Sensors and Systems

Edition 3.0

Bemak

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PEPPERL+FUCHS

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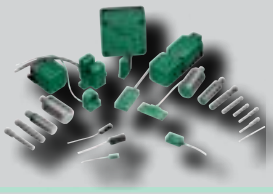
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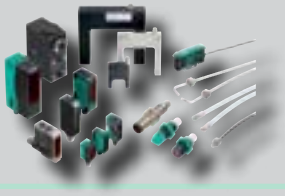
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SENSING YOUR NEEDS



Proximity sensors

1. Inductive sensors
2. Capacitive sensors
3. Magnetic field sensors

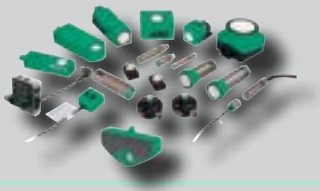
1



Photoelectric sensors

1. Photoelectric sensors/light scanners
2. Distance sensors
3. Contrast sensors/color sensors
4. Light grids
5. Optical data couplers
6. Accessories

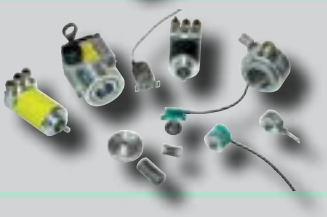
2



Ultrasonic sensors

1. Diffuse mode sensors
2. Thru-beam sensors
3. Sensors for separate evaluation
4. Double sheet sensors
5. Accessories

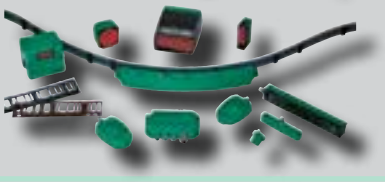
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Rotary encoders

1. Absolute rotary encoders
2. Incremental rotary encoders
3. Cable pulls
4. Accessories
5. Safe Speed Monitor

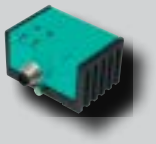
4



Positioning systems

1. Inductive positioning systems
2. Laser distance measurement devices
3. Position encoding system WCS
4. Data Matrix positioning system PCV
5. Electronic cam-operated switch group PAX

5



Inclination and acceleration sensors

1. Inclination sensors
2. Acceleration sensors

6



AS-Interface

1. Masters/gateways
2. Power supplies, power extenders and repeaters
3. Safety at Work
4. Modules
5. Display/operation
6. Accessories

7



RFID identification systems

1. Control interfaces
2. Heads and tags (read/write heads)
3. Handheld devices
4. Accessories

8



Logic control units

1. Counters and displays
2. Process displays
3. Rotational speed and standstill monitors
4. Frequency voltage current converters
5. Sensor end stages/relays

9



Accessories

1. Electric connection technology (connectors and splitters)
2. Sensor testers and tools
3. Mounting accessories
4. Wireless Inductive System WIS

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Over Half a Century of Experience

A pioneer in the development of proximity switches, Pepperl+Fuchs has been manufacturing sensors of the highest quality for over fifty years. With a large number of production facilities and a global network of sales representatives and application specialists, Pepperl+Fuchs is the world's largest manufacturer of electric proximity switches.

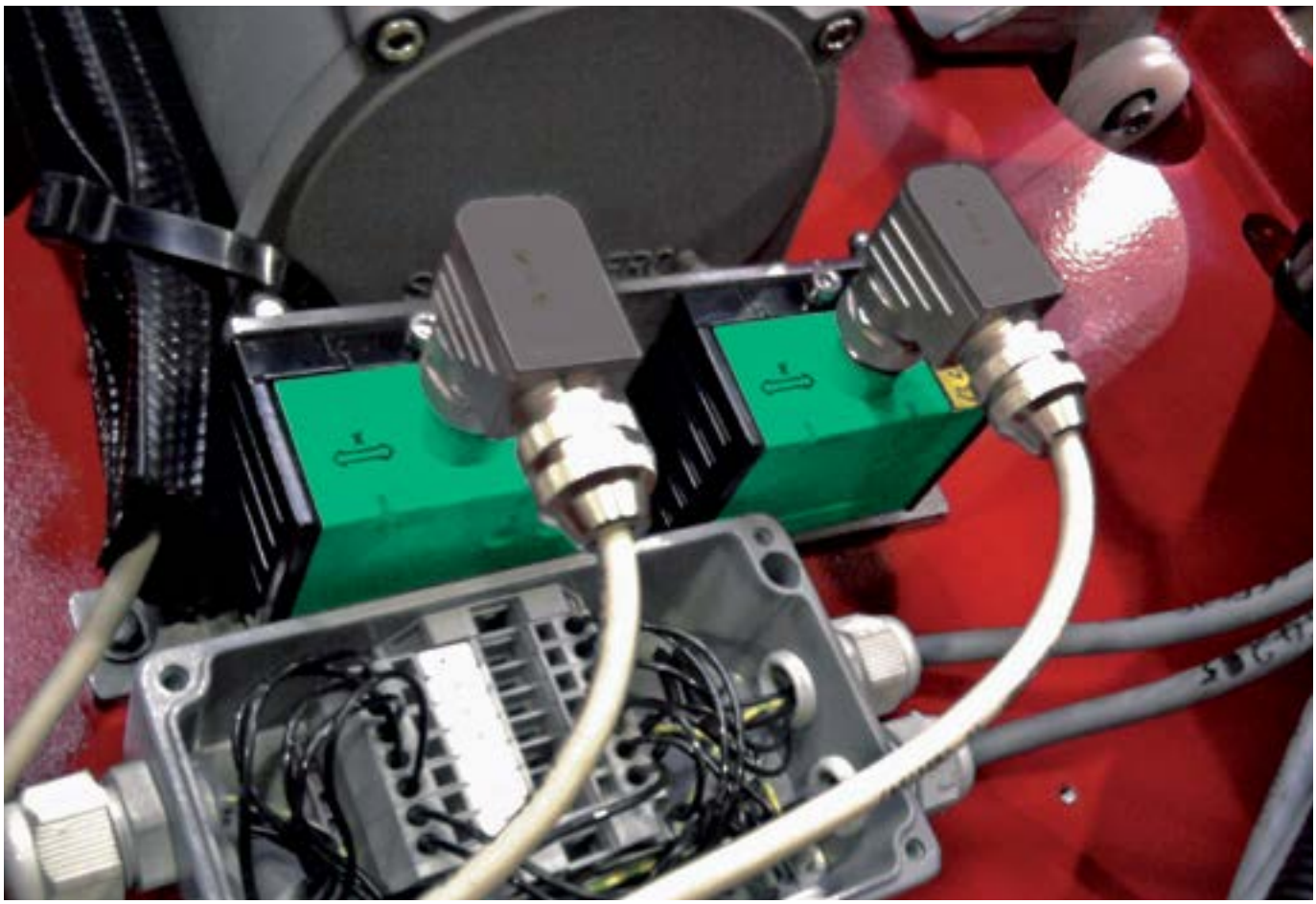
Pepperl+Fuchs endeavors to maintain its high standards of quality and service in compliance with ISO Standard 9001. Our objective of delivering total customer satisfaction means that you have access to excellent products and customer service. Our large team of sales representatives and application specialists are on hand to help you select the best solution for your application. Through the use of modern automated production methods, extensive testing, and intensive research and development, Pepperl+Fuchs stamps its mark of excellence on the development of industrial control solutions.

ISO9001

Sensors from Pepperl+Fuchs meet with uncompromising standards in terms of reliability, functionality, and state-of-the-art technology. We give the utmost priority to high switching accuracy, semiconductor reliability, and waterproofing in the production of our sensors. Each individual sensor undergoes inspections and comprehensive testing to ensure the consistent performance of our products in almost every sector of industry and in all environments.

Application Solutions

In today's highly technological and automated world, the complexity of control systems is continually increasing. Sensors from Pepperl+Fuchs keep pace with the ever-evolving technology and contribute towards increased productivity while reducing costs. Our product portfolio includes over a thousand sensors covering inductive, capacitive, and photoelectric sensors as well as ultrasonic sensors, sensors for special applications, and intrinsically safe proximity switches, offering the ideal solution for virtually every application. When it comes to speed, reliability, and switching accuracy, Pepperl+Fuchs sensors are the preferred choice.



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SENSING YOUR NEEDS

Why Sensors?

- *The typical electromechanical switch has an inadequate service life.*
- *Extremely fast production cycles require high switching frequencies.*
- *Semiconductor sensors are more suitable than mechanical contacts for applications with very weak load currents.*
- *The encapsulated housing design of proximity switches makes them impervious to the negative effects of fluids, vibrations, impacts, dust, dirt, and oil.*
- *The target to be detected is very light and fragile.*
- *The movement of the target is too precise for mechanical switches.*
- *The target must be detected through other objects (e.g., plastic or glass sheets).*

Typical Applications

- Robotics
- Conveyors
- Machine tools
- Counting applications
- Elevators
- Filling level control
- Positioning
- Mobile machinery
- Fairground rides
- Packaging machines
- Anti-lock systems
- Positioning of air and hydraulic cylinders
- Code readers
- Valve setting
- Can crushers
- Door openers and closers
- Printing machines
- Rotational speed detection
- Indexing
- Detection of missing parts
- Edge guide control
- Broken cable detection
- Bottle and can top detection
- Coin payment
- Broken tool detection

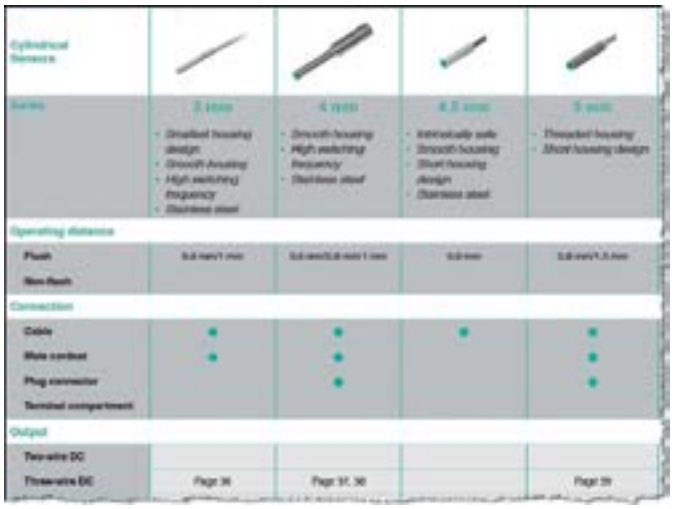


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The Catalog

This compact yet comprehensive catalog presents the entire product portfolio of our Factory Automation division. Throughout the catalog, the table of contents for each section is followed by comprehensive selection tables detailing the most important features of each device series with a direct reference to the product page.

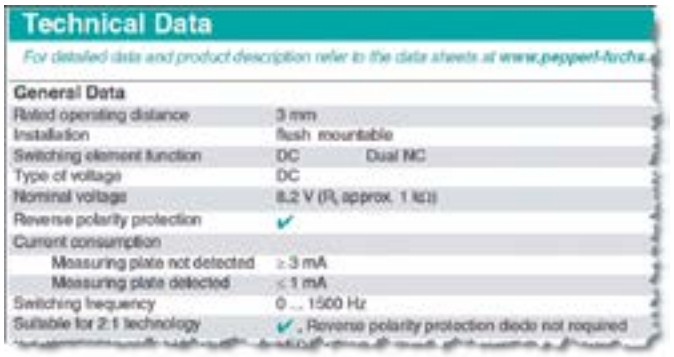
Selection tables:



The selection tables summarize the technical data from the product pages to the key selection criteria, and serve as an important aid for factory planners and designers. Quickly choosing the right product has never been easier.

Product pages

The tables illustrating the technical data on the product pages always start by listing the "Common data" for all the products featured on a page.

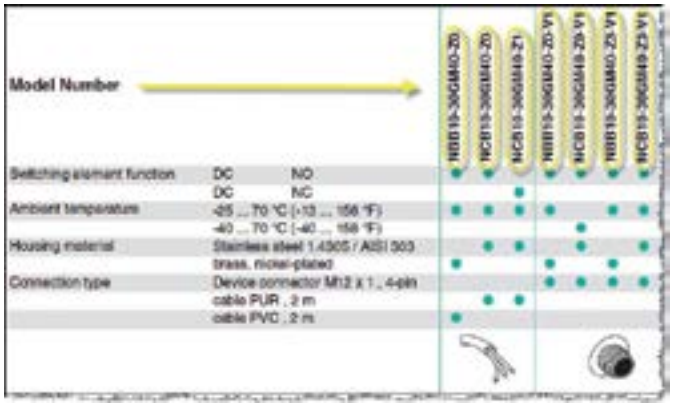


This is followed by a product selection table summarizing the key features that distinguish the illustrated products, enabling you to narrow down your selection and choose a product. The table header contains the full product name for quick reference.

This enables:

- direct and secure ordering for buyers and
- instant access to complete technical documentation such as data sheets, operating instructions, suitable software tools, etc. for technical specialist staff.

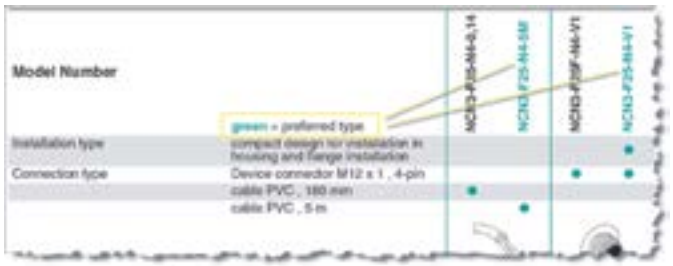
Product selection table:



The technical data is supplemented by a list of approvals and certificates as well as an illustration of the most important device dimensions.

Just a recommendation - preferred types

The wide portfolio of Pepperl+Fuchs offers a huge selection of products that differ even within product families in many details from each other. So the choice of the right product often is not easy. To support you in choosing the right sensor solution, the model numbers of our preferred types are highlighted in this catalog.



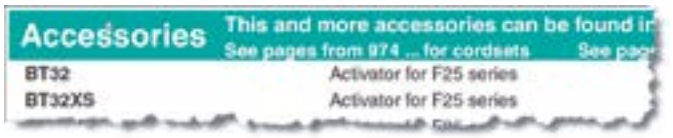
Your benefits with the choice of preferred types are:

- *The suitability for a wide range of applications in all areas of automation technology*
- *High short-term availability*
- *The promise of long-term product availability*

We understand the preferred types as a recommendation and assure you shortterm and long term your replacement needs for the reliable operation of your system.

Accessories

Suitable accessories enable huge potential savings in terms of installation and adjustment. During ongoing operation, they allow for a long service life and high plant availability. A list of accessories and their complete model numbers is included on the product pages.



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The Website

For the most up-to-date and comprehensive product information visit our website **www.pepperl-fuchs.com**.



There are two ways in which you can narrow your search and find the product information you need:

- *To search for information about a specific product, use the **search function.***
- ***To search for a product based on specific features, use the product selector.***

The search function

Enter the product name (if known), part of the product name (e.g., from the catalog), or a part number (e.g., from the type label of a product you have already purchased) in the search field on our website. The search function is not case sensitive. You can also carry out a wildcard search using *.



Depending on the completeness of the product name or part number you entered, the search result displays a hit list with a short description of each product from which you can select the required product.

The product selector

Use the product selector to navigate to the required product group.



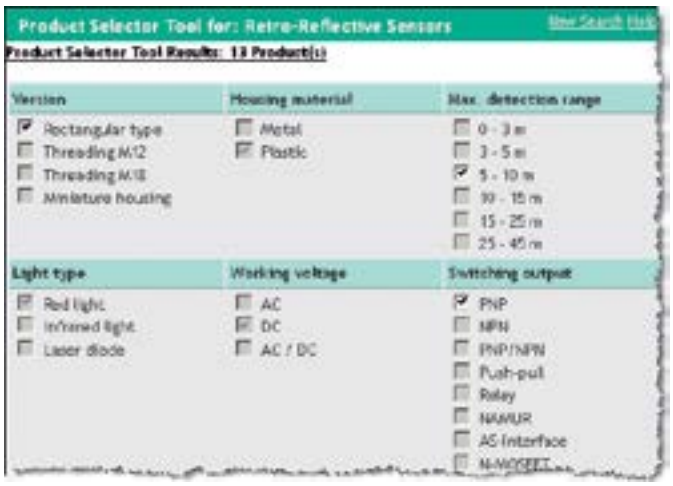
Here, you can choose a product from a list of products



or on the basis of product features.



Now select the required product feature. Each time you make a selection, the number of products that meet the criteria is displayed. The more features you define, the fewer suitable products will be displayed.
Finally, click on
Product Selector Tool Results: xxx product(s)
to access the product list and view the required product.



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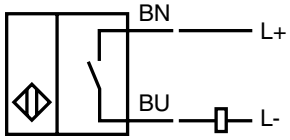
Sensor Connections/Sensor Outputs

Pepperl+Fuchs provides sensors that can be operated with AC and/or DC supply voltages.
The following list provides an overview.

Two-wire DC sensors

These are operated in series with the load. Most are voltage polarity independent (function independent of connection polarity) and are predominantly short-circuit proof, while others offer reverse polarity protection (function only with correct polarity, otherwise the proximity switch remains at high impedance) and are short-circuit proof. While in a locked state, a low leakage current flows due to their functional properties. While in switched state, a minor voltage drop occurs at the switch.

Switching example:

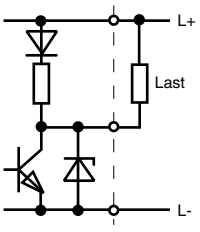


The model number for sensors of this type includes the reference -Z. Two-wire sensors are supplied as:

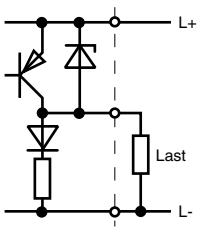
- *NO contact (Z/Z0, Z3, Z4),*
- *NC contact (Z1, Z5),*
- *Programmable wiring (Z2).*

Three-wire DC sensors

These sensors have separate connections for the power supply and the load. They are overload protected, short-circuit proof, and reverse polarity protected. The leakage current is negligible.
This group is divided into switched high (PNP) sensors and switched low (NPN) sensors. Depending on the type of sensor, the load is connected between output and 0 V or between the output and +U_B.



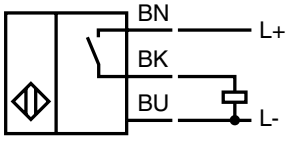
NPN



PNP

Due to the type of end stage transistor, switched low end stages are often referred to as NPN end stages, and switched high end stages are referred to as PNP end stages.

Switching example:



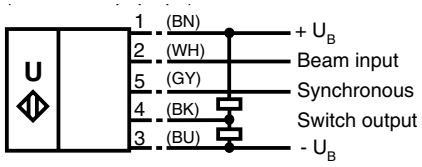
The model number for the vast majority of this type of sensor includes the reference -E.
Sensors of this type are supplied as:

- *NPN NO contact (E or E0),*
- *NPN NC contact (E1),*
- *PNP NO contact (E2),*
- *PNP NC contact (E3),*
- *NPN NO/NC contact convertible (E4)*
- *PNP NO/NC contact convertible (E5).*
- *PNP NO contact, dual channel (E8)*

DC sensors, push-pull

These proximity switches are equivalent to the E-types, although the output is fitted with both a PNP and an NPN transistor. This enables the load to be switched between the output cable and +UB or -UB. A push-pull output combines the properties of a PNP and an NPN output.

Switching example:



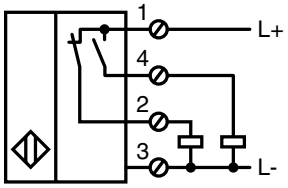
Sensors with push-pull output are included in:

- *Photoelectric sensors*
- *Ultrasonic sensors*
- *Incremental rotary encoders.*

Four-wire DC sensors

These proximity switches are equivalent to E-types, although they are fitted with an NC contact output and an NO contact output.

Switching example:



:

The model number for this type of sensor includes the reference -A. They are supplied as:

- *NPN NC/NO contacts (A or A0).*
- *PNP NC/NO contacts (A2)*

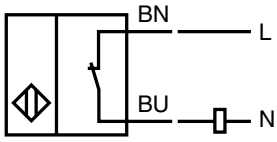
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Two-wire AC sensors

These are operated in series with the load. While in locked state, a low leakage current flows due to their functional properties and a voltage drop occurs at the conducting switch.

Switching example:



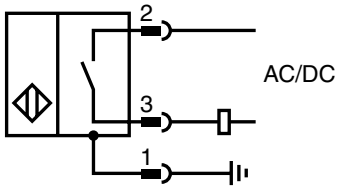
The model number for this type of sensor includes the reference -W. They are supplied as:

- *NC contact (WÖ),*
- *NO contact (WS),*
- *NC contact or NO contact (W) (programmable wiring).*

Two-wire universal current sensors

These are operated in series with the load. They can be connected to either direct current or alternating current supply voltages. They are overload protected and short-circuit proof. While in locked state, a low leakage current flows due to their functional properties and a voltage drop occurs at the conducting switch.

Switching example:

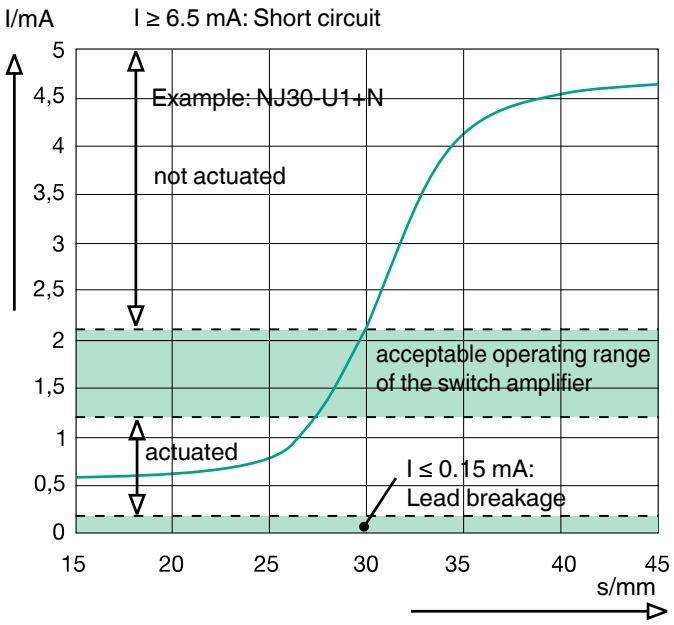


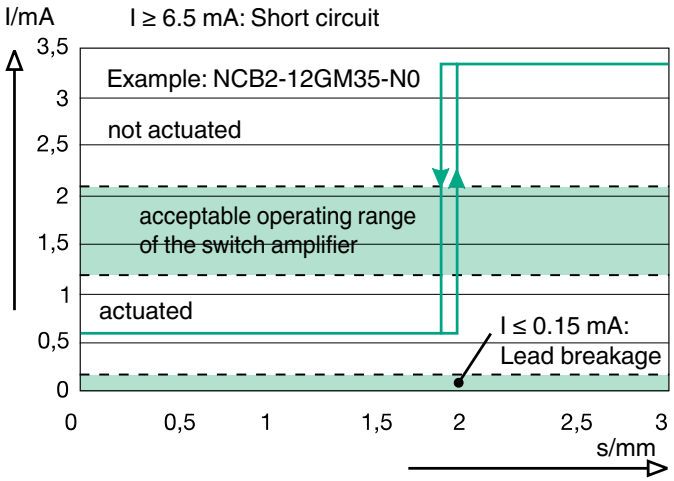
The model number for this type of sensor includes the reference -U. They are supplied as:

- *NC contact (UÖ),*
- *NO contact (US),*
- *NC contact or NO contact (U) (programmable wiring).*

Two-wire NAMUR sensors

NAMUR sensors (Normenarbeitsgemeinschaft für Mess- und Regelungstechnik der chemischen Industrie) manufactured in accordance with EN 60947-5-6 (VDE 0660 Part 212) are two-wire sensors that have a constant (type N) or non-constant (type N0) travel/current characteristic.



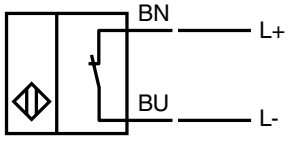


The model number for this type of sensor includes the reference -N or -N0.
They are supplied as:

- *NC contact (N/N0),*
- *NO contact (1N),*
- *Dual channel NC contact (N4).*

NAMUR sensors are connected to external switch amplifiers that convert the current variation into a binary output signal.

Switching example:



Pepperl+Fuchs GmbH offers a range of switch amplifiers for NAMUR sensors for use in hazardous and nonhazardous applications.

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Two-wire NAMUR photoelectric safety sensors

These proximity switches are equivalent to NAMUR sensors, although they behave in a particular way: in the case of a system sensor/control unit/extension cable malfunction, the output of the control unit automatically goes to the safe "OFF" state.

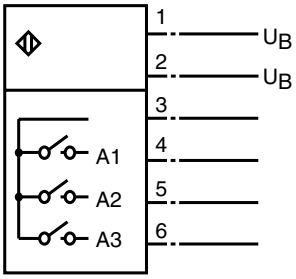
The model number for this type of sensor includes the reference -SN or S1N. They are supplied as:

- *NC contact (SN)*
- *NO contact (S1N).*

Sensors with relay contact output

Some sensors have relay contact outputs. The maximum switching power and the type of voltage can be found in the respective data sheets. The mechanical service life data relates to the number of switching cycles for the unloaded relay contact output. This value is achieved with a low electric contact load. Under nominal load for the contacts, it reduces to the value specified for the electrical life. The service life details are MTBF values.

Switching example:



Three-wire DC analog sensors

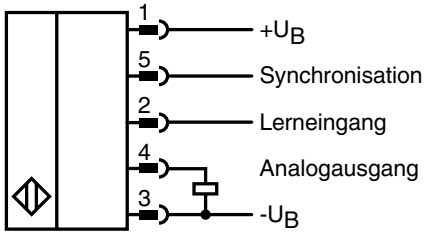
These sensors have separate connections for the power supply and the output. An analog signal that is proportional to the measured quantity can be tapped at the output. The most widely used analog signals are 4 mA ... 20 mA and 0 V ... 10 V.

Examples of the measured quantity include the object distance, an inclination angle, a filling level, a valve position, or an acceleration value.

Most analog sensors have a parameterization option that enables the output to be optimally adapted to the conditions in the application.

Analog sensors often also have switching outputs for signaling trip values (see Three-wire DC sensors).

Switching example:



The model number for this type of sensor includes the reference -I or -U. They are supplied as:

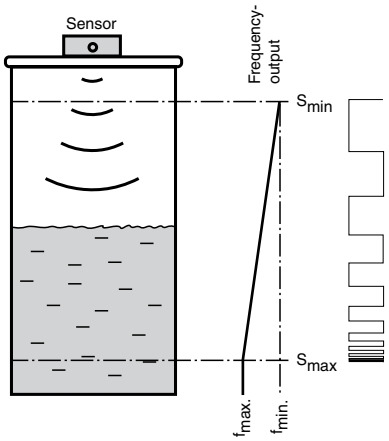
- *Current output, e.g., 4 mA ... 20 mA (I)*
- *Voltage output, e.g., 0 V ... 10 V (U)*
- *Current/voltage output with independent load detection and function changeover (IU).*

Three-wire DC sensors with frequency output

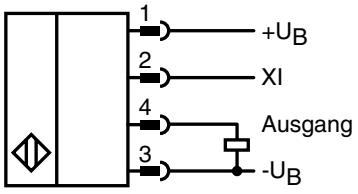
These kinds of sensors (primarily ultrasonic sensors) indicate the measured quantities within the detection area in the form of a rectangular signal with variable frequency. For example, when the fill level is S_{min} the frequency output supplies the lowest frequency value; when the fill level is S_{max} it supplies the highest frequency. The frequency characteristic runs in a straight line between the measurement range limits.

These sensors are also analog sensors with an output signal that can be processed directly by the digital input of a control unit.

Application example:



Switching example:



The model number for this type of sensor includes the reference -F.

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Sensor Interfaces

Many sensors from Pepperl+Fuchs have a digital interface on its own or in addition to binary or analog outputs.

Sensors with RS232 interface

The RS232 interface enables communication with the interface during operation. However, this interface is primarily designed for parameterizing extensive sensor functions. Many of our ultrasonic sensors are fitted with this type of interface.

Sensors with USB interface

Generally, what applies to the RS232 interface also applies to the USB interface. It is essentially designed for parameterizing extensive sensor functions.

Sensors with a parallel interface

The process value is issued by the sensor via parallel data lines. A separate line is required for each bit of the data word.
Pepperl+Fuchs supplies ultrasonic sensors, optical data couplers, and rotary encoders with a parallel interface.

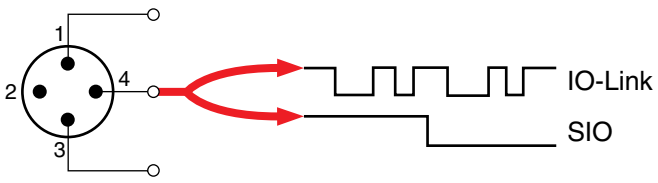
Sensors with SSI interface

The SSI interface (Synchronous Serial Interface) is a unidirectional interface for the rapid transfer of process data from the sensor to the control unit. The telegram length is always 25 bits.
Sensors with SSI interface are included in:

- *Absolute rotary encoders*
- *Data Matrix positioning systems PCV*
- *Position encoding system WCS*
- *Laser distance measurement devices*

Sensors with IO-Link

IO-Link is a point-to-point communication system.
Sensors with IO-Link are fully downward compatible with binary sensors with a switching output. If no IO Link master is connected to the sensor, the sensor operates in SIO mode with a conventional switching output. An IO-Link sensor can therefore be integrated into existing systems without restriction.
If the sensor detects a connected IO-Link master when it is switched on, it operates in IO-Link communication mode.



All the features of this modern interface technology are available in communication mode:

- *Parameterizing the sensor functions*
- *Reading out process data*
- *Transferring diagnostics data*

When using IO-Link, you also benefit from:

- *Reduction in the number of versions–one IO-Link sensor replaces a number of sensors with different end stages*
- *Reduction in machine downtime due to differentiated diagnostics*
- *Calling up of diagnostic information during operation as a means of preventative maintenance*
- *Reduction in project planning and installation costs thanks to a standardized interface*
- *Simple three-core cable to connect all sensors*
- *IO-Link master enables different sensor types–even simple binary sensors–to be connected.*

Bus-compatible sensors

AS-Interface sensors

These sensors are connected directly to the AS-Interface bus. The communicative ability of these devices supports enhanced functionality.
AS-Interface sensors are included in the following product areas

- *Inductive sensors*
- *Photoelectric sensors*
- *Rotary encoders.*

Binary standard sensors can be connected to AS-Interface via AS-Interface modules.

Additional bus systems and networks

Sensor products with extensive features and high data transmission volumes in particular are fitted with bus and network-compatible communication interfaces. Pepperl+Fuchs offers sensor products for all standard field bus systems.

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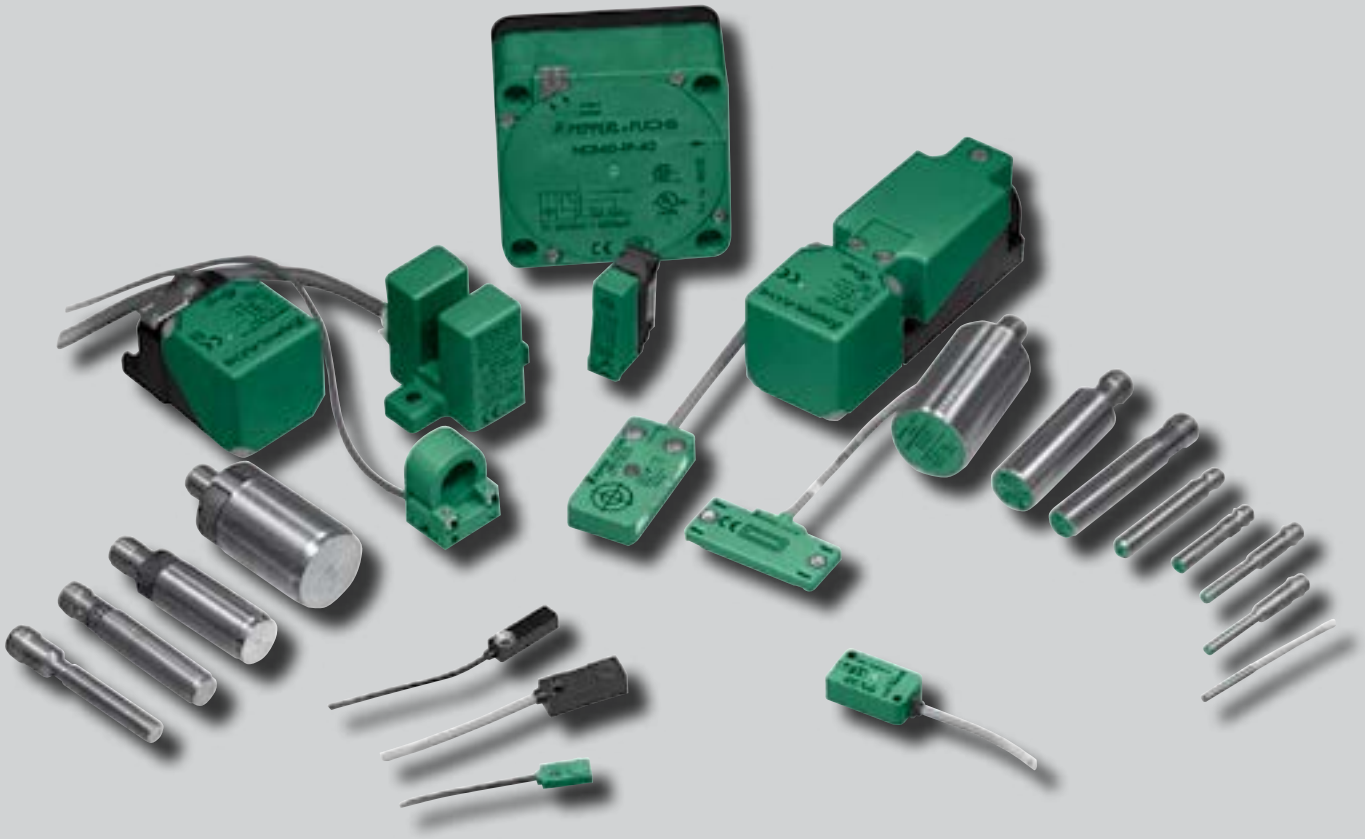
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1 Proximity Switches

1.1 Inductive Sensors

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Cylindrical Sensors					
Series	**3 mm**	**4 mm**	**4.5 mm**	**5 mm**	
	• *Smallest housing design* • *Smooth housing* • *High switching frequency* • *Stainless steel*	• *Smooth housing* • *High switching frequency* • *Stainless steel*	• *Intrinsically safe* • *Smooth housing* • *Short housing design* • *Stainless steel*	• *Threaded housing* • *Short housing design*	
Operating distance					
Flush	0.6 mm/1 mm	0.6 mm to 1.5 mm	0.8 mm	0.8 mm/1.5 mm	
Non-flush					
Connection					
Cable	●	●	●	●	
Male cordset	●	●		●	
Plug connector		●		●	
Terminal compartment					
Output					
Two-wire DC					
Three-wire DC	Page 36	Page 37, 38		Page 39	
Four-wire DC					
Two-wire AC					
Three-wire AC					
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Analog output					
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NAMUR with safety function					
AS-Interface					
Special features					
Weld-immune					
Reduction factor 1					
Metal face					
With e1 certification					
Extended temperature range					
Pressure-resistant					
Hazardous applications approval (3G,3D)					

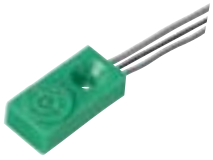
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					Cylindrical Sensors
	6.5 mm	**8 mm**	**11 mm**	**12 mm**	Series
	• *Smooth housing* • *PNP, NPN, and NAMUR types*	• *Threaded housing* • *Plug and cable versions*	• *Intrinsically safe* • *Smooth housing or with M14 metal thread*	• *Large selection of analog outputs, housing lengths, and materials*	
					Operating distance
	1.5 mm to 3 mm	1.5 mm to 4 mm	2 mm	2 mm to 6 mm	**Flush**
	3 mm/6 mm	2 mm to 6 mm	5 mm	4 mm to 10 mm	**Non-flush**
					Connection
	●	●	●	●	**Cable**
					Male cordset
	●	●		●	**Plug connector**
					Terminal compartment
					Output
		Page 46 ff		Page 59 ff	**Two-wire DC**
	Page 40 ff	Page 48 ff		Page 61 ff	**Three-wire DC**
		Page 49 ff		Page 65 ff	**Four-wire DC**
				Page 76 ff	**Two-wire AC**
					Three-wire AC
				Page 78	**Two-wire AC/DC**
				Page 79	**Analog output**
	Page 152	Page 153	Page 154	Page 155 ff	**NAMUR**
			Page 165	Page 166	**NAMUR with safety function**
				Page 170	**AS-Interface**
					Special features
		Page 124, 129 ff		Page 125, 129 ff	**Weld-immune**
	Page 119	Page 120, 129		Page 121, 129	**Reduction factor 1**
		Page 130 ff		Page 130, 132	**Metal face**
				Page 135 ff	**With e1 certification**
		Page 50		Page 65, 67, 70	**Extended temperature range**
				Page 142	**Pressure-resistant**
		Page 145		Page 146 ff	**Hazardous applications approval (3G,3D)**

Cylindrical Sensors					
Series	**14 mm**	**18 mm**	**22 mm**	**30 mm**	
	• *Pressure-resistant to 500 bar* • *Stainless steel*	• *Vast selection* • *Wide detection ranges* • *Types for all applications*	• *Intrinsically safe* • *Smooth housing or with PG21 metal thread*	• *Vast selection* • *Very wide detection ranges* • *Types for all applications*	
Operating distance					
Flush	3 mm	5 mm to 12 mm	6 mm	10 mm to 22 mm	
Non-flush		8 mm to 20 mm	10 mm	15 mm to 40 mm	
Connection					
Cable		●	●	●	
Male cordset					
Plug connector	●	●		●	
Terminal compartment					
Output					
Two-wire DC		Page 80 ff		Page 96 ff	
Three-wire DC	Page 143	Page 84 ff		Page 100 ff	
Four-wire DC		Page 85 ff		Page 101 ff	
Two-wire AC		Page 92 ff		Page 113 ff	
Three-wire AC					
Two-wire AC/DC		Page 94		Page 116 ff	
Analog output		Page 95		Page 118	
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NAMUR with safety function		Page 167	Page 168	Page 169	
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Reduction factor 1		Page 122, 129		Page 123	
Metal face		Page 130, 133		Page 130, 134	
With e1 certification		Page 137 ff		Page 139	
Extended temperature range		Page 85, 88, 140		Page 108, 141	
Pressure-resistant	Page 143	Page 144, 159			
Hazardous applications approval (3G,3D)		Page 148 ff		Page 150 ff	

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				**Cylindrical Sensors**
	30 mm	**40 mm**	**50 mm**	**Series**
	• *Plastic housing* • *Terminal compartment*	• *Intrinsically safe* • *Smooth housing* • *Terminal compartment*	• *Intrinsically safe* • *Cylindrical plastic installation housing*	
				Operating distance
	10 mm			**Flush**
	15 mm	20	25 mm	**Non-flush**
				Connection
			●	**Cable**
				Male cordset
				Plug connector
	●	●		**Terminal compartment**
				Output
				Two-wire DC
				Three-wire DC
	Page 103, 109			**Four-wire DC**
	Page 115			**Two-wire AC**
				Three-wire AC
				Two-wire AC/DC
				Analog output
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				NAMUR with safety function
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				Special features
				Weld-immune
				Reduction factor 1
				Metal face
				With e1 certification
				Extended temperature range
				Pressure-resistant
				Hazardous applications approval (3G,3D)

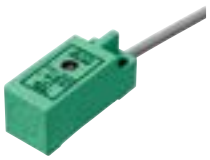
Rectangular Sensors					
Series	**F76**	**F29**	**F79**	**V3**	
	• *Plastic housing 25 x 8 x 5.5 mm*	• *Plastic housing 27 x 10 x 6 mm*	• *Plastic housing 16 x 8 x 4 m*	• *NAMUR versions, can be used to SIL2*	
Operating distance					
Flush	2 mm	2 mm	1.5 mm	2 mm to 3 mm	
Non-flush		4 mm		4 mm	
Connection					
Cable	●	●	●	●	
Male cordset			●		
Plug connector				●	
Terminal compartment					
Output					
Two-wire DC				Page 174	
Three-wire DC	Page 171	Page 172	Page 173	Page 175 ff	
Four-wire DC		Page 172			
Two-wire AC					
Three-wire AC					
Two-wire AC/DC					
Analog output					
NAMUR				Page 242	
NAMUR with safety function					
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Weld-immune		Page 219			
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With e1 certification					
Extended temperature range					
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				**Rectangular Sensors**
	F141/F41/F41A	**F1**	**F2**	**Series**
	• *Miniature metal housing 25 x 5 x 5 mm (F141) 40 x 8 x 8 mm (F41..)*	• *Plastic housing 26 x 12 x 40 mm* • *Can be connected in series*	• *Sensors for stop screws*	
				Operating distance
	0.8 mm to 3 mm	2 mm to 4 mm	1.5 mm	**Flush**
		8 mm		**Non-flush**
				Connection
	●	●	●	**Cable**
				Male cordset
	●	●	●	**Plug connector**
				Terminal compartment
				Output
				Two-wire DC
	Page 177 ff	Page 180, 182	Page 185	**Three-wire DC**
		Page 181, 183		**Four-wire DC**
				Two-wire AC
				Three-wire AC
		Page 184		**Two-wire AC/DC**
				Analog output
				NAMUR
				NAMUR with safety function
				AS-Interface
				Weld-immune
				Reduction factor 1
				With e1 certification
				Extended temperature range
				Hazardous applications approval (3G,3D)

Rectangular Sensors					
Series	**F7**	**F9**	**F10**	**F11**	
	• *Plastic housing 28 x 17 x 17 mm*	• *Plastic housing 38.5 x 16 x 16.5 mm*	• *Plastic housing 38.5 x 25 x 25 mm*	• *Plastic housing 52.5 x 30 x 30.5 mm*	
Operating distance					
Flush		5 mm	7 mm		
Non-flush	5 mm		7 mm to 10 mm	15 mm	
Connection					
Cable	●	●	●	●	
Male cordset					
Plug connector		●	●	●	
Terminal compartment					
Output					
Two-wire DC					
Three-wire DC	Page 186	Page 187	Page 188 ff	Page 190	
Four-wire DC					
DC, relay					
Two-wire AC					
Three-wire AC					
Two-wire AC/DC					
Analog output					
NAMUR					
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AS-Interface					
Special features					
Weld-immune					
Reduction factor 1					
With e1 certification					
Extended temperature range					
Hazardous applications approval (3G,3D)					

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					**Rectangular Sensors**
	F104M	**F33/F33M**	**F148**	**F35**	**Series**
	• *Compact metal housing 32 x 20 x 8 mm*	• *Plastic or metal housing available*	• *Robust metal housing*	• *Sensor head can be used up to 250 °C* • *Suitable for drag chains*	
					Operating distance
	7 mm	5 mm to 8 mm	8mm to 15 mm	20 mm to 25 mm	**Flush**
		10 mm			**Non-flush**
					Connection
	●	●	●		**Cable**
	●	●	●		**Male cordset**
				●	**Plug connector**
					Terminal compartment
					Output
					Two-wire DC
		Page 192 ff	Page 232		**Three-wire DC**
	Page 191	Page 192 ff		Page 236	**Four-wire DC**
			Page 232		**DC, relay**
					Two-wire AC
					Three-wire AC
					Two-wire AC/DC
					Analog output
					NAMUR
					NAMUR with safety function
					AS-Interface
					Special features
					Weld-immune
					Reduction factor 1
		Page 231	Page 232		**With e1 certification**
				Page 236	**Extended temperature range**
					Hazardous applications approval (3G,3D)

Rectangular Sensors				
Series	**M1K**	**L2/L3 VariKont-L**	**U1/U4 VariKont**	
	• *Terminal compartment* • *Adjustable sensor head*	• *Quick-mount lock* • *4 LED indication*	• *Terminal compartment* • *4 LED indication* • *Plastic or metal sensor base*	
Operating distance				
Flush		20 mm	20 mm	
Non-flush	15 mm	40 mm	40 mm	
Connection				
Cable				
Male cordset				
Plug connector		●	●	
Terminal compartment	●		●	
Output				
Two-wire DC	Page 194	Page 197	Page 201	
Three-wire DC	Page 195	Page 198 ff	Page 202 ff	
Four-wire DC	Page 195	Page 198 ff	Page 203 ff	
Two-wire AC	Page 196		Page 206	
Three-wire AC			Page 207	
Two-wire AC/DC		Page 200	Page 208	
Analog output				
NAMUR	Page 243	Page 244	Page 245	
NAMUR with safety function			Page 247	
AS-Interface		Page 249	Page 250	
Special features				
Weld-immune		Page 220 ff, 228	Page 202,225	
Reduction factor 1		Page 227 ff	Page 229	
With e1 certification		Page 233 ff	Page 235	
Extended temperature range		Page 198 ff	Page 203 ff	
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				**Rectangular Sensors**
	FP	**FPS**	**F23**	**Series**
	• *Terminal compartment in sensor base* • *Plastic or metal sensor base*	• *Terminal compartment in sensor base* • *Plastic housing 77 x 60 x 41 mm*	• *100 mm operating distance* • *Plastic housing 117 x 117 x 60.5 mm*	
				Operating distance
	50 mm	25 mm		**Flush**
	50 mm	30 mm	100 mm	**Non-flush**
				Connection
				Cable
				Male cordset
	●		●	**Plug connector**
	●	●		**Terminal compartment**
				Output
	Page 209			**Two-wire DC**
	Page 210	Page 215	Page 217	**Three-wire DC**
	Page 210 ff	Page 215		**Four-wire DC**
	Page 212 ff			**Two-wire AC**
				Three-wire AC
		Page 216	Page 218	**Two-wire AC/DC**
	Page 214			**Analog output**
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	Page 248			**NAMUR with safety function**
				AS-Interface
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	Page 226, 230			**Weld-immune**
	Page 230			**Reduction factor 1**
				With e1 certification
				Extended temperature range
	Page 241			**Hazardous applications approval (3G,3D)**

Slot Sensors



Slot width	2 mm	3.5 mm	5 mm	10 mm	15 mm	30 mm
	• *LED* • *Can be used up to SIL2/SIL3*	• *LED* • *Can be used up to SIL2/SIL3*	• *Can be used up to SIL2*	• *Can be used up to SIL2*	• *Wide slot width*	• *Very wide slot width*
Connection						
Cable	●	●	●	●	●	●
Male cordset						
Plug connector					●	●
Terminal compartment						
Output						
Two-wire DC						
Three-wire DC		Page 251		Page 252	Page 253	
Four-wire DC		Page 251			Page 253	Page 254
Two-wire AC					Page 255	
Three-wire AC						
Two-wire AC/DC						
Analog output						
NAMUR	Page 256	Page 257	Page 258	Page 259	Page 259	Page 259
NAMUR with safety function	Page 260	Page 261				
AS-Interface						
Special features						
Weld-immune						
Reduction factor 1						
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Hazardous applications approval (3G,3D)						

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Ring Sensors





	10 mm / 20 mm	10 mm	15 mm	21 mm / 43 mm	Ring width
	• *Special design for welding clamp monitoring* • *Easy configuration by Teach-In*	• *Bistable function for rotation direction monitoring* • *NAMUR versions*	• *Bistable function for rotation direction monitoring* • *NAMUR versions*	• *Wide ring diameter*	
Connection					
		●	●	●	**Cable**
					Male cordset
	●				**Plug connector**
					Terminal compartment
Output					
					Two-wire DC
	Page 262			Page 263	**Three-wire DC**
					Four-wire DC
					Two-wire AC
					Three-wire AC
					Two-wire AC/DC
					Analog output
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					NAMUR with safety function
					AS-Interface
Special features					
					Weld-immune
					Reduction factor 1
					With e1 certification
					Extended temperature range
					Hazardous applications approval (3G,3D)

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Double sensors for valve actuators			
Series	**F25**	**F31/F31K**	**F31K2**
	• *Direct mounting on standard drives* • *NAMUR versions can be used up to SIL3*	• *Direct mounting on standard drives* • *Valve connection*	• *Direct mounting on standard drives* • *Valve connection* • *Best protection for use under harsh environtmental conditions*
Operating distance			
Flush mountable	3 mm	3 mm	3 mm
Non-flush			
Connection			
Cable	●	●	
Male cordset			
Plug connector	●	●	
Terminal compartment		●	●
Output			
Two-wire DC	Page 267	Page 269, 272	
Three-wire DC	Page 268	Page 270, 273	Page 274
Four-wire DC			
Two-wire AC			
Three-wire AC			
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PEPPERL+FUCHS SENSING YOUR NEEDS



Position sensors for clamping systems

F58	Series
• *2 independent oscillators* • *Very bright display LEDs* • *90° adjustable connector*	
	Operating distance
2 mm	**Non-flush**
	Connection
●	**Plug connector**
	Output
Page 284	**Three-wire DC 2 x PNP, NO contact**
Page 284	**Three-wire DC 2 x NPN, NO contact**
	Special features
●	**Weld-immune**



Rotational speed monitors

U1 *VariKont*	Series
• *Adjustable rotational speed limits* • *Start-up override time approx. 30 s* • *Display LEDs for switching state and attenuation*	
	Operating distance
15 mm	**Flush**
	Non-flush
	Connection
●	**Terminal compartment**
	Output
Page 285	**Three-wire DC PNP, NO contact**
Page 286	**Three-wire AC NO contact**

Choosing the Right Sensor in Five Steps

First of all, decide which sensor principle is suitable. This depends on the material of the object to be detected.

If the object is metal, we recommend an inductive sensor.

If the object is plastic, paper or fluid (oil or water-based), granular or powder, we recommend a capacitive sensor.

If the object contains a magnet, a magnetic field sensor is suitable.

You can find more background information on the physical effect of the different types of proximity switches at the start of each relevant chapter.

Find the ideal sensor for your application in five steps:

- *Step 1: Housing design*
- *Step 2: Operating distance*
- *Step 3: Mounting conditions*
- *Step 4: Electric data and connections*
- *Step 5: General specification and special features*

Step 1: Housing design

Rectangular sensors



This housing design introduced by Pepperl+Fuchs GmbH under the brand names VariKont and VariKont M has the mounting hole arrangement (housing designs IC30 and IC40) defined in European standard EN 60947. This arrangement is the same as for mechanical position limit switches. The VariKont comprises a stable basic housing (PBT or metal) that is screwed to the mounting surface and contains the terminals. The PBT add-on part is sealed against the basic housing with a neoprene seal and contains the encoded connector. The add-on part contains the switch amplifier. The sensor head can be adjusted in five directions, i.e., the active area can be aligned forwards, to the right, to the left, upwards, or downwards.

The main difference between the VariKont and VariKont M types is their dimensions, and this product can also be supplied with V1 connectors in addition to terminals.

The *VariKont L* type does not have a terminal compartment, making it extremely compact so that it can be mounted using only a screwdriver. The active area can be adjusted in increments of 15° within two planes and is connected via cable or a V1 connector.

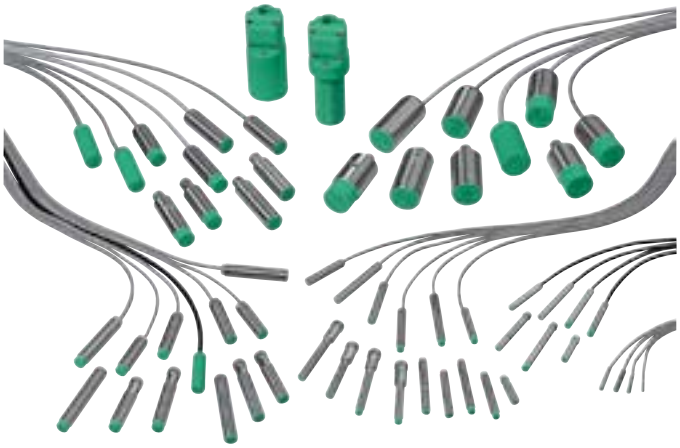
Type	Dimensions (front) mm	Settings (head)
VariKont	40 x 40 or 55 x 55	Adjustable by 90°
VariKont M	30 x 30	Adjustable by 90° and in increments of 15°
VariKont L	40 x 40	Adjustable by 90° and in increments of 15°

Area switches (FP)



These block-shaped sensors have a large front area (80 mm x 80 mm) and therefore a long operating distance. They are comprised of two parts. The lower part contains the terminal compartment and the top contains the male pin and the sensor element along with the electronics, which are vacuum encapsulated in casting resin. The top is always made from PBT and the bottom can be made from either PBT or cast metal. They conform with the mounting hole arrangement (housing design ID80) defined in European standard EN 60947.

Cylindrical sensors



Their active area is on the front face in the axial direction. They are available in diameters from 3 mm (no thread) or 4 mm (with thread) to 30 mm (with thread) or 40 mm smooth (with terminal housing).

Surface mount proximity switches

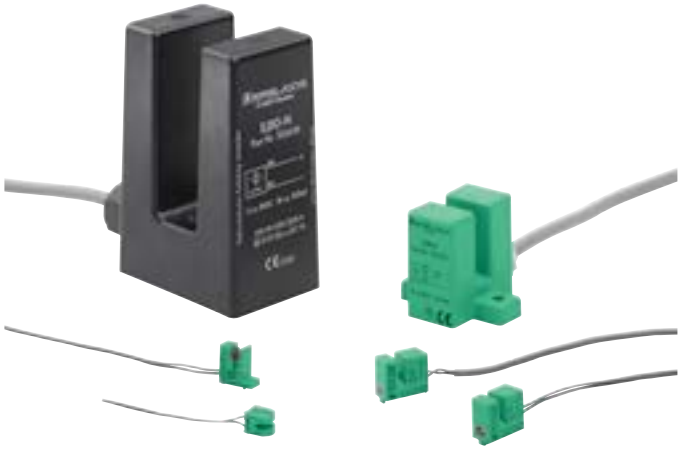


These small proximity switches are mounted to the required surface. Different versions are available with the active zone aligned upwards or forwards.

The housing is usually made of PBT.

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Slot-shaped inductive proximity switches



These have a U-shaped housing made out of PBT. The electromagnetic AC field is generated between two coils that are positioned opposite each other in the sides of the U. The switching element function is triggered when the object (metallic switching target) appears in the area between the coils.

Ring-shaped inductive proximity switches



These proximity switches are designed as a ring. The electromagnetic AC field is concentrated inside the ring. The switching element function is triggered when a metallic object moves into the ring.

The housing is made of PBT.

Inductive PMI positioning systems



Based on the very precise evaluation of multiple coil systems, inductive positioning systems F90, F110, and F112 are able to determine exact positions along linear travel ranges. The PMI360D inductive positioning system is optimized for continual angle determination on valve actuators and valves. Inductive positioning systems are included in Section 5 from page 758.

Step 2: Operating distance

The operating distance is the most important parameter for a proximity switch. It primarily depends on the sensor diameter (coil or capacitor). The dimensions and material composition of the actuator as well as the ambient temperature are also influencing factors. For magnetic proximity switches, the alignment and field strength of the magnets used must also be taken into account.

Definition of the operating distance

Standard EN 60947-5-2 defines the operating distance for all types of proximity switch other than slot and ring-shaped housing designs.

There are two options for actuating a proximity switch:

- Through an axial approach
- Through a radial approach

The following definitions apply first of all to axial actuation.

Rated operating distance s_n

The rated operating distance (according to EN 60947-2-5 "Rated Sensing Range") is a conventional size for defining the operating distance. It neither takes into account production tolerances nor changes through external influences such as voltage and temperature.

Standard measuring plate

The following operating distances are determined using a standard measuring plate. This plate is square with a thickness of 1 mm and is made of steel, e.g., type FE 360 (ST37) with a smooth surface.

Its side lengths are either

- 1 x inner circle diameter of the active area or
- 3 x s_n.

The greater value applies in each case. The standard measuring plate must be grounded for capacitive proximity switches.

Example 1:

M18 proximity switch
5 mm operating distance
3 x operating distance = 15 mm < diameter

Therefore, the actuator dimensions must be 18 x 18 x 1 mm

Example 2:

M18 proximity switch
8 mm operating distance
3 x operating distance = 24 mm

Therefore, the actuator dimensions must be 24 x 24 x 1 mm

This standard measuring plate is the optimal actuator for the operation.

A reduction in the dimensions or change in material composition reduces the operating distance.

Actual operating distance s_r

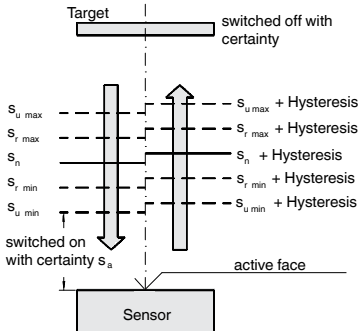
The operating distance of an individual proximity switch measured at ambient temperature of 23 ± 5 °C, at a voltage within the operating voltage range and the defined mounting conditions:

$0.9 \cdot s_n \le s_r \le 1.1 \cdot s_n$

Usable operating distance s_u

The operating distance of an individual proximity switch, measured at an ambient temperature range between -25 °C and +70 °C, with a supply voltage between 85% and 110% of the rated operational voltage:

$0.9 \cdot s_r \le s_u \le 1.1 \cdot s_r$



Assured operating distance s_a

Distance from the active area where actuation of the proximity switch is assured under defined conditions:

$0 < sa \leq 0.81 \cdot s_n$

Repeatability R

Change in the actual operating distance sr, measured over a period of eight hours at a housing temperature of 23 ± 5 °C, any level of relative humidity and a supply voltage of Ue ± 5% or any voltage within the rated operational voltage range ± 5%:

$R \leq 0.1 \cdot s_r$

Hysteresis H

Distance between the trip points when the measuring plate approaches and moves away from the proximity switch. It is specified relative to the actual operating distance sr, measured at an ambient temperature of 23 ± 5 °C and rated operational voltage:

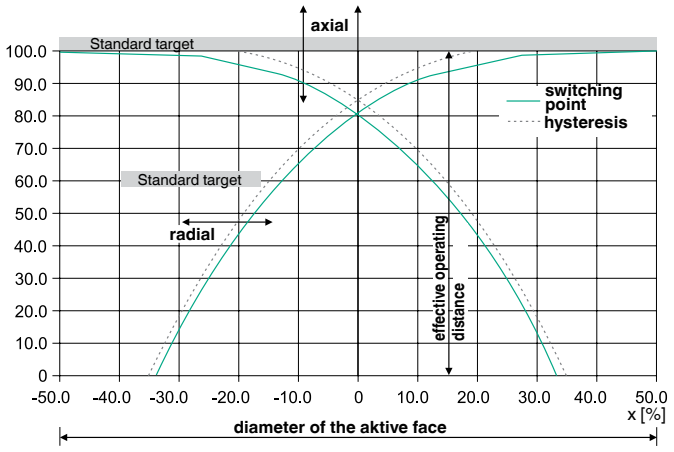
$H \leq 0.2 \cdot s_r$.

Safely switched off

A proximity switch is switched off safely when the distance between the measuring plate and the active area is at least three times the rated operating distance s_n.

Sideways approach

Above, the focus is on an axial approach to the standard measuring plate. However, if you move the plate sideways into the active zone, you obtain another operating distance s depending on the axial offset. This correlation characterizes the response curve.



Different actuator sizes

Inductive sensors are used to check machine parts in many cases. These very rarely have the same size and shape as the standard measuring plate to which the sensor's technical data applies. The operating distance in particular depends on the size of the metal used to attenuate the sensor.

Generally the operating distance increases only marginally with a larger object surface, but reduces significantly for smaller objects.

If the object being checked is different in size to the standard measuring plate, it is recommended that you verify the operating distance of the selected sensor.

Different actuator materials

In addition to the actuator's dimensions, the material property of the actuator is also of considerable importance. This is characterized by the reduction factor. The reduction factor specifies by what factor the operating distance reduces as a result of different materials versus steel FE 360 (St37) for inductive proximity switches and against a grounded plate for capacitive proximity switches. The lower the reduction factor, the shorter the operating distance for the material in question. Since the reduction factor for inductive proximity switches depends upon the housing and shielding material, this factor vary from type to type. Please use the value in the respective data sheet.

In the case of inductive proximity switches, the conductivity/permeability ratio of the actuator is the parameter for the reduction factor. Some typical reduction factor values are provided below:

Material	Reduction factor
Construction steel	1
Aluminum foil	1
Stainless steel	0.85
Aluminum	0.4
Brass	0.4
Copper	0.3

Step 3: Mounting conditions

Inductive and capacitive sensors can be flush mounted or non-flush mounted.

Sensors that cannot be flush mounted

The largest possible operating distance (in reference to the diameter D of the active area) is reached by sensors that cannot be flush mounted.

In the case of an inductive sensor, coils are used to generate electromagnetic fields. To achieve a forwards or backwards

field alignment, the coils are embedded in a pot core. Despite this measure, part of this field is emitted laterally

and is affected by the surrounding metal. This lateral effect is also observed with capacitive sensors.

To prevent sensors with a wide detection range from being attenuated by the surrounding metal, clearance must be created around the sensor element.

The size of the clearance can also be determined from the technical data for the respective sensors.

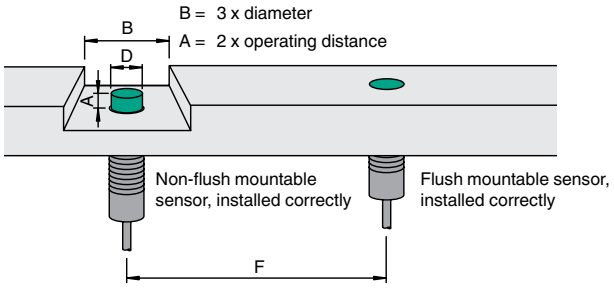
Sensors that can be flush mounted

Sensors that can be flush mounted do not require any clearance. (A=0). The advantage of these sensors over ones that cannot be flush mounted is that

they are better mechanically protected and are less sensitive to interference. However, one disadvantage is the shorter operating distance as the active area

of the sensor is already surrounded by metal. The sideways interference from the surrounding metal is reduced by a special internal shield,

but this happens at the detriment of the detection range. These sensors achieve only approx. 60% of the operating distance of non-flush designs.



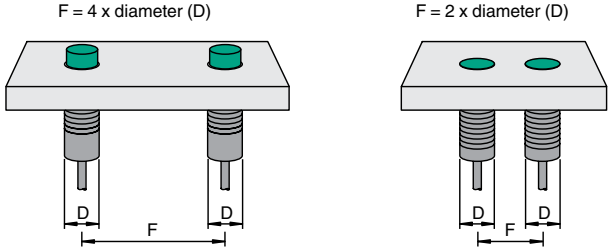
Further details on the mounting conditions are included in the technical data for the sensors.

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Mutual interference

To be able to detect metal, inductive sensors use a sensor coil to generate an electromagnetic AC field. This AC field evaluates the smallest of changes in the immediate vicinity of the sensor element. A change can, for example, result from a metal plate approaching the sensor.

Even an external magnetic AC field, e.g., that of an adjacent sensor, can affect the switching characteristics. Therefore, a minimum distance must be maintained between two adjacent sensors. The minimum distance between two sensors can be determined as follows.



Non-flush mountable sensor, F must be 4 times the housing diameter.

Flush mountable sensor, F must be twice the housing diameter.

If the application does not allow a minimum distance to be maintained, sensors with offset oscillation frequencies are available upon request.

These sensors can then be mounted directly beside each other.

Step 4: Electric data and connections

In addition to the operating distance, other important criteria include sensor parameters such as the type and level of supply voltage. An overview of the output circuits for our sensors is included in this catalog from page 8.

In terms of supply voltage, our wide product range includes DC, AC, and AC/DC sensors.

For each of our sensor series, the available supply voltage types and output types are outlined briefly and clearly in the product selection tables starting from page 14.

Step 5: General specification

The **no-load current I_0** specifies the individual power consumption of the proximity switch. It is measured without load.

The **operating current I_L** (rated operating current I_e according to EN 60947-5-2) specifies the maximum load current for continuous operation.

The **short-time current I_K** is the current that may occur for a short time when switching on, without damaging the proximity switch.

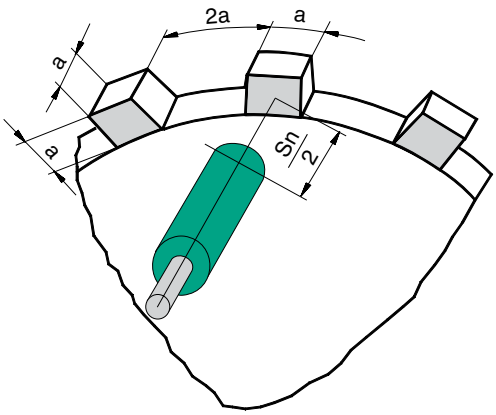
The **leakage current I_R** is the current that flows via the load when the proximity switch is locked.

The **operating voltage U_B** is specified with the maximum and minimum values for the supply voltage. The proximity switch can be operated safely in this area. The rated voltage is specified for NAMUR proximity sensors.

The **voltage drop U_d** is measured via the controlled proximity switch or output.

The **switching frequency f** is the maximum number of changes from attenuated to non-attenuated state in Hertz (Hz), see also the figure in accordance with EN 60947-5-2.

Measurement a is the greater value of either the diameter or the edge length and the three-fold rated operating distance (see „Standard measuring plate“ on page 29).



Actuator to determine the maximum switching frequency.

The **harmonic voltage**, also referred to as ripple or residual ripple, is the AC voltage (peak-to-peak) that is superimposed over the operating voltage and specified as a percentage of the arithmetic average value. Pepperl+Fuchs GmbH sensors feature max. 10% of the residual ripple and comply with standard DIN EN 60947-5-2.

Permissible interference voltage

Short-term voltage peaks on the supply lines can damage unprotected proximity switches. Transient protection on all sensors by Pepperl+Fuchs GmbH suppresses noise pulses in accordance with EN 60947-5-2.

The **time delay before availability t_V** is the time taken until a proximity switch is ready for operation once the operating voltage has been switched on.

Pepperl+Fuchs GmbH proximity switches feature max. 300 ms and comply with EN 60947-5-2.

Switch-on pulse suppression

All proximity switches are equipped with this feature, which suppresses a fault signal at the output when the operating voltage is switched on during time t_V.

Short circuit current limitation

In the case of short circuit current limitation, which is included in most proximity switches by Pepperl+Fuchs GmbH, if the current trip value is exceeded the output is periodically locked and re-released until the short-circuit is fixed.

The permissible ambient temperature is the temperature range within which the proximity switch operates properly. The following apply to the Pepperl+Fuchs GmbH standard series:

-25 °C ... +70 °C or 248 K ... 343 K.

Degree of protection

Depending on the requirements, proximity switches by Pepperl+Fuchs GmbH are IP65, IP67, or IP68 (EN 60529) protected (see page 1092).

Permissible shock and vibration load

The shock resistance test is carried out at 30 times ground acceleration and 11 ms duration. The vibration resistance test is conducted at a resonance frequency between 10 and 55 Hz and 1 mm amplitude (IEC 60068-2-6).

Permissible tightening torque [Nm]

	Stainless steel	Brass	PBT	PPS
M5 x 0.5	3.0	-	-	-
M8 x 1	10.0	3.0	-	-
M12 x 1	15.0	10.0	0.75	-
M18 x 1	30.0	30.0	1.5	5
M30 x 1.5	30.0	30.0	3.0	10

Special Sensor Features for Special Applications

Reduction factor 1

The perfect sensor is one that is equally suited to all types of applications and this is the case with reduction factor 1 sensors. They detect all types of metal with almost the same operating distance. Compared with common inductive sensors, they offer considerable benefits, in particular for applications where a sensor must detect different metals.



Benefits:

- Same operating distance for all metals
- Maximum operating distance from 2 mm to 75 mm
- Electric magnetic field immunity
- Mechanical welding immunity (optional)
- Complete portfolio of cylindrical and cubic housing designs

Weld-immune sensors

Proximity switches used in welding systems are characterized by their high immunity to strong magnetic fields and an increased mechanical robustness suitable for the rough ambient conditions.

They are fitted with a cross-linked PPS front face to provide protection against spattering weld sparks during welding, and their housing is made from PTFE-coated brass.



Sensors with a metal face

Metal Face sensors from Pepperl+Fuchs are made of stainless steel for applications that have particularly high requirements in terms of sensor robustness. For example, sensors that are used in machine tools are exposed to high forces, abrasion, and aggressive media.

To ensure a long service life, sensors with an active face made from stainless steel are used in these applications.



Sensors with e1 and E1 certification

Commercial vehicles represent an important application area for sensor technology. Special setups or add-on systems often result in "rolling machines." Sensors for diggers, cranes, agricultural machinery, refuse, or fire trucks ares some of the many applications for industrial sensor technology. Specially adapted products may be required for use in ships or fork lift trucks.

Here, different and conflicting requirements must all be taken into consideration in the applied components. This includes the various application-specific boundary conditions that we are familiar with from many applications in traditional mechanical engineering. In addition to the basic sensor function, optimal mechanical integration into the overall system is also required, as well as application-specific sealing of the devices and resistance to temperature and environment influences. In some cases, special connectors usually found in vehicles may be integrated into the sensors.

Furthermore, the pertinent standards for the vehicles must be taken into consideration. This includes vehicle or ship-building requirements such as more stringent EMC requirements. Over recent years, Pepperl+Fuchs has worked on many customer-specific developments where it has demonstrated its ability to integrate both these requirements into sensors, both efficiently and cost effectively for high volumes. Many reputable companies within this sector choose our products.

Due to their robustness, inductive proximity switches in cylindrical housings are often used for this market. Pepperl+Fuchs also offer inductive sensors for analog position measurement as well as inclination sensors.

e 1

E 1

Pressure-resistant sensors

Pressure-resistant proximity switches are suitable for use in hydraulic actuators. They are suitable for operating pressures up to 500 bar and peak pressures up to 800 bar on the active area.

The pressure resistance is achieved by means of a ceramic front face that is an integral part of the stainless steel housing. A groove is also incorporated into the housing (O-ring).



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Sensors for Position Feedback to Valve Actuators

Sensors for Box Installation



The term "box solution" refers to the integration of sensor technology in an accessory box that generates the mechanical coupling of the sensors on adjustment drives of different dimensions.

This solution was developed to prevent the sensors from being directly exposed to the environment and therefore allows the use of standard sensors.

Most reputable drive manufacturers offer standard boxes that are fitted with Pepperl+Fuchs sensors, either with or without optical display.

Features:

- *Versatile – as the box offers individual connection options*
- *Reliable – as the installation is integrated into the box such that it is resistant to manipulation and prevents dust build-up*
- *Safe – as the box complies with the accident prevention regulations*
- *Simple – as it is mounted using preadjusted sensors*
- *Compliant – as the connection identification of MSR devices complies with standard DIN 45140 T.1 and the mechanical mounting complies with VDI/VDE 3845*

Standard sensors

For box installation, Pepperl+Fuchs offers cylindrical standard sensors with short housing lengths up to 40 mm and slot sensors with a slot width of 3.5 mm, along with sensors from the V3 series. These are square-shaped sensors in standard dimensions for mechanical micro switches. Standard DC versions and NAMUR versions are available with an extended temperature range (up to -50 °C to +100 °C).

Position feedback sensors for box installation



The F25 sensor series by Pepperl+Fuchs offers an effective alternative for position feedback on valve actuators.

They combine two devices as "double sensors" in one housing, significantly reducing the mounting and maintenance effort.

Backed by decades of experience, Pepperl+Fuchs offers a wide range of sensors and actuators for the F25 Series that are suitable for both the box solution and for direct mounting on the adjustment drive.

Features:

- *Double sensor - as the sensor has two active zones*
- *Safe – as it is not possible to insert a finger between the actuator and the sensor, in compliance with the accident prevention regulations*
- *Variable – as it can be mounted directly to the drive or the valve, via a bracket or in a box*
- *Simple – as mounting requires no adjustments or additional settings*
-
- *Practical – as several sensors can be stacked for more than two trip points if necessary*



Slot-shaped

Cylindrical





V3 series

Sensors for "Open Mounting"

Are you looking for a stable and robust, open-construction position feedback solution that enables the sensor and actuator to be directly mounted?

The F31, F31K, and F31K2 Series by Pepperl+Fuchs are ideally suited for direct mounting to drives without the need for additional mounting materials. Using just two actuators, you can determine the position of all standard drives regardless of their size and make.

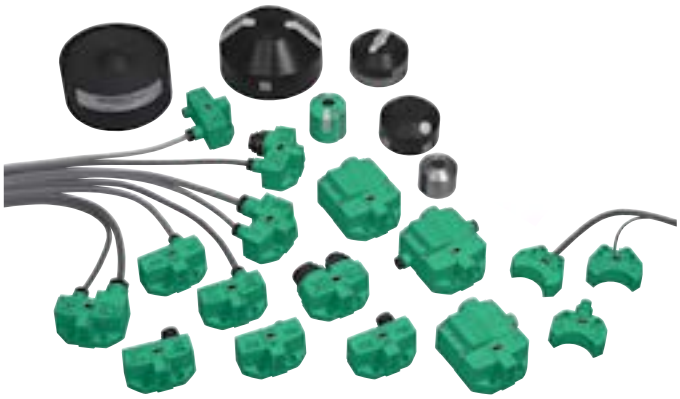
The F31K(2) Series has a terminal compartment with caged spring technology or screw terminals for the system and valve connection.

Versions without valve connections and versions with one or two valve connections are also available. The valve can be controlled directly via the sensor connection if necessary, reducing the mounting effort and cabling costs.

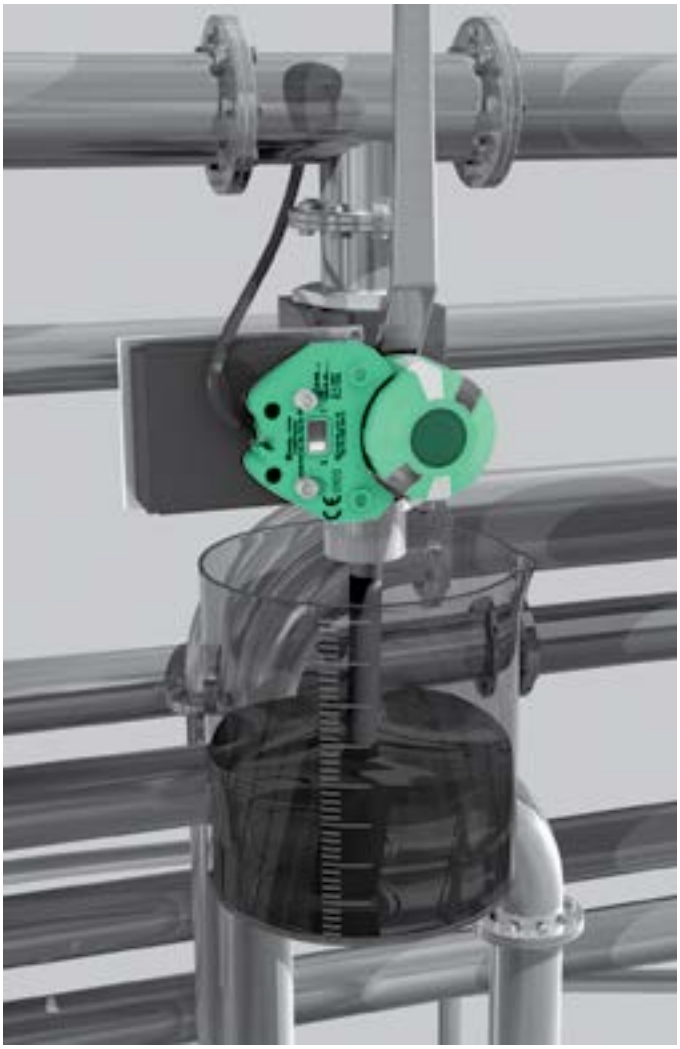
Pepperl+Fuchs also offers an attractive open solution –the F25 sensor series– for position feedback of manually operated ball valves and flaps.

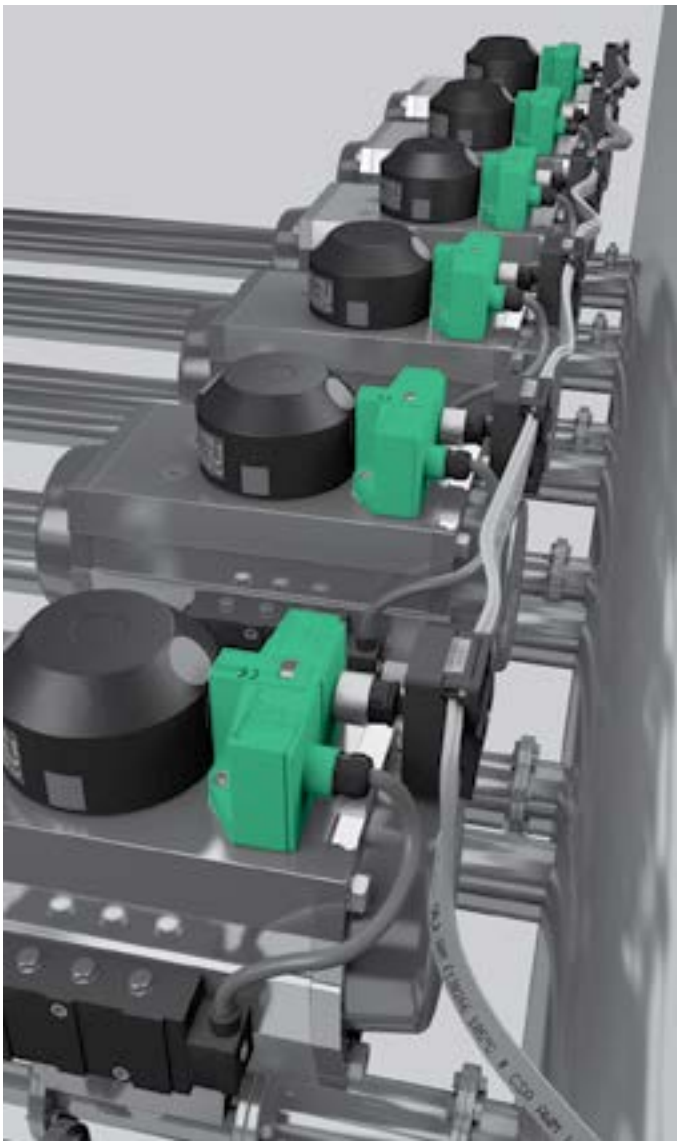
Features:

- *Safe - as the dimensions of the sensor and the distances between sensors and actuators are selected to prevent risk of injury during operation (certified by TÜV)*
- *Variable - as the sensors are suitable for all standard drives regardless of size and make*
- *Fixed – as the adjustment is retained thanks to mounting holes in the sensor housing for easy sensor replacement*
- *Universal – as both left- and right-rotating drives can be read*
- *Clear – as the assignment of the actuator to the hole pattern for the drive is clear and the drive position is clearly visible*
- *Versatile – as you can choose between a cable connection, plug connection (V1, V16, or V18), and terminals*
- *Transparent – as the switching states, supply voltage, and valve control can be displayed clearly using LEDs*









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Type code, inductive standard sensors

N B B 10[1)] - 30 G M 50 - E2 - C - V1

-FA, -FB } Food & Beverage

N Inductive standard sensor
IA Inductive analog sensor
S Inductive slot sensor
R Inductive ring sensor

B Basis line
C Comfort line
E Extended operating range
M Metal face
R Reduction factor 1

B flush
N non-flush

Operating distance
0.6 mm ... 100 mm

Rectangular type
F1, F9, F10, F11, F17, F23, F24, F25, F29, F31, F33, F41, V3, F46
M VariKont M® (M1, M1A, M1K)
L2 VariKont L®
U VariKont®
FP/FPS Surface switch

Diameter in mm

G Threading

M Metal (brass, nickel plated)
K Plastic
KK Plastic terminal block
H Stainless steel 1.4435/AISI 316L
S Stainless steel 1.4305/AISI 303

Cylindrical
usable threaded length (mm)

Electrical Output

A, A0	4-wire, DC, NPN, antivalent
A2	4-wire, DC, PNP, antivalent
B3	AS-Interface Spec. 2.0
B3B	AS-Interface Spec. 2.1
E, E0	3-wire, DC, NPN, NO
E1	3-wire, DC, NPN, NC
E2	3-wire, DC, PNP, NO
E2B	3-wire, DC, PNP, NO, bistable
E3	3-wire, DC, PNP, NC
E4	3-wire, DC, NPN, NO or NC
E5	3-wire, DC, PNP, NO or NC
E8	4-wire, DC, PNP, dual, NO
I3	3-wire, DC, PNP, analog
N, N0	NAMUR, NC
N3	NAMUR, bistable
N4	NAMUR, dual, NC
1N, N1	NAMUR, NO
U	2-wire, AC/DC, programm. wiring
U8	2-wire, AC/DC, dual, NO
UÖ	2-wire, AC/DC, NC
US	2-wire, AC/DC, NO
W	2-wire, AC, programm. wiring
W4	2-wire, AC, programm. wiring
WÖ	2-wire, AC, NC
WS	2-wire, AC, NO } reverse polarity protected
Z0	2-wire, DC, NO } reverse polarity protected
Z1	2-wire, DC, NC
Z2	2-wire, DC, NC or NO
Z3	2-wire, DC, NO } voltage polarity independent
Z4	2-wire, DC, NO } voltage polarity independent
Z5	2-wire, DC, NC

Special Features

C	Welding field resistant
DW	Rotation speed monitoring
D	Pressure-proof
FE	Iron
NE/FE	Iron/nonferrous
P or NFE	nonferrous
SN	Safety function
T	Higher temperatures up to 100 °C
150, 200, 250	Maximum applicable temperature

Connection Elements

V1	M12 x 1 device connector for DC proximity switches
V3	M8 device connector for DC proximity switches
V5	Faston connector
V13	M12 x 1 device connector for AC proximity switches
V16	Rd24 x 1/8 device connector for dual sensors in F31 housing
V18	M18 x 1 device connector for valve connection (F31 housing)

1) The switching interval followed by a P (eg. 20P) indicates a selective switching behavior of the sensor. The nominal distance refers to aluminum..



Properties

- Ø3 mm housing
- Up to 1 mm, flush mountable
- DC, 3-wire switching output
- Cable and pigtail versions

Technical Data

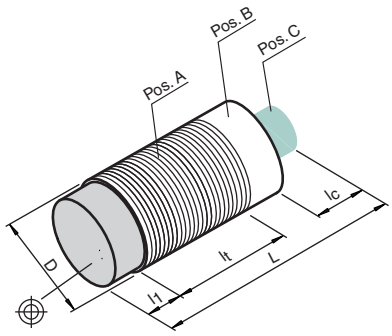
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Installation	flush mountable
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	Stainless steel 1.4305 / AISI 303

Model Number			NBB0,6-3M22-E0	NBB0,6-3M22-E1	NBB0,6-3M22-E2	NBB0,6-3M22-E3	NBB1-3M22-E0	NBB1-3M22-E2	NBB0,6-3M22-E0-0,3M-V3	NBB0,6-3M22-E2-0,3M-V3	NBB1-3M22-E0-0,3M-V3	NBB1-3M22-E2-0,3M-V3
	green = preferred type											
Rated operating distance	0.6 mm		●	●	●	●			●	●		
	1 mm						●	●			●	●
Switching element function	NPN	NC		●								
	NPN	NO	●				●		●		●	
	PNP	NC				●						
	PNP	NO			●			●		●		●
Switching frequency	0 ... 700 Hz						●	●			●	●
	0 ... 1300 Hz			●		●						
	0 ... 1400 Hz		●		●				●	●		
Connection type	cable PUR , 2 m		●	●		●		●				
	cable PVC , 2 m				●		●					
	Cable connector M8 x 1 , 3-pin with PVC cable 300 mm								●	●	●	●

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions		
Length L [mm]		22
Diameter D [mm]		3
Thread length l_t [mm]		0
Cap length l_1 [mm]		0
Connector area l_c [mm]		0
LED position	Pos. A	Pos. A



Accessories

This and more accessories can be found in chapter 10

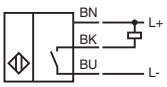
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 4	Mounting flange, 4 mm

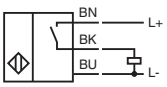
Electrical Connection



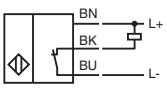
NBB0,6-3M22-E0
NBB1-3M22-E0



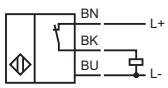
NBB0,6-3M22-E2
NBB1-3M22-E2



NBB0,6-3M22-E1

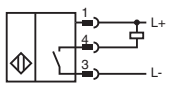


NBB0,6-3M22-E3

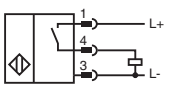




NBB0,6-3M22-E0-0,3M-V3
NBB1-3M22-E0-0,3M-V3



NBB0,6-3M22-E2-0,3M-V3
NBB1-3M22-E2-0,3M-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



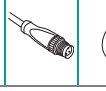
Properties

- Ø4 mm housing
- 0.8 mm and 1.5 mm, flush mountable versions
- DC, 3-wire switching output
- Cable, pigtail and connector versions

Technical Data

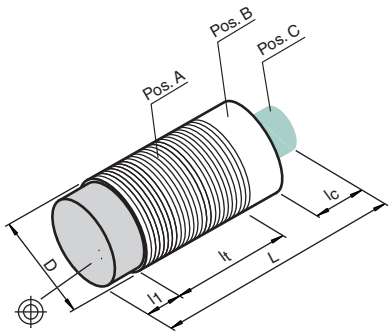
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	0.8 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 3000 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	Stainless steel 1.4305 / AISI 303

Model Number			NBB0,8-4M25-E0	NBB0,8-4M25-E1	NBB0,8-4M25-E2	NBB0,8-4M25-E3	NBB0,8-4M25-E0-0,3M-V3	NBB0,8-4M25-E2-0,3M-V3	NBB0,8-4M25-E0-V3	NBB0,8-4M25-E2-V3	NBB1,5-4M25-E0-V3
	green = preferred type										
Switching element function	NPN	NO	●				●		●		●
	NPN	NC		●							
	PNP	NO			●			●		●	
	PNP	NC				●					
No-load supply current	≤ 10 mA				●	●		●			
	≤ 12 mA		●	●			●		●	●	●
Operating current	0 ... 100 mA		●	●			●		●	●	●
	0 ... 200 mA				●	●		●			
Connection type	Device connector M8 x 1 , 3-pin								●	●	●
	cable PVC , 2 m		●	●	●	●					
	Cable connector M8 x 1 , 3-pin with PVC cable 300 mm						●	●			
											

Approvals and Certificates										
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									

Dimensions										
Length L [mm]	25				25				40	45
Diameter D [mm]	4				4				4 / 8	
Thread length l_t [mm]	0					0				
Cap length l_1 [mm]	0					0				
Connector area l_c [mm]	0				0				5	
LED position	Pos. A				Pos. A				Pos. B	



Accessories

This and more accessories can be found in chapter 10

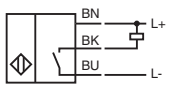
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 4	Mounting flange, 4 mm

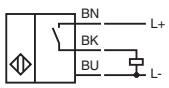
Electrical Connection



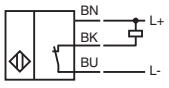
NBB0,8-4M25-E0



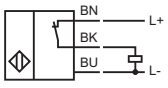
NBB0,8-4M25-E2



NBB0,8-4M25-E1



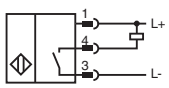
NBB0,8-4M25-E3





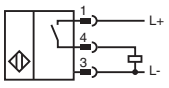
NBB0,8-4M25-E0-0,3M-V3
NBB0,8-4M25-E0-V3
NBB1,5-4M25-E0-V3







NBB0,8-4M25-E2-0,3M-V3
NBB0,8-4M25-E2-V3



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	Stainless steel 1.4305 / AISI 303

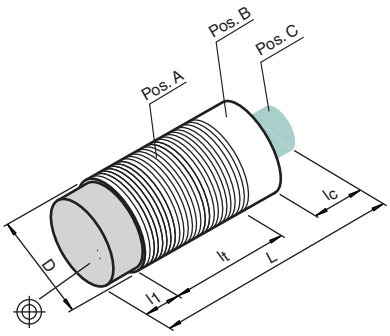
Model Number		NBB0,6-4GM22-E0	NBB0,6-4GM22-E1	NBB0,6-4GM22-E2	NBB0,6-4GM22-E3	NBB1-4GM22-E0	NBB1-4GM22-E2	NBB0,6-4GM22-E2-0,3M-V3	NBB1-4GM22-E0-0,3M-V3	NBB1-4GM22-E2-0,3M-V3
green = preferred type										
Rated operating distance	0.6 mm	●	●	●	●			●		
	1 mm					●	●		●	●
Switching element function	NPN NC		●							
	NPN NO	●				●			●	
	PNP NC				●					
	PNP NO			●			●	●		●
Switching frequency	0 ... 700 Hz					●	●		●	●
	0 ... 1300 Hz		●		●					
	0 ... 1400 Hz	●		●				●		
Connection type	cable PUR , 2 m	●	●	●	●	●	●			
	Cable connector M8 x 1 , 3-pin with PVC cable 300 mm							●	●	●

Approvals and Certificates										
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									

Dimensions	
Length L [mm]	22
Diameter D [mm]	4
Thread length l_t [mm]	22
Cap length l_1 [mm]	0
Connector area l_c [mm]	0
LED position	Pos. A

Properties

- Ø4 mm housing
- Up to 1 mm, flush mountable
- DC, 3-wire switching output
- Cable and pigtail versions



Accessories

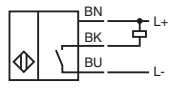
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

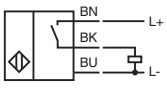
BF 4	Mounting flange, 4 mm

Electrical Connection

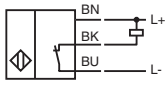
NBB0,6-4GM22-E0
NBB1-4GM22-E0



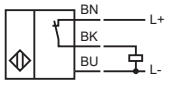
NBB0,6-4GM22-E2
NBB1-4GM22-E2



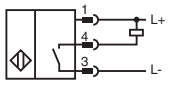
NBB0,6-4GM22-E1



NBB0,6-4GM22-E3



NBB1-4GM22-E0-0,3M-V3

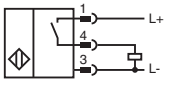




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

NBB0,6-4GM22-E2-0,3M-V3
NBB1-4GM22-E2-0,3M-V3



Date of issue: 04/08/2015



Properties

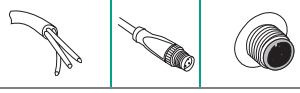
- Ø5 mm housing
- Up to 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable, pigtail and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

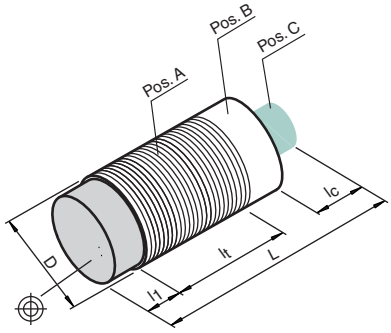
General Data	
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 3000 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number	green = preferred type		NBB0,8-5GM25-E0	NBB0,8-5GM25-E1	NBB0,8-5GM25-E2	NBB0,8-5GM25-E3	NBB0,8-5GM25-E0-0,3M-V3	NBB0,8-5GM25-E2-0,3M-V3	NBB0,8-5GM25-E0-V3	NBB0,8-5GM25-E2-V3	NBB1,5-5GM25-E2-V3	NBB1,5-5GM25-E3-V3
Rated operating distance	0.8 mm		●	●	●	●	●	●	●	●		
	1.5 mm										●	●
Switching element function	NPN	NC		●								
	NPN	NO	●				●		●			
	PNP	NC				●						●
	PNP	NO			●			●		●	●	
No-load supply current	≤ 10 mA				●	●		●			●	●
	≤ 12 mA		●	●			●		●			
	≤ 15 mA									●		
Operating current	0 ... 100 mA		●	●			●					
	0 ... 200 mA				●	●		●			●	●
	0.1 ... 100 mA								●	●		
Housing material	Stainless steel 1.4305 / AISI 303		●	●	●	●	●	●	●	●		
Connection type	Device connector M8 x 1 , 3-pin								●	●	●	●
	cable PVC , 2 m		●	●	●	●						
	Cable connector M8 x 1 , 3-pin with PVC cable 300 mm						●	●				



Approvals and Certificates											
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Dimensions				
Length L [mm]	25		35	32
Diameter D [mm]	5		5 / 8	5 / 8
Thread length l_t [mm]	25		21	20
Cap length l_1 [mm]	0		0	0
Connector area l_c [mm]	0		10	6
LED position	Pos. A		Pos. B	Pos. A



Accessories

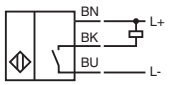
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 5	Mounting flange, 5 mm
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

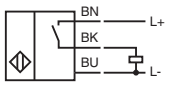
Electrical Connection



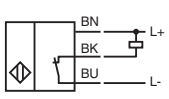
NBB0,8-5GM25-E0



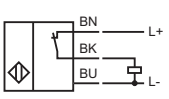
NBB0,8-5GM25-E2



NBB0,8-5GM25-E1

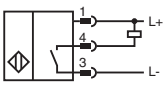


NBB0,8-5GM25-E3

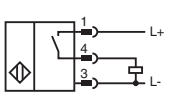




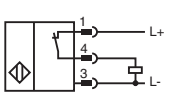
NBB0,8-5GM25-E0-0,3M-V3
NBB0,8-5GM25-E0-V3



NBB0,8-5GM25-E2-0,3M-V3
NBB0,8-5GM25-E2-V3
NBB1,5-5GM25-E2-V3



NBB1,5-5GM25-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø6.5 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

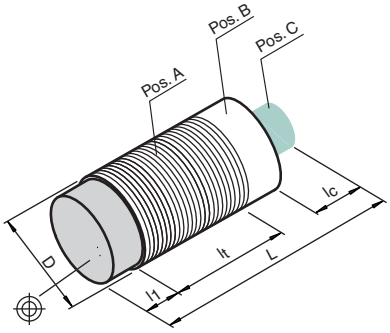
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number			NJ1,5-6,5-40-E0	NJ1,5-6,5-40-E2	NJ1,5-6,5-40-E0-V3	NJ1,5-6,5-40-E2-V3
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Switching frequency	0 ... 2500 Hz		●		●	
	0 ... 500 Hz			●		●
Indication of the switching state	LED, yellow		●	●	●	
Connection type	Device connector M8 x 1 , 3-pin				●	●
	cable PUR , 2 m		●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)				

Dimensions					
Length L [mm]		40		44	
Diameter D [mm]		6.5		6.5 / 8	
Thread length l_t [mm]		0			
Cap length l_1 [mm]		0			
Connector area l_c [mm]		0		6	
LED position	Pos.	C	A	B	



Accessories

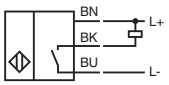
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM	Female connector, M8, 3-pin, field attachable

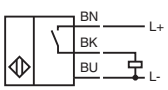
Electrical Connection



NJ1,5-6,5-40-E0

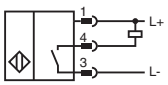


NJ1,5-6,5-40-E2

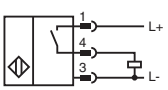




NJ1,5-6,5-40-E0-V3



NJ1,5-6,5-40-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



CE

Properties

- Ø6.5 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data

Rated operating distance	1.5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	✔
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number			NBB1,5-6,5S16-E2	NBB1,5-6,5S30-E0	NBB1,5-6,5S30-E2	NBB1,5-6,5S20-E2-V3	NBB1,5-6,5S20-E3-V3	NBB1,5-6,5S40-E0-V3	NBB1,5-6,5S40-E1-V3	NBB1,5-6,5S40-E2-V3	NBB1,5-6,5S40-E3-V3
Switching element function	NPN	NO		●				●			
	NPN	NC							●		
	PNP	NO	●		●	●				●	
	PNP	NC					●				●
No-load supply current	≤ 10 mA		●			●					
	≤ 11 mA						●				
	≤ 2 mA								●		
	≤ 7 mA			●	●			●		●	●
Switching frequency	0 ... 1500 Hz			●	●			●	●	●	
	0 ... 2000 Hz										●
	0 ... 5000 Hz						●				
	0 ... 6000 Hz		●			●					
Connection type	connector (M8 x 1), 3-pin					●	●	●	●	●	●
	cable PUR , 2 m		●	●	●						



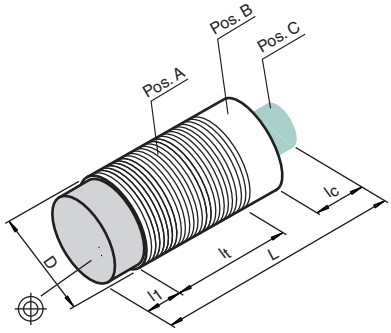


Approvals and Certificates

CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions

Length L [mm]		16	35	35	20	20	40	40	40	40
Diameter D [mm]			6.5				6.5 / 8			
Thread length l_t [mm]						0				
Cap length l_1 [mm]						0				
Connector area l_c [mm]			0			9			5	
LED position	Pos.:	C	C	C	B	B	B	B	B	A



Accessories

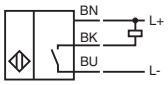
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

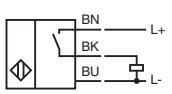
Electrical Connection



NBB1,5-6,5S30-E0

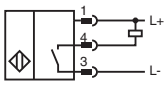


NBB1,5-6,5S16-E2
NBB1,5-6,5S30-E2

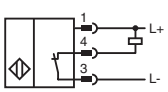




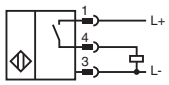
NBB1,5-6,5S40-E0-V3



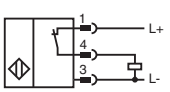
NBB1,5-6,5S40-E1-V3



NBB1,5-6,5S20-E2-V3
NBB1,5-6,5S40-E2-V3



NBB1,5-6,5S20-E3-V3
NBB1,5-6,5S40-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø6.5 mm housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

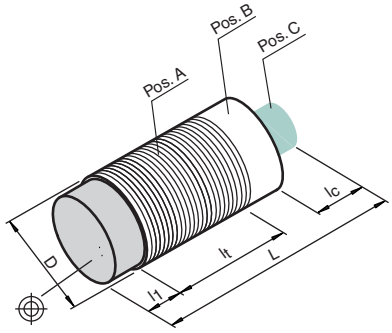
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 3000 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type		NBB2-6,5M30-E0	NBB2-6,5M30-E2	NBB2-6,5M25-E0-V3	NBB2-6,5M25-E1-V3	NBB2-6,5M25-E2-V3	NBB2-6,5M25-E3-V3
Switching element function	NPN	NO	●		●			
	NPN	NC				●		
	PNP	NO		●			●	
	PNP	NC						●
Operating voltage	10 ... 30 V		●	●			●	●
	5 ... 30 V				●	●		
Connection type	Device connector M8 x 1 , 3-pin				●	●	●	●
	cable PVC , 2 m		●	●				
								

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions						
Length L [mm]		30		35		
Diameter D [mm]		6,5		6,5 / 8		
Thread length l_t [mm]		0				
Cap length l_1 [mm]		0				
Connector area l_c [mm]		0		6		
LED position	Pos.	Pos. C		Pos. B		



Accessories

This and more accessories can be found in chapter 10

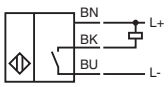
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

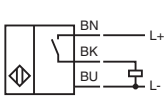
Electrical Connection



NBB2-6,5M30-E0

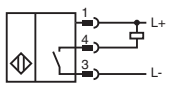


NBB2-6,5M30-E2

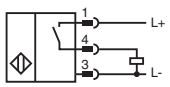




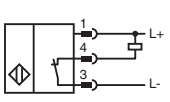
NBB2-6,5M25-E0-V3



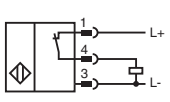
NBB2-6,5M25-E2-V3



NBB2-6,5M25-E1-V3



NBB2-6,5M25-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Ø6.5 mm housing
- 3 mm, virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

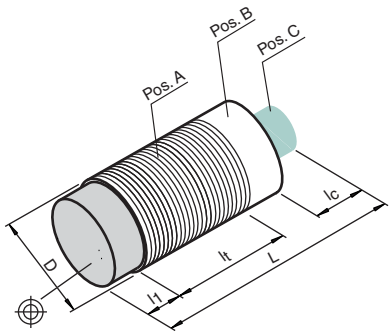
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	virtually flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 200 mA , above 50°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NEB3-6,5M45-E0	NEB3-6,5M45-E1	NEB3-6,5M45-E2	NEB3-6,5M45-E3	NEB3-6,5M45-E0-V1	NEB3-6,5M45-E1-V1	NEB3-6,5M45-E2-V1	NEB3-6,5M45-E3-V1	NEB3-6,5M50-E0-V3	NEB3-6,5M50-E1-V3	NEB3-6,5M50-E2-V3	NEB3-6,5M50-E3-V3
Switching element function	NPN	NO	●				●				●			
	NPN	NC		●				●				●		
	PNP	NO			●				●				●	
	PNP	NC				●				●				●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●				
	Device connector M8 x 1 , 3-pin										●	●	●	●
	cable PUR , 2 m		●	●	●	●								

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions			
Length L [mm]	45	65	60
Diameter D [mm]	6.5	6.5 / 12	6.5 / 8
Thread length l_t [mm]		0	
Cap length l_1 [mm]		0	
Connector area l_c [mm]	0	8	7
LED position		Pos. A	



Accessories

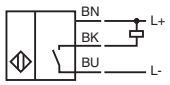
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V1-W-BK	4-pin, M12 female field-attachable connector
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

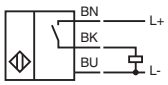
Electrical Connection



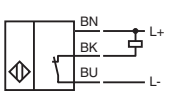
NEB3-6,5M45-E0



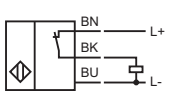
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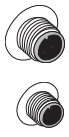


NEB3-6,5M45-E1

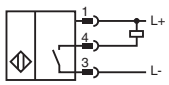


NEB3-6,5M45-E3

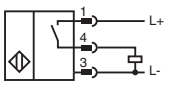


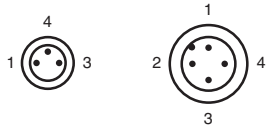


NEB3-6,5M45-E0-V1
NEB3-6,5M50-E0-V3



NEB3-6,5M45-E2-V1
NEB3-6,5M50-E2-V3

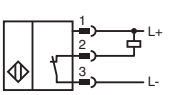




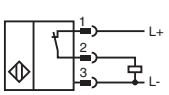
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

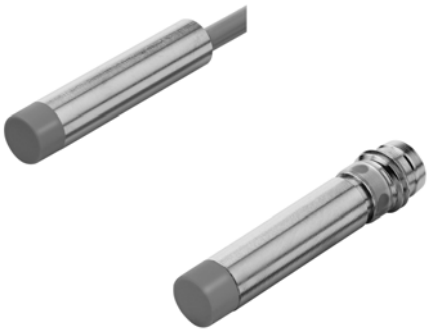
NEB3-6,5M45-E1-V1
NEB3-6,5M50-E1-V3



NEB3-6,5M45-E3-V1
NEB3-6,5M50-E3-V3



Date of issue 04/08/2015



Properties

- Ø6.5 mm housing
- 3 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

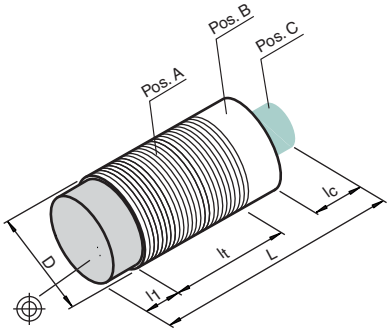
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	non-flush
Type of voltage	DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 2000 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NBN3-6,5M30-E0	NBN3-6,5M30-E2	NBN3-6,5M25-E0-V3	NBN3-6,5M25-E1-V3	NBN3-6,5M25-E2-V3
	green = preferred type					
Switching element function	NPN NO	●		●		
	NPN NC				●	
	PNP NO		●			●
Operating voltage	10 ... 30 V	●	●			●
	5 ... 30 V			●	●	
Connection type	Device connector M8 x 1 , 3-pin			●	●	●
	cable PVC , 2 m	●	●			

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions					
Length L [mm]	30		29		
Diameter D [mm]	6.5		6.5 / 8		
Thread length l_t [mm]	0				
Cap length l_1 [mm]	4				
Connector area l_c [mm]	0		6		
LED position	Pos. C		Pos. B		



Accessories

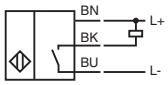
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

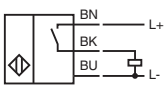
Electrical Connection



NBN3-6,5M30-E0

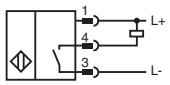


NBN3-6,5M30-E2

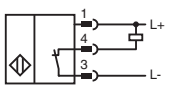




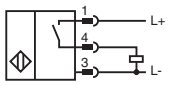
NBN3-6,5M25-E0-V3



NBN3-6,5M25-E1-V3



NBN3-6,5M25-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Ø6.5 mm housing
- 6 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

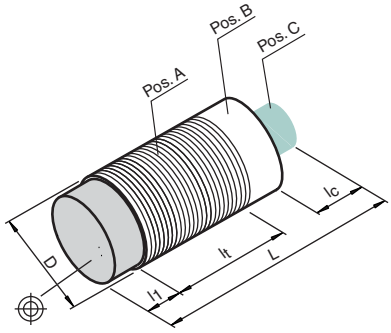
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	6 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 750 Hz
Operating current	0 ... 200 mA , above 50°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NEN6-6,5M45-E0	NEN6-6,5M45-E1	NEN6-6,5M45-E2	NEN6-6,5M45-E3	NEN6-6,5M45-E0-V3	NEN6-6,5M45-E1-V3	NEN6-6,5M45-E2-V3	NEN6-6,5M45-E3-V3	NEN6-6,5M45-E0-V1	NEN6-6,5M45-E1-V1	NEN6-6,5M45-E2-V1	NEN6-6,5M45-E3-V1
Switching element function	NPN	NO	●				●				●			
	NPN	NC		●				●				●		
	PNP	NO			●				●				●	
	PNP	NC				●				●				●
Connection type	Device connector M12 x 1 , 4-pin										●	●	●	●
	Device connector M8 x 1 , 3-pin						●	●	●	●				
	cable PUR , 2 m		●	●	●	●								

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions			
Length L [mm]	45	60	65
Diameter D [mm]	6.5	6.5 / 8	6.5 / 12
Thread length l_t [mm]		0	
Cap length l_1 [mm]		4	
Connector area l_c [mm]	0	6	8
LED position		Pos. A	



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets

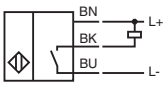
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

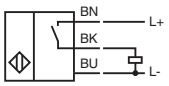
Electrical Connection



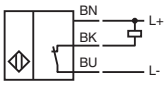
NEN6-6,5M45-E0



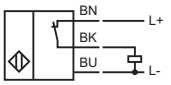
NEN6-6,5M45-E2



NEN6-6,5M45-E1

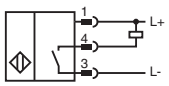


NEN6-6,5M45-E3

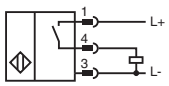


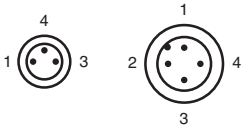


NEN6-6,5M45-E0-V1
NEN6-6,5M45-E0-V3



NEN6-6,5M45-E2-V1
NEN6-6,5M45-E2-V3

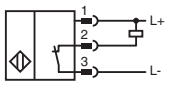




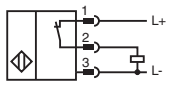
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

NEN6-6,5M45-E1-V1
NEN6-6,5M45-E1-V3



NEN6-6,5M45-E3-V1
NEN6-6,5M45-E3-V3



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 1200 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number		NBB1,5-8GM40-Z0	NCB1,5-8GM40-Z0	NCB1,5-8GM40-Z1	NCB1,5-8GM50-Z0-V3	NCB1,5-8GM50-Z1-V3
	green = preferred type					
Switching element function	DC NO		●		●	
	DC NC			●		●
Connection type	Device connector M8 x 1 , 3-pin				●	●
	cable PUR , 2 m	●	●			
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●
Dimensions						
Length L [mm]			40		51	
Diameter D [mm]				8		
Thread length l_t [mm]			40		48	
Cap length l_1 [mm]				0		
Connector area l_c [mm]			0		6	
LED position				Pos. C		

Properties

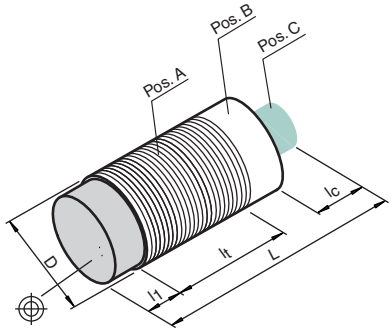
- Ø8 mm housing
- 1.5 mm, flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBB1-8GS50-Z0-T

Rated operating distance: 1 mm
Installation: flush
Switching element function: DC, NO
Operating voltage: 15 ... 34 V
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)
Housing material: Stainless steel 1.4305 / AISI 303
Connection type: cable PUR , 2 m



Accessories

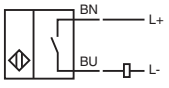
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

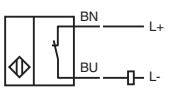
Electrical Connection



NBB1,5-8GM40-Z0
NCB1,5-8GM40-Z0
NBB1-8GS50-Z0-T

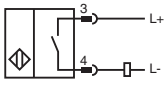


NCB1,5-8GM40-Z1

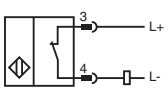




NCB1,5-8GM50-Z0-V3



NCB1,5-8GM50-Z1-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 1200 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number			NCN2-8GM40-Z0	NBN2-8GM40-Z1	NCN2-8GM40-Z1	NCN2-8GM50-Z0-V3	NCN2-8GM50-Z1-V3
Switching element function	DC	NO	●			●	
	DC	NC		●	●		●
Connection type	Device connector M8 x 1 , 3-pin					●	●
	cable PUR , 2 m		●		●		
	cable PVC , 2 m			●			
							
Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●	●
Dimensions							
Length L [mm]				40		51	
Diameter D [mm]					8		
Thread length l_t [mm]				36		44	
Cap length l_1 [mm]					4		
Connector area l_c [mm]				0		6	
LED position					Pos. C		

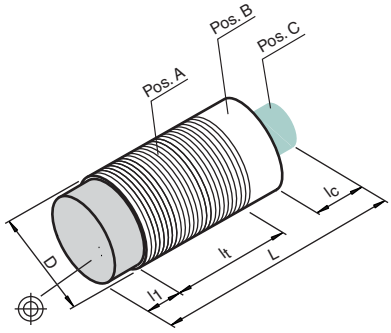
Properties

- Ø8 mm housing
- 2 mm, non-flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

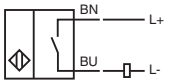
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable



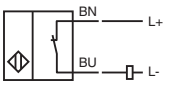
Electrical Connection



NCN2-8GM40-Z0

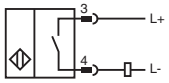


NCN2-8GM40-Z1
NBN2-8GM40-Z1

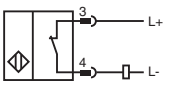




NCN2-8GM50-Z0-V3



NCN2-8GM50-Z1-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø8 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

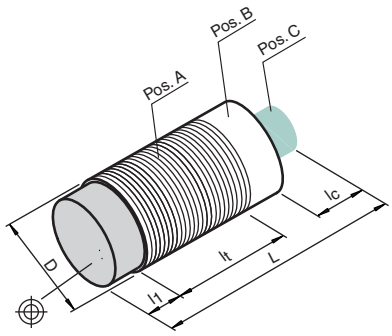
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number			NJ1,5-8GM40-E0	NJ1,5-8GM40-E2	NJ1,5-8GM40-E0-V1	NJ1,5-8GM40-E2-V1
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Switching frequency	0 ... 2500 Hz		●		●	
	0 ... 500 Hz			●		●
Housing material	Stainless steel 1.4305 / AISI 303				●	●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PUR , 2 m		●	●		
						

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●

Dimensions					
Length L [mm]		40		54	
Diameter D [mm]		8		8 / 12	
Thread length l_t [mm]		40	36	35	40
Cap length l_1 [mm]		0	4	0	0
Connector area l_c [mm]		0		6	
LED position	Pos.:	A	C	B	A



Accessories

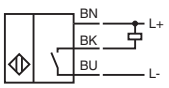
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

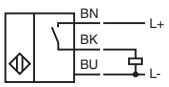
Electrical Connection



NJ1,5-8GM40-E0

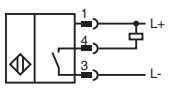


NJ1,5-8GM40-E2

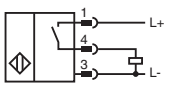


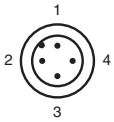


NJ1,5-8GM40-E0-V1



NJ1,5-8GM40-E2-V1

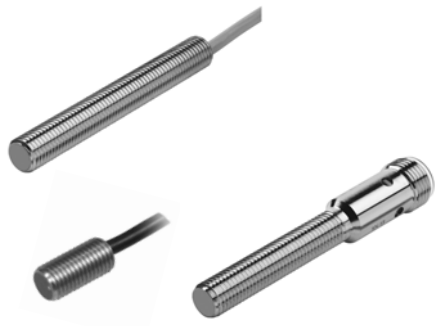




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

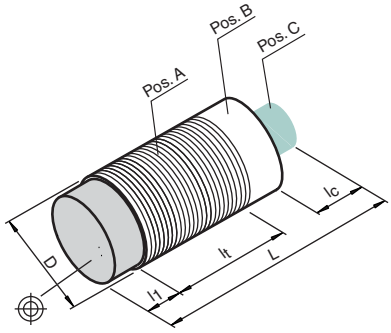
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number			NBB1,5-8GM16-E2	NBB1,5-8GM60-A0	NBB1,5-8GM60-A2	NBB1,5-8GM40-E0-V1	NBB1,5-8GM50-A0-V1	NBB1,5-8GM50-A2-V1
Switching element function	NPN	NO/NC		●			●	
	NPN	NO				●		
	PNP	NO/NC			●			●
	PNP	NO	●					
No-load supply current	≤ 10 mA		●					
	≤ 15 mA					●		
	≤ 20 mA			●	●		●	●
Switching frequency	0 ... 1500 Hz			●	●	●	●	●
	0 ... 6000 Hz		●					
Operating current	0 ... 100 mA			●	●	●	●	●
	0 ... 200 mA		●					
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)			●	●	●	●	●
	-25 ... 85 °C (-13 ... 185 °F)		●					
Housing material	Stainless steel 1.4305 / AISI 303		●					
	brass, nickel-plated			●	●	●	●	●
Connection type	Device connector M12 x 1 , 4-pin					●	●	●
	cable PUR , 2 m		●					
	cable PVC , 2 m			●	●			
								

Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions						
Length L [mm]	16	60	60	65	64	64
Diameter D [mm]	8			8 / 12		
Thread length l_t [mm]	16	60	60	40	50	50
Cap length l_1 [mm]	0					
Connector area l_c [mm]	0			6		
LED position	Pos. C			Pos. A		



Properties

- Ø8 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Accessories

This and more accessories can be found in chapter 10

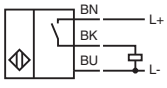
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
EXG-08	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

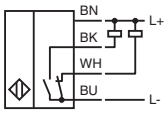
Electrical Connection



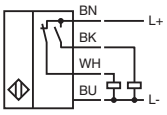
NBB1,5-8GM16-E2



NBB1,5-8GM60-A0

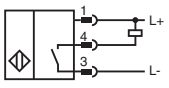


NBB1,5-8GM60-A2

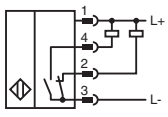




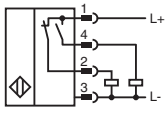
NBB1,5-8GM40-E0-V1
NBB1,5-8GM40-E0-V1

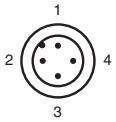


NBB1,5-8GM50-A0-V1



NBB1,5-8GM50-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



CE

Properties

- Ø8 mm housing
- 1.5 mm and 2 mm, flush mountable versions
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data

Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	✔
Indication of the switching state	LED, yellow
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number			NBB1,5-8GS30-E2-T	NBB2-8GS30-E0	NBB2-8GS30-E1	NBB2-8GS30-E2	NBB2-8GS30-E3	NBB1,5-8GS40-E2-T-V3	NBB2-8GS40-E1-V3	NBB2-8GS40-E3-V3	NBB2-8GS30-E2-V1
Rated operating distance	1.5 mm		●					●			
	2 mm			●	●	●	●		●	●	●
Switching element function	NPN	NO		●							
	NPN	NC			●				●		
	PNP	NO	●			●		●			●
	PNP	NC					●			●	
No-load supply current	≤ 1 mA			●	●				●		
	≤ 5 mA						●				
	≤ 7 mA		●			●		●		●	●
Switching frequency	0 ... 1500 Hz		●					●			
	0 ... 2000 Hz										●
	0 ... 2500 Hz						●			●	
	0 ... 3500 Hz					●					
	0 ... 600 Hz			●	●				●		
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●					●			
	-25 ... 85 °C (-13 ... 185 °F)			●	●	●	●		●	●	●
Connection type	connector (M8 x 1), 3-pin								●	●	
	Device connector M12 x 1 , 4-pin										●
	Device connector M8 x 1 , 3-pin							●			
	cable PUR , 2 m		●	●	●	●	●				



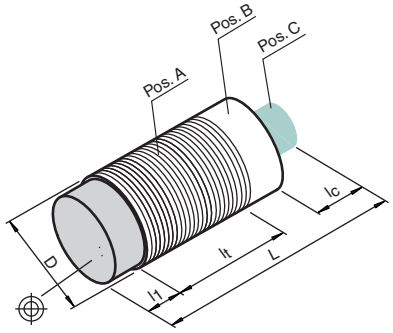


Approvals and Certificates

CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions

Length L [mm]	30	35	35	35	35	44	45	45	49
Diameter D [mm]	8								8/12
Thread length l_t [mm]	30	35	35	35	35	44	42	42	30
Cap length l_1 [mm]	0								
Connector area l_c [mm]	0	0	0	0	0	6	0	0	6
LED position	Pos. C					Pos. A			



Accessories

This and more accessories can be found in chapter 10

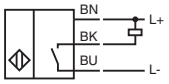
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable

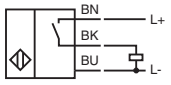
Electrical Connection



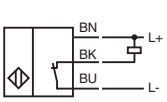
NBB2-8GS30-E0



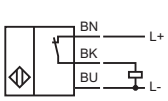
NBB1,5-8GS30-E2-T
NBB2-8GS30-E2



NBB2-8GS30-E1

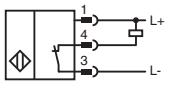


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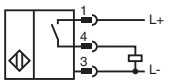




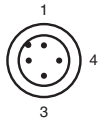
NBB2-8GS40-E1-V3



NBB1,5-8GS40-E2-T-V3
NBB2-8GS30-E2-V1



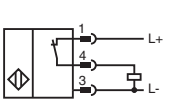




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

NBB2-8GS40-E3-V3



Date of issue: 04/08/2015



Properties

- Ø8 mm housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Connector version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4435 / AISI 316L
Protection degree	IP67
Connection type	M8 x 1 connector, 3-pin

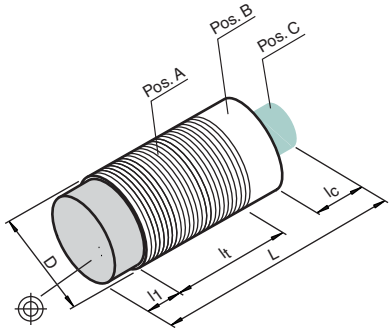


Model Number	green = preferred type		NBB2-8GH20-E0-V3	NBB2-8GH20-E2-V3	NBB2-8GH25-E0-V3	NBB2-8GH25-E2-V3	NBB2-8GH40-E0-V3	NBB2-8GH40-E2-V3
Switching element function	NPN	NO	●		●		●	
	PNP	NO		●		●		●
Approvals and Certificates								
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]			24		29		44	
Diameter D [mm]					8			
Thread length l_t [mm]			20		25		40	
Cap length l_1 [mm]					0			
Connector area l_c [mm]					6			
LED position					Pos. B			

Accessories

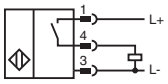
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Befestigungsflansch, 8 mm
V3-GMV4A-5M-PUR	
V3-WMV4A-5M-PUR	

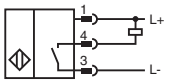


Electrical Connection

NBB2-8GH20-E2-V3
NBB2-8GH25-E2-V3
NBB2-8GH40-E2-V3



NBB2-8GH20-E0-V3
NBB2-8GH25-E0-V3
NBB2-8GH40-E0-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø8 mm housing
- 2 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Technical Data

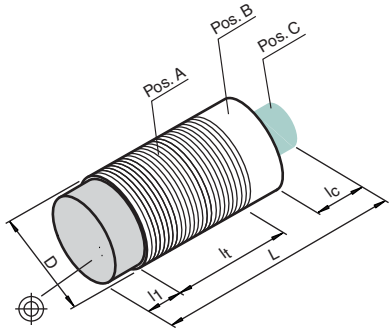
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB2-8GM30-E0	NBB2-8GM30-E2	NBB2-8GM40-E2	NBB2-8GM50-E0	NBB2-8GM50-E2	NBB2-8GM25-E0-V3	NBB2-8GM25-E1-V3	NBB2-8GM25-E2-V3	NBB2-8GM25-E3-V3	NBB2-8GM40-E2-V3	NBB2-8GM40-E3-V3	NBB2-8GM30-E0-V1	NBB2-8GM30-E2-V1	NBB2-8GM30-A0-V1	NBB2-8GM30-A2-V1	NBB2-8GM40-E0-V1	NBB2-8GM40-E2-V1
	green = preferred type																		
Switching element function	NPN	NO/NC														●			
	NPN	NO	●			●		●						●				●	
	NPN	NC							●										
	PNP	NO/NC															●		
	PNP	NO		●	●		●			●		●			●				●
	PNP	NC									●		●						
Operating voltage	10 ... 30 V DC		●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●
	5 ... 30 V DC							●	●										
Switching frequency	0 ... 1000 Hz															●	●		
	0 ... 1500 Hz					●	●												●
	0 ... 2000 Hz												●						
	0 ... 3000 Hz		●	●	●			●	●	●	●	●		●	●				
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●	●	●	●			●	●	●	●	●	●
	-25 ... 80 °C (-13 ... 176 °F)											●	●						
Connection type	Device connector M12 x 1 , 4-pin													●	●	●	●	●	●
	Device connector M8 x 1 , 3-pin							●	●	●	●	●	●						
	cable PVC , 2 m		●	●	●	●	●												

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions								
Length L [mm]	30	40	50	29		50	49	59
Diameter D [mm]	8						8 / 12	
Thread length l_t [mm]	30	40	50	25		40	30	40
Cap length l_1 [mm]	0							
Connector area l_c [mm]	0			6				
LED position	Pos. C			Pos. B				



Accessories

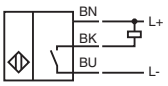
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

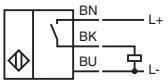
V1-G-BK	4-pin, M12 female field-attachable connector
BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

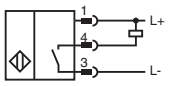
NBB2-8GM30-E0
NBB2-8GM50-E0



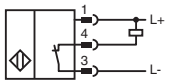
NBB2-8GM30-E2
NBB2-8GM40-E2
NBB2-8GM50-E2



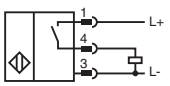
NBB2-8GM25-E0-V3
NBB2-8GM30-E0-V1
NBB2-8GM40-E0-V1



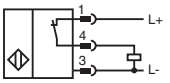
NBB2-8GM25-E1-V3



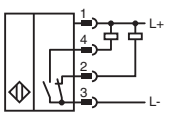
NBB2-8GM25-E2-V3
NBB2-8GM40-E2-V3
NBB2-8GM30-E2-V1
NBB2-8GM40-E2-V1



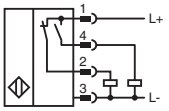
NBB2-8GM25-E3-V3
NBB2-8GM40-E3-V3



NBB2-8GM30-A0-V1



NBB2-8GM30-A2-V1

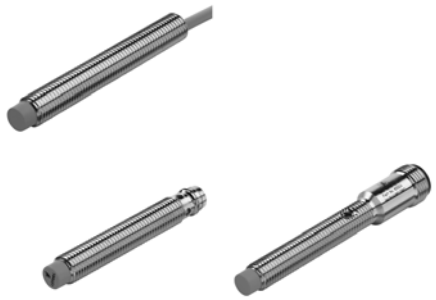




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø8 mm housing
- 2 mm, non-flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Technical Data

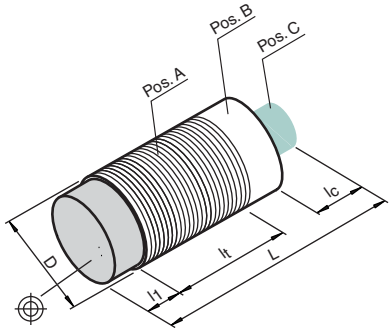
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBN2-8GM50-E0	NBN2-8GM50-E2	NBN2-8GM60-A0	NBN2-8GM60-A2	NBN2-8GM40-E2-V3	NBN2-8GM40-E2-V1	NBN2-8GM50-A0-V1	NBN2-8GM50-A2-V1
Switching element function	NPN	NO/NC			●				●	
	NPN	NO	●							
	PNP	NO/NC				●				●
	PNP	NO		●			●	●		
No-load supply current	≤ 15 mA		●	●			●	●		
	≤ 20 mA				●	●			●	●
Switching frequency	0 ... 1500 Hz		●	●	●	●		●	●	●
	0 ... 2000 Hz						●			
Connection type	Device connector M12 x 1 , 4-pin								●	●
	Device connector M8 x 1 , 3-pin						●			
	cable PVC , 2 m		●	●	●	●				

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]	50		60		50	65	64		
Diameter D [mm]	8						8 / 12		
Thread length l_t [mm]	45		60		35		50		
Cap length l_1 [mm]	4								
Connector area l_c [mm]	0				6				
LED position	Pos. C						Pos. A		



Accessories

This and more accessories can be found in chapter 10

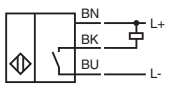
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-W-BK	4-pin, M12 female field-attachable connector
BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

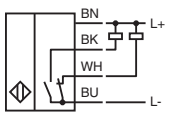
Electrical Connection



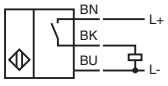
NBN2-8GM50-E0



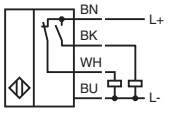
NBN2-8GM60-A0



NBN2-8GM50-E2

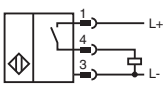


NBN2-8GM60-A2

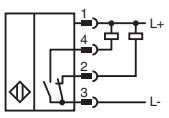




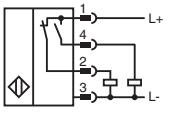
NBN2-8GM40-E2-V1
NBN2-8GM40-E2-V3



NBN2-8GM50-A0-V1



NBN2-8GM50-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø8 mm housing
- 3 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

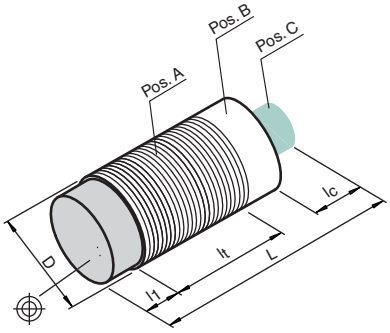
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	non-flush
Type of voltage	DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NBN3-8GM30-E0	NBN3-8GM30-E2	NBN3-8GM50-E0	NBN3-8GM25-E0-V3	NBN3-8GM25-E1-V3	NBN3-8GM25-E2-V3	NBN3-8GM25-E3-V3	NBN3-8GM45-E2-V3	NBN3-8GM30-E0-V1	NBN3-8GM30-E2-V1
green = preferred type											
Switching element function	NPN NO	●		●	●					●	
	NPN NC					●					
	PNP NO		●				●		●		●
	PNP NC							●			
Operating voltage	10 ... 30 V	●	●	●			●	●	●	●	●
	5 ... 30 V				●	●					
Switching frequency	0 ... 1500 Hz			●							
	0 ... 2000 Hz	●	●		●	●	●	●	●	●	●
Connection type	Device connector M12 x 1 , 4-pin									●	●
	Device connector M8 x 1 , 3-pin				●	●	●	●	●		
	cable PVC , 2 m	●	●	●							

Approvals and Certificates											
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Dimensions											
Length L [mm]		30	30	50	29	29	29	29	55	49	49
Diameter D [mm]		8								8 / 12	
Thread length l_t [mm]		30	30	45	21	21	21	21	40	26	26
Cap length l_1 [mm]		4									
Connector area l_c [mm]		0			6						
LED position		Pos. C			Pos. B						



Accessories

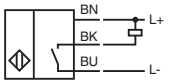
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

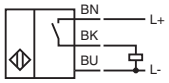
BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection

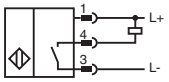
NBN3-8GM30-E0
NBN3-8GM50-E0



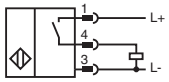
NBN3-8GM30-E2



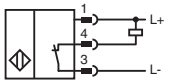
NBN3-8GM25-E0-V3



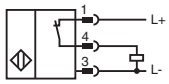
NBN3-8GM25-E2-V3
NBN3-8GM30-E2-V1
NBN3-8GM45-E2-V3



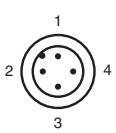
NBN3-8GM25-E1-V3



NBN3-8GM25-E3-V3







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø8 mm housing
- 3 mm virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

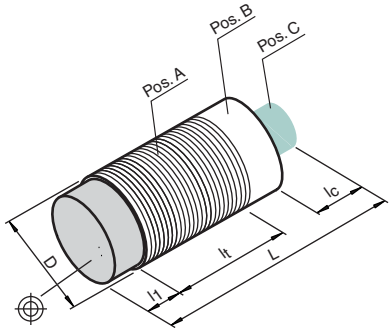
General Data	
Rated operating distance	3 mm
Installation	virtually flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Switching frequency	0 ... 1500 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Protection degree	IP67
Housing material	brass, nickel-plated

Model Number			NEB3-8GM45-E0	NEB3-8GM45-E1	NEB3-8GM45-E2	NEB3-8GM45-E3	NEB3-8GM45-E0-V3	NEB3-8GM45-E1-V3	NEB3-8GM45-E2-V3	NEB3-8GM45-E3-V3	NEB3-8GM45-E0-V1	NEB3-8GM45-E1-V1	NEB3-8GM45-E2-V1	NEB3-8GM45-E3-V1
green = preferred type														
Switching element function	NPN	NO	●				●				●			
	NPN	NC		●				●				●		
	PNP	NO			●				●				●	
	PNP	NC				●				●				●
Connection type	Device connector M12 x 1 , 4-pin										●	●	●	●
	Device connector M8 x 1 , 3-pin						●	●	●	●				
	cable PUR , 2 m		●	●	●	●								



Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions			
Length L [mm]	45	60	66
Diameter D [mm]	8		8 / 12
Thread length l_t [mm]	45		44
Cap length l_1 [mm]	0		
Connector area l_c [mm]	0	6	10
LED position	Pos. A		



Accessories

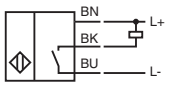
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

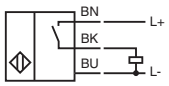
Electrical Connection



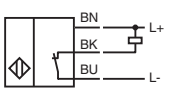
NEB3-8GM45-E0



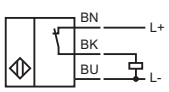
NEB3-8GM45-E2

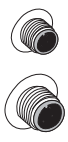


NEB3-8GM45-E1

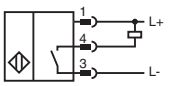


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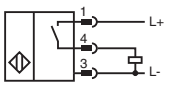




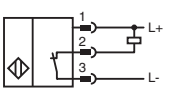
NEB3-8GM45-E0-V3
NEB3-8GM45-E0-V1



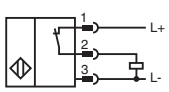
NEB3-8GM45-E2-V1
NEB3-8GM45-E2-V3



NEB3-8GM45-E1-V3
NEB3-8GM45-E1-V1



NEB3-8GM45-E3-V1
NEB3-8GM45-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	virtually flush
Switching element function	PNP NO
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Switching frequency	0 ... 500 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	chromium plated brass

Model Number		NEB4-8GM45-E2	NEB4-8GM50-E2-V3
Connection type	Device connector M8 x 1 , 3-pin		●
	cable PUR , 2 m	●	

Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	45	60
Diameter D [mm]	8	
Thread length l_t [mm]	45	
Cap length l_1 [mm]	0	
Connector area l_c [mm]	0	6
LED position	Pos. A	

Properties

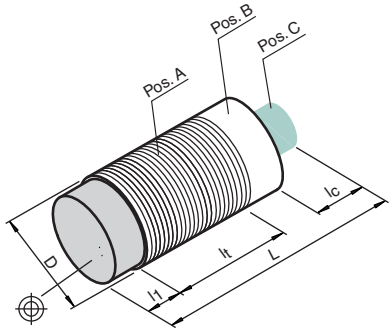
- Ø8 mm housing
- 4 mm, virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

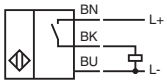
BF 8	Mounting flange, 8 mm
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



Electrical Connection

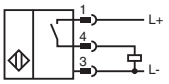


NEB4-8GM45-E2





NEB4-8GM50-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	6 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 750 Hz
Operating current	0 ... 200 mA , above 50°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

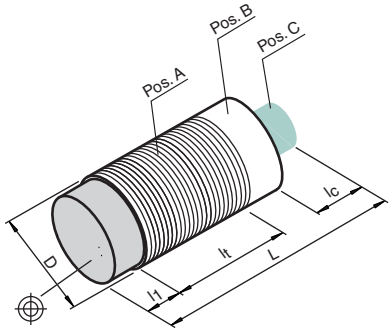
Model Number			NEN6-8GM45-E0	NEN6-8GM45-E1	NEN6-8GM45-E2	NEN6-8GM45-E3	NEN6-8GM45-E0-V3	NEN6-8GM45-E1-V3	NEN6-8GM45-E2-V3	NEN6-8GM45-E3-V3
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Connection type	Device connector M8 x 1 , 3-pin						●	●	●	●
	cable PUR , 2 m		●	●	●	●				

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions								
Length L [mm]	45				60			
Diameter D [mm]	8							
Thread length l_t [mm]	44				40			
Cap length l_1 [mm]	4							
Connector area l_c [mm]	0				6			
LED position	Pos. A							

Properties

- Ø8 mm housing
- 6 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

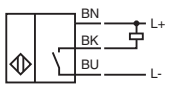
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM	Female connector, M8, 3-pin, field attachable
V1-W-BK	4-pin, M12 female field-attachable connector
V3-WM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

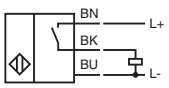
Electrical Connection



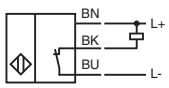
NEN6-8GM45-E0



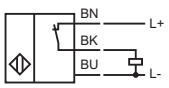
NEN6-8GM45-E2



NEN6-8GM45-E1

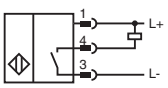


NEN6-8GM45-E3

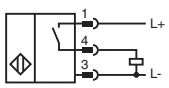




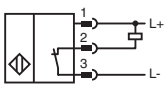
NEN6-8GM45-E0-V3



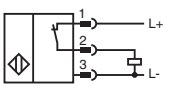
NEN6-8GM45-E2-V3



NEN6-8GM45-E1-V3



NEN6-8GM45-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	6 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 750 Hz
Operating current	0 ... 200 mA , above 50°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin

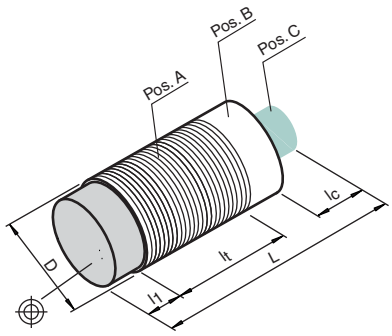


Model Number	green = preferred type		NEN6-8GM45-E0-V1	NEN6-8GM45-E1-V1	NEN6-8GM45-E2-V1	NEN6-8GM45-E3-V1
Switching element function	NPN	NO	●			
	NPN	NC		●		
	PNP	NO			●	
	PNP	NC				●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions	
Length L [mm]	66
Diameter D [mm]	8 / 12
Thread length l_t [mm]	40
Cap length l_1 [mm]	4
Connector area l_c [mm]	8
LED position	Pos. A

Properties

- Ø8 mm housing
- 6 mm, non-flush mountable
- DC, 3-wire switching output
- Connector version



Accessories

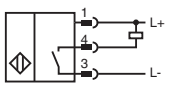
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM	Female connector, M8, 3-pin, field attachable
V1-W-BK	4-pin, M12 female field-attachable connector
V3-WM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

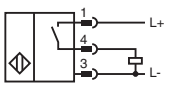
Electrical Connection



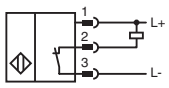
NEN6-8GM45-E0-V1



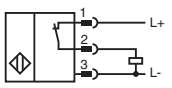
NEN6-8GM45-E2-V1

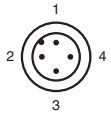


NEN6-8GM45-E1-V1



NEN6-8GM45-E3-V1



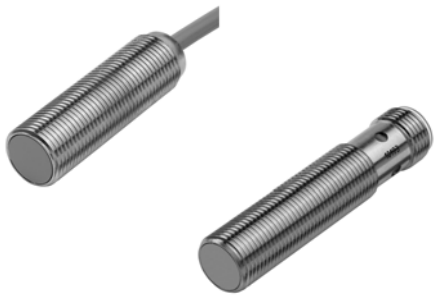


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Type of voltage	DC
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

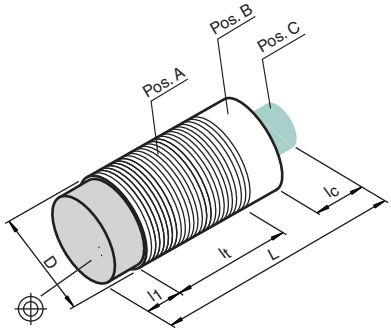
Model Number			NBB2-12GM40-Z0	NCB2-12GM40-Z0	NCB2-12GM40-Z1	NCB4-12GM35-Z4	NCB4-12GM35-Z5	NBB2-12GM40-Z0-V1	NCB2-12GM40-Z0-V1	NCB2-12GM40-Z1-V1	NCB4-12GM40-Z4-V1	NCB4-12GM40-Z5-V1
	green = preferred type											
Rated operating distance	2 mm		●	●	●			●	●	●		
	4 mm					●	●				●	●
Switching element function	DC	NO	●	●		●		●	●		●	
	DC	NC			●		●			●		●
Operating voltage	3.5 ... 30 V					●	●				●	●
	5 ... 60 V		●	●	●			●	●	●		
Reverse polarity protection	conducting					●	●				●	●
	tolerant		●	●	●			●	●	●		
Switching frequency	0 ... 800 Hz			●	●				●	●		
	0 ... 1000 Hz		●			●	●	●			●	●
Pre-fault indication	LED, red					●					●	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●		●	●	●	●
	-40 ... 70 °C (-40 ... 158 °F)							●				
Housing material	Stainless steel 1.4305 / AISI 303			●	●				●	●		
	brass, nickel-plated		●			●	●	●			●	●
Connection type	Device connector M12 x 1 , 4-pin							●	●	●	●	●
	cable PUR , 2 m			●	●							
	cable PVC , 2 m		●			●	●					

Approvals and Certificates										
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●			●	●	●		
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Dimensions										
Length L [mm]	40			35			55			
Diameter D [mm]	12									
Thread length l_t [mm]	37			32			39			
Cap length l_1 [mm]	0									
Connector area l_c [mm]	0						6			
LED position	Pos. C									

Properties

- Ø12 mm housing
- 2 mm and 4 mm, flush mountable versions
- DC, 2-wire switching output
- Cable and connector versions



Accessories

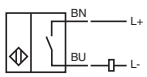
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

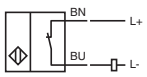
Electrical Connection



NBB2-12GM40-Z0
NCB2-12GM40-Z0
NCB4-12GM35-Z4

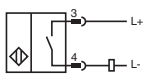


NCB2-12GM40-Z1
NCB4-12GM35-Z5

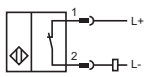




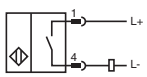
NBB2-12GM40-Z0-V1
NCB2-12GM40-Z0-V1

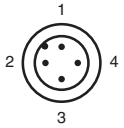


NCB2-12GM40-Z1-V1
NCB4-12GM40-Z5-V1



NCB4-12GM40-Z4-V1

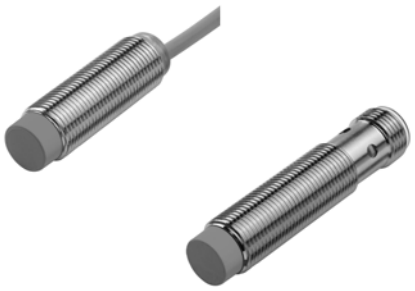




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

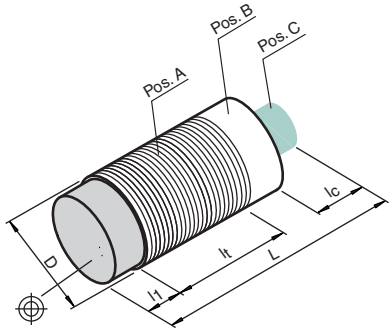
General Data	
Installation	non-flush
Type of voltage	DC
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number		NBN4-12GM40-Z0	NCN4-12GM40-Z0	NCN4-12GM40-Z1	NCN8-12GM35-Z4	NCN8-12GM35-Z5	NBN4-12GM40-Z0-V1	NCN4-12GM40-Z0-V1	NCN4-12GM40-Z1-V1	NCN8-12GM40-Z4-V1	NCN8-12GM40-Z5-V1
	green = preferred type										
Rated operating distance	4 mm	●	●	●			●	●	●		
	8 mm				●	●				●	●
Switching element function	DC NO	●	●		●		●	●		●	
	DC NC			●		●			●		●
Operating voltage	3.5 ... 30 V				●	●				●	●
	5 ... 60 V	●	●	●			●	●	●		
Reverse polarity protection	conducting				●	●				●	●
	tolerant	●	●	●			●	●	●		
Switching frequency	0 ... 750 Hz				●	●				●	●
	0 ... 800 Hz		●	●				●	●		
	0 ... 1000 Hz	●					●				
Pre-fault indication	LED, red				●					●	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●	●	●	●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)										●
Housing material	Stainless steel 1.4305 / AISI 303		●	●				●	●		
	brass, nickel-plated	●			●	●	●			●	●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●	●
	cable PUR , 2 m		●	●							
	cable PVC , 2 m	●			●	●					
											

Approvals and Certificates											
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●			●	●	●		
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Properties

- Ø12 mm housing
- 4 mm and 8 mm, non-flush mountable versions
- DC, 2-wire switching output
- Cable and connector versions



Dimensions				
Length L [mm]	40	35	55	
Diameter D [mm]	12			
Thread length l_t [mm]	32	27	34	
Cap length l_1 [mm]	5			
Connector area l_c [mm]	0		6	
LED position	Pos. C			

Accessories

This and more accessories can be found in chapter 10

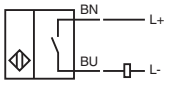
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

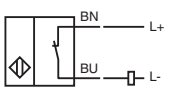
Electrical Connection



NBN4-12GM40-Z0
NCN4-12GM40-Z0
NCN8-12GM35-Z4

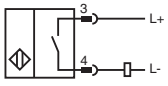


NCN4-12GM40-Z1
NCN8-12GM35-Z5

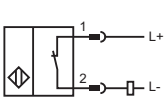




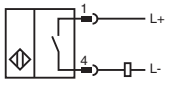
NBN4-12GM40-Z0-V1
NCN4-12GM40-Z0-V1

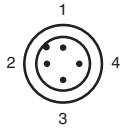


NCN4-12GM40-Z1-V1
NCN8-12GM40-Z5-V1



NCN8-12GM40-Z4-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

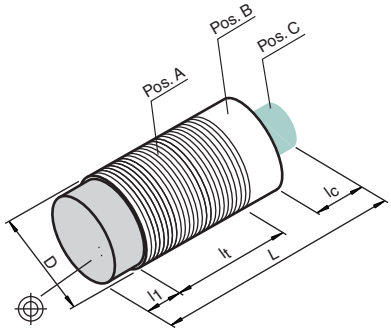
General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 17 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68 / IP69K
Connection type	cable PVC , 2 m



Model Number		NBB2-12GK50-E0	NBB2-12GK50-E2	NBN4-12GK50-E0	NBN4-12GK50-E2
Rated operating distance	2 mm	●	●		
	4 mm			●	●
Installation	flush	●	●		
	non-flush			●	●
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Switching frequency	0 ... 1200 Hz			●	●
	0 ... 1500 Hz	●	●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		50			
Diameter D [mm]		12			
Thread length l_t [mm]		40			
Cap length l_1 [mm]		1			
Connector area l_c [mm]		0			
LED position		Pos. C			

Properties

- Ø12 mm housing
- 2 mm, flush and 4 mm, non-flush mountable versions
- DC, 3-wire switching output
- Cable version



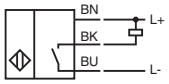
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

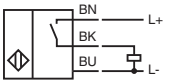
BF 12	Mounting flange, 12 mm

Electrical Connection

NBB2-12GK50-E0
NBN4-12GK50-E0



NBB2-12GK50-E2
NBN4-12GK50-E2



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68
Connection type	cable PUR , 2 m



Model Number			NJ2-12GK40-E	NJ2-12GK40-E1	NJ2-12GK40-E2	NJ2-12GK40-E3	NJ4-12GK40-E	NJ4-12GK40-E1	NJ4-12GK40-E2	NJ4-12GK40-E3
Rated operating distance	2 mm		●	●	●	●				
	4 mm						●	●	●	●
Installation	flush		●	●	●	●				
	non-flush						●	●	●	●
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Switching frequency	0 ... 2000 Hz						●	●	●	●
	0 ... 3000 Hz		●	●	●	●				
Approvals and Certificates										
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●	●	●	●	●

Dimensions								
Length L [mm]			40				40	
Diameter D [mm]					12			
Thread length l_t [mm]			35				35	
Cap length l_1 [mm]					1			
Connector area l_c [mm]					0			

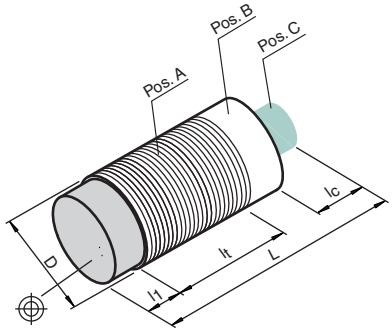
Properties

- Ø12 mm plastic housing
- 2 mm, flush and 4 mm, non-flush mountable versions
- DC, 3-wire switching output
- Cable version

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

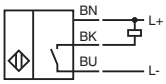
BF 12	Mounting flange, 12 mm



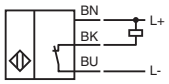
Electrical Connection



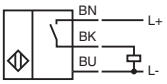
NJ2-12GK40-E
NJ4-12GK40-E



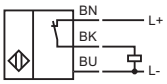
NJ2-12GK40-E1
NJ4-12GK40-E1



NJ2-12GK40-E2
NJ4-12GK40-E2



NJ2-12GK40-E3
NJ4-12GK40-E3



Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 60 V
Reverse polarity protection	✔
Switching frequency	0 ... 3000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

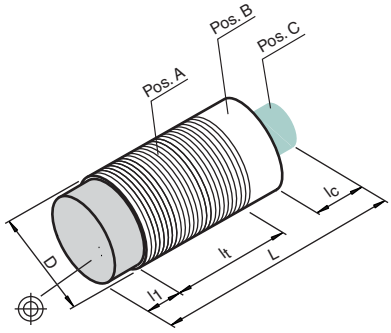
Model Number			NJ2-12GM40-E	NJ2-12GM40-E2	NJ2-12GM40-E3	NJ2-12GM40-E-V1	NJ2-12GM40-E2-V1	NJ2-12GM40-E3-V1
Switching element function	NPN	NO	●			●		
	PNP	NO		●			●	
	PNP	NC			●			●
No-load supply current	≤ 11 mA		●	●		●	●	
	≤ 15 mA				●			●
Connection type	Device connector M12 x 1 , 4-pin					●	●	●
	cable PUR , 2 m		●	●	●			
								

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●

Dimensions						
Length L [mm]	40			50		
Diameter D [mm]	12					
Thread length l_t [mm]	40			50		
Cap length l_1 [mm]	0					
Connector area l_c [mm]	0					
LED position	Pos. A					

Properties

- Ø12 mm housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

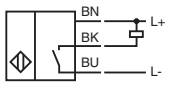
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

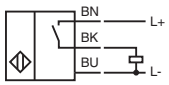
Electrical Connection



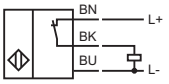
NJ2-12GM40-E



NJ2-12GM40-E2

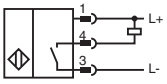


NJ2-12GM40-E3

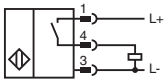




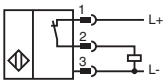
NJ2-12GM40-E-V1

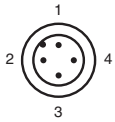


NJ2-12GM40-E2-V1



NJ2-12GM40-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

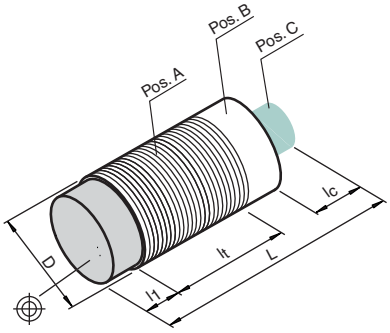
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB2-12GM30-E2	NBB2-12GM40-E0	NBB2-12GM40-E1	NBB2-12GM40-E2	NBB2-12GM40-E3	NBB2-12GM30-E2-V1	NBB2-12GM40-E0-V1	NBB2-12GM40-E2-V1
Switching element function	NPN	NO		●					●	
	NPN	NC			●					
	PNP	NO	●			●		●		●
	PNP	NC					●			
Switching frequency	0 ... 1000 Hz			●	●	●	●		●	●
	0 ... 800 Hz		●					●		
Operating current	0 ... 100 mA			●	●	●	●			
	0 ... 200 mA		●					●	●	●
Connection type	Device connector M12 x 1 , 4-pin							●	●	●
	cable PVC , 2 m		●	●	●	●	●			

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions						
Length L [mm]	30	40			45	50
Diameter D [mm]	12					
Thread length l_t [mm]	27	37			30	50
Cap length l_1 [mm]	0					
Connector area l_c [mm]	0				6	
LED position	Pos. C					



Accessories

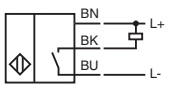
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

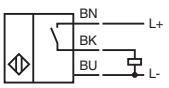
Electrical Connection



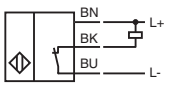
NBB2-12GM40-E0



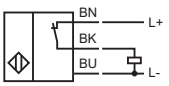
NBB2-12GM30-E2
NBB2-12GM40-E2



NBB2-12GM40-E1

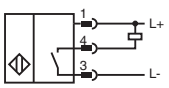


NBB2-12GM40-E3

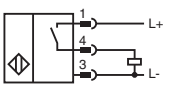


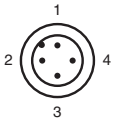


NBB2-12GM40-E0-V1



NBB2-12GM30-E2-V1
NBB2-12GM40-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB2-12GM50-E0	NBB2-12GM50-E1	NBB2-12GM50-E2	NBB2-12GM60-A0	NBB2-12GM60-A2	NBB2-12GM50-E0-V1	NBB2-12GM50-E1-V1	NBB2-12GM50-E2-V1	NBB2-12GM60-E2-V1	NBB2-12GM60-A0-V1	NBB2-12GM60-A2-V1
Switching element function	NPN	NO/NC				●						●	
	NPN	NO	●					●					
	NPN	NC		●					●				
	PNP	NO/NC					●						●
	PNP	NO			●					●	●		
No-load supply current	≤ 15 mA											●	●
	≤ 20 mA		●	●	●	●	●	●	●	●	●		
Switching frequency	0 ... 1000 Hz					●	●					●	●
	0 ... 1500 Hz		●	●	●			●	●	●	●		
Indication of the switching state	LED, yellow		●	●	●	●	●	●	●	●		●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●	●		●	●	●
	-40 ... 70 °C (-40 ... 158 °F)									●			
Connection type	Device connector M12 x 1 , 4-pin							●	●	●	●	●	●
	cable PVC , 2 m		●	●	●	●	●						

Approvals and Certificates												
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.											

Dimensions												
Length L [mm]	50	50	50	60	60	65	65	65	70	70	70
Diameter D [mm]	12										
Thread length l_t [mm]	50	50	50	60	60	50	50	50	40	70	70
Cap length l_1 [mm]	0										
Connector area l_c [mm]	0					6			10	0	
LED position	Pos.:	C	C	C	C	C	C	C	C	-	C	C

Properties

- Ø12 mm housing
- 2 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Further Products

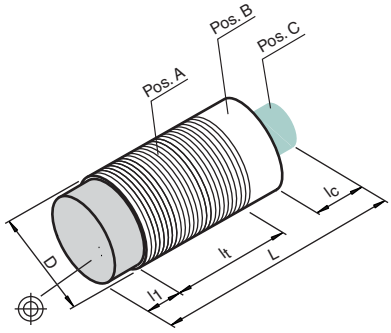
In this series, we offer additionally:

NBB2-12GM60-E2-T

Technical data similar to NBB2-12GM50-E2 but:
Operating voltage: 10 ... 65 V
No-load supply current: ≤ 10 mA
Operating current: 0 ... 300 mA
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)

NBB2-12GM50-E2-T-V1

Technical data similar to NBB2-12GM50-E2-V1 but:
Operating voltage: 10 ... 65 V
No-load supply current: ≤ 10 mA
Operating current: 0 ... 300 mA
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)



Accessories

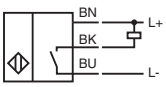
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

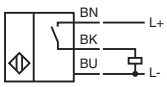
Electrical Connection



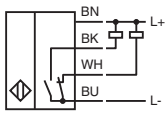
NBB2-12GM50-E0



NBB2-12GM50-E2
NBB2-12GM60-E2-T

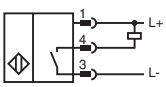


NBB2-12GM60-A0

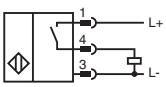




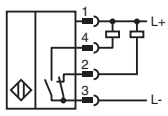
NBB2-12GM50-E0-V1

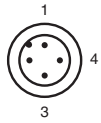


NBB2-12GM60-E2-V1
NBB2-12GM50-E2-T-V1
NBB2-12GM50-E2-V1

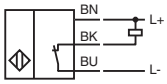


NBB2-12GM60-A0-V1

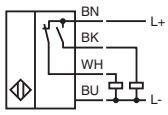




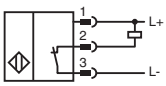
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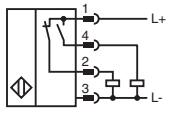
NBB2-12GM60-A2



NBB2-12GM50-E1-V1



NBB2-12GM60-A2-V1



Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 4 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

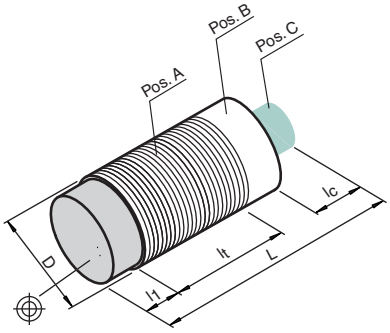
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 2000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number			NJ4-12GM40-E	NJ4-12GM40-E1	NJ4-12GM40-E2	NJ4-12GM40-E3	NJ4-12GM40-E-V1	NJ4-12GM40-E2-V1	NJ4-12GM40-E3-V1
Switching element function	NPN	NO	●				●		
	NPN	NC		●					
	PNP	NO			●			●	
	PNP	NC				●			●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●
	cable PUR , 2 m		●	●	●	●			

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●

Dimensions							
Length L [mm]	40				50		
Diameter D [mm]	12						
Thread length l_t [mm]	35				45		
Cap length l_1 [mm]	5						
Connector area l_c [mm]	0						
LED position	Pos. A						



Accessories

This and more accessories can be found in chapter 10

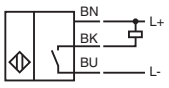
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

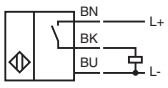
Electrical Connection



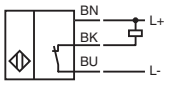
NJ4-12GM40-E



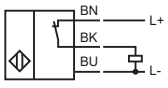
NJ4-12GM40-E2



NJ4-12GM40-E1

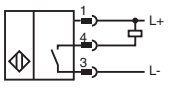


NJ4-12GM40-E3

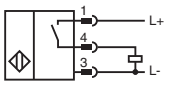




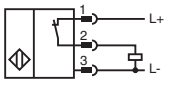
NJ4-12GM40-E-V1

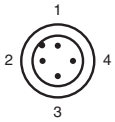


NJ4-12GM40-E2-V1



NJ4-12GM40-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type		NBB4-12GM30-E2	NBB4-12GM30-E3	NBB4-12GM40-E0	NBB4-12GM40-E2	NBB4-12GM30-E2-V3	NBB4-12GM30-E2-V1	NBB4-12GM30-E3-V1
Switching element function	NPN	NO			●				
	PNP	NO	●			●	●	●	
	PNP	NC		●					●
No-load supply current	≤ 15 mA		●	●	●		●	●	●
	≤ 20 mA					●			
Switching frequency	0 ... 1000 Hz		●	●			●	●	●
	0 ... 800 Hz				●	●			
Operating current	0 ... 150 mA		●	●			●	●	●
	0 ... 200 mA				●	●			
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●			●	●	●
	-40 ... 80 °C (-40 ... 176 °F)					●			
	-40 ... 85 °C (-40 ... 185 °F)				●				
Connection type	Device connector M12 x 1 , 4-pin							●	●
	Device connector M8 x 1 , 3-pin						●		
	cable PVC , 2 m		●	●	●	●			

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							

Dimensions					
Length L [mm]	30	40		44	45
Diameter D [mm]	12				
Thread length l_t [mm]	27	37		35	30
Cap length l_1 [mm]	0				
Connector area l_c [mm]	0			9	6
LED position	Pos. C				

Properties

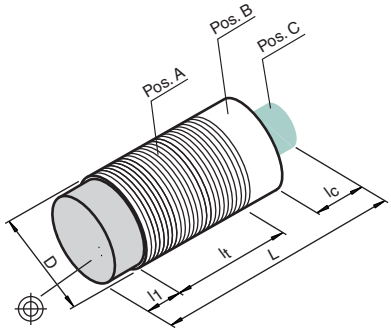
- Ø12 mm housing
- 4 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBB4-12GM30-E2-T-V1

Technical data similar to NBB4-12GM30-E2-V1 but:
Operating current: 0 ... 100 mA
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)



Accessories

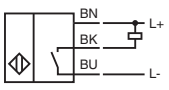
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-2M-PUR H/S	Female cordset, M12, 4-pin, irradiated PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

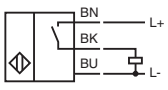
Electrical Connection



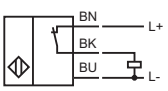
NBB4-12GM40-E0



NBB4-12GM40-E2
NBB4-12GM30-E2

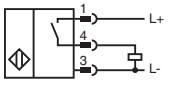


NBB4-12GM30-E3

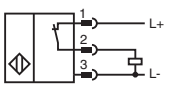




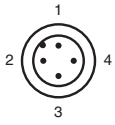
NBB4-12GM30-E2-T-V1
NBB4-12GM30-E2-V1
NBB4-12GM30-E2-V3



NBB4-12GM30-E3-V1







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 4 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

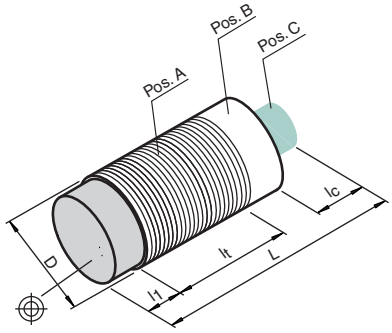
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 800 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number		NBB4-12GM50-E0	NBB4-12GM50-E1	NBB4-12GM50-E2	NBB4-12GM50-E3	NBB4-12GM50-E0-V1	NBB4-12GM50-E1-V1	NBB4-12GM50-E2-V1	NBB4-12GM50-E3-V1	NCB4-12GM50-E2-V1
	green = preferred type									
Switching element function	NPN NO	●				●				
	NPN NC		●				●			
	PNP NO			●				●		●
	PNP NC				●				●	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●	●	●		●	●
	-40 ... 70 °C (-40 ... 158 °F)							●		
Housing material	Stainless steel 1.4305 / AISI 303									●
	brass, nickel-plated	●	●	●	●	●	●	●	●	
Connection type	Device connector M12 x 1 , 4-pin					●	●	●	●	●
	cable PVC , 2 m	●	●	●	●					

Approvals and Certificates										
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									

Dimensions										
Length L [mm]		50				65				
Diameter D [mm]		12								
Thread length l_t [mm]		47				49				
Cap length l_1 [mm]		0								
Connector area l_c [mm]		0				6				
LED position		Pos. C								



Accessories

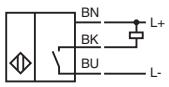
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 12	Mounting flange, 12 mm
V1-W-BK	4-pin, M12 female field-attachable connector
EXG-12	Quick mounting bracket with dead stop
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

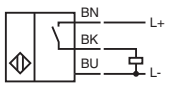
Electrical Connection



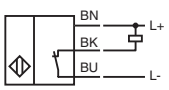
NBB4-12GM50-E0



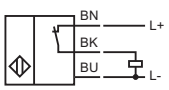
NBB4-12GM50-E2



NBB4-12GM50-E1

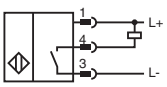


NBB4-12GM50-E3

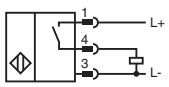




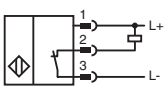
NBB4-12GM50-E0-V1



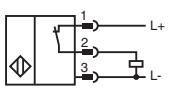
NCB4-12GM50-E2-V1
NBB4-12GM50-E2-V1

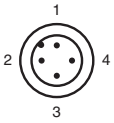


NBB4-12GM50-E1-V1



NBB4-12GM50-E3-V1

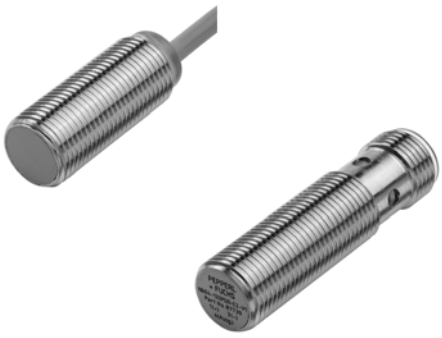




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø12 mm housing
- 4 mm, flush mountable
- DC, 3-wire and 4-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBB4-12GM30-E2-V3

Technical data like NBB4-12GM30-E2-V1 but:
Connection type: Device connector M8 x 1 , 3-pin

Technical Data

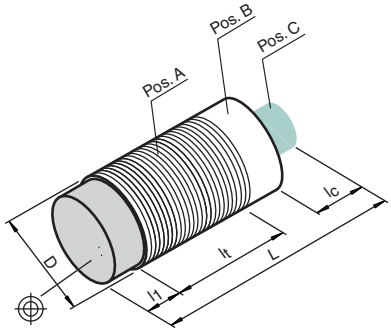
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB4-12GM30-E2	NBB4-12GM30-E3	NBB4-12GM50-E0	NBB4-12GM50-E1	NBB4-12GM50-E2	NBB4-12GM50-E3	NBB4-12GM50-A2	NBB4-12GM30-E2-V1	NBB4-12GM30-E3-V1	NBB4-12GM50-E0-V1	NBB4-12GM50-E1-V1	NBB4-12GM50-E2-V1	NBB4-12GM50-E3-V1	NBB4-12GM50-A2-V1
	green = preferred type															
Switching element function	NPN	NO			●							●				
	NPN	NC				●							●			
	PNP	NO	●				●			●				●		
	PNP	NC		●				●			●				●	
	PNP	NO/NC							●							●
No-load supply current	≤ 15 mA		●	●	●	●	●	●		●	●	●	●	●	●	
	≤ 20 mA								●							●
Switching frequency	0 ... 800 Hz				●	●	●	●	●			●	●	●	●	●
	0 ... 1000 Hz		●	●						●	●					
	0 ... 1500 Hz								●							●
Operating current	0 ... 150 mA		●	●						●	●					
	0 ... 200 mA				●	●	●	●	●			●	●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●	●	●	●	●	●		●	●
	-40 ... 70 °C (-40 ... 158 °F)													●		
Connection type	Device connector M12 x 1 , 4-pin									●	●	●	●	●	●	●
	cable PVC , 2 m		●	●	●	●	●	●	●							

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions				
Length L [mm]	30	50	45	65
Diameter D [mm]	12			
Thread length l_t [mm]	27	47	30	49
Cap length l_1 [mm]	0			
Connector area l_c [mm]	0		6	
LED position	Pos. C			

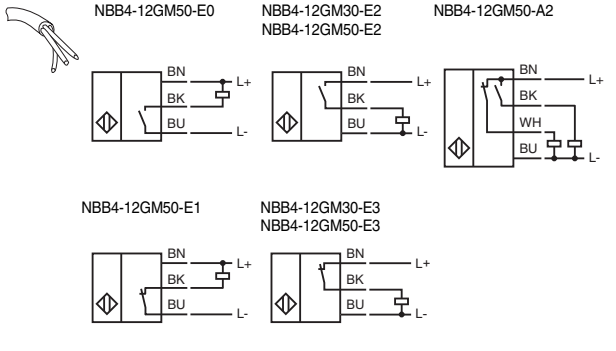


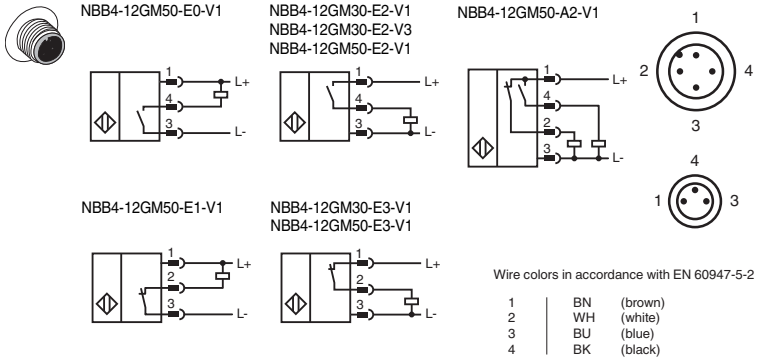
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 17 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBN4-12GM50-E0	NBN4-12GM50-E1	NBN4-12GM50-E2	NBN4-12GM50-E3	NBN4-12GM50-E0-V1	NBN4-12GM50-E1-V1	NBN4-12GM50-E2-V1	NBN4-12GM50-E3-V1
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●
	cable PVC , 2 m		●	●	●	●				





Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions								
Length L [mm]	50				65			
Diameter D [mm]	12							
Thread length l_t [mm]	42				45			
Cap length l_1 [mm]	5							
Connector area l_c [mm]	0				6			
LED position	Pos. C							

Properties

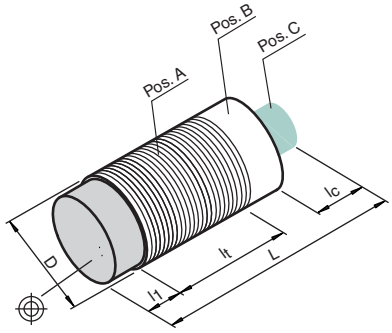
- Ø12 mm housing
- 4 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBN4-12GM40-E2-T-V1
NBN4-12GM60-E2-T-V1

Technical data:
PNP NO
-25 ... 100 °C (-13 ... 212 °F)
Device connector M12 x 1 , 3-pin



Accessories

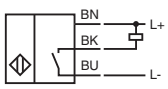
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

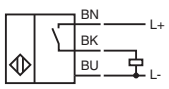
Electrical Connection



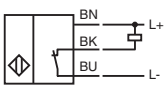
NBN4-12GM50-E0



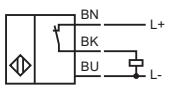
NBN4-12GM50-E2



NBN4-12GM50-E1

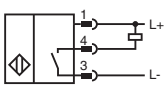


NBN4-12GM50-E3

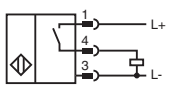


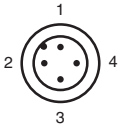


NBN4-12GM50-E0-V1

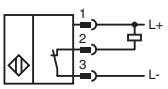


NBN4-12GM40-E2-T-V1
NBN4-12GM60-E2-T-V1
NBN4-12GM50-E2-V1

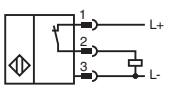




NBN4-12GM50-E1-V1



NBN4-12GM50-E3-V1



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

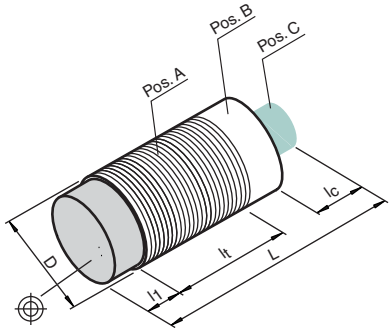
Model Number			NBN4-12GM60-A0	NBN4-12GM60-A2	NBN4-12GM35-A0-V1	NBN4-12GM35-A2-V1	NBN4-12GM60-A0-V1	NBN4-12GM60-A2-V1
Switching element function	NPN	NO/NC	●		●		●	
	PNP	NO/NC		●		●		●
No-load supply current	≤ 15 mA						●	●
	≤ 20 mA		●	●	●	●		
Switching frequency	0 ... 1000 Hz		●	●				
	0 ... 1200 Hz						●	●
	0 ... 800 Hz				●	●		
Connection type	Device connector M12 x 1 , 4-pin				●	●	●	●
	cable PVC , 2 m		●	●				

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions			
Length L [mm]	60	50	70
Diameter D [mm]		12	
Thread length l_t [mm]	55	30	65
Cap length l_1 [mm]		5	
Connector area l_c [mm]	0	6	0
LED position	Pos. C	Pos. B	

Properties

- Ø12 mm housing
- 4 mm, non-flush mountable
- DC, 4-wire switching outputs
- Cable and connector versions



Accessories

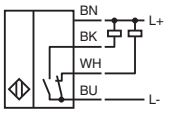
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 12	Mounting flange, 12 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

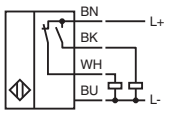
Electrical Connection



NBN4-12GM60-A0

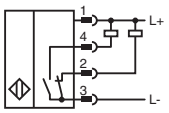


NBN4-12GM60-A2

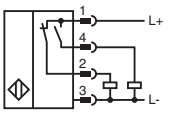


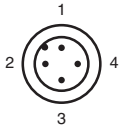


NBN4-12GM35-A0-V1
NBN4-12GM60-A0-V1



NBN4-12GM35-A2-V1
NBN4-12GM60-A2-V1

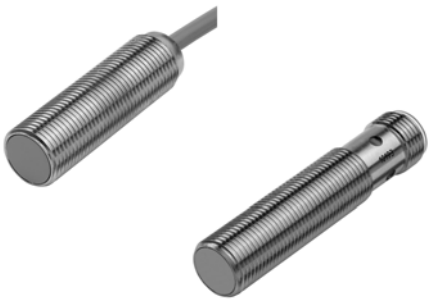




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 6 mm, virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

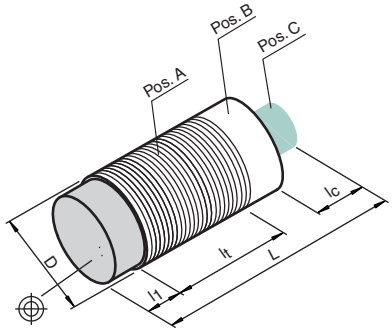
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	6 mm
Installation	virtually flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 800 Hz
Operating current	0 ... 200 mA , above 70°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NEB6-12GM50-E0	NEB6-12GM50-E1	NEB6-12GM50-E2	NEB6-12GM50-E3	NEB6-12GM50-E0-V1	NEB6-12GM50-E1-V1	NEB6-12GM50-E2-V1	NEB6-12GM50-E3-V1
green = preferred type									
Switching element function	NPN NO	●				●			
	NPN NC		●				●		
	PNP NO			●				●	
	PNP NC				●				●
Connection type	Device connector M12 x 1 , 4-pin					●	●	●	●
	cable PUR , 2 m	●	●	●	●				

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions		
Length L [mm]	50	60
Diameter D [mm]	12	
Thread length l_t [mm]	49	40
Cap length l_1 [mm]	0	
Connector area l_c [mm]	0	6
LED position	Pos. A	



Accessories

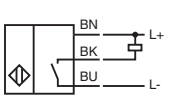
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

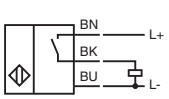
Electrical Connection



NEB6-12GM50-E0

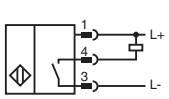


NEB6-12GM50-E2

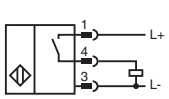


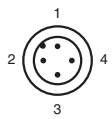


NEB6-12GM50-E0-V1



NEB6-12GM50-E2-V1

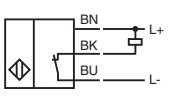




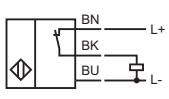
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

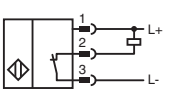
NEB6-12GM50-E1



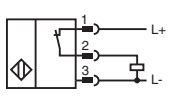
NEB6-12GM50-E3



NEB6-12GM50-E1-V1



NEB6-12GM50-E3-V1



Date of issue: 04/08/2015



Properties

- Ø12 mm housing
- 7 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	7 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 300 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	all direction LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NBN7-12GM35-E2	NBN7-12GM35-E2-V1	NBN7-12GM35-E3-V1
	green = preferred type			
Switching element function	PNP NO	●	●	
	PNP NC			●
Connection type	Device connector M12 x 1 , 4-pin		●	●
	cable PVC , 2 m	●		

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

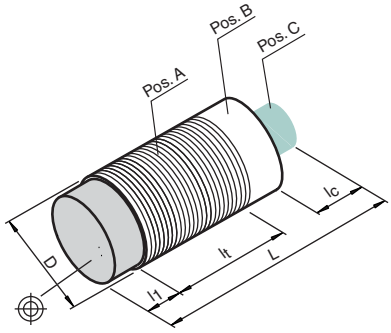
Dimensions			
Length L [mm]	35	50	
Diameter D [mm]	12		
Thread length l_t [mm]	27	30	
Cap length l_1 [mm]	5		
Connector area l_c [mm]	0	6	
LED position	Pos. C	Pos. B	

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

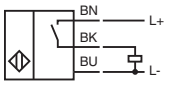
BF 12	Mounting flange, 12 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



Electrical Connection

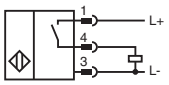


NBN7-12GM35-E2

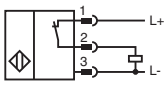


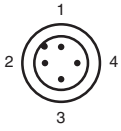


NBN7-12GM35-E2-V1



NBN7-12GM35-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 16 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

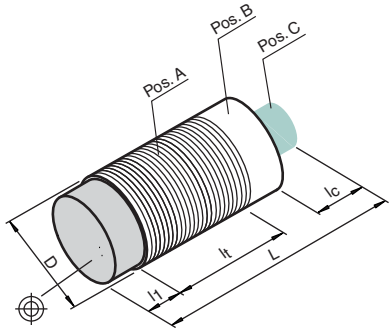
Model Number			NBN8-12GM50-E0	NBN8-12GM50-E2	NBN8-12GM50-A0	NBN8-12GM50-A2	NBN8-12GM50-E0-V1	NBN8-12GM50-E2-V1	NBN8-12GM50-A0-V1	NBN8-12GM50-A2-V1
green = preferred type										
Switching element function	NPN	NO/NC			●				●	
	NPN	NO	●				●			
	PNP	NO/NC				●				●
	PNP	NO		●				●		
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●		●	●
	-40 ... 70 °C (-40 ... 158 °F)							●		
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●
	cable PVC , 2 m		●	●	●	●				

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions					
Length L [mm]	50			65	
Diameter D [mm]	12				
Thread length l_t [mm]	39			41	
Cap length l_1 [mm]	8				
Connector area l_c [mm]	0			6	
LED position	Pos. C				

Properties

- Ø12 mm housing
- 8 mm, non-flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions



Accessories

This and more accessories can be found in chapter 10

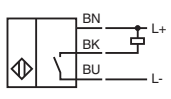
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

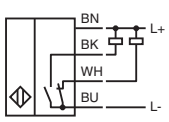
Electrical Connection



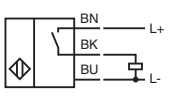
NBN8-12GM50-E0



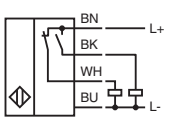
NBN8-12GM50-A0



NBN8-12GM50-E2

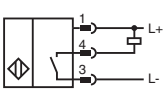


NBN8-12GM50-A2

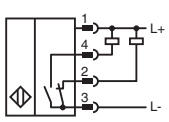


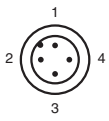


NBN8-12GM50-E0-V1



NBN8-12GM50-A0-V1

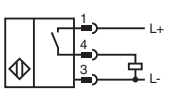




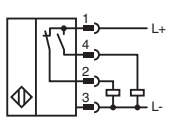
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

NBN8-12GM50-E2-V1



NBN8-12GM50-A2-V1



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Properties

- Ø12 mm housing
- 10 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 600 Hz
Operating current	0 ... 200 mA , above 70°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

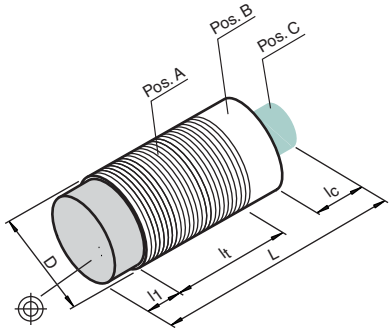
Model Number			NEN10-12GM50-E0	NEN10-12GM50-E1	NEN10-12GM50-E2	NEN10-12GM50-E3	NEN10-12GM50-E0-V1	NEN10-12GM50-E1-V1	NEN10-12GM50-E2-V1	NEN10-12GM50-E3-V1
	green = preferred type									
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●
	cable PUR , 2 m		●	●	●	●				





Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]		50				60			
Diameter D [mm]		12							
Thread length l_t [mm]		44				34			
Cap length l_1 [mm]		5,7							
Connector area l_c [mm]		0				6			
LED position		Pos. A							



Accessories

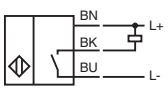
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
EXG-12	Quick mounting bracket with dead stop
BF 12	Mounting flange, 12 mm
EXG-18	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

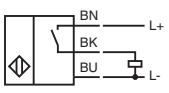
Electrical Connection



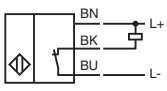
NEN10-12GM50-E0



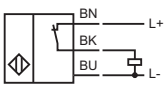
NEN10-12GM50-E2



NEN10-12GM50-E1

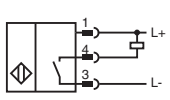


NEN10-12GM50-E3

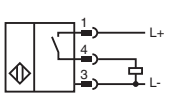


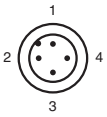


NEN10-12GM50-E0-V1



NEN10-12GM50-E2-V1

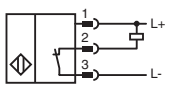




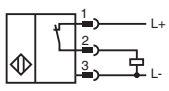
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

NEN10-12GM50-E1-V1



NEN10-12GM50-E3-V1



Date of issue 04/08/2015



Properties

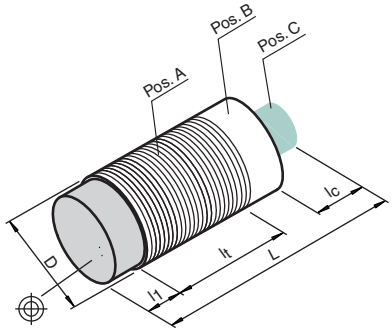
- Ø12 mm housing
- 2 mm, flush and 4 mm, non-flush mountable versions
- AC, 2-wire switching output
- Cable version

Further Products

In this series, we offer additionally:

NBB2-12GM60-WS

Technical data like NJ2-12GM50-WS but:
Operating voltage: 20 ... 150 V AC
Switching frequency: 0 ... 25 Hz
Operating voltage indicator: LED, green
Housing material: Brass, nickel plated
Length L: 60 mm
Thread length l_t: 60 mm



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	AC
Operating voltage	20 ... 253 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 20 Hz
Operating current	5 ... 200 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67
Connection type	cable PVC , 2 m

Model Number			NJ2-12GM50-WS	NJ2-12GM50-WO	NJ4-12GM50-WS	NJ4-12GM50-WO
Rated operating distance	2 mm		●	●		
	4 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	AC	NO	●		●	
	AC	NC		●		●



Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●

Dimensions				
Length L [mm]	50			
Diameter D [mm]	12			
Thread length l_t [mm]	50		45	
Cap length l_1 [mm]	0		5	
Connector area l_c [mm]	0			
LED position	Pos. A			

Accessories

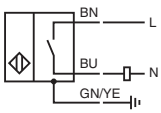
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop

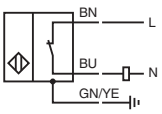
Electrical Connection



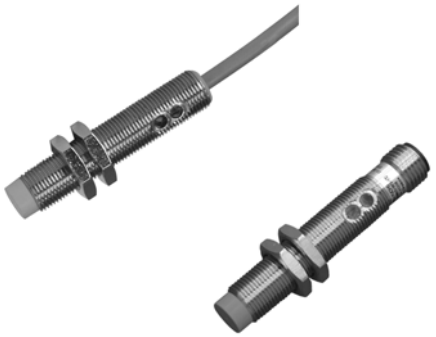
NJ4-12GM50-WS
NJ2-12GM50-WS
NBB2-12GM60-WS



NJ4-12GM50-WO
NJ2-12GM50-WO



Date of issue: 04/08/2015



Technical Data

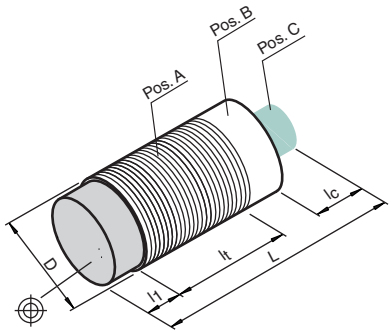
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	non-flush
Type of voltage	AC
Operating voltage	20 ... 150 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 25 Hz
Operating current	5 ... 200 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBN4-12GM60-WO	NBN4-12GM60-WS	NBN4-12GM60-WO-V12	NBN4-12GM60-WS-V11	NBN4-12GM60-WS-V12
Switching element function	AC	NO		●		●	●
	AC	NC	●		●		
Connection type	Device connector 1/2"-20 UN , 3-pin				●		●
	Device connector M12, 3-pin					●	
	cable PVC , 2 m		●	●			
							
Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)			●	●		●
Dimensions							
Length L [mm]			60		70		
Diameter D [mm]			12				
Thread length l_t [mm]			55		50	65	50
Cap length l_1 [mm]			5				
Connector area l_c [mm]			0		12		
LED position			Pos. A				

Properties

- Ø12 mm housing
- 4 mm, non-flush mountable
- AC, 2-wire switching output
- Cable and connector versions



Accessories

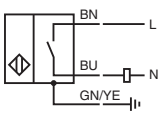
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop

Electrical Connection

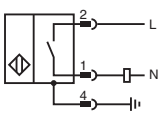


NBN4-12GM60-WS

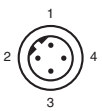




NBN4-12GM60-WS-V11



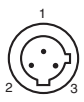
V11



Wire colors

1	BU	(blue)
2	BN	(brown)
4	GN/YE	(green/yellow)

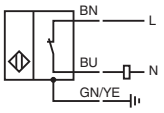
V12



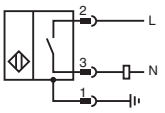
Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

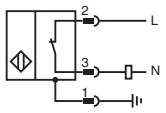
NBN4-12GM60-WO



NBN4-12GM60-WS-V12



NBN4-12GM60-WO-V12



Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 4 mm, flush and 8 mm, non-flush mountable versions
- AC/DC, 2-wire switching output
- Cable and connector versions

Technical Data

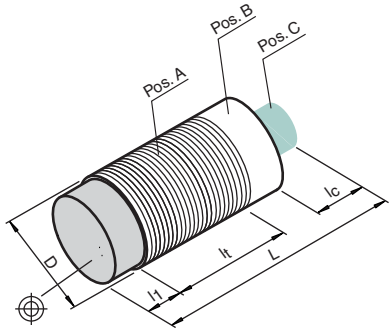
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	AC/DC	NO
Type of voltage	AC/DC	
Operating voltage	20 ... 250 V AC/20 ... 300 V DC	
Reverse polarity protection	tolerant	
Switching frequency	30 Hz	
Operating current	8 ... 200 mA AC/DC	
Short-circuit protection	✔	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	brass, nickel-plated	
Protection degree	IP67	

Model Number		NBB4-12GM75-US	NBN8-12GM75-US	NBB4-12GM65-US-V12	NBN8-12GM65-US-V12
Rated operating distance	4 mm	●		●	
	8 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Connection type	Device connector 1/2"-20 UN , 3-pin			●	●
	cable PUR , 2 m	●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●

Dimensions					
Length L [mm]		75		82	
Diameter D [mm]		12			
Thread length l_t [mm]		72	64	65	64
Cap length l_1 [mm]		0	8	0	8
Connector area l_c [mm]		0		8	
LED position		Pos. B			



Accessories

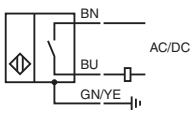
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

EXG-12	Quick mounting bracket with dead stop

Electrical Connection

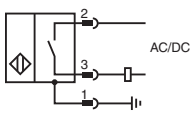


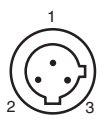
NBB4-12GM75-US
NBN8-12GM75-US





NBB4-12GM65-US-V12
NBN8-12GM65-US-V12





Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	0 ... 6 mm
Installation	virtually flush
Type of voltage	DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Limit frequency (3dB)	1000 Hz
Short-circuit protection	✔
Adjustment tolerance zero point	≤ ± 10 % of full-scale value
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	chromium plated brass
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



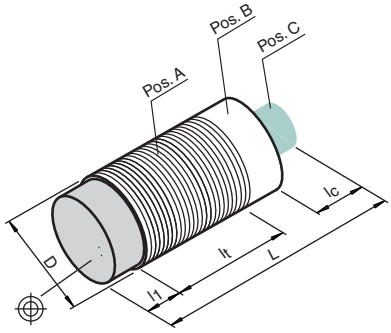
Model Number	green = preferred type	IA6-12GM35-U-V1	IA6-12GM50-IU-V1
Switching element function	analog voltage output	●	
	analog, current or voltage output		●
Operating voltage	10 ... 30 V	●	
	15 ... 30 V , residual ripple 20 % U_B		●
Output type	0 ... 5 V	●	
	0 ... 10 V / 4 ... 20 mA		●
Load resistor	≥ 500 Ω	●	
	voltage output: ≥ 500 Ω current output: ≤ 500 Ω		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		45	60
Diameter D [mm]		12	
Thread length l_t [mm]		29	44
Cap length l_1 [mm]		0	
Connector area l_c [mm]		8	
LED position		45	60

Properties

- Ø12 mm housing
- 6 mm, virtually flush mountable
- DC, 3-wire analog output
- Connector version

Your Benefit

- Inductive position measurement
- Distance proportional analog value
- Suitable for positioning tasks



Accessories

This and more accessories can be found in chapter 10

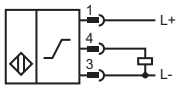
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

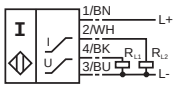
Electrical Connection

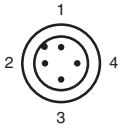


IA6-12GM35-U-V1



IA6-12GM50-IU-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 5 mm, flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

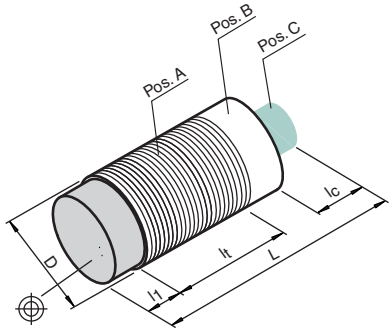
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number	green = preferred type	NBB5-18GM40-Z0	NCB5-18GM40-Z0	NCB5-18GM40-Z1	NBB5-18GM40-Z0-V1	NCB5-18GM40-Z0-V1	NCB5-18GM40-Z1-V1	NCB5-18GM40-Z3-V1
Switching element function	DC NO	●	●		●	●		●
	DC NC			●			●	
Switching frequency	0 ... 350 Hz		●	●		●	●	●
	0 ... 500 Hz	●			●			
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●		●	●	●
	-40 ... 70 °C (-40 ... 158 °F)				●			
Housing material	Stainless steel 1.4305 / AISI 303		●	●		●	●	●
	brass, nickel-plated	●			●			
Connection type	Device connector M12 x 1 , 4-pin				●	●	●	●
	cable PUR , 2 m		●	●				
	cable PVC , 2 m	●						
								

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●

Dimensions							
Length L [mm]	40				55		
Diameter D [mm]	18						
Thread length l_t [mm]	37				40		
Cap length l_1 [mm]	0						
Connector area l_c [mm]	0				15		
LED position	Pos. C						



Accessories

This and more accessories can be found in chapter 10

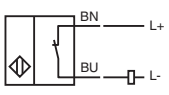
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
BF 18	Mounting flange, 18 mm
EXG-18	Quick mounting bracket with dead stop
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

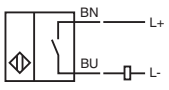
Electrical Connection



NCB5-18GM40-Z1

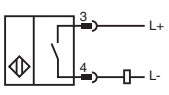


NBB5-18GM40-Z0
NCB5-18GM40-Z0

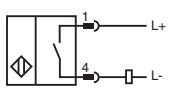


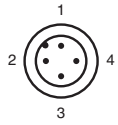


NBB5-18GM40-Z0-V1
NCB5-18GM40-Z0-V1

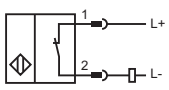


NCB5-18GM40-Z3-V1





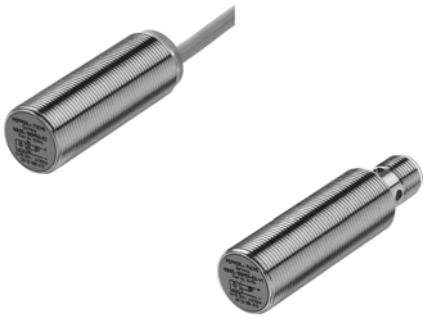
NCB5-18GM40-Z1-V1



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø18 mm housing
- 8 mm, flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

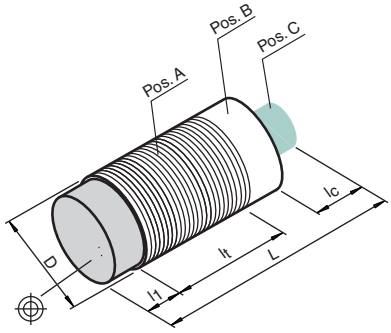
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	flush
Type of voltage	DC
Operating voltage	3.5 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NCB8-18GM50-Z4	NCB8-18GM50-Z5	NCB8-18GM50-Z4-V1	NCB8-18GM50-Z5-V1
Switching element function	DC	NO	●		●	
	DC	NC		●		●
Pre-fault indication	LED, red		●		●	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●		●
	-40 ... 70 °C (-40 ... 158 °F)				●	
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	48		65	
Diameter D [mm]		18		
Thread length l_t [mm]	45		50	
Cap length l_1 [mm]		0		
Connector area l_c [mm]	0		15	
LED position		Pos. C		



Accessories

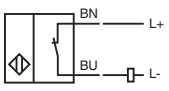
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
EXG-18	Quick mounting bracket with dead stop
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

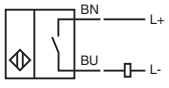
Electrical Connection



NCB8-18GM50-Z5

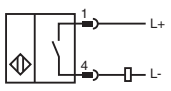


NCB8-18GM50-Z4

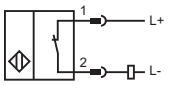


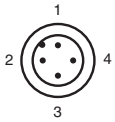


NCB8-18GM50-Z4-V1



NCB8-18GM50-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

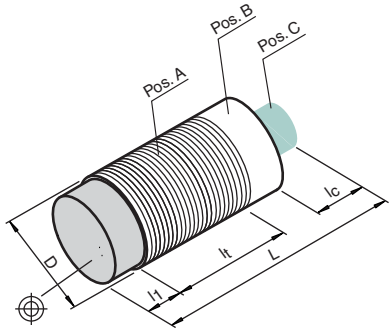
- Ø18 mm housing
- 8 mm, non-flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number		NBN8-18GM40-Z0	NCN8-18GM40-Z0	NCN8-18GM40-Z1	NBN8-18GM40-Z0-V1	NCN8-18GM40-Z0-V1	NCN8-18GM40-Z1-V1
	green = preferred type						
Switching element function	DC NO	●	●		●	●	
	DC NC			●			●
Switching frequency	0 ... 300 Hz		●	●		●	●
	0 ... 450 Hz				●		
	0 ... 500 Hz	●					
Housing material	Stainless steel 1.4305 / AISI 303		●	●		●	●
	brass, nickel-plated	●			●		
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PUR , 2 m		●	●			
	cable PVC , 2 m	●					
							
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●
Dimensions							
Length L [mm]			40			55	
Diameter D [mm]				18			
Thread length l_t [mm]			37			30	
Cap length l_1 [mm]				10			
Connector area l_c [mm]			0			15	
LED position				Pos. C			



Accessories

This and more accessories can be found in chapter 10

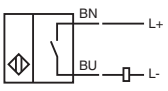
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 18-F	Mounting flange with dead stop, 18 mm
BF 18	Mounting flange, 18 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

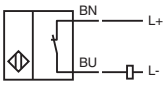
Electrical Connection



NBN8-18GM40-Z0
NCN8-18GM40-Z0

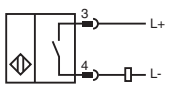


NCN8-18GM40-Z1

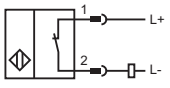


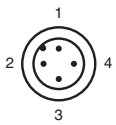


NBN8-18GM40-Z0-V1
NCN8-18GM40-Z0-V1



NCN8-18GM40-Z1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø18 mm housing
- 12 mm, non-flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	12 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	3.5 ... 30 V
Reverse polarity protection	reverse polarity-conductive
Switching frequency	0 ... 1000 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NCN12-18GM50-Z4	NCN12-18GM50-Z5	NCN12-18GM50-Z4-V1	NCN12-18GM50-Z5-V1
Switching element function	DC	NO	●		●	
	DC	NC		●		●
Pre-fault indication	LED, red		●		●	
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		

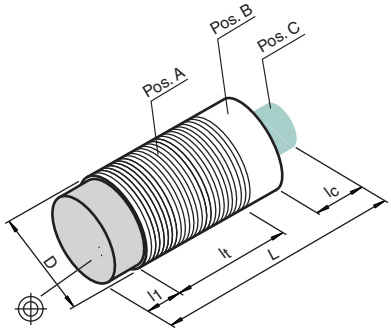
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	48		65	
Diameter D [mm]		18		
Thread length l_t [mm]	35		40	
Cap length l_1 [mm]		10		
Connector area l_c [mm]	0		15	
LED position		Pos. C		

Accessories

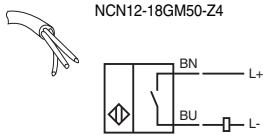
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

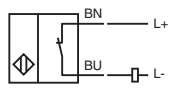


Electrical Connection

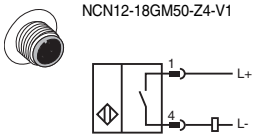
NCN12-18GM50-Z4



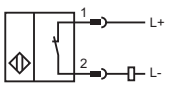
NCN12-18GM50-Z5

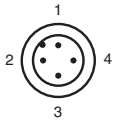


NCN12-18GM50-Z4-V1



NCN12-18GM50-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

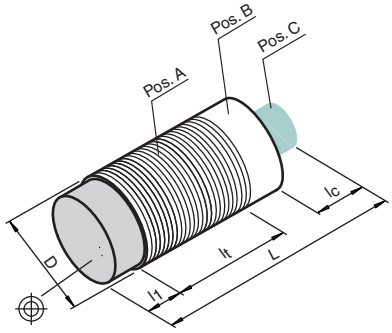
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB5-18GM20-E2	NBB5-18GM40-E1	NBB5-18GM40-E2	NBB5-18GM20-E2-V1	NBB5-18GM40-E0-V1	NBB5-18GM40-E2-V1	NBB5-18GM40-E3-V1
Switching element function	NPN	NO					●		
	NPN	NC		●					
	PNP	NO	●		●	●		●	
	PNP	NC							●
No-load supply current	≤ 15 mA			●			●	●	
	≤ 20 mA		●		●	●			●
Switching frequency	0 ... 800 Hz								●
	0 ... 1000 Hz		●	●	●	●	●	●	
Operating current	0 ... 100 mA		●	●	●	●	●	●	
	0 ... 200 mA								●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●		●	●	●
	-40 ... 70 °C (-40 ... 158 °F)					●			
Connection type	Device connector M12 x 1 , 4-pin					●	●	●	●
	cable PVC , 2 m		●	●	●				

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							

Dimensions								
Length L [mm]	20	40	40	35	50	50	50
Diameter D [mm]				18			
Thread length l_t [mm]	17	37	37	20	39	39	39
Cap length l_1 [mm]				0			
Connector area l_c [mm]		0		15		11	
LED position		Pos. C				Pos. A	



Accessories

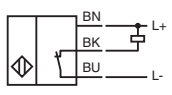
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
BF 18	Mounting flange, 18 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector
EXG-18	Quick mounting bracket with dead stop
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
BF 18-F	Mounting flange with dead stop, 18 mm

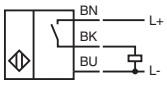
Electrical Connection



NBB5-18GM40-E1

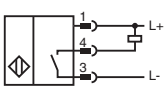


NBB5-18GM40-E2
NBB5-18GM20-E2

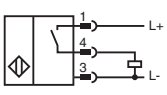




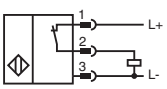
NBB5-18GM40-E0-V1

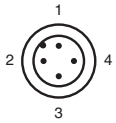


NBB5-18GM40-E2-V1
NBB5-18GM20-E2-V1



NBB5-18GM40-E3-V1



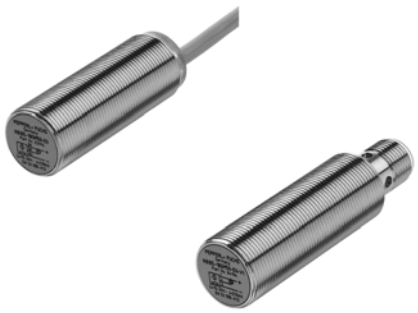


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 800 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB5-18GM50-E0	NBB5-18GM50-E2	NBB5-18GM50-E3	NBB5-18GM60-A0	NBB5-18GM60-A2	NBB5-18GM50-E0-V1	NBB5-18GM50-E2-V1	NBB5-18GM50-E3-V1	NBB5-18GM60-A0-V1	NBB5-18GM60-A2-V1
Switching element function	NPN	NO/NC				●					●	
	NPN	NO	●					●				
	PNP	NO/NC					●					●
	PNP	NO		●					●			
	PNP	NC			●					●		
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●		●	●	●
	-40 ... 70 °C (-40 ... 158 °F)								●			
Connection type	Device connector M12 x 1 , 4-pin							●	●	●	●	●
	cable PVC , 2 m		●	●	●	●	●					
												

Approvals and Certificates												
Protection class	II								●			
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●		●	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.											

Dimensions				
Length L [mm]	50	60	65	70
Diameter D [mm]	18			
Thread length l_t [mm]	47	60	50	60
Cap length l_1 [mm]	0			
Connector area l_c [mm]	0		15	10
LED position	Pos. C			

Properties

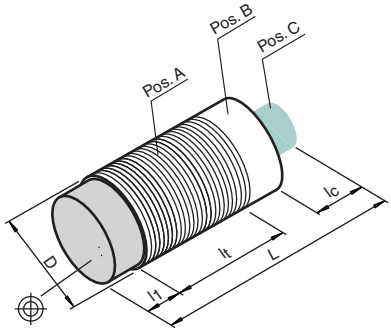
- Ø18 mm housing
- 5 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBB5-18GM50-E2-T-V1

Technical data like NBB5-18GM50-E2-V1 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)
Connection type: Device connector M12 x 1 , 3-pin



Accessories

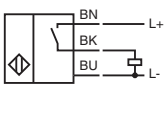
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

EXG-18	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
BF 18	Mounting flange, 18 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

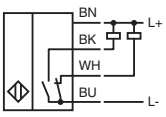
Electrical Connection



NBB5-18GM50-E2

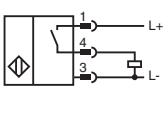


NBB5-18GM60-A0

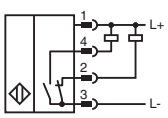


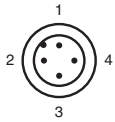


NBB5-18GM50-E2-T-V1
NBB5-18GM50-E2-V1

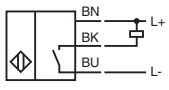


NBB5-18GM60-A0-V1

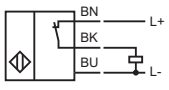




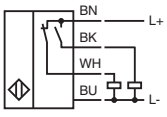
NBB5-18GM50-E0



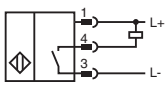
NBB5-18GM50-E3



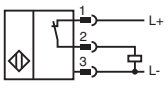
NBB5-18GM60-A2



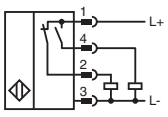
NBB5-18GM50-E0-V1

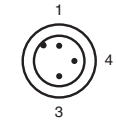


NBB5-18GM50-E3-V1



NBB5-18GM60-A2-V1





Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

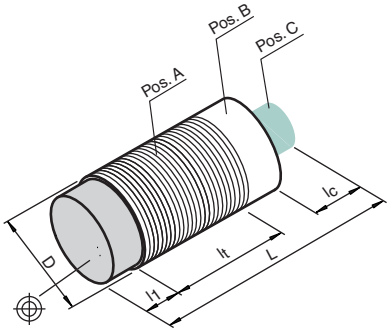
General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68 / IP69K
Connection type	cable PVC , 2 m



Model Number			NBB5-18GK50-E0	NBB5-18GK50-E2	NBN8-18GK50-A2
Rated operating distance	5 mm		●	●	
	8 mm				●
Installation	flush		●	●	
	non-flush				●
Switching element function	NPN	NO	●		
	PNP	NO/NC			●
	PNP	NO		●	
No-load supply current	≤ 15 mA		●	●	
	≤ 25 mA				●
Switching frequency	0 ... 500 Hz				●
	0 ... 1000 Hz		●	●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]			52	52	53
Diameter D [mm]				18	
Thread length l_t [mm]				49	
Cap length l_1 [mm]				1	
Connector area l_c [mm]				0	
LED position				Pos. C	

Properties

- Ø18 mm housing
- Up to 8 mm, flush and non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions



Accessories

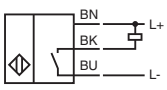
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm

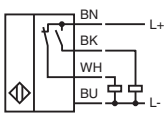
Electrical Connection



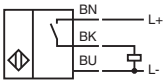
NBB5-18GK50-E0



NBN8-18GK50-A2



NBB5-18GK50-E2



Date of issue: 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

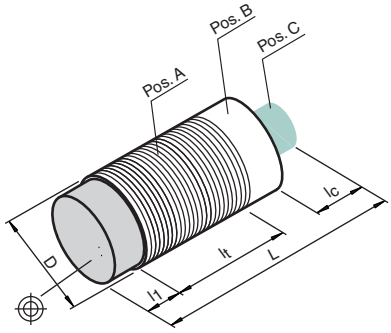
Model Number			NBB8-18GM30-E2	NBB8-18GM30-E3	NBB8-18GM50-E0	NBB8-18GM50-E2	NBB8-18GM60-A0	NBB8-18GM60-A2	NBB8-18GM30-E2-V1	NBB8-18GM30-E3-V1	NBB8-18GM50-E0-V1	NBB8-18GM50-E2-V1	NBB8-18GM60-A0-V1	NBB8-18GM60-A2-V1
	green = preferred type													
Switching element function	NPN	NO/NC					●						●	
	NPN	NO			●						●			
	PNP	NO/NC						●						●
	PNP	NO	●			●			●			●		
	PNP	NC		●						●				
No-load supply current	≤ 15 mA		●	●	●	●			●	●	●	●		
	≤ 25 mA						●	●					●	●
Operating current	0 ... 100 mA		●	●					●	●				
	0 ... 200 mA				●	●	●	●			●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	●			●		●	
	-40 ... 70 °C (-40 ... 158 °F)								●	●		●		●
Connection type	Device connector M12 x 1 , 4-pin								●	●	●	●	●	●
	cable PVC , 2 m		●	●	●	●	●	●						

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions								
Length L [mm]		30	50	60	45	65	70
Diameter D [mm]		18
Thread length l_t [mm]		27	47	57	30	50	60
Cap length l_1 [mm]		0
Connector area l_c [mm]		0			15		10
LED position	Pos.	C					B

Properties

- Ø18 mm housing
- 8 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions



Accessories

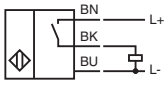
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
BF 18-F	Mounting flange with dead stop, 18 mm
BF 18	Mounting flange, 18 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

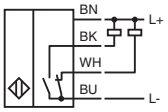
Electrical Connection



NBB8-18GM30-E2
NBB8-18GM50-E2

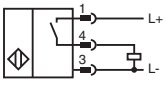


NBB8-18GM60-A0

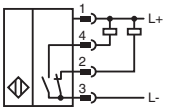


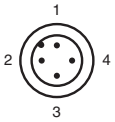


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NBB8-18GM50-E2-V1

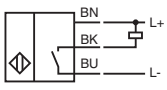


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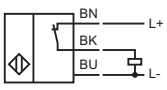




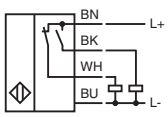
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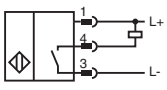
NBB8-18GM30-E3



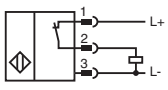
NBB8-18GM60-A2



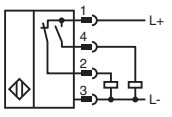
NBB8-18GM50-E0-V1



NBB8-18GM30-E3-V1



NBB8-18GM60-A2-V1



Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 8 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

NBN8-18GM50-E2-T

Technical data like NBN8-18GM50-E2 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)

NBN8-18GM50-E2-T-V1

Technical data like NBN8-18GM50-E2-V1 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)

Technical Data

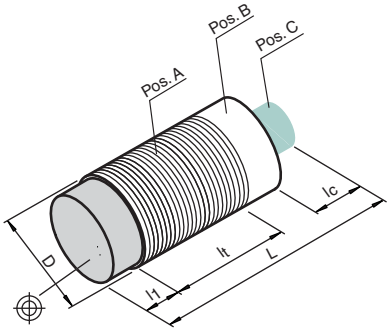
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow

Model Number			NBN8-18GK50-E0	NBN8-18GK50-E2	NBN8-18GM50-E0	NBN8-18GM50-E2	NBN8-18GM50-E0-V1	NBN8-18GM50-E2-V1
Switching element function	NPN	NO	●		●		●	
	PNP	NO		●		●		●
No-load supply current	≤ 15 mA		●	●				
	≤ 18 mA				●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)							●
Housing material	brass, nickel-plated				●	●	●	●
	PBT		●	●				
Protection degree	IP67				●	●	●	●
	IP68 / IP69K		●	●				
Connection type	Device connector M12 x 1 , 4-pin						●	●
	cable PVC , 2 m		●	●	●	●		

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions						
Length L [mm]	52	52	50	50	65	65
Diameter D [mm]	18					
Thread length l_t [mm]	49	49	37	37	40	40
Cap length l_1 [mm]	1		10			
Connector area l_c [mm]	0				15	
LED position	Pos. C					



Accessories

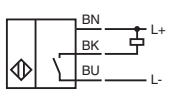
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-W-BK	4-pin, M12 female field-attachable connector
BF 18	Mounting flange, 18 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

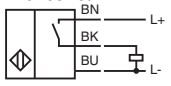
Electrical Connection

NBN8-18GK50-E0
NBN8-18GM50-E0



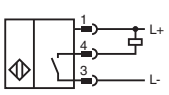


NBN8-18GK50-E2
NBN8-18GM50-E2
NBN8-18GM50-E2-T

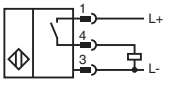


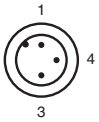
NBN8-18GM50-E0-V1

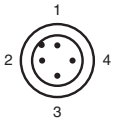




NBN8-18GM50-E2-T-V1
NBN8-18GM50-E2-V1







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø18 mm housing
- 12 mm, non-flush mountable
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Technical Data

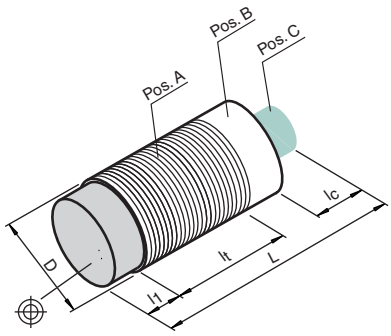
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	12 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type		NBN12-18GM35-E2	NBN12-18GM50-E2	NBN12-18GM50-A0	NBN12-18GM50-A2	NBN12-18GM35-E2-V1	NBN12-18GM50-E2-V1	NBN12-18GM50-A0-V1	NBN12-18GM50-A2-V1
Switching element function	NPN	NO/NC			●				●	
	PNP	NO/NC				●				●
	PNP	NO	●	●			●	●		
No-load supply current	≤ 12 mA		●	●			●	●		
	≤ 20 mA				●	●			●	●
Switching frequency	0 ... 200 Hz			●				●		
	0 ... 300 Hz		●				●			
	0 ... 1000 Hz				●	●			●	●
Operating current	0 ... 100 mA		●				●			
	0 ... 200 mA			●	●	●		●	●	●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●
	cable PVC , 2 m		●	●	●	●				

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions				
Length L [mm]	35.5	50		65
Diameter D [mm]	18			
Thread length l_t [mm]	22.5	37	25	40
Cap length l_1 [mm]	10			
Connector area l_c [mm]	0		15	
LED position	Pos. C			



Accessories

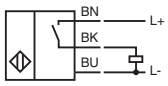
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-W-BK	4-pin, M12 female field-attachable connector
BF 18-F	Mounting flange with dead stop, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

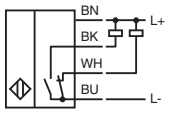
Electrical Connection



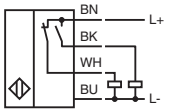
NBN12-18GM35-E2
NBN12-18GM50-E2



NBN12-18GM50-A0

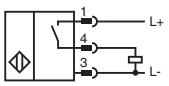


NBN12-18GM50-A2

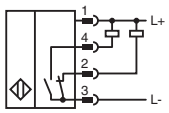




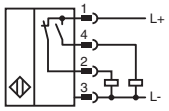
NBN12-18GM35-E2-V1
NBN12-18GM50-E2-V1

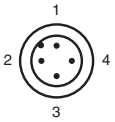


NBN12-18GM50-A0-V1



NBN12-18GM50-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	12 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

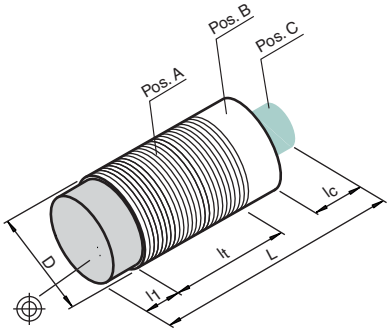
Model Number		NEB12-18GM50-E2	NEB12-18GM50-E2-V1	NEB12-18GM50-E3-V1
	green = preferred type			
Switching element function	PNP NO	●	●	
	PNP NC			●
Connection type	Device connector M12 x 1 , 4-pin		●	●
	cable PUR , 2 m	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions			
Length L [mm]	53	69	
Diameter D [mm]		18	
Thread length l_t [mm]	53	53	53
Cap length l_1 [mm]		0	
Connector area l_c [mm]	0	14	
LED position		Pos. C	

Properties

- Ø18 mm housing
- 12 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

This and more accessories can be found in chapter 10

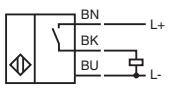
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop

Electrical Connection

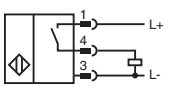
NEB12-18GM50-E2



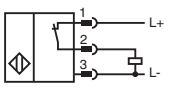


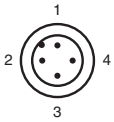
NEB12-18GM50-E2-V1





NEB12-18GM50-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



CE

Properties

- Ø18 mm housing
- 20 mm, non-flush mountable
- DC, 3-wire switching output
- Connector version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	20 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NEN20-18GM50-E2-V1	NEN20-18GM50-E3-V1
	green = preferred type			
Switching element function	PNP	NO	●	
	PNP	NC		●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

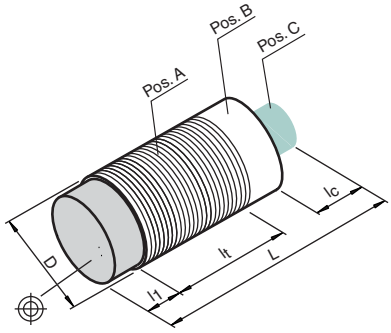
Dimensions	
Length L [mm]	69
Diameter D [mm]	18
Thread length l_t [mm]	43
Cap length l_1 [mm]	10
Connector area l_c [mm]	14
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

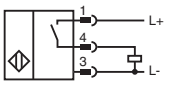
BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop



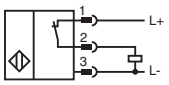
Electrical Connection

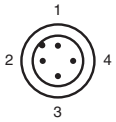


NEN20-18GM50-E2-V1



NEN20-18GM50-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- Up to 8 mm, flush and non-flush mountable versions
- AC, 2-wire switching output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	AC
Operating voltage	20 ... 253 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 20 Hz
Operating current	5 ... 200 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	cable PVC , 2 m



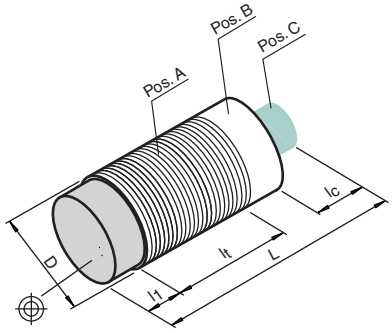
Model Number			NBB5-18GM60-WS	NBB5-18GM60-WO	NBN8-18GM60-WS	NBN8-18GM60-WO
green = preferred type						
Rated operating distance	5 mm		●	●		
	8 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	AC	NO	●		●	
	AC	NC		●		●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●

Dimensions				
Length L [mm]	60			
Diameter D [mm]	18			
Thread length l_t [mm]	60		50	
Cap length l_1 [mm]	0		10	
Connector area l_c [mm]	0			
LED position	Pos. C			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

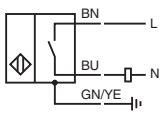
BF 18	Mounting flange, 18 mm
EXG-18	Quick mounting bracket with dead stop



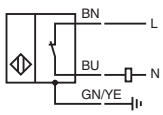
Electrical Connection



NBN8-18GM60-WS
NBB5-18GM60-WS



NBN8-18GM60-WO
NBB5-18GM60-WO



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Properties

- Ø18 mm housing
- Up to 8 mm, flush and non-flush mountable versions
- AC, 2-wire switching output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	AC
Operating voltage	20 ... 253 V
No-load supply current	≤ 1.5 mA
Switching frequency	0 ... 25 Hz
Operating current	5 ... 200 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68
Connection type	cable PVC , 2 m

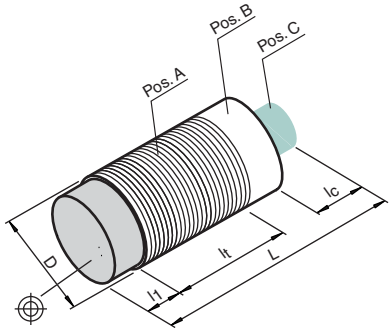


Model Number			NBB5-18GK-WS	NBB5-18GK-WO	NBN8-18GK-WS	NBN8-18GK-WO
Rated operating distance	5 mm		●	●		
	8 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	AC	NO	●		●	
	AC	NC		●		●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●
Dimensions						
Length L [mm]			79		80	
Diameter D [mm]				18		
Thread length l_t [mm]			61		60	
Cap length l_1 [mm]			0		0.5	
Connector area l_c [mm]				0		
LED position				-		

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

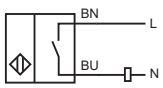
BF 18	Mounting flange, 18 mm



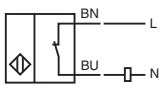
Electrical Connection



NBB5-18GK-WS
NBN8-18GK-WS



NBB5-18GK-WO
NBN8-18GK-WO



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 250 V AC/20 ... 300 V DC
Reverse polarity protection	tolerant
Switching frequency	30 Hz
Operating current	4 ... 300 mA AC/DC
Short-circuit protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

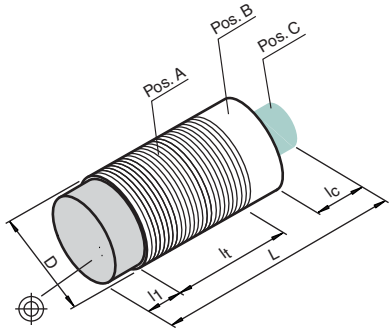
Model Number		NBB8-18GM60-US	NBB8-18GM60-UO	NBN15-18GM60-US	NBN15-18GM60-UO	NBB8-18GM60-US-V12	NBB8-18GM60-UO-V12	NBN15-18GM60-US-V12	NBN15-18GM60-UO-V12
	green = preferred type								
Rated operating distance	15 mm			●	●			●	●
	8 mm	●	●			●	●		
Installation	flush	●	●			●	●		
	non-flush			●	●			●	●
Switching element function	AC/DC NO	●		●		●		●	
	NC		●		●		●		●
Type of voltage	UC	●		●		●		●	
Connection type	Device connector 1/2"-20 UN , 3-pin					●	●	●	●
	cable PUR , 2 m	●	●	●	●				
									

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●	●

Dimensions					
Length L [mm]	63		70		
Diameter D [mm]	18				
Thread length l_t [mm]	62	52	60	50	
Cap length l_1 [mm]	0			10	
Connector area l_c [mm]	0		10		
LED position	Pos. A				

Properties

- Ø18 mm housing
- Up to 15 mm, flush and non-flush mountable versions
- AC/DC, 2-wire switching output
- Cable and connector versions



Accessories

This and more accessories can be found in chapter 10

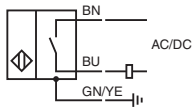
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
EXG-18	Quick mounting bracket with dead stop

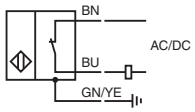
Electrical Connection



NBB8-18GM60-US
NBN15-18GM60-US

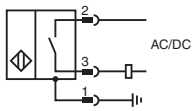


NBB8-18GM60-UO
NBN15-18GM60-UO

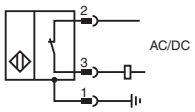


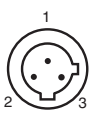


NBB8-18GM60-US-V12
NBN15-18GM60-US-V12



NBB8-18GM60-UO-V12
NBN15-18GM60-UO-V12





Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

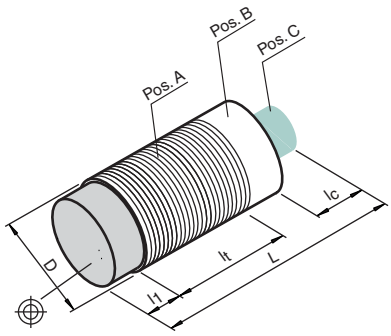
- Ø18 mm housing
- 1 ... 5 mm, flush mountable
- DC, 3-wire analog output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	1 ... 5 mm
Installation	flush
Switching element function	Analog current output
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 12 mA
Linearity error	≤ ± 4 % of full-scale value
Load resistor	≤ 1000 Ω
Adjustment tolerance zero point	≤ ± 10 % of full-scale value
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type	NBB5-18GM60-I	NBB5-18GM60-I3	NBB5-18GM60-I-V1	NBB5-18GM60-I3-V1
Output type	0 ... 20 mA		●		●
	4 ... 20 mA	●		●	
Slope of output characteristic	4 mA / mm	●		●	
	5 mA / mm		●		●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 2 m	●	●		
					
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		60		70	
Diameter D [mm]		18			
Thread length l_t [mm]		57		60	
Cap length l_1 [mm]		0			
Connector area l_c [mm]		0		10	
LED position		Pos. C		Pos. B	



Accessories

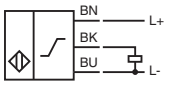
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

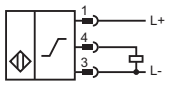


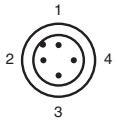
NBB5-18GM60-I
NBB5-18GM60-I3





NBB5-18GM60-I3-V1
NBB5-18GM60-I-V1

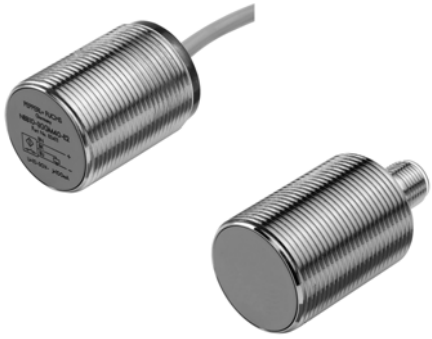




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

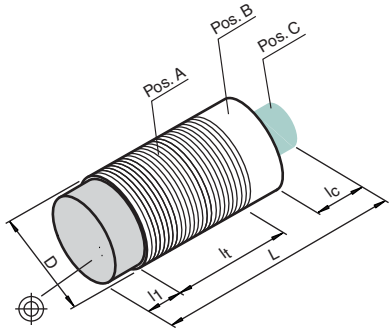
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 150 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number	green = preferred type	NBB10-30GM40-Z0	NCB10-30GM40-Z0	NCB10-30GM40-Z1	NBB10-30GM40-Z0-V1	NCB10-30GM40-Z0-V1	NBB10-30GM40-Z3-V1	NCB10-30GM40-Z3-V1	NCB10-30GM40-Z1-V1
Switching element function	DC NO	●	●		●	●	●	●	
	DC NC			●					●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●		●	●	●
	-40 ... 70 °C (-40 ... 158 °F)					●			
Housing material	Stainless steel 1.4305 / AISI 303		●	●		●		●	●
	brass, nickel-plated	●			●		●		
Connection type	Device connector M12 x 1 , 4-pin				●	●	●	●	●
	cable PUR , 2 m		●	●					
	cable PVC , 2 m	●							

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●		●

Dimensions									
Length L [mm]		40					55		
Diameter D [mm]					30				
Thread length l_t [mm]		37					40		
Cap length l_1 [mm]					0				
Connector area l_c [mm]		0					15		
LED position					Pos. C				



Accessories

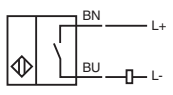
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-30	Quick mounting bracket with dead stop
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

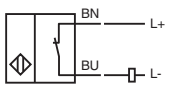
Electrical Connection



NCB10-30GM40-Z0
NBB10-30GM40-Z0

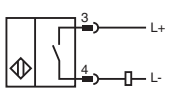


NCB10-30GM40-Z1

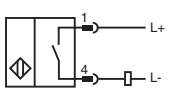




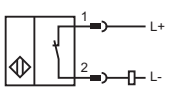
NCB10-30GM40-Z0-V1
NBB10-30GM40-Z0-V1

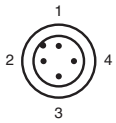


NBB10-30GM40-Z3-V1
NCB10-30GM40-Z3-V1



NCB10-30GM40-Z1-V1



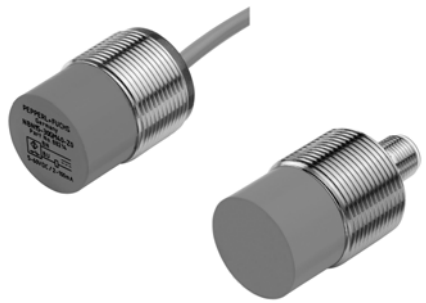


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

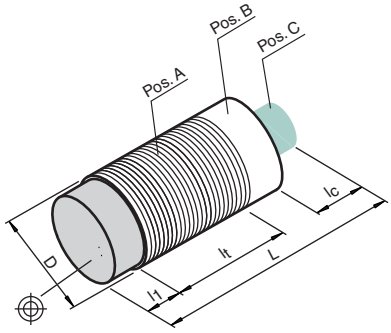
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	5 ... 60 V
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Protection degree	IP67

Model Number	green = preferred type	NBN15-30GM40-Z0	NCN15-30GM40-Z0	NCN15-30GM40-Z1	NBN15-30GM40-Z0-V1	NCN15-30GM40-Z0-V1	NBN15-30GM40-Z3-V1	NCN15-30GM40-Z3-V1	NCN15-30GM40-Z1-V1
Switching element function	DC NO	●	●		●	●	●	●	
	DC NC			●					●
Switching frequency	0 ... 100 Hz		●	●		●		●	●
	0 ... 150 Hz	●			●		●		
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●			●	●	●
	-40 ... 70 °C (-40 ... 158 °F)				●	●			
Housing material	Stainless steel 1.4305 / AISI 303		●	●		●		●	●
	brass, nickel-plated	●			●		●		
Connection type	Device connector M12 x 1 , 4-pin				●	●	●	●	●
	cable PUR , 2 m		●	●					
	cable PVC , 2 m	●							
									
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●		●
Dimensions									
Length L [mm]			40				55		
Diameter D [mm]						30			
Thread length l_t [mm]			19				22		
Cap length l_1 [mm]						18			
Connector area l_c [mm]			0				15		
LED position						Pos. C			

Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- DC, 2-wire switching output
- Cable and connector versions



Accessories

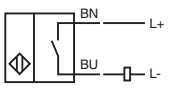
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

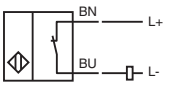
Electrical Connection



NBN15-30GM40-Z0
NCN15-30GM40-Z0

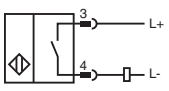


NCN15-30GM40-Z1

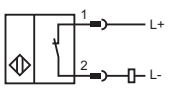




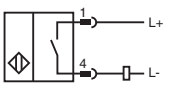
NBN15-30GM40-Z0-V1
NCN15-30GM40-Z0-V1

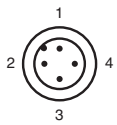


NCN15-30GM40-Z1-V1



NBN15-30GM40-Z3-V1
NCN15-30GM40-Z3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 15 mm, flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

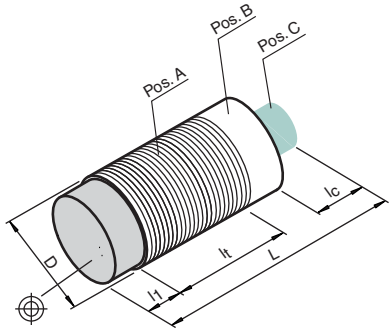
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Type of voltage	DC
Operating voltage	3.5 ... 30 V
Switching frequency	500 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NCB15-30GM50-Z4	NCB15-30GM50-Z5	NCB15-30GM50-Z4-V1	NCB15-30GM50-Z5-V1
Switching element function	DC	NO	●		●	
	DC	NC		●		●
Reverse polarity protection	✔		●		●	
	reverse polarity-conductive			●		●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	50		65	
Diameter D [mm]	30			
Thread length l_t [mm]	47		50	
Cap length l_1 [mm]	0			
Connector area l_c [mm]	0		15	
LED position	Pos. C			



Accessories

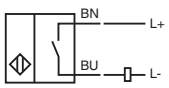
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

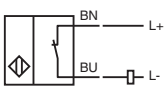
Electrical Connection



NCB15-30GM50-Z4

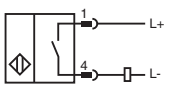


NCB15-30GM50-Z5

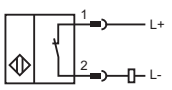


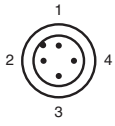


NCB15-30GM50-Z4-V1



NCB15-30GM50-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Properties

- Ø30 mm housing
- 25 mm, non-flush mountable
- DC, 2-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	25 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	3.5 ... 30 V
Switching frequency	500 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

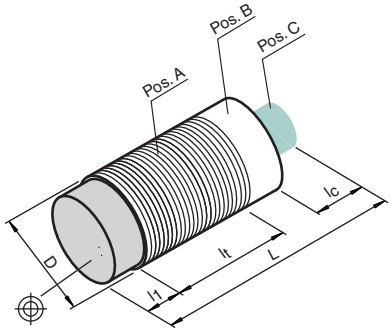
Model Number			NCN25-30GM50-Z4	NCN25-30GM50-Z5	NCN25-30GM50-Z4-V1	NCN25-30GM50-Z5-V1	NCN25-30GM50-Z7-V1
Switching element function	DC	NO	●		●		
	DC	NC		●		●	●
Reverse polarity protection	reverse polarity-conductive		●	●	●	●	
	tolerant						●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PVC , 2 m		●	●			





Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions		
Length L [mm]	50	65
Diameter D [mm]	30	
Thread length l_t [mm]	32	
Cap length l_1 [mm]	18	
Connector area l_c [mm]	0	15
LED position	Pos. C	



Accessories

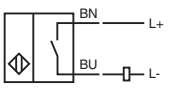
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

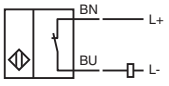
Electrical Connection



NCN25-30GM50-Z4

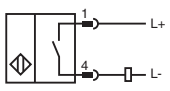


NCN25-30GM50-Z5

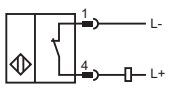




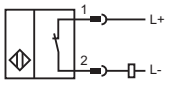
NCN25-30GM50-Z4-V1

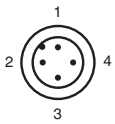


NCN25-30GM50-Z7-V1



NCN25-30GM50-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

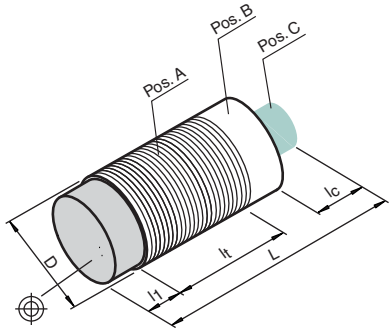
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB10-30GM50-E0	NBB10-30GM50-E2	NBB10-30GM50-E0-V1	NBB10-30GM50-E2-V1	NBB10-30GM50-E3-V1
Switching element function	NPN	NO	●		●		
	PNP	NO		●		●	
	PNP	NC					●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●		●
	-40 ... 70 °C (-40 ... 158 °F)					●	
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PVC , 2 m		●	●			
							

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions					
Length L [mm]	50		65		
Diameter D [mm]		30			
Thread length l_t [mm]		50			
Cap length l_1 [mm]		0			
Connector area l_c [mm]	0		15		
LED position		Pos. C			



Accessories

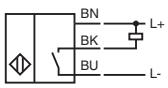
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

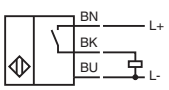
Electrical Connection



NBB10-30GM50-E0

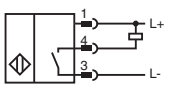


NBB10-30GM50-E2

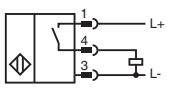




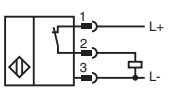
NBB10-30GM50-E0-V1

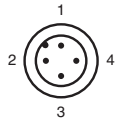


NBB10-30GM50-E2-V1



NBB10-30GM50-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, 4-wire switching output
- Cable and connector versions

Technical Data

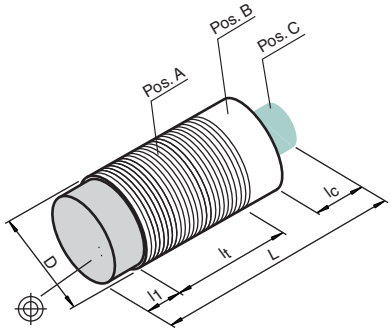
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBB10-30GM60-A0	NBB10-30GM60-A2	NBB10-30GM60-A0-V1	NBB10-30GM60-A2-V1
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)					●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	60		70	
Diameter D [mm]	30			
Thread length l_t [mm]	60			
Cap length l_1 [mm]	0		10	
Connector area l_c [mm]	0		10	
LED position	Pos. C		Pos. A	



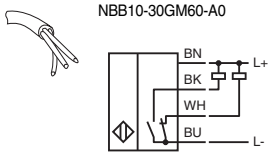
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

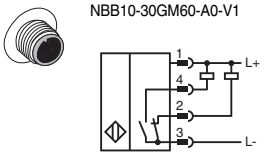
BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

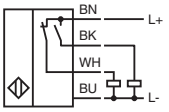
NBB10-30GM60-A0



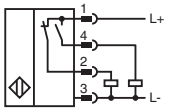
NBB10-30GM60-A0-V1

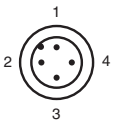


NBB10-30GM60-A2



NBB10-30GM60-A2-V1

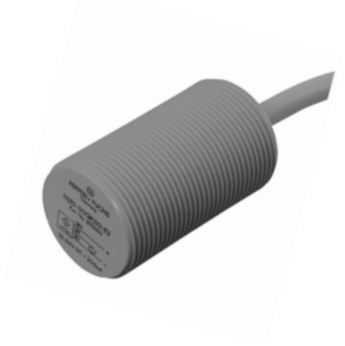




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68 / IP69K
Connection type	cable PVC , 2 m



Model Number			NBB10-30GK50-E0	NBB10-30GK50-E2
Switching element function	NPN	NO	●	
	PNP	NO		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			52	
Diameter D [mm]			30	
Thread length l_t [mm]			48	
Cap length l_1 [mm]			1	
Connector area l_c [mm]			0	
LED position			Pos. C	

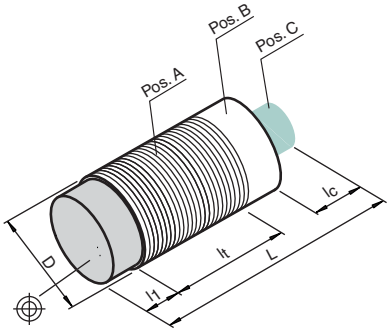
Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, 3-wire switching output
- Cable version

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

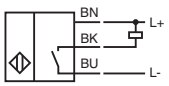
BF 30	Mounting flange, 30 mm



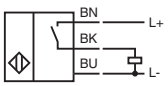
Electrical Connection



NBB10-30GK50-E0



NBB10-30GK50-E2



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, 4-wire switching output
- Terminal compartment

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 300 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	terminal compartment

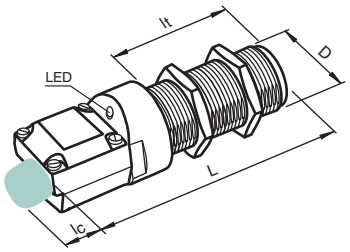


Model Number			NJ10-30GKK-A	NJ10-30GKK-A2
Switching element function	NPN	NO/NC	●	
	PNP	NO/NC		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			115	
Diameter D [mm]			30	
Thread length l_t [mm]			58	
Cap length l_1 [mm]			2	
Connector area l_c [mm]			0	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

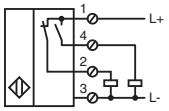
BF 30	Mounting flange, 30 mm



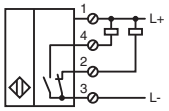
Electrical Connection



NJ10-30GKK-A2



NJ10-30GKK-A



Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 15 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

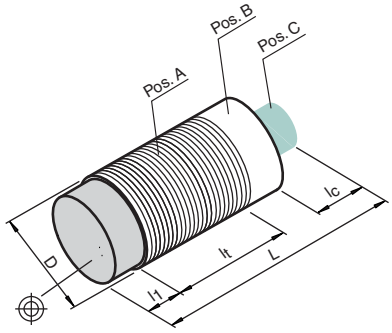
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NBB15-30GM30-E2	NBB15-30GM30-E3	NBB15-30GM50-E0	NBB15-30GM50-E2	NBB15-30GM50-E2-V1	NBB15-30GM30-E3-V1	NBB15-30GM50-E0-V1	NBB15-30GM50-E2-V1
	green = preferred type								
Switching element function	NPN NO			●				●	
	PNP NO	●			●	●			●
	PNP NC		●				●		
Operating current	0 ... 100 mA	●	●			●	●		
	0 ... 200 mA			●	●			●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●		●	●	
	-40 ... 70 °C (-40 ... 158 °F)					●			●
Connection type	Device connector M12 x 1 , 4-pin					●	●	●	●
	cable PVC , 2 m	●	●	●	●				

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions					
Length L [mm]	30	50	45	65	
Diameter D [mm]	30				
Thread length l_t [mm]	27	47	30	50	
Cap length l_1 [mm]	0				
Connector area l_c [mm]	0		15		
LED position	Pos. C				



Accessories

This and more accessories can be found in chapter 10

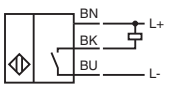
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
BF 30-F	Mounting flange with dead stop, 30 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

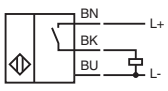
Electrical Connection



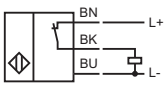
NBB15-30GM50-E0



NBB15-30GM30-E2
NBB15-30GM50-E2

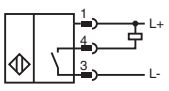


NBB15-30GM30-E3

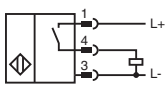




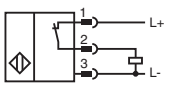
NBB15-30GM50-E0-V1

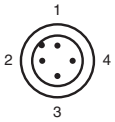


NBB15-30GM30-E2-V1
NBB15-30GM50-E2-V1



NBB15-30GM30-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

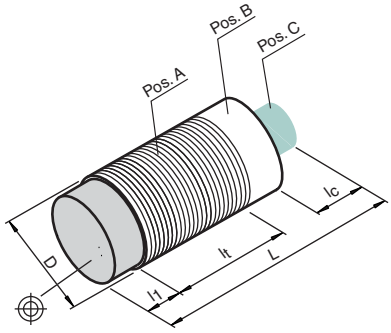
Model Number	green = preferred type	NBB15-30GM60-A0	NBB15-30GM60-A2	NBB15-30GM60-A0-V1	NBB15-30GM60-A2-V1
Switching element function	NPN NO/NC	●		●	
	PNP NO/NC		●		●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)				●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 2 m	●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions					
Length L [mm]		60		70	
Diameter D [mm]			30		
Thread length l_t [mm]		57		60	
Cap length l_1 [mm]			0		
Connector area l_c [mm]		0		10	
LED position		Pos. C		Pos. A	

Properties

- Ø30 mm housing
- 15 mm, flush mountable
- DC, 4-wire switching output
- Cable and connector versions



Accessories

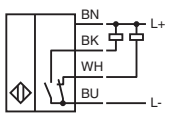
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

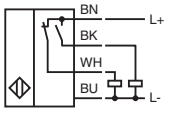
Electrical Connection



NBB15-30GM60-A0

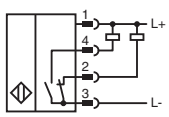


NBB15-30GM60-A2

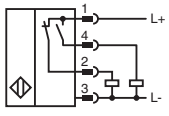


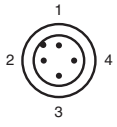


NBB15-30GM60-A0-V1



NBB15-30GM60-A2-V1

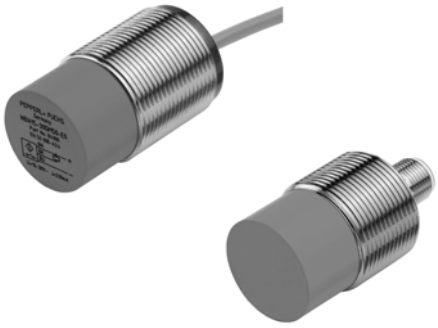




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

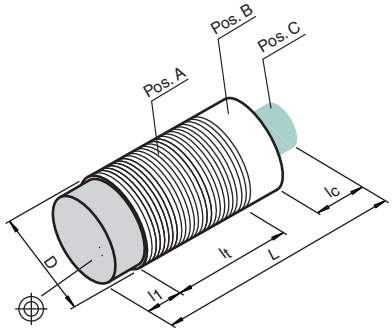
Model Number			NBN15-30GM50-E0	NBN15-30GM50-E2	NBN15-30GM50-E0-V1	NBN15-30GM50-E2-V1
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
No-load supply current	≤ 15 mA		●	●		
	≤ 20 mA				●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)					●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		





Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions					
Length L [mm]		50		65	
Diameter D [mm]			30		
Thread length l_t [mm]			32		
Cap length l_1 [mm]			18		
Connector area l_c [mm]		0		15	
LED position			Pos. C		



Accessories

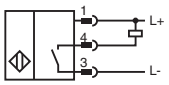
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

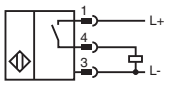
Electrical Connection



NBN15-30GM50-E0-V1

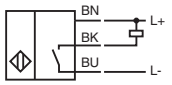


NBN15-30GM50-E2-V1

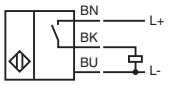


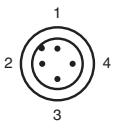


NBN15-30GM50-E0



NBN15-30GM50-E2





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NBN15-30GM60-A0	NBN15-30GM60-A2	NBN15-30GM60-A0-V1	NBN15-30GM60-A2-V1
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		



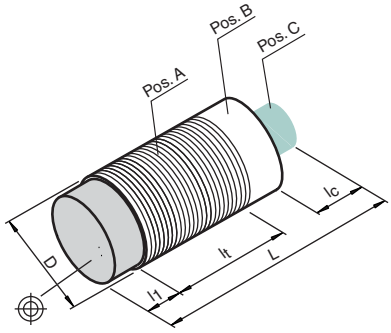


Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	60	70
Diameter D [mm]	30	
Thread length l_t [mm]	42	
Cap length l_1 [mm]	18	
Connector area l_c [mm]	0	10
LED position	Pos. C	Pos. A

Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- DC, 4-wire switching output
- Cable and connector versions



Accessories

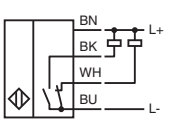
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 30	Mounting flange, 30 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

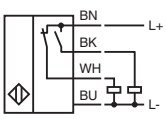
Electrical Connection



NBN15-30GM60-A0

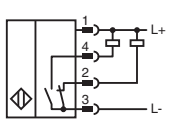


NBN15-30GM60-A2

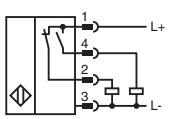


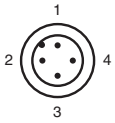


NBN15-30GM60-A0-V1



NBN15-30GM60-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68 / IP69K
Connection type	cable PVC , 2 m



Model Number			NBN15-30GK50-E0	NBN15-30GK50-E2
Switching element function	NPN	NO	●	
	PNP	NO		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			52	
Diameter D [mm]			30	
Thread length l_t [mm]			48	
Cap length l_1 [mm]			1	
Connector area l_c [mm]			0	
LED position			Pos. C	

Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- DC, 3-wire switching output
- Cable version

Further Products

In this series, we offer additionally:

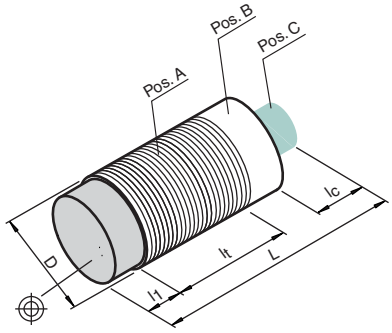
NJ15-30GK-E2-T

Technical data comparable to NBN15-30GK50-E2 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

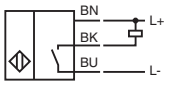
BF 30	Mounting flange, 30 mm



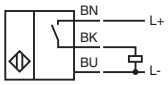
Electrical Connection



NBN15-30GK50-E0



NBN15-30GK50-E2
NJ15-30GK-E2-T



Date of issue: 04/08/2015



Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- DC, 4-wire switching output
- Terminal compartment

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 300 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	terminal compartment

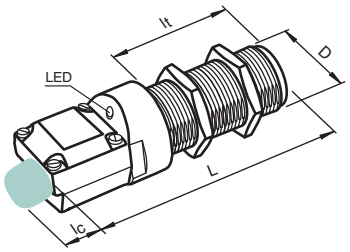


Model Number			NJ15-30GKK-A	NJ15-30GKK-A2
Switching element function	NPN	NO/NC	●	
	PNP	NO/NC		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]				115
Diameter D [mm]				30
Thread length l_t [mm]				58
Cap length l_1 [mm]				2
Connector area l_c [mm]				0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

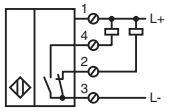
BF 30	Mounting flange, 30 mm



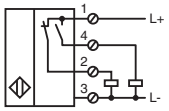
Electrical Connection



NJ15-30GKK-A



NJ15-30GKK-A2



Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 22 mm, virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

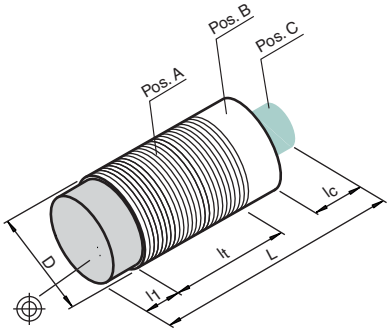
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	22 mm
Installation	virtually flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	chromium plated brass
Protection degree	IP67

Model Number			NEB22-30GM60-E0	NEB22-30GM60-E2	NEB22-30GM60-E0-V1	NEB22-30GM60-E2-V1	NEB22-30GM60-E3-V1
	green = preferred type						
Switching element function	NPN	NO	●		●		
	PNP	NO		●		●	
	PNP	NC					●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PVC , 2 m		●	●			

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	●
CSA approval	cCSAus Listed, General Purpose	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions						
Length L [mm]	60		73.5			
Diameter D [mm]	30					
Thread length l_t [mm]	60	60	52	61.5	52	
Cap length l_1 [mm]	0					
Connector area l_c [mm]	0		13,5	12.5		
LED position	C	C	C	A	C	



Accessories

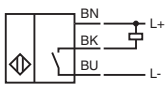
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

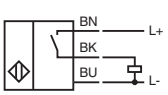
Electrical Connection

NEB22-30GM60-E0



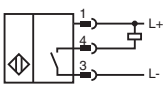


NEB22-30GM60-E2

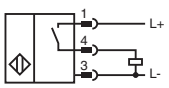


NEB22-30GM60-E0-V1

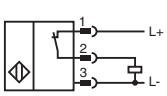


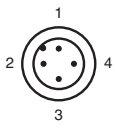


NEB22-30GM60-E2-V1



NEB22-30GM60-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number		NBN22-30GM35-E2	NBN25-30GM50-E0	NBN25-30GM50-E2	NBN22-30GM35-E2-V1	NBN25-30GM50-E0-V1	NBN25-30GM50-E2-V1
	green = preferred type						
Rated operating distance	22 mm	●			●		
	25 mm		●	●		●	●
Switching element function	NPN NO		●			●	
	PNP NO	●		●	●		●
No-load supply current	≤ 10 mA		●	●		●	●
	≤ 12 mA	●			●		
Switching frequency	0 ... 200 Hz		●	●		●	●
	0 ... 80 Hz	●			●		
Operating current	0 ... 100 mA	●			●		
	0 ... 200 mA		●	●		●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●	●	
	-40 ... 70 °C (-40 ... 158 °F)						●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PVC , 2 m	●	●	●			



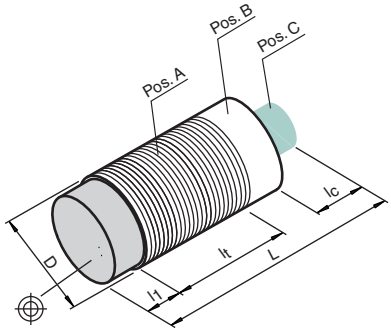


Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions							
Length L [mm]	35	50	50	50	65	65
Diameter D [mm]	30					
Thread length l_t [mm]	15	32	32	17	32	32
Cap length l_1 [mm]	18					
Connector area l_c [mm]	0				15	
LED position	Pos. C					

Properties

- Ø30 mm housing
- 22 mm and 25 mm versions, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

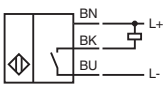
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

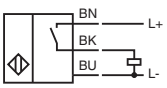
Electrical Connection



NBN25-30GM50-E0

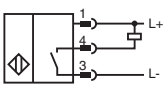


NBN22-30GM35-E2
NBN25-30GM50-E2

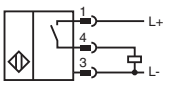


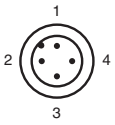


NBN25-30GM50-E0-V1



NBN22-30GM35-E2-V1
NBN25-30GM50-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	40 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	chromium plated brass
Protection degree	IP67

Model Number			NEN40-30GM60-E0	NEN40-30GM60-E2	NEN40-30GM60-E0-V1	NEN40-30GM60-E2-V1	NEN40-30GM60-E3-V1
	green = preferred type						
Switching element function	NPN	NO	●		●		
	PNP, NO			●			
	PNP	NO				●	
	PNP	NC					●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PVC , 2 m		●	●			



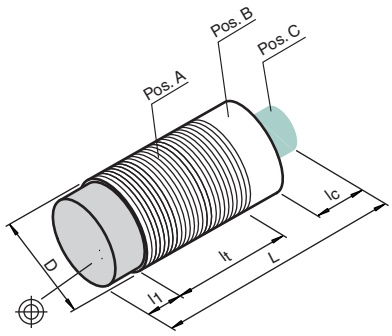


Approvals and Certificates		
UL approval	cULus Listed, General Purpose	●
CSA approval	cCSAus Listed, General Purpose	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions						
Length L [mm]		60		73.5		
Diameter D [mm]				30		
Thread length l_t [mm]	50	50	42	51.5	42	
Cap length l_1 [mm]			10			
Connector area l_c [mm]	0	0	13.5	12.5	13.5	
LED position	C	C	C	A	C	

Properties

- Ø30 mm housing
- 40 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

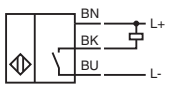
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

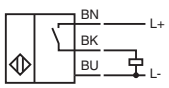
Electrical Connection



NEN40-30GM60-E0

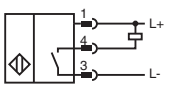


NEN40-30GM60-E2

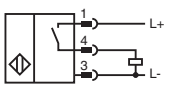




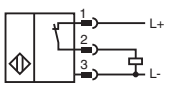
NEN40-30GM60-E0-V1

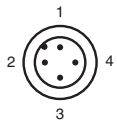


NEN40-30GM60-E2-V1



NEN40-30GM60-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Properties

- Ø30 mm housing
- 10 mm, flush mountable and 15 mm, virtually flush mountable
- AC, 2-wire switching output
- Cable and connector versions

Technical Data

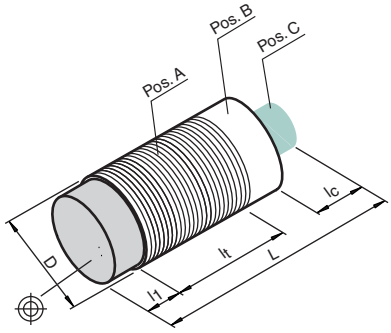
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	AC
Operating voltage	20 ... 253 V
Reverse polarity protection	tolerant
Switching frequency	0 ... 20 Hz
Operating current	5 ... 200 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type	NBB10-30GM50-WS	NBB10-30GM50-WO	NBB15-30GM50-WS	NBB15-30GM50-WO	NBB15-30GM50-WS-V12	NBB15-30GM50-WO-V12	NBB15-30GM50-WS-V93	NBB15-30GM50-WO-V93
Rated operating distance	10 mm	●	●						
	15 mm			●	●	●	●	●	●
Installation	flush	●	●						
	virtually flush			●	●	●	●	●	●
Switching element function	AC NO	●		●		●		●	
	AC NC		●		●		●		●
Connection type	Device connector 1/2"-20 UN , 3-pin					●	●		
	Device connector 7/8"-16 UN , 3-pin							●	●
	cable PVC , 2 m	●	●	●	●				

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●	●

Dimensions									
Length L [mm]		50				60		65	
Diameter D [mm]		30							
Thread length l_t [mm]		47				50			
Cap length l_1 [mm]		0							
Connector area l_c [mm]		0				10		15	
LED position		Pos. C				Pos. B			



Accessories

This and more accessories can be found in chapter 10

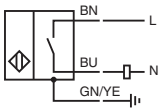
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop

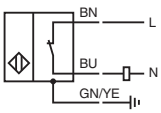
Electrical Connection



NBB10-30GM50-WS
NBB15-30GM50-WS

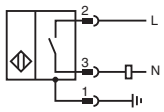


NBB10-30GM50-WO
NBB15-30GM50-WO

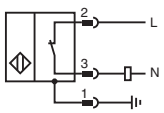




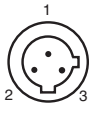
NBB15-30GM50-WS-V12
NBB15-30GM50-WS-V93



NBB15-30GM50-WO-V12
NBB15-30GM50-WO-V93



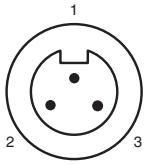
V12



Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

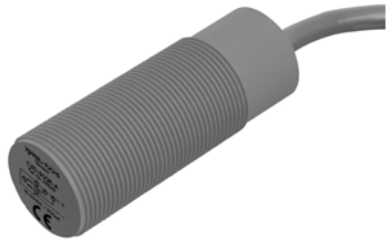
V93



Wire colors

1	GN	(green)
2	BK	(black)
3	WH	(white)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	virtually flush
Type of voltage	AC
Operating voltage	20 ... 250 V
Switching frequency	0 ... 25 Hz
Operating current	1.5 ... 200 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68
Connection type	cable PVC , 2 m



Model Number			NBB15-30GK-WS	NBB15-30GK-WO
Switching element function	AC	NO	●	
	AC	NC		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●
Dimensions				
Length L [mm]			80	
Diameter D [mm]			30	
Thread length l_t [mm]			60	
Cap length l_1 [mm]			0	
Connector area l_c [mm]			0	
LED position			-	

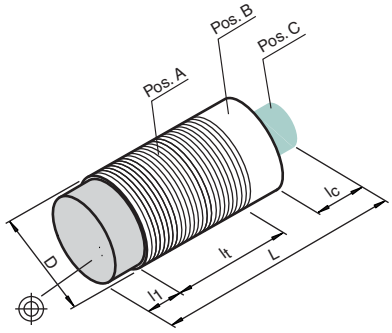
Properties

- Ø30 mm housing
- 15 mm, virtually flush mountable
- AC, 2-wire switching output
- Cable version

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

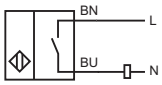
BF 30	Mounting flange, 30 mm



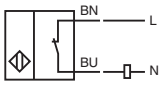
Electrical Connection



NBB15-30GK-WS



NBB15-30GK-WO



Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

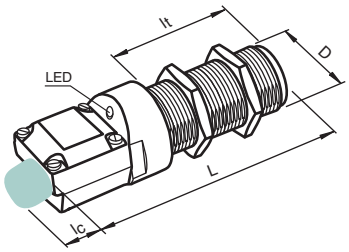
General Data	
Installation	flush
Type of voltage	AC
Operating voltage	20 ... 250 V
No-load supply current	≤ 1.7 mA
Switching frequency	0 ... 20 Hz
Operating current	1.5 ... 200 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	terminal compartment



Model Number			NBB10-30GKK-WO	NBB10-30GKK-WS	NBB15-30GKK-WO	NBB15-30GKK-WS
Rated operating distance	10 mm		●	●		
	15 mm				●	●
Switching element function	AC	NO		●		●
	AC	NC	●		●	
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●
Dimensions						
Length L [mm]			115			
Diameter D [mm]			30			
Thread length l_t [mm]			58			
Cap length l_1 [mm]			2			
Connector area l_c [mm]			0			

Properties

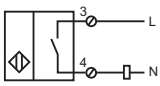
- Ø30 mm housing
- 10 mm and 15 mm , flush mountable versions
- AC, 2-wire switching output
- Terminal compartment



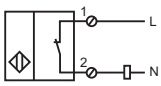
Electrical Connection



NBB15-30GKK-WS
NBB10-30GKK-WS



NBB15-30GKK-WO
NBB10-30GKK-WO



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Operating voltage	20 ... 250 V AC/20 ... 300 V DC
Reverse polarity protection	tolerant
Switching frequency	30 Hz
Operating current	4 ... 500 mA AC/DC
Short-circuit protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

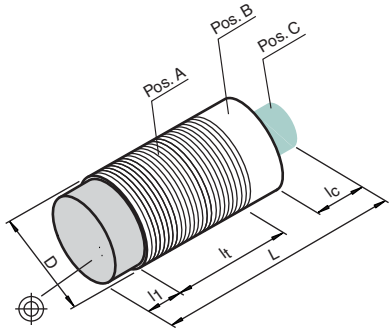
Model Number			NBB15-30GM50-US	NBB15-30GM50-UO	NBB15-30GM50-US-V12	NBB15-30GM50-UO-V12	NBB15-30GM50-US-V93	NBB15-30GM50-UO-V93
Switching element function	AC/DC	NO	●		●		●	
		NC		●		●		●
Type of voltage	UC		●					
Connection type	Device connector 1/2"-20 UN , 3-pin				●			
	Device connector 7/8"-16 UN , 3-pin						●	●
	Device connector M12 x 1 , 3-pin					●		
	cable PUR , 2 m		●	●				

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●

Dimensions				
Length L [mm]	51	60	65	
Diameter D [mm]		30		
Thread length l_t [mm]		50		
Cap length l_1 [mm]		0		
Connector area l_c [mm]		10	15	
LED position		Pos. B		

Properties

- Ø30 mm housing
- 15 mm, flush mountable
- AC/DC, 2-wire switching output
- Cable and connector versions



Accessories

This and more accessories can be found in chapter 10

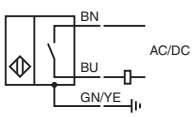
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
EXG-30	Quick mounting bracket with dead stop

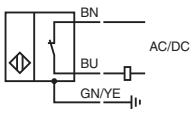
Electrical Connection



NBB15-30GM50-US

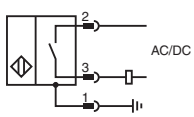


NBB15-30GM50-UO

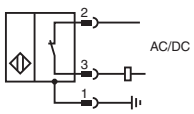




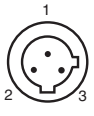
NBB15-30GM50-US-V93
NBB15-30GM50-US-V12



NBB15-30GM50-UO-V93
NBB15-30GM50-UO-V12

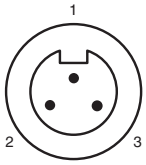


V12



Wire colors		
1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

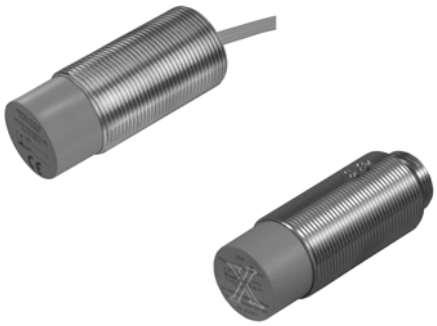
V93



Wire colors		
1	GN	(green)
2	BK	(black)
3	WH	(white)

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

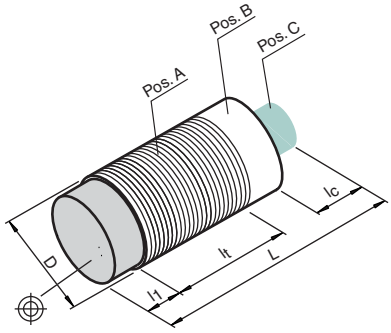
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	25 mm
Installation	non-flush
Operating voltage	20 ... 250 V AC/20 ... 300 V DC
Reverse polarity protection	tolerant
Switching frequency	30 Hz
Operating current	4 ... 500 mA AC/DC
Short-circuit protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type	NBN25-30GM50-US	NBN25-30GM50-UO	NBN25-30GM50-US-V12	NBN25-30GM50-UO-V12	NBN25-30GM50-US-V93	NBN25-30GM50-UO-V93
Switching element function	AC/DC NO	●		●		●	
	NC		●		●		●
Type of voltage	UC	●					
Connection type	Device connector 1/2"-20 UN , 3-pin			●			
	Device connector 7/8"-16 UN , 3-pin					●	●
	Device connector M12 x 1 , 3-pin				●		
	cable PUR , 2 m	●	●				
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●
Dimensions							
Length L [mm]		51		60		65	
Diameter D [mm]				30			
Thread length l_t [mm]				32			
Cap length l_1 [mm]				18			
Connector area l_c [mm]		0		10		15	
LED position				Pos. B			

Properties

- Ø30 mm housing
- 25 mm, non-flush mountable
- AC/DC, 2-wire switching output
- Cable and connector versions



Accessories

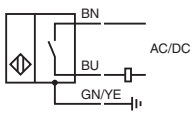
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm

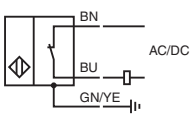
Electrical Connection



NBN25-30GM50-US

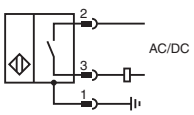


NBN25-30GM50-UO

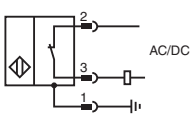




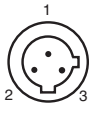
NBN25-30GM50-US-V93
NBN25-30GM50-US-V12



NBN25-30GM50-UO-V93
NBN25-30GM50-UO-V12



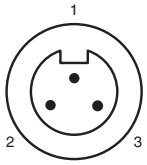
V12



Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

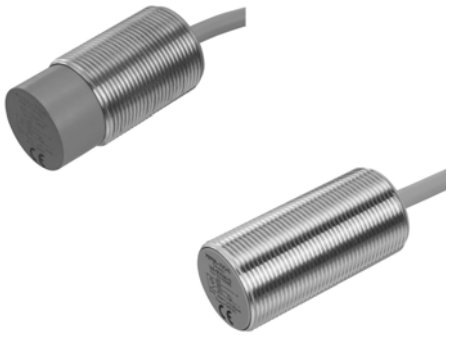
V93



Wire colors

1	GN	(green)
2	BK	(black)
3	WH	(white)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 3 ... 8 mm, flush mountable and 5 ... 15 mm non-flush mountable
- DC, 3-wire analog output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	Analog current output
Type of voltage	DC
Operating voltage	15 ... 30 V
No-load supply current	≤ 10 mA
Output type	0 ... 20 mA
Linearity error	≤ ± 10 % of full-scale value
Load resistor	≤ 500 Ω
Adjustment tolerance zero point	≤ ± 10 % of full-scale value
Ambient temperature	-10 ... 70 °C (14 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	cable PVC , 2 m



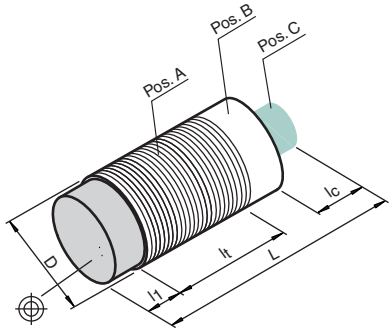
Model Number	green = preferred type	IA8-30GM-I3	IA15-30GM-I3
Measurement range	3 ... 8 mm	●	
	5 ... 15 mm		●
Installation	flush	●	
	non-flush		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		60	
Diameter D [mm]		30	
Thread length l_t [mm]		60	42
Cap length l_1 [mm]		0	18
Connector area l_c [mm]		0	
LED position		-	

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

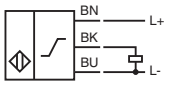
BF 30	Mounting flange, 30 mm
DA5-IU-C	Digital display unit



Electrical Connection



IA15-30GM-I3
IA8-30GM-I3



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	PNP	NO
Type of voltage	DC	
Operating voltage	10 ... 30 V	
No-load supply current	≤ 15 mA	
Reverse polarity protection	✔	
Operating current	0 ... 100 mA	
Short-circuit protection	pulsing	
Indication of the switching state	Multihole-LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	Stainless steel 1.4305 / AISI 303	
Protection degree	IP67	
Connection type	Device connector M8 x 1 , 3-pin	



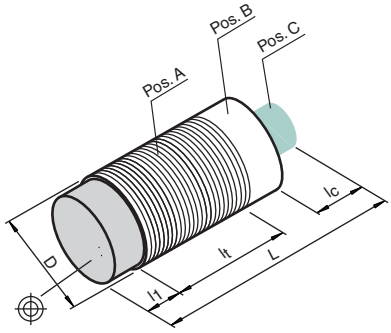
Model Number		NRB2-6,5S50-E2-V3	NRN6-6,5S50-E2-V3
Rated operating distance	2 mm	●	
	6 mm		●
Installation	flush	●	
	non-flush		●
Switching frequency	0 ... 1000 Hz	●	
	0 ... 400 Hz		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		59	
Diameter D [mm]		6.5 / 8	
Thread length l_t [mm]		0	
Cap length l_1 [mm]		0	5
Connector area l_c [mm]		6	
LED position		Pos. C	

Properties

- Ø6.5 mm housing
- 2 mm, flush mountable and 6 mm, non-flush mountable
- DC, 3-wire switching output
- Connector version

Your Benefit

- Same sensing range for all metals



Accessories

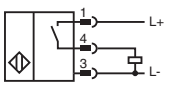
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 6,5	Mounting flange, 6.5 mm
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

Electrical Connection



NRB2-6,5S50-E2-V3
NRN6-6,5S50-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø8 mm housing
- 2 mm, flush mountable and 6 mm, non-flush mountable
- DC, 3-wire switching output
- Connector versions

Your Benefit

- Same sensing range for all metals

Technical Data

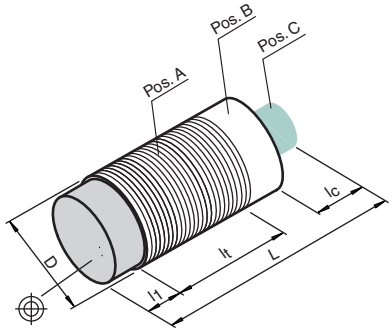
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	PNP	NO
Type of voltage	DC	
Operating voltage	10 ... 30 V	
No-load supply current	≤ 15 mA	
Reverse polarity protection	✔	
Short-circuit protection	pulsing	
Indication of the switching state	Multihole-LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	Stainless steel 1.4305 / AISI 303	
Protection degree	IP67	

Model Number		NRB2-8GS50-E2-V3	NRN6-8GS50-E2-V3	NRB2-8GS40-E2-V1	NRN6-8GS40-E2-V1
Rated operating distance	2 mm	●		●	
	6 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Operating current	0 ... 100 mA	●	●		
	0 ... 200 mA			●	●
Switching frequency	0 ... 4000 Hz			●	
	0 ... 2500 Hz				●
	0 ... 1000 Hz	●			
	0 ... 400 Hz		●		●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	Device connector M8 x 1 , 3-pin	●	●		
					

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions					
Length L [mm]		59		65	
Diameter D [mm]		8		8 / 12	
Thread length l_t [mm]	50	45	40	35	
Cap length l_1 [mm]	0	5	0	5	
Connector area l_c [mm]		6			
LED position		Pos. C			



Accessories

This and more accessories can be found in chapter 10

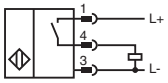
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V3-WM	Female connector, M8, 3-pin, field attachable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

Electrical Connection



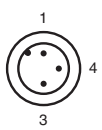
NRB2-8GS40-E2-V1
NRB2-8GS50-E2-V3
NRN6-8GS40-E2-V1
NRN6-8GS50-E2-V3

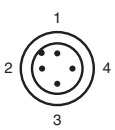




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V
Operating current	0 ... 200 mA
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



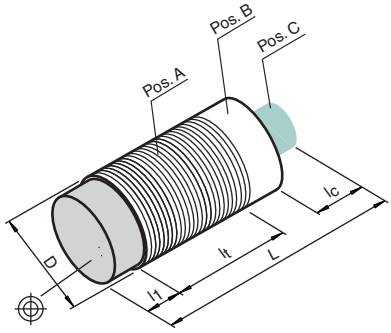
Model Number			NRB4-12GS40-E2-V1	NRB4-12GS40-A2-V1	NRN10-12GS40-E2-V1	NRN10-12GS40-A2-V1
Rated operating distance	4 mm		●	●		
	10 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	PNP	NO/NC		●		●
	PNP	NO	●		●	
No-load supply current	≤ 13 mA		●		●	
	≤ 15 mA			●		●
Switching frequency	0 ... 1000 Hz				●	●
	0 ... 2000 Hz		●	●		
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●		
	-25 ... 85 °C (-13 ... 185 °F)				●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			55			
Diameter D [mm]			12			
Thread length l_t [mm]			39		29	
Cap length l_1 [mm]			0		8	
Connector area l_c [mm]			15			
LED position			Pos. C			

Properties

- Ø12 mm housing
- 4 mm, flush and 10 mm, non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Connector version

Your Benefit

- Same sensing range for all metals



Accessories

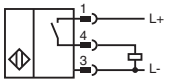
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

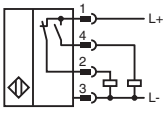
Electrical Connection

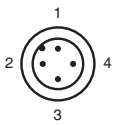


NRB4-12GS40-E2-V1
NRN10-12GS40-E2-V1



NRB4-12GS40-A2-V1
NRN10-12GS40-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



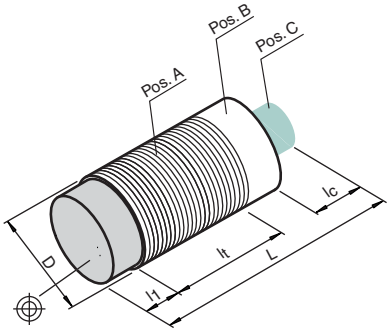
Model Number			NRB8-18GS40-E2-V1	NRB8-18GS50-E2-V1	NRB12-18GS40-E2-V1	NRN15-18GS40-E2-V1	NRN15-18GS50-E2-V1	NRN15-18GS50-E3-V1
Rated operating distance	8 mm		●	●				
	12 mm				●			
	15 mm					●	●	●
Installation	flush		●	●				
	non-flush					●	●	●
	virtually flush				●			
Switching element function	PNP	NO	●	●	●	●	●	
	PNP	NC						●
No-load supply current	≤ 15 mA		●	●		●	●	●
	≤ 28 mA				●			
Switching frequency	0 ... 500 Hz					●	●	●
	0 ... 600 Hz		●	●	●			
Operating current	0 ... 100 mA					●		
	0 ... 200 mA		●	●	●		●	●
Approvals and Certificates								
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]			55	65	55	55	65	65
Diameter D [mm]			18					
Thread length l_t [mm]			40	50	40	30	40	40
Cap length l_1 [mm]			0				10	
Connector area l_c [mm]			15					
LED position			Pos. C					

Properties

- Ø18 mm housing
- 8 mm flush, 12 mm virtually flush, and 15 mm non-flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Same sensing range for all metals



Accessories

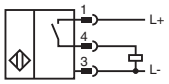
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

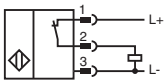
Electrical Connection

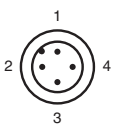


NRB12-18GS40-E2-V1
NRB8-18GS40-E2-V1
NRN15-18GS40-E2-V1
NRN15-18GS50-E2-V1
NRB8-18GS50-E2-V1



NRN15-18GS50-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type of voltage	DC
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



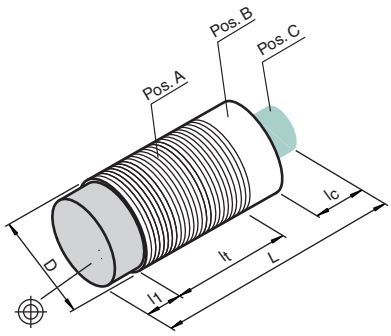
Model Number			NRB15-30GS50-E2-V1	NRB15-30GS50-E3-V1	NRN30-30GS50-E2-V1	NRN30-30GS50-E3-V1
Rated operating distance	15 mm		●	●		
	30 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	PNP	NO	●		●	
	PNP	NC		●		●
Switching frequency	0 ... 300 Hz				●	●
	0 ... 750 Hz		●	●		
Housing material	stainless steel 1.4301				●	
	Stainless steel 1.4305 / AISI 303		●	●		●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			65			
Diameter D [mm]			30			
Thread length l_t [mm]			50		32	
Cap length l_1 [mm]			0		18	
Connector area l_c [mm]			15			
LED position			Pos. C			

Properties

- Ø30 mm housing
- 15 mm flush and 30 mm non-flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Same sensing range for all metals



Accessories

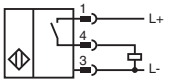
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

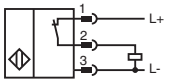
Electrical Connection

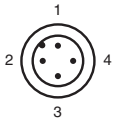


NRB15-30GS50-E2-V1
NRN30-30GS50-E2-V1



NRB15-30GS50-E3-V1
NRN30-30GS50-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø8 mm housing
- 1.5 mm, flush and 3 mm non-flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Specially optimized for welding applications

Technical Data

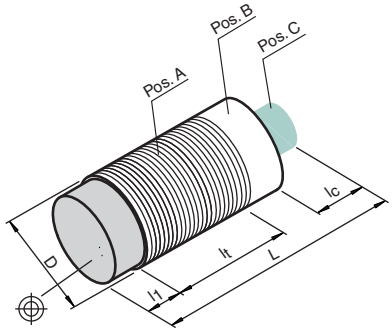
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, PTFE coated
Protection degree	IP67

Model Number		NBB1,5-8GM40-E2-C-V3	NBB1,5-8GM30-E2-C-V1	NBN3-8GM30-E2-C-V1
Rated operating distance	1.5 mm	●	●	
	3 mm			●
Installation	flush	●	●	
	non-flush			●
Switching frequency	0 ... 1800 Hz	●	●	
	0 ... 50 Hz			●
Connection type	Device connector M12 x 1 , 4-pin		●	●
	Device connector M8 x 1 , 3-pin	●		
				

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions				
Length L [mm]		50	60	60
Diameter D [mm]		8	8/12	8/12
Thread length l_t [mm]		47	30	31
Cap length l_1 [mm]		0	0	4
Connector area l_c [mm]		3	6	6
LED position	Pos.	A	B	B



Accessories

This and more accessories can be found in chapter 10

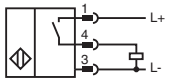
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-WM	Female connector, M8, 3-pin, field attachable
BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-BK	4-pin, M12 female field-attachable connector
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM	Female connector, M8, 3-pin, field attachable
EXG-08	Quick mounting bracket with dead stop

Electrical Connection



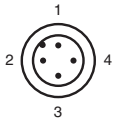
NBB1,5-8GM30-E2-C-V1
NBB1,5-8GM40-E2-C-V3
NBN3-8GM30-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Properties

- Ø12 mm housing
- 2 mm, flush and 4 mm non-flush mountable versions
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Specially optimized for welding applications

Technical Data

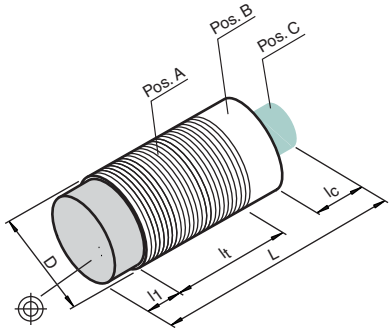
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, PTFE coated
Protection degree	IP67

Model Number		NBN4-12GM50-E2-C	NBB2-12GM50-E2-C-V1	NBB2-12GM50-E2-C3-V1	NBN4-12GM50-E2-C-V1
Rated operating distance	2 mm		●	●	
	4 mm	●			●
Installation	flush		●	●	
	non-flush	●			●
Switching frequency	0 ... 1200 Hz	●			●
	0 ... 1500 Hz		●	●	
Connection type	Device connector M12 x 1 , 4-pin		●	●	●
	cable PVC , 2 m	●			

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions					
Length L [mm]	50		65		
Diameter D [mm]	12				
Thread length l_t [mm]	42	49	49	41	
Cap length l_1 [mm]	5	0	0	5	
Connector area l_c [mm]	0	15	15	19	
LED position	Pos. C				



Accessories

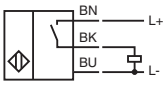
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-12	Quick mounting bracket with dead stop

Electrical Connection

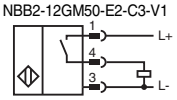


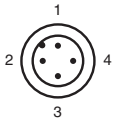
NBN4-12GM50-E2-C





NBB2-12GM50-E2-C-V1
NBN4-12GM50-E2-C-V1
NBB2-12GM50-E2-C3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Properties

- Ø18 mm housing
- 5 mm, flush and 8 mm non-flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Specially optimized for welding applications

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, PTFE coated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin

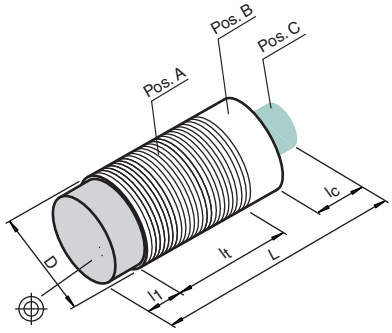


Model Number			NBB5-18GM50-E2-C-V1	NBB5-18GM50-E0-C-V1	NBB5-18GM50-E2-C3-V1	NBN8-18GM50-E2-C-V1
Rated operating distance	5 mm		●	●	●	
	8 mm					●
Installation	flush		●	●	●	
	non-flush					●
Switching element function	NPN	NO		●		
	PNP	NO	●		●	●
Switching frequency	0 ... 500 Hz					●
	0 ... 800 Hz		●	●	●	
Operating current	0 ... 200 mA		●	●	●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			65			
Diameter D [mm]			18			
Thread length l_t [mm]			50			40
Cap length l_1 [mm]			0			10
Connector area l_c [mm]			15			
LED position			Pos. C			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

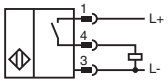
V1-G-BK	4-pin, M12 female field-attachable connector
BF 18	Mounting flange, 18 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop



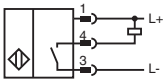
Electrical Connection

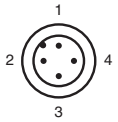


NBB5-18GM50-E2-C-V1
NBN8-18GM50-E2-C-V1
NBB5-18GM50-E2-C3-V1



NBB5-18GM50-E0-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	PNP NO
Type of voltage	DC
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, PTFE coated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NBN8-18GM50-E2-C-V1	NRN8-18GM50-E2-C-V1	NRN12-18GM50-E2-C-V1	NRN15-18GM50-E2-C-V1
Reduction factor 1			●	●	●
Rated operating distance	8 mm	●	●		
	12 mm			●	
	15 mm				●
Switching frequency	0 ... 500 Hz	●			●
	0 ... 600 Hz		●	●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

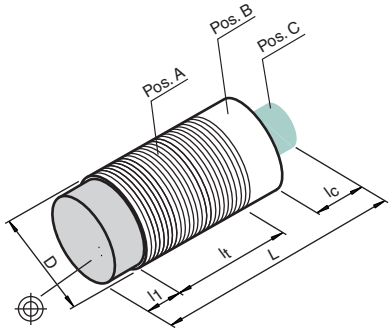
Dimensions	
Length L [mm]	65
Diameter D [mm]	18
Thread length l_t [mm]	40
Cap length l_1 [mm]	10
Connector area l_c [mm]	15
LED position	Pos. C

Properties

- Ø18 mm housing
- Up to 15 mm, flush and non-flush mountable versions
- DC, 3-wire switching output
- Connector versions

Your Benefit

- Specially optimized for welding applications



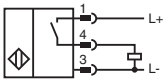
Accessories

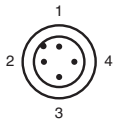
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

NBN8-18GM50-E2-C-V1
NRN12-18GM50-E2-C-V1
NRN15-18GM50-E2-C-V1
NRN8-18GM50-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 10 mm, flush and 15 mm non-flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Specially optimized for welding applications

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, PTFE coated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin

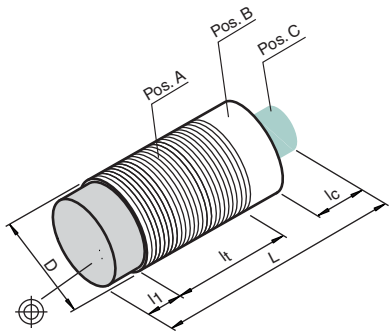


Model Number			NBB10-30GM50-E0-C-V1	NBB10-30GM50-E2-C-V1	NBB10-30GM50-E2-C3-V1	NBN15-30GM50-E2-C-V1
Rated operating distance	10 mm		●	●	●	
	15 mm					●
Installation	flush		●	●	●	
	non-flush					●
Switching element function	NPN	NO	●			
	PNP	NO		●	●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			65			
Diameter D [mm]			30			
Thread length l_t [mm]			50			32
Cap length l_1 [mm]			0			18
Connector area l_c [mm]			15			
LED position			Pos. C			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

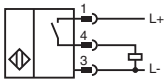
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
EXG-30	Quick mounting bracket with dead stop



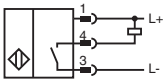
Electrical Connection

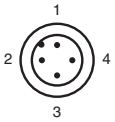


NBB10-30GM50-E2-C3-V1
NBB10-30GM50-E2-C-V1
NBN15-30GM50-E2-C-V1



NBB10-30GM50-E0-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Reduction factor 1	✔
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Housing material	brass, PTFE coated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



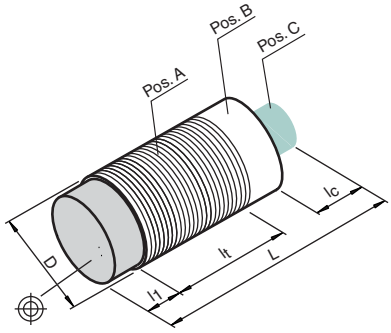
Model Number		NRB2-8GM40-E2-C-V1	NRN6-8GM40-E2-C-V1	NRB4-12GM40-E2-C-V1	NRN10-12GM40-E2-C-V1	NRB8-18GM40-E2-C-V1	NRB8-18GM50-E2-C-V1	NRB12-18GM40-E2-C-V1	NRN15-18GM50-E2-C-V1	NRB15-30GM50-E2-C-V1	NRN30-30GM50-E2-C-V1
Rated operating distance [mm]		2	6	4	10	8	8	12	15	15	30
Installation	flush	●		●		●	●			●	
	non-flush		●		●				●		●
	virtually flush							●			
Switching frequency	0 ... 300 Hz										●
	0 ... 400 Hz										
	0 ... 500 Hz								●		
	0 ... 600 Hz					●	●	●			
	0 ... 750 Hz									●	
	0 ... 1000 Hz				●						
	0 ... 2000 Hz			●							
	0 ... 2500 Hz		●								
	0 ... 4000 Hz	●									
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●		●	●	●	●	●	●
	-25 ... 85 °C (-13 ... 185 °F)				●						
Approvals and Certificates											
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										
Dimensions											
Length L [mm]		65	65	55	55	55	65	55	65	65	65
Diameter D [mm]		8/12		12		18				30	
Thread length l_t [mm]		40	35	39	31	40	50	40	40	50	32
Cap length l_1 [mm]		0	5	0	8	0	0	0	10	0	18
Connector area l_c [mm]		6		15							
LED position	Pos.	B		C							

Properties

- Ø8 - 30 mm housing versions
- Up to 30 mm, flush, non-flush and virtually flush mountable versions
- DC, 3-wire switching output
- Connector version

Your Benefit

- Same sensing range for all metals
- Specially optimized for welding applications



Accessories

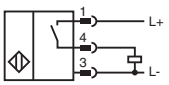
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

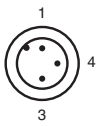
BF 8	Mounting flange, 8 mm
V1-G-BK	4-pin, M12 female field-attachable connector
BF 12	Mounting flange, 12 mm
BF 18	Mounting flange, 18 mm
BF 30	Mounting flange, 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



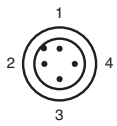
NRB2-8GM40-E2-C-V1
NRN6-8GM40-E2-C-V1
NRB4-12GM40-E2-C-V1
NRN10-12GM40-E2-C-V1
NRB12-18GM40-E2-C-V1
NRB8-18GM40-E2-C-V1
NRB8-18GM50-E2-C-V1
NRN15-18GM50-E2-C-V1
NRB15-30GM50-E2-C-V1
NRN30-30GM50-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Properties

- Ø8 - 30 mm housing versions
- Up to 15 mm, flush mountable versions
- DC, 3-wire switching output
- Connector versions

Your Benefit

- Increased resistance to environmental influences due to self-contained metal sleeve
- Specially optimized for welding applications

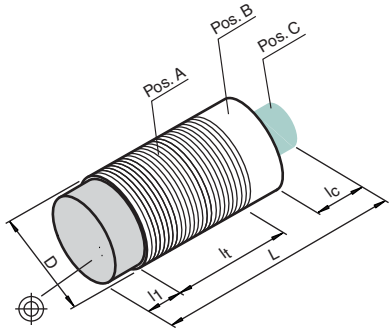
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
metal face	✔
Installation	flush
Switching element function	PNP NO
Type of voltage	DC
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 5 Hz
Short-circuit protection	pulsing
Housing material	Xylan coated - Stainless steel 1.4305 / AISI 303
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NMB3-8GM50-E2-C-V1	NMB5-12GM65-E2-C-V1	NMB10-18GM65-E2-C-V1	NMB15-30GM65-E2-C-V1
Rated operating distance	3 mm	●			
	5 mm		●		
	10 mm			●	
	15 mm				●
Operating current	0 ... 100 mA	●			
	0 ... 200 mA		●	●	●
Operating voltage display	LED, green		●	●	●
Indication of the switching state	LED, red	●			
	Multihole-LED, yellow		●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●	●
	-25 ... 75 °C (-13 ... 167 °F)	●			
Protection degree	IP67	●			
	IP67 / IP68 / IP69K - cordset dependent according to cable Standard		●	●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		50	65	65	65
Diameter D [mm]		8 / 12	12	18	30
Thread length l_t [mm]		25	42	39.5	37.5
Cap length l_1 [mm]		0	2	2.5	2.5
Connector area l_c [mm]		6	19	15	15
LED position	Pos.:	A	C	C	C



Accessories

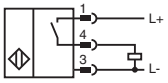
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

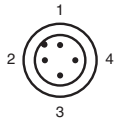
V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
AB-12	Mounting aid
AB-18	Mounting aid
EXG-08	Quick mounting bracket with dead stop

Electrical Connection



NMB3-8GM50-E2-C-V1
NMB5-12GM65-E2-C-V1
NMB10-18GM65-E2-C-V1
NMB15-30GM65-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
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PEPPERL+FUCHS
SENSING YOUR NEEDS



Properties

- Ø8 mm metal face housing
- 3 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Increased resistance to environmental influences due to self-contained metal sleeve

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 360 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, red
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number	green = preferred type	NMB3-8GM35-E0	NMB3-8GM35-E2	NMB3-8GM50-E0-V3	NMB3-8GM50-E2-V3	NMB3-8GM50-E0-V1	NMB3-8GM50-E2-V1
Switching element function	NPN NO	●		●		●	
	PNP NO		●		●		●
Connection type	Device connector M12 x 1 , 4-pin					●	●
	Device connector M8 x 1 , 3-pin			●	●		
	cable PUR , 2 m	●	●				

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

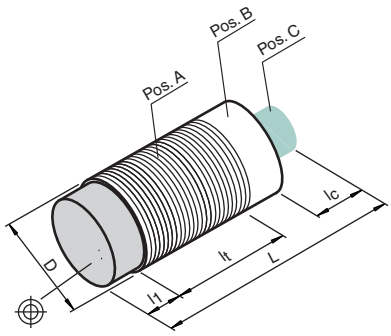
Dimensions						
Length L [mm]	35			50		
Diameter D [mm]		8			8 / 12	
Thread length l_t [mm]			25			
Cap length l_1 [mm]			0			
Connector area l_c [mm]	0			6		
LED position	Pos. C			Pos. A		

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

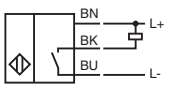
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



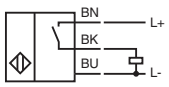
Electrical Connection



NMB3-8GM35-E0

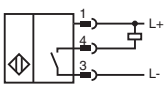


NMB3-8GM35-E2

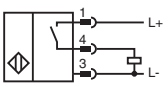




NMB3-8GM50-E0-V1
NMB3-8GM50-E0-V3



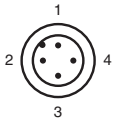
NMB3-8GM50-E2-V1
NMB3-8GM50-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 360 Hz
Operating current	≤ 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Stainless steel 1.4305 / AISI 303

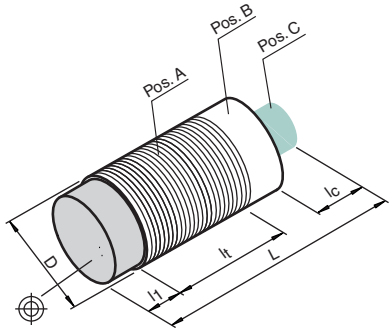
Model Number	green = preferred type		NMB5-12GM55-E0	NMB5-12GM55-E2	NMB5-12GM65-E0-V1	NMB5-12GM65-E2-V1	NMB5-12GM65-E3-V1
Switching element function	NPN	NO	●		●		
	PNP	NO		●		●	
	PNP	NC					●
Protection degree	IP67 / IP68 / IP69K - cordset dependent according to cable Standard				●	●	●
	IP69K		●	●			
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PUR , 2 m		●	●			
							
Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						
Dimensions							
Length L [mm]			55		65		
Diameter D [mm]			12				
Thread length l_t [mm]			45		42		
Cap length l_1 [mm]			2				
Connector area l_c [mm]			0		15		
LED position			Pos. C				

Properties

- Ø12 mm metal face housing
- 5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Increased resistance to environmental influences due to self-contained metal sleeve



Accessories

This and more accessories can be found in chapter 10

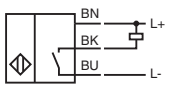
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
AB-12	Mounting aid

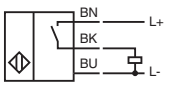
Electrical Connection



NMB5-12GM55-E0

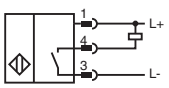


NMB5-12GM55-E2

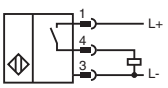




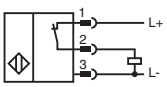
NMB5-12GM65-E0-V1

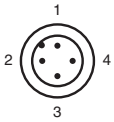


NMB5-12GM65-E2-V1



NMB5-12GM65-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
SENSING YOUR NEEDS



Properties

- Ø18 mm metal face housing
- 10 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Increased resistance to environmental influences due to self-contained metal sleeve

Technical Data

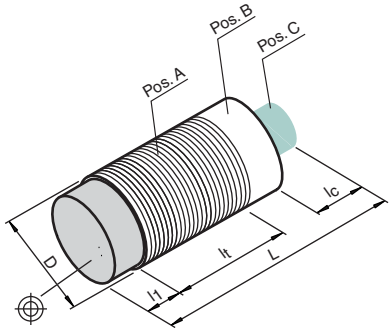
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 240 Hz
Operating current	≤ 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Stainless steel 1.4305 / AISI 303

Model Number	green = preferred type	NMB10-18GM55-E0	NMB10-18GM55-E2	NMB10-18GM65-E0-V1	NMB10-18GM65-E2-V1	NMB10-18GM65-E3-V1
Switching element function	NPN NO	●		●		
	PNP NO		●		●	
	PNP NC					●
Protection degree	IP67 / IP68 / IP69K - cordset dependent according to cable Standard			●	●	●
	IP69K	●	●			
Connection type	Device connector M12 x 1 , 4-pin			●	●	●
	cable PUR , 2 m	●	●			

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions				
Length L [mm]	55		65	
Diameter D [mm]		18		
Thread length l_t [mm]	44		40	
Cap length l_1 [mm]		2.5		
Connector area l_c [mm]	0		15	
LED position		Pos. C		



Accessories

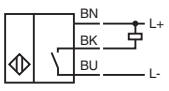
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
AB-18	Mounting aid

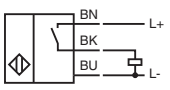
Electrical Connection



NMB10-18GM55-E0

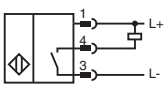


NMB10-18GM55-E2

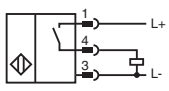




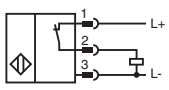
NMB10-18GM65-E0-V1

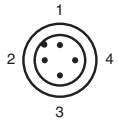


NMB10-18GM65-E2-V1



NMB10-18GM65-E3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø30 mm metal face housing
- 15 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Increased resistance to environmental influences due to self-contained metal sleeve

Technical Data

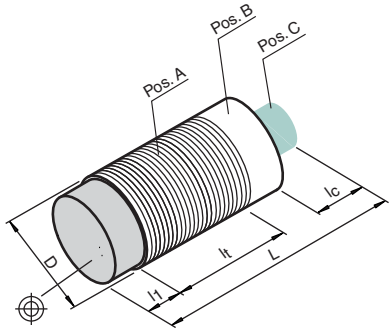
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating current	≤ 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Stainless steel 1.4305 / AISI 303

Model Number	green = preferred type	NMB15-30GM55-E0	NMB15-30GM55-E2	NMB15-30GM65-E0-V1	NMB15-30GM65-E2-V1
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Protection degree	IP67 / IP68 / IP69K - cordset dependent according to cable Standard			●	●
	IP69K	●	●		
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PUR , 2 m	●	●		
					

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	55		65	
Diameter D [mm]	30			
Thread length l_t [mm]	42		37	
Cap length l_1 [mm]	2.5			
Connector area l_c [mm]	0		15	
LED position	Pos. C			



Accessories

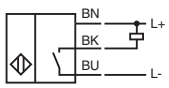
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
AB-30	Mounting aid
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

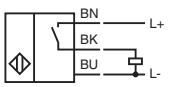
Electrical Connection



NMB15-30GM55-E0

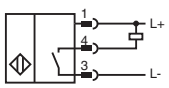


NMB15-30GM55-E2

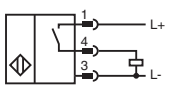


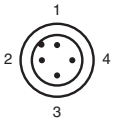


NMB15-30GM65-E0-V1



NMB15-30GM65-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 60 V
Operating current	0 ... 200 mA
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)

Model Number	green = preferred type	NBB4-12GM45-E0-M	NBB4-12GM45-E2-M	NCB4-12GM70-E0-M	NCB4-12GM70-E2-M	NBB4-12GM45-E0-V1-M	NBB4-12GM45-E2-V1-M
Switching element function	NPN NO	●		●		●	
	PNP NO		●		●		●
No-load supply current	≤ 10 mA			●	●	●	●
	≤ 15 mA	●	●				
Switching frequency	0 ... 1000 Hz			●	●		
	0 ... 800 Hz	●	●			●	●
Housing material	Stainless steel 1.4305 / AISI 303			●	●		
	brass, nickel-plated	●	●			●	●
Protection degree	IP68 / IP69K					●	●
	IP69K	●	●	●	●		
Connection type	Device connector M12 x 1 , 4-pin					●	●
	cable PUR , 2 m	●	●	●	●		

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
e1 Type approval	2006/28/EG	●	●	●	●	●	●

Dimensions				
Length L [mm]	60	70	60
Diameter D [mm]		12	
Thread length l_t [mm]	45	55	44
Cap length l_1 [mm]		0	
Connector area l_c [mm]	16		6
LED position		Pos. B	

Properties

- Ø12 mm housing
- 4 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- e1 Type appoval
- Increased immunity 100 V/m
- Conducted noise immunity acc. to ISO 7637-2: pulse 1…4

Further Products

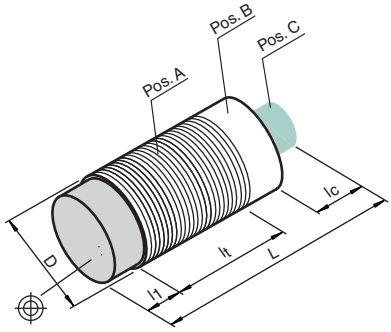
In this series, we offer additionally:

NBN4-12GK50-E2-M

Technical data comparable to NCB4-12GM70-E2-M but:
Installation: non-flush
Operating voltage: 10 ... 65 VDC
Operating current: 0 ... 300 mA
Housing material: PPS
Protection degree: IP68

NBB4-12GM45-E2-M-150MM-3DT04

Technical data like NBB4-12GM45-E2-V1-M but:
Connection type: Cable connector Deutsch DT04 , 3-pin with PUR cable 150 mm



Accessories

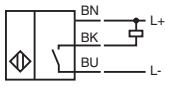
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector

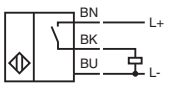
Electrical Connection



NBB4-12GM45-E0-M
NCB4-12GM70-E0-M

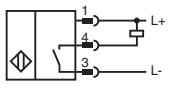


NBB4-12GM45-E2-M-150MM-3DT04
NBB4-12GM45-E2-M
NBN4-12GK50-E2-M
NCB4-12GM70-E2-M

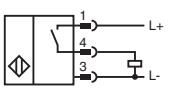




NBB4-12GM45-E0-V1-M

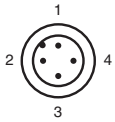


NBB4-12GM45-E2-V1-M



Wire colors

A	BN
B	BU
C	BK



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 7 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

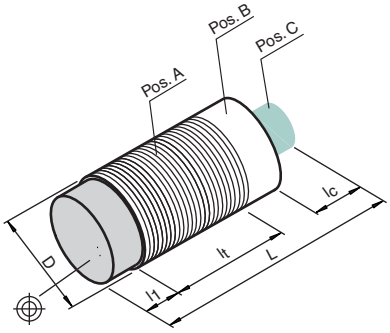
- e1 Type appoval
- Increased immunity 100 V/m
- Conducted noise immunity acc. to ISO 7637-2: pulse 1…4

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	7 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 400 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP69K

Model Number			NBN7-12GM45-E0-M	NBN7-12GM45-E2-M	NBN7-12GM50-E0-V1-M	NBN7-12GM50-E2-V1-M
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PUR , 2 m		●	●		
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose				●	●
	cCSAus Listed, General Purpose, Class 2 Power Source		●	●		
e1 Type approval	2006/28/EG		●	●	●	●
Dimensions						
Length L [mm]			60		65	
Diameter D [mm]			12			
Thread length l_t [mm]			37		41	
Cap length l_1 [mm]			8			
Connector area l_c [mm]			16		6	
LED position			Pos. B			



Accessories

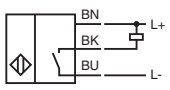
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

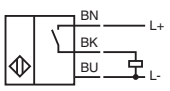
Electrical Connection



NBN7-12GM45-E0-M

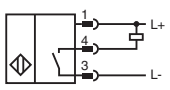


NBN7-12GM45-E2-M

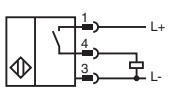


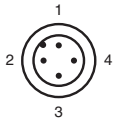


NBN7-12GM50-E0-V1-M



NBN7-12GM50-E2-V1-M



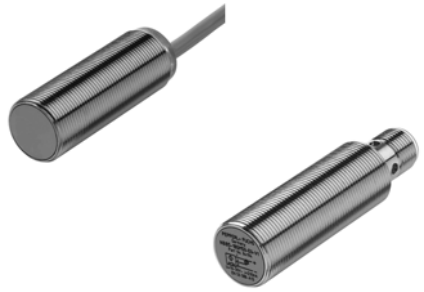


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 400 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP68 / IP69K

Model Number		NBB8-18GM50-E0-M	NBB8-18GM50-E2-M	NBB8-18GM50-E0-V1-M	NBB8-18GM50-E2-V1-M
	green = preferred type				
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PUR , 2 m	●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
e1 Type approval	2006/28/EG	●	●	●	●

Dimensions				
Length L [mm]	50		65	
Diameter D [mm]		18		
Thread length l_t [mm]	47		50	
Cap length l_1 [mm]		0		
Connector area l_c [mm]	0		15	
LED position		Pos. C		

Properties

- Ø18 mm housing
- 8 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- e1 Type appoval
- Increased immunity 100 V/m
- Conducted noise immunity acc. to ISO 7637-2: pulse 1…5

Further Products

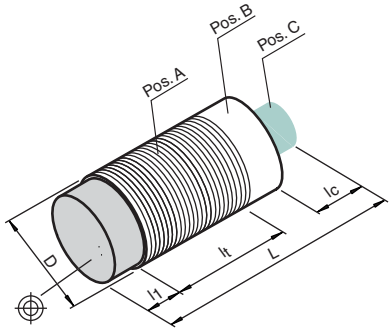
In this series, we offer additionally:

NBB5-18GK50-E2-M
NBN8-18GK50-E2-M

Technical data comparable to NBN8-18GK50-E2-M but:
Installation: NBB5... = 5 mm, flush
NBN8... = 8 mm, non-flush
Operating voltage: 10 ... 65 VDC
Operating current: 0 ... 300 mA
Housing material: PPS
Protection degree: IP68

NBB8-18GM50-E2-M-150MM-3DT04

Technical data like NBB8-18GM50-E2-V1-M but:
Connection type: Cable connector Deutsch DT04 , 3-pin with PUR cable 150 mm



Accessories

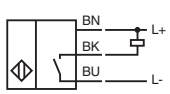
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

EXG-18	Quick mounting bracket with dead stop
BF 18	Mounting flange, 18 mm

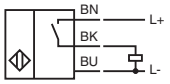
Electrical Connection



NBB8-18GM50-E0-M

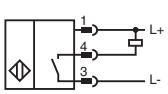


NBB5-18GK50-E2-M
NBB8-18GM50-E2-M
NBB8-18GM50-E2-M-150MM-3DT04
NBN8-18GK50-E2-M

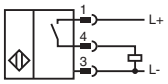


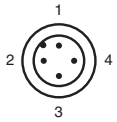


NBB8-18GM50-E0-V1-M



NBB8-18GM50-E2-V1-M





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



CE e1

Properties

- Ø18 mm housing
- 12 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- e1 Type appoval
- Increased immunity 100 V/m
- Conducted noise immunity acc. to ISO 7637-2: pulse 1…5

Technical Data

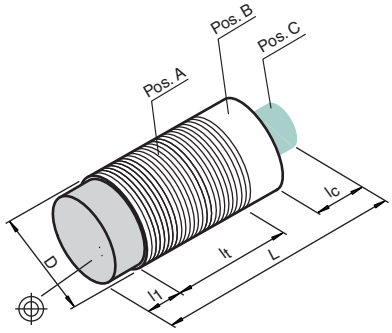
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	12 mm
Installation	non-flush
Type of voltage	DC
Operating voltage	10 ... 60 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP68 / IP69K

Model Number	green = preferred type	NBN12-18GM50-E0-M	NBN12-18GM50-E2-M	NBN12-18GM50-E0-V1-M	NBN12-18GM50-E2-V1-M
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Indication of the switching state	LED, yellow	●	●		
	Multihole-LED, yellow			●	●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PUR	●	●		

Approvals and Certificates					
e1 Type approval	2004/104/EC		●		●
	2006/28/EG	●		●	

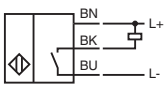
Dimensions				
Length L [mm]	50		65	
Diameter D [mm]	18			
Thread length l_t [mm]	37		40	
Cap length l_1 [mm]	10			
Connector area l_c [mm]	0		15	
LED position	Pos. C			



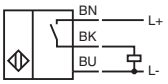
Electrical Connection



NBN12-18GM50-E0-M

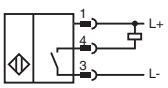


NBN12-18GM50-E2-M

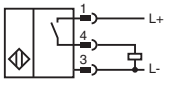


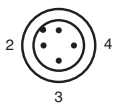


NBN12-18GM50-E0-V1-M



NBN12-18GM50-E2-V1-M





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Type of voltage	DC
Operating voltage	5 ... 60 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 200 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP68 / IP69K

Model Number		NBB15-30GM50-E0-M	NBB15-30GM50-E2-M	NBB15-30GM50-E0-V1-M	NBB15-30GM50-E2-V1-M
	green = preferred type				
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PUR , 2 m	●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
e1 Type approval	2006/28/EG	●	●	●	●

Dimensions					
Length L [mm]	50		65		
Diameter D [mm]	30				
Thread length l_t [mm]	47		50		
Cap length l_1 [mm]	0				
Connector area l_c [mm]	0		15		
LED position	Pos. C				

Properties

- Ø30 mm housing
- 15 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- e1 Type appoval
- Increased immunity 100 V/m
- Conducted noise immunity acc. to ISO 7637-2: pulse 1…5

Further Products

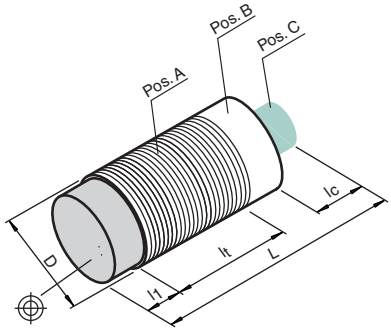
In this series, we offer additionally:

NBB10-30GK50-E2-M
NBN15-30GK50-E2-M

Technical data comparable to NBB15-30GM50-E2-M but:
Installation: NBB10... = 10 mm, flush
NBN15... = 15 mm, non-flush
Operating voltage: 10 ... 65 VDC
Operating current: 0 ... 300 mA
Housing material: PPS
Protection degree: IP68

NBB15-30GM50-E2-M-150MM-3DT04

Technical data like NBB15-30GM50-E2-V1-M but:
Connection type: Cable connector Deutsch DT04 , 3-pin with PUR cable 150 mm



Accessories

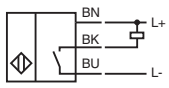
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
EXG-30	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

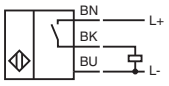
Electrical Connection



NBB15-30GM50-E0-M

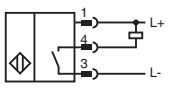


NBB15-30GM50-E2-M
NBN15-30GK50-E2-M
NBB15-30GM50-E2-M-150MM-3DT04
NBB10-30GK50-E2-M

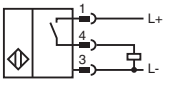




NBB15-30GM50-E0-V1-M

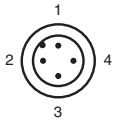


NBB15-30GM50-E2-V1-M



Wire colors

A	BN
B	BU
C	BK



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 5 mm, flush and 8 mm, non-flush mountable versions
- DC, 2-wire NAMUR
- Cable version

Your Benefit

- For use in high temperature applications
- Ex approval for use in hazardous area zone 0 and 1

Technical Data

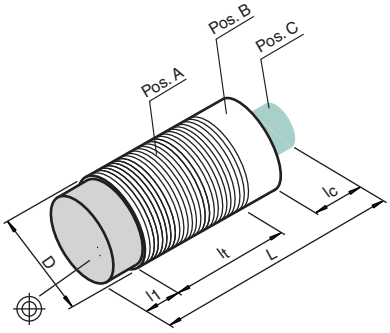
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-40 ... 150 °C (-40 ... 302 °F)
Housing material	PPS
Protection degree	IP65
Connection type	cable SIHF , 2 m



Model Number		NJ5-18GK-N-150	NJ8-18GK-N-150
Rated operating distance	5 mm	●	
	8 mm		●
Installation	flush	●	
	non-flush		●
Switching frequency	0 ... 200 Hz		●
	0 ... 500 Hz	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

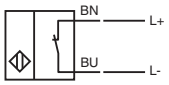
Dimensions	
Length L [mm]	47
Diameter D [mm]	18
Thread length l_t [mm]	34.5
Cap length l_1 [mm]	1
Connector area l_c [mm]	7
LED position	-



Electrical Connection



NJ5-18GK-N-150
NJ8-18GK-N-150



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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0102

Properties

- Ø30 mm housing
- 4 mm, flush and 15 mm non-flush mountable
- DC, 2-wire NAMUR
- Cable version

Your Benefit

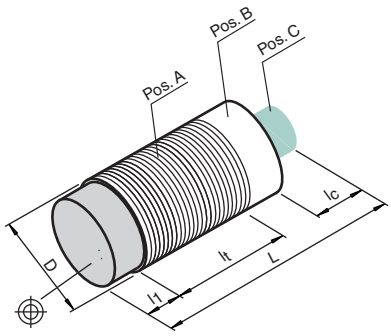
- For use in high temperature applications
- Ex approval for use in hazardous area zone 0 and 1

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Protection degree	IP65

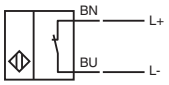
Model Number		NJ4-30GM-N-200	NJ15-30GK-N-150
Rated operating distance	15 mm		●
	4 mm	●	
Installation	flush	●	
	non-flush		●
Switching frequency	0 ... 100 Hz		●
	0 ... 1000 Hz	●	
Suitable for 2:1 technology	✔	●	
Ambient temperature	-25 ... 150 °C (-13 ... 302 °F)		●
	0 ... 200 °C (32 ... 392 °F)	●	
Housing material	Stainless steel 1.4305 / AISI 303	●	
	PPS		●
Connection type	cable SIHF , 2 m		●
	cable SIHF , 5 m	●	
			
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G	●	●
Approvals and Certificates			
FM Control drawing	116-0165F	●	
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		75	47
Diameter D [mm]		30	
Thread length l_t [mm]		50	40
Cap length l_1 [mm]		0	
Connector area l_c [mm]		15	7
			I
LED position		-	



Electrical Connection



NJ15-30GK-N-150
NJ4-30GM-N-200



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Properties

- Ø12 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Connector version

Your Benefit

- For high pressure applications

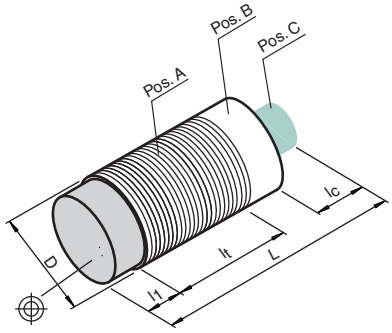
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating pressure	500 bar (725,2 psi)
Peak pressure	800 bar (1160,3 psi)
Ambient temperature	-25 ... 80 °C (-13 ... 176 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Ceramic
Protection degree	IP68
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NCB1,5-12GM40-E2-D-V1	NCB1,5-12GM45-E2-D-V1	NCB1,5-12GM60-E2-D-V1	NCB1,5-12GM70-E2-D-V1	NCB1,5-12GM85-E2-D-V1
Switching frequency	0 ... 2000 Hz			●		●
	0 ... 600 Hz	●	●		●	
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]		56		69	93	
Diameter D [mm]				12		
Thread length l_t [mm]		30	33	38	57	62
Cap length l_1 [mm]		18	15	13	18	13
Connector area l_c [mm]				8		
LED position				-		



Accessories

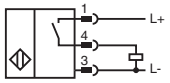
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

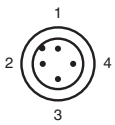
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



NCB1,5-12GM40-E2-D-V1
NCB1,5-12GM45-E2-D-V1
NCB1,5-12GM60-E2-D-V1
NCB1,5-12GM70-E2-D-V1
NCB1,5-12GM85-E2-D-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NCB3-14GM65-E2-D-V1
Rated operating distance	3 mm
Installation	flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	≤ 200 mA
Short-circuit protection	pulsing
Operating pressure	500 bar (725,2 psi)
Peak pressure	800 bar (1160,3 psi)
Ambient temperature	-25 ... 80 °C (-13 ... 176 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Ceramic
Protection degree	IP68
Connection type	Device connector M12 x 1 , 4-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	65
Diameter D [mm]	14
	19
Thread length l_t [mm]	9.1
Cap length l_1 [mm]	18.6
Connector area l_c [mm]	0
LED position	-

Properties

- Ø14 mm housing
- 3 mm, flush mountable
- DC, 3-wire switching output
- Connector version

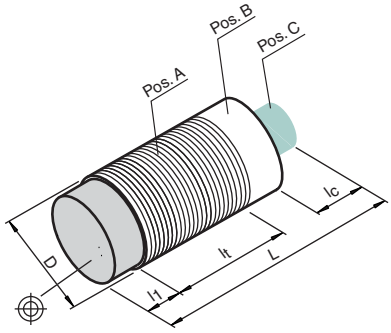
Your Benefit

- For high pressure applications

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

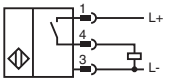
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

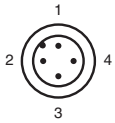


Electrical Connection



NCB3-14GM65-E2-D-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- For high pressure applications

Technical Data

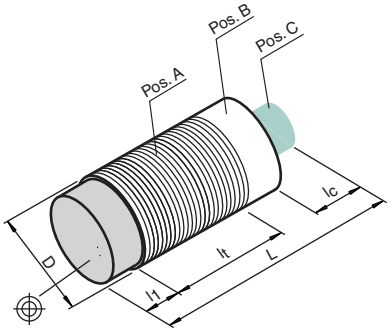
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating pressure	350 bar (507.6 psi)
Ambient temperature	-35 ... 80 °C (-31 ... 176 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Sensing face	Epoxy (black)
Protection degree	IP67

Model Number			NCB1,5-18GM60-E2-D	NCB1,5-18GM60-E3-D	NCB1,5-18GM60-E2-D-V1
Switching element function	PNP	NO	●		●
	PNP	NC		●	
Connection type	Device connector M12 x 1 , 4-pin				●
	cable PVC , 2 m		●	●	

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●

Dimensions			
Length L [mm]	57	57	69
Diameter D [mm]		18	
Thread length l_t [mm]	41	41	44
Cap length l_1 [mm]		15	
Connector area l_c [mm]	0	0	10
LED position		-	



Accessories

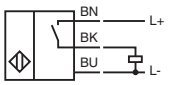
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

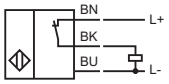
Electrical Connection



NCB1,5-18GM60-E2-D

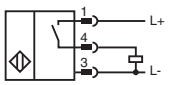


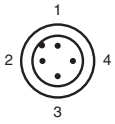
NCB1,5-18GM60-E3-D





NCB1,5-18GM60-E2-D-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NBB2-8GM40-E2-V1-3G-3D
Rated operating distance	2 mm
Installation	flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Use in the Hazardous Area	
Use in the hazardous area	see instruction manuals
Category	3G; 3D

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	65
Diameter D [mm]	8 / 12
Thread length l_t [mm]	40
Cap length l_1 [mm]	0
Connector area l_c [mm]	6
LED position	Pos. B

Properties

- Ø8 mm housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Connector version

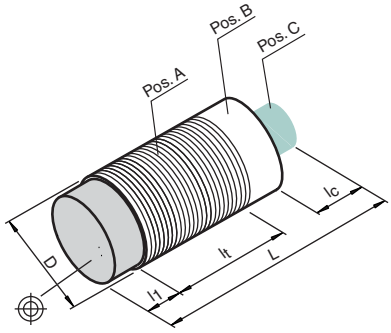
Your Benefit

- ATEX-approval for zone 2 and zone 22

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

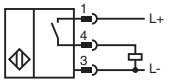
BF 8	Mounting flange, 8 mm
EXG-08	Quick mounting bracket with dead stop

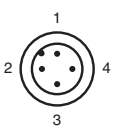


Electrical Connection



NBB2-8GM40-E2-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø12 mm housing
- 2 mm and 4 mm, flush and non-flush mountable versions
- DC, 2-wire switching output
- Cable and connector versions

Your Benefit

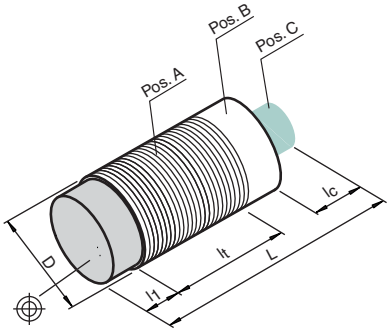
- ATEX-approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	DC NO
Operating voltage	5 ... 60 V DC
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number	green = preferred type	NBB2-12GM40-Z0-3G-3D	NCN4-12GM40-Z0-3G-3D	NCB2-12GM40-Z0-V1-3G-3D
Rated operating distance	2 mm	●		●
	4 mm		●	
Installation	flush	●		●
	non-flush		●	
Switching frequency	0 ... 1000 Hz	●		
	0 ... 800 Hz		●	●
Housing material	Stainless steel 1.4305 / AISI 303		●	●
	brass, nickel-plated	●		
Connection type	Device connector M12 x 1 , 4-pin			●
	cable PVC , 2 m	●	●	
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	3G; 3D	●	●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●
Dimensions				
Length L [mm]		40		55
Diameter D [mm]		12		
Thread length l_t [mm]		37	32	39
Cap length l_1 [mm]		0	5	0
Connector area l_c [mm]		0		6
LED position	Pos.:	C		B



Accessories

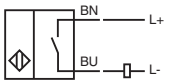
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector

Electrical Connection

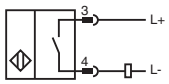


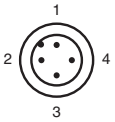
NBB2-12GM40-Z0-3G-3D
NCN4-12GM40-Z0-3G-3D





NCB2-12GM40-Z0-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Ø12 mm housing
- 2 mm and 4 mm, flush and non-flush mountable versions
- DC, 3-wire and 4-wire switching output
- Cable and connector versions

Your Benefit

- ATEX-approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

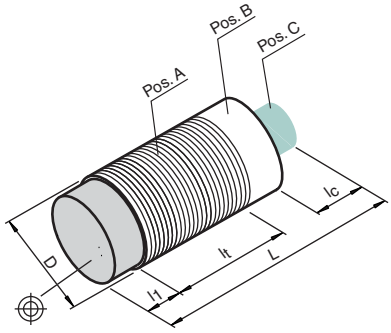
General Data	
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number		NCB2-12GM40-E2-3G-3D	NBB2-12GM60-A2-3G-3D	NBB4-12GM50-E2-3G-3D	NCN4-12GM40-E2-3G-3D	NBB4-12GM50-E2-V1-3G-3D	NCN4-12GM40-E2-V1-3G-3D
	green = preferred type						
Rated operating distance	2 mm	●	●				
	4 mm			●	●	●	●
Installation	flush	●	●	●		●	
	non-flush				●		●
Switching element function	PNP NO/NC		●				
	PNP NO	●		●	●	●	●
No-load supply current	≤ 15 mA	●		●	●	●	●
	≤ 20 mA		●				
Switching frequency	0 ... 1000 Hz	●	●	●		●	
	0 ... 1200 Hz				●		●
Operating current	0 ... 150 mA			●		●	
	0 ... 200 mA	●	●		●		●
Housing material	Stainless steel 1.4305 / AISI 303	●			●		●
	brass, nickel-plated		●	●		●	
Connection type	Device connector M12 x 1 , 4-pin					●	●
	cable PVC , 2 m	●	●	●	●		
							

Use in the Hazardous Area							
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●
Category	3G; 3D	●	●	●	●	●	●

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions							
Length L [mm]		40	60	50	40	65	50
Diameter D [mm]		12					
Thread length l_t [mm]		37	60	47	32	49	45
Cap length l_1 [mm]		0	0	0	5	0	5
Connector area l_c [mm]		0				6	
LED position	Pos.:	C	C	C	C	B	B



Accessories

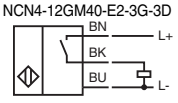
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

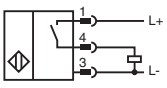


NBB4-12GM50-E2-3G-3D
NCB2-12GM40-E2-3G-3D
NCN4-12GM40-E2-3G-3D

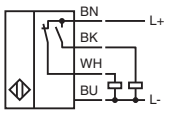


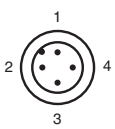


NBB4-12GM50-E2-V1-3G-3D
NCN4-12GM40-E2-V1-3G-3D



NBB2-12GM60-A2-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 5 mm, flush and 8 mm, non-flush mountable versions
- DC, 2-wire switching output
- Cable and connector versions

Your Benefit

- ATEX-approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

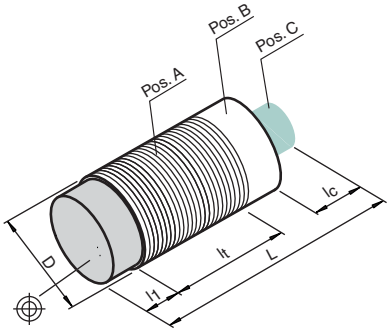
General Data	
Operating voltage	5 ... 60 V DC
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number	green = preferred type	NBB5-18GM40-Z0-3G-3D	NCB5-18GM40-Z0-3G-3D	NCB5-18GM40-Z1-3G-3D	NCN8-18GM40-Z0-3G-3D	NCB5-18GM40-Z0-V1-3G-3D
Rated operating distance	5 mm	●	●	●		●
	8 mm				●	
Installation	flush	●	●	●		●
	non-flush				●	
Switching element function	DC NO	●	●		●	●
	DC NC			●		
Switching frequency	0 ... 300 Hz				●	
	0 ... 350 Hz		●	●		●
	0 ... 500 Hz	●				
Housing material	Stainless steel 1.4305 / AISI 303		●	●	●	●
	brass, nickel-plated	●				
Connection type	Device connector M12 x 1 , 4-pin					●
	cable PVC , 2 m	●	●	●	●	

Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals	●	●	●	●	●
Category	3G; 3D	●	●	●	●	●

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●

Dimensions						
Length L [mm]	40	40	40	40	55
Diameter D [mm]			18		
Thread length l_t [mm]	37	37	37	27	40
Cap length l_1 [mm]	0	0	0	10	0
Connector area l_c [mm]	0	0	0	0	15
LED position	Pos. C				



Accessories

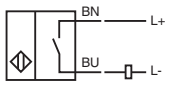
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
EXG-18	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector

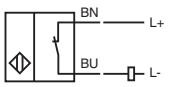
Electrical Connection



NCN8-18GM40-Z0-3G-3D
NBB5-18GM40-Z0-3G-3D
NCB5-18GM40-Z0-3G-3D

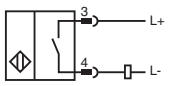


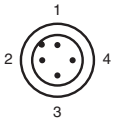
NCB5-18GM40-Z1-3G-3D





NCB5-18GM40-Z0-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Ø18 mm housing
- Up to 8 mm, flush and non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Your Benefit

- ATEX-approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

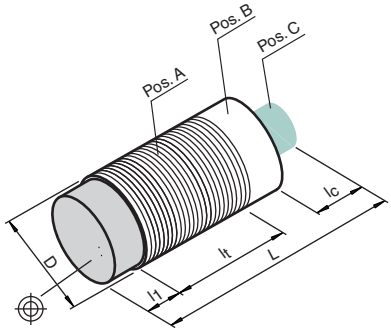
General Data	
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number	green = preferred type	NJ5-18GM50-E2-3G-3D	NBB8-18GM50-E2-3G-3D	NCN8-18GM50-E2-3G-3D	NJ5-18GM50-E2-V1-3G-3D	NBB5-18GM60-A2-V1-3G-3D	NBB8-18GM50-E2-V1-3G-3D	NBB8-18GM60-A2-V1-3G-3D
Rated operating distance	5 mm	●			●	●		
	8 mm		●	●			●	●
Installation	flush	●	●		●	●	●	●
	non-flush			●				
Switching element function	PNP NO/NC					●		●
	PNP NO	●	●	●	●		●	
Operating voltage	10 ... 30 V DC		●			●	●	●
	10 ... 60 V DC	●		●	●			
No-load supply current	[mA] ≤	9	15	10	9	20	15	25
Switching frequency	0 ... 1500 Hz	●			●			
	0 ... 400 Hz			●				
	0 ... 500 Hz		●				●	●
	0 ... 800 Hz					●		
Housing material	Stainless steel 1.4305 / AISI 303	●		●	●			
	brass, nickel-plated		●			●	●	●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●	●
	cable PVC , 2 m	●	●	●				

Use in the Hazardous Area								
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●
Category	3G; 3D	●	●	●	●	●	●	●

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●		●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●		●	●			
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●			●	●	●

Dimensions								
Length L [mm]		50	50	50	65	70	65	70
Diameter D [mm]					18			
Thread length l_t [mm]		50	47	37	50	60	50	60
Cap length l_1 [mm]		0	0	10	0	0	0	0
Connector area l_c [mm]		0	0	0	15	10	15	10
LED position	Pos.:	A	C	C	C	A	C	B



Accessories

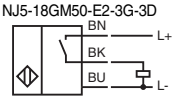
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector

Electrical Connection

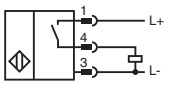


NCN8-18GM50-E2-3G-3D
NBB8-18GM50-E2-3G-3D
NJ5-18GM50-E2-3G-3D

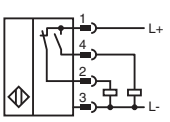


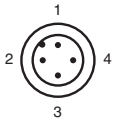


NBB8-18GM50-E2-V1-3G-3D
NJ5-18GM50-E2-V1-3G-3D



NBB5-18GM60-A2-V1-3G-3D
NBB8-18GM60-A2-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	5 ... 60 V DC
Reverse polarity protection	tolerant
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	all direction LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67
Connection type	cable PVC , 2 m

Model Number			NCB10-30GM40-Z0-3G-3D	NCN15-30GM40-Z0-3G-3D	NCB10-30GM40-Z0-V1-3G-3D
Rated operating distance	10 mm		●		●
	15 mm			●	
Installation	flush		●		●
	non-flush			●	
Switching element function	DC	NO	●	●	
	DC	NC			●
Switching frequency	0 ... 100 Hz			●	
	0 ... 150 Hz		●		●
Connection type	cable PVC , 2 m				
	Device connector M12 x 1 , 4-pin				





Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	3G; 3D	●	●	●

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	

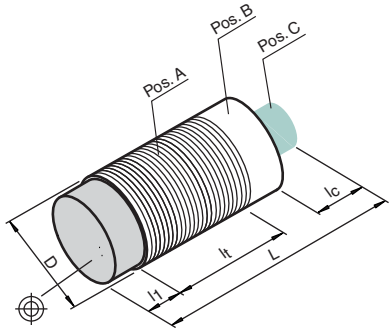
Dimensions				
Length L [mm]		40		55
Diameter D [mm]			30	
Thread length l_t [mm]		37	22	40
Cap length l_1 [mm]		0	18	0
Connector area l_c [mm]			0	15
LED position			Pos. C	

Properties

- Ø30 mm housing
- 10 mm and 15 mm, flush and non-flush mountable versions
- DC, 2-wire switching output
- Cable version

Your Benefit

- ATEX-approval for zone 2 and zone 22



Accessories

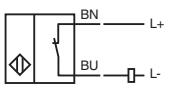
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector

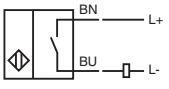
Electrical Connection



NCB10-30GM40-Z1-3G-3D

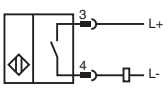


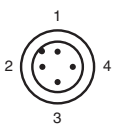
NCN15-30GM40-Z0-3G-3D





NCB10-30GM40-Z0-V1-3G-3D



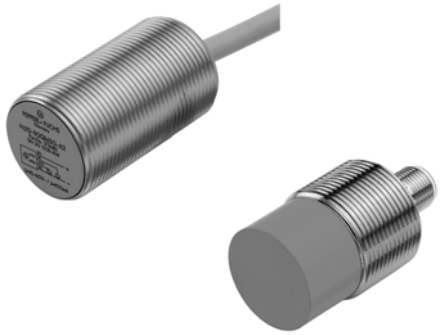


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number		NBB15-30GM50-E2-3G-3D	NJ10-30GM50-E2-3G-3D	NJ15-30GM50-E2-3G-3D	NJ10-30GM50-E2-V1-3G-3D	NJ15-30GM50-E2-V1-3G-3D
Rated operating distance	10 mm		●		●	
	15 mm	●		●		●
Installation	flush	●	●		●	
	non-flush			●		●
Switching element function	PNP NO	●	●	●	●	●
Operating voltage	10 ... 30 V DC	●				
	10 ... 60 V DC		●	●	●	●
No-load supply current	≤ 15 mA	●				
	≤ 9 mA		●	●	●	●
Switching frequency	0 ... 200 Hz	●				
	0 ... 500 Hz			●		●
	0 ... 650 Hz		●		●	
Housing material	Stainless steel 1.4305 / AISI 303		●	●	●	●
	brass, nickel-plated	●				
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m	●	●	●		

Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals	●	●	●	●	●
Category	3G; 3D	●	●	●	●	●

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

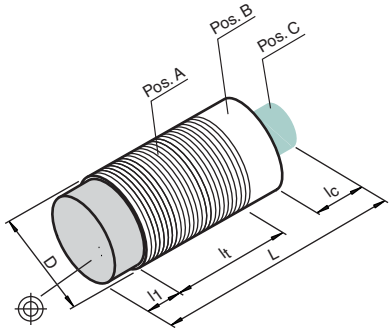
Dimensions						
Length L [mm]	50	50			65	
Diameter D [mm]	30	30				
Thread length l_t [mm]	32	47	50	32	50	32
Cap length l_1 [mm]	0	0	0	18	0	18
Connector area l_c [mm]	0	0			15	
LED position	Pos.:	C	A	A	C	C

Properties

- Ø30 mm housing
- 10 mm and 15 mm, flush and non-flush mountable versions
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- ATEX-approval for zone 2 and zone 22



Accessories

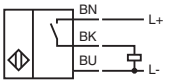
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection

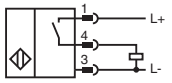


NBB15-30GM50-E2-3G-3D
NJ10-30GM50-E2-3G-3D
NJ15-30GM50-E2-3G-3D

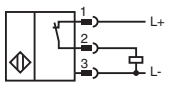


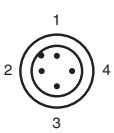


NJ10-30GM50-E2-V1-3G-3D
NJ15-30GM50-E2-V1-3G-3D



NBB15-30GM50-E3-V1-3G-3D

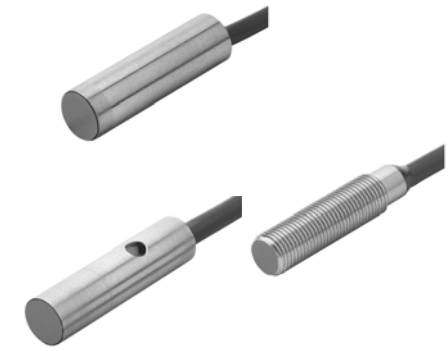




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

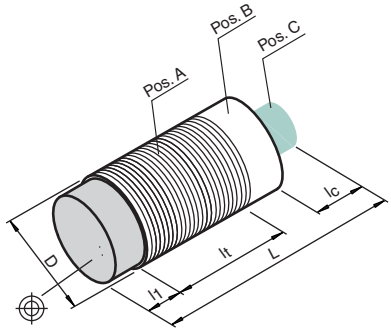


Properties

- Ø4.5 mm / Ø5 mm and Ø6.5 mm housing versions
- 0.8 mm and 1.5 mm flush mountable versions
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number	green = preferred type	NJ0,8-4,5-N	NJ0,8-5GM-N	NJ1,5-6,5-N	NCB1,5-6,5M25-N0	NCB1,5-6,5M25-N0-V1
Rated operating distance	0.8 mm	●	●			
	1.5 mm			●	●	●
Switching frequency	0 ... 2000 Hz				●	●
	0 ... 5000 Hz	●	●	●		
Indication of the switching state	LED, yellow				●	
	Multihole-LED, yellow					●
Connection type	Device connector M12 x 1 , 4-pin					●
	cable PVC , 2 m	●	●	●	●	

Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals	●	●	●	●	●
Category	1G; 2G; 1D		●	●		
	2G	●			●	●

Approvals and Certificates						
Control drawing	116-0165F	●	●			
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions						
Length L [mm]		20		22	25	47
Diameter D [mm]		4.5	5	6.5		6.5/12
Thread length l_t [mm]		0	17	0		
Cap length l_1 [mm]		0				
Connector area l_c [mm]		0				6
LED position	Pos.	-		A		B

Accessories

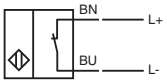
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 4,5	Mounting flange, 4.5 mm
BF 5	Mounting flange, 5 mm
BF 6,5	Mounting flange, 6.5 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

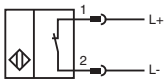


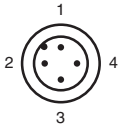
NJ0,8-4,5-N
NJ0,8-5GM-N
NCB1,5-6,5M25-N0
NJ1,5-6,5-N





NCB1,5-6,5M25-N0-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Ø8 mm housing
- 1.5 mm flush mountable
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

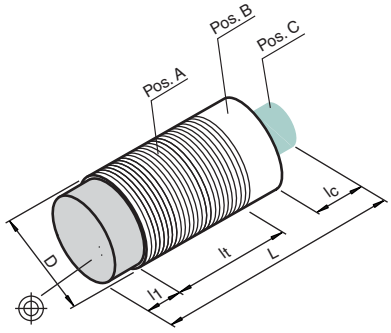
- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data					
Rated operating distance	1.5 mm				
Installation	flush				
Switching element function	NAMUR, NC				
Nominal voltage	8.2 V (R_i approx. 1 kΩ)				
Current consumption					
Measuring plate not detected	≥ 3 mA				
Measuring plate detected	≤ 1 mA				
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required				
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)				
Housing material	Stainless steel 1.4305 / AISI 303				
Model Number		NJ1,5-8GM-N	NCB1,5-8GM25-N0	NJ1,5-8GM-N-V1	NCB1,5-8GM25-N0-V1
	green = preferred type				
Switching frequency	0 ... 2000 Hz		●		●
	0 ... 5000 Hz	●		●	
Indication of the switching state	LED, yellow		●		●
Protection degree	IP66 / IP67	●			
	IP67		●	●	●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 2 m	●	●		
					
Use in the hazardous area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	1G; 2G	●			
	1G; 2G; 1D				●
	1G; 2G; 3G; 1D		●		
	2G			●	
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions					
Length L [mm]		22	25	42	45
Diameter D [mm]		8		8 / 12	
Thread length l_t [mm]		22	25	20	25
Cap length l_1 [mm]		0			
Connector area l_c [mm]		0		6	
LED position	Pos.	-	C	-	B



Accessories

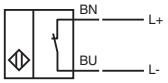
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
BF 8	Mounting flange, 8 mm
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

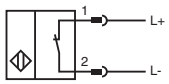


NCB1,5-8GM25-N0
NJ1,5-8GM-N





NCB1,5-8GM25-N0-V1
NJ1,5-8GM-N-V1

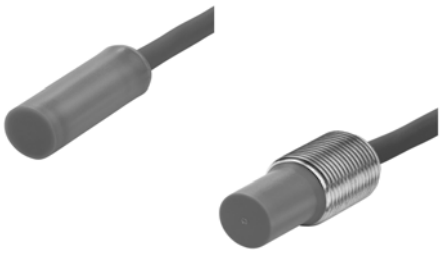




Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 3000 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Protection degree	IP68
Connection type	cable PVC , 2 m



Model Number		NJ2-11-N	NJ2-11-N-G	NJ5-11-N	NJ5-11-N-G
Rated operating distance	2 mm	●	●		
	5 mm			●	●
Installation	flush	●	●		
	non-flush			●	●
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required			●	●
Housing material	Stainless steel 1.4305 / AISI 303		●		●
	PVDF	●		●	
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	1G; 2G; 3G; 1D; 3D	●	●		
	2G			●	
	2G; 3G; 1D; 3D				●
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

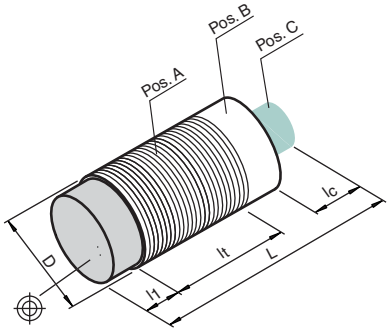
Dimensions					
Length L [mm]		30		30	31
Diameter D [mm]	11	14		11	14
Thread length l_t [mm]	0	30		0	17
Cap length l_1 [mm]		0			14
Connector area l_c [mm]			0		
LED position			-		

Properties

- Ø11 mm smooth and threaded housing versions
- 2 mm flush mountable and 5 mm non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Accessories

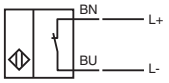
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 11	Mounting flange, 11 mm

Electrical Connection



NJ2-11-N
NJ2-11-N-G
NJ5-11-N
NJ5-11-N-G



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Connection type	cable PVC , 2 m



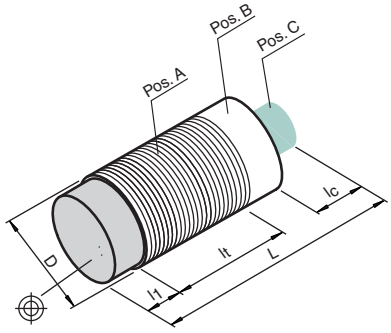
Model Number		NJ2-12GK-N	NJ4-12GK-N	NCB2-12GK35-N0	NCN4-12GK35-N0
Rated operating distance	2 mm	●		●	
	4 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Switching frequency	0 ... 1000 Hz			●	
	0 ... 1500 Hz		●		
	0 ... 2000 Hz	●			
	0 ... 800 Hz				●
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●		●	
Indication of the switching state	all direction LED, yellow			●	●
Protection degree	IP66 / IP68	●	●		
	IP67			●	●
Use in the hazardous area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	2G; 1D	●	●	●	●
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		34		35	
Diameter D [mm]		12			
Thread length l_t [mm]		30.5		32	
Cap length l_1 [mm]		0			
Connector area l_c [mm]		0			
LED position		-		Pos. C	

Properties

- Ø12 mm housing
- 2 mm flush mountable and 4 mm non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Accessories

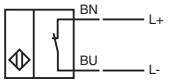
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm

Electrical Connection



NCB2-12GK35-N0
NJ2-12GK-N
NCN4-12GK35-N0
NJ4-12GK-N



Date of issue 04/08/2015

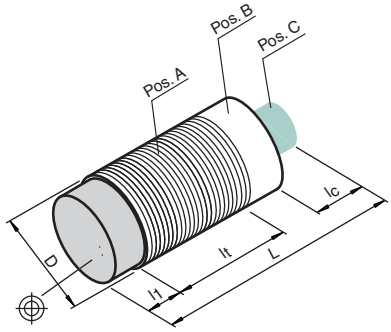


Properties

- Ø12 mm housing
- 2 mm and 4mm, flush and non-flush mountable versions
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	Stainless steel 1.4305 / AISI 303

Model Number	green = preferred type	NJ2-12GM-N	NJ4-12GM-N	NCB2-12GM35-N0	NCB4-12GM40-N0	NCN4-12GM35-N0	NJ2-12GM-N-V1	NJ4-12GM-N-V1	NCB2-12GM35-N0-V1	NCB4-12GM40-N0-V1	NCN4-12GM35-N0-V1
Rated operating distance	2 mm	●		●			●		●		
	4 mm		●		●	●		●		●	●
Installation	flush	●		●	●		●		●	●	
	non-flush		●			●		●			●
Current consumption											
Measuring plate not detected	≥ 2.2 mA				●				●	●	
	≥ 3 mA	●	●	●		●	●	●			●
Measuring plate detected	≤ 1 mA	●	●	●	●	●	●	●	●	●	●
Switching frequency	0 ... 1000 Hz			●					●		
	0 ... 1500 Hz		●		●			●		●	
	0 ... 2000 Hz	●					●				
	0 ... 800 Hz					●					●
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●		●	●		●		●	●	
Indication of the switching state	LED, yellow			●	●	●			●	●	●
Protection degree	IP66 / IP67			●		●			●		
	IP67	●	●		●		●	●		●	●
Connection type	Device connector M12 x 1 , 4-pin						●	●	●	●	●
	cable PVC , 2 m	●	●	●	●	●					

Use in the Hazardous Area											
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●	●	●	●
Category	1G; 2G						●	●			
	1G; 2G; 1D	●	●						●		●
	1G; 2G; 3G				●						
	1G; 2G; 3G; 1D; 3D			●		●					
	1G; 2G; 3G; 3D									●	

Approvals and Certificates											
Control drawing	116-0165F	●	●	●	●	●	●	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Dimensions											
Length L [mm]	35	33	35	40	35	50	50	50	55	50
Diameter D [mm]	12									
Thread length l_t [mm]	35	28	32	37	27	50	45	34	40	29
Cap length l_1 [mm]	0	5	0	0	5	0	5	0	0	5
Connector area l_c [mm]	0					6				
LED position	-		Pos. C			-		Pos. B		

Accessories

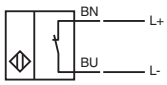
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

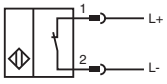


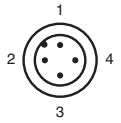
NCB2-12GM35-N0
NJ2-12GM-N
NCB4-12GM40-N0
NCN4-12GM35-N0
NJ4-12GM-N





NCB2-12GM35-N0-V1
NJ2-12GM-N-V1
NCB4-12GM40-N0-V1
NCN4-12GM35-N0-V1
NJ4-12GM-N-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Connection type	cable PVC , 2 m



Model Number		NJ5-18GK-N	NJ8-18GK-N	NCB5-18GK40-N0	NCN8-18GK40-N0
Rated operating distance	5 mm	●		●	
	8 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Switching frequency	0 ... 200 Hz		●		
	0 ... 300 Hz				●
	0 ... 400 Hz			●	
	0 ... 500 Hz	●			
Indication of the switching state	all direction LED, yellow			●	●
Housing material	PBT			●	●
	PBT/PPS	●	●		
Protection degree	IP66 / IP68	●			
	IP67			●	●
	IP68		●		
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	2G; 1D	●	●	●	●
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

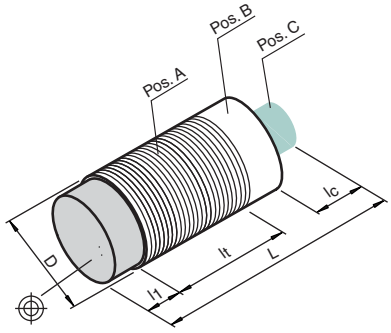
Dimensions				
Length L [mm]	39		40	
Diameter D [mm]		18		
Thread length l_t [mm]	34.5		37	
Cap length l_1 [mm]	1		0	
Connector area l_c [mm]		0		
LED position	-		Pos. C	

Properties

- Ø18 mm housing
- 5 mm flush mountable and 8 mm non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Accessories

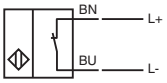
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm

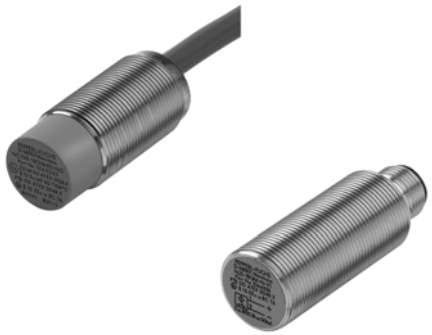
Electrical Connection



NCB5-18GK40-N0
NJ5-18GK-N
NCN8-18GK40-N0
NJ8-18GK-N



Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 5 mm to 8 mm flush and non-flush mountable versions
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

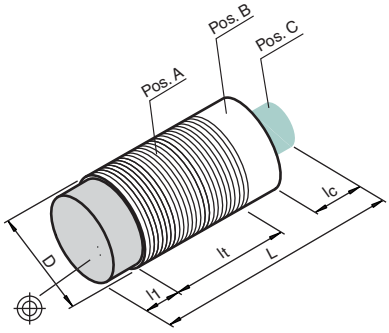
General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	Stainless steel 1.4305 / AISI 303

Model Number	green = preferred type	NJ5-18GM-N	NJ8-18GM-N	NCB5-18GM40-N0	NCB5-18GM70-N0	NCB8-18GM40-N0	NCN8-18GM40-N0	NJ5-18GM-N-V1	NJ8-18GM-N-V1	NCB5-18GM40-N0-V1	NCB8-18GM40-N0-V1	NCN8-18GM40-N0-V1
Rated operating distance	5 mm	●		●	●			●		●		
	8 mm		●			●	●		●		●	●
Installation	flush	●		●	●	●		●		●	●	
	non-flush		●				●		●			●
Current consumption												
Measuring plate detected	≤ 1 mA	●	●	●	●	●	●	●	●	●	●	●
Measuring plate not detected	≥ 2.2 mA					●					●	
	≥ 3 mA	●	●	●	●		●	●	●	●		●
Switching frequency	0 ... 1000 Hz				●							
	0 ... 1500 Hz					●					●	
	0 ... 200 Hz		●						●			
	0 ... 300 Hz						●					●
	0 ... 400 Hz			●						●		
	0 ... 500 Hz	●						●				
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required					●					●	
Indication of the switching state	LED, yellow			●	●	●	●					●
Protection degree	IP66 / IP67			●		●						
	IP67	●	●		●		●	●	●	●	●	●
Connection type	Device connector M12 x 1 , 4-pin							●	●	●	●	●
	cable PVC , 2 m	●	●	●	●	●	●					

Use in the Hazardous Area												
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●	●	●	●	●
Category	1G; 2G							●	●			
	1G; 2G; 1D	●	●		●					●		●
	1G; 2G; 3G										●	
	1G; 2G; 3G; 1D; 3D			●			●					
	1G; 2G; 3G; 3D					●						

Approvals and Certificates												
Control drawing	116-0165F	●	●	●		●	●	●	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.											

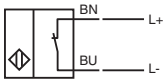
Dimensions												
Length L [mm]		40			70	40		50			55	
Diameter D [mm]		18										
Thread length l_t [mm]		40	24	37	70	37	27	40	24	40	40	30
Cap length l_1 [mm]		0	16		0		10	0	16	0		10
Connector area l_c [mm]				0					10			15
LED position	Pos.	-			C				-			C



Electrical Connection

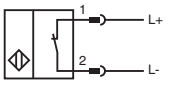


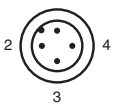
NCB5-18GM40-N0
NCB5-18GM70-N0
NJ5-18GM-N
NCB8-18GM40-N0
NCN8-18GM40-N0
NJ8-18GM-N





NCB5-18GM40-N0-V1
NJ5-18GM-N-V1
NCB8-18GM40-N0-V1
NCN8-18GM40-N0-V1
NJ8-18GM-N-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

		NJ1,5-18GM-N-D	NJ1,5-18GM-N-D-V1
General Data			
Rated operating distance	1.5 mm		
Installation	flush		
Switching element function	NAMUR, NC		
Nominal voltage	8.2 V (R_i approx. 1 kΩ)		
Current consumption			
Measuring plate not detected	≥ 3 mA		
Measuring plate detected	≤ 1 mA		
Switching frequency	0 ... 400 Hz		
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)		
Housing material	Stainless steel 1.4305 / AISI 303		
Model Number			
Protection degree	IP66 / IP68	●	
	IP67		●
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PVC , 2 m	●	
			
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	2G; 1D	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		50	45
Diameter D [mm]		18	
Thread length l_t [mm]		20	
Cap length l_1 [mm]		15	
Connector area l_c [mm]		0	10
LED position		-	

Properties

- Ø18 mm housing
- 1.5 mm flush mountable
- DC, NAMUR interface
- Cable and connector versions

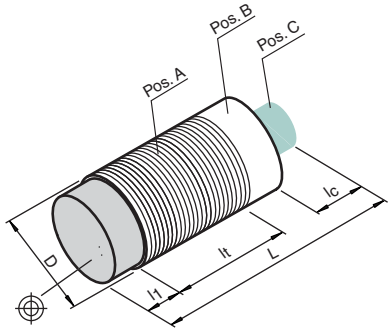
Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508
- Compression proof up to 350 bar, dynamically on active surface

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

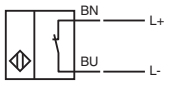
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable



Electrical Connection

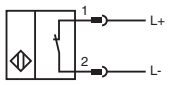
NJ1,5-18GM-N-D

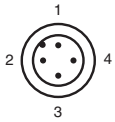




NJ1,5-18GM-N-D-V1



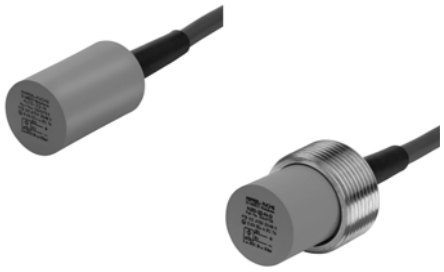




Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue 04/08/2015



Properties

- Ø22 mm smooth and threaded housing versions
- 6 mm flush and 8 mm non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensors applicable up to zone 1 and zone 20
- Usable up to SIL2 acc. to IEC 61508

Technical Data

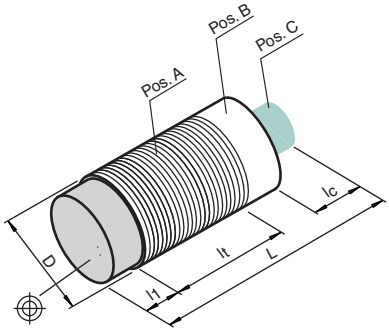
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 2000 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Protection degree	IP68
Connection type	cable PVC , 2 m



Model Number		NJ6-22-N	NJ6-22-N-G	NJ10-22-N	NJ10-22-N-G
Rated operating distance	10 mm			●	●
	6 mm	●	●		
Installation	flush	●	●		
	non-flush			●	●
Housing material	Stainless steel 1.4305 / AISI 303		●		●
	PBT	●		●	
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	2G			●	
	2G; 1D				●
	2G; 3G	●			
	2G; 3G; 3D		●		
Approvals and Certificates					
Control drawing	116-0165F	●		●	
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

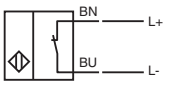
Dimensions					
Length L [mm]		35			
Diameter D [mm]		22	28.3	22	28.3
Thread length l_t [mm]		0	35	0	15
Cap length l_1 [mm]			0		20
Connector area l_c [mm]			0		
LED position			-		



Electrical Connection



NJ10-22-N
NJ10-22-N-G
NJ6-22-N
NJ6-22-N-G



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Connection type	cable PVC , 2 m



Model Number		NJ10-30GK-N	NJ15-30GK-N	NCB10-30GK40-N0	NCN15-30GK40-N0
Rated operating distance	10 mm	●		●	
	15 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Current consumption					
Measuring plate detected	≤ 1 mA	●	●	●	●
Measuring plate not detected	≥ 2.2 mA			●	●
	≥ 3 mA	●	●		
Switching frequency	0 ... 100 Hz		●		
	0 ... 150 Hz				●
	0 ... 200 Hz			●	
	0 ... 300 Hz	●			
Indication of the switching state	all direction LED, yellow			●	●
Protection degree	IP66 / IP68	●			
	IP67			●	●
	IP68		●		
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	2G; 1D	●	●		
	2G; 3G; 1D; 3D			●	●
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

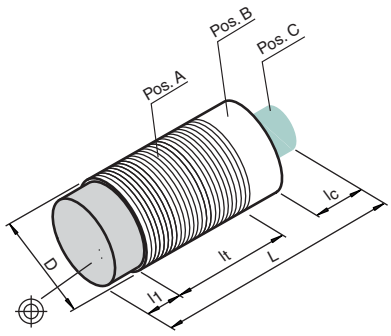
Dimensions			
Length L [mm]	40		
Diameter D [mm]	30		
Thread length l_t [mm]	34.5	37	22
Cap length l_1 [mm]	1	0	18
Connector area l_c [mm]		0	
LED position	-	Pos. C	-

Properties

- Ø30 mm housing
- 10 mm flush and 15 mm non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensors applicable up to zone 1 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Accessories

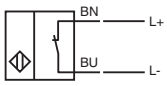
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm

Electrical Connection



NCB10-30GK40-N0
NJ10-30GK-N
NCN15-30GK40-N0
NJ15-30GK-N



Date of issue 04/08/2015

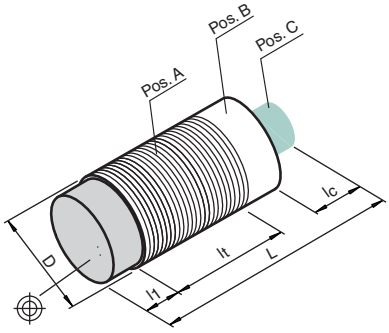


Properties

- Ø30 mm housing
- 10 mm flush and 15 mm non-flush and virtually flush mountable versions
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Usable up to SIL2 acc. to IEC 61508



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	Stainless steel 1.4305 / AISI 303

Model Number	green = preferred type	NJ15-30GM-N	NCB10-30GM40-N0	NCB15-30GM40-N0	NCN15-30GM40-N0	NJ10-30GM-N-V1	NCB10-30GM40-N0-V1	NCB15-30GM40-N0-V1	NCN15-30GM40-N0-V1
Rated operating distance	10 mm		●			●	●		
	15 mm	●		●	●			●	●
Installation	flush		●			●	●		
	non-flush	●			●				●
	virtually flush			●				●	
Current consumption									
Measuring plate not detected	≥ 2.2 mA		●	●	●		●	●	●
	≥ 3 mA	●				●			
Measuring plate detected	≤ 1 mA	●	●	●	●	●	●	●	●
Switching frequency	0 ... 100 Hz	●							
	0 ... 150 Hz				●				●
	0 ... 200 Hz		●				●		
	0 ... 300 Hz					●			
	0 ... 450 Hz			●				●	
Indication of the switching state	LED, yellow		●	●	●		●	●	●
Protection degree	IP65					●			
	IP67	●	●	●	●		●	●	●
Connection type	Device connector M12 x 1 , 4-pin					●	●	●	●
	cable PVC , 2 m	●	●	●	●				

Use in the Hazardous Area									
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●	●
Category	1G; 2G					●			
	1G; 2G; 1D	●							
	1G; 2G; 3G; 1D; 3D		●		●		●		●
	1G; 2G; 3G; 3D			●				●	

Approvals and Certificates									
Control drawing	116-0165F	●	●	●	●	●		●	
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]	40	40			50	55			
Diameter D [mm]	30	30							
Thread length l_t [mm]	22	37	22		40		22		
Cap length l_1 [mm]	0	0	18		0		18		
Connector area l_c [mm]	0	0			10	15			
LED position	-	Pos. C			-	Pos. C			

Accessories

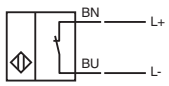
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

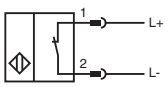


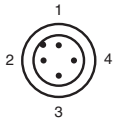
NCB10-30GM40-N0
NCB15-30GM40-N0
NCN15-30GM40-N0
NJ15-30GM-N





NCB10-30GM40-N0-V1
NJ10-30GM-N-V1
NCB15-30GM40-N0-V1
NCN15-30GM40-N0-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015





0102

Properties

- Ø30 mm and Ø40 mm housing versions
- 10 mm to 20 mm flush and non-flush mountable versions
- DC, NAMUR interface
- Terminal compartment

Your Benefit

- ATEX approved sensor applicable up to zone 1
- Usable up to SIL2 acc. to IEC 61508

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67
Connection type	terminal compartment



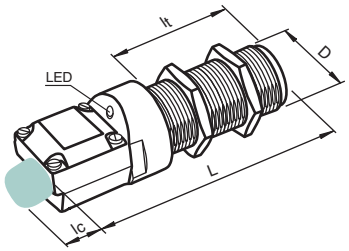
Model Number		NJ10-30GKK-N	NJ15-30GKK-N	NJ20-40-N
Rated operating distance	10 mm	●		
	15 mm		●	
	20 mm			●
Installation	flush	●		
	non-flush		●	●
Switching frequency	0 ... 100 Hz		●	●
	0 ... 300 Hz	●		
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	2G	●	●	●
Approvals and Certificates				
Control drawing	116-0165F			●
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions		
Length L [mm]	115	95
Diameter D [mm]	30	40
Thread length l_t [mm]	58	0 (50)
Cap length l_1 [mm]	2	0
Connector area l_c [mm]	0	
LED position	-	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

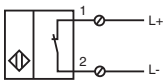
BF 30	Mounting flange, 30 mm
BF 40	Mounting flange, 40 mm



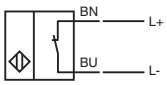
Electrical Connection



NJ10-30GKK-N
NJ15-30GKK-N



NJ20-40-N



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

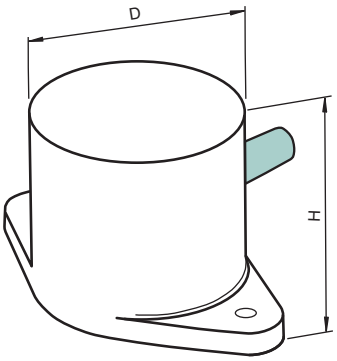
Model Number	NJ25-50-N
Rated operating distance	25 mm
Installation	non-flush
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 250 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m
	
Use in the Hazardous Area	
Use in the hazardous area	see instruction manuals
Category	2G
Control drawing	116-0165F
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Height H [mm]	40
Diameter D [mm]	50
Thread length l_t [mm]	0
Connector area l_c [mm]	0

Properties

- Ø50 mm housing
- 25 mm non-flush mountable
- DC, NAMUR interface
- Cable version

Your Benefit

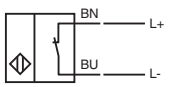
- ATEX approved sensor applicable up to zone 1
- Usable up to SIL2 acc. to IEC 61508



Electrical Connection

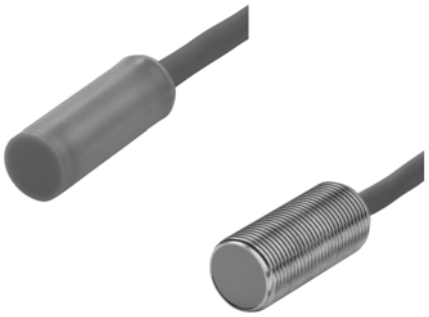


NJ25-50-N



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Switching element function	NAMUR, NC
Nominal voltage	8 V DC
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 3000 Hz
Suitable for 2:1 technology	✔, with reverse polarity protection diode
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Protection degree	IP68
Connection type	cable silicon , 2 m



Model Number		NJ2-11-SN	NJ2-11-SN-G
Housing material	Stainless steel 1.4305 / AISI 303		●
	PVDF	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	●
Approvals and Certificates			
FM control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		31	30
Diameter D [mm]		11	14
Thread length l_t [mm]		0	30
Cap length l_1 [mm]		0	
Connector area l_c [mm]		0	
LED position		-	

Properties

- Ø11/14 mm housing
- 2 mm, flush mountable
- DC, NAMUR safety interface
- Cable version

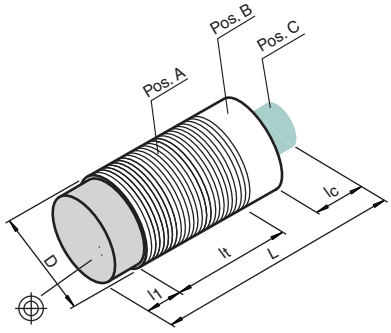
Your Benefit

- Usable up to SIL 3 acc. to IEC 61508
- Usable in hazardous area
- High protection degree (IP68)

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

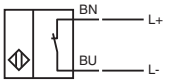
BF 11	Mounting flange, 11 mm



Electrical Connection



NJ2-11-SN
NJ2-11-SN-G



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8 V DC
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Housing material	PP
Protection degree	IP68
Connection type	cable silicon , 2 m



Model Number	green = preferred type	NJ2-12GK-SN	NJ4-12GK-SN
Rated operating distance	2 mm	●	
	4 mm		●
Installation	flush	●	
	non-flush		●
Switching frequency	0 ... 1500 Hz		●
	0 ... 2000 Hz	●	
Suitable for 2:1 technology	✔, with reverse polarity protection diode	●	
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)	●	
	-50 ... 100 °C (-58 ... 212 °F)		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	
	1G; 2G; 3G; 1D; 3D		●
Approvals and Certificates			
FM control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

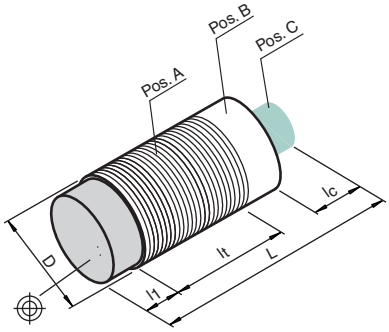
Dimensions	
Length L [mm]	34
Diameter D [mm]	12
Thread length l_t [mm]	30
Cap length l_1 [mm]	0
Connector area l_c [mm]	0
LED position	-

Properties

- Ø12 mm housing
- 2 mm, flush and 4 mm, non-flush mountable versions
- DC, NAMUR safety interface
- Cable version

Your Benefit

- Usable up to SIL 3 acc. to IEC 61508
- Usable in hazardous area
- High protection degree (IP68)



Accessories

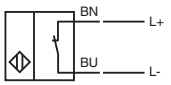
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop

Electrical Connection



NJ4-12GK-SN
NJ2-12GK-SN



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Nominal voltage	8 V DC
Connection type	cable silicon , 2 m



Model Number	green = preferred type	NJ3-18GK-S1N	NJ3-18GK-S1N-130	NJ5-18GK-SN	NJ8-18GK-SN
Rated operating distance	3 mm	●	●		
	5 mm			●	
	8 mm				●
Installation	flush	●	●	●	
	non-flush				●
Switching element function	NAMUR, NO	●	●		
	NAMUR, NC			●	●
Current consumption					
Measuring plate not detected	≥ 3 mA			●	●
	≤ 1 mA	●	●		
Measuring plate detected	≥ 3 mA	●	●		
	≤ 1 mA			●	●
Switching frequency	0 ... 200 Hz	●	●		●
	0 ... 500 Hz			●	
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●			
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)	●			
	-25 ... 130 °C (-13 ... 266 °F)		●		
	-40 ... 100 °C (-40 ... 212 °F)			●	●
Housing material	Hostalen PPN, black	●			●
	PP			●	
	PPS , PTFE		●		
Protection degree	IP65		●		
	IP68	●		●	●
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●		●	●
Category	1G; 2G; 3G; 1D	●		●	
	1G; 2G; 3G; 1D; 3D				●
Approvals and Certificates					
FM control drawing	116-0165F	●		●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

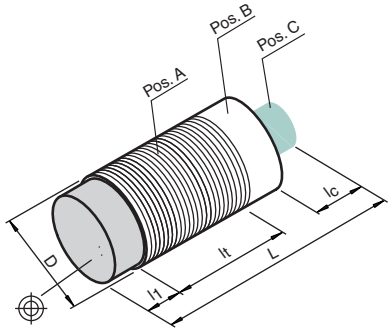
Dimensions		
Length L [mm]	40.5	39
Diameter D [mm]	18	
Thread length l_t [mm]	34.5	
Cap length l_1 [mm]	1	
Connector area l_c [mm]	0	
LED position	-	

Properties

- Ø18 mm housing
- Up to 8 mm, flush and non-flush mountable versions
- DC, NAMUR safety interface
- Cable version

Your Benefit

- Usable up to SIL 3 acc. to IEC 61508
- Usable in hazardous area
- Versions with high protection degree (IP68)
- Versions usable in applications that require extended temperature range up to +130 °C (266 °F)



Accessories

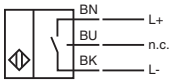
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
EXG-18	Quick mounting bracket with dead stop

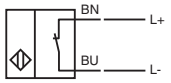
Electrical Connection



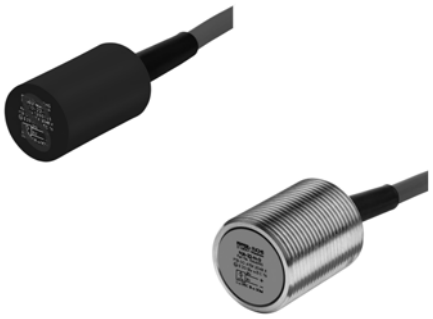
NJ3-18GK-S1N
NJ3-18GK-S1N-130



NJ5-18GK-SN
NJ8-18GK-SN



Date of issue 04/08/2015



Properties

- Ø22 mm / PG21 housing
- 6 mm, flush mountable
- DC, NAMUR safety interface
- Cable version

Your Benefit

- Usable up to SIL 3 acc. to IEC 61508
- Usable in hazardous area
- High protection degree (IP68)

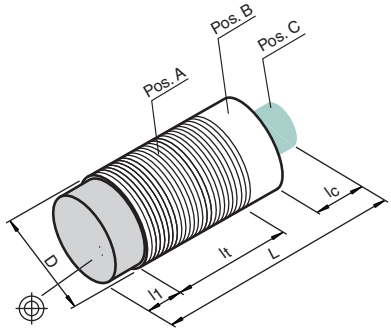
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	6 mm
Installation	flush
Switching element function	NAMUR, NC
Nominal voltage	8 V DC
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 2000 Hz
Suitable for 2:1 technology	✔, with reverse polarity protection diode
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Protection degree	IP68
Connection type	cable silicon , 2 m



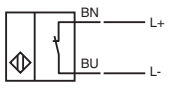
Model Number		NJ6-22-SN	NJ6-22-SN-G
Housing material	Stainless steel 1.4305 / AISI 303		●
	PBT	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	●
Approvals and Certificates			
FM control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		35	
Diameter D [mm]		22	PG21
Thread length l_t [mm]		0	35
Cap length l_1 [mm]		0	
Connector area l_c [mm]		0	
LED position		-	



Electrical Connection



NJ6-22-SN
NJ6-22-SN-G



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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0102

Properties

- Ø30 mm housing
- Up to 15 mm, flush and non-flush mountable versions
- DC, NAMUR safety interface
- Cable version

Your Benefit

- Usable up to SIL 3 acc. to IEC 61508
- Usable in hazardous area
- High protection degree (IP68)
- Versions usable in applications that require extended temperature range down to -50 °C (-58 °F)

Technical Data

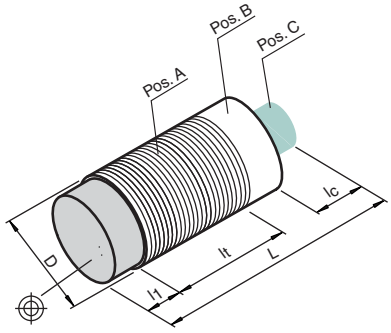
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Nominal voltage	8 V DC
Housing material	PP
Protection degree	IP68
Connection type	cable silicon , 2 m



Model Number	green = preferred type	NJ5-30GK-S1N	NJ10-30GK-SN	NJ15-30GK-SN
Rated operating distance	5 mm	●		
	10 mm		●	
	15 mm			●
Installation	flush	●	●	
	non-flush			●
Switching element function	NAMUR, NO	●		
	NAMUR, NC		●	●
Current consumption				
Measuring plate not detected	≥ 3 mA		●	●
	≤ 1 mA	●		
Measuring plate detected	≥ 3 mA	●		
	≤ 1 mA		●	●
Switching frequency	0 ... 100 Hz			●
	0 ... 150 Hz	●		
	0 ... 300 Hz		●	
Suitable for 2:1 technology	✔, with reverse polarity protection diode	●		
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)	●		
	-40 ... 100 °C (-40 ... 212 °F)			●
	-50 ... 100 °C (-58 ... 212 °F)		●	
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	1G; 2G; 1D	●	●	
	1G; 2G; 3G; 1D; 3D			●
Approvals and Certificates				
FM control drawing	116-0165F	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	40
Diameter D [mm]	30
Thread length l_t [mm]	34.5
Cap length l_1 [mm]	1
Connector area l_c [mm]	0
LED position	-



Accessories

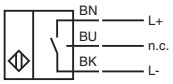
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm

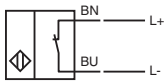
Electrical Connection



NJ5-30GK-S1N



NJ10-30GK-SN
NJ15-30GK-SN



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

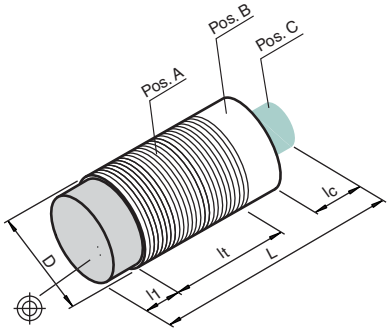
General Data	
Installation	flush
Switching element function	NO/NC programmable
Output polarity	AS-Interface
Slave type	A/B slave
AS-Interface specification	V3.0
Operating voltage	26.5 ... 31.9 V via AS-i bus system
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Indication of the switching state	dual-LED, yellow
Fault indication	dual-LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Properties

- Ø12 mm, Ø18 mm and Ø30 mm housing versions
- 4 mm, 5 mm, 8 mm and 15 mm flush mountable versions
- AS interface
- Connector version

Model Number		NCB4-12GM60-B3B-V1	NCB5-18GM60-B3B-V1	NBB8-18GM60-B3B-V1	NBB15-30GM60-B3B-V1
Rated operating distance	4 mm	●			
	5 mm		●		
	8 mm			●	
	15 mm				●
Switching frequency	0 ... 100 Hz		●		
	0 ... 200 Hz			●	●
	0 ... 500 Hz	●			
Housing material	Stainless steel 1.4305 / AISI 303	●	●		
	brass, nickel-plated			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		75	70	75	
Diameter D [mm]		12	18		30
Thread length l_t [mm]		60	44	60	
Cap length l_1 [mm]			0		
Connector area l_c [mm]		15	10	15	
LED position		Pos. B		Pos. C	



Accessories

This and more accessories can be found in chapter 10

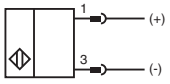
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

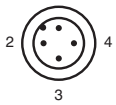
BF 12, BF 18, BF 30	Mounting flange
EXG-12, EXG-18, EXG-30	Quick mounting bracket with dead stop
V1-G-BK0,3M-PUR-U-V1-G	Connection cable, M12 to M12, PUR cable, 4-pin
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-BK1M-PUR-U-V1-G	Connection cable, M12 to M12, PUR cable, 4-pin
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection



NCB4-12GM60-B3B-V1
NCB5-18GM60-B3B-V1
NBB8-18GM60-B3B-V1
NBB15-30GM60-B3B-V1





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Properties

- Miniature F76 housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

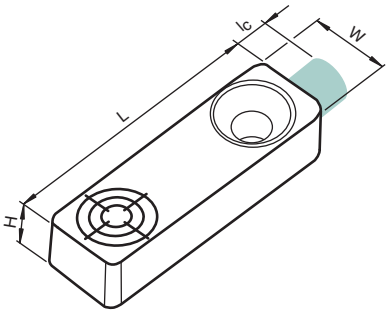
General Data	
Rated operating distance	2 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1500 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PC
Protection degree	IP67
Connection type	cable PVC , 0.5 m



Model Number			NBB2-F76-E0-0,5M	NBB2-F76-E1-0,5M	NBB2-F76-E2-0,5M	NBB2-F76-E3-0,5M
	green = preferred type					
Switching element function	NPN	NC		●		
	NPN	NO	●			
	PNP	NC				●
	PNP	NO			●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

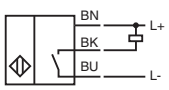
Dimensions	
Length L [mm]	25
Width W [mm]	8
Height H [mm]	5.5
Connector area l_c [mm]	3



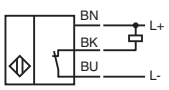
Electrical Connection



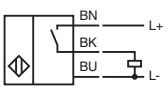
NBB2-F76-E0-0,5M



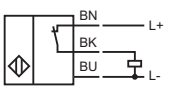
NBB2-F76-E1-0,5M



NBB2-F76-E2-0,5M



NBB2-F76-E3-0,5M



Date of issue 04/08/2015



Properties

- Miniature F29 housing
- 2 mm flush and 4 mm non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Cable version

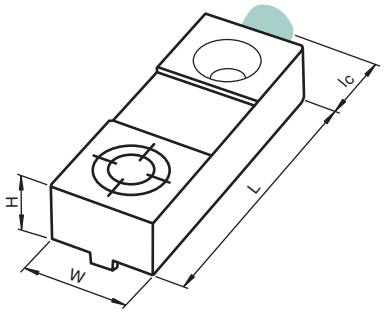
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection type	cable PVC , 2 m



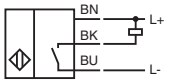
Model Number			NBB2-F29-A0	NBB2-F29-A2	NBN4-F29-E0	NBN4-F29-E2	NBN4-F29-A0	NBN4-F29-A2
	green = preferred type							
Rated operating distance	2 mm		●	●				
	4 mm				●	●	●	●
Installation	flush		●	●				
	non-flush				●	●	●	●
Switching element function	NPN	NO/NC	●				●	
	NPN	NO			●			
	PNP	NO/NC		●				●
	PNP	NO				●		
Operating voltage	10 ... 30 V DC				●	●		
	4.75 ... 30 V DC		●	●			●	●
No-load supply current	≤ 10 mA				●	●		
	≤ 15 mA		●	●			●	●
Housing material	PPS				●	●	●	●
	Ryton R4		●	●				
Approvals and Certificates								
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]			27					
Width W [mm]			10					
Height H [mm]			6					
Connector area I_c [mm]			4					



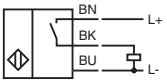
Electrical Connection



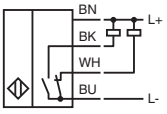
NBN4-F29-E0



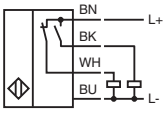
NBN4-F29-E2



NBB2-F29-A0
NBN4-F29-A0



NBB2-F29-A2
NBN4-F29-A2



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Properties

- Miniature F79 housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and pigtailed connector versions

Technical Data

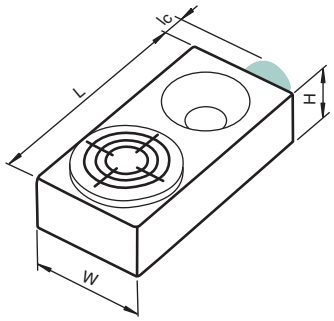
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Operating voltage	5 ... 30 V DC
No-load supply current	≤ 15 mA
Switching frequency	0 ... 1200 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number			NBB1,5-F79-E0	NBB1,5-F79-E1	NBB1,5-F79-E2	NBB1,5-F79-E3	NBB1,5-F79-E0-0,1M-V3	NBB1,5-F79-E1-0,1M-V3	NBB1,5-F79-E2-0,1M-V3	NBB1,5-F79-E3-0,1M-V3
	green = preferred type									
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Connection type	cable PVC , 500 mm		●	●	●	●				
	Cable connector M8 x 1 , 3-pin with PVC cable 100 mm						●	●	●	●

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions	
Length L [mm]	16
Width W [mm]	8
Height H [mm]	4
Cap length l_1 [mm]	0.7
Connector area l_c [mm]	1.5



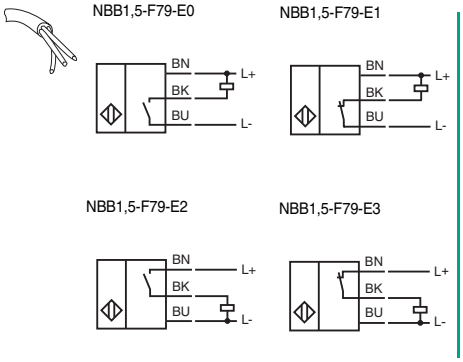
Accessories

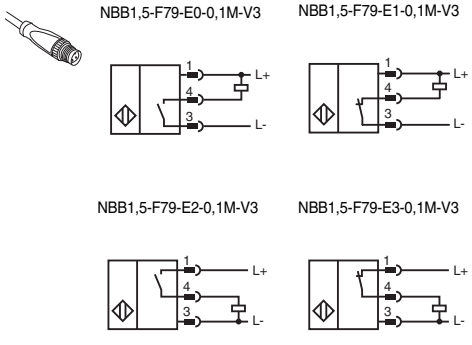
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

Electrical Connection







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush
Operating voltage	5 ... 60 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 2000 Hz
Operating current	4 ... 100 mA
Lowest operating current	4 mA
Indication of the switching state	LED, yellow
Housing material	PBT
Protection degree	IP67

Model Number			NBB3-V3-Z4	NBB3-V3-Z5	NBB3-V3-Z4-V5	NBB3-V3-Z5-V5
	green = preferred type					
Switching element function	DC	NO	●		●	
	DC	NC		●		●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)			●	●	●
	-25 ... 85 °C (-13 ... 185 °F)		●			
Connection type	4.8 mm Faston				●	●
	cable PVC , 130 mm		●	●		



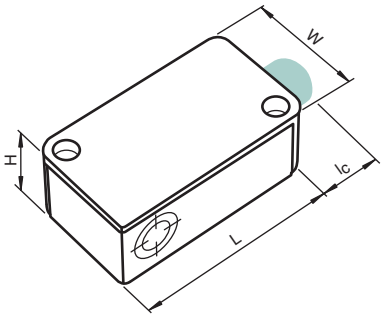


Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●

Dimensions				
Length L [mm]	27.8			
Width W [mm]	16			
Height H [mm]	10			
Connector area l_c [mm]	0		9.7	

Properties

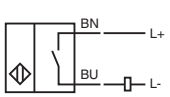
- **Miniature V3 housing**
- **3 mm, flush mountable**
- **DC, 2-wire switching output**
- **Cable and connector versions**



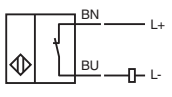
Electrical Connection



NBB3-V3-Z4



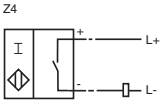
NBB3-V3-Z5





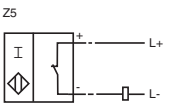
NBB3-V3-Z4-V5

Z4



NBB3-V3-Z5-V5

Z5



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NBB2-V3-E0	NBB2-V3-E2	NBB2-V3-E3	NBB2-V3-E0-V5	NBB2-V3-E1-V5	NBB2-V3-E2-V5	NBB2-V3-E3-V5
	green = preferred type							
Switching element function	NPN NO	●			●			
	NPN NC					●		
	PNP NO		●				●	
	PNP NC			●				●
Connection type	4.8 mm Faston				●	●	●	●
	cable PVC , 130 mm	●	●	●				



Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							

Dimensions								
Length L [mm]					27.8			
Width W [mm]					16			
Height H [mm]					10			
Connector area l_c [mm]		0			9.2			

Properties

- Miniature V3 housing
- 2 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Further Products

In this series, we offer additionally:

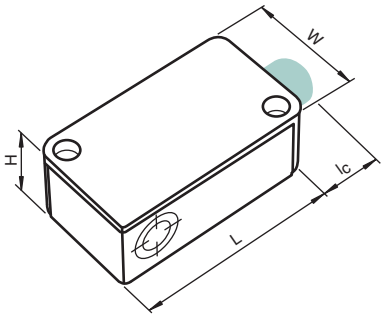
NBB2-V3-E2-V3
Technical data like NBB2-V3-E2-V5 but:
Connection type: Device connector
M8 x 1 , 3-pin



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

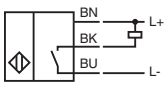
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



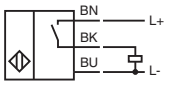
Electrical Connection



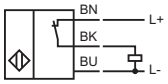
NBB2-V3-E0



NBB2-V3-E2

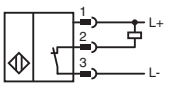


NBB2-V3-E3

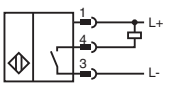




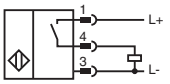
NBB2-V3-E1-V5



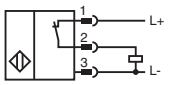
NBB2-V3-E0-V5



NBB2-V3-E2-V3
NBB2-V3-E2-V5



NBB2-V3-E3-V5





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Miniature V3 housing
- 4 mm, non-flush mountable
- DC, 3-wire switching output
- Cable version

Technical Data

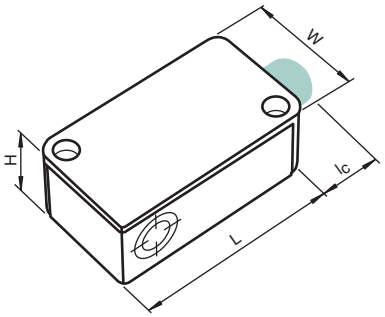
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Rated operating distance	4 mm	
Installation	non-flush	
Operating voltage	10 ... 30 V DC	
No-load supply current	≤ 15 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 500 Hz	
Operating current	0 ... 100 mA	
Short-circuit protection	pulsing	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	PBT	
Protection degree	IP67	

Model Number		NBN4-V3-E0	NBN4-V3-E2
	green = preferred type		
Switching element function	NPN NO	●	
	PNP NO		●
Connection type	cable PVC , 100 mm	●	
	cable PVC , 130 mm		●

Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

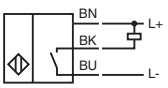
Dimensions	
Length L [mm]	27.8
Width W [mm]	16
Height H [mm]	10
Connector area l_c [mm]	0



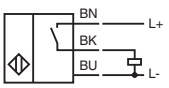
Electrical Connection



NBN4-V3-E0



NBN4-V3-E2



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	0.8 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 5 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67
Connection type	cable PUR , 2 m

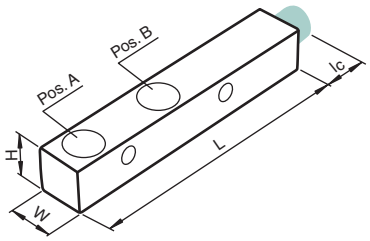


Properties

- Miniature F141 housing
- 0.8 mm, flush mountable
- DC, 3-wire switching output
- Cable version

Model Number	green = preferred type	NBB0,8-F141-E0	NBB0,8-F141-E1	NBB0,8-F141-E2	NBB0,8-F141-E3
Switching element function	NPN normally closed		●		
	NPN NO	●			
	PNP NO			●	
	PNP NC				●
Switching frequency	0 ... 10000 Hz	●		●	
	0 ... 2500 Hz		●		●

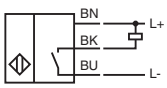
Dimensions	
Length L [mm]	25
Width W [mm]	5
Height H [mm]	5
Connector area l_c [mm]	0
Active area position	Pos. A



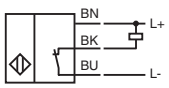
Electrical Connection



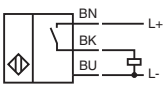
NBB0,8-F141-E0



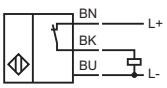
NBB0,8-F141-E1



NBB0,8-F141-E2



NBB0,8-F141-E3



Date of issue 04/08/2015



Properties

- Miniature F41 housing
- 1.5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Switching frequency	0 ... 1500 Hz
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number	green = preferred type	NBB1,5-F41-E2	NBB1,5-F41-E3	NBB1,5-F41A-E2	NBB1,5-F41A-E3	NBB1,5-F41-E2-V3	NBB1,5-F41-E3-V3	NBB1,5-F41A-E2-V3	NBB1,5-F41A-E3-V3
Switching element function	PNP NO	●		●		●		●	
	PNP NC		●		●		●		●
Connection type	Device connector M8 x 1 , 3-pin					●	●	●	●
	cable PVC , 2 m	●	●	●	●				





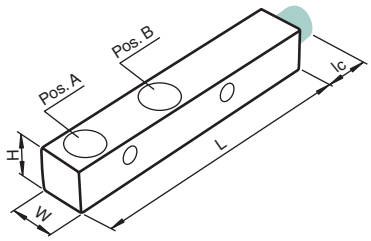
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions					
Length L [mm]	40		46		
Width W [mm]	8				
Height H [mm]	8				
Connector area l_c [mm]	8		9		
Active area position	Pos. A	Pos. B	Pos. A	Pos. B	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

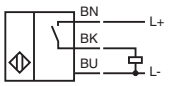
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



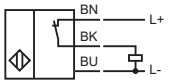
Electrical Connection



NBB1,5-F41-E2
NBB1,5-F41A-E2

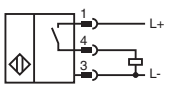


NBB1,5-F41-E3
NBB1,5-F41A-E3

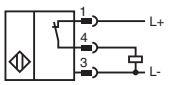




NBB1,5-F41-E2-V3
NBB1,5-F41A-E2-V3



NBB1,5-F41-E3-V3
NBB1,5-F41A-E3-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Miniature F41 housing
- 3 mm, virtually flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	virtually flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 200 mA , above 50°C ≤ 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	brass, nickel-plated
Protection degree	IP67

Model Number			NEB3-F41-E0	NEB3-F41-E1	NEB3-F41-E2	NEB3-F41-E3	NEB3-F41-E0-V3	NEB3-F41-E1-V3	NEB3-F41-E2-V3	NEB3-F41-E3-V3
Switching element function	NPN	NO	●				●			
	NPN	NC		●				●		
	PNP	NO			●				●	
	PNP	NC				●				●
Connection type	Device connector M8 x 1 , 3-pin						●	●	●	●
	cable PVC , 2 m		●	●	●	●				





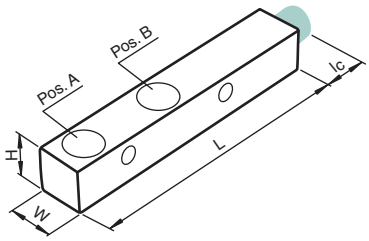
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions								
Length L [mm]	40				50			
Width W [mm]	8							
Height H [mm]	8							
Connector area l_c [mm]	0				6			
Active area position	Pos. A							

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

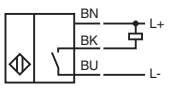
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



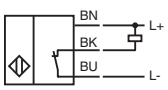
Electrical Connection



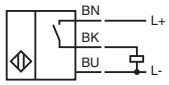
NEB3-F41-E0



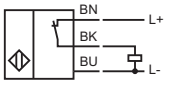
NEB3-F41-E1



NEB3-F41-E2

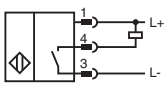


NEB3-F41-E3

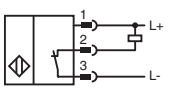




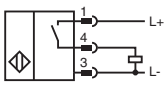
NEB3-F41-E0-V3



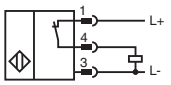
NEB3-F41-E1-V3



NEB3-F41-E2-V3



NEB3-F41-E3-V3

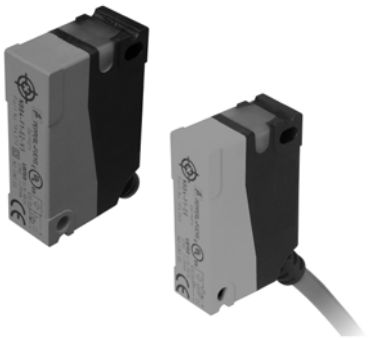




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Compact F1 housing
- 2 mm and 4 mm, flush mountable versions
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Alignable housing

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1400 Hz
Operating current	0 ... 250 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number			NBB2-F1-E2	NBB4-F1-E0	NBB4-F1-E2	NBB4-F1-E3	NBB2-F1-E2-V3	NBB4-F1-E0-V3	NBB4-F1-E2-V3	NBB4-F1-E3-V3
	green = preferred type									
Rated operating distance	2 mm		●				●			
	4 mm			●	●	●		●	●	●
Switching element function	NPN	NO		●				●		
	PNP	NO	●		●		●		●	
	PNP	NC				●				●
Connection type	Device connector M8 x 1 , 3-pin						●	●	●	●
	cable PVC , 2 m		●	●	●	●				

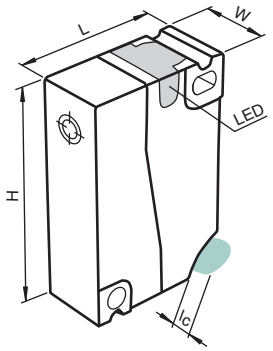
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions								
Length L [mm]	26							
Width W [mm]	12							
Height H [mm]	40							
Connector area l_c [mm]	0				9			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

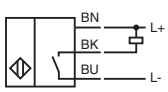
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



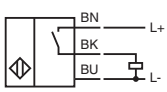
Electrical Connection



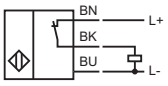
NBB4-F1-E0



NBB2-F1-E2
NBB4-F1-E2

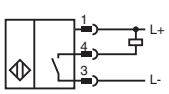


NBB4-F1-E3

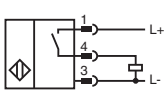




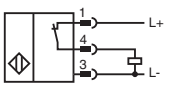
NBB4-F1-E0-V3



NBB2-F1-E2-V3
NBB4-F1-E2-V3



NBB4-F1-E3-V3



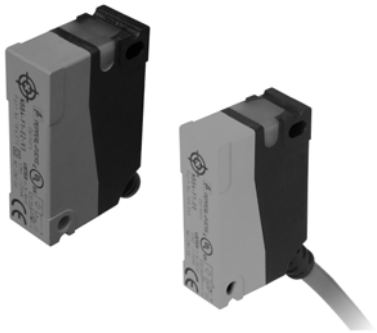


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1400 Hz
Operating current	0 ... 250 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number		NBB4-F1-A0	NBB4-F1-A2	NBB4-F1-A0-V31	NBB4-F1-A2-V31
	green = preferred type				
Switching element function	NPN NO/NC	●		●	
	PNP NO/NC		●		●
Connection type	Device connector M8 x 1 , 4-pin			●	●
	cable PVC , 2 m	●	●		

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	26	
Width W [mm]	12	
Height H [mm]	40	
Connector area l_c [mm]	0	9

Properties

- Compact F1 housing
- 4 mm, flush mountable
- DC, 4-wire switching output
- Cable and connector versions

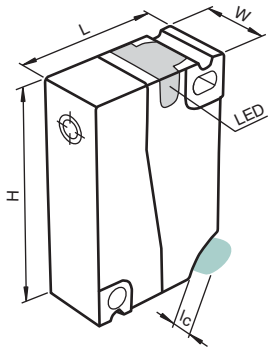
Your Benefit

- Alignable housing

Accessories

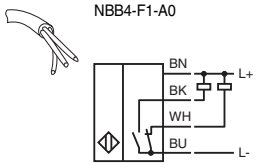
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable

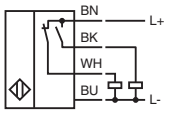


Electrical Connection

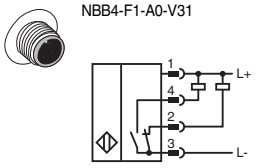
NBB4-F1-A0



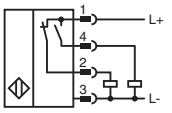
NBB4-F1-A2



NBB4-F1-A0-V31



NBB4-F1-A2-V31

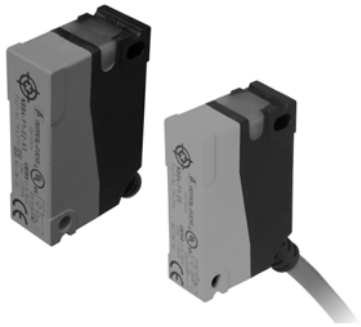




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1400 Hz
Operating current	0 ... 250 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number	green = preferred type		NBN8-F1-E0	NBN8-F1-E2	NBN8-F1-E3	NBN8-F1-E0-V3	NBN8-F1-E2-V3	NBN8-F1-E3-V3
Switching element function	NPN	NO	●			●		
	PNP	NO		●			●	
	PNP	NC			●			●
Connection type	Device connector M8 x 1 , 3-pin					●	●	●
	cable PVC , 2 m		●	●	●			

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions								
Length L [mm]					26			
Width W [mm]					12			
Height H [mm]					40			
Connector area l_c [mm]			0			9		

Properties

- Compact F1 housing
- 8 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

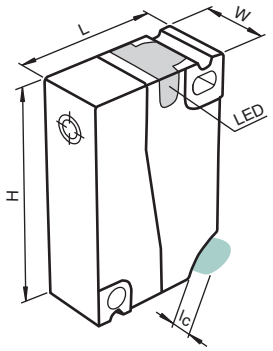
- Alignable housing

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

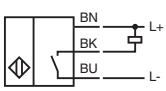
V3-WM	Female connector, M8, 3-pin, field attachable
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



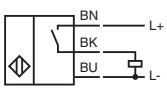
Electrical Connection



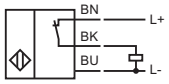
NBN8-F1-E0



NBN8-F1-E2

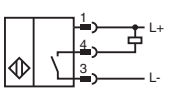


NBN8-F1-E3

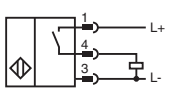




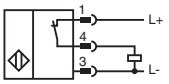
NBN8-F1-E0-V3



NBN8-F1-E2-V3



NBN8-F1-E3-V3



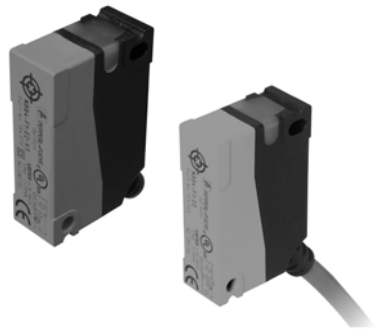


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Compact F1 housing
- 8 mm, non-flush mountable
- DC, 4-wire switching output
- Cable and connector versions

Your Benefit

- Alignable housing

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	8 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1400 Hz
Operating current	0 ... 250 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number			NBN8-F1-A0	NBN8-F1-A2	NBN8-F1-A0-V31	NBN8-F1-A2-V31
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Connection type	Device connector M8 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		





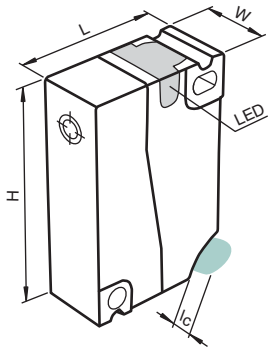
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	26	
Width W [mm]	12	
Height H [mm]	40	
Connector area l_c [mm]	0	9

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

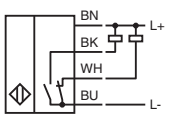
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable



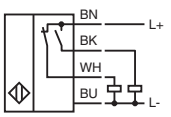
Electrical Connection



NBN8-F1-A0

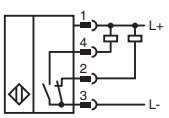


NBN8-F1-A2

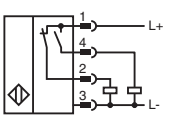




NBN8-F1-A0-V31



NBN8-F1-A2-V31





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Operating voltage	20 ... 253 V AC/DC
No-load supply current	≤ 4 mA
Reverse polarity protection	✔
Switching frequency	0 ... 25 Hz
Operating current	4 ... 250 mA AC 4 ... 100 mA DC
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67
Connection type	cable PVC , 2 m



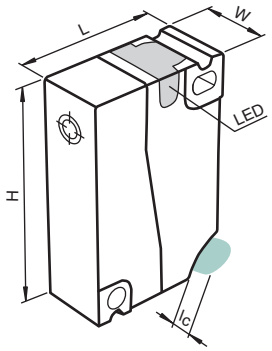
Model Number			NBB2-F1-US	NBB4-F1-US	NBB4-F1-UO
Rated operating distance	2 mm		●		
	4 mm			●	●
Switching element function	AC/DC	NO	●	●	
	AC/DC	NC			●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●
Dimensions					
Length L [mm]				26	
Width W [mm]				12	
Height H [mm]				40	
Connector area l_c [mm]				0	

Properties

- Compact F1 housing
- 2 mm and 4 mm, flush mountable versions
- AC/DC, 2-wire switching output
- Cable version

Your Benefit

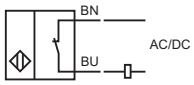
- Alignable housing



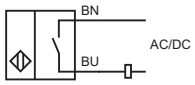
Electrical Connection



NBB4-F1-UO

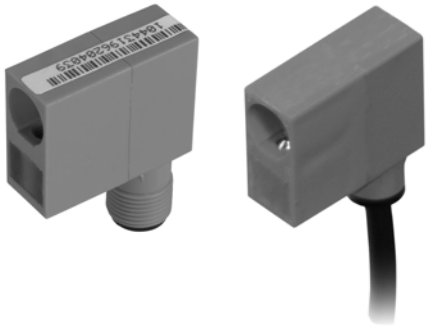


NBB2-F1-US
NBB4-F1-US



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS

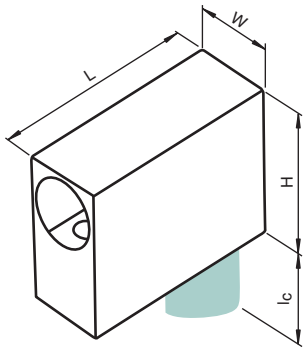


Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	1.5 mm
Installation	flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP67

Model Number		NJ1,5-F2-E2	NJ1,5-F2-E2-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PUR , 2 m	●	
			
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		31	
Width W [mm]		12	
Height H [mm]		25	
Connector area l_c [mm]		9	15

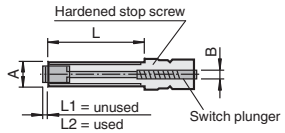


Properties

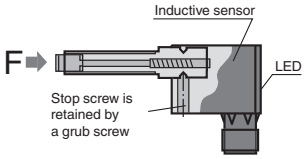
- **Compact F2 housing**
- **1.5 mm, flush mountable**
- **DC, 3-wire switching output**
- **Cable and connector versions**

The inductive proximity sensor with plug-in acknowledgement elements is designed for applications where the simple installation of an adjustable mechanical stop with electronic acknowledgement is required.
Heavy duty fine threaded stop screws serve as finely adjustable end stops.
The state of the acknowledgement element is indicated by the built-in LED on the proximity sensor.

Accessories:
Stop screws (Acknowledgement elements)



Type Coding	A	B	L	L1	L2	Load F max.
AS 08/15	M 8 x 1	6	15	3.5	2	2 000 N
AS 08/40	M 8 x 1	6	40	3.5	2	2 000 N
AS 10/50	M 10 x 1	7	50	2.5	1	9 500 N
AS 12/60	M 12 x 1	9	60	2	0.5	20 500 N
AS 12/80	M 12 x 1	9	80	2	0.5	20 500 N



Accessories

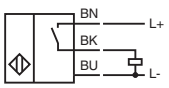
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

AS 12/60	Stop screw for series F2 sensors
AS 12/80	Stop screw for series F2 sensors
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
AS 08/15	Stop screw for series F2 sensors
AS 08/40	Stop screw for series F2 sensors
AS 10/50	Stop screw for series F2 sensors

Electrical Connection

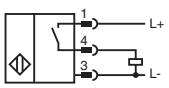
NJ1,5-F2-E2

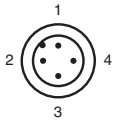




NJ1,5-F2-E2-V1







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

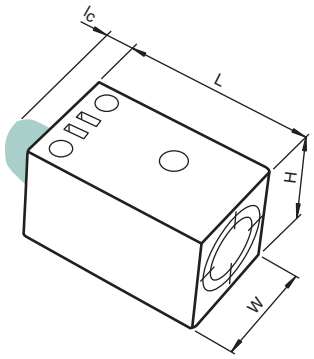
General Data	
Rated operating distance	5 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number			NBN5-F7-E0	NBN5-F7-E2
Switching element function	NPN	NO	●	
	PNP	NO		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			28	
Width W [mm]			17	
Height H [mm]			17	
Connector area l_c [mm]			0	

Properties

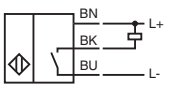
- **Compact F7 housing**
- **5 mm, non-flush mountable**
- **DC, 3-wire switching output**
- **Cable version**



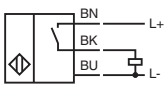
Electrical Connection



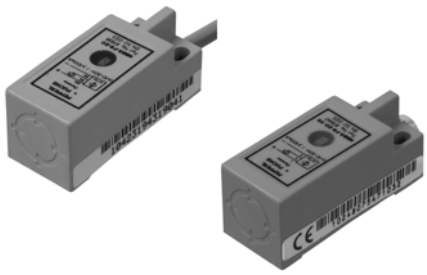
NBN5-F7-E0



NBN5-F7-E2



Date of issue: 04/08/2015



Properties

- Compact F9 housing
- 5 mm, flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number			NBB5-F9-E0	NBB5-F9-E2	NBB5-F9-E0-V3	NBB5-F9-E2-V3
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Connection type	Device connector M8 x 1 , 3-pin				●	●
	cable PVC , 2 m		●	●		

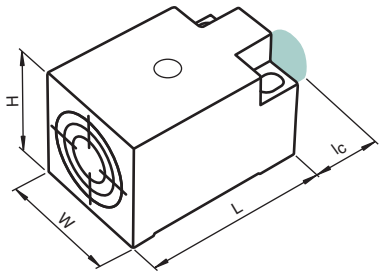
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	38.5	
Width W [mm]	16	
Height H [mm]	16.5	
Connector area l_c [mm]	0	6

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

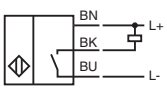
V3-GM	Female connector, M8, 3-pin, field attachable
V3-WM	Female connector, M8, 3-pin, field attachable
V3-WR-5M-PUR	Cable connector
V3-WR-E2-5M-PUR	M8 cable socket.



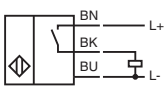
Electrical Connection



NBB5-F9-E0

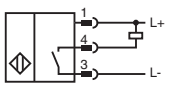


NBB5-F9-E2

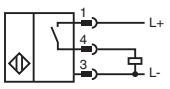




NBB5-F9-E0-V3



NBB5-F9-E2-V3

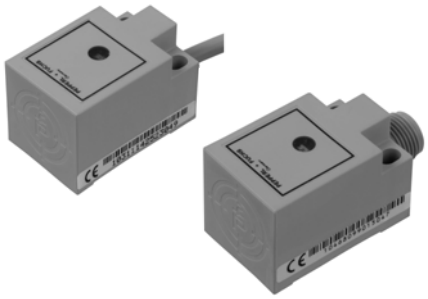




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	7 mm
Operating voltage	10 ... 30 V
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	500 Hz
Operating current	0 ... 150 mA
Short-circuit protection	✔
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number			NBB7-F10-E0	NBB7-F10-E1	NBB7-F10-E2	NBB7-F10-E3	NBB7-F10-E0-V1	NBB7-F10-E2-V1
Installation	flush		●	●	●	●		
	non-flush						●	●
Switching element function	NPN	NC		●				
	NPN	NO	●				●	
	PNP	NC				●		
	PNP	NO			●			●
Connection type	Device connector M12 x 1 , 4-pin						●	●
	cable PVC , 2 m		●	●	●	●		

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions		
Length L [mm]	38.5	
Width W [mm]	25	
Height H [mm]	25.5	
Connector area l_c [mm]	0	10

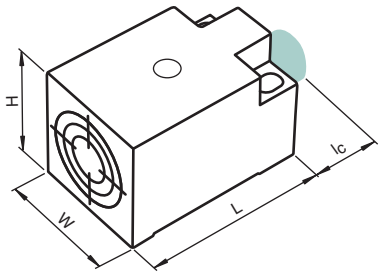
Properties

- **Compact F10 housing**
- **7 mm, flush and non-flush mountable versions**
- **DC, 3-wire switching output**
- **Cable and connector versions**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

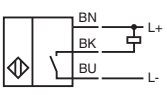
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



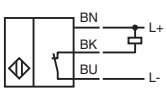
Electrical Connection



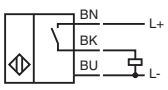
NBB7-F10-E0



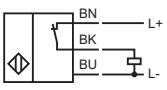
NBB7-F10-E1



NBB7-F10-E2

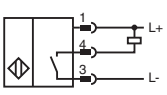


NBB7-F10-E3

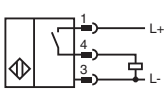


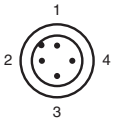


NBB7-F10-E0-V1



NBB7-F10-E2-V1



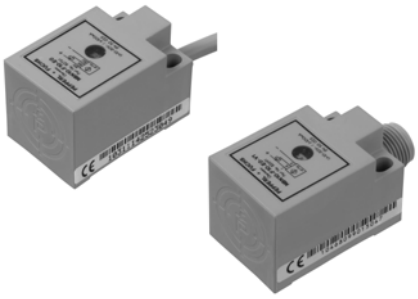


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Compact F10 housing
- 10 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NBN10-F10-E0	NBN10-F10-E2	NBN10-F10-E0-V1	NBN10-F10-E2-V1
	green = preferred type				
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 2 m	●	●		

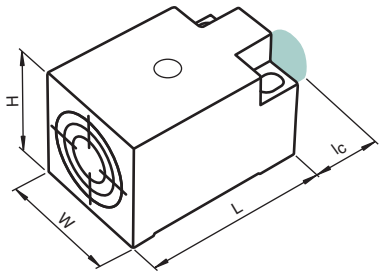
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	38.5	
Width W [mm]	25	
Height H [mm]	25.5	
Connector area l_c [mm]	0	10

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

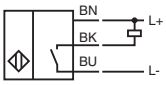
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



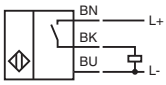
Electrical Connection



NBN10-F10-E0

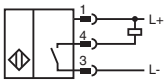


NBN10-F10-E2

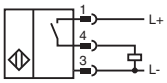


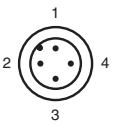


NBN10-F10-E0-V1



NBN10-F10-E2-V1

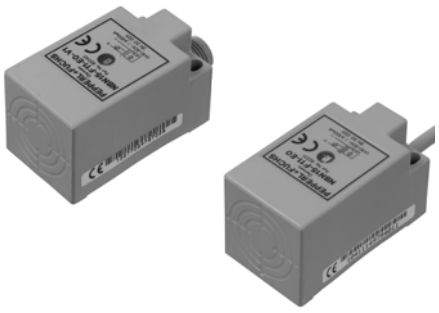




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating current	0 ... 150 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number			NBN15-F11-E0	NBN15-F11-E2	NBN15-F11-E0-V1	NBN15-F11-E2-V1
Switching element function	NPN	NO	●		●	
	PNP	NO		●		●
Connection type	Device connector M12 x 1 , 4-pin				●	●
	cable PVC , 2 m		●	●		

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	52.5	
Width W [mm]	30	
Height H [mm]	30.5	
Connector area l_c [mm]	0	10

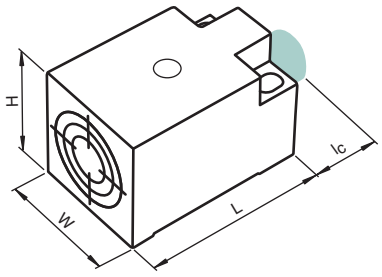
Properties

- Compact F11 housing
- 15 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

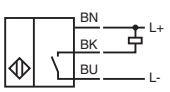
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



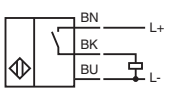
Electrical Connection



NBN15-F11-E0

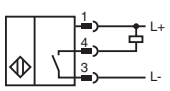


NBN15-F11-E2

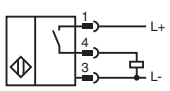


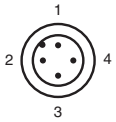


NBN15-F11-E0-V1



NBN15-F11-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	7 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	150 Hz
Operating current	200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	GD-Zn
Protection degree	IP67

Model Number			NBB7-F104M-A0	NBB7-F104M-A2	NBB7-F104M-A0-200MM-V1	NBB7-F104M-A2-200MM-V1
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Connection type	cable PUR , 2 m		●	●		
	Cable connector M12 x 1 , 4-pin with PUR cable 200 mm				●	●

Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	32
Width W [mm]	20
Height H [mm]	8
Connector area l_c [mm]	4

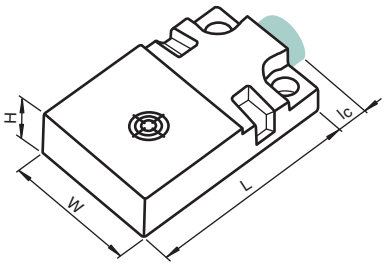
Properties

- **Compact F104 housing**
- **7 mm, flush mountable**
- **DC, 4-wire switching output**
- **Cable and pigtailed connector versions**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

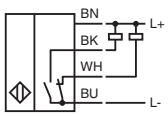
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable



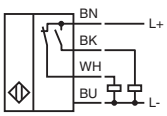
Electrical Connection



NBB7-F104M-A0

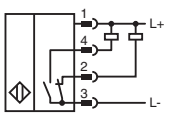


NBB7-F104M-A2

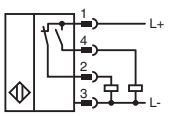


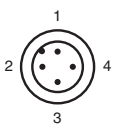


NBB7-F104M-A0-200MM-V1



NBB7-F104M-A2-200MM-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

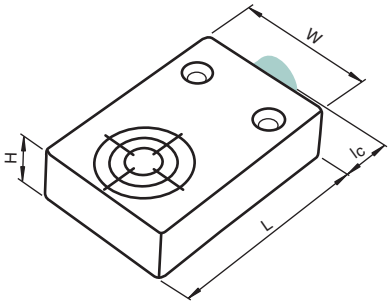
General Data	
Rated operating distance	5 mm
Installation	flush
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	metal
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number			NBB5-F33M-E0	NBB5-F33M-E2	NBB5-F33M-A0	NBB5-F33M-A2
Switching element function	NPN	NO/NC			●	
	NPN	NO	●			
	PNP	NO/NC				●
	PNP	NO		●		
No-load supply current	≤ 15 mA		●	●		
	≤ 20 mA				●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			50			
Width W [mm]			25			
Height H [mm]			10			
Connector area l_c [mm]			0			

Properties

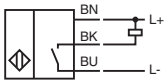
- **Compact F33 metal housing**
- **5 mm, flush mountable**
- **DC, 3-wire and 4-wire switching output versions**
- **Cable version**



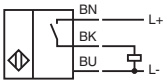
Electrical Connection



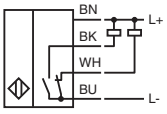
NBB5-F33M-E0



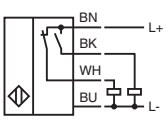
NBB5-F33M-E2



NBB5-F33M-A0



NBB5-F33M-A2



Date of issue: 04/08/2015



Properties

- **Compact F33 plastic housing**
- **5 mm and 8 mm, flush mountable versions**
- **DC, 3-wire and 4-wire switching output versions**
- **Cable version**

Technical Data

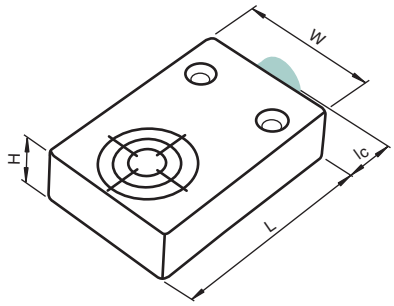
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		NBB5-F33-E0	NBB5-F33-E2	NBB5-F33-A0	NBB5-F33-A2	NBB8-F33-E0	NBB8-F33-E1	NBB8-F33-E2	NBB8-F33-E3
	green = preferred type								
Rated operating distance	5 mm	●	●	●	●				
	8 mm					●	●	●	●
Switching element function	NPN NO/NC			●					
	NPN NO	●				●			
	NPN NC						●		
	PNP NO/NC				●				
	PNP NO		●					●	
	PNP NC								●
Operating voltage	10 ... 30 V DC	●	●	●	●				
	10 ... 60 V DC					●	●	●	●
No-load supply current	≤ 10 mA					●	●	●	●
	≤ 15 mA	●	●						
	≤ 20 mA			●	●				
Switching frequency	0 ... 350 Hz					●	●	●	●
	0 ... 500 Hz	●	●	●	●				
Indication of the switching state	LED yellow					●	●	●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	●	●				
	-35 ... 70 °C (-31 ... 158 °F)					●	●	●	●
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)					●	●	●	●
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●				

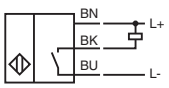
Dimensions	
Length L [mm]	50
Width W [mm]	25
Height H [mm]	10
Connector area l_c [mm]	0



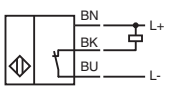
Electrical Connection



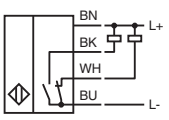
NBB5-F33-E0
NBB8-F33-E0



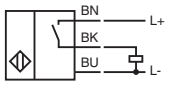
NBB8-F33-E1



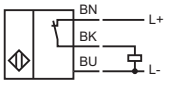
NBB5-F33-A0



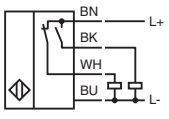
NBB5-F33-E2
NBB8-F33-E2



NBB8-F33-E3



NBB5-F33-A2



Date of issue 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

Model Number	**NCN15-M1K-Z2**
Rated operating distance	15 mm
Installation	non-flush
Switching element function	DC NO/NC
Operating voltage	5 ... 60 V DC
Reverse polarity protection	tolerant
Switching frequency	0 ... 150 Hz
Operating current	2 ... 200 mA
Lowest operating current	2 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Pre-fault indication	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	screw terminals
	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Certified by China Compulsory Certification (CCC)

Dimensions	
Length L [mm]	91
Width W [mm]	30
Height H [mm]	30
Connector area l_c [mm]	0 (M16 X 1.5)

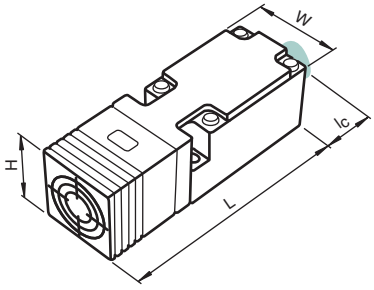
Properties

- **Flexible *VariKont*-M housing**
- **15 mm, non-flush mountable**
- **DC, 2-wire switching output**
- **Terminal compartment**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

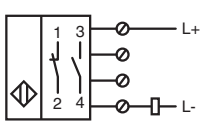
MH 04-3742A	Mounting aid for VariKont and -M1K-



Electrical Connection



NCN15-M1K-Z2



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 14 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	screw terminals



Model Number			NCN15-M1K-E4	NCN15-M1K-E5	NJ15-M1K-A2
Switching element function	NPN	NO/NC	●		
	PNP	NO/NC		●	●
Switching frequency	0 ... 200 Hz				●
	0 ... 500 Hz		●	●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	
CSA approval	cCSAus Listed, General Purpose		●	●	
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●
Dimensions					
Length L [mm]				91	
Width W [mm]				30	
Height H [mm]				30	
Connector area l_c [mm]				0 (M16 X 1.5)	

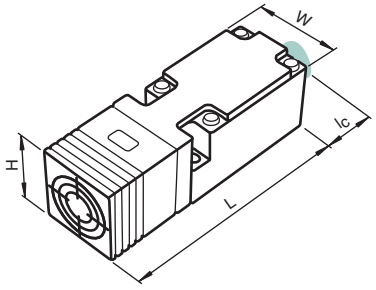
Properties

- Flexible *VariKont*-M housing
- 15 mm, non-flush mountable
- DC, 3-wire and 4-wire switching output versions
- Terminal compartment

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

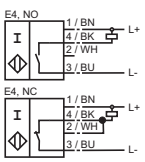
MH 04-3742A	Mounting aid for VariKont and -M1K-



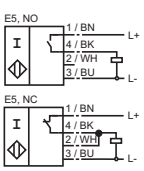
Electrical Connection



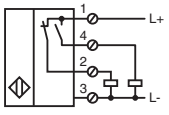
NCN15-M1K-E4



NCN15-M1K-E5



NJ15-M1K-A2



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Operating voltage	20 ... 253 V AC
Switching frequency	0 ... 20 Hz
Operating current	5 ... 400 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	screw terminals



Model Number			NBN15-M1K-WS	NBN15-M1K-WO
Switching element function	AC	NO	●	
	AC	NC		●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
Dimensions				
Length L [mm]			91	
Width W [mm]			30	
Height H [mm]			30	
Connector area l_c [mm]			0 (M16 X 1.5)	

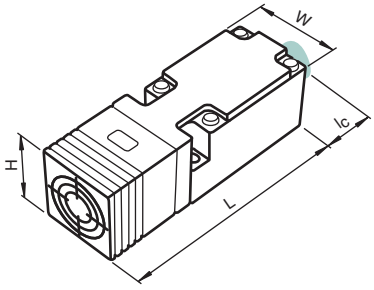
Properties

- Flexible *VariKont*-M housing
- 15 mm, non-flush mountable
- AC, 2-wire switching output
- Terminal compartment

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

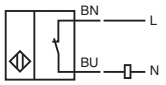
MH 04-3742A	Mounting aid for VariKont and -M1K-



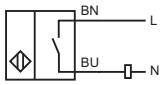
Electrical Connection



NBN15-M1K-WO



NBN15-M1K-WS



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching frequency	0 ... 30 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NBB20-L2-Z0-V1	NBB20-L2-Z4-V1	NBB20-L2-Z5-V1	NBN40-L2-Z0-V1	NBN40-L2-Z4-V1	NBN40-L2-Z5-V1
Rated operating distance	20 mm	●	●	●			
	40 mm				●	●	●
Installation	flush	●	●	●			
	non-flush				●	●	●
Switching element function	NO	●	●		●	●	
	NC			●			●
Operating voltage	3.8 ... 30 V DC		●	●		●	●
	5 ... 30 V DC	●			●		
Reverse polarity protection	✔		●	●		●	●
	tolerant	●			●		
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						
Dimensions							
Length L [mm]		67					
Width W [mm]		40					
Height H [mm]		40					

Properties

- **Flexible, compact *VariKont*-L housing**
- **20 mm, flush and 40 mm, non-flush mountable versions**
- **DC, 2-wire switching output**
- **Connector version**

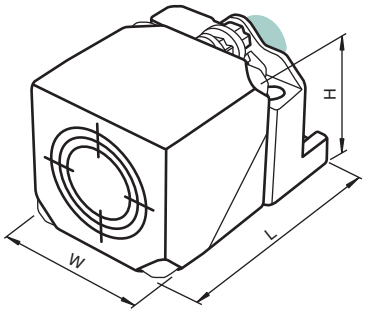
Your Benefit

- **All-around visible status display**
- **Sensor head can be aligned in 5 different positions**
- **Mounting base with quick clamping lever for swift mounting**
- **Rotatable connector allows all orientations of the attached cordset**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

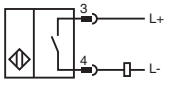
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid



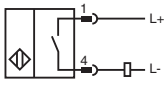
Electrical Connection



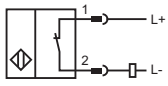
NBB20-L2-Z0-V1
NBN40-L2-Z0-V1

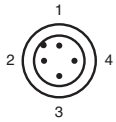


NBB20-L2-Z4-V1
NBN40-L2-Z4-V1



NBB20-L2-Z5-V1
NBN40-L2-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type		NBB20-L2-E0-V1	NBB20-L2-E2-V1	NBB20-L2-A0-V1	NBB20-L2-A2-V1	NBN40-L2-E0-V1	NBN40-L2-E2-V1	NBN40-L2-A0-V1	NBN40-L2-A2-V1
Rated operating distance	20 mm		●	●	●	●				
	40 mm						●	●	●	●
Installation	flush		●	●	●	●				
	non-flush						●	●	●	●
Switching element function	NPN	NO/NC			●				●	
	NPN	NO	●				●			
	PNP	NO/NC				●				●
	PNP	NO		●				●		
Switching frequency	0 ... 100 Hz						●	●	●	●
	0 ... 150 Hz		●	●	●	●				
Approvals and Certificates										
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									
Dimensions										
Length L [mm]			67							
Width W [mm]			40							
Height H [mm]			40							

Properties

- **Flexible, compact *VariKont*-L housing**
- **20 mm, flush and 40 mm, non-flush mountable versions**
- **DC, 3-wire and 4-wire switching output versions**
- **Connector version**

Your Benefit

- **All-around visible status display**
- **Sensor head can be aligned in 5 different positions**
- **Mounting base with quick clamping lever for swift mounting**
- **Rotatable connector allows all orientations of the attached cordset**

Further Products

In this series, we offer additionally:

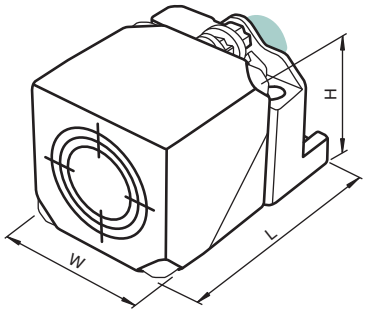
NBB20-L2-A2-T-V1

Technical data like NBB20-L2-A2-V1 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

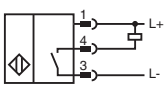
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid



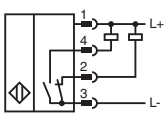
Electrical Connection



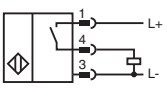
NBB20-L2-E0-V1
NBN40-L2-E0-V1



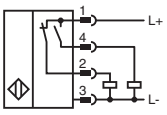
NBB20-L2-A0-V1
NBN40-L2-A0-V1

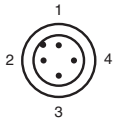


NBB20-L2-E2-V1
NBN40-L2-E2-V1



NBB20-L2-A2-T-V1
NBB20-L2-A2-V1
NBN40-L2-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA-GF35 metal base Xylan coated metal mounting flange Xylan coated.
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NBB20-L2M-E0-V1	NBB20-L2M-E2-V1	NBB20-L2M-A0-V1	NBB20-L2M-A2-V1	NBN40-L2M-E0-V1	NBN40-L2M-E2-V1	NBN40-L2M-A0-V1	NBN40-L2M-A2-V1
Rated operating distance	20 mm		●	●	●	●				
	40 mm						●	●	●	●
Installation	flush		●	●	●	●				
	non-flush						●	●	●	●
Switching element function	NPN	NO/NC			●				●	
	NPN	NO	●				●			
	PNP	NO/NC				●				●
	PNP	NO		●				●		
Switching frequency	0 ... 100 Hz						●	●	●	●
	0 ... 150 Hz		●	●	●	●				
Approvals and Certificates										
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									
Dimensions										
Length L [mm]			67							
Width W [mm]			40							
Height H [mm]			40							

Properties

- **Flexible, compact *VariKont*-L housing**
- **20 mm, flush and 40 mm, non-flush mountable versions**
- **DC, 3-wire and 4-wire switching output versions**
- **Connector version**

Your Benefit

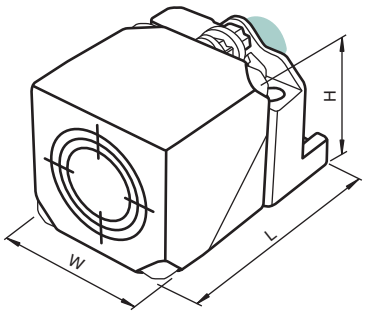
- **All-around visible status display**
- **Sensor head can be aligned in 5 different positions**
- **Mounting base with quick clamping flange for swift mounting**
- **Rotatable connector allows all orientations of the attached cordset**

Further Products

In this series, we offer additionally:

NBB20-L2M-A2-T-V1

Technical data like NBB20-L2M-A2-V1 but:
Ambient temperature: -25 ... 100 °C (-13 ... 212 °F)
Housing material: PA-GF35
metal base powder coated
metal mounting flange powder coated.



Accessories

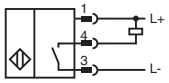
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

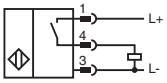
Electrical Connection



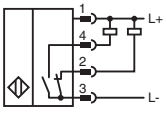
NBB20-L2M-E0-V1
NBN40-L2M-E0-V1



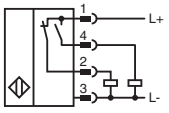
NBB20-L2M-E2-V1
NBN40-L2M-E2-V1

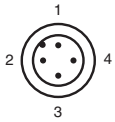


NBB20-L2M-A0-V1
NBN40-L2M-A0-V1



NBB20-L2M-A2-T-V1
NBB20-L2M-A2-V1
NBN40-L2M-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

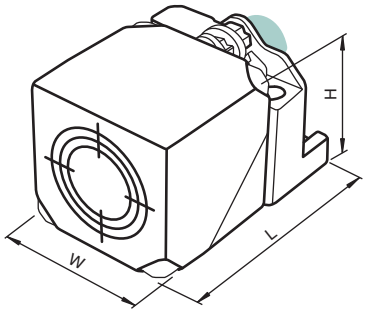


Properties

- Flexible, compact *VariKont*-L housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- AC/DC, 2-wire switching output
- Connector version

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping flange for swift mounting



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 250 V AC/DC
No-load supply current	≤ 0.6 mA
Reverse polarity protection	✔
Switching frequency	0 ... 30 Hz
Operating current	3 ... 300 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	metal - Zinc housing
Housing base	Metal Bracket
Protection degree	IP67

Model Number			NBB20-L3M-US-V12	NBB20-L3M-UO-V12	NBB20-L3M-US-V93	NBB20-L3M-UO-V93	NBN40-L3M-US-V12	NBN40-L3M-US-V93
Rated operating distance	20 mm		●	●	●	●		
	40 mm						●	●
Installation	flush		●	●	●	●		
	non-flush						●	●
Switching element function	AC/DC	NC		●		●		
	AC/DC	NO	●		●		●	●
Connection type	Device connector 1/2"-20 UN , 3-pin		●	●			●	
	Device connector 7/8"-16 UN , 3-pin				●	●		●



Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●

Dimensions					
Length L [mm]	67	76		67	76
Width W [mm]		40			
Height H [mm]		40			

Accessories

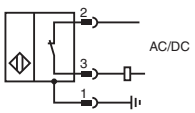
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V93-G-YE2M-STOOW	Female connector, 7/8" - 16 UNF, 3-pin, PUR cable
V12-W-YE2M-PUR-H/S	Connecting cable, 1/2" - 20 UNF, 3-pin, irradiated PUR cable
MHW 01	Modular mounting bracket
V12-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 3-pin, PVC cable
V12-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 3-pin, PVC cable

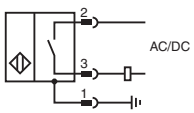
Electrical Connection

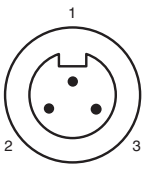


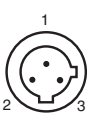
NBB20-L3M-UO-V12
NBB20-L3M-UO-V93



NBN40-L3M-US-V12
NBN40-L3M-US-V93
NBB20-L3M-US-V12
NBB20-L3M-US-V93







Wire colors

1	GN	(green)
2	BK	(black)
3	WH	(white)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	DC NO/NC
Operating voltage	5 ... 60 V DC
Reverse polarity protection	tolerant
Operating current	2 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	2 LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA/metal with epoxy powder coating
Protection degree	IP68 / IP69K
Connection type	screw terminals



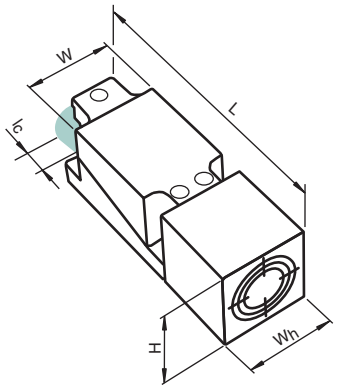
Model Number	green = preferred type	NBB20-U1-Z2	NBN40-U1-Z2	NBB20-U4-Z2	NBN40-U4-Z2
Rated operating distance	20 mm	●		●	
	40 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Switching frequency	0 ... 100 Hz		●		●
	0 ... 250 Hz	●		●	
Housing base	plastic	●	●		
	metal			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●
Dimensions					
Length L [mm]		118			
Width W [mm]		40			
Head width W_h [mm]		40			
Height H [mm]		40			
Connector area I_c [mm]		0 (M20 x 1.5)		0 (1/2" NPT)	

Properties

- Flexible *VariKont* housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- DC, 2-wire switching output
- Terminal compartment

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions



Accessories

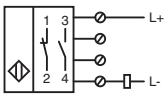
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-M20-80	Receptacles, M12/M20; plastic version
MHW 01	Modular mounting bracket
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*

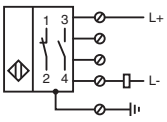
Electrical Connection



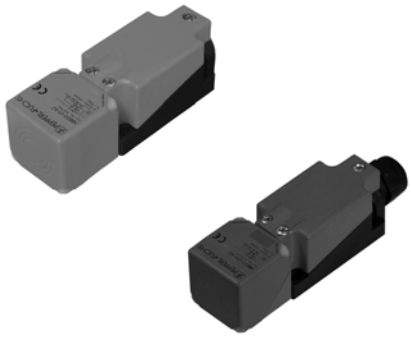
NBB20-U1-Z2
NBN40-U1-Z2



NBB20-U4-Z2
NBN40-U4-Z2



Date of issue 04/08/2015



Properties

- Flexible *VariKont* housing
- 20 mm, flush mountable
- DC, 3-wire switching output
- Terminal compartment

Your Benefit

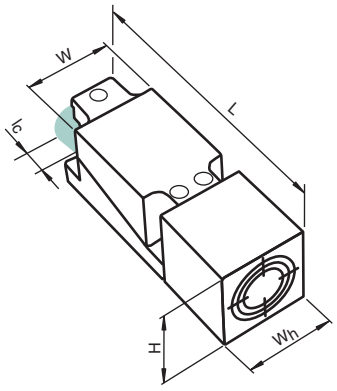
- All-around visible status display
- Sensor head can be aligned in 5 different positions

Further Products

In this series, we offer additionally:

NBB20-U4-E2-C-V1

Technical data like NBB20-U4-E2-C but:
Connection type: Device connector M12 x 1 , 4-pin



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	20 mm
Installation	flush
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA/metal with epoxy powder coating
Protection degree	IP68 / IP69K
Connection type	screw terminals



Model Number	green = preferred type		NBB20-U1-E0	NBB20-U1-E1	NBB20-U1-E2	NBB20-U1-E2-C	NBB20-U1-E3	NBB20-U2-E0	NBB20-U2-E2	NBB20-U4-E0	NBB20-U4-E2	NBB20-U4-E2-C	NBB20-U10-E2
Weld-immune						✔						✔	
Switching element function	NPN	NO	●					●		●			
	NPN	NC		●									
	PNP	NO			●	●			●		●	●	●
	PNP	NC					●						
No-load supply current	≤ 10 mA										●		
	≤ 20 mA		●	●	●	●	●	●	●	●		●	●
Switching frequency	0 ... 150 Hz		●	●	●		●	●	●	●	●		●
	0 ... 5 Hz					●						●	
Housing base	plastic		●	●	●	●	●	●	●				●
	metal									●	●	●	

Approvals and Certificates		
UL approval	cULus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ●
CSA approval	cCSAus Listed, General Purpose	● ● ● ● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions			
Length L [mm]	118		
Width W [mm]	40		
Head width W_h [mm]	40		
Height H [mm]	40		
Connector area l_c [mm]	0 (M20 x 1,5)	0 (1/2" NPT)	20

Accessories

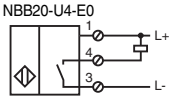
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-M20-80	Receptacles, M12/M20; plastic version
MHW 01	Modular mounting bracket
V1-G-BK	4-pin, M12 female field-attachable connector
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

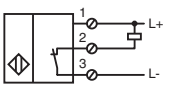
Electrical Connection



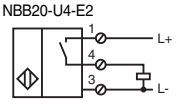
NBB20-U1-E0
NBB20-U2-E0
NBB20-U4-E0



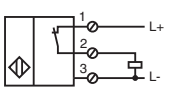
NBB20-U1-E1



NBB20-U1-E2
NBB20-U1-E2-C
NBB20-U10-E2
NBB20-U2-E2
NBB20-U4-E2-C
NBB20-U4-E2

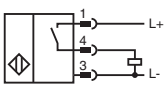


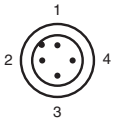
NBB20-U1-E3





NBB20-U4-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	20 mm
Installation	flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Protection degree	IP68 / IP69K
Connection type	screw terminals



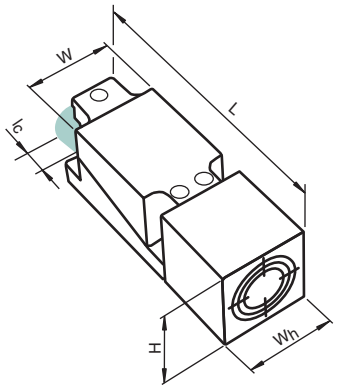
Model Number		NBB20-U1-A0	NBB20-U1-A0-T	NBB20-U1-A2	NBB20-U1-A2-T	NBB20-U2-A0	NBB20-U2-A2	NBB20-U2-A2-T	NBB20-U4-A0	NBB20-U4-A0-T	NBB20-U4-A2	NBB20-U4-A2-T	NBB20-U10-A2
	green = preferred type												
Switching element function	NPN NO/NC	●	●			●			●	●			
	PNP NO/NC			●	●		●	●			●	●	●
Switching frequency	0 ... 150 Hz	●		●		●	●		●		●		●
	0 ... 300 Hz		●		●			●		●		●	
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●		●			●		●		●	
	-25 ... 85 °C (-13 ... 185 °F)	●		●		●	●		●		●		●
Housing material	PA / LCP		●		●			●		●		●	
	PA/metal with epoxy powder coating	●		●		●	●		●		●		●
Housing base	plastic	●	●	●	●	●	●	●					●
	metal								●	●	●	●	
Approvals and Certificates													
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.												
Dimensions													
Length L [mm]		118											
Width W [mm]		40											
Head width W_h [mm]		40											
Height H [mm]		40											
Connector area l_c [mm]		0 (M20 x 1,5)				0 (1/2" NPT)							20

Properties

- Flexible *VariKont* housing
- 20 mm, flush mountable
- DC, 4-wire switching output
- Terminal compartment

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions



Accessories

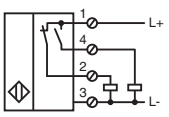
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-M20-80	Receptacles, M12/M20; plastic version
MHW 01	Modular mounting bracket
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*

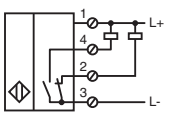
Electrical Connection



NBB20-U1-A2
NBB20-U1-A2-T
NBB20-U10-A2
NBB20-U2-A2
NBB20-U2-A2-T
NBB20-U4-A2
NBB20-U4-A2-T



NBB20-U1-A0
NBB20-U1-A0-T
NBB20-U2-A0
NBB20-U4-A0
NBB20-U4-A0-T



Date of issue 04/08/2015



Properties

- Flexible *VariKont* housing
- 40 mm, non-flush mountable
- DC, 3-wire switching output
- Terminal compartment

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	40 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA/metal with epoxy powder coating
Protection degree	IP68 / IP69K
Connection type	screw terminals

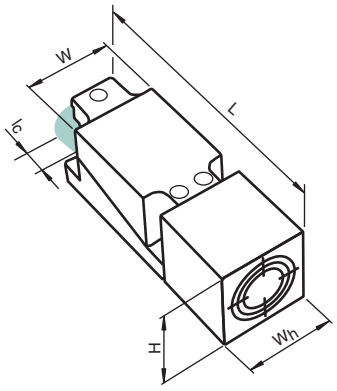


Model Number			NBN40-U1-E0	NBN40-U1-E1	NBN40-U1-E2	NBN40-U1-E3	NBN40-U2-E0	NBN40-U2-E2	NBN40-U4-E0	NBN40-U4-E2	NBN40-U10-E2
	green = preferred type										
Switching element function	NPN	NO	●				●		●		
	NPN	NC		●							
	PNP	NO			●			●		●	●
	PNP	NC				●					
Housing base	plastic		●	●	●	●	●	●			●
	metal								●	●	
Approvals and Certificates											
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										
Dimensions											
Length L [mm]			118								
Width W [mm]			40								
Head width W_h [mm]			40								
Height H [mm]			40								
Connector area l_c [mm]			0 (M20 x 1,5)				0 (1/2" NPT)				20

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

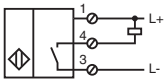
V1-M20-80	Receptacles, M12/M20; plastic version
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
MHW 01	Modular mounting bracket



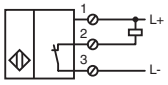
Electrical Connection



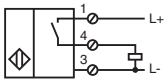
NBN40-U1-E0
NBN40-U2-E0
NBN40-U4-E0



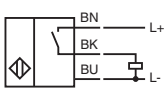
NBN40-U1-E1



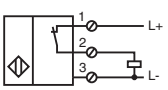
NBN40-U1-E2
NBN40-U4-E2
NBN40-U10-E2



NBN40-U2-E2



NBN40-U1-E3



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Rated operating distance	40 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Protection degree	IP68 / IP69K
Connection type	screw terminals



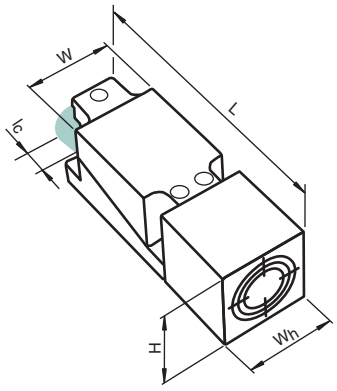
Model Number	green = preferred type	NBN40-U1-A0	NBN40-U1-A2	NBN40-U1-A2-T	NBN40-U2-A2	NBN40-U2-A2-T	NBN40-U4-A2
Switching element function	NPN NO/NC	●					
	PNP NO/NC		●	●	●	●	●
Switching frequency	0 ... 150 Hz	●	●		●		●
	0 ... 250 Hz			●		●	
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)			●		●	
	-25 ... 85 °C (-13 ... 185 °F)	●	●		●		●
Housing material	PA / LCP			●		●	
	PA/metal with epoxy powder coating	●	●		●		●
Housing base	plastic	●	●	●	●	●	
	metal						●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						
Dimensions							
Length L [mm]		118					
Width W [mm]		40					
Head width W_h [mm]		40					
Height H [mm]		40					
Connector area l_c [mm]		0 (M20 x 1,5)			0 (1/2" NPT)		

Properties

- Flexible *VariKont* housing
- 40 mm, non-flush mountable
- DC, 4-wire switching output
- Terminal compartment

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions



Accessories

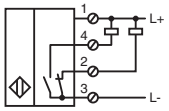
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
V1-M20-80	Receptacles, M12/M20; plastic version
MHW 01	Modular mounting bracket

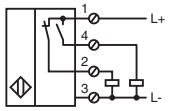
Electrical Connection



NBN40-U1-A0



NBN40-U1-A2
NBN40-U1-A2-T
NBN40-U2-A2
NBN40-U2-A2-T
NBN40-U4-A2



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	AC NO/NC
Operating voltage	20 ... 253 V
Switching frequency	0 ... 20 Hz
Operating current	10 ... 500 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Protection degree	IP68
Connection type	screw terminals



Model Number	green = preferred type	NJ20+U1+W	NJ20+U1+W-T	NJ20+U4+W	NJ40+U1+W	NJ40+U2+W	NJ40+U4+W	NJ40+U4+W-T
Rated operating distance	20 mm	●	●	●				
	40 mm				●	●	●	●
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●					
	-25 ... 70 °C (-13 ... 158 °F)	●		●	●	●	●	
	0 ... 100 °C (32 ... 212 °F)							●
Housing material	PBT	●	●		●	●		
	PBT/base of metal			●			●	●
Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	
Dimensions								
Length L [mm]		118			128			
Width W [mm]					40			
Head width W_h [mm]		40			55			
Height H [mm]		40			55			
Connector area l_c [mm]	a) 0 (1/2" NPT)	b		a	b		a	
	b) 0 (M20 x 1,5)							

Properties

- Flexible *VariKont* housing
- 20 mm and 40 mm, non-flush mountable versions
- AC, 2-wire switching output
- Terminal compartment

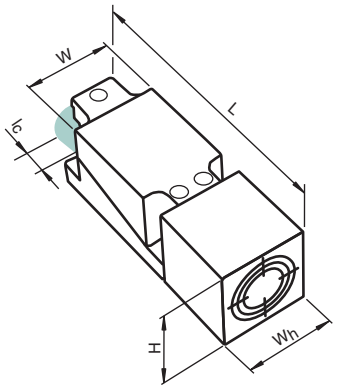
Your Benefit

- Sensor head can be aligned in 5 different positions

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

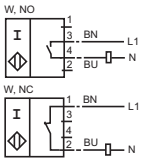
V1-G-BK	4-pin, M12 female field-attachable connector
MHW 01	Modular mounting bracket
V1-M20-80	Receptacles, M12/M20; plastic version
V1-W-BK	4-pin, M12 female field-attachable connector



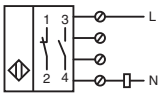
Electrical Connection



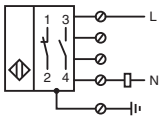
NJ20+U1+W-T



NJ20+U1+W
NJ40+U1+W
NJ40+U2+W



NJ20+U4+W
NJ40+U4+W
NJ40+U4+W-T



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	AC NO/NC
Operating voltage	20 ... 253 V
Switching frequency	0 ... 20 Hz
Operating current	10 ... 500 mA
Indication of the switching state	LED green: NC LED red: NO
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT housing/PBT base
Protection degree	IP68
Connection type	screw terminals



Model Number		NJ40+U2+W4	NJ40+U1+W4	NJ20+U1+W4
Rated operating distance	20 mm			●
	40 mm	●	●	
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●
Dimensions				
Length L [mm]		128		118
Width W [mm]		40		
Head width W_h [mm]		55		40
Height H [mm]		55		40
Connector area I_c [mm]		0 (1/2" NPT)		0 (M20 x 1,5)

Properties

- Flexible *VariKont* housing
- 20 mm and 40 mm, non-flush mountable versions
- AC, 4-wire switching output
- Terminal compartment

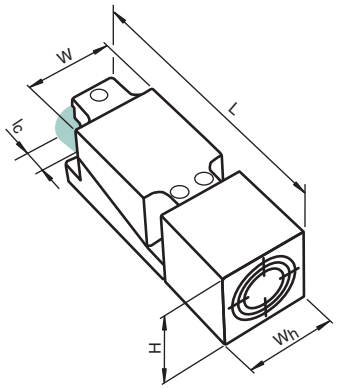
Your Benefit

- Sensor head can be aligned in 5 different positions

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

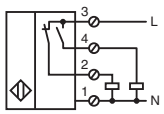
V1-M20-80	Receptacles, M12/M20; plastic version
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
MHW 01	Modular mounting bracket



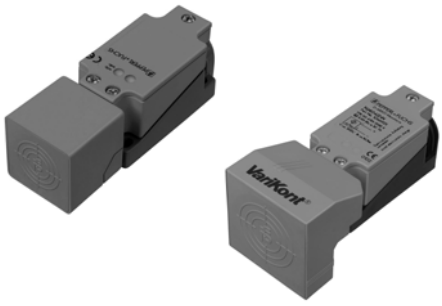
Electrical Connection



NJ20+U1+W4
NJ40+U1+W4
NJ40+U2+W4



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	AC/DC	NO/NC
Operating voltage	20 ... 253 V	
Short-circuit protection	pulsing	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Protection degree	IP68	
Connection type	screw terminals	



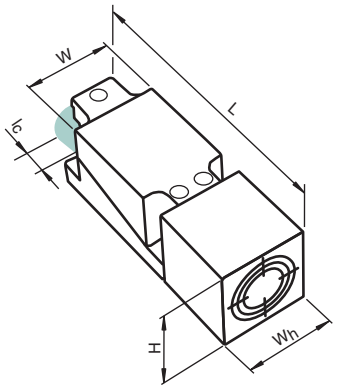
Model Number		NCB20+U4+U	NCN20+U1+U	NCN40+U1+U	NCN40+U2+U	NCN40+U4+U
	green = preferred type					
Rated operating distance	20 mm	●	●			
	40 mm			●	●	●
Installation	flush	●				
	non-flush		●	●	●	●
Switching frequency	0 ... 25 Hz		●	●	●	●
	200 Hz VDC / 30 Hz VAC	●				
Operating current	3 ... 400 mA	●				
	5 ... 500 mA		●	●	●	●
Operating voltage display	LED, green		●	●	●	●
Indication of the switching state	LED, yellow		●	●	●	●
Housing material	PBT housing/PBT base		●	●	●	
	PBT housing/metal base	●				●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●
Dimensions						
Length L [mm]		118			128	
Width W [mm]				40		
Head width W_h [mm]		40			55	
Height H [mm]		40			55	
Connector area l_c [mm]		0 (1/2" NPT)	0 (M20 x 1,5)		0 (1/2" NPT)	

Properties

- **Flexible *VariKont* housing**
- **20 mm, flush / non-flush and 40 mm, non-flush mountable versions**
- **AC/DC, 2-wire switching output**
- **Terminal compartment**

Your Benefit

- **Sensor head can be aligned in 5 different positions**



Accessories

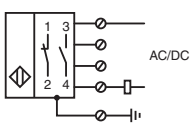
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
V1-M20-80	Receptacles, M12/M20; plastic version

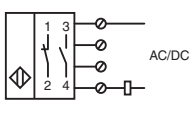
Electrical Connection



NCB20+U4+U
NCN40+U4+U



NCN40+U1+U
NCN20+U1+U
NCN40+U2+U



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	50 mm
Operating voltage	10 ... 60 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 80 Hz
Operating current	2 ... 200 mA
Lowest operating current	2 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)

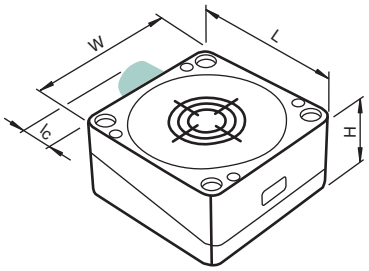
Model Number			NCB50-FP-Z2-P1	NCN50-FP-Z2-P1	NCN50-FP-Z2-P4	NCB50-FP-Z4-V1	NCB50-FP-Z5-V1
Installation	flush		●			●	●
	non-flush			●	●		
Switching element function	DC	NO/NC	●	●	●		
	DC	NO				●	
	DC	NC					●
Housing material	PBT housing / PBT base		●	●		●	●
	PBT housing / metal base				●		
Protection class	II		●				
Protection degree	IP67			●	●		
	IP68		●			●	●
Connection type	Device connector M12 x 1 , 4-pin					●	●
	screw terminals		●	●	●		

Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)				●	
	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			●		

Dimensions				
Length L [mm]	84	80		84
Width W [mm]	84	80		84
Height H [mm]	40			
Cap length l_1 [mm]	0			
Connector area l_c [mm]	9 (M20 x 1,5)	11 (M20 x 1,5)		25

Properties

- **Flat pack housing**
- **50 mm, flush and non-flush mountable versions**
- **DC, 2-wire switching output**
- **Terminal compartment and connector versions**



Accessories

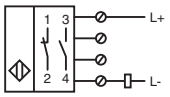
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

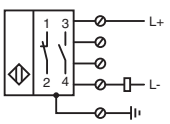
Electrical Connection



NCB50-FP-Z2-P1
NCN50-FP-Z2-P1

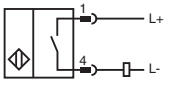


NCN50-FP-Z2-P4

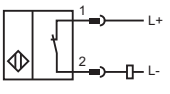


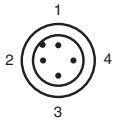


NCB50-FP-Z4-V1



NCB50-FP-Z5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	50 mm
Installation	flush
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 80 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP68

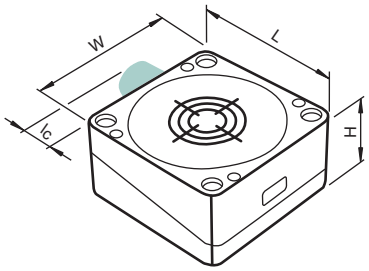
Model Number	green = preferred type	NCB50-FP-E2-P1	NCB50-FP-E2-P4	NCB40-FP-A2-P1	NCB50-FP-A2-P1	NCB50-FP-A2-P4	NCB50-FP-E2-P1-V1	NCB40-FP-A2-P1-V1	NCB50-FP-A2-P1-V1
Rated operating distance	40 mm			●				●	
	50 mm	●	●		●	●	●		●
Switching element function	PNP NO/NC			●	●	●		●	●
	PNP NO	●	●				●		
Housing material	PBT housing / PBT base	●	●	●	●		●	●	●
	PBT housing / metal base		●			●			
Connection type	Device connector M12 x 1 , 4-pin						●	●	●
	screw terminals	●	●	●	●	●			

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●	●	●	

Dimensions									
Length L [mm]		84	84	80	84	84	84	80	84
Width W [mm]		84	84	80	84	84	84	80	84
Height H [mm]		40							
Cap length l_1 [mm]		0							
Connector area l_c [mm]	a) 10 (1/2" NPT)	c	a	c	c	a	b		
	b) 25								
	c) 9 (M20 x 1.5)								

Properties

- **Flat pack housing**
- **40 mm and 50 mm, flush mountable**
- **DC, 3-wire and 4-wire switching output versions**
- **Terminal compartment and connector versions**



Accessories

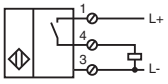
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

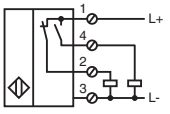
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection

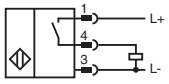
NCB50-FP-E2-P4
NCB50-FP-E2-P1



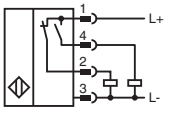
NCB50-FP-A2-P4
NCB40-FP-A2-P1
NCB50-FP-A2-P1

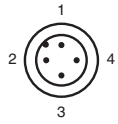


NCB50-FP-E2-P1-V1



NCB40-FP-A2-P1-V1
NCB50-FP-A2-P1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Rated operating distance	50 mm	
Installation	non-flush	
Switching element function	PNP	NO/NC
Operating voltage	10 ... 60 V	
No-load supply current	≤ 20 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 80 Hz	
Operating current	0 ... 200 mA	
Short-circuit protection	pulsing	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	PBT housing / PBT base	
Protection degree	IP68	

Model Number		NCN50-FP-A2-P1	NCN50-FP-A2-P1-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	screw terminals	●	
			
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●
Dimensions			
Length L [mm]		80	
Width W [mm]		80	
Height H [mm]		40	
Cap length l_1 [mm]		0	
Connector area l_c [mm]		11 (M20 x 1.5)	27

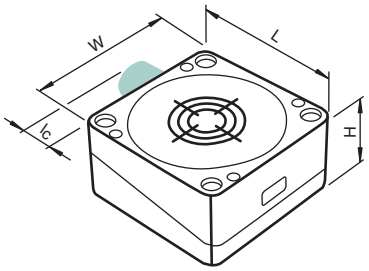
Properties

- **Flat pack housing**
- **50 mm, non-flush mountable**
- **DC, 4-wire switching output**
- **Terminal compartment and connector versions**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

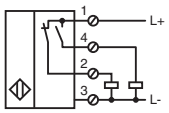
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable



Electrical Connection

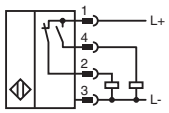


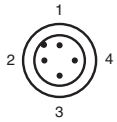
NCN50-FP-A2-P1





NCN50-FP-A2-P1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

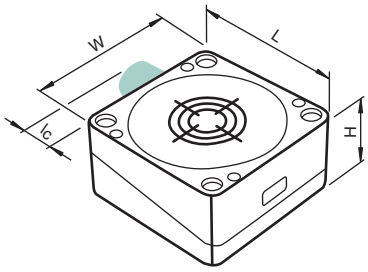
General Data		
Rated operating distance	40 mm	
Installation	flush	
Switching element function	AC	NO/NC
Operating voltage	20 ... 253 V	
Switching frequency	0 ... 20 Hz	
Operating current	5 ... 500 mA	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Protection degree	IP68	
Connection type	screw terminals	



Model Number		NCB40-FP-W-P1	NCB40-FP-W-P2	NCB40-FP-W-P4
	green = preferred type			
Housing material	PBT housing / PBT base	●	●	
	PBT housing / metal base			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●		
Dimensions				
Length L [mm]			80	
Width W [mm]			80	
Height H [mm]			40	
Cap length l_1 [mm]			0	
Connector area l_c [mm]		11 (M20 x 1.5)	11 (1/2" NPT)	

Properties

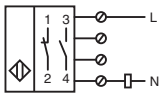
- Flat pack housing
- 40 mm, flush mountable
- AC, 2-wire switching output
- Terminal compartment



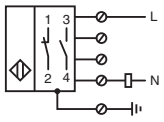
Electrical Connection



NCB40-FP-W-P1
NCB40-FP-W-P2



NCB40-FP-W-P4



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Flat pack housing
- 40 mm and 50 mm, non-flush mountable versions
- AC, 2-wire switching output
- Terminal compartment

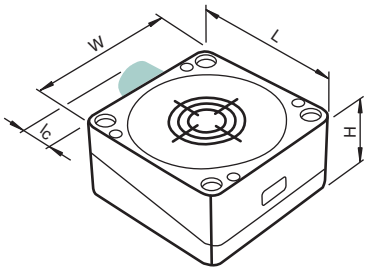
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	AC NO/NC
Operating voltage	20 ... 253 V AC
Switching frequency	0 ... 20 Hz
Operating current	5 ... 500 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Protection degree	IP68
Connection type	screw terminals



Model Number	green = preferred type	NCN40-FP-W-T-P1	NCN40-FP-W-T-P4	NCN50-FP-W-P1	NCN50-FP-W-P2	NCN50-FP-W-P4
Rated operating distance	40 mm	●	●			
	50 mm			●	●	●
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)	●	●			
	-25 ... 70 °C (-13 ... 158 °F)			●	●	●
Housing material	PBT housing / PBT base	●		●	●	
	PBT housing / metal base		●			●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●		
Dimensions						
Length L [mm]				80		
Width W [mm]				80		
Height H [mm]				40		
Cap length l_1 [mm]				0		
Connector area l_c [mm]	a) 11 (1/2" NPT)	b	a	b	a	
	b) 11 (M20 x 1.5)					

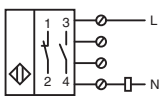


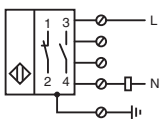
Electrical Connection



NCN40-FP-W-T-P1
NCN50-FP-W-P2
NCN50-FP-W-P1

NCN50-FP-W-P4
NCN40-FP-W-T-P4





Date of issue 04/08/2015



Properties

- Flat pack housing
- 40 mm, non-flush mountable
- DC, 3-wire analog output
- Terminal compartment and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

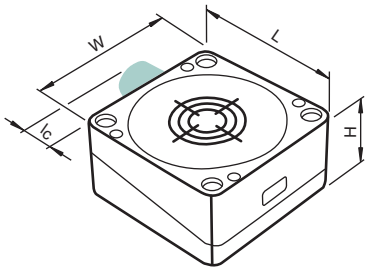
General Data	
Installation	non-flush
Measurement range	15 ... 40 mm
Switching element function	Analog current output 0 ... 20 mA
Operating voltage	15 ... 30 V DC
No-load supply current	≤ 8 mA
Repeat accuracy	0 ... 6 µm
Output type	0 ... 20 mA
Linearity error	≤ ± 10 % of full-scale value
Load resistor	≤ 500 Ω
Adjustment tolerance zero point	≤ ± 10 % of full-scale value
Ambient temperature	-10 ... 70 °C (14 ... 158 °F)
Housing material	PBT housing / PBT base
Protection degree	IP67

Model Number		IA40-FP-I3-P1	IA40-FP-I3-P2	IA40-FP-I3-P2-V1
	green = preferred type			
Connection type	Device connector M12 x 1 , 4-pin			●
	screw terminals	●	●	
				
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			80	
Width W [mm]			80	
Height H [mm]			40	
Cap length l_1 [mm]			0	
Connector area l_c [mm]			11 (M20 x 1,5)	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

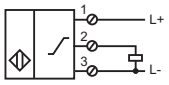
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
DA5-IU-C	Digital display unit
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable



Electrical Connection

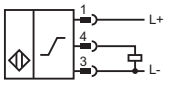


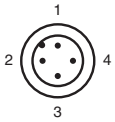
IA40-FP-I3-P2
IA40-FP-I3-P1





IA40-FP-I3-P2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



CE

Properties

- Compact flat pack housing
- 25 mm, flush and 30 mm non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Terminal compartment

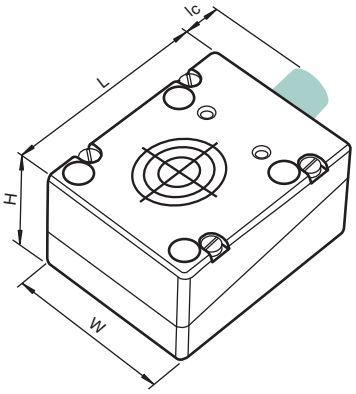
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Short-circuit protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PBT
Housing base	PBT
Protection degree	IP65
Connection type	screw terminals



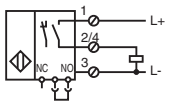
Model Number	green = preferred type	NBN30-FPS-E5	NBB25-FPS-A2	NBN30-FPS-A2
Rated operating distance	25 mm		●	
	30 mm	●		●
Installation	flush		●	
	non-flush	●		●
Switching element function	PNP, NO/NC, programmable	●		
	PNP NO/NC		●	●
Operating voltage	10 ... 30 V DC		●	●
	10 ... 65 V DC	●		
Switching frequency	0 ... 50 Hz	●		●
	0 ... 70 Hz		●	
Operating current	0 ... 200 mA		●	●
	0 ... 300 mA	●		
Approvals and Certificates				
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●	●
Dimensions				
Length L [mm]			77	
Width W [mm]			60	
Height H [mm]			41	
Connector area l_c [mm]			8	



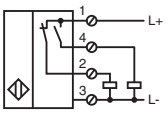
Electrical Connection



NBN30-FPS-E5



NBB25-FPS-A2
NBN30-FPS-A2



Date of issue 04/08/2015



CE

Properties

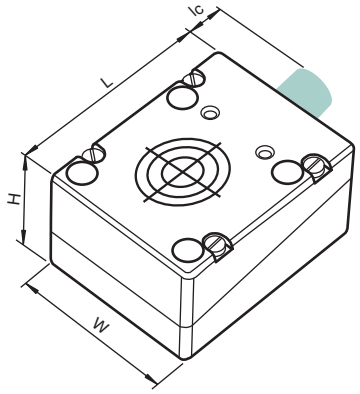
- Compact flat pack housing
- 30 mm non-flush mountable
- AC/DC, 2-wire switching output
- Terminal compartment

Technical Data

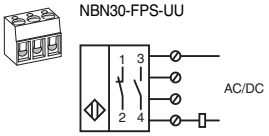
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NBN30-FPS-UU
Rated operating distance	30 mm
Installation	non-flush
Switching element function	AC/DC NO/NC
Operating voltage	20 ... 265 V AC/DC
No-load supply current	≤ 2 mA
Reverse polarity protection	✔
Switching frequency	0 ... 25 Hz
Operating current	0 ... 300 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PBT
Housing base	PBT
Protection degree	IP65
Connection type	screw terminals

Dimensions	
Length L [mm]	77
Width W [mm]	60
Height H [mm]	41
Connector area l_c [mm]	8



Electrical Connection



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NCN100-F23-E2-V1
Rated operating distance	100 mm
Installation	non-flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	ABS (TSG), bottom Al
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin
	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	177
Width W [mm]	177
Height H [mm]	60.5
Connector area l_c [mm]	15

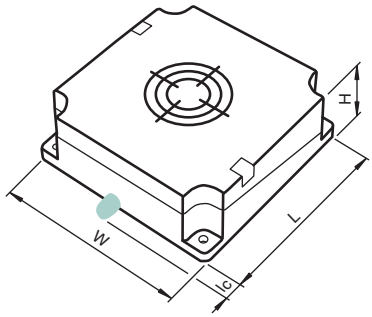
Properties

- **F23 surface mount housing**
- **100 mm non-flush mountable**
- **DC, 3-wire switching output**
- **Connector version**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

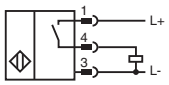
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

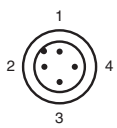


Electrical Connection



NCN100-F23-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NCN100-F23-US-V93
Rated operating distance	100 mm
Installation	non-flush
Switching element function	Normally open
Operating voltage	20 ... 300 V DC 20 ... 253 V AC
No-load supply current	≤ 1 mA
Switching frequency	0 ... 10 Hz
Operating current	0 ... 300 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	ABS (TSG), bottom Al
Protection degree	IP67
Connection type	Device connector 7/8"-16 UN , 3-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Certified by China Compulsory Certification (CCC)

Dimensions	
Length L [mm]	177
Width W [mm]	177
Height H [mm]	60.5
Connector area l_c [mm]	15

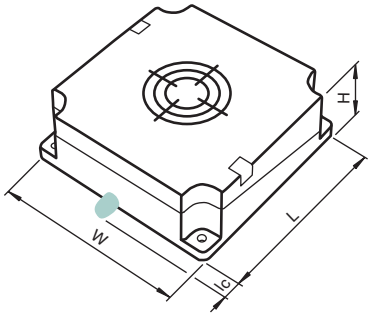
Properties

- **F23 surface mount housing**
- **100 mm non-flush mountable**
- **AC/DC, 2-wire switching output**
- **Connector version**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

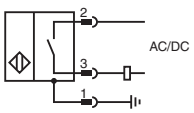
V93-G-YE2M-STOOW	Female connector, 7/8" - 16 UNF, 3-pin, PUR cable

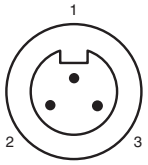


Electrical Connection



NCN100-F23-US-V93





Wire colors

1	GN	(green)
2	BK	(black)
3	WH	(white)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	4 mm
Installation	non-flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PPS
Protection degree	IP67

Model Number		NBN4-F29-E2-C	NBN4-F29A-E2-C
Connection type	cable PUR, irradiated , 2 m		●
	cable PVC , 2 m	●	

Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

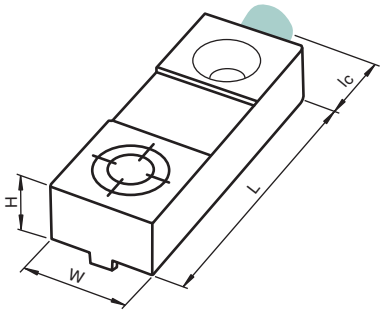
Dimensions		
Length L [mm]	27	
Width W [mm]	10	
Height H [mm]	6	9
Connector area l_c [mm]	4	

Properties

- Miniature F29 housing
- 4 mm non-flush mountable
- DC, 3-wire switching output
- Cable version

Your Benefit

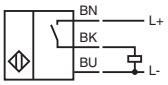
- Specially optimized for welding applications



Electrical Connection



NBN4-F29A-E2-C
NBN4-F29-E2-C



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NBB20-L2-Z4-C-V1
Rated operating distance	20 mm
Installation	flush
Switching element function	NO
Operating voltage	3.8 ... 30 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 3 Hz
Operating current	2 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40
Connector area I_c [mm]	0

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush mountable
- DC, 2-wire switching output
- Connector version

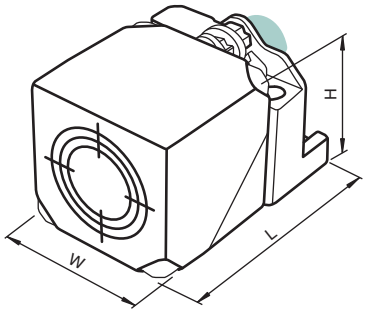
Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset
- Specially optimized for welding applications

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

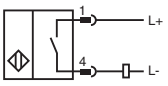
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

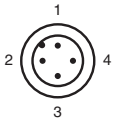


Electrical Connection



NBB20-L2-Z4-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NBB20-L2-E2-C-V1	NBB20-L2-A2-C-V1	NBN40-L2-E2-C-V1	NBN40-L2-A2-C-V1
Rated operating distance	20 mm		●	●		
	40 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	PNP	NO/NC		●		●
	PNP	NO	●		●	
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			67			
Width W [mm]			40			
Height H [mm]			40			
Connector area I_c [mm]			0			

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- DC, 3-wire and 4-wire switching output
- Connector version

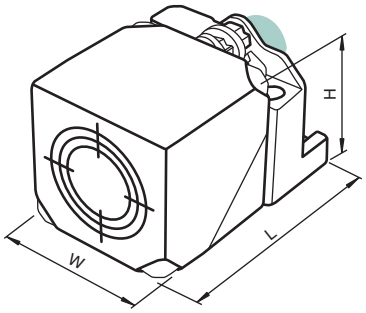
Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset
- Specially optimized for welding applications

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

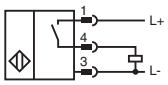
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid



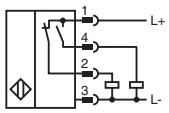
Electrical Connection

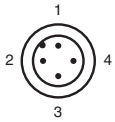


NBB20-L2-E2-C-V1
NBN40-L2-E2-C-V1



NBB20-L2-A2-C-V1
NBN40-L2-A2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	PNP	NO
Operating voltage	10 ... 30 V	
No-load supply current	≤ 25 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 50 Hz	
Operating current	0 ... 200 mA	
Short-circuit protection	pulsing	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	0 ... 50 °C (32 ... 122 °F)	
Housing material	PA 6 Grivory GVN-35H	
Protection degree	IP69K	
Connection type	Device connector M12 x 1 , 4-pin	



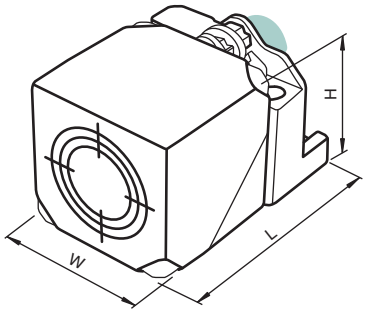
Model Number		NBB20-L2-E2B-C-V1	NBN40-L2-E2B-C-V1
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		67	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0	

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- DC, 3-wire bistable switching output
- Connector version

Your Benefit

- Sensor for special applications e.g. conveyor systems due to bistable switching behavior
- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset
- Specially optimized for welding applications



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

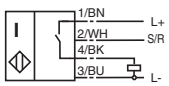
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

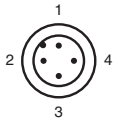
Electrical Connection



NBB20-L2-E2B-C-V1
NBN40-L2-E2B-C-V1

E2B





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 5 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Connection type	Device connector M12 x 1 , 4-pin

Model Number			NBB20-L3-A2-C3-V1	NBB20-L3M-A0-C3-V1	NBB20-L3M-A2-C3-V1	NBN40-L3M-A2-C3-V1
Rated operating distance	20 mm		●	●	●	
	40 mm					●
Installation	flush		●	●	●	
	non-flush					●
Switching element function	NPN	NO/NC		●		
	PNP	NO/NC	●		●	●
Housing material	GD-ZnAl4Cu1, Coated metal fixing flange, coated.			●	●	●
	GD-ZnAl4Cu1, coated mounting flange PA6-GF35		●			
Housing base	PTFE coated zinc		●			
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

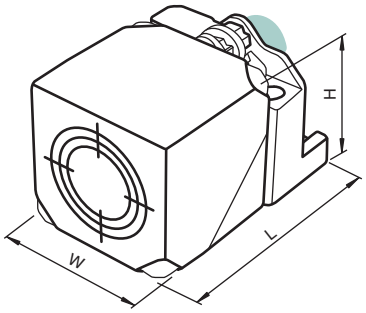
Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- DC, 4-wire switching output
- Connector version

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset
- Specially optimized for welding applications



Accessories

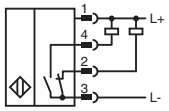
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

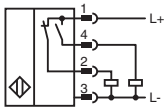
Electrical Connection

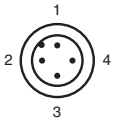


NBB20-L3M-A0-C3-V1



NBB20-L3-A2-C3-V1
NBB20-L3M-A2-C3-V1
NBN40-L3M-A2-C3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 250 V AC/DC
No-load supply current	≤ 0.6 mA
Reverse polarity protection	✔
Switching frequency	2 Hz
Operating current	3 ... 300 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PTFE coated zinc
Housing base	PTFE coated zinc
Protection degree	IP67

Model Number		NBB20-L3M-US-C3-V12	NBB20-L3M-US-C3-V93	NBB20-L3M-UO-C3-V12	NBN40-L3M-US-C3-V12	NBN40-L3M-US-C3-V93
Rated operating distance	20 mm	●	●	●		
	40 mm				●	●
Installation	flush	●	●	●		
	non-flush				●	●
Switching element function	AC/DC normally open	●	●		●	●
	AC/DC normally closed			●		
Connection type	Device connector 1/2"-20 UN , 3-pin	●		●	●	
	Device connector 7/8"-16 UN , 3-pin		●			●

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●	●

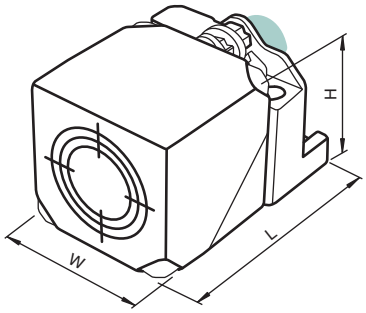
Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- AC/DC, 2-wire switching output
- Connector version

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset
- Specially optimized for welding applications



Accessories

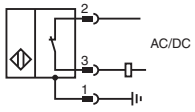
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V93-G-YE2M-STOOW	Female connector, 7/8" - 16 UNF, 3-pin, PUR cable
V12-W-YE2M-PUR-H/S	Connecting cable, 1/2" - 20 UNF, 3-pin, irradiated PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

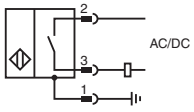
Electrical Connection

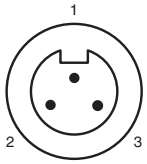


NBB20-L3M-UO-C3-V12



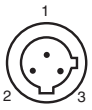
NBB20-L3M-US-C3-V12
NBB20-L3M-US-C3-V93
NBN40-L3M-US-C3-V12
NBN40-L3M-US-C3-V93





Wire colors

1	GN	(green)
2	BK	(black)
3	WH	(white)



Wire colors

1	GN	(green)
2	RD/BK	(red/black)
3	RD/WH	(red/white)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 5 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA
Housing base	plastic
Protection degree	IP68 / IP69K

Model Number		NBB15-U1-E2-C	NBN40-U1-E2-C	NBB20-U1-E2-C-V1
Rated operating distance	15 mm	●		
	20 mm			●
	40 mm		●	
Installation	flush	●		●
	non-flush		●	
Connection type	Device connector M12 x 1 , 4-pin			●
	screw terminals	●	●	
				

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

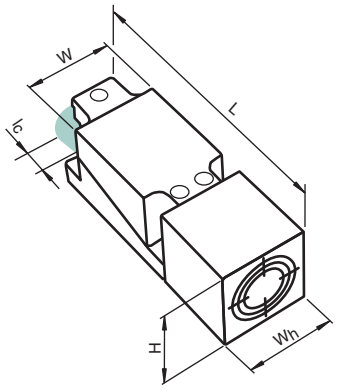
Dimensions			
Length L [mm]	118		
Width W [mm]	40		
Height H [mm]	40		
Connector area l_c [mm]	0		20

Properties

- Flexible *VariKont* housing
- Up to 40 mm, flush and non-flush mountable versions
- DC, 3-wire switching output
- Terminal compartment and connector versions

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Specially optimized for welding applications



Accessories

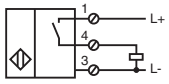
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MHW 01	Modular mounting bracket
V1-M20-80	Receptacles, M12/M20; plastic version
V1-G-BK	4-pin, M12 female field-attachable connector
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection

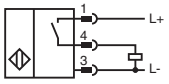


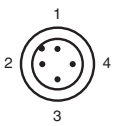
NBB15-U1-E2-C
NBN40-U1-E2-C





NBB20-U1-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	50 mm
Installation	flush
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT/metal
Protection degree	IP68
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NCB50-FP-E2-C-P1-V1	NCB50-FP-E2-C-P3-V1	NCB50-FP-A2-C-P3-V1
Switching element function	PNP	NO	●	●	
	PNP	NO/NC			●
Operating voltage	10 ... 30 V DC			●	
	10 ... 60 V DC		●		●
Housing base	metal			●	●
	PBT		●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●		●
Dimensions					
Length L [mm]				84	
Width W [mm]				84	
Height H [mm]				40	
Connector area l_c [mm]			25	32	

Properties

- Flat pack housing
- 50 mm, flush mountable
- DC, 3-wire and 4-wire switching output versions
- Connector version

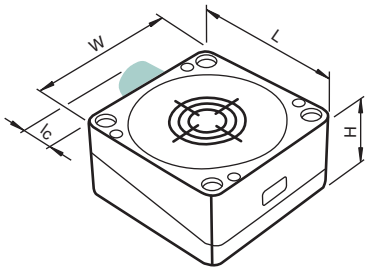
Your Benefit

- Specially optimized for welding applications

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

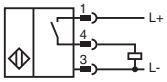
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



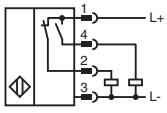
Electrical Connection

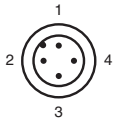


NCB50-FP-E2-C-P1-V1
NCB50-FP-E2-C-P3-V1



NCB50-FP-A2-C-P3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	GD-ZnAl4Cu1, coated mounting flange PA6-GF35
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NRB20-L3-A2-V1	NRB20-L3-E2-V1	NRN35-L3-A2-V1	NRN40-L3K-A2-V1
Rated operating distance	20 mm		●	●		
	35 mm				●	
	40 mm					●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	PNP	NO/NC	●		●	●
	PNP	NO		●		
Approvals and Certificates						
Protection class	II		●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

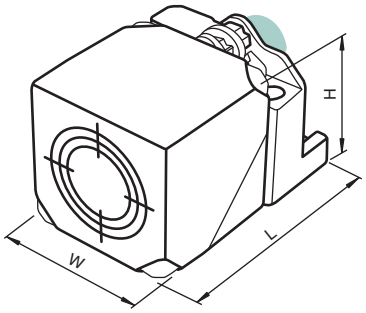
Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40
Connector area l_c [mm]	0

Properties

- Flexible *VariKont*-L housing
- Up to 40 mm, flush and non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Connector version

Your Benefit

- Same sensing range for all metals
- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Rotatable connector allows all orientations of the attached cordset
- Mounting base with quick clamping lever for swift mounting



Accessories

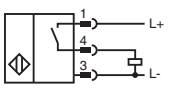
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

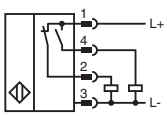
Electrical Connection

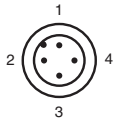


NRB20-L3-E2-V1



NRB20-L3-A2-V1
NRN35-L3-A2-V1
NRN40-L3K-A2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015





Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	GD-ZnAl4Cu1, coated mounting flange PA6-GF35
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NRB20-L3-E2-C-V1	NRB20-L3-A2-C-V1	NRN35-L3-E2-C-V1	NRN35-L3-A2-C-V1	NRN40-L3K-E2-C-V1	NRN40-L3K-A2-C-V1
Rated operating distance	20 mm		●	●				
	35 mm				●	●		
	40 mm						●	●
Installation	flush		●	●				
	non-flush				●	●	●	●
Switching element function	PNP	NO/NC		●		●		●
	PNP	NO	●		●		●	
Approvals and Certificates								
Protection class	II		●	●	●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]			67					
Width W [mm]			40					
Height H [mm]			40					
Connector area I_c [mm]			0					

Properties

- **Flexible *VariKont*-L housing**
- **Up to 40 mm, flush and non-flush mountable versions**
- **DC, 3-wire and 4-wire switching output versions**
- **Connector version**

Your Benefit

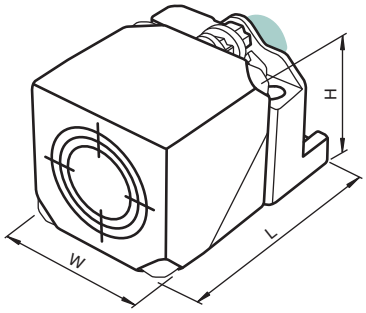
- **Same sensing range for all metals**
- **All-around visible status display**
- **Sensor head can be aligned in 5 different positions**
- **Rotatable connector allows all orientations of the attached cordset**
- **Mounting base with quick clamping lever for swift mounting**

Further Products

In this series, we offer additionally:

NRB20-L3M-A2-C3-V1

Technical data like NRB20-L3-A2-C-V1 but:
Housing material: GD-ZnAl4Cu1, coated
metal fixing flange, coated.



Accessories

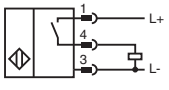
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

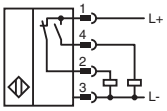
Electrical Connection

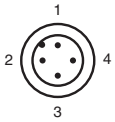


NRN35-L3-E2-C-V1
NRB20-L3-E2-C-V1
NRN40-L3K-E2-C-V1



NRB20-L3-A2-C-V1
NRB20-L3M-A2-C3-V1
NRN35-L3-A2-C-V1
NRN40-L3K-A2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	PNP	NO/NC
Operating voltage	10 ... 30 V DC	
No-load supply current	≤ 25 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 100 Hz	
Operating current	0 ... 200 mA	
Short-circuit protection	pulsing	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	
Housing material	PA/metal with epoxy powder coating	
Housing base	plastic	
Protection degree	IP67	
Connection type	screw terminals	



Model Number		NRB20-U1-A2	NRN40-U1-A2
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		118	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0 (M20 x 1.5)	

Properties

- Flexible *VariKont* housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- DC, 4-wire switching output
- Terminal compartment

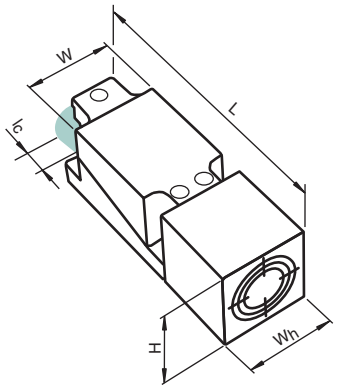
Your Benefit

- Same sensing range for all metals
- All-around visible status display
- Sensor head can be aligned in 5 different positions

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

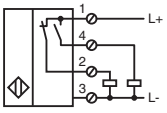
MHW 01	Modular mounting bracket
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*



Electrical Connection



NRB20-U1-A2
NRN40-U1-A2



Date of issue 04/08/2015





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	0 ... 50 °C (32 ... 122 °F) (± 10 % changing operating distance) -25 ... 70 °C (-13 ... 158 °F) (± 20 % changing operating distance)
Housing material	PBT/metal
Housing base	metal
Protection degree	IP68
Connection type	Device connector M12 x 1 , 4-pin



Model Number			NRB50-FP-A2-P3-V1	NRB50-FP-E2-P3-V1	NRN75-FP-A2-P3-V1	NRB50-FP-A2-C-P3-V1	NRB50-FP-E2-C-P3-V1	NRN75-FP-A2-C-P3-V1	NRN75-FP-E2-C-P3-V1
Rated operating distance	50 mm		●	●		●	●		
	75 mm				●			●	●
Installation	flush		●	●		●	●		
	non-flush				●			●	●
Switching element function	PNP	NO/NC	●		●	●		●	
	PNP	NO		●			●		●
Switching frequency	0 ... 1 Hz					●	●	●	●
	0 ... 50 Hz				●				
	0 ... 80 Hz		●	●					
Approvals and Certificates									
Protection class	II		●	●	●	●	●	●	●
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

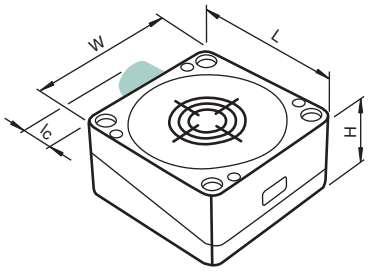
Dimensions					
Length L [mm]	84	80	84	80	
Width W [mm]	84	80	84	80	
Height H [mm]	40				
Connector area l_c [mm]	32	33	32	33	

Properties

- Flat pack housing
- 50 mm, flush and 75 mm, non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Connector version

Your Benefit

- Same sensing range for all metals



Accessories

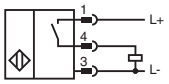
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

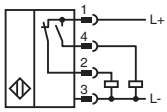
Electrical Connection

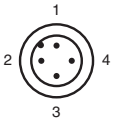


NRB50-FP-E2-P3-V1
NRB50-FP-E2-C-P3-V1
NRN75-FP-E2-C-P3-V1



NRB50-FP-A2-P3-V1
NRN75-FP-A2-P3-V1
NRB50-FP-A2-C-P3-V1
NRN75-FP-A2-C-P3-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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CE e1

Properties

- Compact F33 housing
- 8 mm, flush and 10 mm, non-flush mountable versions
- DC, 3-wire switching output
- Cable version

Further Products

In this series, we offer additionally:

NBB8-F33-E2-M-150MM-3DT04

Technical data like NBB8-F33-E2-M but:
Connection type: Cable connector Deutsch DT04 , 3-pin with PUR cable 150 mm

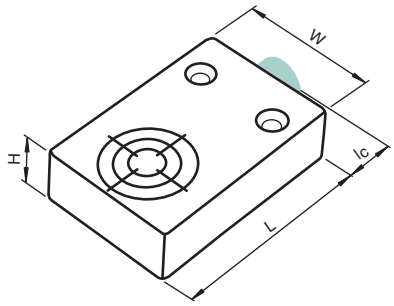
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	5 ... 60 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PBT
Protection degree	IP67 / IP69K
Connection type	cable PUR , 2 m



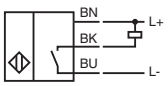
Model Number	green = preferred type	NBB8-F33-E0-M	NBB8-F33-E2-M	NBN10-F33-E0-M	NBN10-F33-E2-M
Rated operating distance	10 mm			●	●
	8 mm	●	●		
Installation	flush	●	●		
	non-flush			●	●
Switching element function	NPN NO	●		●	
	PNP NO		●		●
Switching frequency	0 ... 200 Hz			●	●
	0 ... 350 Hz	●	●		
Approvals and Certificates					
e1 Type approval	2006/28/EG	●	●	●	●
Dimensions					
Length L [mm]		50			
Width W [mm]		25			
Height H [mm]		10			
Connector area l_c [mm]		0			



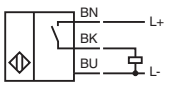
Electrical Connection



NBB8-F33-E0-M
NBN10-F33-E0-M

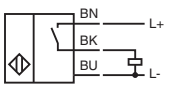


NBB8-F33-E2-M
NBN10-F33-E2-M





NBB8-F33-E2-M-150MM-3DT04



Date of issue 04/08/2015



CE

Properties

- Compact F148P housing
- 8 mm and 15 mm, flush mountable versions
- DC, 3-wire switching and relay output versions
- Cable version

Further Products

In this series, we offer additionally:

NBB8-F148P10-E2-M-150MM-3DT04

Technical data like NBB8-F148P10-E2-M but:
Connection type: 150 mm cable with Deutsch connector

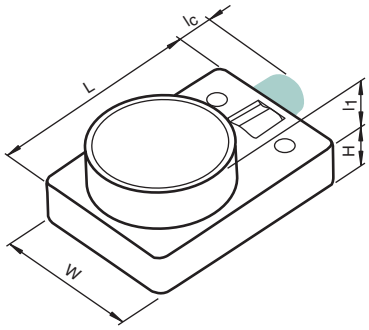
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	flush
Operating current	≤ 200 mA
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	anodized aluminium
Protection degree	IP67 / IP69K
Connection type	cable PUR , 2 m



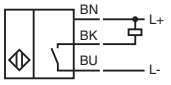
Model Number	green = preferred type	NBB8-F148P10-E0-M	NBB8-F148P10-E2-M	NBB15-F148P10-E0-M	NBB15-F148P10-E2-M	NBB15-F148P10-ARO-M
Rated operating distance	15 mm			●	●	●
	8 mm	●	●			
Switching element function	1 electronic relay, N.C.					●
	NPN NO	●		●		
	PNP NO		●		●	
Operating voltage	10 ... 30 V DC					●
	10 ... 60 V DC	●	●	●	●	
No-load supply current	≤ 10 mA	●	●	●	●	
	≤ 8 mA					●
Reverse polarity protection	✔	●	●	●	●	
	tolerant					●
Switching frequency	0 ... 120 Hz				●	
	0 ... 400 Hz	●	●	●		
	0 ... 40 Hz					●
Short-circuit protection	pulsing	●	●	●	●	
Approvals and Certificates						
E1 Type approval	10R-04	●	●	●	●	●
Dimensions						
Length L [mm]				50		
Width W [mm]				35		
Height H [mm]				10		
Connector area l_c [mm]				0		



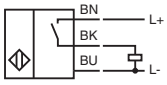
Electrical Connection



NBB8-F148P10-E0-M
NBB15-F148P10-E0-M



NBB8-F148P10-E2-M
NBB15-F148P10-E2-M

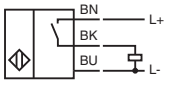


NBB15-F148P10-ARO-M





NBB8-F148P10-E2-M-150MM-3DT04



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type		NBB20-L2-A0-V1-M	NBB20-L2-A2-V1-M	NBN40-L2-A0-V1-M	NBN40-L2-A2-V1-M
Rated operating distance	20 mm		●	●		
	40 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Switching frequency	0 ... 100 Hz				●	●
	0 ... 200 Hz		●	●		
Approvals and Certificates						
e1 Type approval	2006/28/EG		●	●	●	●
Dimensions						
Length L [mm]			67			
Width W [mm]			40			
Height H [mm]			40			
Connector area I_c [mm]			0			

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- DC, 4-wire switching output
- Connector version

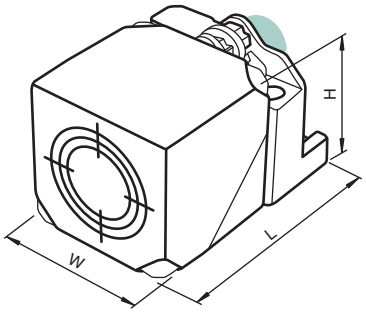
Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

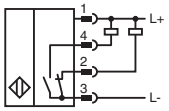
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
V1-M20-80	Receptacles, M12/M20; plastic version



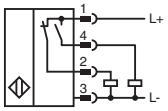
Electrical Connection



NBB20-L2-A0-V1-M
NBN40-L2-A0-V1-M



NBB20-L2-A2-V1-M
NBN40-L2-A2-V1-M



Date of issue 04/08/2015



CE e1

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- DC, 4-wire switching output
- Connector version

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Rotatable connector allows all orientations of the attached cordset

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA-GF35 metal base powder coated metal mounting flang powder coated.
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin

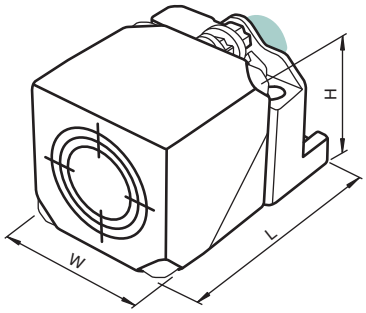


Model Number			NBB20-L2M-A0-V1-M	NBB20-L2M-A2-V1-M	NBN40-L2M-A0-V1-M	NBN40-L2M-A2-V1-M
Rated operating distance	20 mm		●	●		
	40 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	NPN	NO/NC	●		●	
	PNP	NO/NC		●		●
Switching frequency	0 ... 100 Hz				●	●
	0 ... 200 Hz		●	●		
Approvals and Certificates						
e1 Type approval	2006/28/EG		●	●	●	●
Dimensions						
Length L [mm]			67			
Width W [mm]			40			
Height H [mm]			40			
Connector area I_c [mm]			0			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

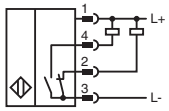
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
V1-M20-80	Receptacles, M12/M20; plastic version



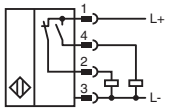
Electrical Connection



NBN40-L2M-A0-V1-M
NBB20-L2M-A0-V1-M



NBN40-L2M-A2-V1-M
NBB20-L2M-A2-V1-M



Date of issue: 04/08/2015

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CE e 1

Properties

- Flexible *VariKont* housing
- 20 mm, flush and 40 mm, non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Terminal compartment

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA/metal with epoxy powder coating
Housing base	plastic
Protection degree	IP68 / IP69K
Connection type	screw terminals

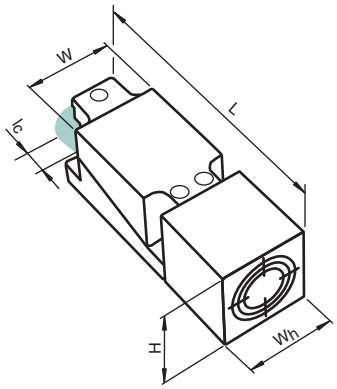


Model Number			NBB20-U1-A0-M	NBB20-U1-A2-M	NBB20-U1-E0-M	NBB20-U1-E2-M	NBN40-U1-A0-M	NBN40-U1-A2-M	NBN40-U1-E0-M	NBN40-U1-E2-M
	green = preferred type									
Rated operating distance	20 mm		●	●	●	●				
	40 mm						●	●	●	●
Installation	flush		●	●	●	●				
	non-flush						●	●	●	●
Switching element function	NPN	NO/NC	●				●			
	NPN	NO			●				●	
	PNP	NO/NC		●				●		
	PNP	NO				●				●
Switching frequency	0 ... 150 Hz						●	●	●	●
	0 ... 200 Hz		●	●	●	●				
Approvals and Certificates										
e1 Type approval	2006/28/EG		●	●	●	●	●	●	●	●
Dimensions										
Length L [mm]			128							
Width W [mm]			40							
Height H [mm]			40							
Connector area l_c [mm]			0 (M20 x 1.5)							

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

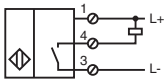
MHW 01	Modular mounting bracket



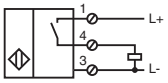
Electrical Connection



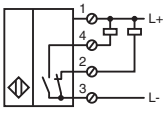
NBB20-U1-E0-M
NBN40-U1-E0-M



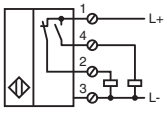
NBB20-U1-E2-M
NBN40-U1-E2-M



NBB20-U1-A0-M
NBN40-U1-A0-M



NBB20-U1-A2-M
NBN40-U1-A2-M



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Description	Sensor consists of a sensor head and a cylindrical amplifier
Installation	flush mountable
Switching element function	PNP NO/NC
Operating voltage	10 ... 30 V
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Switching frequency	0 ... 20 Hz
Short-circuit protection	pulsing
Indication of the switching state	Multihole-LED, yellow
Ambient temperature	0 ... 250 °C (32 ... 482 °F)
Housing material	PTFE / Al / 1.4305 / AISI 303
Protection degree	amplifier IP67 sensor IP40
Connection type	Device connector M12 x 1 , 4-pin



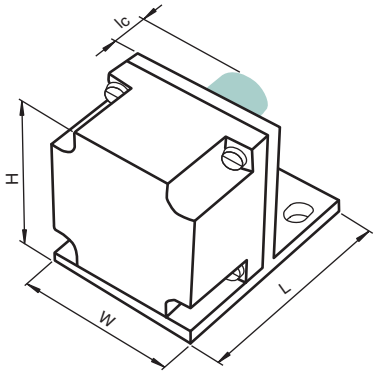
Model Number		NCN25-F35-A2-250-V1	NCN20-F35-A2-250-10M-V1	NCN25-F35-A2-250-15M-V1	NCN20-F35-A2-250-20M-V1
Rated operating distance	20 mm		●		●
	25 mm	●		●	
Cable length between sensor and amplifier	10 m	●	●		
	15 m			●	
	20 m				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●		●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]			56		
Width W [mm]			40		
Height H [mm]			40		
Connector area l_c [mm]			12		

Properties

- Sturdy F35 housing
- 20 mm and 25 mm, flush mountable versions
- DC, 4-wire switching output
- Connector version

Your Benefit

- For use in high temperature applications



Accessories

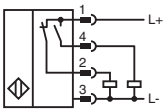
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

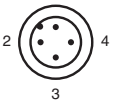
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



NCN20-F35-A2-250-10M-V1
NCN20-F35-A2-250-20M-V1
NCN25-F35-A2-250-15M-V1
NCN25-F35-A2-250-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NBB3-V3-Z4-3G-3D
Rated operating distance	3 mm
Installation	flush
Switching element function	DC NO
Operating voltage	5 ... 60 V DC
Reverse polarity protection	✔
Switching frequency	0 ... 2000 Hz
Operating current	4 ... 100 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 130 mm

Use in the Hazardous Area	
Use in the hazardous area	see instruction manuals
Category	3G; 3D

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

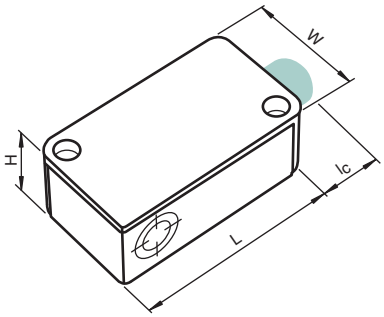
Dimensions	
Length L [mm]	27.8
Width W [mm]	16
Height H [mm]	10
Connector area l_c [mm]	0

Properties

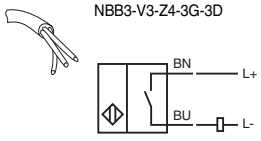
- Miniature V3 housing
- 3 mm, flush mountable
- DC, 2-wire switching output
- Cable version

Your Benefit

- ATEX approval for use in zone 2/ zone 22



Electrical Connection



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 130 mm



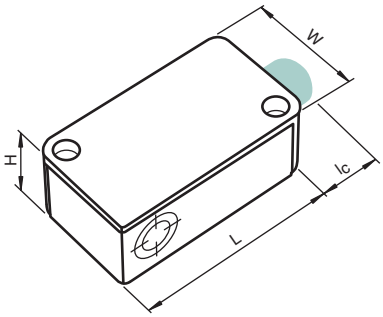
Model Number	green = preferred type	NBB2-V3-E2-3G-3D	NBB2-V3-E3-3G-3D	NBN4-V3-E2-3G-3D
Rated operating distance	2 mm	●	●	
	4 mm			●
Installation	flush	●	●	
	non-flush			●
Switching element function	PNP NO	●		●
	PNP NC		●	
Switching frequency	0 ... 1000 Hz	●	●	
	0 ... 500 Hz			●
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	3G; 3D	●	●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			27.8	
Width W [mm]			16	
Height H [mm]			10	
Connector area l_c [mm]			0	

Properties

- Miniature V3 housing
- 2 mm, flush and 4 mm non-flush mountable versions
- DC, 3-wire switching output
- Cable version

Your Benefit

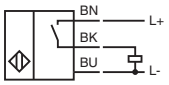
- ATEX approval for use in zone 2 / zone 22



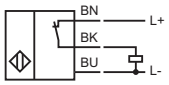
Electrical Connection



NBB2-V3-E2-3G-3D
NBN4-V3-E2-3G-3D



NBB2-V3-E3-3G-3D



Date of issue: 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type		NBB20-L2-E2-V1-3G-3D	NBB20-L2-A2-V1-3G-3D	NBN40-L2-E2-V1-3G-3D	NBN40-L2-A2-V1-3G-3D
Rated operating distance	20 mm		●	●		
	40 mm				●	●
Installation	flush		●	●		
	non-flush				●	●
Switching element function	PNP	NO/NC		●		●
	PNP	NO	●		●	
Switching frequency	0 ... 100 Hz				●	●
	0 ... 150 Hz		●	●		
Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals		●	●	●	●
Category	3G; 3D		●	●	●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

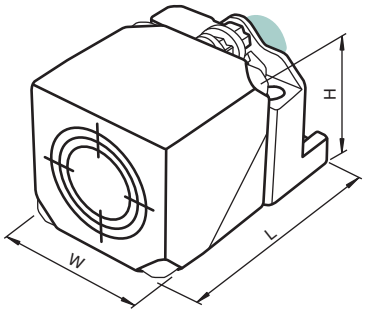
Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40
Connector area l_c [mm]	0

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- DC, 3-wire and 4-wire switching output versions
- Connector version

Your Benefit

- ATEX approval for use in zone 2/ zone 22
- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Rotatable connector allows all orientations of the attached cordset
- Mounting base with quick clamping lever for swift mounting



Accessories

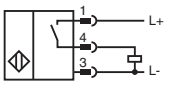
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*

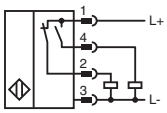
Electrical Connection

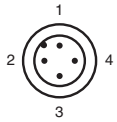


NBB20-L2-E2-V1-3G-3D
NBN40-L2-E2-V1-3G-3D



NBB20-L2-A2-V1-3G-3D
NBN40-L2-A2-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Switching element function	PNP NO	
Operating voltage	10 ... 30 V DC	
No-load supply current	≤ 20 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 150 Hz	
Operating current	0 ... 200 mA	
Short-circuit protection	pulsing	
Operating voltage display	LED, green	
Indication of the switching state	LED, yellow	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)	
Housing material	PA/metal	
Protection degree	IP68 / IP69K	
Connection type	screw terminals	



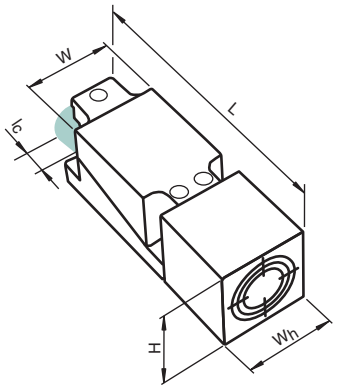
Model Number		NBB20-U1K-E2-3G-3D	NBN40-U1K-E2-3G-3D
	green = preferred type		
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	3G; 3D	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		118	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0 (M20 x 1.5)	

Properties

- **Flexible *VariKont* housing**
- **20 mm, flush and 40 mm non-flush mountable versions**
- **DC, 3-wire switching output**
- **Terminal compartment**

Your Benefit

- **ATEX approval for use in zone 2/ zone 22**
- **All-around visible status display**
- **Sensor head can be aligned in 5 different positions**



Accessories

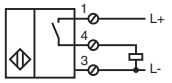
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MHW 01	Modular mounting bracket

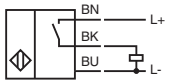
Electrical Connection



NBB20-U1K-E2-3G-3D



NBN40-U1K-E2-3G-3D



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 80 Hz
Operating current	0 ... 200 mA
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT housing / PBT base

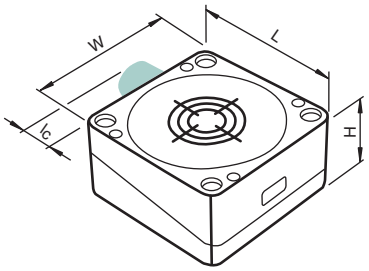
Model Number		NCB40-FP-A2-P1-3G-3D	NCB50-FP-A2-P1-3G-3D	NCN50-FP-A2-P1-3G-3D	NCB50-FP-E2-P1-V1-3G-3D
Rated operating distance	40 mm	●			
	50 mm		●	●	●
Installation	flush	●	●		●
	non-flush			●	
Switching element function	PNP NO				●
	PNP NO/NC	●	●	●	
Protection degree	IP67		●	●	●
	IP68	●			
Connection type	Device connector M12 x 1 , 4-pin				●
	screw terminals	●	●	●	
					
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	3G; 3D	●	●	●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●
Dimensions					
Length L [mm]		80	84	80	84
Width W [mm]		80	84	80	84
Height H [mm]		40			
Connector area l_c [mm]		11 (M20 x 1.5)			25

Properties

- **Flat pack housing**
- **40 mm and 50 mm, flush and non-flush mountable versions**
- **DC, 3-wire and 4-wire switching output versions**
- **Terminal compartment and connector versions**

Your Benefit

- **ATEX approval for use in zone 2/ zone 22**



Accessories

This and more accessories can be found in chapter 10

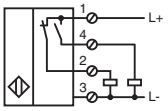
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

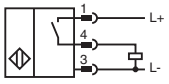


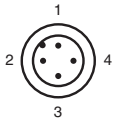
NCB40-FP-A2-P1-3G-3D
NCB50-FP-A2-P1-3G-3D
NCN50-FP-A2-P1-3G-3D





NCB50-FP-E2-P1-V1-3G-3D





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NJ2-V3-N	NCB2-V3-N0	NCN4-V3-N0	NJ2-V3-N-V5	NCB2-V3-N0-V5	NCN4-V3-N0-V5
	green = preferred type						
Rated operating distance	2 mm	●	●		●	●	
	4 mm			●			●
Installation	flush	●	●		●	●	
	non-flush			●			●
Switching frequency	0 ... 1000 Hz	●			●		
	0 ... 2000 Hz		●	●		●	●
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●			●		
Indication of the switching state	LED, yellow		●	●		●	●
Connection type	4.8 mm Faston				●	●	●
	cable PVC , 130 mm	●	●	●			

Use in the Hazardous Area							
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●
Category	1G; 2G; 1D	●	●	●	●	●	●

Approvals and Certificates							
Control drawing	116-0165F	●	●	●			
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

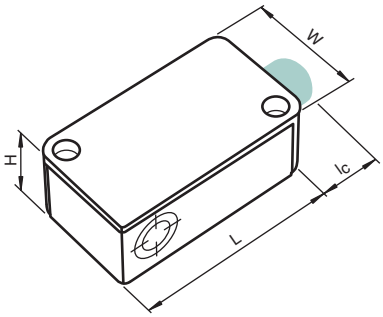
Dimensions			
Length L [mm]	27.8		
Width W [mm]	16		
Height H [mm]	10		
Connector area l_c [mm]	0	9.2	

Properties

- Miniature V3 housing
- 2 mm, flush and 4 mm non-flush mountable versions
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

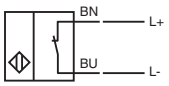
- Usable up to SIL 2 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20



Electrical Connection

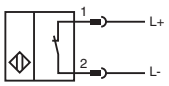


NCB2-V3-N0
NCN4-V3-N0
NJ2-V3-N





NCB2-V3-N0-V5
NCN4-V3-N0-V5
NJ2-V3-N-V5



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 500 Hz
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NCN15-M1K-N0	NCN15-M1K-N0-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	screw terminals	●	

Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	●

Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions			
Length L [mm]		91	
Width W [mm]		30	
Height H [mm]		30	
Connector area l_c [mm]		0 (M16 X 1.5)	25

Properties

- **Compact and flexible *VariKont*-M housing**
- **15 mm, non-flush mountable**
- **DC, NAMUR interface**
- **Terminal compartment and connector versions**

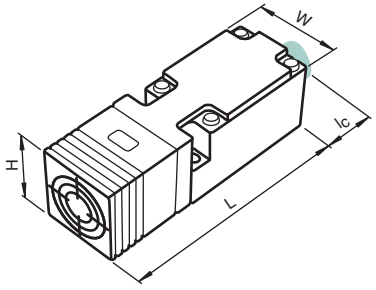
Your Benefit

- **ATEX approval up to zone 0 / zone 20**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

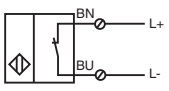
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable



Electrical Connection

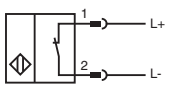


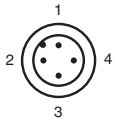
NCN15-M1K-N0





NCN15-M1K-N0-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 2.2 mA
Measuring plate detected	≤ 1 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NCB20-L2-N0-V1	NCN40-L2-N0-V1
	green = preferred type		
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Switching frequency	0 ... 150 Hz		●
	0 ... 300 Hz	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 3G; 3D	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		67	
Width W [mm]		40	
Height H [mm]		40	
Connector area I_c [mm]		0	

Properties

- **Flexible *VariKont*-L housing**
- **20 mm, flush and 40 mm, non-flush mountable versions**
- **DC, NAMUR interface**
- **Connector version**

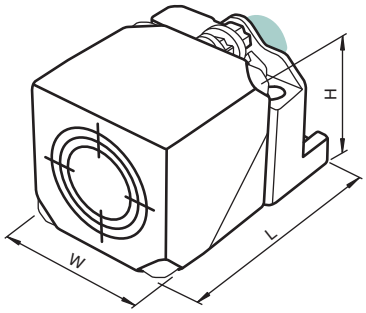
Your Benefit

- **ATEX approval up to zone 0 / zone 20**
- **Rotatable connector allows all orientations of the attached cordset**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

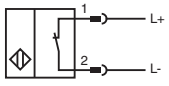
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
MHW 01	Modular mounting bracket

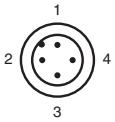


Electrical Connection



NCB20-L2-N0-V1
NCN40-L2-N0-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Connection type	screw terminals



Model Number		NJ20+U1+N	NJ20+U4+N	NBB20-U1K-N0	NBB20-U4K-N0	NBN40-U1K-N0	NBN40-U2K-N0	NBN40-U4K-N0
	green = preferred type							
Rated operating distance	20 mm	●	●	●	●			
	40 mm					●	●	●
Installation	flush			●	●			
	non-flush	●	●			●	●	●
Current consumption								
Measuring plate not detected	≥ 2.2 mA			●	●	●	●	●
	≥ 3 mA	●	●					
Measuring plate detected	≤ 1 mA	●	●	●	●	●	●	●
Switching frequency	0 ... 100 Hz							
	0 ... 150 Hz	●	●			●	●	●
	0 ... 300 Hz			●	●			
Indication of the switching state	LED, yellow			●	●	●	●	●
Housing material	plastic housing / plastic base	●		●		●	●	
	plastic housing / metal base		●		●			●
Protection degree	IP68	●	●					
	IP68 / IP69K			●	●	●	●	●
Use in the Hazardous Area								
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●
Category	1G; 2G; 1D	●	●					
	1G; 2G; 3G			●	●	●	●	●
	2G							
Approvals and Certificates								
Control drawing	116-0165F	●	●					
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]		118						
Width W [mm]		40						
Height H [mm]		40						
Connector area l_c [mm]	1) M20 x 1.5 thread 2) 1/2" NPT thread	0[1]	0[2]	0[1]	0[2]	0[1]	0[1]	0[2]

Properties

- **Flexible *VariKont* housing**
- **Up to 40 mm, flush and non-flush mountable versions**
- **DC, NAMUR interface**
- **Terminal compartment**

Your Benefit

- **ATEX approval up to zone 0 / zone 20**

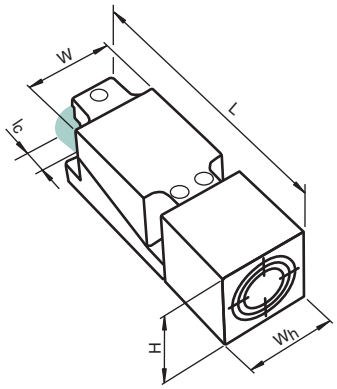
Further Products

In this series, we offer additionally:

NJ40+U1+N
NJ40+U2+N
NJ40+U4+N



Technical data like NJ20+U1+N but:
asymmetric head 55 mm x 55 mm
Rated operating distance: 40 mm
Housing base:
PBT with M20 thread (NJ40+U1+N)
PBT with 1/2" NPT thread (NJ40+U2+N)
metal with 1/2" NPT thread (NJ40+U4+N)



Accessories

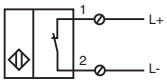
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

MHW 01	Modular mounting bracket
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
MH 04-2057B	Mounting aid for VariKont and +U1+

Electrical Connection



NBB20-U1K-N0
NBN40-U1K-N0
NBB20-U4K-N0
NBN40-U4K-N0
NJ20+U1+N
NJ20+U4+N
NJ40+U1+N
NJ40+U4+N
NBN40-U2K-N0



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Housing material	PBT/metal
Protection degree	IP67

Model Number		NJ50-FP-N-P4	NCB40-FP-N0-P4	NCN50-FP-N0-P4	NCN50-FP-N0-P4-V1
Rated operating distance	40 mm		●		
	50 mm	●		●	●
Installation	flush		●		
	non-flush	●		●	●
Switching frequency	0 ... 100 Hz	●			
	0 ... 80 Hz		●	●	●
Indication of the switching state	LED, yellow		●	●	●
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●	●	●
	-25 ... 70 °C (-13 ... 158 °F)	●			
Connection type	Device connector M12 x 1 , 4-pin				●
	screw terminals	●	●	●	
					
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	1G; 2G; 1D	●	●	●	●
Approvals and Certificates					
Control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	80
Width W [mm]	80
Height H [mm]	40
Connector area l_c [mm]	25

Properties

- **Flat pack housing**
- **40 mm, flush and 50 mm, non-flush mountable versions**
- **DC, NAMUR interface**
- **Terminal compartment and connector versions**

Your Benefit

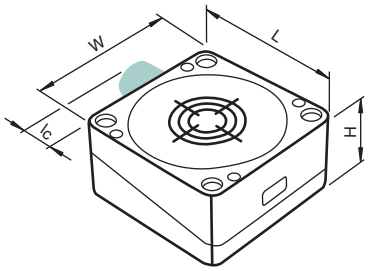
- **ATEX approval up to zone 0 / zone 20**

Further Products

In this series, we offer additionally:

NCB40-FP-N0-P1

Technical data like NCB40-FP-N0-P4 but:
Housing base: PBT



Accessories

This and more accessories can be found in chapter 10

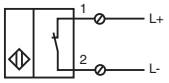
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

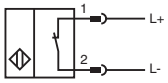


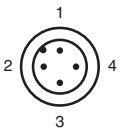
NCB40-FP-N0-P4
NCN50-FP-N0-P4
NJ50-FP-N-P4





NCN50-FP-N0-P4-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 150 Hz
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)
Protection degree	IP68
Connection type	screw terminals



Model Number		NJ15S+U1+N	NJ20S+U1+N	NJ15S+U4+N	NJ20S+U4+N
Rated operating distance	15 mm	●		●	
	20 mm		●		●
Installation	flush	●		●	
	non-flush		●		●
Housing material	PBT housing / PBT base	●	●		
	PBT housing / metal base			●	●
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	1G; 2G; 1D	●	●	●	●
Approvals and Certificates					
Control drawing	116-0165F			●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	118	
Width W [mm]	40	
Height H [mm]	40	
Connector area l_c [mm]	0 (M20 x 1.5)	0 (1/2" NPT)

Properties

- Flexible *VariKont* housing
- 15 mm, flush and 20 mm, non-flush mountable versions
- DC, NAMUR safety interface
- Terminal compartment

Your Benefit

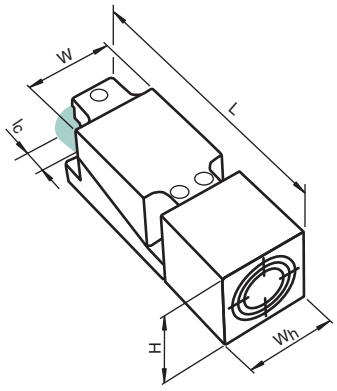
- Usable up to SIL 3 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20

Further Products

In this series, we offer additionally:

NJ6S1+U1+N1

for non-ferrous metals only.
Technical data:
Rated operating distance: 6 mm
Installation: flush in mild steel
Switching element function: NAMUR, NO
Current consumption
Measuring plate not detected: ≤ 1 mA
Measuring plate detected: ≥ 3 mA
Target object: aluminium plate



Accessories

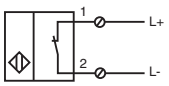
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MHW 01	Modular mounting bracket
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
MH 04-2057B	Mounting aid for VariKont and +U1+

Electrical Connection

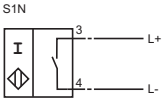


NJ15S+U1+N
NJ15S+U4+N
NJ20S+U1+N
NJ20S+U4+N



NJ6S1+U1+N1

S1N



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data			
Rated operating distance	40 mm		
Installation	non-flush		
Switching element function	NAMUR, NC		
Type of voltage	DC		
Nominal voltage	8.2 V (R_i approx. 1 kΩ)		
Current consumption			
Measuring plate not detected	≥ 3 mA		
Measuring plate detected	≤ 1 mA		
Switching frequency	0 ... 100 Hz		
Ambient temperature	-40 ... 100 °C (-40 ... 212 °F)		
Protection degree	IP68		
Connection type	screw terminals		



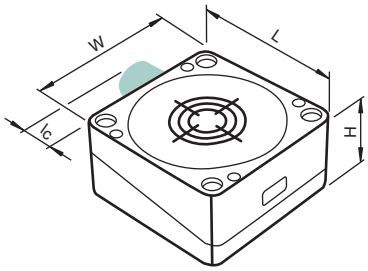
Model Number		NJ40-FP-SN-P1	NJ40-FP-SN-P4
Housing material	PBT housing / PBT base	●	
	PBT housing / metal base		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	2G; 1D	●	●
Approvals and Certificates			
Control drawing	116-0165F		●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		80	
Width W [mm]		80	
Height H [mm]		40	
Connector area l_c [mm]		11 (M20 x 1.5)	

Properties

- Flat pack housing
- 40 mm, non-flush mountable
- DC, NAMUR safety interface
- Terminal compartment

Your Benefit

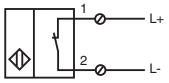
- Usable up to SIL 3 acc. to IEC 61508
- ATEX approval up to zone 1 / zone 20



Electrical Connection



NJ40-FP-SN-P4
NJ40-FP-SN-P1



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Switching element function	NO/NC programmable
Slave type	A/B slave
AS-Interface specification	V3.0
Required master specification	≥ V2.1
Operating voltage	26.5 ... 31.9 V via AS-i bus system
Reverse polarity protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Fault indication	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA
Protection degree	IP69K
Connection type	Device connector M12 x 1 , 4-pin



Model Number		NBB20-L2-B3B-V1	NBN40-L2-B3B-V1
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
No-load supply current	≤ 25 mA		●
	≤ 40 mA	●	
Switching frequency	0 ... 150 Hz	●	
	0 ... 50 Hz		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		67	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0	

Properties

- Flexible *VariKont*-L housing
- 20 mm, flush and 40 mm non-flush mountable versions
- AS interface
- Connector version

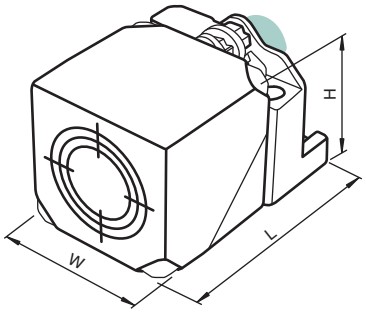
Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions
- Mounting base with quick clamping lever for swift mounting
- Rotatable connector allows all orientations of the attached cordset

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

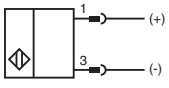
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
MHW 01	Modular mounting bracket
MH 02-L	Mounting aid

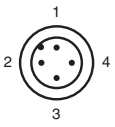


Electrical Connection



NBB20-L2-B3B-V1
NBN40-L2-B3B-V1





Date of issue 04/08/2015



Properties

- Flexible *VariKont* housing
- 20 mm, flush and 40 mm non-flush mountable versions
- AS interface
- Terminal compartment

Your Benefit

- All-around visible status display
- Sensor head can be aligned in 5 different positions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NO/NC programmable
Slave type	A/B slave
AS-Interface specification	V3.0
Required master specification	≥ V2.1
Operating voltage	26.5 ... 31.9 V via AS-i bus system
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Fault indication	LED, red
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PA/metal with epoxy powder coating
Housing base	plastic
Protection degree	IP68 / IP69K
Connection type	screw terminals

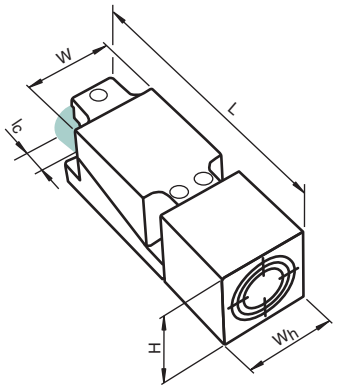


Model Number		NBB20-U1-B3B	NBN40-U1-B3B
Rated operating distance	20 mm	●	
	40 mm		●
Installation	flush	●	
	non-flush		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		118	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0 (M20 x 1.5)	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

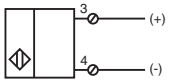
V1-M20-80	Receptacles, M12/M20; plastic version
MHW 01	Modular mounting bracket



Electrical Connection

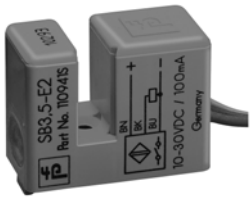


NBB20-U1-B3B
NBN40-U1-B3B



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Properties

- 3.5 mm slot width
- Very fast response
- DC, 3-wire and 4-wire switching output versions
- Flexible leads and cable versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

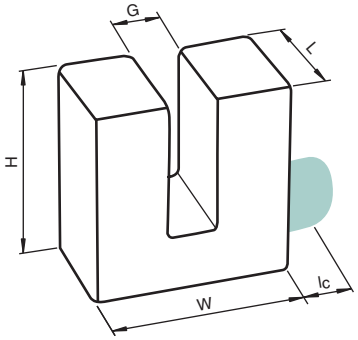
General Data	
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Housing material	PBT
Protection degree	IP67

Model Number	green = preferred type	SB3,5-E2	SB3,5-G-E2	SB3,5-A2
Switching element function	PNP NO/NC			●
	PNP NO	●	●	
Switching frequency	0 ... 2000 Hz	●	●	
	0 ... 3000 Hz			●
Indication of the switching state	LED, yellow	●	●	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●	
	-25 ... 85 °C (-13 ... 185 °F)			●
Connection type	cable PVC , 500 mm			●
	flexible leads LIY , 500 mm	●		
	flexible leads PVC , 135 mm		●	



Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

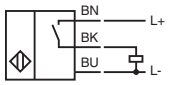
Dimensions	
Length L [mm]	10
Width W [mm]	19
Height H [mm]	15
Slot width G [mm]	3.5
Connector area l_c [mm]	0



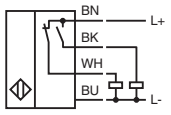
Electrical Connection



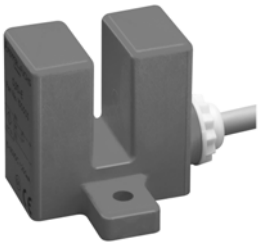
SB3,5-E2
SB3,5-G-E2



SB3,5-A2



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

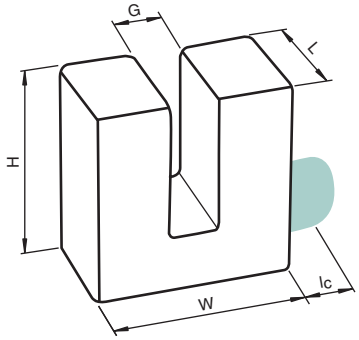
General Data	
Slot width	10 mm
Depth of immersion (lateral)	13.5 ... 16.5 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 1000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number			SJ10-E	SJ10-E2	SJ10-E3
Switching element function	NPN	NO	●		
	PNP	NO		●	
	PNP	NC			●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]				25	
Width W [mm]				44	
Height H [mm]				45	
Slot width G [mm]				10	
Connector area l_c [mm]				6 (PG9)	

Properties

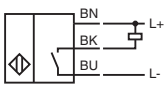
- 10 mm slot width
- Very fast response
- DC, 3-wire switching output
- Cable version



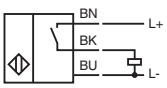
Electrical Connection



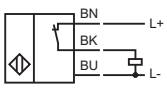
SJ10-E



SJ10-E2



SJ10-E3



Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	15 mm
Depth of immersion (lateral)	17 ... 20 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number			SJ15-E	SJ15-E2	SJ15-A	SJ15-A2	SJ15-A2-V1
Switching element function	NPN	NO/NC			●		
	NPN	NO	●				
	PNP	NO/NC				●	●
	PNP	NO		●			
Connection type	Device connector M12 x 1 , 4-pin						●
	cable PVC , 2 m		●	●	●	●	





Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions					
Length L [mm]	30				
Width W [mm]	48				
Height H [mm]	60				
Slot width G [mm]	15				
Connector area l_c [mm]	0				12

Accessories

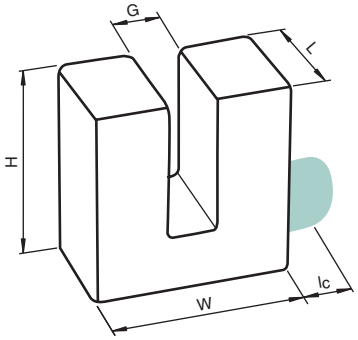
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

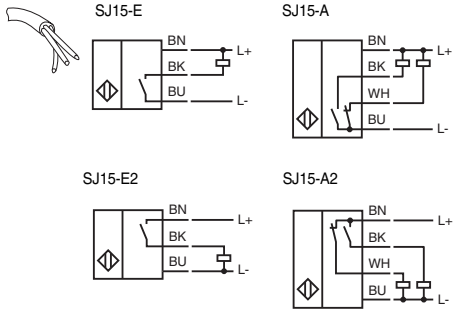
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

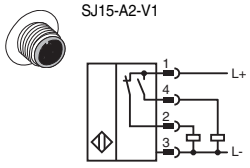
Properties

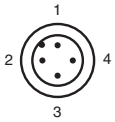
- **15 mm slot width**
- **Fast response**
- **DC, 3-wire and 4-wire switching output versions**
- **Cable and connector versions**



Electrical Connection







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	30 mm
Depth of immersion (lateral)	27 ... 31 mm
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 150 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	ABS
Protection degree	IP67

Model Number			SJ30-A	SJ30-A2	SJ30-A0-V1
Switching element function	NPN	NO/NC	●		●
	PNP	NO/NC		●	
Operating voltage	10 ... 30 V DC		●	●	
	10 ... 65 V DC				●
Connection type	Device connector M12 x 1 , 4-pin				●
	cable PVC , 2 m		●	●	

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	

Dimensions			
Length L [mm]		51	
Width W [mm]		84	
Height H [mm]		110	
Slot width G [mm]		30	
Connector area l_c [mm]		35 (PG13.5)	22

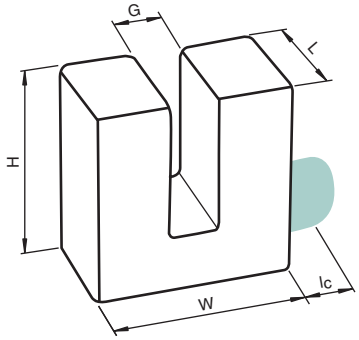
Properties

- **30 mm slot width**
- **Fast response**
- **DC, 4-wire switching output**
- **Cable and connector versions**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

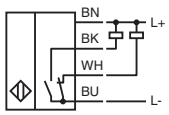
V1-G-BK	4-pin, M12 female field-attachable connector
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V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



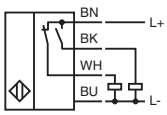
Electrical Connection



SJ30-A

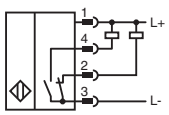


SJ30-A2





SJ30-A0-V1



Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

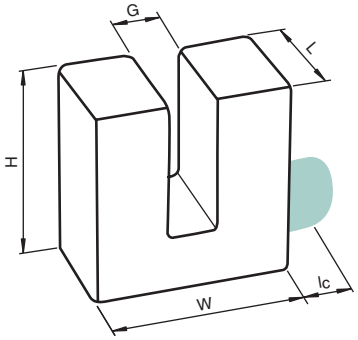
General Data	
Slot width	15 mm
Depth of immersion (lateral)	18.5 ... 20.5 mm
Operating voltage	20 ... 253 V AC
Switching frequency	0 ... 25 Hz
Operating current	10 ... 500 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	PBT
Connection type	cable PVC , 2 m



Model Number			SJ15-WO	SJ15-WS
Switching element function	AC	NO		●
	AC	NC	●	
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●
Dimensions				
Length L [mm]			30	
Width W [mm]			48	
Height H [mm]			60	
Slot width G [mm]			15	
Connector area l_c [mm]			0	

Properties

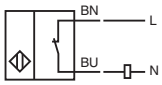
- **15 mm slot width**
- **Fast response**
- **AC, 2-wire switching output**
- **Cable version**



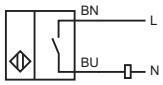
Electrical Connection



SJ15-WO



SJ15-WS



Date of issue 04/08/2015



Properties

- 2 mm slot width
- Extrardinary fast response
- DC, 2-wire NAMUR
- Flexible leads version

Your Benefit

- Usable up to SIL 2 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	2 mm
Switching element function	NAMUR, NC
Depth of immersion (lateral)	5 ... 7 mm , typ. 6 mm
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Operating voltage	5 ... 25 V
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 5000 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

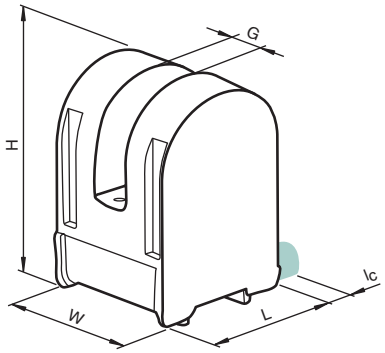
Model Number	green = preferred type	SJ2-N	SC2-N0-GN
Suitable for 2:1 technology	✔ , Reverse polarity protection diode not required	●	
Indication of the switching state	LED, yellow		●
Connection type	cable PVC , 500 mm		●
	flexible leads LIFYW , 500 mm	●	



Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	
	1G; 2G; 3G; 1D		●

Approvals and Certificates			
Control drawing	116-0165F	●	
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

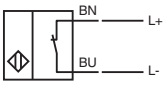
Dimensions		
Length L [mm]	8	15
Width W [mm]	8	
Height H [mm]	12	
Slot width G [mm]	2	
Connector area l_c [mm]	0	



Electrical Connection

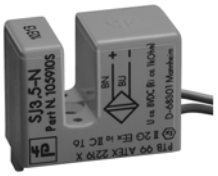


SC2-N0-GN
SJ2-N



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Properties

- 3.5 mm slot width
- Very fast response
- DC, 2-wire NAMUR
- Flexible leads version

Your Benefit

- Usable up to SIL 2 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

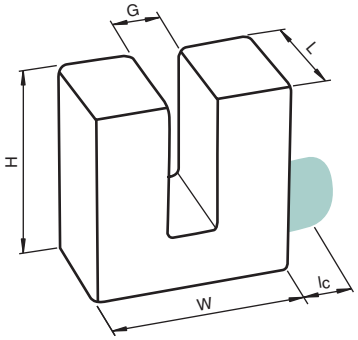
General Data	
Slot width	3.5 mm
Switching element function	NAMUR, NC
Depth of immersion (lateral)	5 ... 7 mm , typ. 6 mm
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Operating voltage	5 ... 25 V
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 3000 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Protection degree	IP67

Model Number	green = preferred type	SJ3,5-N	SJ3,5-G-N	SJ3,5-N LED	SC3,5-G-N0	SC3,5-N0-GN	SC3,5-N0-BU
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●	●		●	●	●
	✔, with reverse polarity protection diode			●			
Switching hysteresis	0.11 ... 0.2 mm					●	
	0.21 ... 0.4 mm						●
Indication of the switching state	LED, yellow			●	●	●	●
Housing material	PBT		●	●	●	●	●
	PBT/PPS	●					
Connection type	flexible leads LIY , 500 mm	●	●	●			
	flexible leads PVC , 135 mm				●		
	flexible leads PVC , 500 mm					●	●

Use in the Hazardous Area							
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●
Category	1G; 2G; 1D	●	●			●	●
	1G; 2G; 3G; 1D				●		
	2G			●			

Approvals and Certificates							
Control drawing	116-0165F	●					
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

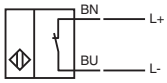
Dimensions							
Length L [mm]				10			
Width W [mm]		19				19.5	
Height H [mm]				15			
Slot width G [mm]				3.5			
Connector area l_c [mm]				0			



Electrical Connection



SC3,5-G-N0
SC3,5-N0-GN
SC3,5-N0-BU
SJ3,5-G-N
SJ3,5-N
SJ3,5-N LED



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	5 mm
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Operating voltage	5 ... 25 V
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 2000 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

Model Number		SJ5-N	SJ5-G-N	SJ5-K-N
Depth of immersion (lateral)	5 ... 7 mm , typ. 6 mm	●	●	
	8 ... 10 mm , typ. 9 mm			●
Connection type	cable PVC , 2 m			●
	flexible leads LIY , 500 mm	●	●	

Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	1G; 2G; 1D	●	●	●

Approvals and Certificates				
Control drawing	116-0165F	●		●
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

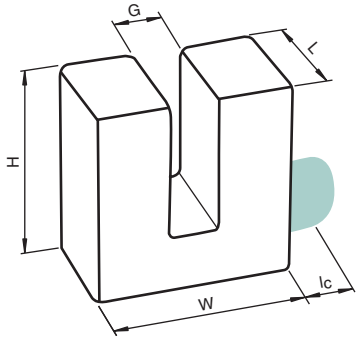
Dimensions			
Length L [mm]	10		15
Width W [mm]	15		29
Height H [mm]	15		31
Slot width G [mm]		5	
Connector area l_c [mm]		0	

Properties

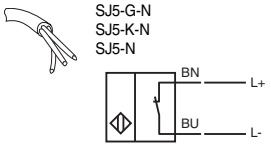
- 5 mm slot width
- Very fast response
- DC, 2-wire NAMUR
- Flexible leads and cable versions

Your Benefit

- Usable up to SIL 2 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20



Electrical Connection



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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0102

Properties

- 10, 15 and 30 mm slot width versions
- Fast response
- DC, 2-wire NAMUR
- Cable version

Your Benefit

- Usable up to SIL 2 acc. to IEC 61508
- ATEX approval up to zone 0 / zone 20

Technical Data

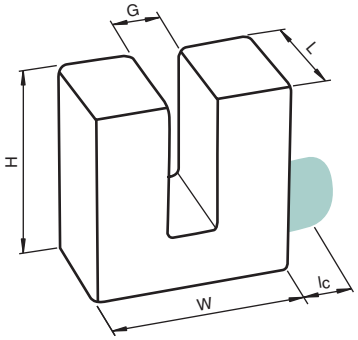
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Operating voltage	5 ... 25 V
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		SJ10-N	SJ15-N	SJ30-N
Slot width	10 mm	●		
	15 mm		●	
	30 mm			●
Depth of immersion (lateral)	13.5 ... 16.5 mm , typ. 15 mm	●		
	16 ... 19 mm , typ. 17.5 mm		●	
	27 ... 30 mm			●
Switching frequency	0 ... 1000 Hz	●	●	
	0 ... 150 Hz			●
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)	●		
	-25 ... 70 °C (-13 ... 158 °F)		●	●
Housing material	ABS			●
	PBT	●	●	
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	1G; 2G; 1D	●	●	●
Approvals and Certificates				
Control drawing	116-0165F	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

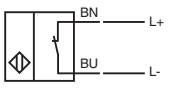
Dimensions			
Length L [mm]	25	30	51
Width W [mm]	44	48	84
Height H [mm]	45	60	110
Slot width G [mm]	10	15	30
Connector area l_c [mm]	6 (PG9)	0	35 (PG13.5)



Electrical Connection



SJ10-N
SJ15-N
SJ30-N



Date of issue 04/08/2015



Properties

- 2 mm slot width
- Extrardinary fast response
- DC, 2-wire NAMUR
- Flexible leads version

Your Benefit

- EX approval 1G/1D for use up to zone 0 / zone 20
- Applicable up to SIL3 acc. to IEC 61508

Technical Data

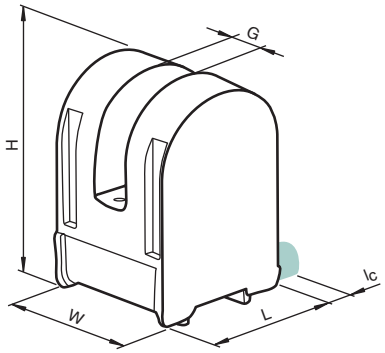
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	2 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Type of voltage	DC
Nominal voltage	8 V
Switching frequency	0 ... 5000 Hz
Suitable for 2:1 technology	✔, with reverse polarity protection diode
Housing material	PBT
Protection degree	IP67
Connection type	flexible leads LIFYW , 500 mm



Model Number	green = preferred type	SJ2-SN	SJ2-S1N
Switching element function	NAMUR, NO		●
	NAMUR, NC	●	
Current consumption			
Measuring plate not detected	≥ 3 mA	●	
	≤ 1 mA		●
Measuring plate detected	≥ 3 mA		●
	≤ 1 mA	●	
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●
	-40 ... 100 °C (-40 ... 212 °F)	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 3G; 1D	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

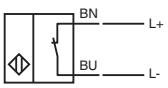
Dimensions	
Length L [mm]	15
Width W [mm]	8
Height H [mm]	12
Slot width G [mm]	2
Connector area l_c [mm]	0



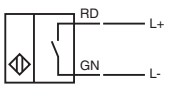
Electrical Connection



SJ2-SN

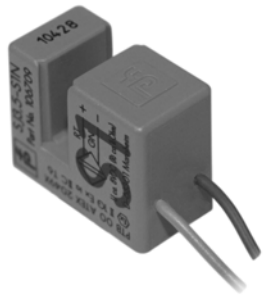


SJ2-S1N



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slot width	3.5 mm
Depth of immersion (lateral)	5 ... 7 typ. 6 mm
Type of voltage	DC
Nominal voltage	8 V
Suitable for 2:1 technology	✔, with reverse polarity protection diode
Housing material	PBT
Protection degree	IP67
Connection type	flexible leads LIY , 500 mm



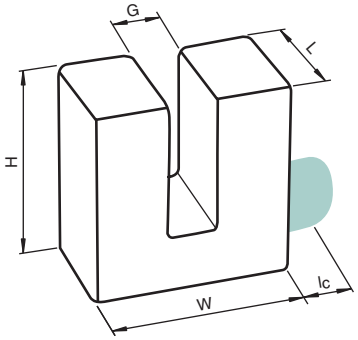
Model Number	green = preferred type	SJ3,5-SN	SJ3,5-S1N
Switching element function	NAMUR, NO		●
	NAMUR, NC	●	
Current consumption			
Measuring plate not detected	≥ 3 mA	●	
	≤ 1 mA		●
Measuring plate detected	≥ 3 mA		●
	≤ 1 mA	●	
Switching frequency	0 ... 2500 Hz		●
	0 ... 3000 Hz	●	
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)		●
	-50 ... 100 °C (-58 ... 212 °F)	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 3G; 1D	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		10	
Width W [mm]		19	
Height H [mm]		15	
Slot width G [mm]		3.5	
Connector area l_c [mm]		0	

Properties

- 3.5 mm slot width
- Very fast response
- DC, 2-wire NAMUR
- Flexible leads version

Your Benefit

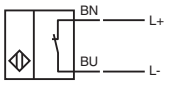
- EX approval 1G/1D for use up to zone 0 / zone 20
- Applicable up to SIL3 acc. to IEC 61508



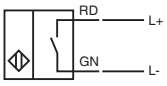
Electrical Connection



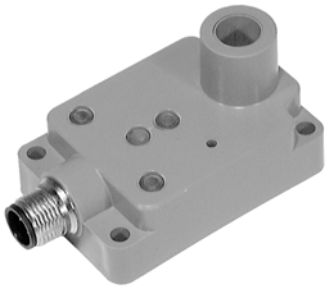
SJ3,5-SN



SJ3,5-S1N



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	PNP NO
Operating voltage	12 ... 30 V DC
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 5 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Housing material	PA 66
Protection degree	IP65
Connection type	Device connector M12 x 1 , 4-pin



Model Number		RC10-E2-C-V1	RC20-E2-C-V1
Inside diameter	10 mm	●	
	20 mm		●
Dimensions			
Length L [mm]		60	
Width W [mm]		40	
Height H [mm]		34	
Inside diameter D [mm]		10 mm	20 mm
Connector area l_c [mm]		11	

Properties

- Ø10 mm and Ø20 mm inside diameter versions
- Weld immune
- DC, 3-wire switching output
- Connector version

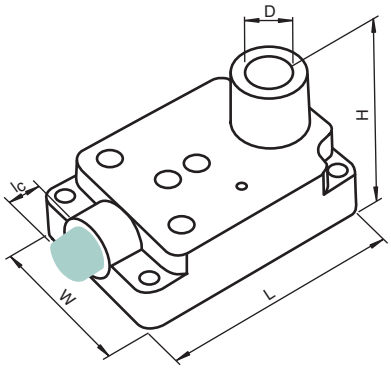
Your Benefit

- Sensor for checking bolt holders and collets
- Easily programmable for optimum trip point

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

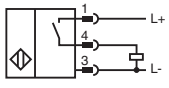
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

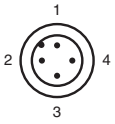


Electrical Connection



RC10-E2-C-V1
RC20-E2-C-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

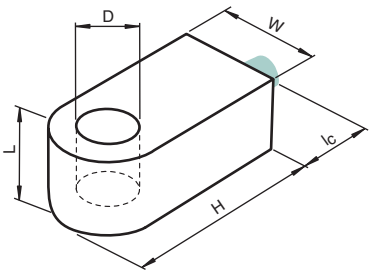
General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number			RJ21-E	RJ43-E	RJ21-E2	RJ43-E2
Inside diameter	21 mm		●		●	
	43 mm			●		●
Switching element function	NPN	NO	●	●		
	PNP	NO			●	●
Measuring cylinder						
Diameter	6 mm		●		●	
	9 mm			●		●
Length	12 mm		●		●	
	18 mm			●		●
Switching frequency	0 ... 1000 Hz		●		●	
	0 ... 500 Hz			●		●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
Dimensions						
Length L [mm]			20			
Width W [mm]			45	70	45	70
Height H [mm]			80	100	80	100
Inside diameter D [mm]			21	43	21	43
Connector area l_c [mm]			0			

Properties

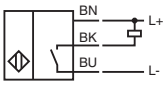
- Ø21 mm and Ø43 mm inside diameter versions
- 6 mm / 9 mm minimum target diameter
- Mild steel targets
- Very fast response
- DC, 3-wire switching output



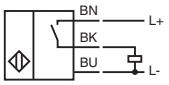
Electrical Connection



RJ21-E
RJ43-E



RJ21-E2
RJ43-E2



Date of issue 04/08/2015



Properties

- Up to Ø43 mm inside diameter versions
- 3 mm / 6 mm / 9 mm minimum target diameter
- 9S20K targets
- Very fast response
- DC, NAMUR interface

Your Benefit

- EX approved sensor applicable up to zone 1

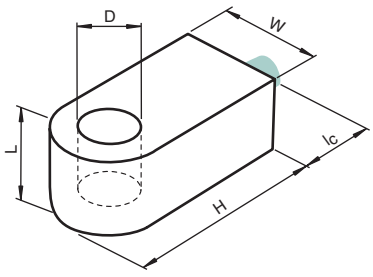
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Measuring cylinder	9S20K
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



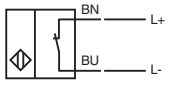
Model Number		RJ15-14-N	RJ15-N	RJ21-N	RJ43-N
Inside diameter	15 mm	●	●		
	21 mm			●	
	43 mm				●
Measuring cylinder	9S20K	●	●	●	●
Diameter	3 mm	●	●		
	6 mm			●	
	9 mm				●
Length	6 mm	●			
	4 mm		●		
	12 mm			●	
	18 mm				●
Switching frequency	0 ... 1000 Hz			●	
	0 ... 1500 Hz	●	●		
	0 ... 500 Hz				●
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	2G	●	●	●	●
Approvals and Certificates					
Control drawing	116-0165F		●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]		20			
Width W [mm]		25	29	45	70
Height H [mm]		32.5	45	80	100
Inside diameter D [mm]		15		21	43
Connector area l_c [mm]		0			



Electrical Connection



RJ15-14-N
RJ15-N
RJ21-N
RJ43-N



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



0102

Properties

- Ø10 mm and Ø15 mm inside diameter versions
- 2.5 mm / 3 mm minimum target diameter
- 9S20K targets
- Very fast response
- DC, NAMUR interface

Your Benefit

- EX approved sensor applicable up to zone 1

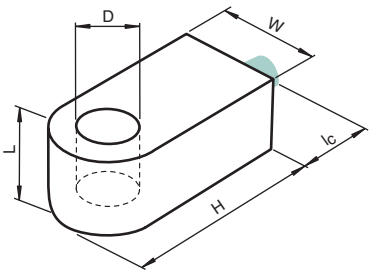
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Ambient temperature	-20 ... 65 °C (-4 ... 149 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



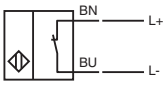
Model Number		RC10-14-N0	RC15-14-N0
Inside diameter	10 mm	●	
	15 mm		●
Measuring cylinder	9S20K	●	●
Diameter	2.5 mm	●	
	3 mm		●
Length	4 mm	●	●
Switching frequency	0 ... 1500 Hz		●
	0 ... 2000 Hz	●	
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	2G	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		20	
Width W [mm]		25	
Height H [mm]		32.5	
Inside diameter D [mm]		10	15
Connector area l_c [mm]		0	



Electrical Connection



RC10-14-N0
RC15-14-N0



Date of issue 04/08/2015



Properties

- Ø10 mm and Ø15 mm inside diameter versions
- 2.5 mm / 3 mm minimum target diameter
- Ferrous targets
- Very fast response
- DC, bistable NAMUR interface

Your Benefit

- Direction detection due to bistable switching behavior
- EX approved sensor applicable up to zone 1

Technical Data

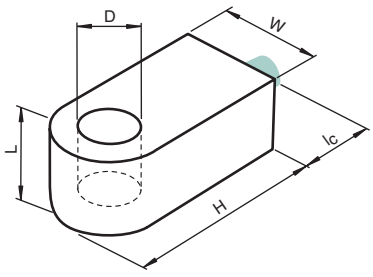
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Switching element function	NAMUR, bistable
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Traverse B	3 mA
Traverse A	1 mA
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		RC10-14-N3	RC15-14-N3
Inside diameter	10 mm	●	
	15 mm		●
Measuring cylinder	ferrous metal	●	●
Diameter	2.5 mm	●	
	3 mm		●
Length	3 mm	●	
	4 mm		●
Passage speed	≤ 10 m/s		●
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)	●	
	-20 ... 70 °C (-4 ... 158 °F)		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	2G	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●

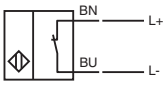
Dimensions		
Length L [mm]	20	
Width W [mm]	25	
Height H [mm]	32.5	
Inside diameter D [mm]	10	15
Connector area l_c [mm]	0	



Electrical Connection



RC10-14-N3
RC15-14-N3



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	Dual (NO)
Installation	flush mountable
Operating voltage	6 ... 60 V DC
Reverse polarity protection	tolerant
Switching frequency	0 ... 500 Hz
Operating current	4 ... 100 mA
Off-state current	0 ... 1 mA, typically 0.7 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

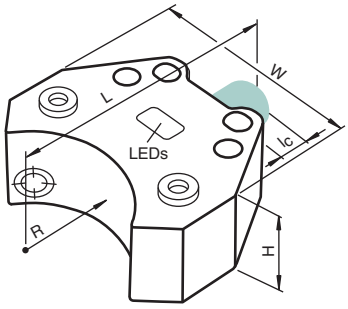
Model Number		NBN3-F25-Z8-0,14	NBN3-F25-Z8-5M	NBN3-F25-Z8-V1	NBN3-F25F-Z8-V1
Installation type	compact design for installation in housing and flange installation				●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 180 mm	●			
	cable PVC , 5 m		●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)			●	
Dimensions					
Length L [mm]		52	52	61	62
Width W [mm]		52	52	52	52
Height H [mm]		20	20	20	20
Radius R [mm]		20.8	20.8	20.8	20.8
Connector area l_c [mm]		0	0	12	18

Properties

- F25 housing
- 3 mm, flush mountable
- DC, dual 2-wire switching output
- Cable and connector versions

Your Benefit

- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80



Accessories

This and more accessories can be found in chapter 10

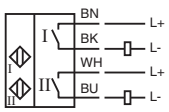
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT32	Activator for F25 series
BT32XS	Activator for F25 series
BT32XAS	Activator for F25 series
BT33	Activator for F25 series
BT34	Activator for F25 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

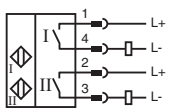


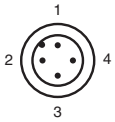
NBN3-F25-Z8-5M
NBN3-F25-Z8-0,14





NBN3-F25-Z8-V1
NBN3-F25F-Z8-V1

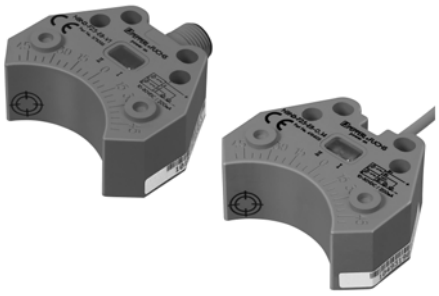




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	PNP Dual NO
Installation	flush mountable
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	all connections
Switching frequency	0 ... 500 Hz
Operating current	0 ... 200 mA
Off-state current	0 ... 0.5 mA, typically 0.1 µA at 25 °C
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Protection degree	IP67
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT

Model Number		NBN3-F25-E8-0,14	NBN3-F25-E8-5M	NBN3-F25-E8-V1	NBN3-F25F-E8-V1
	green = preferred type				
Installation type	compact design for installation in housing and flange installation				●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 180 mm	●			
	cable PVC , 5 m		●		
	MINI-COMBICON				
					
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	52	61	62	
Width W [mm]	52			
Height H [mm]	20			
Radius R [mm]	20.8			
Connector area l_c [mm]	0	12	18	

Properties

- **F25 housing**
- **3 mm, flush mountable**
- **DC, dual 3-wire switching output**
- **Cable and connector versions**

Your Benefit

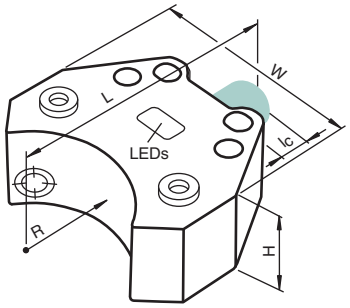
- **Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80**

Further Products

In this series, we offer additionally:

NBN3-F25-E8-K
Technical data like NBN3-F25-E8-5M but:
Protection degree: IP20
Connection type: MINI-COMBICON





Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

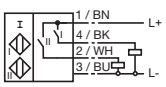
BT32	Activator for F25 series
BT32XS	Activator for F25 series
BT32XAS	Activator for F25 series
BT33	Activator for F25 series
BT34	Activator for F25 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

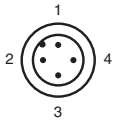
Electrical Connection



NBN3-F25-E8-K
NBN3-F25-E8-0,14
NBN3-F25-E8-5M
NBN3-F25-E8-V1
NBN3-F25F-E8-V1

E8





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	Dual (NO)
Installation	flush mountable
Operating voltage	6 ... 60 V DC
Reverse polarity protection	tolerant
Switching frequency	0 ... 500 Hz
Operating current	4 ... 100 mA
Off-state current	0 ... 1 mA, typically 0.7 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

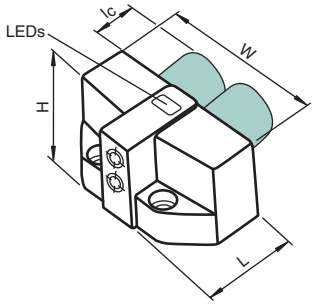
Model Number		NBN3-F31-Z8-K	NBN3-F31-Z8-K-K	NBN3-F31-Z8-V1	NBN3-F31-Z8-V18	NBN3-F31-Z8-V16-V15	NBN3-F31-Z8-V16-V16
Valve status indication	LED, yellow					●	●
Connection type	Device connector M18 x 1 , 4-pin				●		
Connection (system side)	connector M12 x 1, 4-pin			●			
	connector Rd24 x 1/8 , 4-pin					●	●
	PVC cable 5 m	●	●				
Connection (valve side)	5-pin, M12 x 1 socket					●	
	PVC cable 0.5 m		●				
	connector Rd24 x 1/8 , 4-pin						●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●	●		
Dimensions							
Length L [mm]		36					
Width W [mm]		65					
Height H [mm]		33.5					
Connector area l_c [mm]		28		10	18	28	

Properties

- F31 housing
- 3 mm, flush mountable
- DC, dual 2-wire switching output
- Cable and connector versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



Accessories

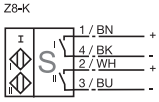
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V18-G	Cable socket in M18 format, ready for make up
V16-G	Cable socket, dia. 24, 6-pin+PE, easy to assemble
V18-W	Cable socket in M18 format, ready for make up
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly

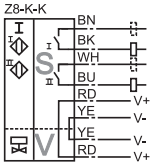
Electrical Connection



NBN3-F31-Z8-K

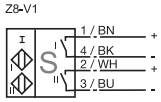


NBN3-F31-Z8-K-K

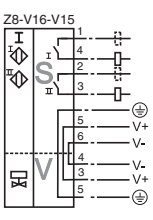




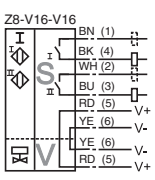
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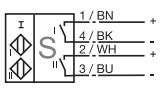
NBN3-F31-Z8-V15

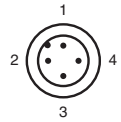


NBN3-F31-Z8-V16-V16



NBN3-F31-Z8-V18

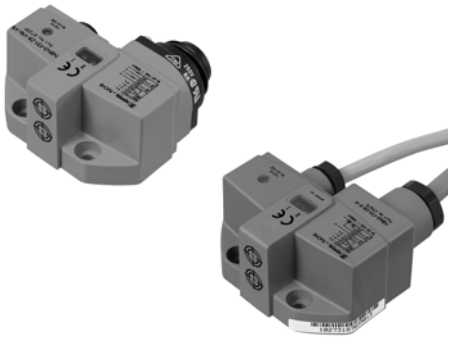




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	PNP Dual NO
Installation	flush mountable
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	all connections
Switching frequency	0 ... 500 Hz
Operating current	0 ... 100 mA
Off-state current	0 ... 0.5 mA, typically 0.1 µA at 25 °C
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number	green = preferred type	NBN3-F31-E8-K	NBN3-F31-E8-K-K	NBN3-F31-E8-V1	NBN3-F31-E8-V16-V15	NBN3-F31-E8-V18
Valve status indication	LED, yellow		●			
Connection type	Device connector M12 x 1 , 4-pin			●		
	Device connector M18 x 1 , 4-pin					●
Connection (system side)	Device connector Rd24 x 1/8 , 4-pin			●	●	
	PVC cable 5 m	●	●			
Connection (valve side)	5-pin, M12 x 1 socket			●	●	
	PVC cable 0.5 m		●			

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

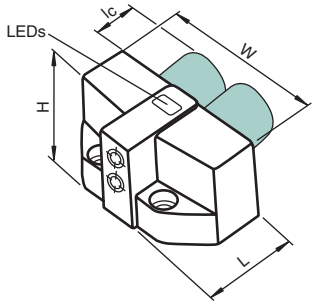
Dimensions					
Length L [mm]	36				
Width W [mm]	65				
Height H [mm]	33.5				
Connector area l_c [mm]	28	10	28	18	

Properties

- F31 housing
- 3 mm, flush mountable
- DC, dual 3-wire switching output
- Cable and connector versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



Accessories

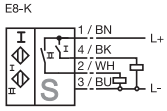
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V18-G	Cable socket in M18 format, ready for make up
V16-G	Cable socket, dia. 24, 6-pin+PE, easy to assemble
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly

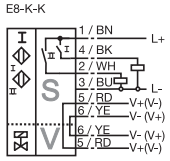
Electrical Connection



NBN3-F31-E8-K

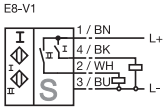


NBN3-F31-E8-K-K

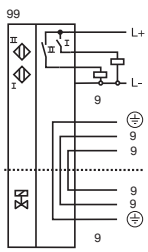




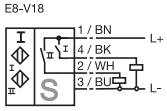
NBN3-F31-E8-V1

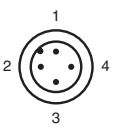


NBN3-F31-E8-V16-V15



NBN3-F31-E8-V18





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	AC/DC binary NO
Installation	flush mountable
Operating voltage	20 ... 253 V AC/DC
Reverse polarity protection	✔
Switching frequency	25 Hz
Operating current	4 ... 400 mA
Off-state current	≤ 1.7 mA
Short-circuit protection	✔
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

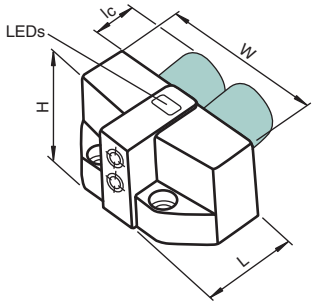
Model Number		NBN3-F31-U8-K	NBN3-F31-U8-V125	NBN3-F31-U8-V18
Connection type	Device connector 1/2"-20 UN		●	
	Device connector M18 x 1 , 4-pin			●
	cable PVC , 5 m	●		
				
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
Dimensions				
Length L [mm]			36	
Width W [mm]			65	
Height H [mm]			33.5	
Connector area l_c [mm]		28	10	18

Properties

- F31 housing
- 3 mm, flush mountable
- AC/DC, dual 2-wire switching output
- Cable and connector versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



Accessories

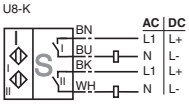
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
V18-G	Cable socket in M18 format, ready for make up
V125-G-YE2M-PVC	Cable socket, M12, 5-pin, PVC cable
V18-W	Cable socket in M18 format, ready for make up
V125-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 5-pin, PVC cable

Electrical Connection

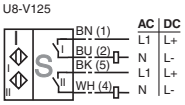


NBN3-F31-U8-K

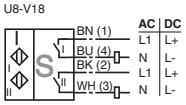


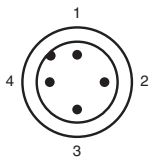


NBN3-F31-U8-V125



NBN3-F31-U8-V18





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

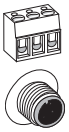
Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	DC binary NO
Installation	flush mountable
Reverse polarity protection	tolerant
Switching frequency	0 ... 500 Hz
Operating current	4 ... 100 mA
Off-state current	0 ... 1 mA, typically 0.7 mA
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NBN3-F31K-Z8	NBN3-F31K-Z8-K	NBN3-F31K-Z8-V1-V1
Operating voltage	10 ... 30 V DC			●
	6 ... 60 V DC	●	●	
No-load supply current	≤ 25 mA			●
Short-circuit protection	pulsing			●
Operating voltage display	LED, green			●
Valve status indication	LED, yellow		●	●
Connection (system side)	Cage tension spring terminals	●	●	●
Connection (valve side)	4-pin, M12 x 1 socket			●
	Cage tension spring terminals		●	
				

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

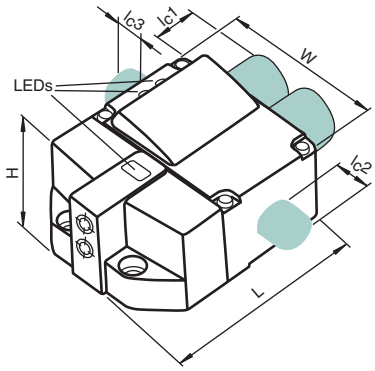
Dimensions			
Length L [mm]	77.5		
Width W [mm]	65		
Height H [mm]	35		
Connector area l_c1 [mm]	10		
Connector area l_c2 [mm]	-	10	
Connector area l_c3 [mm]		-	10

Properties

- F31K housing
- 3 mm, flush mountable
- DC, dual 2-wire switching output
- Terminal compartment
- Connector and cable gland versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

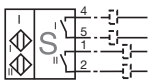
BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
VMA-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, Form A on M12, 2+PE, LED, Z diode, PVC cable
VMB-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, Form B on M12, 2+PE, LED, Z diode, PUR cable
VMC-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, model C on M12, 2 + PE, LED, zener diode, PVC cable
VMCI-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, model C (ind) on M12, 2 + PE, LED, zener diode, PVC cable

Electrical Connection

NBN3-F31K-Z8

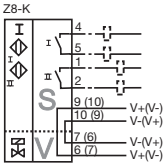


Z8

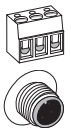


NBN3-F31K-Z8-K

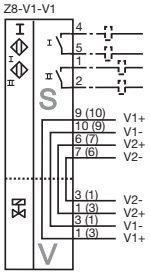
Z8-K

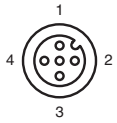


NBN3-F31K-Z8-V1-V1



Z8-V1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Switching element function	PNP Dual NO
Installation	flush mountable
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 500 Hz
Operating current	0 ... 100 mA
Off-state current	0 ... 0.5 mA, typically 0.1 µA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NBN3-F31K-E8	NBN3-F31K-E8-K	NBN3-F31K-E8-V1-V1
	green = preferred type			
Valve status indication	LED, yellow		●	●
Connection (system side)	Cage tension spring terminals	●	●	●
Connection (valve side)	4-pin, M12 x 1 socket			●
	Cage tension spring terminals		●	

Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

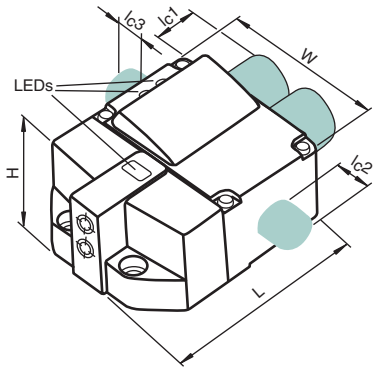
Dimensions			
Length L [mm]	77.5		
Width W [mm]	65		
Height H [mm]	35		
Connector area l_c1 [mm]	10		
Connector area l_c2 [mm]	-	10	
Connector area l_c3 [mm]	-		10

Properties

- F31K housing
- 3 mm, flush mountable
- DC, dual 3-wire switching output
- Terminal compartment
- Connector and cable gland versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



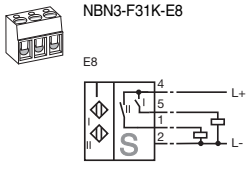
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

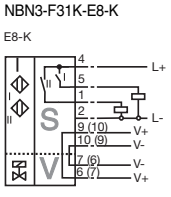
BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
VMA-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, Form A on M12, 2+PE, LED, Z diode, PVC cable
VMB-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, Form B on M12, 2+PE, LED, Z diode, PUR cable
VMC-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, model C on M12, 2 + PE, LED, zener diode, PVC cable
VMCI-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, model C (ind) on M12, 2 + PE, LED, zener diode, PVC cable
VMBI-2+P/Z2-0,3M-PVC-V1-W-Y	Valve connector, Form B (Ind) on M12, 2+PE, LED, Z-Diode, PVC cable

Electrical Connection

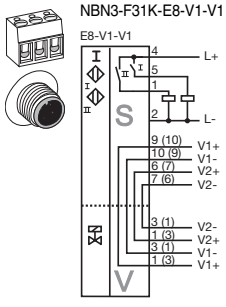
NBN3-F31K-E8

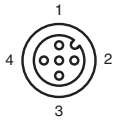


NBN3-F31K-E8-K



NBN3-F31K-E8-V1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2.5 mm
Installation	flush mountable
Switching element function	PNP Dual NO
Operating voltage	10 ... 30 VDC
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 100 mA
Off-state current	0 ... 0.5 mA typ. 0.1 µA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Valve status indication	LED, yellow
Ambient temperature	-40 ... 75 °C (-40 ... 167 °F)
Housing material	PC
Protection degree	IP66 / IP67 / IP69K
Connection (system side)	screw terminal



Model Number		NBN3-F31K2-E8-B13-S	NBN3-F31K2M-E8-B13-S	NBN3-F31K2M-E8-B23-S	NBN3-F31K2-E8-B33-S
Housing base	aluminum		●	●	
	PC	●			●
Thread for cable gland	1/2" - 14 NPT			●	
	M20 x 1.5	●	●		●
Connection (valve side)	4-pin, M12 x 1 socket				●



Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

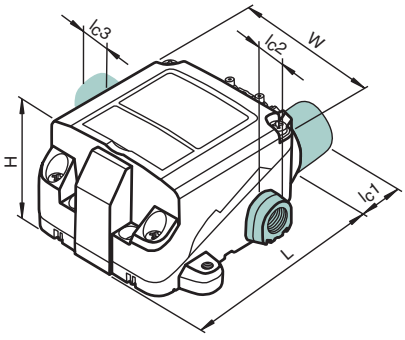
Dimensions					
Length L [mm]	106				
Width W [mm]	100				
Height H [mm]	53				
Connector area l_c1 [mm]	depends on the cable gland being used				
Connector area l_c2 [mm]	-	-	-	15	
Connector area l_c3 [mm]	-	-	-	15	

Properties

- F31K2 housing
- 3 mm, flush mountable
- DC, dual 3-wire switching output
- Terminal compartment
- Versions with connectors for valve control

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130
- Tight sealing and temperature resistance



Accessories

This and more accessories can be found in chapter 10

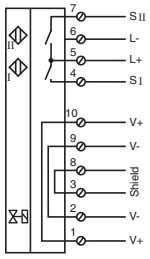
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
BT65-F31K2-RG-EN	Activator for F31K2 series

Electrical Connection



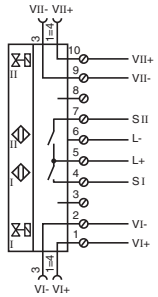
NBN3-F31K2-E8-B13-S
NBN3-F31K2M-E8-B13-S
NBN3-F31K2M-E8-B23-S





NBN3-F31K2-E8-B33-S





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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	programmable
Operating voltage	26.5 ... 31.9 V via AS-i bus system
Switching frequency	0 ... 100 Hz
LED PWR	AS-Interface voltage; LED green
LED IN	switching state (input); LED yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection (system side)	connector M12 x 1, 4-pin

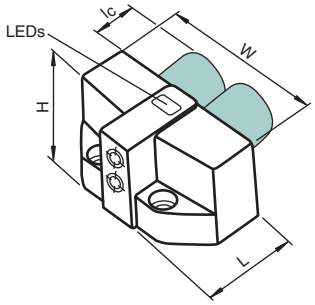
Model Number		NCN3-F31-B3B-V1	NCN3-F31-B3B-V1-K	NCN3-F31-B3B-V1-V1
LED OUT	binary LED yellow/red yellow: switching state red: lead breakage/short-circuit		●	●
Connection (valve side)	0.5 m, PVC cable		●	
	socket connector , M12 x 1 , 4-pin			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			36	
Width W [mm]			65	
Height H [mm]			33.5	
Connector area l_c [mm]		10	12	15

Properties

- F31 housing
- 3 mm, flush mountable
- AS interface
- Cable and connector versions

Your Benefit

- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130



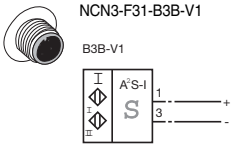
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

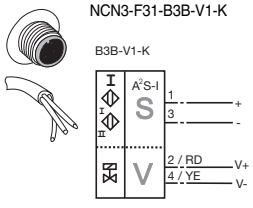
BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-BK	4-pin, M12 female field-attachable connector

Electrical Connection

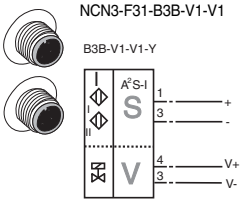
NCN3-F31-B3B-V1

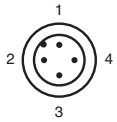


NCN3-F31-B3B-V1-K



NCN3-F31-B3B-V1-V1





Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	NCN3-F31K-B3B-B31
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	programmable
Operating voltage	26.5 ... 31.9 V via AS-i bus system
Switching frequency	0 ... 100 Hz
LED PWR	AS-Interface voltage; LED green
LED IN	switching state (input); LED yellow
LED OUT	binary LED yellow/red yellow: switching state red: lead breakage/short-circuit
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection (system side)	screw terminals
Connection (valve side)	screw terminals



Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	77.5
Width W [mm]	65
Height H [mm]	35
Connector area l_c1 [mm]	10
Connector area l_c2 [mm]	10

Properties

- **F31K housing**
- **3 mm, flush mountable**
- **AS interface**
- **Terminal compartment**

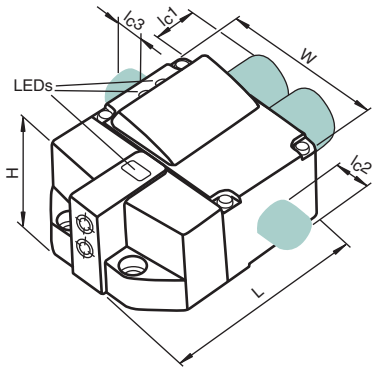
Your Benefit

- **LED indicators for switching state and valve output**
- **Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series
BT65B	Activator for F31 series
BT115B	Activator for F31 series

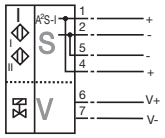


Electrical Connection



NCN3-F31K-B3B-B31

B3B-V1-K



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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	DC Dual NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Reverse polarity protection	✔
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 1500 Hz
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

Model Number	green = preferred type	NCN3-F25-N4-0,14	NCN3-F25-N4-5M	NCN3-F25F-N4-V1	NCN3-F25-N4-V1
Installation type	compact design for installation in housing and flange installation				●
Connection type	Device connector M12 x 1 , 4-pin			●	●
	cable PVC , 180 mm	●			
	cable PVC , 5 m		●		
Use in the Hazardous Area					
Use in the hazardous area	see instruction manuals	●	●	●	●
Category	1G; 2G; 3G		●	●	
	1G; 2G; 3G; 3D	●			●
Approvals and Certificates					
FM control drawing	116-0165F	●	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

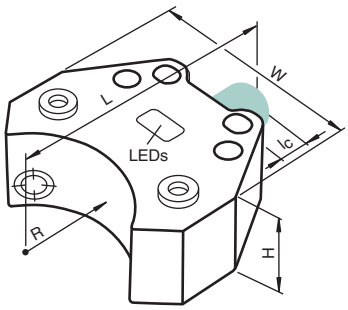
Dimensions				
Length L [mm]	52		62	61
Width W [mm]		52		
Height H [mm]		20		
Connector area l_c [mm]	0		17	9

Properties

- F25 housing
- 3 mm, flush mountable
- DC, dual NAMUR interface
- Cable and connector versions

Your Benefit

- EX approval 1G applicable up to zone 0
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80



Accessories

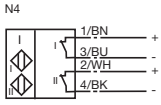
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT32	Activator for F25 series
BT32XS	Activator for F25 series
BT32XAS	Activator for F25 series
BT33	Activator for F25 series
BT34	Activator for F25 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-N4-5M-PUR	Female cordset, M12, 4-pin, NAMUR, PUR cable

Electrical Connection

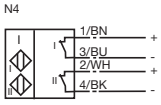


NCN3-F25-N4-0,14
NCN3-F25-N4-5M





NCN3-F25F-N4-V1
NCN3-F25-N4-V1



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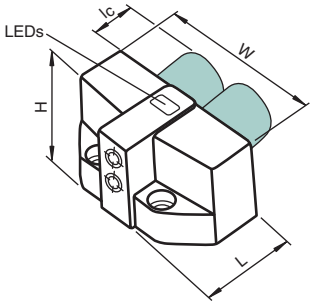


Properties

- F31 housing
- 3 mm, flush mountable
- DC, dual NAMUR interface
- Cable and connector versions

Your Benefit

- EX approval 1G applicable up to zone 0
- Usable up to SIL2 acc. to IEC 61508
- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	NAMUR, binary NC
Type of voltage	DC
Nominal voltage	8 V
Reverse polarity protection	✔
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 3 kHz
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 100 °C (-13 ... 158 °F)
Housing material	PBT

Model Number	green = preferred type	NCN3-F31-N4-K	NCN3-F31-N4-K-K	NCN3-F31-N4-V16-K	NCN3-F31-N4-V1	NCN3-F31-N4-V18	NCN3-F31-N4-V16-V16	NCN3-F31-N5-V18-V1
Valve status indication	LED, yellow		●	●			●	●
Protection degree	IP66 / IP67	●						
	IP67		●	●	●	●	●	●
Connection (system side)	Device connector M12 x 1 , 4-pin				●			
	Device connector M18 x 1 , 4-pin					●		●
	Device connector Rd24 x 1/8 , 7-pin			●			●	
	PVC cable , 5 m	●	●					
Connection (valve side)	4-pin, M12 x 1 socket							●
	socket connector Rd24 x 1/8 , 7-pin						●	
	PVC cable , 0.5 m		●	●				
Use in the Hazardous Area								
Use in the hazardous area	see instruction manuals	●	●	●	●	●	●	●
Category	1G; 2G							●
	1G; 2G; 3G	●	●	●	●	●	●	
Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]		36						
Width W [mm]		65						
Height H [mm]		33.5						
Connector area l_c [mm]		16	28	28	10	22	28	22

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

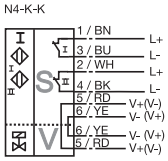
BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series

Electrical Connection

NCN3-F31-N4-K



NCN3-F31-N4-K-K



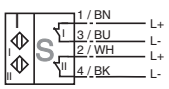
NCN3-F31-N4-V16-K



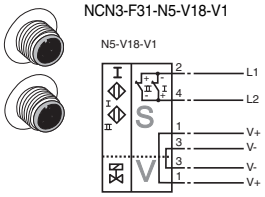
NCN3-F31-N4-V18



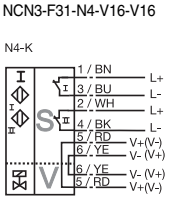
NCN3-F31-N4-V1



NCN3-F31-N5-V18-V1



NCN3-F31-N4-V16-V16



Date of issue: 04/08/2015



0102

Properties

- F31K housing
- 3 mm, flush mountable
- DC, dual NAMUR interface
- Terminal compartment and connector versions

Your Benefit

- EX approval 1G applicable up to zone 0
- Usable up to SIL2 acc. to IEC 61508
- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80 and 30 x 130

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

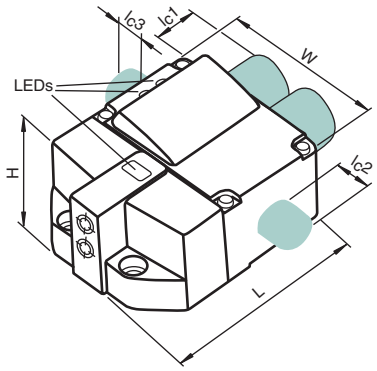
General Data	
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	DC Dual NC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Reverse polarity protection	✔
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 3 kHz
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

Model Number		NCN3-F31K-N4	NCN3-F31K-N4-K	NCN3-F31K-N4-K-S	NCN3-F31K-N4-S	NCN3-F31K-N4-V1-V1
	green = preferred type					
Suitable for 2:1 technology	✔, Reverse polarity protection diode not required	●	●			●
Valve status indication	LED, yellow		●	●		●
Connection (system side)	Cage tension spring terminals	●	●			●
	Screw terminals, tightening torque min. 0.5Nm Stripped length 7 mm			●	●	
Connection (valve side)	4-pin, M12 x 1 socket					●
	Cage tension spring terminals		●			
	like connection (system side)			●		

Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals	●	●	●	●	●
Category	1G; 2G; 3G	●	●	●	●	●

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions						
Length L [mm]				77.5		
Width W [mm]				65		
Height H [mm]				35		
Connector area l_c1 [mm]				10		
Connector area l_c2 [mm]		-	10	10	-	10
Connector area l_c3 [mm]		-	-	-	-	10



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

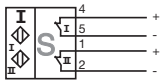
BT65A	Activator for F31 series
BT65X	Activator for F31 series
BT115A	Activator for F31 series
BT115X	Activator for F31 series

Electrical Connection

NCN3-F31K-N4
NCN3-F31K-N4-S

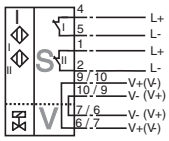


N4



NCN3-F31K-N4-K
NCN3-F31K-N4-K-S

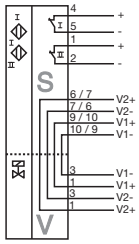
N4-K

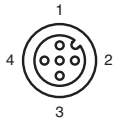


NCN3-F31K-N4-V1-V1



N4-V1-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	3 mm
Installation	flush mountable
Switching element function	DC Dual NC
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≥ 3 mA
Measuring plate detected	≤ 1 mA
Switching frequency	0 ... 1500 Hz
Ambient temperature	-25 ... 100 °C (-13 ... 212 °F)
Housing material	PBT
Protection degree	IP67

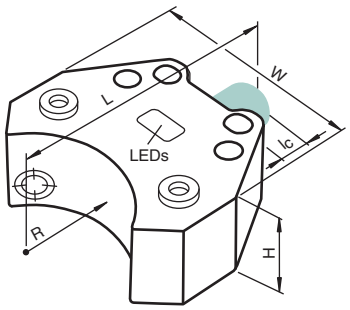
Model Number		NCN3-F25-SN4-0,14	NCN3-F25-SN4-5M	NCN3-F25-SN4-V1
Connection type	Device connector M12 x 1 , 4-pin			●
	cable PVC , 180 mm	●		
	cable PVC , 5 m		●	
				
Use in the Hazardous Area				
Use in the hazardous area	see instruction manuals	●	●	●
Category	1G; 2G; 3G	●	●	●
Approvals and Certificates				
FM control drawing	116-0165F	●	●	●
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		52	52	61
Width W [mm]			52	
Height H [mm]			20	
Connector area l_c [mm]		0	0	9

Properties

- F25 housing
- 3 mm, flush mountable
- DC, dual NAMUR safety interface
- Cable and connector versions

Your Benefit

- EX approval 1G applicable up to zone 0
- Usable up to SIL3 acc. to IEC 61508
- LED indicators for switching state and valve output
- Direct mounting without additional mounting aids on NAMUR bore holes 30 x 80



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

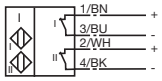
BT32	Activator for F25 series
BT32XS	Activator for F25 series
BT32XAS	Activator for F25 series
BT33	Activator for F25 series
BT34	Activator for F25 series
V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-N4-5M-PUR	Female cordset, M12, 4-pin, NAMUR, PUR cable

Electrical Connection



NCN3-F25-SN4-0,14
NCN3-F25-SN4-5M

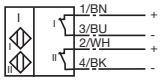
N4





NCN3-F25-SN4-V1

N4



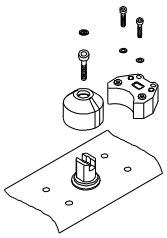
Date of issue: 04/08/2015

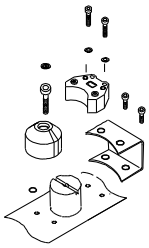
Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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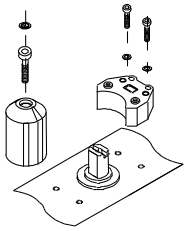
Actuator, Mounting Sets, and Brackets for Position Feedback Sensors (-F25 Series)

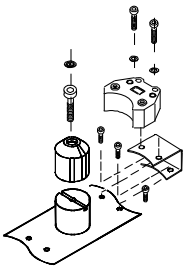
Mounting set [1]	Shaft diameter [2]	Shaft height	Mounting hole pattern	Includes: Actuator	Includes: Bracket	Fig.
BT32-F25-0	< 34 mm	20 mm	30 mm x 80 mm	BT32	–	1
BT33-F25-0	< 34 mm	30 mm	30 mm x 80 mm	BT33	–	3
BT34-F25-2	preferably > 34 mm	20/30 mm	30 mm x 80 mm	BT34	K2	2
BT34-F25-3	preferably > 34 mm	30 mm	30 mm x 130 mm	BT34	K3	4
BT34-F25-4	preferably > 34 mm	50 mm	30 mm x 130 mm	BT34	K4	5
MH5-F25-Y43089	< 34 mm	20/30 mm	30 mm x 130 mm	–	Metal plate	6
MH20-F25-Y43090	Height compensation for additionally mounted regulator			–	F25 fully encapsulated	7

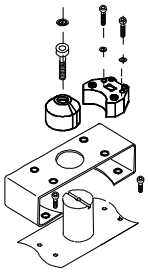
[1] Includes mounting screws for the respective double sensor
[2] If the ring is higher than 3 mm, the height of the snap ring is the determining factor rather than the shaft diameter.

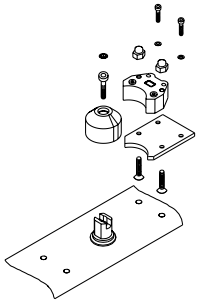

Fig. 1

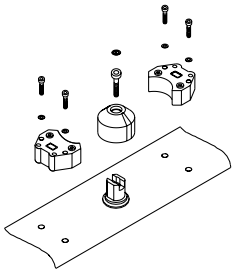

Fig. 2


Fig. 3


Fig. 4


Fig. 5


Fig. 6


Fig. 7

Individual part	Shaft diameter	Shaft height	Number of switching targets	Notes	Fig.
Actuator [3]					
BT32	≤ 34 mm	20 mm	2	Active height: 28 mm	8
BT32XS	≤ 34 mm	20 mm	1	As per BT32, with reverse-direction operation	9
BT32XAS	≤ 34 mm	20 mm	2	As per BT32, with reverse-direction operation	9
BT33	≤ 34 mm	30 mm	2	Active height: 38 mm	10
BT34	≥ 34 mm	≥ 20 mm	2	Active height: 28 mm, sitting on the drive shaft	11
BT37	≥ 34 mm	20 mm	1	Actuator BT37 with 4 mm groove for mounting on regulator	–
Bracket					
K2	–	–	–	Mounting hole pattern 30 mm x 80 mm	2

[1] Actuator without mounting screws for the respective double sensor

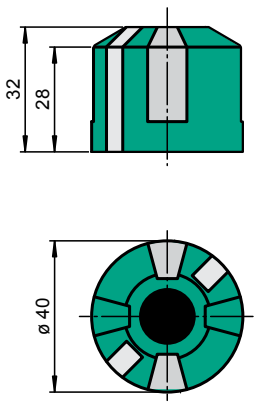


Fig. 8

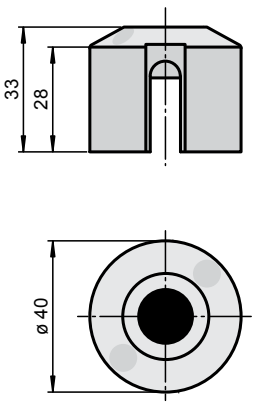


Fig. 9

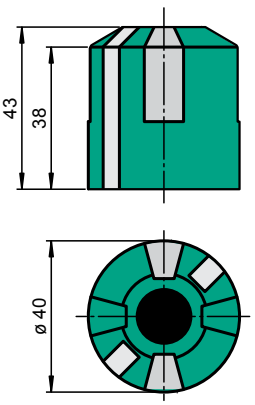


Fig. 10

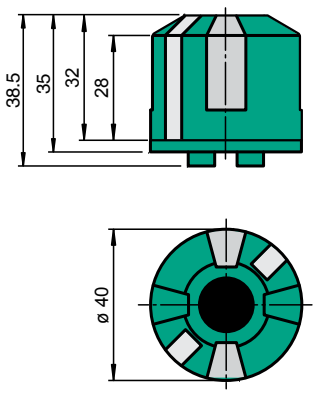


Fig. 11

Actuators for the -F31 / F31K2 Series with Fixed Switching Positions

The following actuators are made out of conductive plastic that prevents build-up of electrostatic charge and therefore can be used in hazardous areas. The sheathing surface of the BT65X and BT115X actuators is made out of stainless steel (V2A) with openings at the actuating positions. This results in an inverted operating principle.

Actuator	Drive shaft diameter	Shaft height	Mounting hole pattern	Notes	Illustration
BT65A	< 58 mm	20 mm and 30 mm	30 mm x 80 mm	Snap ring diameter max. 65 mm, Snap ring height max. 6 mm. For right and left rotating drives with 90°/180° rotation.	
BT65X					
BT115A	< 90 mm	30 mm and 50 mm	30 mm x 130 mm	Snap ring diameter max. 110 mm, Snap ring height max. 7 mm. For right and left rotating drives with 90°/180° rotation.	
BT115X					

Actuators for the -F31 / F31K2 Series with Adjustable Switching Positions

Actuator	Drive shaft diameter	Shaft height	Mounting hole pattern	Notes	Illustration
BT65B	< 58 mm	20 mm and 30 mm *)	30 mm x 80 mm	Snap ring diameter max. 65 mm, snap ring height max. 6 mm	
BT65-F31K2-RG-EN	< 49 mm	20 mm and 30 mm	30 mm x 80 mm	Adjustable in 5° steps, clearly visible colored indicators. Comes with protection hood.	
BT115B	< 90 mm	30 mm and 50 mm	30 mm x 130 mm	Snap ring diameter max. 110 mm, snap ring height max. 7 mm	

*) 30 mm using MH-BT65B mounting base

MH-BT65B Mounting Base

MH-BT65B

Adapter plate for using BT65B actuators on drives with:
hole dimension 80 mm x 30 mm
hole dimension 130 mm x 30 mm
and drive shaft height 30 mm



Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Assembly set with switch plate for mounting of inductive valve sensors on manual operated valves acc. to ISO5211-DIN3337.
The assembly set includes a 2-parts mounting bracket with switch plate, a driver stem and a lock nut.

Properties

- Simple mounting
- Conforming to standards
- Adjustable in height
- Adjustable shaft extension

Your Benefit

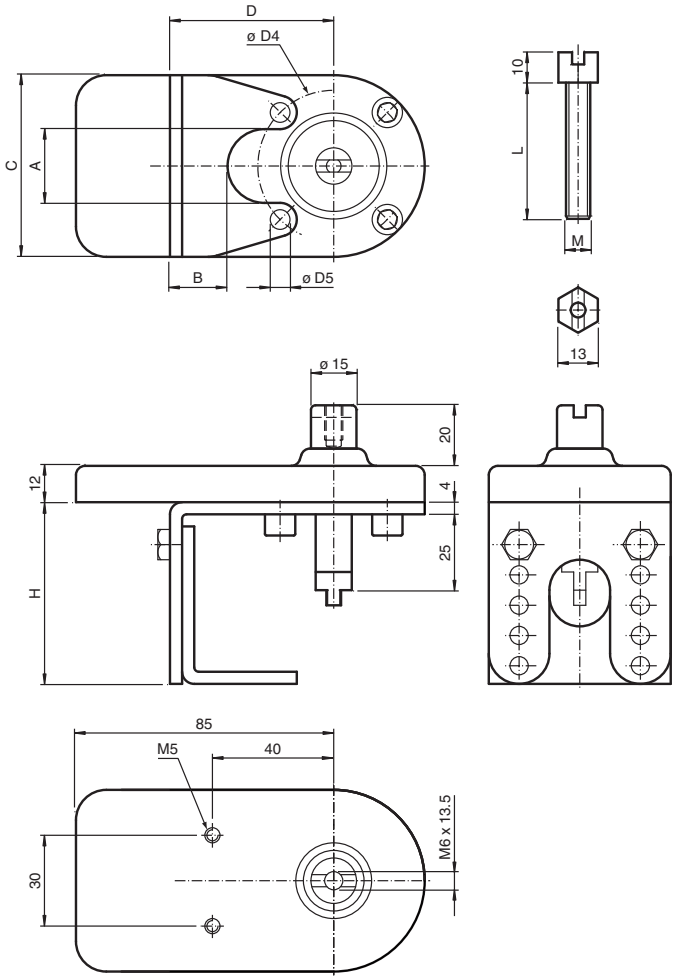
- Suitable for use in hazardous areas due to conductive material
- Sturdy holder consisting of stainless steel and Vestamid
- Easy standard installation acc. to ISO5211-DIN3337

Technical Data

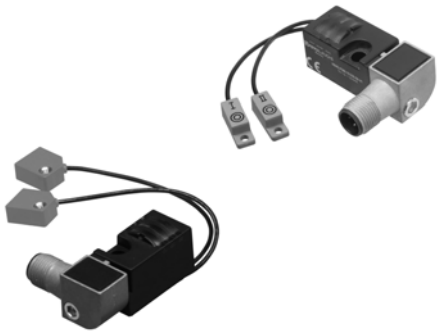
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Suitable sensors	Double sensor, -F25 series with actuator BT32... Double sensor, -F31 series with actuator BT65A Double sensor, -F31K series with actuator BT65A
Material	Mounting bracket and nut: stainless steel 1.4301 Tappet and shaft: Stainless steel 1.4305 / AISI 303 (V2A) Sensor plate: Vestamid (PA 12), conductive

Model Number		MH-BT-F03-M5	MH-BT-F04-M5	MH-BT-F04-M6	MH-BT-F05-M5	MH-BT-F05-M6	MH-BT-F07-M5	MH-BT-F07-M6	MH-BT-F07-M8	MH-BT-F10-M8	MH-BT-F10-M10	MH-BT-F10-M12	MH-BT-F12-M10
Dimensions													
A	[mm]	16	20.7	20.7	24.36	24.36	34.36	34.5	34.5	52.12	52.12	52.12	66.39
B	[mm]	20	20	20	15	15	15	15	15	15	15	15	15
C	[mm]	60	60	60	60	60	64.5	64.5	64.5	93	93	93	111
D	[mm]	54	54	54	54	54	54	54	54	74	74	74	74
Ø D4	[mm]	36	42	42	50	50	70	70	70	102	102	102	125
Ø D5	[mm]	5.3	5.3	5.3	6.5	6.5	8.5	8.5	8.5	11	11	11	13
H		60 mm / 70 mm / 80 mm / 90 mm / 100 mm, adjustable								80 mm / 90 mm / 100 mm / 110 mm / 120 mm, adjustable			
L	[mm]	25	25	50	25	50	25	50	45	45	60	50	60
M	[mm]	5	5	6	5	6	5	6	8	8	10	12	10



Date of issue 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	2 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Constant magnetic field	100 mT
Alternating magnetic field	100 mT
Operating voltage display	LED green
Indication of the switching state	switching state "close" = LED red (S2) switching state "open" = LED yellow (S1)
Housing material	amplifier; PBT, PA6 + GD-ZN AL4 oscillators; PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 4-pin



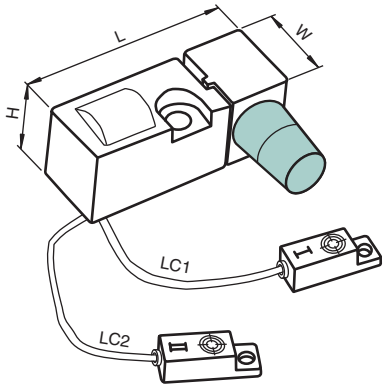
Model Number			NBN2-F581-100S16-E8-V1	NBN2-F583-100S18-E8-V1	NBN2-F581-270S15-E8-V1	NBN2-F583-100S3-E8-V1	NBN2-F581-100S6-E10-V1	NBN2-F581-60/180S6-E8-V1
Switching element function	NPN	Dual NO					●	
	PNP	Dual NO	●	●	●	●		●
No-load supply current	≤ 15 mA		●	●	●	●		●
	≤ 35 mA						●	
Switching frequency	0 ... 100 Hz		●	●	●	●		
	0 ... 25 Hz						●	●
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)						●	●
	0 ... 50 °C (32 ... 122 °F)		●	●	●	●		
Approvals and Certificates								
UL approval	cULus Listed, General Purpose		●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]			47					
Width W [mm]			18					
Height H [mm]			18					
Connector area l_c1 [mm]			100	270	100		60	
Connector area l_c2 [mm]			100	270	100		180	

Properties

- Compact F58 housing
- 2 mm, non-flush mountable
- DC, 3-wire switching outputs
- Adjustable connector version

Your Benefit

- Flexible mounting due to adjustable plug in 45° grid
- Numerous sensor types for minmal installation space



Accessories

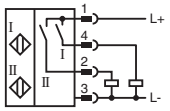
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-OR2M-POC	Female cordset, M12, 4-pin, TPE cable, welding-bead resistant
V1-G-2M-PUR H/S	Female cordset, M12, 4-pin, irradiated PUR cable
V1-W-2M-PUR H/S	Female cordset, M12, 4-pin, irradiated PUR cable

Electrical Connection

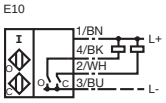


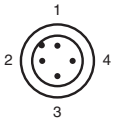
NBN2-F581-100S16-E8-V1
NBN2-F581-270S15-E8-V1
NBN2-F583-100S3-E8-V1
NBN2-F583-100S18-E8-V1
NBN2-F581-60/180S6-E8-V1



NBN2-F581-100S6-E10-V1

E10





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
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Properties

- Flexible *VariKont* housing
- 15 mm, flush mountable
- DC, 3-wire switching output
- Terminal compartment

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Switching element function	PNP NO
Operating voltage	15 ... 60 V DC
No-load supply current	≤ 25 mA
Reverse polarity protection	✔
Short-circuit protection	pulsing
Operating current	0 ... 100 mA
Indication of the switching state	LED 1: yellow
Damping indicator	LED 2: yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	screw terminals

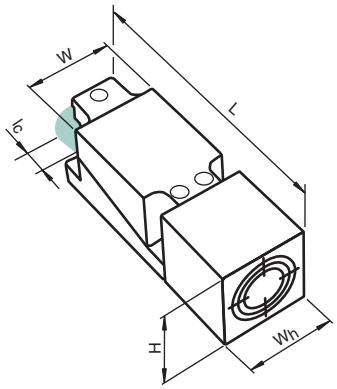


Model Number		NJ15+U1+DW1-1	NJ15+U1+DW1-10	NJ15+U1+DW1-100
Frequency range	0.1 ... 1 Hz , adjustable	●		
	1 ... 10 Hz , adjustable		●	
	10 ... 100 Hz , adjustable			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●
Dimensions				
Length L [mm]		118		
Width W [mm]		40		
Head width W_h [mm]		40		
Height H [mm]		40		
Connector area l_c [mm]		0 (M20 x 1,5)		

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

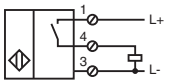
MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
V1-M20-80	Receptacles, M12/M20; plastic version
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector



Electrical Connection



NJ15+U1+DW1-1
NJ15+U1+DW1-10
NJ15+U1+DW1-100



Date of issue 04/08/2015



Properties

- Flexible *VariKont* housing
- 15 mm, flush mountable
- AC, 3-wire switching output
- Terminal compartment

Technical Data

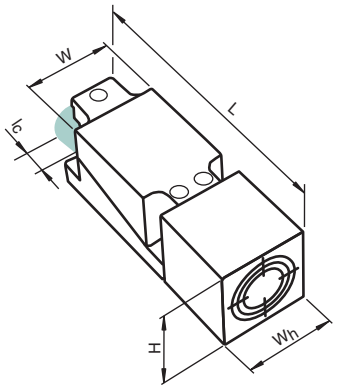
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Switching element function	NO
Operating voltage	90 ... 250 V AC [1]
Operating current	0 ... 150 mA
Indication of the switching state	LED 1: yellow
Damping indicator	LED 2: yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection type	screw terminals



Model Number		NJ15+U1+DW2-1	NJ15+U1+DW2-10	NJ15+U1+DW2-100	NJ15+U4+DW2-1	NJ15+U4+DW2-10	NJ15+U4+DW2-100
Frequency range	0.1 ... 1 Hz , adjustable	●			●		
	1 ... 10 Hz , adjustable		●			●	
	10 ... 100 Hz , adjustable			●			●
Housing material	PBT	●	●	●			
	PBT/metal				●	●	●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●			
Dimensions							
Length L [mm]		118					
Width W [mm]		40					
Head width W_h [mm]		40					
Height H [mm]		40					
Connector area l_c [mm]		0 (M20 x 1,5)			0 (1/2" NPT)		

[1] In the temperature range below 0 °C, permissible operating voltage U_b 80...253 V
Safety fuse ≤ 0.2 A (quick-blow) according to IEC 60127-2 Sheet 1
Recommendation: after a short circuit, check that the device is functioning correctly.



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MH 04-2681F	Mounting aid for VariKont, +U1+ and +U9*
V1-M20-80	Receptacles, M12/M20; plastic version
V1-G-BK	4-pin, M12 female field-attachable connector
MHW 01	Modular mounting bracket
V1-W-BK	4-pin, M12 female field-attachable connector

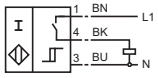
Electrical Connection

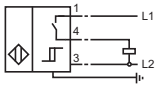


NJ15+U1+DW2-1
NJ15+U1+DW2-10
NJ15+U1+DW2-100

NJ15+U4+DW2-1
NJ15+U4+DW2-10
NJ15+U4+DW2-100

DW2





Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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SENSING YOUR NEEDS



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1 Proximity Switches

1.2 Capacitive Sensors

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Cylindrical housing				
	12 mm	**18 mm**	**30 mm**	
	• Stainless steel housing	• Housing made from stainless steel or plastic	• Housing made from plastic, nickel-plated brass, or stainless steel	
Operating distance				
Flush	4 mm	8 mm	10 mm	
Non-flush	8 mm	15 mm	10 mm ... 15 mm	
Connection				
Cable	●	●	●	
Male cordset				
Plug connector	●	●	●	
Terminal compartment			●	
Output				
Two-wire DC				
Three-wire DC	Page 294	Page 295 ff	Page 297 ff	
Four-wire DC			Page 297 ff	
Two-wire AC			Page 300 ff	
Three-wire AC				
Two-wire AC/DC				
Analog output				
NAMUR	Page 302	Page 303	Page 304	

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						Cubic housing
	F46/F46A	**F64**	**F104**	***VariKont***	**FP**	
	• Flat housing design • Chemically resistant design (optional)	• Small housing design	• Flat housing design • Cable and plug versions	• Head can be moved in five directions • Sensor can be replaced without loosening the connections	• Wide detection range • Terminal compartment • Sensor can be replaced without loosening the connections	
						Operating distance
				15 mm		**Flush**
	2 mm ... 10 mm	8 mm ... 15 mm	5 mm		40 mm	**Non-flush**
						Connection
	●	●	●			**Cable**
						Male cordset
			●			**Plug connector**
				●	●	**Terminal compartment**
						Output
						Two-wire DC
	Page 305 ff	Page 307	Page 308			**Three-wire DC**
				Page 309	Page 310	**Four-wire DC**
					Page 311	**Two-wire AC**
						Three-wire AC
						Two-wire AC/DC
						Analog output
	Page 312					**NAMUR**

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Introduction to Capacitive Sensors

Capacitive sensors detect both metallic and nonmetallic targets such as glass, plastic, or wood. Depending on the size and material properties of the target as well as the size and mounting conditions of the sensor, switching distances of between 1 mm and 50 mm are possible.

Capacitive proximity switches can be used as "penetrating sensors" to detect liquid or granular media. They react to the contents of a thin-walled and electrically nonconductive container made from glass or plastic. This function is performed by increasing the overall capacitance, consisting of the container wall and filling media (see also "Functional description of capacitive proximity switches"). The "penetration" functionality of capacitive sensors enables flow rate and fill level controls to be performed for liquid media and bulk goods without coming into direct contact with them.

Special technical features of capacitive sensors:

- They react to both electrically conductive materials and insulating materials
- (ferrous metals, nonferrous metals, glass, wood, plastic, as well as oil and liquid solutions)
- The operating distance of the sensor can be adapted to the object and mounting properties
- They can be used as "penetrating" sensors through nontransparent and nonconductive container walls

Common applications for capacitive sensors:

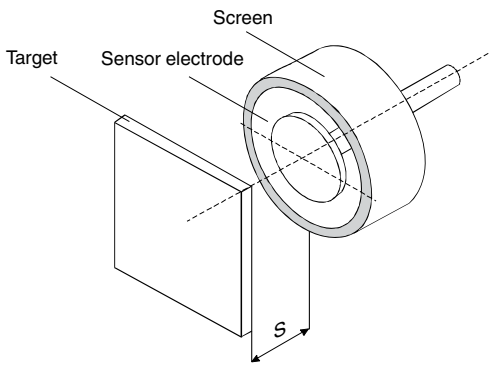
- Checks for the presence of paper, wood, glass, or plastic materials
- Fill level control for fluid media and bulk goods (pellets, tablets, granulate, toner)
- Flow rate control on plastic piping and hoses

Common areas of application for capacitive sensors:

- Print and paper processing industry
- Packaging and food industry
- Pharmacy, chemical, and process technology
- Wood and plastic processing
- Automotive industry

Functional description

Capacitive proximity switches have a sensor electrode (active area) and a shield ring. The sensor electrode is the active area of the sensor and emits an electric AC field that forms a capacitance with the surroundings acting as the counter potential (capacitor principle). If an actuator moves closer to the active sensor electrode, the counter potential changes. The capacity between the sensor and the switching flag increases. This change in external capacity is compared with an internal sensor reference value. If the reference value is exceeded, the sensor is actuated and delivers a switch-over signal to the sensor output. The external shield ring focuses the electric field of the sensor electrode and reduces the influence of the installation position upon the operating distance of the sensor.



The rated operating distance s_n of a capacitive proximity switch is based on a grounded metal object of a particular size. In contrast, the capacitance change for nonconductive actuator materials is lower and the object must be moved closer to the sensor electrode in order to actuate the switch. The length of the specific operating distance depends upon the electrode area, the size and the material (permittivity) of the object to be detected as well as the sensor's installed position. The lower the permittivity number of the respective actuator material under otherwise comparable geometric mounting conditions, the shorter the achievable operating distance. With most capacitive proximity switches, the sensitivity can be adjusted within limits using a potentiometer on the sensor. The factory-set operating distance can be adjusted retrospectively in accordance with the object material and the installation position.

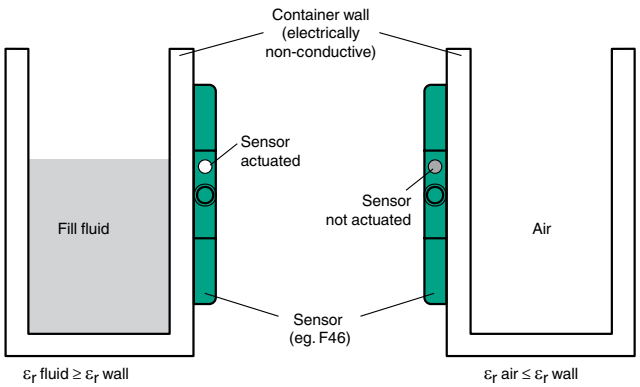
Correlation between material constants and operating distances

The rated operating distance s_n of a capacitive proximity switch is preset at the factory using a grounded metal object of a particular size and under defined mounting conditions (flush, non-flush). If other materials are used with the otherwise unchanged geometrics of the object and the mounting conditions of the sensor, the preset operating distance decreases. The table below illustrates the ranges of material-related dielectric constants and the expected reduction factors for the rated operated distance.

Material	Dielectricity ε_r	Reduction factor
Grounded metal plate	>100 to 10,000	1
Water	80	1
Alcohol	22	0.75
Glass	5 to 16	0.6
Ceramic	4 to 7	0.5
PVC	2.3 to 3.4	0.45
Wood (dry)	3 to 7	0.3
Oil	2.6 to 2.9	0.28
Paper (dry)	1.6 to 2.6	0.25
Air	1	0

The values in the table are reference values and therefore should not be referred to in terms of physical accuracy.

Special application–penetration functionality

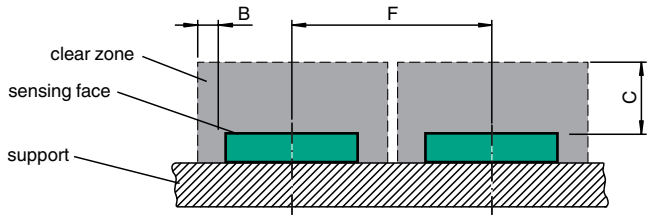


The penetration functionality of capacitive proximity switches is based on the change in the total capacitance of the media to be detected. In this context, the term "penetration" is not used to describe how a specific detection range is covered in an optical sense. Rather, an insensitive sensor suppresses the container wall in the sense of a dielectric constant component (left drawing, sensor does not react to container wall). If the filling media in the container now rises above the center of the sensor's electrode, the electric conductivity of the system changes and results in sensor actuation.

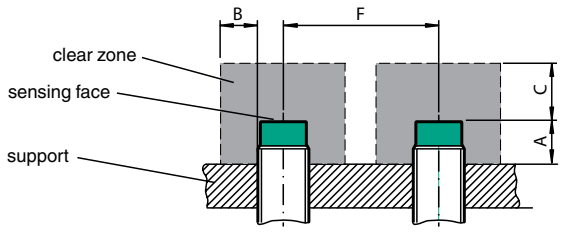
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Mounting conditions of capacitive sensors

Mounting the sensor in a machine or plant environment can result in preattenuation of the sensor due to material located within the detection range. This preattenuation results in a change in the preset operating distance. An installed potentiometer can be used to offset these changes within certain limits. However, if the preset operating distance has not changed, you must ensure that no material, other than the object, is located within the sensor detection range (see the gray clearance area). The exact values for lengths A to F are sensor-specific and are included on the data sheets of the corresponding product.



Installation conditions for cubic sensors



Mounting conditions for cylindrical sensors

Flush mounting of capacitive sensors

In addition to the above-mentioned, nonflush mounting of cylindrical sensors, the sensors can also be flush mounted (measurement A is 0 mm) in special cases. Pepperl+Fuchs offers specially aligned flush-mountable sensors (CJ-, CBB-, CCB types) for this purpose. A potentiometer can also be used with these types of sensor to adapt the operating distance for different object materials.

Sensors in cubic housing are generally installed on a carrier material. In this case, measurement A is defined by the height of the housing. One particular quality feature of capacitive sensors is their shielding against the carrier material. The most critical case would involve mounting in a metallic conductive carrier material. Pepperl+Fuchs sensors can be used under the above-mentioned conditions in all types of carrier material.

Type Code, Capacitive Sensors

C C N 15 - 30 G S 60 - E2 - V1

C Capacitive

B Basis line
C Comfort line

B flush
N non-flush

Operating range
1 mm ... 40 mm

Diameter in mm
Rectangular type
F46, F46A, F64, F104
U VariKont®
FP Surface switch

G Threading

M Metal (brass, nickel plated)
K Plastic
S Stainless steel 1.4305/AISI 303
H Stainless steel 1.4435/AISI 316L

Cylindrical
usable threaded length (mm)

Electrical Output

A, A0	4-wire, DC, NPN, antivalent
A2	4-wire, DC, PNP, antivalent
E, E0	3-wire, DC, NPN, NO
E1	3-wire, DC, NPN, NC
E2	3-wire, DC, PNP, NO
E3	3-wire, DC, PNP, NC
N, N0	NAMUR, NC
1N, N1	NAMUR, NO
U	2-wire, AC/DC, programm. wiring
UÖ	2-wire, AC/DC, NC
US	2-wire, AC/DC, NO
W	2-wire, AC, programm. wiring
WÖ	2-wire, AC, NC
WS	2-wire, AC, NO

Connection Elements

V1	M12 x 1 device connector for DC proximity switches
V3	M8 device connector for DC proximity switches
V5	Faston connector
V13	M12 x 1 device connector for AC proximity switches
V16	Rd24 x 1/8 device connector for dual sensors in F31 housing
V18	M18 x 1 device connector for valve connection (F31 housing)



Properties

- Ø12 mm housing
- 4 mm, flush and 8 mm, non-flush mountable versions
- Adjustable sensitivity
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Corrosion resistant high grade steel housing

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 36 V DC
No-load supply current	≤ 12 mA
Reverse polarity protection	✔
Switching frequency	0 ... 50 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4404 / AISI 316L
Protection degree	IP65

Model Number	green = preferred type	CBB4-12GH70-E0	CBB4-12GH70-E2	CBN8-12GH70-E2	CBB4-12GH60-E0-V1	CBB4-12GH60-E2-V1	CBN8-12GH60-E2-V1
Rated operating distance	4 mm	●	●		●	●	
	8 mm			●			●
Installation	flush	●	●		●	●	
	non-flush			●			●
Switching element function	NPN NO	●			●		
	PNP NO		●	●		●	●
Connection type	Device connector M12 x 1 , 4-pin				●	●	●
	cable PUR , 2 m	●	●	●			

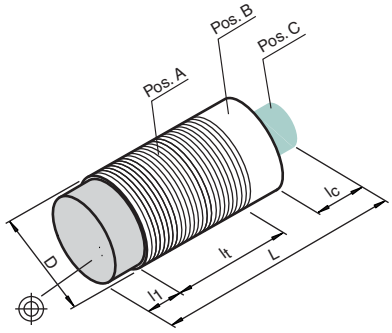
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

Dimensions					
Length L [mm]	69	70	60	61	
Diameter D [mm]	12				
Thread length l_t [mm]	38	35	38	35	
Cap length l_1 [mm]	0	5	0	5	
Connector area l_c [mm]	0		6		
LED position	Pos. B		Pos. C		

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

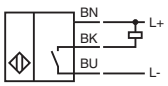
BF 12	Mounting flange, 12 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



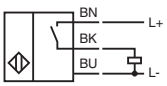
Electrical Connection



CBB4-12GH70-E0

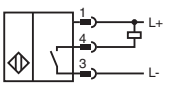


CBB4-12GH70-E2
CBN8-12GH70-E2

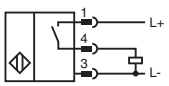


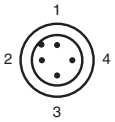


CBB4-12GH60-E0-V1



CBB4-12GH60-E2-V1
CBN8-12GH60-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

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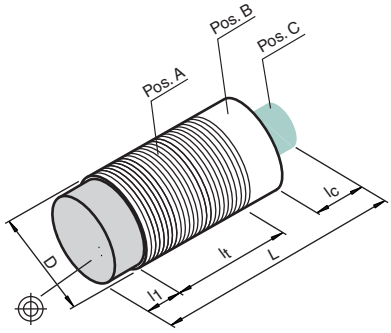
General Data		
Switching element function	PNP NO	
Operating voltage	10 ... 30 V	
No-load supply current	≤ 18 mA	
Reverse polarity protection	✔	
Switching frequency	0 ... 100 Hz	
Operating current	0 ... 100 mA	
Short-circuit protection	pulsing	
Indication of the switching state	LED, yellow	
Potentiometer	sensitivity adjustment	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)	
Housing material	PBT	
Protection degree	IP67	
Connection type	Device connector M12 x 1 , 3-pin	



Model Number		CBB8-18GK75-E2-V1	CBN15-18GK75-E2-V1
Rated operating distance	8 mm	●	
	15 mm		●
Installation	flush	●	
	non-flush		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		88.5	
Diameter D [mm]		18	
Thread length l_t [mm]		52	39
Cap length l_1 [mm]		2	15
Connector area l_c [mm]		12	
LED position		Pos. B	

Properties

- Ø18 mm housing
- 8 mm, flush and 15 mm, non-flush mountable versions
- Adjustable sensitivity
- DC, 3-wire switching output
- Connector version



Accessories

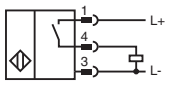
This and more accessories can be found in chapter 10
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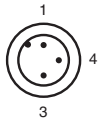
BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop

Electrical Connection



CBB8-18GK75-E2-V1
CBN15-18GK75-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Properties

- Ø18 mm housing
- 8 mm, flush and 15 mm, non-flush mountable versions
- Adjustable sensitivity
- DC, 3-wire switching output
- Cable and connector versions

Your Benefit

- Corrosion resistant stainless steel housing

Technical Data

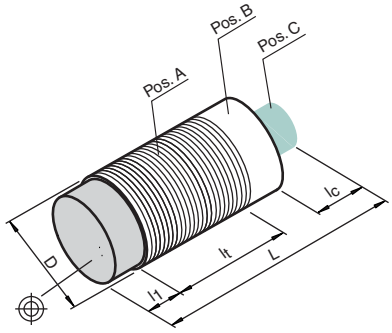
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V
No-load supply current	≤ 18 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number	green = preferred type	CBB8-18GS75-E0	CBB8-18GS75-E2	CBN15-18GS75-E2	CBB8-18GS75-E2-V1	CBN15-18GS75-E2-V1
Rated operating distance	2 ... 8 mm	●	●		●	
	2 ... 15 mm			●		●
Installation	flush	●	●		●	
	non-flush			●		●
Switching element function	NPN NO	●				
	PNP NO		●	●	●	●
Connection type	Device connector M12 x 1 , 3-pin				●	●
	cable PVC , 2 m	●	●	●		

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions					
Length L [mm]	75.5		88.5		
Diameter D [mm]	18				
Thread length l_t [mm]	61	47	53	39	
Cap length l_1 [mm]	0.5	15	0.5	15	
Connector area l_c [mm]	0		12		
LED position	Pos. C		Pos. B		



Accessories

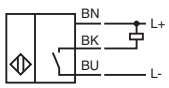
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-18	Quick mounting bracket with dead stop
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

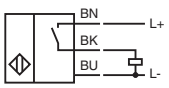
Electrical Connection



CBB8-18GS75-E0

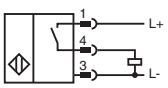


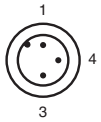
CBB8-18GS75-E2
CBN15-18GS75-E2





CBB8-18GS75-E2-V1
CBN15-18GS75-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

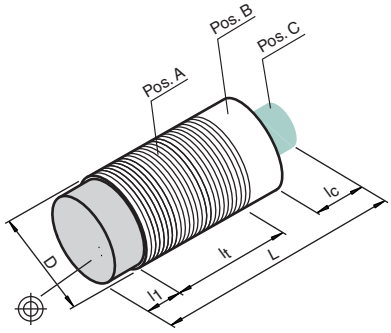
General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Properties

- Ø30 mm housing
- 10 mm, flush and 15 mm, non-flush mountable versions
- Adjustable sensitivity
- DC, 3-wire and 4-wire switching output versions
- Cable version

Model Number			CBB10-30GK60-E0	CBN15-30GK60-E0	CBN15-30GK60-E2	CBN15-30GK60-A0	CBN15-30GK60-A2
Rated operating distance	10 mm		●				
	15 mm			●	●	●	●
Installation	flush		●				
	non-flush			●	●	●	●
Switching element function	NPN	NO/NC				●	
	NPN	NO	●	●			
	PNP	NO/NC					●
	PNP	NO			●		
Approvals and Certificates							
UL approval	cULus Listed, General Purpose		●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			●	●	●	●
Dimensions							
Length L [mm]			60				
Diameter D [mm]			30				
Thread length l_t [mm]			60				
Cap length l_1 [mm]			0				
Connector area l_c [mm]			0				
LED position			Pos. C				



Accessories

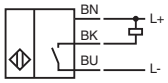
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm

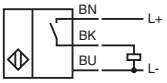
Electrical Connection



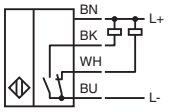
CBB10-30GK60-E0
CBN15-30GK60-E0



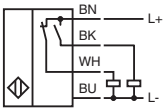
CBN15-30GK60-E2



CBN15-30GK60-A0



CBN15-30GK60-A2



Date of issue: 2015-04-08



Properties

- Ø30 mm housing
- 10 mm, flush mountable
- Adjustable sensitivity
- DC, 4-wire switching output versions
- Terminals version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	CBB10-30GKK-A2
Rated operating distance	10 mm
Installation	flush
Switching element function	PNP NO/NC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	ABS
Protection degree	IP67
Connection type	screw terminals

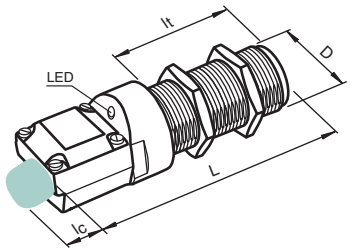
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	115
Diameter D [mm]	30 / 40
Thread length l_t [mm]	61
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

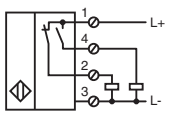
BF 30	Mounting flange, 30 mm



Electrical Connection



CBB10-30GKK-A2



Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	non-flush
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number			CCN15-30GS60-E0	CCN15-30GS60-E2	CCN15-30GS60-A0	CCN15-30GS60-A2	CCN15-30GS60-E2-V1	CCN15-30GS60-A2-V1
	green = preferred type							
Switching element function	NPN	NO/NC			●			
	NPN	NO	●					
	PNP	NO/NC				●		●
	PNP	NO		●			●	
Connection type	Device connector M12 x 1 , 4-pin						●	●
	cable PVC , 2 m		●	●	●	●		

Approvals and Certificates								
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

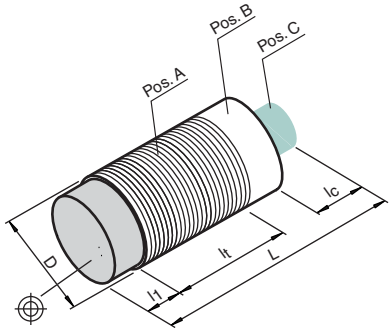
Dimensions						
Length L [mm]	60				75	
Diameter D [mm]	30					
Thread length l_t [mm]	41					
Cap length l_1 [mm]	18					
Connector area l_c [mm]	0				15	
LED position	Pos. C					

Properties

- Ø30 mm housing
- 15 mm, non-flush mountable
- Adjustable sensitivity
- DC, 3-wire and 4-wire switching output versions
- Cable and connector versions

Your Benefit

- Corrosion resistant stainless steel housing



Accessories

This and more accessories can be found in chapter 10

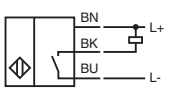
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

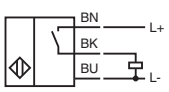
Electrical Connection



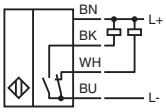
CCN15-30GS60-E0



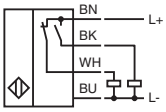
CCN15-30GS60-E2



CCN15-30GS60-A0

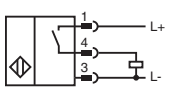


CCN15-30GS60-A2

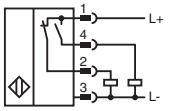


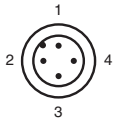


CCN15-30GS60-E2-V1



CCN15-30GS60-A2-V1



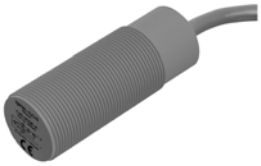


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08





Properties

- Ø30 mm housing
- 10 mm, flush and non-flush mountable versions
- Adjustable sensitivity
- AC, 2-wire switching output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Operating voltage	20 ... 253 V AC
Reverse polarity protection	tolerant
Switching frequency	0 ... 10 Hz
Operating current	5 ... 200 mA
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection type	cable PVC , 2 m

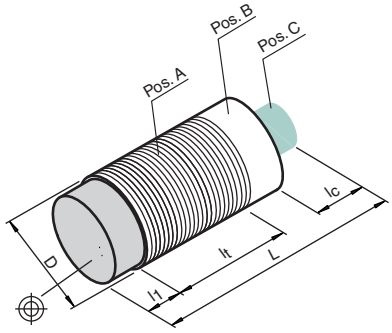


Model Number			CJ10-30GK-WS	CJ10-30GK-WO	CJ10-30GM-WS	CJ10-30GM-WO
Installation	flush					●
	non-flush		●	●	●	
Switching element function	AC	NO	●		●	
	AC	NC		●		●
Housing material	Stainless steel 1.4305 / AISI 303				●	●
	PBT		●	●		
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)		●	●	●	●
Dimensions						
Length L [mm]			80		79	
Diameter D [mm]			30			
Thread length l_t [mm]			59		60	
Cap length l_1 [mm]			1		18	
Connector area l_c [mm]			0			
LED position			Pos. C			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

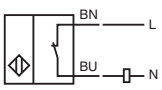
BF 30	Mounting flange, 30 mm



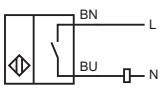
Electrical Connection



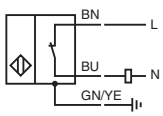
CJ10-30GK-WO



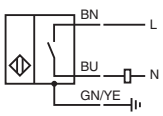
CJ10-30GK-WS



CJ10-30GM-WO



CJ10-30GM-WS



Date of issue: 2015-04-08

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



CE

Properties

- Ø30 mm housing
- 10 mm, flush mountable
- Adjustable sensitivity
- AC, 2-wire switching output
- Terminals version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	CBB10-30GKK-W
Rated operating distance	10 mm
Installation	flush
Switching element function	AC NO/NC
Operating voltage	20 ... 250 V AC
Switching frequency	0 ... 50 Hz
Operating current	0 ... 500 mA
Operating voltage display	LED, green
Indication of the switching state	LED, red
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	ABS
Protection degree	IP67
Connection type	screw terminals

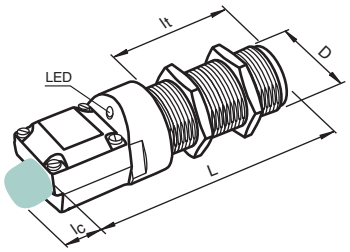


Dimensions	
Length L [mm]	115
Diameter D [mm]	30 / 40
Thread length l_t [mm]	61
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

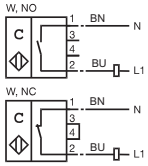
BF 30	Mounting flange, 30 mm



Electrical Connection



CBB10-30GKK-W



Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	NAMUR, NO
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≤ 1 mA
Measuring plate detected	≥ 2.4 mA
Switching frequency	0 ... 1 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68
Connection type	cable PVC , 2 m



Model Number		CJ1-12GK-N	CJ4-12GK-N
Rated operating distance	1 mm	●	
	4 mm		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions	
Length L [mm]	60
Diameter D [mm]	12
Thread length l_t [mm]	39
Cap length l_1 [mm]	1
Connector area l_c [mm]	0
LED position	-

Properties

- Ø12 mm housing
- 1 mm and 4 mm, non-flush mountable versions
- DC, NAMUR interface
- Cable version

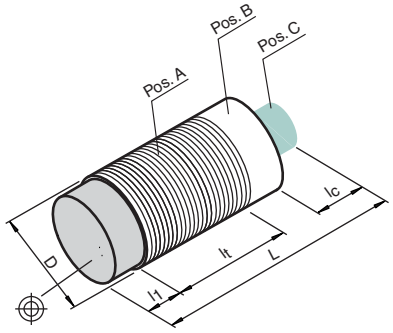
Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Ready-for-use switching distance

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

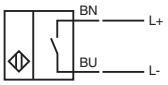
BF 12	Mounting flange, 12 mm



Electrical Connection

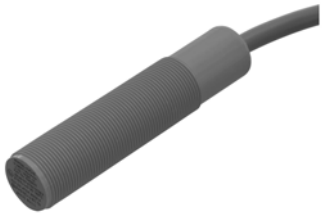


CJ1-12GK-N
CJ4-12GK-N



Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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0102

Properties

- Ø18 mm housing
- 2 mm and 6 mm, non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensor applicable up to zone 0 and zone 20
- Ready-for-use switching distance

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	NAMUR, NO
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≤ 1 mA
Measuring plate detected	≥ 2.4 mA
Switching frequency	0 ... 1 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP68
Connection type	cable PVC , 2 m



Model Number		CJ2-18GK-N	CJ6-18GK-N
Rated operating distance	2 mm	●	
	6 mm		●
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 2G; 1D	●	●
Approvals and Certificates			
Control drawing	116-0165F	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

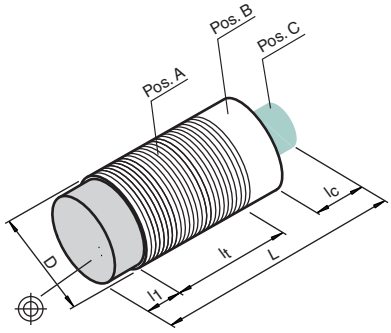
Dimensions	
Length L [mm]	80
Diameter D [mm]	18
Thread length l_t [mm]	59
Cap length l_1 [mm]	1
Connector area l_c [mm]	0
LED position	-

Accessories

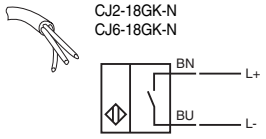
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm



Electrical Connection



Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 10 mm, flush mountable
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

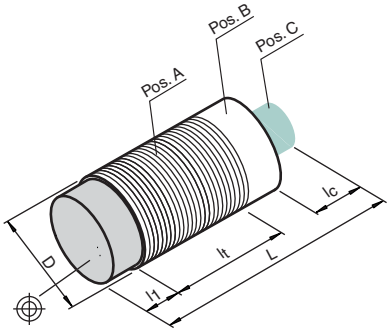
- ATEX approved sensor applicable up to zone 0 and zone 20

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	10 mm
Installation	flush
Switching element function	NAMUR, NO
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≤ 1.5 mA
Measuring plate detected	≥ 2.5 mA
Reverse polarity protection	✔
Switching frequency	0 ... 50 Hz
Indication of the switching state	LED, yellow
Ambient temperature	-20 ... 70 °C (-4 ... 158 °F)
Housing material	Stainless steel 1.4305 / AISI 303
Protection degree	IP67

Model Number		CCB10-30GS55-N1	CCB10-30GS55-N1-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PVC , 2 m	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	1G; 1D	●	●
Approvals and Certificates			
ETL approval	cETLus	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		70	82
Diameter D [mm]		30	
Thread length l_t [mm]		55	
Cap length l_1 [mm]		0	
Connector area l_c [mm]		0	12
LED position		Pos. C	



Accessories

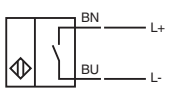
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 30	Mounting flange, 30 mm

Electrical Connection

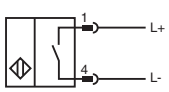
CCB10-30GS55-N1

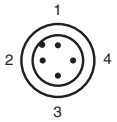




CCB10-30GS55-N1-V1







Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
4	BU	(blue)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number			CBN2-F46-E0	CBN2-F46-E1	CBN2-F46-E2	CBN2-F46-E3	CBN5-F46-E0	CBN5-F46-E1	CBN5-F46-E2	CBN5-F46-E3	CBN10-F46-E0	CBN10-F46-E2	CBN10-F46-E3
green = preferred type													
Rated operating distance	2 mm		●	●	●	●							
	5 mm						●	●	●	●			
	10 mm										●	●	●
Switching element function	NPN	NO	●				●				●		
	NPN	NC		●				●					
	PNP	NO			●				●			●	
	PNP	NC				●				●			●
Switching frequency	0 ... 10 Hz		●	●	●	●	●	●	●	●			
	0 ... 5 Hz										●	●	●

Approvals and Certificates												
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.											

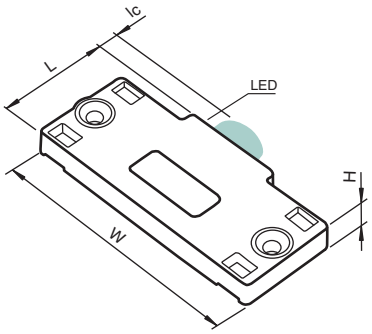
Dimensions	
Length L [mm]	22
Width W [mm]	50
Height H [mm]	5
Connector area l_c [mm]	3

Properties

- F46 housing
- 2 mm, 5 mm and 10 mm, non-flush mountable versions
- DC, 3-wire switching output
- Cable version

Your Benefit

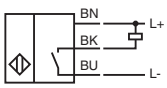
- Ready-for-use switching distance



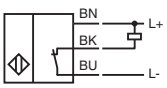
Electrical Connection



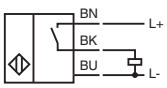
CBN2-F46-E0
CBN5-F46-E0
CBN10-F46-E0



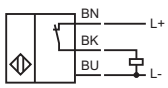
CBN2-F46-E1
CBN5-F46-E1



CBN2-F46-E2
CBN5-F46-E2
CBN10-F46-E2



CBN2-F46-E3
CBN5-F46-E3
CBN10-F46-E3



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	non-flush
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PVDF
Protection degree	IP68
Connection type	cable FEP , 2 m



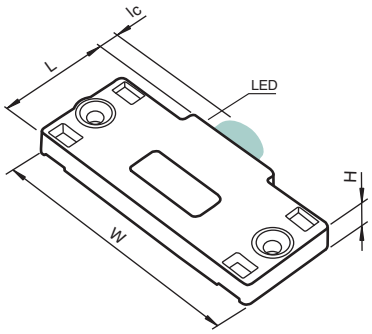
Model Number			CCN5-F46A-E0	CCN5-F46A-E1	CCN5-F46A-E2	CCN5-F46A-E3
Switching element function	NPN	NO	●			
	NPN	NC		●		
	PNP	NO			●	
	PNP	NC				●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose		●	●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					
Dimensions						
Length L [mm]			20.4			
Width W [mm]			50			
Height H [mm]			10.7			
Connector area l_c [mm]			10			

Properties

- F46A housing
- 5 mm, non-flush mountable
- DC, 3-wire switching output
- Cable version

Your Benefit

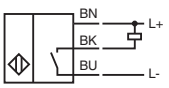
- Ready-for-use switching distance
- Soiling-repellent PTFE housing



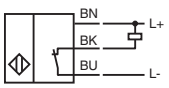
Electrical Connection



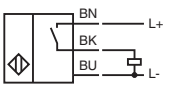
CCN5-F46A-E0



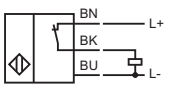
CCN5-F46A-E1



CCN5-F46A-E2



CCN5-F46A-E3



Date of issue: 04/08/2015



Properties

- F64 housing
- 8 mm, 12 mm and 15 mm, non-flush mountable versions
- DC, 3-wire switching output
- Cable version

Your Benefit

- Ready-for-use switching distance

Technical Data

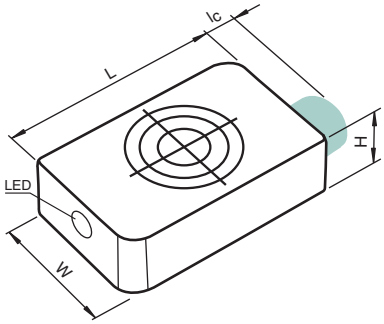
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Reverse polarity protection	✔
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 16 mA
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67

Model Number	green = preferred type	CBN8-F64-E0	CBN8-F64-E1	CBN12-F64-E2	CBN12-F64-E3	CCN15-F64-E2
Rated operating distance	8 mm	●	●			
	12 mm			●	●	
	15 mm					●
Switching element function	NPN NO	●				
	NPN NC		●			
	PNP NO			●		●
	PNP NC				●	
Switching frequency	0 ... 20 Hz			●	●	●
	0 ... 5 Hz	●	●			
Housing material	Crastin (PBTB)	●	●			
	PBT			●	●	●
Connection type	cable PUR , 2 m					●
	cable PUR , 3.1 m			●		
	cable PUR , 4.6 m				●	
	cable PVC , 2 m	●	●			

Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

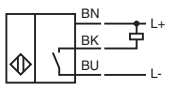
Dimensions	
Length L [mm]	40
Width W [mm]	25
Height H [mm]	12
Connector area l_c [mm]	2



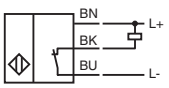
Electrical Connection



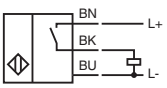
CBN8-F64-E0



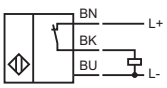
CBN8-F64-E1



CBN12-F64-E2
CCN15-F64-E2



CBN12-F64-E3



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	5 mm
Installation	non-flush
Switching element function	PNP NO
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Reverse polarity protection	✔
Switching frequency	0 ... 100 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	GD-Zn
Protection degree	IP67

Model Number		CBN5-F104M-E2	CBN5-F104M-E2-V3R
Connection type	Device connector 8 mm , 3-pin		●
	cable PUR , 2 m	●	
			
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		32	
Width W [mm]		20	
Height H [mm]		8	
Connector area l_c [mm]		3	

Properties

- F104M housing
- 5 mm, non-flush mountable
- DC, 3-wire switching output
- Cable and connector versions

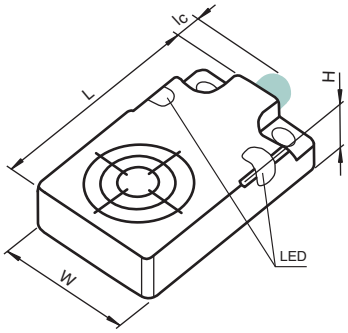
Your Benefit

- Ready-for-use switching distance

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

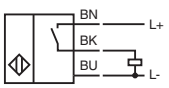
V3-WR-2M-PUR	Cable socket, snap locking, 3-pin, PUR cable
V3-GR-2M-PUR	Cable socket, snap locking, 3-pin, PUR cable



Electrical Connection

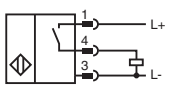


CBN5-F104M-E2





CBN5-F104M-E2-V3R





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	15 mm
Installation	flush
Switching element function	PNP NO/NC
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Operating voltage display	LED, green
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP65
Connection type	screw terminals



Model Number		CJ15+U1+A2	CJ15+U4+A2
Housing material	PBT housing / PBT base	●	
	PBT housing / metal base		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		118	
Width W [mm]		40	
Height H [mm]		40	
Connector area l_c [mm]		0 (M20 x 1.5)	0 (1/2" NPT)

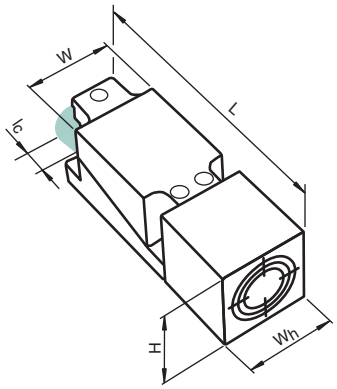
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MHW 01	Modular mounting bracket

Properties

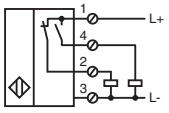
- ***VariKont* housing**
- **15 mm, flush mountable**
- **Adjustable sensitivity**
- **DC, 4-wire switching output**
- **Terminal compartment**



Electrical Connection



CJ15+U1+A2
CJ15+U4+A2



Date of issue 04/08/2015



Technical Data

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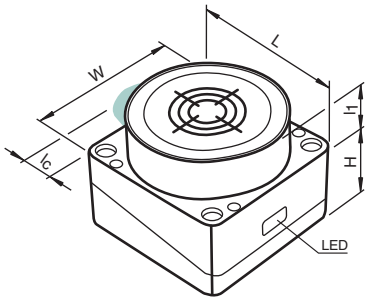
General Data	
Rated operating distance	40 mm
Installation	non-flush
Operating voltage	10 ... 60 V DC
No-load supply current	≤ 20 mA
Reverse polarity protection	✔
Switching frequency	0 ... 10 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP65
Connection type	screw terminals



Model Number			CJ40-FP-A0-P1	CJ40-FP-A2-P1	CJ40-FP-A2-P4
Switching element function	NPN	NO/NC	●		
	PNP	NO/NC		●	●
Housing material	PBT/POM housing / PBT base		●	●	
	POM housing / metal base				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose		●	●	●
CSA approval	cCSAus Listed, General Purpose		●	●	●
Dimensions					
Length L [mm]				80	
Width W [mm]				80	
Height H [mm]				40	
Cap length l_1 [mm]				12.5	
Connector area l_c [mm]			11 (M20 x 1.5)		11 (1/2" NPT)

Properties

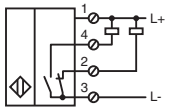
- **FP housing**
- **40 mm, non-flush mountable**
- **Adjustable sensitivity**
- **DC, 4-wire switching output**
- **Terminal compartment**



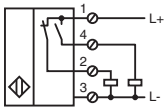
Electrical Connection



CJ40-FP-A0-P1



CJ40-FP-A2-P1
CJ40-FP-A2-P4



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Technical Data

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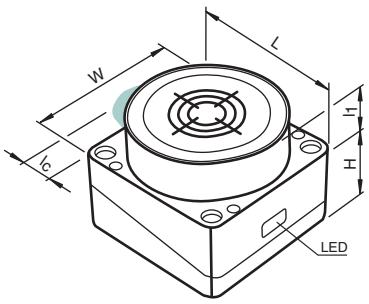
General Data	
Rated operating distance	40 mm
Installation	non-flush
Switching element function	AC NO/NC
Operating voltage	20 ... 250 V AC
Reverse polarity protection	tolerant
Switching frequency	0 ... 10 Hz
Operating current	10 ... 500 mA
Indication of the switching state	LED, red
Potentiometer	sensitivity adjustment
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP65
Connection type	screw terminals



Model Number		CJ40-FP-W-P1	CJ40-FP-W-P4
Housing material	PBT/POM housing / PBT base	●	
	PBT/POM housing / metal base		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		80	
Width W [mm]		80	
Height H [mm]		40	
Cap length l_1 [mm]		12.5	
Connector area l_c [mm]		11 (M20 x 1.5)	11 (1/2" NPT)

Properties

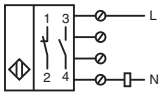
- FP housing
- 40 mm, non-flush mountable
- Adjustable sensitivity
- AC, 2-wire switching output
- Terminal compartment



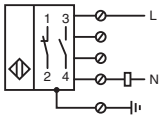
Electrical Connection



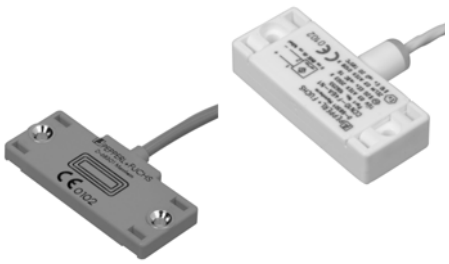
CJ40-FP-W-P1



CJ40-FP-W-P4



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	non-flush
Switching element function	NAMUR, NO
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Measuring plate not detected	≤ 1 mA
Measuring plate detected	≥ 2.2 mA
Switching frequency	0 ... 10 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)

Model Number		CBN2-F46-N1	CBN5-F46-N1	CBN10-F46-N1	CCN5-F46A-N1	CCN10-F46A-N1
Rated operating distance	10 mm			●		●
	2 mm	●				
	5 mm		●		●	
Housing material	PBT	●	●	●		
	PVDF				●	●
Protection degree	IP67	●	●	●		
	IP68				●	●
Connection type	cable FEP , 2 m				●	●
	cable PUR , 2 m	●	●	●		
Use in the Hazardous Area						
Use in the hazardous area	see instruction manuals	●	●	●	●	●
Category	1G; 2G; 1D	●	●	●	●	●
Approvals and Certificates						
Control drawing	116-0165F	●	●		●	●
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

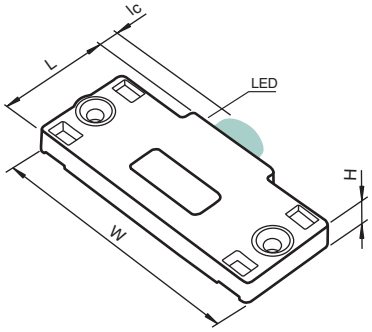
Dimensions		
Length L [mm]	22	20.4
Width W [mm]	50	42
Height H [mm]	5	10.5
Connector area l_c [mm]	3	10

Properties

- Flat F46 / F46A housing
- Up to 10 mm, non-flush mountable versions
- DC, NAMUR interface
- Cable version

Your Benefit

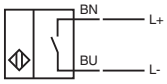
- ATEX approved sensor applicable up to zone 0 and zone 20
- Soiling-repellent PTFE housing versions (F46A)
- Ready-for-use switching distance



Electrical Connection

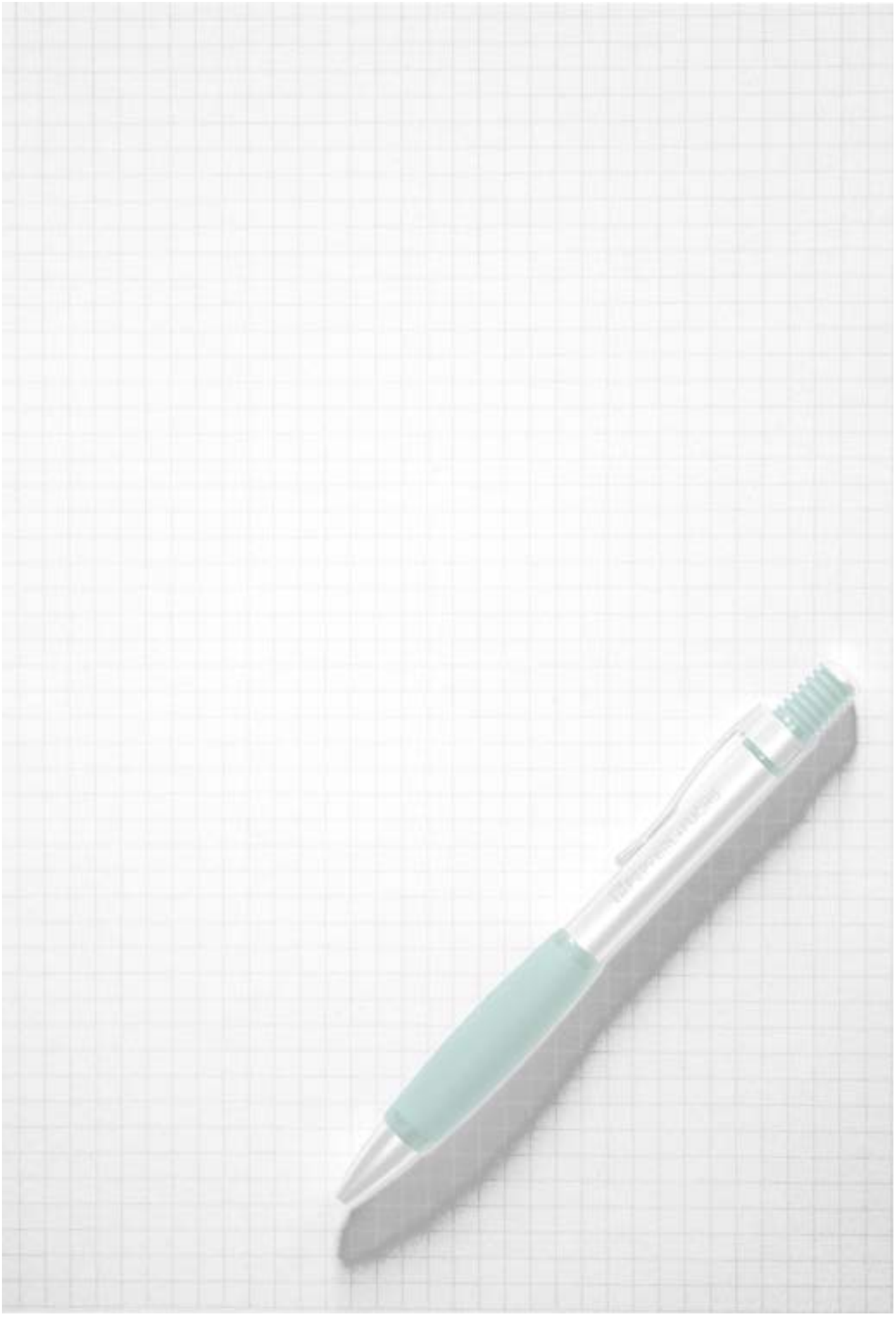


CBN10-F46-N1
CBN2-F46-N1
CBN5-F46-N1
CCN10-F46A-N1
CCN5-F46A-N1



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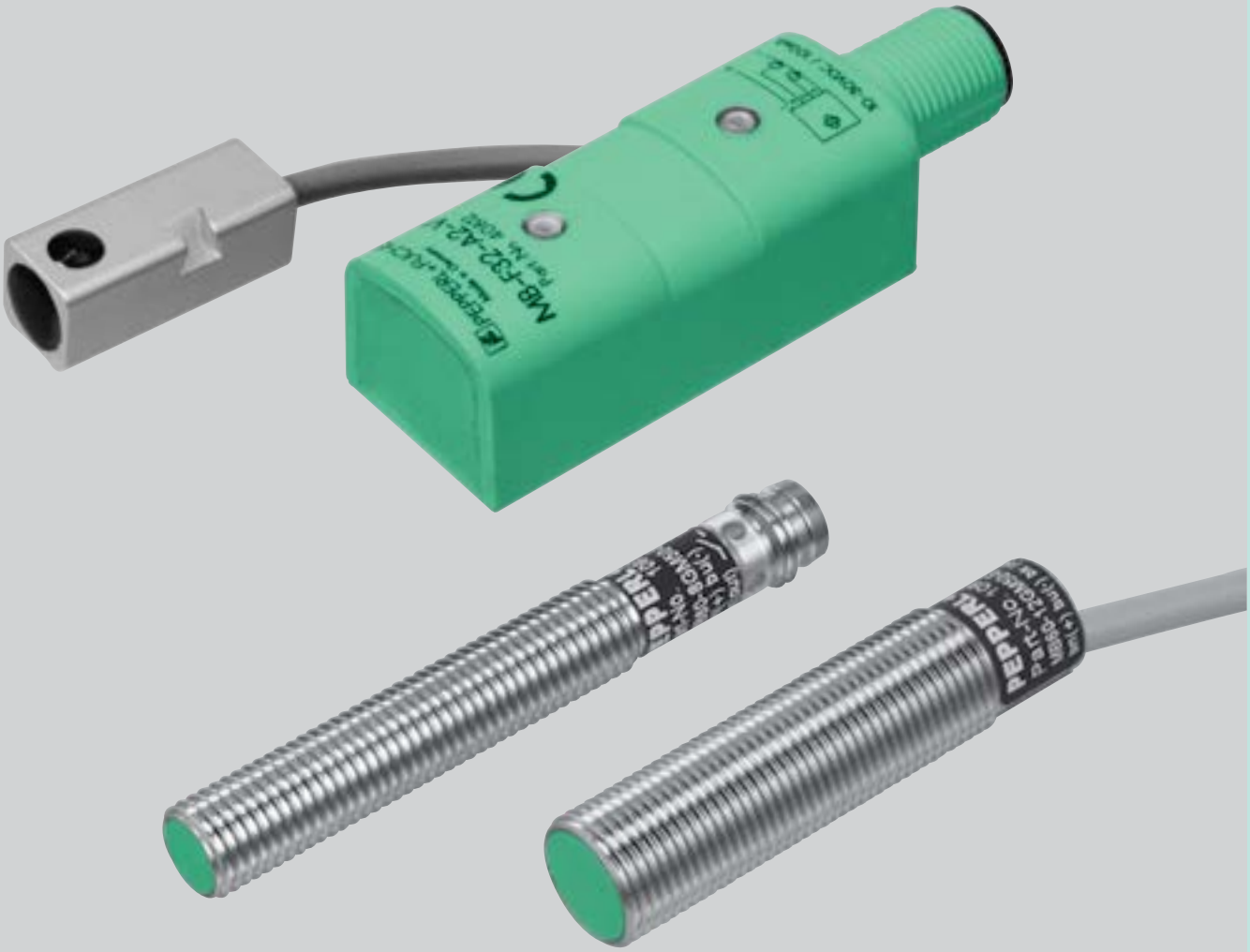
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1.3 Magnetic Field Sensors 314



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1 Proximity Sensors

1.3 Magnetic Field Sensors

Overview of Magnetic Field Sensors/Selection Table 316

Introduction to Magnetic Field Sensors 317
Operating Distance and Responsiveness
Mounting Conditions for Magnetic Field Sensors

Magnetic "Penetrating Sensors" for Hydraulic Cylinders 318

Type Code, Magnetic Field Sensors 318

Data Section

1.3.1 Magnetic Field Sensors 319

1.3.2 Accessories, Permanent Magnets ..... see below

DM25-32-07
D = 32 mm, H = 7 mm
Material: BaFe with steel jacket
Ambient temperature: -40 °C ... 85 °C



DM60-31-15
D = 31 mm, H = 15 mm
Material: SrFe
Ambient temperature: max. 200 °C



DM06-05 NDFEB
D = 6 mm, H = 5 mm
Material: NdFeB
Coating: Ni + Sn
Ambient temperature: max. 120 °C
Packaging unit: 20 units



DM10-10 NDFEB
D = 10 mm, H = 10 mm
Material: NdFeB
Coating: Ni + Sn
Ambient temperature: max. 120 °C



DM20-10 NDFEB
D = 20 mm, H = 10 mm
Material: NdFeB
Coating: Ni + Sn
Ambient temperature: max. 120 °C



Designs				
Series	**8 mm**	**12 mm**	**F12**	**F32**
	• Nickel-plated brass or stainless steel housing • Plastic or stainless steel front face	• Nickel-plated brass housing	• Aluminum housing	• Mounted to hydraulic cylinders using tightening strap • Noncontact detection of the piston position
Operating distance				
Flush in nonmagnetic material	60 mm	60 mm	35 mm	50 mm (switching width)
Connection				
Cable	●	●	●	●
Plug connector	●	●		●
Output				
Three-wire DC	Page 319	Page 320		
Four-wire DC				Page 322
NAMUR		Page 321	Page 323	

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Introduction to Magnetic Field Sensors

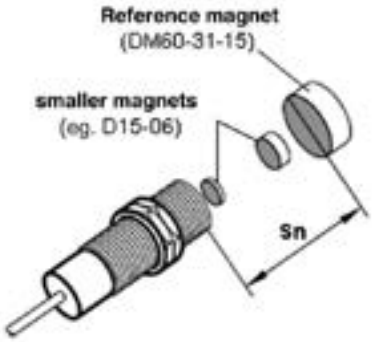
Unlike inductive or capacitive proximity switches, magnetic field sensors react to the presence of a magnetic field, regardless of whether this field is generated by an electromagnet or a permanent magnet. Compared with close-range sensors, they usually have longer operating distances.

Special technical characteristics of magnetic field sensors

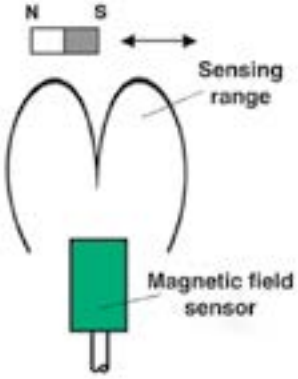
- Long operating distance - longest operating distance among close-range sensors
- Variable operating distance - the required operating distance can be adjusted based on the magnet selected and installed
- Coding character – sensor reacts solely to magnetic fields

Operating Distance and Responsiveness

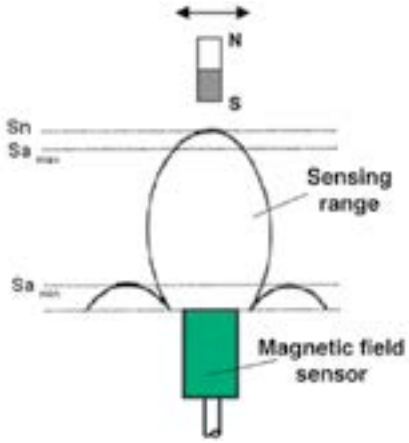
The possible operating distance of a magnetic field sensor depends on the size and magnetic flux density of the actuating magnet. Permanent magnet DM60 is used as a base for determining the rated operating distance (Sn). The magnet has a diameter of 31 mm and a height of 15 mm with a remanence B_r of 380 to 400 mT.



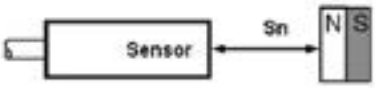
When the magnet passes laterally over the surface of the sensor, a polarity-dependent response curve is produced. The response curve represents the detection range of the sensor. The result is a bipolar alignment of the magnet: two symmetric curves.



Unipolar alignment of the magnet results in a central detection range with side curves. These side curves are responsible for maintaining a specific minimum distance between the magnet and the sensor to ensure safe switching behavior.

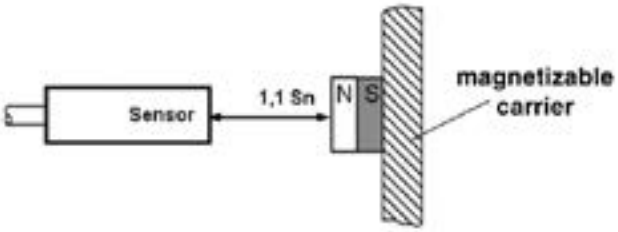


Mounting Conditions for Magnetic Field Sensors

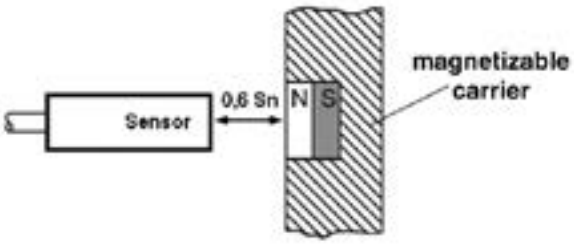


Due to the passive character of magnetic field sensors, unlike inductive or capacitive sensors, they can be flush mounted without affecting the operating distance. In contrast, the mounting conditions of the actuating magnet affect the operating distance.

If the magnet is applied to a magnetizable carrier, the obtainable operating distance increases slightly.



If the magnet is inserted flush into a magnetizable carrier material, the operating distance is considerably reduced by the magnetic "short circuit" through the carrier material.

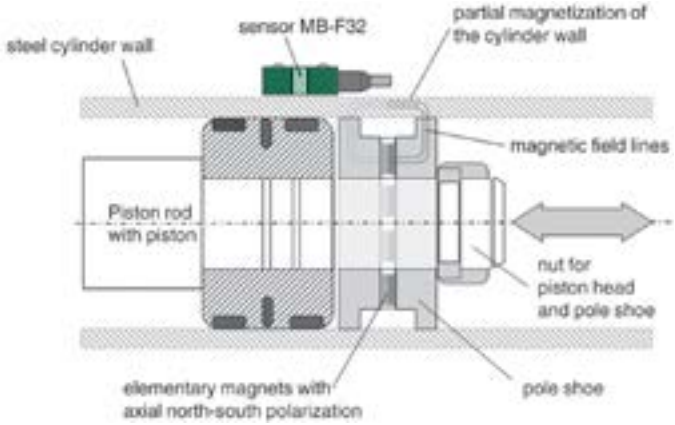


Magnetic "Penetrating Sensors" for Hydraulic Cylinders

The MB-F32 magnetic field sensor has a unique special feature. The sensor enables one of the pistons to be detected through the wall of a hydraulic cylinder. Once the piston passes over the sensor, the sensor generates a switching signal. This special function means that the sensor can be used to determine the position of the piston and also to count the piston strokes.

Functional description of magnetic penetrating sensors

The MB-F32 sensor reacts sensitively to magnetic fields. It requires a magnetic field change in order to change its switching state. In the example below [Fig. 7], the magnetic pole shoe of the piston induces a partial magnetic field in the steel cylinder wall. The sensor switches once the partial magnetic field passes over it.



Mounting conditions of magnetic penetrating sensors

The MB-F32 magnetic field sensor is positioned externally on the steel cylinder wall and secured using a tightening strap. To create a functional system, a special pole shoe must be mounted to the piston inside the hydraulic cylinder. The shape and geometric dimensions of the pole shoe as well as the size and number of magnets depends on the configuration of the respective cylinder piston system. The specialists at Pepperl+Fuchs can help you design your magnet system.

Cross section through a hydraulic cylinder with view of the cylinder and pole shoe

Type code, magnetic field sensors

M B 60 - 12 G M 50 - E2 - V1

Electrical Output
- **A2** 4-wire, DC, PNP, antivalent
- **E2** 3-wire, DC, PNP, NO
- **1N, N1** NAMUR, NO

Cylindrical
usable threaded length (mm)

- **M** Metal
- **G** Threading

Diameter in mm

Rectangular type
F32, F12

Operating range
35 mm or 60 mm

- **J** Initiator
- **B** Basis line
- **C** Comfort line

- **M** Magnetic

Connection Elements
- **V1** M12 x 1 device connector for DC proximity switches
- **V3** M8 device connector for DC proximity switchesgeeignet)

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Properties

- Ø8 mm housing
- Up to 60 mm (depends on magnet), flush mountable
- DC, 3-wire switching output
- Cable and connector versions

Technical Data

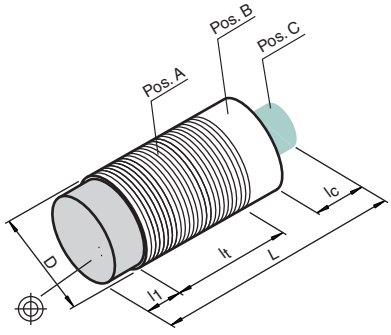
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	60 mm
Installation	flush in non-magnetic metal
Switching element function	PNP NO
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 5000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)
Housing material	Stainless steel 1.4404 / AISI 316L
Protection degree	IP67

Model Number		MB60-8GM50-E2	MB60-8GM50-E2-V3
	green = preferred type		
Connection type	Device connector M8 x 1 , 3-pin		●
	cable PUR , 2 m	●	

Approvals and Certificates			
Protection class	III	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	50	60
Diameter D [mm]	8	
Thread length l_t [mm]	40	45
Cap length l_1 [mm]	0	
Connector area l_c [mm]	0	6
LED position	Pos. C	



Accessories

This and more accessories can be found in chapter 10

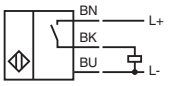
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-WM	Female connector, M8, 3-pin, field attachable
BF 8	Mounting flange, 8 mm
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
EXG-08	Quick mounting bracket with dead stop
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
DM 25-32-07	Permanent magnet for magnetic field sensors
DM 60-31-15	Permanent magnet for magnetic field sensors
V3-GM	Female connector, M8, 3-pin, field attachable

Electrical Connection

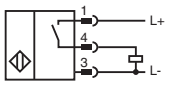


MB60-8GM50-E2





MB60-8GM50-E2-V3





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

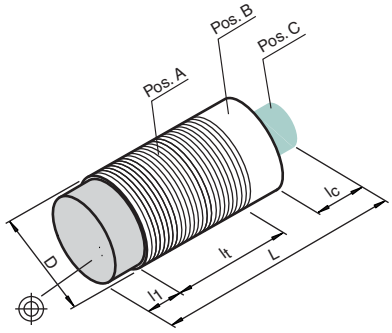
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	60 mm
Installation	flush in non-magnetic metal
Switching element function	PNP NO
Operating voltage	10 ... 30 V
No-load supply current	≤ 10 mA
Reverse polarity protection	✔
Switching frequency	0 ... 5000 Hz
Operating current	0 ... 200 mA
Short-circuit protection	pulsing
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)
Housing material	Stainless steel 1.4404 / AISI 316L
Protection degree	IP67

Model Number		MB60-12GM50-E2	MB60-12GM50-E2-V1
	green = preferred type		
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PUR , 2 m	●	
			
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		50	60
Diameter D [mm]		12	
Thread length l_t [mm]		29	40
Cap length l_1 [mm]		0	
Connector area l_c [mm]		0	8
LED position		Pos. B	

Properties

- Ø12 mm housing
- Up to 60 mm (depends on magnet), flush mountable
- DC, 3-wire switching output
- Cable and connector versions



Accessories

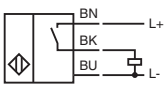
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
DM 25-32-07	Permanent magnet for magnetic field sensors
DM 60-31-15	Permanent magnet for magnetic field sensors
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
EXG-12	Quick mounting bracket with dead stop
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector

Electrical Connection

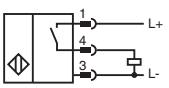


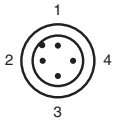
MB60-12GM50-E2





MB60-12GM50-E2-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operating distance	60 mm
Installation	flush in non-magnetic metal
Switching element function	NAMUR, NO
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Magnet detected	≥ 2.5 mA
Magnet not detected	≤ 1 mA
Switching frequency	0 ... 5000 Hz
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Stainless steel 1.4404 / AISI 316L
Protection degree	IP67

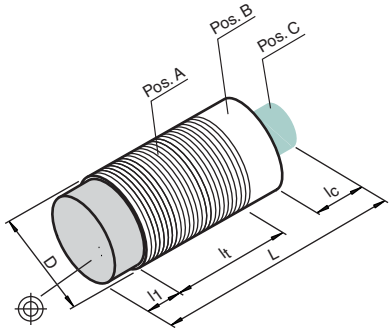
Model Number	green = preferred type	MC60-12GM50-1N	MC60-12GM50-1N-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PVC , 2 m	●	
Use in the Hazardous Area			
Use in the hazardous area	see instruction manuals	●	●
Category	2G	●	●
Approvals and Certificates			
FM-control drawing	116-0165F	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		50	63
Diameter D [mm]		12	
Thread length l_t [mm]		40	
Cap length l_1 [mm]		0	
Connector area l_c [mm]		0	8
LED position		Pos. C	

Properties

- Ø12 mm housing
- Up to 60 mm (depends on magnet), flush mountable
- DC, NAMUR interface
- Cable and connector versions

Your Benefit

- ATEX approved sensor applicable up to zone 1
- FM approval



Accessories

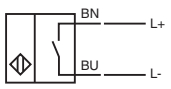
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
EXG-12	Quick mounting bracket with dead stop
DM 60-31-15	Permanent magnet for magnetic field sensors
DM 25-32-07	Permanent magnet for magnetic field sensors
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-G-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable
V1-W-N-2M-PUR	Cable socket, M12, 2-pin, NAMUR, PUR cable

Electrical Connection

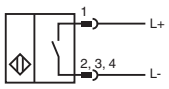


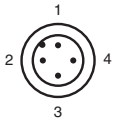
MC60-12GM50-1N





MC60-12GM50-1N-V1





Wire colors in accordance with EN 60947-5-6

1	BN	(brown)
2	BU	(blue)

Date of issue 04/08/2015



Properties

- F32 housing
- Hydraulic cylinder installation
- Requires magnetic piston
- DC, 4-wire switching output
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Installation	on the cylinder surface
Switching element function	PNP NO/NC
Switching range	typ. 50 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Reverse polarity protection	✔
Operating current	0 ... 100 mA
Short-circuit protection	pulsing
LED indicator	red: switching state output 1 yellow: switching state output 2
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Housing material	Polyamide (PA)
Protection degree	IP67

Model Number		MB-F32-A2	MB-F32-A2-V1
Connection type	Device connector M12 x 1 , 4-pin		●
	cable PVC , 2 m	●	
			

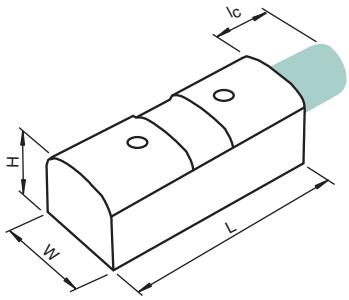
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	50	
Width W [mm]	21	
Height H [mm]	18	
Connector area l_c [mm]	25	14

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

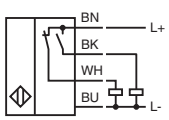
V1-G-BK	4-pin, M12 female field-attachable connector
V1-W-BK	4-pin, M12 female field-attachable connector
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable



Electrical Connection

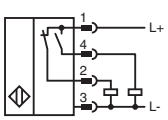
MB-F32-A2

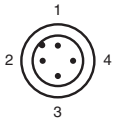




MB-F32-A2-V1







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	MJ35-F12-1N
Rated operating distance	35 mm
Installation	flush
Switching element function	NAMUR, NO
Type of voltage	DC
Nominal voltage	8.2 V (R_i approx. 1 kΩ)
Current consumption	
Magnet detected	≥ 3 mA
Magnet not detected	≤ 1 mA
Switching frequency	0 ... 5000 Hz
Indication of the switching state	LED, yellow
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	anodized aluminium
Protection degree	IP67
Connection type	cable PVC , 2 m

Use in the Hazardous Area	
Use in the hazardous area	see instruction manuals
Category	2G

Approvals and Certificates	
FM-control drawing	116-0165F
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

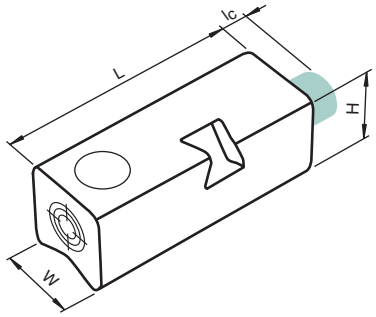
Dimensions	
Length L [mm]	30
Width W [mm]	12
Height H [mm]	12
Connector area l_c [mm]	0

Properties

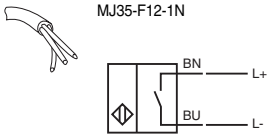
- Miniature F12 housing
- Up to 35 mm (depends on magnet), flush mountable
- DC, NAMUR interface
- Cable version

Your Benefit

- ATEX approved sensor applicable up to zone 1
- FM approval
- Suitable for installation on aluminium pneumatic cylinder



Electrical Connection



Date of issue 04/08/2015

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Photoelectric Sensors



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SENSING YOUR NEEDS

Photoelectric Sensors

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Background suppression sensors					
Series	**KT10**	**Ø 18 mm**	**ML17**	**R2**	
	Page 352 ff	Page 354 ff	Page 373	Page 356	
Features	• High-precision M4 miniature sensors • Smallest background suppressor • Sturdy V2A stainless steel metal housing	• Economical Series for standard applications • Classic Series with wide range of features	• Special housing design for M18 front mounting or side mounting thru-holes	• Ultra small housing • Abrasion-resistant, antistatic glass front	
Specifications					
Detection range limit	8 mm	120 mm	up to 100 mm	up to 80 mm	
Type of voltage		DC	DC	DC	
Red light		●	●	●	
Infrared light	●				
Laser, visible					
Connection					
Cable	●	●	●		
Male cordset			●	●	
Plug connector		●	●		
Terminal compartment					
Output					
PNP switching output		●		●	
NPN switching output		●			
Push-pull output		●	●		
N-channel MOSFET					
Relay output					
NAMUR					
AS-Interface					
Special features					
For "hygienic design"					
For hazardous applications					

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					**Background suppression sensors**
	ML4.2	**ML6**	**ML7**	**ML8**	**Series**
	Page 357 ff	Page 360 ff	Page 365 ff	Page 367 ff	
	• High-precision VISO+ sensors for demanding applications • Scratch-resistant glass optical surface	• Precision VISO+ sensors for standard applications • Robust plastic optical surface	• Miniature housing design with different mounting options • Certified by ECOLAB	• Cost-effective series • Tamperproof, no operating controls • Sensors for detecting critical objects using multiple light spots	**Features**
					Specifications
	up to 80 mm	up to 150 mm	up to 350 mm	up to 350 mm	**Detection range limit**
	DC	DC	DC	DC	**Type of voltage**
	●	●	●	●	**Red light**
	●	●	●	●	**Infrared light**
					Laser, visible
					Connection
	●	●	●	●	**Cable**
	●	●	●	●	**Male cordset**
	●	●	●	●	**Plug connector**
					Terminal compartment
					Output
			●	●	**PNP switching output**
		●		●	**NPN switching output**
	●	●	●		**Push-pull output**
					N-channel MOSFET
					Relay output
					NAMUR
					AS-Interface
					Special features
					For "hygienic design"
					For hazardous applications

Background suppression sensors				
Series	**ML10**	**ML100**	**ML300**	
	Page 372	Page 374	Page 375	
Features	• High-precision miniature background suppressor • Scratch-resistant glass optical surface	• Cost-effective series for standard applications • PowerBeam	• Cost-effective series for standard applications • BERO sensors, analog sensors • Prefault diagnostics	
Specifications				
Detection range limit	up to 2.2 mm	350 mm	200 mm	
Type of voltage		DC	DC	
Red light		●	●	
Infrared light	●			
Laser, visible				
Connection				
Cable		●	●	
Male cordset	●	●		
Plug connector		●	●	
Terminal compartment				
Output				
PNP switching output		●	●	
NPN switching output		●	●	
Push-pull output				
N-channel MOSFET				
Relay output				
NAMUR				
AS-Interface				
Special features				
For "hygienic design"				
For hazardous applications				

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				**Background suppression sensors**
	MLE75/MLE76	**MLV12**	**MLV41**	**Series**
	Page 376 ff	Page 378 ff	Page 380 ff	
	• EHEDG-certified sensors with hygienic design in stainless steel (V4A) housing • Front lens inserted with no gaps and without use of adhesive	• Sensor family in industry-standard housing • 90° rotatable plug	• Corrosion-resistant metal housing • IO-Link interface for service and process data • Shallow installation depth	**Features**
				Specifications
	up to 140 mm	up to 250 mm	350 mm	**Detection range limit**
	DC	DC	DC	**Type of voltage**
	●	●	●	**Red light**
		●	●	**Infrared light**
				Laser, visible
				Connection
	●	●	●	**Cable**
			●	**Male cordset**
	●	●	●	**Plug connector**
				Terminal compartment
				Output
		●		**PNP switching output**
				NPN switching output
	●	●	●	**Push-pull output**
				N-channel MOSFET
				Relay output
				NAMUR
				AS-Interface
				Special features
	●			**For "hygienic design"**
				For hazardous applications

Background suppression sensors				
Series	**RL28**	**RL29**	**RL31**	
	Page 383 ff	Page 389	Page 390 ff	
Features	• Universal series for a wide range of application options • Universal voltage devices with terminal compartment • Programmable timer function	• Cost-effective series for standard applications	• Cost-effective series for standard applications • End value versions with IO-Link interface for service and process data	
Specifications				
Detection range limit	up to 2 m	1.2 m	up to 800 mm	
Type of voltage	DC and AC/DC	DC	DC	
Red light	●	●	●	
Infrared light	●			
Laser, visible	●			
Connection				
Cable	●	●	●	
Male cordset	●	●		
Plug connector	●	●	●	
Terminal compartment	●			
Output				
PNP switching output	●			
NPN switching output				
Push-pull output	●	●	●	
N-channel MOSFET				
Relay output	●			
NAMUR				
AS-Interface	●			
Special features				
For "hygienic design"				
For hazardous applications				

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SENSING YOUR NEEDS

			**Background suppression sensors**
	SBL	**RL32**	**Series**
	Page 392 ff	Page 394	
	• Background suppression sensor for roller conveyors • Slim housing design for mounting between rollers • Sensors with and without integrated control logic for block removal	• EC-type examination certificate for Zone 2 and Zone 22, slim housing design • Glass optical surface	**Features**
			Specifications
	900 mm	up to 800 mm	**Detection range limit**
	DC	DC	**Type of voltage**
		●	**Red light**
	●	●	**Infrared light**
			Laser, visible
			Connection
			Cable
	●		**Male cordset**
	●	●	**Plug connector**
			Terminal compartment
			Output
	●	●	**PNP switching output**
	●		**NPN switching output**
	●		**Push-pull output**
			N-channel MOSFET
			Relay output
			NAMUR
			AS-Interface
			Special features
			For "hygienic design"
		●	**For hazardous applications**

Energetic diffuse mode sensors					
Series	**KT10**	**Ø 12 mm**	**Ø 18 mm**	**ML17**	
	Page 395 ff	Page 397	Page 398 ff	Page 408	
Features	• High-precision M4 miniature sensors • Sturdy V2A stainless steel metal housing	• M12 series for space-saving mounting • Easy commissioning due to visible red light	• Economical Series for standard applications • Basic Series with robust metal housing • Classic Series with wide range of features	• Special housing design for M18 front mounting or side mounting thru-holes	
Specifications					
Detection range limit	80 mm	200 mm	up to 500 mm	450 mm	
Type of voltage	DC	DC	DC and AC/DC	DC	
Red light		●	●		
Infrared light	●		●	●	
Laser, visible			●		
Connection					
Cable	●	●	●	●	
Male cordset				●	
Plug connector		●	●	●	
Terminal compartment					
Output					
PNP switching output		●	●		
NPN switching output		●	●		
Push-pull output			●	●	
N-channel MOSFET			●		
Relay output					
NAMUR					
AS-Interface					
Special features					
For "hygienic design"					
For hazardous applications					

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SENSING YOUR NEEDS

					**Energetic diffuse mode sensors**
	ML7/ML71	**ML8**	**ML100**	**ML300**	**Series**
	Page 405 ff	Page 407	Page 409	Page 410 ff	
	• Miniature housing design with different mounting options • Certified by ECOLAB	• Miniature design • Cost-effective series • Tamperproof, no operating controls	• Cost-effective series for standard applications • PowerBeam	• Cost-effective series for standard applications • BERO sensors, analog sensors • Prefault diagnostics	**Features**
					Specifications
	200 mm	200 mm	1 m	up to 1.2 m	**Detection range limit**
	DC	DC	DC	DC	**Type of voltage**
	●	●	●	●	**Red light**
				●	**Infrared light**
					Laser, visible
					Connection
	●	●	●	●	**Cable**
	●	●	●		**Male cordset**
	●	●	●	●	**Plug connector**
					Terminal compartment
					Output
	●	●	●	●	**PNP switching output**
	●	●	●	●	**NPN switching output**
					Push-pull output
					N-channel MOSFET
					Relay output
					NAMUR
					AS-Interface
					Special features
					For "hygienic design"
					For hazardous applications

Energetic diffuse mode sensors






Series	RL29	RL31	RL61	WTS10
	Page 412	Page 413 ff	Page 415 ff	Page 417
Features	• Cost-effective series for standard applications	• Cost-effective series for standard applications • Devices for DC or AC/DC operation	• Cubic housing design with M30 thread	• Light scanner for checking the quality of welding tips • Coaxial optics with uniform light spot
Specifications				
Detection range limit	2.5 m	up to 2.5 m	up to 4 m	12 mm
Type of voltage	DC	DC and AC/DC	DC and AC/DC	DC
Red light	●	●		●
Infrared light		●	●	
Laser, visible				
Connection				
Cable		●	●	
Male cordset				
Plug connector	●	●	●	●
Terminal compartment				
Output				
PNP switching output				●
NPN switching output				●
Push-pull output	●	●	●	
N-channel MOSFET				
Relay output		●	●	
NAMUR				
AS-Interface				
Special features				
For "hygienic design"				
For hazardous applications				

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				**Energetic diffuse mode sensors**
	MLV11	**RL36**	***VariKont M***	**Series**
	Page 418	Page 419	Page 420	
	• EC-type examination certificate for Zone 1, small housing design • Insensitive to glare due to polarization filter	• EC-type examination certificate for Zone 1, small housing design • Immune	• EC-type examination certificate Zone 20 (dust) and Zone 1 (gas) • Rotatable sensor head	**Features**
				Specifications
	500 mm	2 m	300 mm	**Detection range limit**
	DC	DC	DC	**Type of voltage**
				Red light
	●	●	●	**Infrared light**
				Laser, visible
				Connection
				Cable
				Male cordset
	●			**Plug connector**
		●	●	**Terminal compartment**
				Output
				PNP switching output
				NPN switching output
				Push-pull output
				N-channel MOSFET
				Relay output
	●	●	●	**NAMUR**
				AS-Interface
				Special features
				For "hygienic design"
	●	●	●	**For hazardous applications**

Retroreflective sensors				
Series	**Ø 12 mm**	**Ø 18 mm**	**ML17**	
	Page 421 ff	Page 423 ff	Page 445 ff	
Features	• M12 series for space-saving mounting • Robust metal housing with high IP67 degree of protection • Easy commissioning due to visible red light	• Economical Series for standard applications • Basic Series with robust metal housing • Classic Series with wide range of features	• Special housing design for M18 front mounting or side mounting thru-holes	
Specifications				
Detection range limit	up to 2.5 m	up to 20 m	5 m	
Type of voltage	DC	DC and AC/DC	DC	
Red light	●	●	●	
Infrared light				
Laser, visible		●		
Connection				
Cable	●	●	●	
Male cordset				
Plug connector	●	●	●	
Terminal compartment				
Output				
PNP switching output	●	●		
NPN switching output	●	●		
Push-pull output		●	●	
N-channel MOSFET		●		
Relay output				
NAMUR				
AS-Interface				
Special features				
For "hygienic design"				
For hazardous applications				

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					**Retroreflective sensors**
	R2	**ML4.2**	**ML6**	**ML7/ML71**	**Series**
	Page 434	Page 435	Page 436 ff	Page 438 ff	
	• Ultra small housing • Abrasion-resistant, antistatic glass front	• High-precision VISO+ sensors for demanding applications • Scratch-resistant glass optical surface	• Precision VISO+ sensors for standard applications • Robust plastic optical surface	• Miniature housing design with different mounting options • Certified by ECOLAB	**Features**
					Specifications
	1.4 m	6 m	6 m	up to 7.6 m	**Detection range limit**
	DC	DC	DC	DC	**Type of voltage**
	●	●	●	●	**Red light**
					Infrared light
					Laser, visible
					Connection
	●	●	●	●	**Cable**
				●	**Male cordset**
		●	●	●	**Plug connector**
					Terminal compartment
					Output
	●	●		●	**PNP switching output**
	●			●	**NPN switching output**
		●	●		**Push-pull output**
					N-channel MOSFET
					Relay output
					NAMUR
					AS-Interface
					Special features
					For "hygienic design"
					For hazardous applications

Retroreflective sensors					
Series	**ML8**	**ML100**	**ML300**	**MLE75**	
	Page 443 ff	Page 447 ff	Page 449 ff	Page 451	
Features	• Cost-effective series • Tamperproof, no operating controls • Detection of critical objects using multiple light spots	• Cost-effective series for standard applications • PowerBeam	• Cost-effective series for standard applications • BERO sensors, analog sensors • Prefault diagnostics	• Sensors in stainless steel (V4A) housing for the splash zone • Permanent impermeability even with repeated thermal shocks	
Specifications					
Detection range limit	3.5 m	7 m	up to 7 m	5.1 m	
Type of voltage	DC	DC	DC	DC	
Red light	●	●	●	●	
Infrared light		●			
Laser, visible					
Connection					
Cable	●	●	●	●	
Male cordset	●				
Plug connector	●	●	●	●	
Terminal compartment					
Output					
PNP switching output	●	●	●		
NPN switching output	●	●	●		
Push-pull output				●	
N-channel MOSFET					
Relay output					
NAMUR					
AS-Interface					
Special features					
For "hygienic design"				●	
For hazardous applications					

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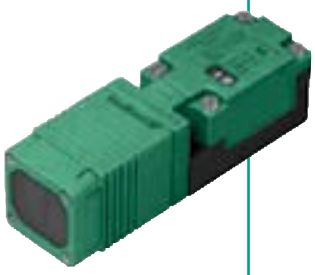
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				**Retroreflective sensors**
	MLE76	**MLV12**	**MLV41**	**Series**
	Page 452	Page 453 ff	Page 457 ff	
	• EHEDG-certified sensors with hygienic design in stainless steel (V4A) housing • Front lens inserted with no gaps and without use of adhesive	• Sensor family in industry-standard housing • Versions with laser • 90° rotatable plug	• Corrosion-resistant metal housing • Version with IO-Link interface for service and process data • Shallow installation depth	**Features**
				Specifications
	5.1 m	up to 21 m	up to 12 m	**Detection range limit**
	DC	DC	DC	**Type of voltage**
	●	●	●	**Red light**
				Infrared light
		●		**Laser, visible**
				Connection
	●	●	●	**Cable**
				Male cordset
	●	●	●	**Plug connector**
				Terminal compartment
				Output
		●	●	**PNP switching output**
		●	●	**NPN switching output**
	●	●	●	**Push-pull output**
				N-channel MOSFET
				Relay output
				NAMUR
				AS-Interface
				Special features
	●			**For "hygienic design"**
				For hazardous applications

Retroreflective sensors					
Series	**RL28**	**RL29**	**RL31**	**RL61**	
	Page 463 ff	Page 472	Page 473 ff	Page 475 ff	
Features	• Universal series for a wide range of application options • Programmable timer function	• Cost-effective series with terminal compartment • Versions with foreground suppression	• Cost-effective series for standard applications • Devices for DC or AC/DC operation	• Cubic housing design with M30 thread • 4 display LEDs • Programmable timer function	
Specifications					
Detection range limit	up to 42 m	up to 10 m	up to 16.5 m	25 m	
Type of voltage	DC and AC/DC	DC	AC and DC	AC and DC	
Red light	●	●	●	●	
Infrared light					
Laser, visible	●				
Connection					
Cable	●	●	●	●	
Male cordset					
Plug connector	●	●	●	●	
Terminal compartment	●				
Output					
PNP switching output	●				
NPN switching output	●				
Push-pull output	●	●	●	●	
N-channel MOSFET					
Relay output	●		●	●	
NAMUR					
AS-Interface	●				
Special features					
For "hygienic design"					
For hazardous applications					

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					Retroreflective sensors
	MLV11	**RL32**	**RL36**	***VariKont M***	Series
	Page 477	Page 478	Page 479	Page 480	
	• EC-type examination certificate for Zone 1, small housing design • Insensitive to glare due to polarization filter	• EC-type examination certificate for Zone 2 and Zone 22, slim housing design • Glass optical surface	• EC-type examination certificate for Zone 1, small housing design • Immune	• EC-type examination certificate Zone 20 (dust) and Zone 1 (gas) • Rotatable sensor head	Features
					Specifications
	3 m	up to 14 m	11.5 m	2 m	Detection range limit
	DC	DC	DC	DC	Type of voltage
	●	●	●	●	Red light
					Infrared light
					Laser, visible
					Connection
					Cable
					Male cordset
	●	●			Plug connector
			●	●	Terminal compartment
					Output
		●			PNP switching output
					NPN switching output
					Push-pull output
					N-channel MOSFET
					Relay output
	●		●	●	NAMUR
					AS-Interface
					Special features
					For "hygienic design"
		●	●	●	For hazardous applications

Thru-beam sensors					
Series	**KS/KSE10**	**Ø 12 mm**	**Ø 18 mm**	**R2**	
	Page 481 ff	Page 483	Page 484 ff	Page 490	
Features	• High-precision M4 miniature sensors • Sturdy V2A stainless steel metal housing	• M12 series for space-saving mounting • Robust metal housing with high IP67 degree of protection • Easy commissioning due to visible red light	• Economical Series for standard applications • Basic Series with robust metal housing • Classic Series with wide range of features	• Ultra small housing • Abrasion-resistant, antistatic glass front	
Specifications					
Detection range limit	1.5 m	5 m	up to 60 m	2.5 m	
Type of voltage	DC	DC	DC and AC/DC	DC	
Red light		●	●	●	
Infrared light	●		●		
Laser, visible			●		
Connection					
Cable	●	●	●		
Male cordset				●	
Plug connector		●	●		
Terminal compartment					
Output					
PNP switching output		●	●	●	
NPN switching output		●	●		
Push-pull output			●		
N-channel MOSFET			●		
Relay output					
NAMUR					
AS-Interface					
Special features					
For "hygienic design"					
For hazardous applications					

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					**Thru-beam sensors**
	ML4.2	**ML7/ML71**	**ML8**	**ML100**	**Series**
	Page 491	Page 492 ff	Page 494	Page 495 ff	
	• High-precision VISO+ sensors for demanding applications • Scratch-resistant glass optical surface	• Versatile miniature design with various mounting options • Certified by ECOLAB	• Cost-effective series with many extras • Tamperproof, no operating controls	• Cost-effective series for standard applications • PowerBeam: high detection ranges up to 30 m	**Features**
					Specifications
	10 m	4.5 m	4.5 m	up to 30 m	**Detection range limit**
	DC	DC	DC	DC	**Type of voltage**
	●	●	●	●	**Red light**
				●	**Infrared light**
					Laser, visible
					Connection
	●	●	●	●	**Cable**
			●	●	**Male cordset**
	●	●	●	●	**Plug connector**
					Terminal compartment
					Output
		●	●	●	**PNP switching output**
		●	●	●	**NPN switching output**
	●				**Push-pull output**
					N-channel MOSFET
					Relay output
					NAMUR
					AS-Interface
					Special features
					For "hygienic design"
					For hazardous applications

Thru-beam sensors				
Series	**ML300**	**MLV12**	**RL28**	
	Page 498 ff	Page 500	Page 501 ff	
Features	• Cost-effective series for standard applications • BERO sensors, analog sensors • Prefault diagnostics	• Sensor family in industry-standard housing • 90° rotatable plug	• Universal series for a wide range of application options • Universal voltage devices with terminal compartment • Programmable timer function	
Specifications				
Detection range limit	up to 14 m	25 m	up to 400 m	
Type of voltage	DC	DC	DC and AC/DC	
Red light	●	●	●	
Infrared light	●	●		
Laser, visible			●	
Connection				
Cable	●	●	●	
Male cordset				
Plug connector	●	●	●	
Terminal compartment			●	
Output				
PNP switching output	●	●	●	
NPN switching output	●			
Push-pull output			●	
N-channel MOSFET				
Relay output			●	
NAMUR				
AS-Interface			●	
Special features				
For "hygienic design"				
For hazardous applications				

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					**Thru-beam sensors**
	RL31	**MLV11**	**RL32**	**RL36**	**Series**
	Page 506 ff	Page 508	Page 509	Page 510	
	• Cost-effective series for standard applications • Devices for DC or AC/DC operation	• EC-type examination certificate for Zone 1, small housing design • Insensitive to glare due to polarization filter • IP67 degree of protection	• EC-type examination certificate for Zone 2 and Zone 22, slim housing design • Glass optical surface	• EC-type examination certificate for Zone 1, large housing design • Immune • Adjustable sensitivity	**Features**
					Specifications
	30 m	10 m	30 m	30 m	**Detection range limit**
	DC and AC/DC	DC	DC	DC	**Type of voltage**
	●	●	●	●	**Red light**
				●	**Infrared light**
					Laser, visible
					Connection
	●				**Cable**
					Male cordset
	●	●	●		**Plug connector**
				●	**Terminal compartment**
					Output
			●		**PNP switching output**
					NPN switching output
	●				**Push-pull output**
					N-channel MOSFET
	●				**Relay output**
		●		●	**NAMUR**
					AS-Interface
					Special features
					For "hygienic design"
		●	●	●	**For hazardous applications**

The Functional Principles at a Glance

The photoelectric sensors or photo sensors used in automation provide all the benefits of rapid and noncontact detection. Our wide range of photoelectric standard sensors is suitable for all noncontact object detection solutions. The many different versions available mean that it is always possible to find the best possible sensor for any application. Ongoing development of these sensors is setting new market trends through innovations such as the measuring photoelectric sensor or the efficient connection of sensors to the control hierarchy via IO-Link.

AT A GLANCE

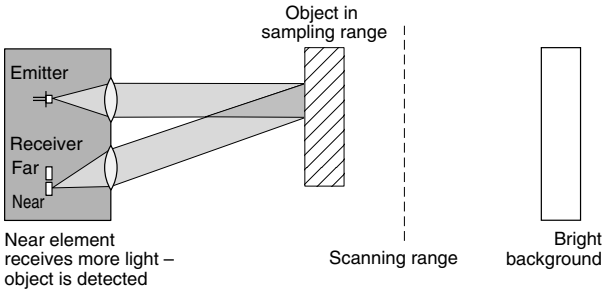
- *Various functional principles are available:*
  - Thru-beam sensors
  - Retroreflective sensors
  - Energetic diffuse mode sensors or background suppression sensors
  - Fiber optic sensors with compatible fiber optic cables
  - Contrast sensors and color sensors
  - Photoelectric slot and slot grid sensors
  - Light grids
- *Brass, stainless steel, or plastic housing*
- *From miniature housings to cylindrical threaded housing to robust compact sensors*
- *Innovative functions for easy setup and safe operation*

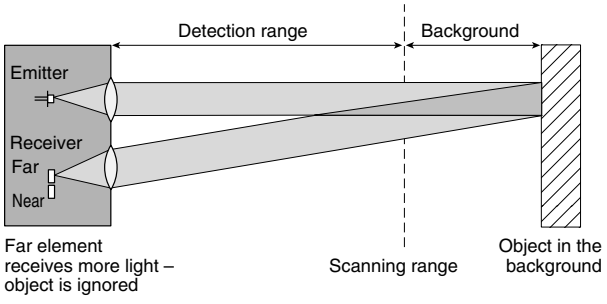
1. Background suppression sensors



Background suppression sensors were developed to reach a defined detection range for any object, regardless of its brightness, color, or other characteristics such as the brightness of the background. The following figure illustrates the functional principle of a background suppression sensor. The light emitted by the emitter is directed by the lens and hits the object. If the object is located within the detection range, a portion of the reflected light, bundled by the receiver lens, is mapped to the near element of the receiver (N); the sensor outputs the “switched on” signal.

As the object’s distance increases, this light spot moves in the direction of the far element (F). At the detection range limit, one half of the light spot is on the near element, the other on the far element and the sensor registers “off.” If the object moves further away, the light only hits the far element and the sensor still registers “off.”





Features:

- *Almost constant detection range for diffuse reflecting materials with extremely different degrees of remission.*
- *Dark objects in front of a light background are reliably detected.*
- *Insensitive to interfering reflections from objects outside of the specified detection range.*
- *High excess gain.*
- *Minimal mounting effort as the sensor consists of one unit and does not require a reflector.*

Similarly to background suppression, it is also possible to make use of foreground suppression. These sensors ignore all objects that are located closer to the sensor than the preset minimum detection range.

Measuring photoelectric sensors



Measuring photoelectric sensors combine the advantages of background/foreground suppression with the measuring functionality of a distance sensor. An integrated measuring core, otherwise found only in distance sensors, enables different switching functions in one device and provides outstanding performance data.

Convergent mode sensors



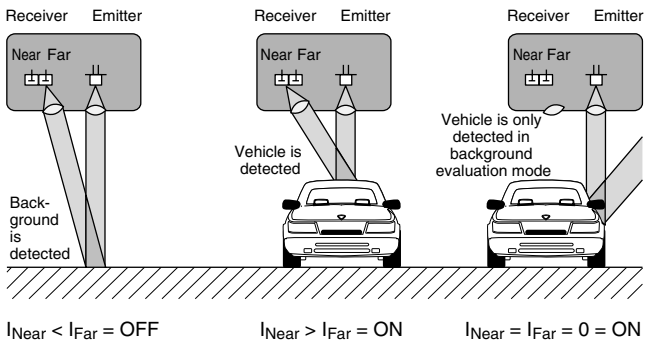
Convergent mode sensors function similarly to background suppression sensors, although the distance between the object and the background is greater. Due to this compromise in terms of selectivity, this device is offered at an extremely attractive cost/benefit ratio. These sensors are the first choice where suppression of an existing background is required in the application despite high cost pressures.

Background evaluation sensors



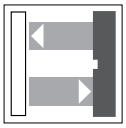
In addition to background suppression, the reverse principle–background evaluation–is also used in certain applications. While the one method ignores the background and detects only objects within the detection range, the other evaluates only the light reflected from the background: the background becomes the reference rather than the object (see Fig.). If an object interrupts the light path to the background, the sensor switches, regardless of whether or not the reflected light reaches the receiver again and indicates a detected object before the background–such as with reflective objects.

Background evaluation sensors do not have a blind zone and are especially suitable for detecting complex, highly reflective objects. In contrast to systems with background suppression, they can also be tested and support self-monitoring.

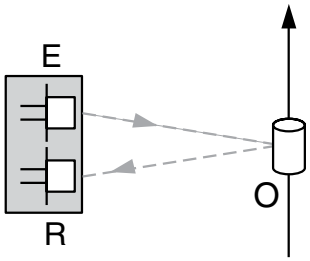


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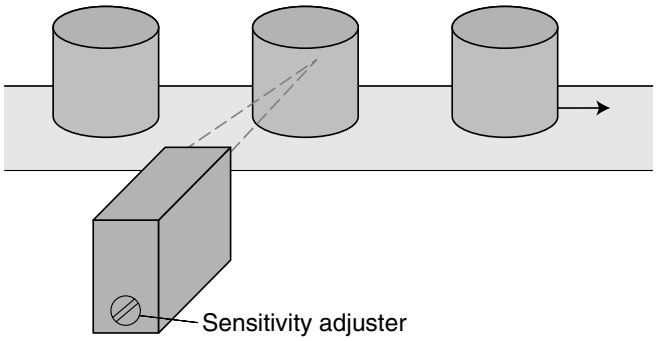
2. Diffuse Mode Sensors



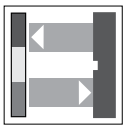
In principle, a diffuse mode sensor is constructed similarly to a retroreflective sensor. However, it does not use a reflector and the receiver evaluates the light reflected from the detected object instead.



Due to the diffuse reflection (remission) by the object, the sensor's detection range is reduced compared with that of the retroreflective sensor. This detection range is the maximum distance from the emitter at which an object can be reliably detected.



Special versions of diffuse mode sensors



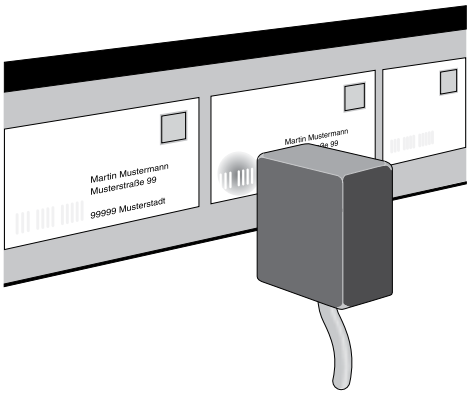
The standard feature of the diffuse mode sensor–that it reacts sensitively to the surface finish of the target–is utilized in contrast sensors and color sensors.

Contrast sensors

This sensor evaluates the difference in brightness between the target and a marking that is applied to it. The color of the emitter light or the color of the print mark is selected to allow as much contrast as possible. Our contrast sensors are fitted with a three-color LED as the light source. The best possible transmitter light color is selected automatically by the sensor during the Teach-in process. A large number of sensors are arranged in accordance with the auto-collimation principle, i.e., the transmitter and receiver and located on a common optical axis (monocular system). This enables the lens to be moved and makes the installation position of the sensor very flexible.

Luminescence sensors

The luminescence sensor–a version of the contrast sensor–works with modulated ultraviolet light. Suitable materials (luminophores) that are applied to the target become photoluminescent when exposed to the light. These materials include optical brighteners in white paper, certain chalks, varnishes, oils, fats, and in highlighters.



The light emitted from the luminophores to the receiver has a longer wavelength than that emitted from the transmitter; it is within the visible spectral range. Due to modulation and the precisely defined frequency shift between the transmitter light and the receiver light, luminescence sensors are barely affected by interfering light sources and therefore function reliably.

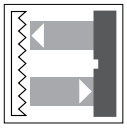
Color sensors

While a standard contrast sensor evaluates only the differences in brightness in a specific spectral range that is predetermined by the light color of the emitter, the color sensor divides the light reflected by the object into several subspectra and provides an intensity value for each of these subspectra. The distribution of these values reflects the spectral characteristics and the color of the target.

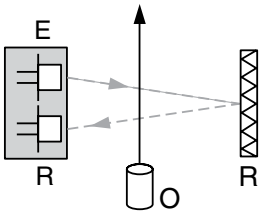
Visolux color sensors operate according to the three-range process, which can be either active or passive.

- ***Active three-range process:***
  The target is illuminated sequentially with the three emitter colors (red, green, and blue). The amount of reflected light is measured individually for each color. The color of the target is clearly determined based upon the three values obtained this way.
- ***Passive three-range process:***
  The target is illuminated with white emitter light. The light source is, for example, a white LED. The red, green, and blue portions of the reflected light are then filtered out and the amount of light is determined in each case. Three receivers are used for this and the values obtained are used to determine the color of the target.

3. Retroreflective Sensors

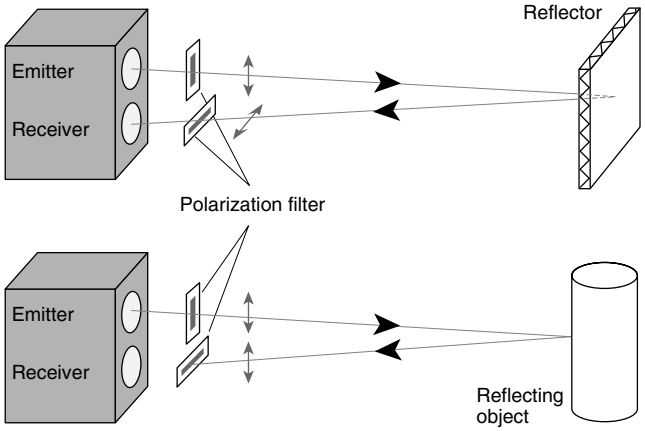


Retroreflective sensors contain an emitter and a receiver in one housing. The emitted light is reflected back to the receiver by a reflector. When the light beam is interrupted, the output is switched.



Retroreflective sensors with polarization filter

A problem typically associated with reflector systems is that shiny and reflective objects cannot be reliably detected. This problem is solved through the use of a polarization filter. Linear polarizing filters are positioned in front of the sensor's emitter and receiver, and the polarization levels are aligned perpendicular to one another (see Fig.). These filters create two polarization planes positioned at 90° from each other. As such, only the light beams from the corner cube reflectors reach the receiver because it changes the polarization level of the light, allowing it to pass freely through the filter in front of the receiver.



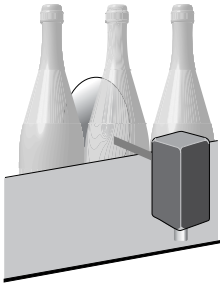
Features:

- *Detects nontransparent objects even with shiny and reflective surfaces.*
- *Clear object detection possible with special sensors (G version).*
- *Minimal installation effort as electrical connection is required for the sensor only.*

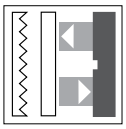
Retroreflective sensors for clear object detection



Retroreflective sensors with reduced exces gain are used for clear object detection. This results in increased switching sensitivity with only minimal absorption through the glass.



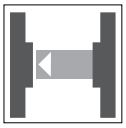
Retroreflective sensors with foreground suppression



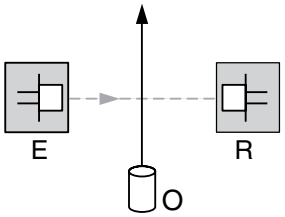
These photoelectric sensors ignore all signals from reflectors and high-gloss reflective objects positioned closer to the sensor than a preset minimum detection range.

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4. Thru-Beam Sensors



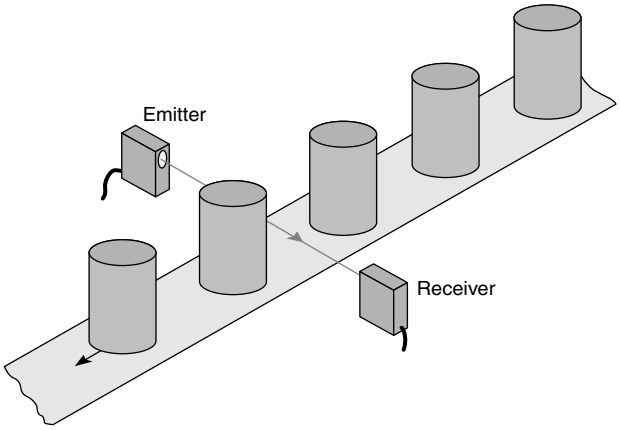
The emitters and receivers of thru-beam sensors are housed in physically separated housings. The emitter (E) sends signals directly to the receiver (R). If an object (O) interrupts the light beam, the receiver voltage decreases and the output is switched.



Features:

- *Detects nontransparent and reflective objects.*
- *Wide detection ranges and high excess gain because the light beam travels only one path, from the emitter to the receiver.*
- *Low susceptibility to interference, therefore ideal for use in difficult conditions, e.g., open-air applications or in dirty surroundings.*
- *Greater installation effort as both units must be mounted and wired.*

Typically, thru-beam sensors are used to monitor production and packaging lines (see Fig.), fill levels in transparent containers, and the safety of doors and hazardous areas. The latter application area is a domain for thru-beam technology.

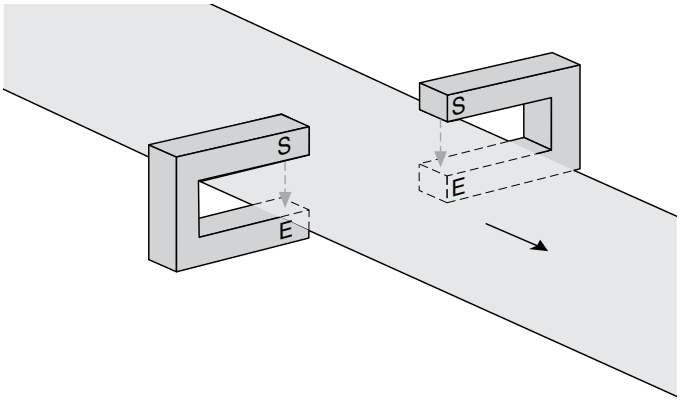


Special versions of thru-beam sensors

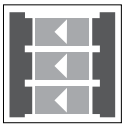
Photoelectric slot sensors



If there is only a short physical distance–a few millimeters or centimeters–to bridge between the emitter and the receiver, they can both be positioned opposite one another in a U-shaped housing. Compared with normal thru-beam sensors, photoelectric slot sensors (see Fig.) benefit from simpler electrical installation as only one device needs to be wired. Also, the optical axes do not need to be adjusted.

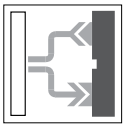


Light grids



Safety applications in particular often involve monitoring a large area. The easiest way to achieve this is through the parallel arrangement of several thru-beam sensors. All the emitters in this type of light grid are grouped into a single housing and all the receivers, whose switching outputs are logically linked, are grouped into another. This reduces the installation effort compared with a corresponding number of individual thru-beam sensors. The distances between the individual beams of the grid are application-specific.

5. Fiber Optic Systems



The optical characteristics of a photoelectric sensor with a fiber optic cable are similar to those of a thru-beam sensor or a diffuse mode sensor, depending on the housing design.

Thru-beam systems have one fiber optic cable each for the emitter and receiver, while in diffuse systems the light is passed through separate emitting and receiving fibers in a single fiber optic cable.

The emitter and receiver are arranged in one housing. The optically active area runs from the device to the sensing point using flexible fiber optic cables made of glass or plastic fibers. Due to their small optically active areas, fiber optic systems are suitable for detecting small details at close range. Special fiber optic cables are used with a coaxial or mixed fiber arrangement and small fiber diameters (plastic fibers: a few hundred µm, glass fibers: typically 50 µm).

The large opening angle at the light exit of the fiber optic cable (approx. 70°) also enables it to be used to achieve shorter detection ranges than standard photoelectric sensors or

light sensors; if necessary, these can be increased using suitable lens attachments.

Glass or plastic?

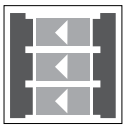
When choosing a suitable fiber optic cable, users can choose between plastic or glass fiber optic. The characteristics of both these materials are briefly outlined below.



- ***Plastic fiber optics***
  consist of a single PVC-sheathed fiber. As the fiber optic cable material is lightweight and very flexible, it can be used on machines with moving parts. One advantage in particular is the individual assembly of the fibers. The standard length is 2 m. The cutter provided can be used to shorten the fiber optic cable easily to the length required for the application. Two different fiber diameters and a range of different fiber heads are available to choose from. You are sure to find a type to suit your application.
- ***Glass fiber optics***
  consist of many individual fibers, each with a diameter of approx. 50 µm. Depending upon the application, sheathing is available in stainless steel, PVC, metal and silicone, or silicone. Due to the low optical attenuation of glass fibers compared to plastic fibers, larger sensing ranges are possible. The robust mechanical design of the stainless steel sheathing means that the cables can be used at temperatures of up to 300 °C. You will find a suitable solution for your application from the range of fiber heads, each of which can be combined with the sheathing materials.

To help you choose the right product, the "Fiber Optic Devices" section highlights which fiber optic cables are suitable for the individual sensor types.

6. Light Grids for Clear Object Detection



The devices in the PR and LG series are high-resolution light curtains for detecting very small position-independent objects.

The use of special low-noise receiver levels and a sophisticated evaluation algorithm enables even highly transparent objects with a high excess gain to be detected reliably.

Crossed beam evaluation:

Each emitter emits light to each receiver. This results in a very high sensor resolution.

Automatic calibration:

After turning on the supply voltage (model number –W) or externally activating the calibration input (model number –F), the sensor automatically calibrates itself. Each individual emitter-receiver distance is calibrated separately.

Example PR16:

16 emitters and 16 receivers for crossed beam evaluation result in 256 light beams being individually evaluated internally. Furthermore, the signal threshold for the individual emitter-receiver distances is permanently adjusted within a certain bandwidth during operation. This means that the sensor compares the stored value with the current measured reception level at certain time intervals.

If these two values differ over time (due to dust on the lens or slight misalignment) the receiver threshold for each of the individual light paths is redefined. This ensures that highly transparent objects are detected even in harsh industrial conditions.

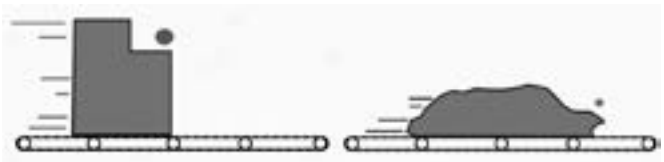
RLG28 retroreflective area sensor

A very effective operating principle



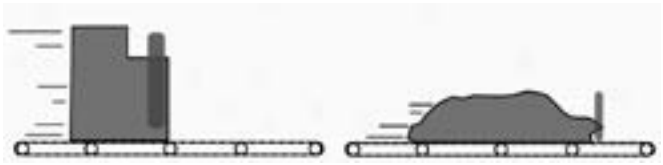
The retroreflective area sensor uniquely combines the advantages of a retroreflective sensor with those of a light grid. A retroreflective area sensor contains several emitters and receivers in one housing and, with a reflector positioned opposite it, forms a detection field with a consistent width and height across the relevant detection range. When the light beams within the detection area are interrupted by an object, the switching function is triggered.

The use of standard photoelectric sensors is often problematic when detecting objects with an appearance that differs occasionally. More specifically, objects with varying front edges regularly overload devices with single-point detection characteristics.



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This sensor solves the problem 100%. It features a 60 mm wide detection field for the reliable detection of objects whose front edges can vary, e.g., different types of pallets, bags, packaged objects, or other items without a clearly defined shape.



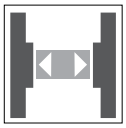
Features:

- *Retroreflective area sensor with six light beams in a standard photoelectric sensor housing*
- *Replaces connection-compatible single-beam photoelectric sensors*
- *Reflection and foil-resistant, shock and vibration-resistant*
- *Uses six beams to generate a 60 mm wide detection area throughout the entire detection range, without a blind zone*
- *Constant detection of objects as small as 12 mm within the entire detection range*
- *Reliable detection of the front edge of the object irrespective of its shape, position, or surface finish*
- *Suitable for low temperature ranges of down to -30 °C*

Application examples

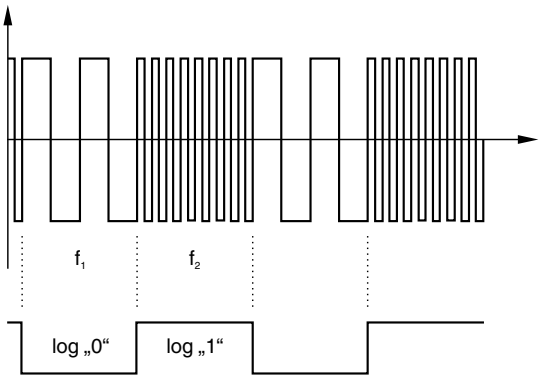
- *Reliable front edge detection for a wide range of objects, such as pallets with different heights and varying reflectivity, as well as dirt and damage*
- *Detection of objects regardless of their shape, e.g., bags or other objects without a clearly defined shape*
- *Detection of objects regardless of their texture, e.g., reflective foil-wrapped objects*
- *Reliable location-independent detection of falling objects, e.g., in ejection control*
- *Overhang control*
- *As a muting sensor*

7. Optical Data Couplers



Optical data couplers use the light for the wireless transmission of information between two points, in cases where wire-based communication is not economically feasible. They perform a protocol-free transfer of the data from the interface to the receiver and make it available at the serial interface, thus solving communication problems with stock feeders, forklift trucks, automated guide vehicles, or monorail conveyors.

Devices are available with different detection ranges and transfer rates. The latest version, the LS680-DA, is the fastest optical data coupler on the market and enables connection to Fast Ethernet networks without reducing the transfer rate for the first time.



Our product range includes optical data couplers for parallel data transfer as well as devices for serial data transfer.

- *Parallel data transfer:*
  An optical data coupler can transfer 8 bits bidirectionally. The signals in the device are converted into a serial bit sequence. In the receiver, the data is reassigned to the parallel outputs. Interference-immune FSK modulation is used to transfer the binary signals.
- *Serial data transfer:*
  Our serial optical data couplers also use the FSK procedure. The data at the interface is transferred free of protocols and then re-output to the serial interface in the receiver. Many devices with a serial interface are also available in a version with a red emitter light. These are always used if parallel transfer paths need to be created and cross-talk with the adjacent infrared path needs to be eliminated.

VISO+

Photoelectrics With Unequaled Benefits

Pepperl+Fuchs photoelectric sensors easily cope with extreme influences such as excessive ambient light, high humidity, or dirt. Which is why most of our standard sensors bear the VISO+ quality symbol.

High priority is given to functional reliability. The sensors operate extremely reliably as the emitters generate between 10 and 100 times more light than is required for reliable detection. As a result, they operate perfectly even in very dirty, dusty environments or with inaccurate alignment. The high degree of insensitivity to ambient light further increases operational reliability and allows them to be used in the direct vicinity of frequency-controlled energy-saving lighting. A high degree of immunity to cross-talk allows several sensors to be positioned closely next to each other.

The features at a glance:

- *Very high excess gain*
- *Very high degree of immunity to ambient light, even with frequency-controlled energy-saving lighting*
- *Protection against cross-talk.*



CE

Properties

- Background suppression
- Cylindrical threaded housing
- Stainless steel housing
- DC sensor
- Requires external amplifier
- Cable version
- Infrared light

Your Benefit

- Smallest sensor design for space-saving mounting
- Reliable detection of all surfaces, regardless of color and structure

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KT10-8-H-8
Detection range	0.5 ... 8 mm
Light type	modulated infrared light , 870 nm
Diameter of the light spot	2 mm at 8 mm sensor range
Operating voltage	see accessory: signal transformer
Signal output	see accessory: signal transformer
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303
Optical face	glass
Protection degree	IP65
Connection	1500 mm fixed cable
	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

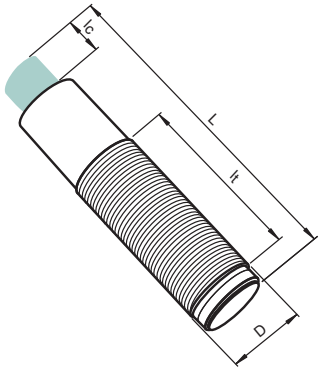
Dimensions	
Length L [mm]	25
Diameter D [mm]	4
Thread length l_t [mm]	25
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

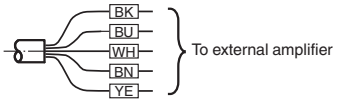
SU11/40a/49/92	External amplifier
SU11/32/40a/82b/92	External amplifier
SU11/40a/49/115	External amplifier
SU10/40a/49/116	External amplifier
BF 4	Mounting flange, 4 mm



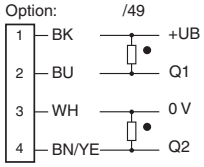
Electrical Connection

❍ = light on, ● = dark on

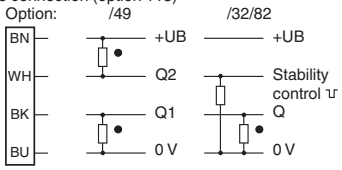
KT10-H/KT10-80



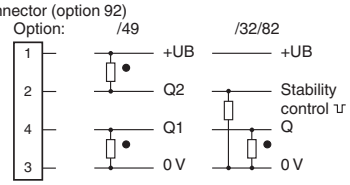
External amplifier SU10 ...



External amplifier SU11 ...
Cable connection (option 115)



Connector (option 92)



Date of issue: 04/08/2015

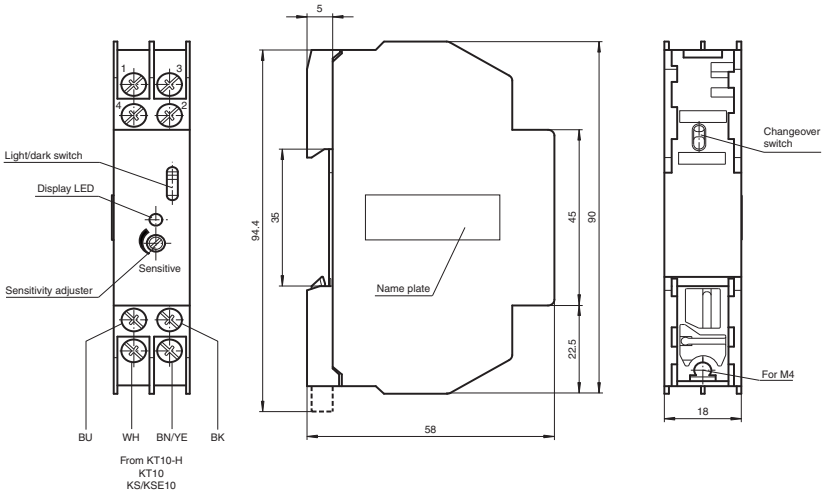
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External amplifier SU10/40a/49/116





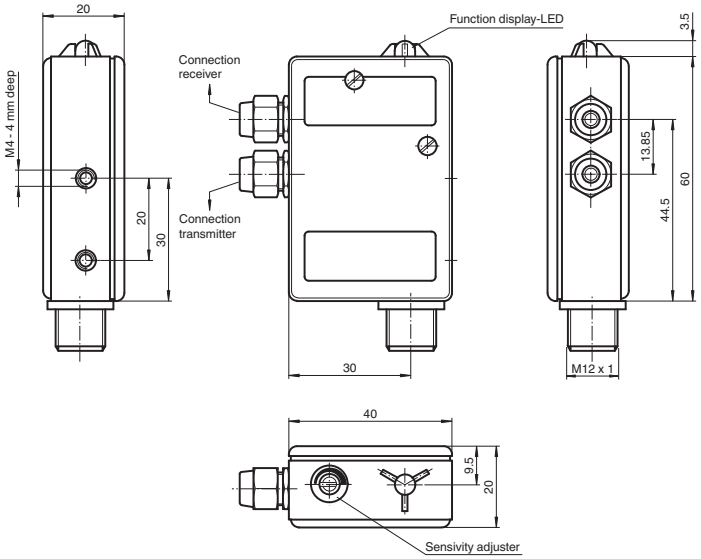
External amplifier for mounting on a standard top hat rail.

Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output
Output current:	max. 200 mA

External amplifier SU11.../92



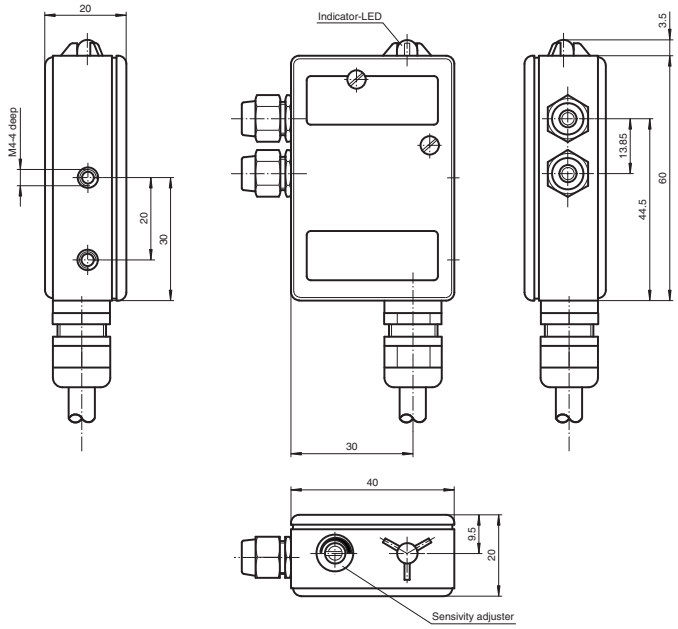


Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

External amplifier SU11.../115





Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

Date of issue: 2015-04-08

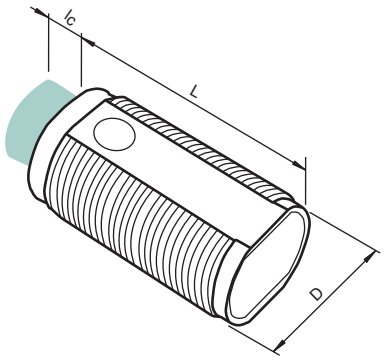


Properties

- Background suppression
- Cylindrical threaded housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Most compact mechanically adjustable M18-background suppression sensor for space-saving mounting
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Adjustable switchpoint



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	10 ... 120 mm
Adjustment range	40 ... 120 mm
Light type	modulated visible red light , 640 nm
Diameter of the light spot	approx. 6 mm at detection range 120 mm
Operating voltage	10 ... 30 V DC
No-load supply current	< 15 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GLV18-8-H-120/115/120	GLV18-8-H-120/25/102/115	GLV18-8-H-120/25/102/159	GLV18-8-H-120/73/120
Switching type	light/dark on	●			●
	light on		●	●	
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions			
Length L [mm]	33		
Diameter D [mm]	18		
Connector area l_c [mm]	7	11	

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on



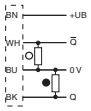
GLV18-8-H-120/25/102/115

Option 25/102/115



GLV18-8-H-120/115/120

Option /115/120





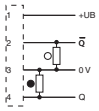
GLV18-8-H-120/25/102/159

Option 25/102/159

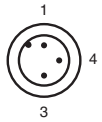


GLV18-8-H-120/73/120

Option 73/120

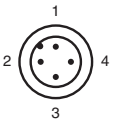


Wire colors in accordance with EN 6



1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Wire colors in accordance with EN 6



1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VT18-8-H-120-M/40a/65b/118/128
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	20 ... 120 mm , adjustable
Light type	modulated visible red light
Diameter of the light spot	approx. 6 mm at a distance of 120 mm
Operating voltage	10 ... 30 V DC
No-load supply current	< 35 mA
Switching type	light/dark on, switchable
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Optical face	plastic
Protection degree	IP67
Connection	M12 connector, 4-pin (Vario-Quick quick connect technology)
	
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Thread length l_t [mm]	41
Connector area l_c [mm]	13

Properties

- **Background suppression**
- **Cylindrical threaded housing**
- **Nickel-plated brass housing**
- **DC sensor**
- **Discrete output**
- **Connector version**
- **Visible red light**

Your Benefit

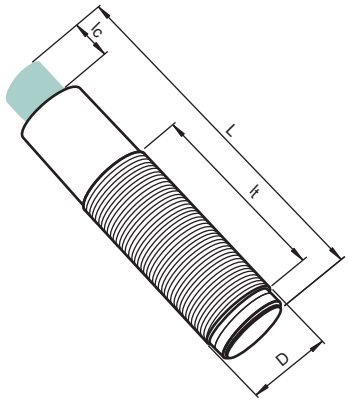
- **Reliable detection of all surfaces, regardless of color and texture**
- **Minimal black/white difference**
- **Adjustable switchpoint**

Further Products

In this series, we offer additionally:

VT18-8-H-120-M/32/40a/65b/118

Tech. spec. like VT18-8-H-120-M/40a/65b/118/128 but:
Signal output: 1 PNP output, short-circuit protected overvoltage protected, open collector



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
OMH-VL18	Mounting Bracket with swivel nut

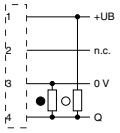
Electrical Connection

❍ = light on, ● = dark on



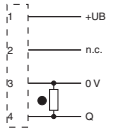
VT18-8-H-120-M/40a/65b/118/128

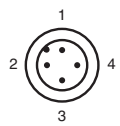
Option 40a/118/128



VT18-8-H-120-M/32/40a/65b/118

Option 32/40a/118





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Background suppression
- Rectangular ultra-small housing
- Plastic housing
- DC sensor
- Discrete output
- Pigtail version
- Visible red light

Your Benefit

- Improved machine availability with abrasion-resistant, antistatic glass front

Technical Data

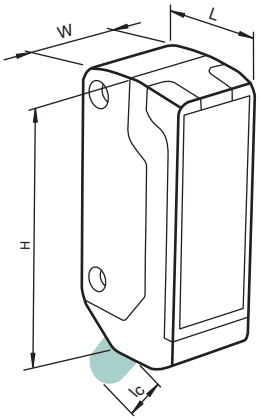
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light, 630 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 10 mA
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector
Switching type	light on
Switching current	max. 50 mA, resistive load
Switching frequency	approx. 800 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC/ABS and PBT
Optical face	glass
Cable	PUR
Protection degree	IP67
Connection	200 m fixed cable with connector M8 x 1, 4-pin



Model Number	green = preferred type	OBT15-R2-E2-0,2M-V31	OBT30-R2-E2-0,2M-V31	OBT50-R2-E2-0,2M-V31	OBT80-R2-E2-0,2M-V31
Detection range	2 ... 15 mm	●			
	1 ... 30 mm		●		
	3 ... 50 mm			●	
	15 ... 80 mm				●
Diameter of the light spot	aaprox 2 mm at a distance of 15 mm	●			
	aaprox 2 mm at a distance of 30 mm		●		
	aaprox 3.5 mm at a distance of 50 mm			●	
	aaprox 5 mm at a distance of 80 mm				●
Approvals and Certificates					
UL approval	cULus Recognized, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	11.2
Width W [mm]	7.5
Height H [mm]	24
Connector area l_c [mm]	0



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MH-R2-01	Mounting bracket
MH-R2-02	Mounting bracket
MH-R2-03	Mounting bracket
MH-R2-04	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable

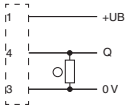
Electrical Connection

❍ = light on, ● = dark on



OBT15-R2-E2-0,2M-V31
OBT30-R2-E2-0,2M-V31
OBT50-R2-E2-0,2M-V31
OBT80-R2-E2-0,2M-V31

Option E2





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 25 mA
Switching type	light/dark on electrically switchable
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	glass pane
Protection degree	IP67

Model Number		ML4.2-8-H-20-RT/40b/110/115	ML4.2-8-H-40-RT/40b/110/115	ML4.2-8-H-60-RT/40b/110/115	ML4.2-8-H-80-RT/40b/110/115	ML4.2-8-H-20-RT/40b/110/115b	ML4.2-8-H-40-RT/40b/110/115b	ML4.2-8-H-80-RT/40b/110/115b	ML4.2-8-H-20-RT/40b/95/110	ML4.2-8-H-40-RT/40b/95/110	ML4.2-8-H-40-43-RT/40b/95/110	ML4.2-8-H-60-RT/40b/95/110	ML4.2-8-H-80-RT/40b/95/110
	green = preferred type												
Detection range	7 ... 20 mm	●				●			●				
	10 ... 40 mm		●				●			●	●		
	10 ... 60 mm			●								●	
	10 ... 80 mm				●			●					●
Connection	2 m fixed cable	●	●	●	●								
	300 mm fixed cable with M12 x 1, 4-pin connector					●	●	●					
	M8 x 1 connector, 4-pin								●	●	●	●	●
													

Approvals and Certificates													
UL approval	cULus Listed	●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.												

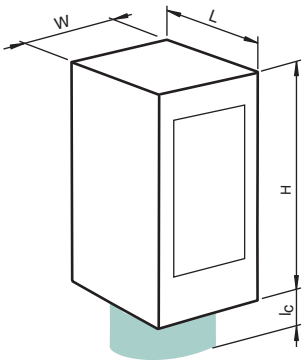
Dimensions			
Length L [mm]	18		
Width W [mm]	13,9		
Height H [mm]	25.4		
Connector area l_c [mm]	7,5		13,9

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small, sharp light spots provide reliable, color insensitive object positioning
- Extremely sharp background suppression
- Antistatic optical face inhibits dust build-up in paper and printing applications



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V1-G-5M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable
V1-W-5M-PUR	Cable socket, M12, 4-pin, PUR cable

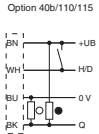
Electrical Connection

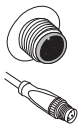
❍ = light on, ● = dark on



ML4.2-8-H-20-RT/40b/110/115
ML4.2-8-H-40-RT/40b/110/115
ML4.2-8-H-60-RT/40b/110/115
ML4.2-8-H-80-RT/40b/110/115

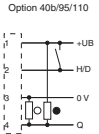
Option 40b/110/115

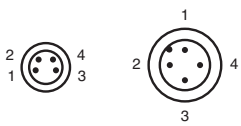




ML4.2-8-H-20-RT/40b/95/110
ML4.2-8-H-40-RT/40b/95/110
ML4.2-8-H-60-RT/40b/95/110
ML4.2-8-H-80-RT/40b/95/110
ML4.2-8-H-40-43-RT/40b/95/110
ML4.2-8-H-40-RT/40b/110/115b
ML4.2-8-H-80-RT/40b/110/115b
ML4.2-8-H-20-RT/40b/110/115b

Option 40b/95/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

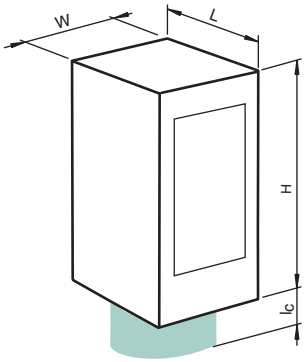


Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small, sharp light spots provide reliable, color insensitive object positioning
- Extremely sharp background suppression
- Antistatic optical face inhibits dust build-up in paper and printing applications



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light , 880 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 25 mA
Switching type	light/dark on electrically switchable
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	ML4.2-8-H-20-IR/40b/110/115	ML4.2-8-H-40-IR/40b/110/115	ML4.2-8-H-60-IR/40b/110/115	ML4.2-8-H-80-IR/40b/110/115	ML4.2-8-H-20-IR/40b/95/110	ML4.2-8-H-40-IR/40b/95/110	ML4.2-8-H-60-IR/40b/95/110	ML4.2-8-H-80-IR/40b/95/110
Detection range	7 ... 20 mm	●				●			
	10 ... 40 mm		●				●		
	10 ... 60 mm			●				●	
	10 ... 80 mm				●				●
Diameter of the light spot	approx. 1.5 mm at 20 mm	●				●			
	approx. 3 mm at 40 mm		●				●		
	approx. 4 mm at 60 mm			●				●	
	approx. 6 mm at 80 mm				●				●
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 4-pin					●	●	●	●

Approvals and Certificates										
UL approval	cULus Listed	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.									

Dimensions		
Length L [mm]	18	
Width W [mm]	13.9	
Height H [mm]	25.4	
Connector area l_c [mm]	7.5	13.9

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

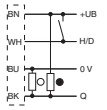
Electrical Connection

❍ = light on, ● = dark on



ML4.2-8-H-40-IR/40b/110/115
ML4.2-8-H-60-IR/40b/110/115
ML4.2-8-H-80-IR/40b/110/115
ML4.2-8-H-20-IR/40b/110/115

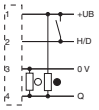
Option 40b/110/115





ML4.2-8-H-20-IR/40b/95/110
ML4.2-8-H-40-IR/40b/95/110
ML4.2-8-H-60-IR/40b/95/110
ML4.2-8-H-21-22-IR/40b/95/110
ML4.2-8-H-80-IR/40b/95/110

Option 40b/95/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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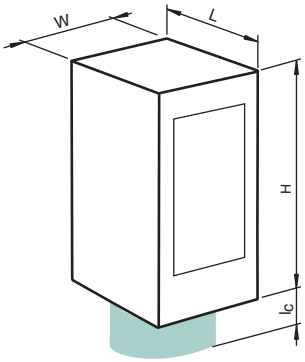


Properties

- Background suppression with multiple beams
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Dual sensor with two light spots
- Improved detection of transparent or reflective materials
- Simple 2-point edge control
- Antistatic optical face inhibits dust in paper and printing applications



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light , 880 nm
Diameter of the light spot	2 light spots: size 2.5 mm distance 5 mm at 20 mm (ML4.2-8-H-20...) size 3.5 mm distance 9 mm at 40 mm (ML4.2-8-H-40...)
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	glass pane
Protection degree	IP67

Model Number		ML4.2-8-H-20-IR/DS/25/95/136	ML4.2-8-H-20-IR/DS/40b/95/110	ML4.2-8-H-40-IR/DS/40b/95/110	ML4.2-8-H-40-IR/DS/40b/110/115
Detection range	10 ... 40 mm			●	●
	7 ... 20 mm	●	●		
Light type	modulated infrared light , 880 nm	●	●	●	●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●	●	●
	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected	●			
Switching type	light on: +UB / dark on: 0V	●			
	light/dark on electrically switchable		●	●	●
Connection	2 m fixed cable				●
	M8 x 1 connector, 4-pin	●	●	●	

Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions			
Length L [mm]	18		
Width W [mm]	13,9		
Height H [mm]	25,4		
Connector area l_c [mm]	13,9		7,5

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

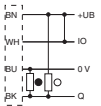
Electrical Connection

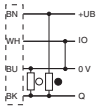
❍ = light on, ● = dark on

ML4.2-8-H-40-IR/DS/40b/110/115



Option 40b/110/115

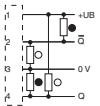




ML4.2-8-H-20-IR/DS/25/95/136

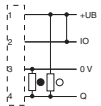


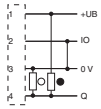
Option 25/95/136



ML4.2-8-H-20-IR/DS/40b/95/110
ML4.2-8-H-40-IR/DS/40b/95/110

Option 40b/95/110







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 25 mA
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67
Connection	2 m fixed cable



Model Number		ML6-8-H-20-RT/59/115/136	ML6-8-H-40-RT/40b/102/115	ML6-8-H-40-RT/59/115/136	ML6-8-H-60-RT/59/115/136	ML6-8-H-80-RT/59/115/136
Detection range	7 ... 20 mm	●				
	10 ... 40 mm		●	●		
	10 ... 60 mm				●	
	10 ... 80 mm					●
Diameter of the light spot	approx. 1.5 mm at 20 mm	●				
	approx. 3 mm at 40 mm		●	●		
	approx. 4 mm at 60 mm				●	
	approx. 6 mm at 80 mm					●
Signal output	NPN, open collector short-circuit protected reverse polarity protected		●			
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●		●	●	●
Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

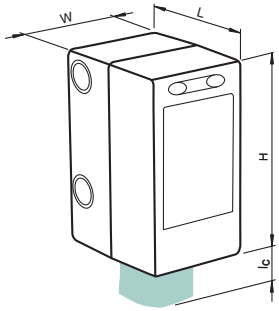
Dimensions	
Length L [mm]	18
Width W [mm]	13,9
Height H [mm]	25,4
Connector area l_c [mm]	7,5

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable version
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small, sharp light spots provide reliable, color insensitive object positioning
- Extremely sharp background suppression



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket

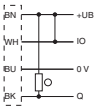
Electrical Connection

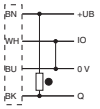
❍ = light on, ● = dark on

ML6-8-H-40-RT/40b/102/115



Option 40b/102/115



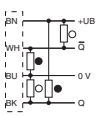






ML6-8-H-60-RT/59/115/136
ML6-8-H-80-RT/59/115/136
ML6-8-H-20-RT/59/115/136
ML6-8-H-40-RT/59/115/136
ML6-8-H-80-RT/110/115a

Option 59/115/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 25 mA
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67
Connection	M8 x 1 connector, 4-pin



Model Number	green = preferred type	ML6-8-H-20-RT/59/95/136	ML6-8-H-40-RT/59/95/136	ML6-8-H-40-RT/95/102	ML6-8-H-60-RT/59/95/136	ML6-8-H-80-RT/59/95/136
Detection range	7 ... 20 mm	●				
	10 ... 40 mm		●	●		
	10 ... 60 mm				●	
	10 ... 80 mm					●
Diameter of the light spot	approx. 1.5 mm at 20 mm	●				
	approx. 3 mm at 40 mm		●	●		
	approx. 4 mm at 60 mm				●	
	approx. 6 mm at 80 mm					●
Signal output	NPN, open collector short-circuit protected reverse polarity protected			●		
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●		●	●
Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

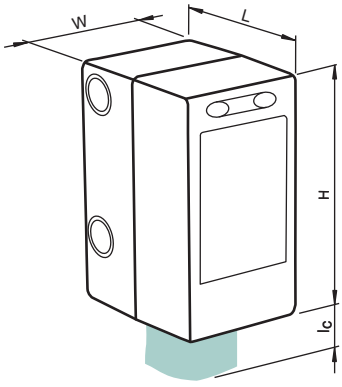
Dimensions	
Length L [mm]	18
Width W [mm]	13.9
Height H [mm]	25.4
Connector area l_c [mm]	13.9

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small, sharp light spots provide reliable, color insensitive object positioning
- Extremely sharp background suppression



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

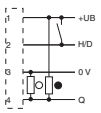
Electrical Connection

❍ = light on, ● = dark on



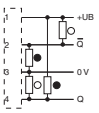
ML6-8-H-150-RT/40b/65a/95/110

Option 40b/95/110



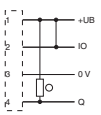
ML6-8-H-60-RT/59/95/136
ML6-8-H-80-RT/59/95/136
ML6-8-H-20-RT/59/95/136
ML6-8-H-40-RT/59/95/136

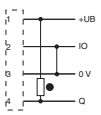
Option 59/95/136



ML6-8-H-40-RT/95/102

Option 95/102







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	15 ... 150 mm
Adjustment range	30 ... 150 mm
Light type	modulated visible red light , 660 nm
Diameter of the light spot	approx. 6 mm at detection range 150 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	ML6-8-H-150-RT/59/65a/115/136	ML6-8-H-150-RT/59/65a/115b/136	ML6-8-H-150-RT/40b/65a/95/110
Switching type	light/dark on electrically switchable			●
	light/dark on, programmable	●	●	
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected			●
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●	
Connection	2 m fixed cable	●		
	300 mm fixed cable with M12 x 1, 4-pin connector		●	
	M8 x 1 connector, 4-pin			●
				
Approvals and Certificates				
UL approval	cULus Listed	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		18		
Width W [mm]		13,9		
Height H [mm]		25,4		
Connector area l_c [mm]		7,5		13,9

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Various connection versions
- Visible red light

Your Benefit

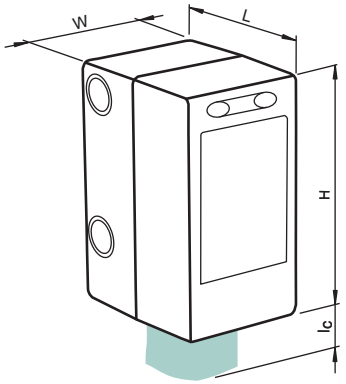
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- Adjustable switchpoint

Further Products

In this series, we also offer:

ML6-8-H-120-RT/59/65a/95/136

Spec. like ML6-8-H-150-RT/59/65a/115b/136 but:
Detection range: 15 ... 120 mm
Connection: M8 x 1 connector, 4-pin



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

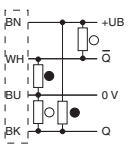
Electrical Connection

❍ = light on, ● = dark on

ML6-8-H-150-RT/59/65a/115/136



Option 59/115/136



ML6-8-H-150-RT/40b/65a/95/110

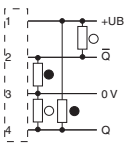


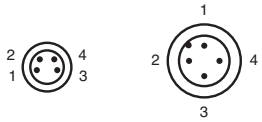
Option 40b/95/110



ML6-8-H-150-RT/59/65a/115b/136

Option 59/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	15 ... 150 mm
Adjustment range	30 ... 150 mm
Light type	modulated infrared light , 880 nm
Diameter of the light spot	approx. 6 mm at detection range 150 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Switching type	light/dark on, programmable
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67

Model Number		ML6-8-H-150-IR/59/65a/115/136	ML6-8-H-150-IR/59/65a/95/136
Connection	2 m fixed cable	●	
	M8 x 1 connector, 4-pin		●
			
Approvals and Certificates			
UL approval	cULus Listed	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

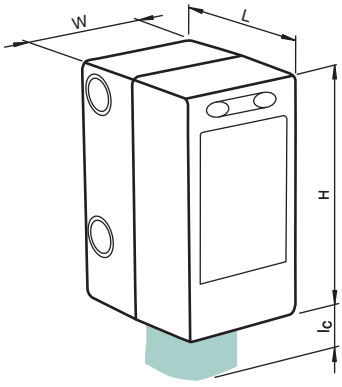
Dimensions		
Length L [mm]	18	
Width W [mm]	13.9	
Height H [mm]	25.4	
Connector area l_c [mm]	7.5	13.9

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- Adjustable switchpoint



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

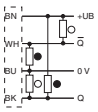
Electrical Connection

❍ = light on, ● = dark on



ML6-8-H-150-IR/59/65a/115/136

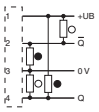
Option 59/115/136





ML6-8-H-150-IR/59/65a/95/136

Option 59/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

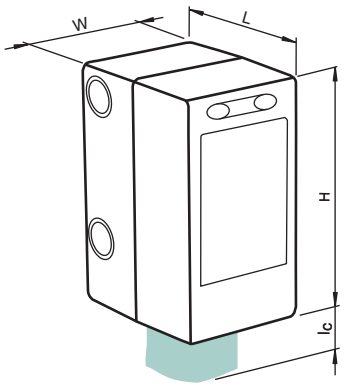


Properties

- Background suppression with multiple beams
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Dual sensor with two light spots
- Improved detection of transparent or reflective materials and 2-point edge control



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	660 nm visible red light
Diameter of the light spot	2 light spots: size 2.5 mm, distance 5 mm at 20 mm (ML6-8-H-20...) size 3.5 mm, distance 9 mm at 40 mm (ML6-8-H-40...)
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching type	light on +UB dark on: 0 V
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67

Model Number		ML6-8-H-40-RT/DS/25/115/136	ML6-8-H-20-RT/DS/25/95/136	ML6-8-H-40-RT/DS/25/95/136
Detection range	7 ... 20 mm		●	
	10 ... 40 mm	●		●
Connection	2 m fixed cable	●		
	M8 x 1 connector, 4-pin		●	●
				
Approvals and Certificates				
UL approval	cULus Listed	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		18		
Width W [mm]		13.9		
Height H [mm]		25.4		
Connector area I_c [mm]		7.5	13.9	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

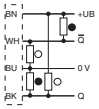
Electrical Connection

❍ = light on, ● = dark on



ML6-8-H-40-RT/DS/25/115/136

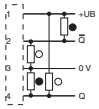
Option 25/115/136





ML6-8-H-20-RT/DS/25/95/136
ML6-8-H-40-RT/DS/25/95/136

Option 25/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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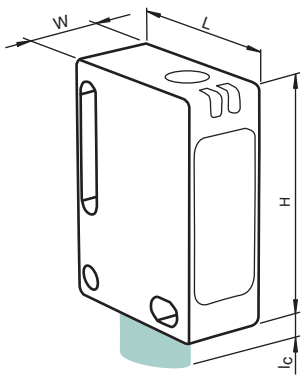


Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- Adjustable switchpoint
- ECOLAB certificate



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	5 ... 140 mm
Adjustment range	25 ... 140 mm
Light type	modulated visible red light
Diameter of the light spot	approx. 5 mm at detection range 120 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		ML7-8-H-140-RT/59/65a/115/136	ML7-8-H-140-RT/59/65a/115a/136	ML7-8-H-140-RT/59/65a/115b/136	ML7-8-H-140-RT/59/65a/136/143
	green = preferred type				
Connection	2 m fixed cable	●			
	200 mm fixed cable with 4-pin, M12x1 connector			●	
	200 mm fixed cable with 4-pin, M8x1 connector		●		
	M8 x 1 connector, 4-pin				●

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions			
Length L [mm]	23		
Width W [mm]	11		
Height H [mm]	31		
Connector area l_c [mm]	7.6		9.1

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

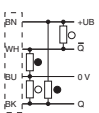
Electrical Connection

❍ = light on, ● = dark on

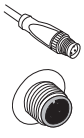
ML7-8-H-140-RT/59/65a/115/136



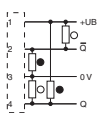
Option 59/115/136



ML7-8-H-140-RT/59/65a/115a/136
ML7-8-H-140-RT/59/65a/115b/136

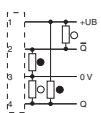


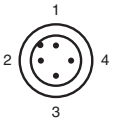
Option 59/115b/136



ML7-8-H-140-RT/59/65a/136/143

Option 59/136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light type	modulated infrared light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on
Switching current	max. 100 mA
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number	green = preferred type	ML7-8-H-140-IR/59/65a/115/136	ML7-8-H-140-IR/59/65a/115b/136	ML7-8-H-350-IR/59/65a/115a/136	ML7-8-H-350-IR/65a/115b/120	ML7-8-H-140-IR/59/65a/136/143	ML7-8-H-350-IR/59/65a/136/143
Detection range	4 ... 140 mm	●	●			●	
	5 ... 350 mm			●	●		●
Adjustment range	25 ... 140 mm	●	●			●	
	25 ... 350 mm			●	●		●
Diameter of the light spot	approx. 15 mm at detection range 350 mm			●	●		●
	approx. 5 mm at detection range 120 mm	●	●			●	
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●	●		●	●
	2 PNP, complementary, short-circuit protected, reverse polarity protected				●		
Switching frequency	1 kHz	●	●			●	
	250 Hz			●	●		●
Connection	2 m fixed cable	●					
	200 mm fixed cable with 4-pin, M12x1 connector		●		●		
	200 mm fixed cable with 4-pin, M8x1 connector			●			
	M8 x 1 connector, 4-pin					●	●
							

Approvals and Certificates							
Protection class	II	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

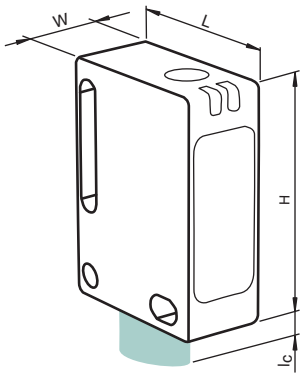
Dimensions							
Length L [mm]		23					
Width W [mm]		11					
Height H [mm]		31					
Connector area l_c [mm]		7,6				9,1	

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Infrared light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- Adjustable switchpoint
- ECOLAB certificate



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

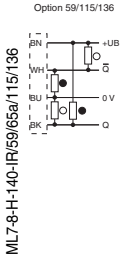
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

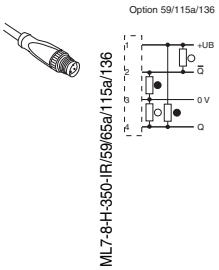
Electrical Connection

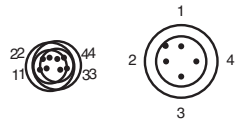
❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Background suppression	✔
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 15 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67

Model Number		ML8-8-H-30-RT/102/115/162	ML8-8-H-50-RT/102/115/162	ML8-8-H-30-RT/103/143/162	ML8-8-H-50-RT/103/143/162
Detection range	15 ... 30 mm	●		●	
	20 ... 50 mm		●		●
Diameter of the light spot	2 light spots; 11 mm apart, spotsize 4 mm at a distance of 50 mm		●		●
	3 light spots, 12 mm apart (outer spot to outer spot), spotsize 3.5 mm at a distance of 30 mm	●		●	
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●
Connection	2 m fixed cable	●	●		
	M8 x 1 connector, 4-pin			●	●
					

Approvals and Certificates						
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

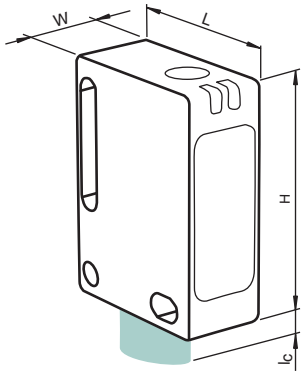
Dimensions		
Length L [mm]	23	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	7.6	9.1

Properties

- Background suppression with multiple beams
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Special sensors for printed circuit board and irregular object detection
- Reliably detects printed circuit boards with multiple light spots in a row
- Reliable detection of PCBs even with a near background
- Ignores holes, indentations and components on the circuit board
- Slotted mounting holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

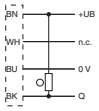
Electrical Connection

❍ = light on, ● = dark on



ML8-8-H-50-RT/102/115/162
ML8-8-H-30-RT/102/115/162

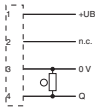
Option /25/102/115





ML8-8-H-50-RT/103/143/162
ML8-8-H-30-RT/103/143/162

Option /25/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Background suppression	✔
Sensing range adjustment	✔
Detection range	20 ... 100 mm
Adjustment range	25 ... 100 mm
Light type	modulated visible red light , 640 nm
Diameter of the light spot	2 light spots; 12 mm apart, spotsize 4 mm at a distance of 50 mm, 25 mm apart, spotsize 10 mm at a distance of 100 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 15 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67

Model Number		ML8-8-H-100-RT/65a/102/115/162	ML8-8-H-100-RT/65a/103/115/162	ML8-8-H-100-RT/65a/102/143/162	ML8-8-H-100-RT/65a/103/143/162
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	M8 x 1 connector, 4-pin			●	●
Approvals and Certificates					
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

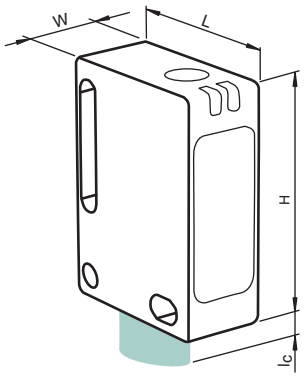
Dimensions		
Length L [mm]	23	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	7.6	9.1

Properties

- Background suppression with multiple beams
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Special sensors for printed circuit board and irregular object detection
- Reliably detects printed circuit boards with multiple light spots in a row
- Reliable detection of PCBs even with a near background
- Ignores holes, indentations and components on the circuit board
- Slotted mounting holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

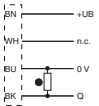
Electrical Connection

❍ = light on, ● = dark on



ML8-8-H-100-RT/65a/103/115/162
ML8-8-H-100-RT/65a/102/115/162

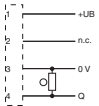
Option /59/103/115





ML8-8-H-100-RT/65a/103/143/162
ML8-8-H-100-RT/65a/102/143/162

Option /25/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Background suppression	✔
Sensing range adjustment	✔
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light on
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector
Switching current	max. 100 mA
Switching frequency	200 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP65
Connection	2 m fixed cable



Model Number		ML8-8-H-140-RT/65a/102/115	ML8-8-H-350-IR/65a/102/115
Detection range	4 ... 350 mm		●
	5 ... 140 mm	●	
Adjustment range	25 ... 140 mm	●	
	25 ... 350 mm		●
Light type	modulated infrared light		●
	modulated visible red light	●	
Diameter of the light spot	approx. 15 mm at detection range 350 mm		●
	approx. 5 mm at detection range 120 mm	●	
Approvals and Certificates			
Protection class	II, rated voltage ≤ 50 V AC with pollution degree 1-2 according to IEC 60664-1	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		23	
Width W [mm]		11	
Height H [mm]		31	
Connector area l_c [mm]		7.6	

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable version
- Visible red and infrared light versions

Your Benefit

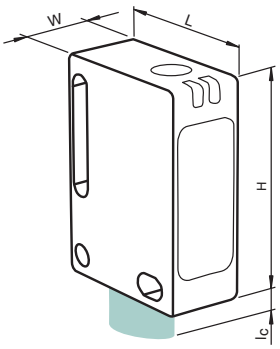
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Slotted mounting holes provide flexible mounting options

Further Products

In this series, we offer additionally:

ML8-8-H-350-IR/25/65a/103/115b

Tech. spec. like ML8-8-H-350-IR/65a/102/115 but:
Signal output: 1 NPN output
Switching type: light on
Connection: fixed cable 300 mm with M12 connector 4-pin



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

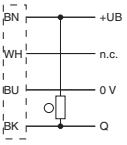
Electrical Connection

❍ = light on, ● = dark on



ML8-8-H-350-IR/65a/102/115
ML8-8-H-140-RT/65a/102/115

Option /25/102/115



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	5 ... 220 mm
Adjustment range	100 ... 220 mm
Light type	modulated visible red light
Diameter of the light spot	approx. 10 mm at detection range 220 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 15 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP65/IP67

Model Number		ML8-8-HGU-220-RT/102/115	ML8-8-HGU-220-RT/103/115b	ML8-8-HGU-220-RT/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●	●
Connection	2 m fixed cable	●		
	fixed cable 300 mm with M12 connector, 4-pin		●	
	M8 x 1 connector, 4-pin			●
				
Approvals and Certificates				
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

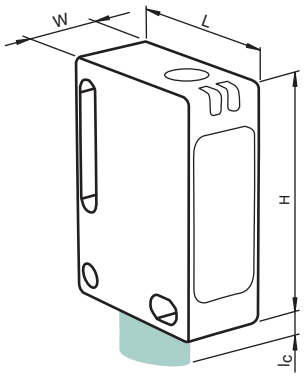
Dimensions		
Length L [mm]	23	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	7.6	9.1

Properties

- Diffuse type with convergent beam
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Convergent sensing ignores some objects in the background
- Slotted mounting holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

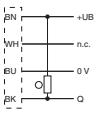
Electrical Connection

❍ = light on, ● = dark on

ML8-8-HGU-220-RT/102/115



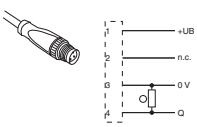
Option /25/102/115



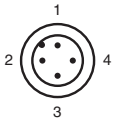
ML8-8-HGU-220-RT/103/115b
ML8-8-HGU-220-RT/103/143



Option /25/103







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light on
Switching current	max. 100 mA
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP65 / IP67

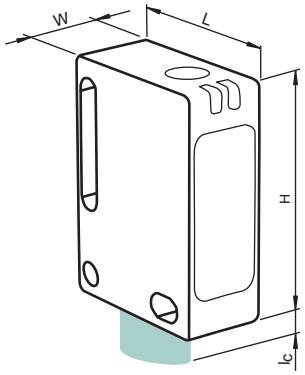
Model Number		ML8-8-HGU-30-RT/102/115/162	ML8-8-HGU-50-RT/102/115/162	ML8-8-HGU-30-RT/103/143/162	ML8-8-HGU-50-RT/103/143/162
Detection range	15 ... 30 mm	●		●	
	25 ... 50 mm		●		●
Diameter of the light spot	approx. 4 mm x 35 mm at 50 mm		●		●
	approx. 5 mm x 25 mm at 30 mm	●		●	
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●
Connection	2 m fixed cable	●	●		
	M8 x 1 connector, 4-pin			●	●
					
Approvals and Certificates					
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		23			
Width W [mm]		11			
Height H [mm]		31			
Connector area l_c [mm]		7.6		9.1	

Properties

- Diffuse type with convergent beam with elongated light spot
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Special sensors for printed circuit board or irregular object detection
- Reliably detects printed circuit boards using a long and very narrow light spot
- Accurate position detection
- Elliptical light spot ignores holes and indentations
- Slotted mounting holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate

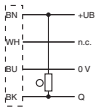
Electrical Connection

❍ = light on, ● = dark on



ML8-8-HGU-50-RT/102/115/162
ML8-8-HGU-30-RT/102/115/162

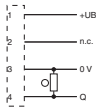
Option /25/102/115





ML8-8-HGU-30-RT/103/143/162
ML8-8-HGU-50-RT/103/143/162

Option /25/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	0.9 ... 2.2 mm
Light type	modulated infrared light , 870 nm
Diameter of the light spot	2 mm at sensor range 2.2 mm
Operating voltage	see accessory: external amplifier
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC/ABS
Optical face	glass
Protection degree	IP65

Model Number	ML10-8-H-3,2-IR/115	ML10-8-H-3,2-IR/115e
Connection		
2 m cable with 4-pin connector		●
2 m cable with 5-pin connector	●	



Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	20
Width W [mm]	12
Height H [mm]	14
Connector area l_c [mm]	0

Properties

- Background suppression
- Rectangular nano housing
- Plastic housing
- Requires external amplifier
- Cable version
- Infrared light

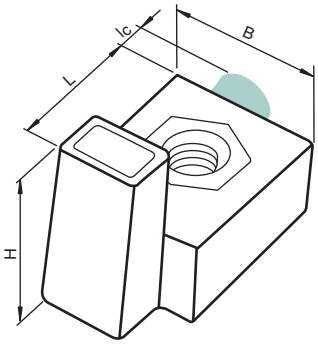
Your Benefit

- Special miniature design fits under feeder tables
- Smallest rectangular background suppression sensor for space saving
- Almost as small as fiber optics, but much better performance
- Precision through maximum switching accuracy
- Simple mounting with only one screw

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

SU180-MD/40ab/115/170	External amplifier for single sensor connection - Master module
SU100/25/145/165	External amplifier for connection of up to 3 devices ML10
SU180-MD/40b/110/115	External amplifier for single sensor connection - Master module
SU180-SD/40ab/115/170	External amplifier for single sensor connection - Slave module
SU180-SD/40b/110/115	External amplifier for single sensor connection - Slave module



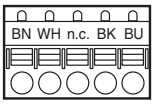
Electrical Connection

❍ = light on, ● = dark on



ML10-8-H-3,2-IR/115e
ML10-8-H-3,2-IR/115





Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 30 mA
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection, overvoltage protected
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)
Material	
Housing	ABS
Optical face	Acrylic
Protection degree	IP67

Model Number		ML17-8-H-50-RT/115/136	ML17-8-H-100-RT/115/136	ML17-8-H-50-RT/115b/136	ML17-8-H-100-RT/115b/136	ML17-8-H-50-RT/136/143	ML17-8-H-100-RT/136/143	ML17-8-H-50-RT/73/136	ML17-8-H-100-RT/73/136
Detection range	10 ... 100 mm		●		●		●		●
	10 ... 50 mm	●		●		●		●	
Diameter of the light spot	≤ 3 mm at 50 mm	●		●		●		●	
	≤ 6 mm at 100 mm		●		●		●		●
Connection	150 mm PVC cable with 4-pin, M12 connector			●	●				
	2 m PVC cable	●	●						
	4-pin , M12 x 1 connector							●	●
	4-pin , M8 x 1 connector					●	●		

Approvals and Certificates									
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

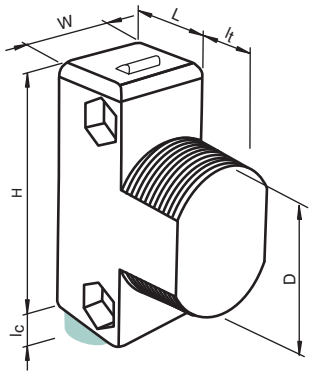
Dimensions			
Length L [mm]	19		
Width W [mm]	15		
Height H [mm]	35		
Thread length l_t [mm]	10		
Connector area l_c [mm]	0	10	18

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Threaded face and side thru-holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket

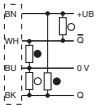
Electrical Connection

❍ = light on, ● = dark on



ML17-8-H-100-RT/115/136
ML17-8-H-50-RT/115/136

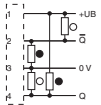
Option 59/115/136





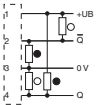
ML17-8-H-100-RT/73/136
ML17-8-H-50-RT/73/136

Option 73/136



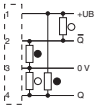
ML17-8-H-100-RT/115b/136
ML17-8-H-50-RT/115b/136

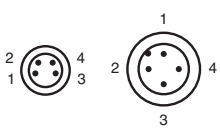
Option 59/115b/136



ML17-8-H-100-RT/136/143
ML17-8-H-50-RT/136/143

Option 59/136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

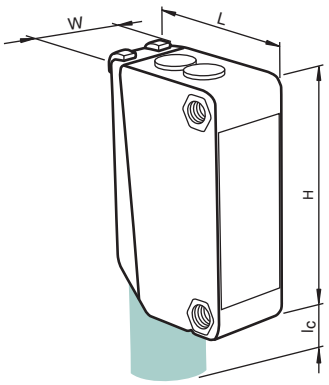


Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Simplest alignment and set-up with ultra-bright Power-Beam emitter LED
- Small black/white difference
- Adjustable long range version
- Rugged housing has metal-reinforced mounting holes



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	5 ... 350 mm
Adjustment range	30 ... 350 mm
Light type	modulated visible red light
Diameter of the light spot	approx. 20 mm at a distance of 350 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	500 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	ML100-8-H-350-RT/102/115	ML100-8-H-350-RT/103/115	ML100-8-H-350-RT/103/115a	ML100-8-H-350-RT/103/115b	ML100-8-H-350-RT/95/102	ML100-8-H-350-RT/95/103	ML100-8-H-350-RT/98/102	ML100-8-H-350-RT/98/103
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●				●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●	●	●		●		●
Connection	2 m fixed cable	●	●						
	300 mm fixed cable with 4-pin, M12 x 1 connector				●				
	300 mm fixed cable with M8 connector, 4-pin			●					
	connector M8 x 1 , 3-pin							●	●
	connector M8 x 1 , 4-pin					●	●		

Approvals and Certificates		
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions		
Length L [mm]	20	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	0	10

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

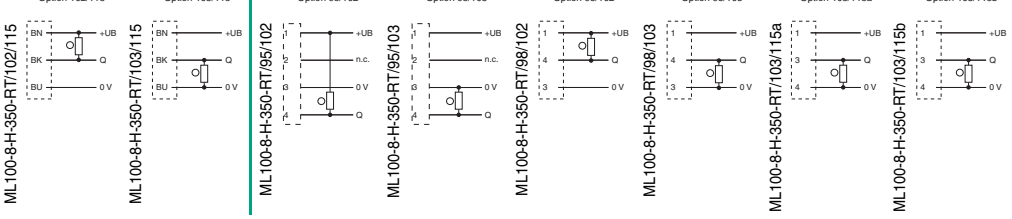
OMH-ML100-01	Mounting bracket
OMH-ML100-02	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series

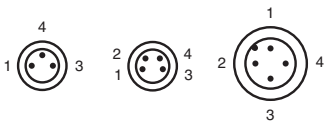
Electrical Connection

❍ = light on, ● = dark on









Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	0 ... 200 mm , adjustable
Adjustment range	25 ... 200 mm
Light type	modulated visible red light , 660 nm
Diameter of the light spot	approx. 12 mm at a distance of 200 mm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 25 mA
Switching current	max. 0.1 A
Switching frequency	500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	PBT
Optical face	glass pane
Protection degree	IP67
Connection	M8 x 1 connector, 3-pin



Model Number		ML300-8-H-200-RT/25/98/103	ML300-8-H-200-RT/59/98/103	ML300-8-H-200-RT/25/98/102
Switching type	dark on		●	
	light on	●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector			●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●	
Approvals and Certificates				
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

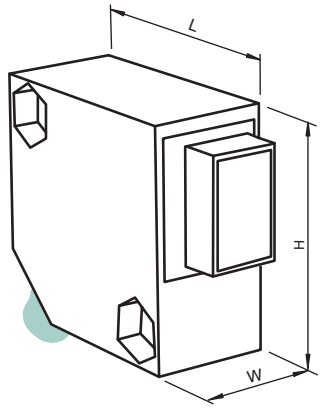
Dimensions	
Length L [mm]	30
Width W [mm]	15
Height H [mm]	30

Properties

- Background suppression
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail

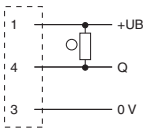
Electrical Connection

❍ = light on, ● = dark on



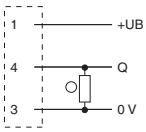
ML300-8-H-200-RT/25/98/102

Option 98/102



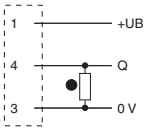
ML300-8-H-200-RT/25/98/103

Option 98/103



ML300-8-H-200-RT/59/98/103

Option 59/98/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Background suppression	✔
Detection range	13 ... 140 mm
Light type	modulated visible red light
Diameter of the light spot	approx. 5 mm at detection range 120 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	dark on
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		MLE75-8-H-140-RT/59/65/115/136	MLE75-8-H-140-RT/59/65/95/136
Connection	2 m fixed cable	●	
	M8 x 1 connector, 4-pin		●
			
Approvals and Certificates			
UL approval	cULus	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

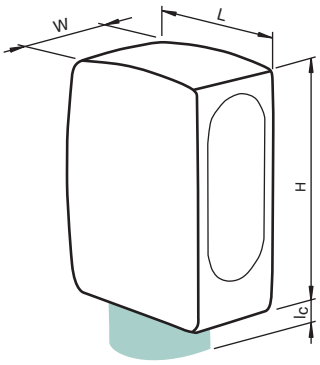
Dimensions	
Length L [mm]	25.1
Width W [mm]	12.9
Height H [mm]	32.9
Connector area l_c [mm]	12

Properties

- Background suppression
- Rectangular miniature housing
- Stainless steel housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Chemical and corrosion resistant housing for rough enviroments
- Wash down design for applications in food & beverage industries
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- Adjustable switchpoint
- ECOLAB certificate



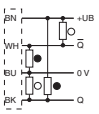
Electrical Connection

❍ = light on, ● = dark on



MLE75-8-H-140-RT/59/65/115/136

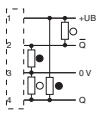
Option 59/115/136





MLE75-8-H-140-RT/59/65/95/136

Option 59/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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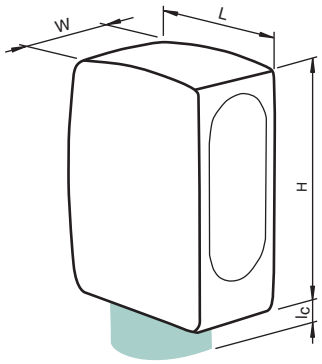


Properties

- Background suppression
- Rectangular miniature housing
- Stainless steel housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Chemical and corrosion resistant housing for rough enviroments
- Hygienic design for applications in food & beverage industries
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Sharp background suppression
- ECOLAB and EHEDG certificate, integrated mounting solution is part of certificates
- Special accessories in safe hygienic design



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Background suppression	✔
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		MLE76100-8-H-50-RT/59/115/136	MLE76100-8-H-100-RT/59/115/136	MLE76100-8-H-140-RT/59/115/136	MLE76100-8-H-50-RT/59/92/136	MLE76350-8-H-50-RT/59/92/136	MLE76100-8-H-100-RT/59/92/136	MLE76100-8-H-140-RT/59/92/136
Detection range	12 ... 100 mm		●				●	
	13 ... 140 mm			●				●
	7 ... 50 mm	●			●	●		
Diameter of the light spot	approx. 4 mm at detection range 50 mm	●			●	●		
	approx. 5 mm at detection range 100 mm		●				●	
	approx. 5 mm at detection range 120 mm			●				●
Connection	2 m fixed cable	●	●	●				
	connector M12 x 1, 4-pin				●	●	●	●
Approvals and Certificates								
Protection class	II				●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							
Dimensions								
Length L [mm]	25.1				25,1			
Width W [mm]	12.9				12,9			
Height H [mm]	32.9				32,9			
Connector area I_c [mm]	171		50		41	171	41	

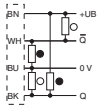
Electrical Connection

❍ = light on, ● = dark on



MLE76100-8-H-100-RT/59/115/136
MLE76100-8-H-140-RT/59/115/136
MLE76100-8-H-50-RT/59/115/136

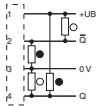
Option 59/115/136

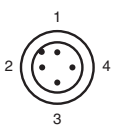




MLE76100-8-H-100-RT/59/92/136
MLE76100-8-H-140-RT/59/92/136
MLE76100-8-H-50-RT/59/92/136
MLE76350-8-H-50-RT/59/92/136

Option 59/92/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	20 ... 250 mm , adjustable
Adjustment range	50 ... 250 mm
Light type	modulated visible red light , 660 nm
Diameter of the light spot	8 mm at Tw 250 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 55 mA
Switching type	light/dark on switchable
Switching current	max. 0.2 A
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number		MLV12-8-H-250-RT/65b/115/128	MLV12-8-H-250-RT/65b/95/128	MLV12-8-H-250-RT/47/65b/95	MLV12-8-H-250-RT/47/65b/124	MLV12-8-H-250-RT/47/65b/92	MLV12-8-H-250-RT/65b/124/128
	green = preferred type						
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, 0.2 A / 30 V DC	●	●				●
	2 PNP outputs, complementary, short-circuit protected, reverse polarity protected, open collector			●	●	●	
Connection	2500 mm fixed cable , PUR	●					
	Metal connector, M12, 5-pin, 90° rotatable				●	●	●
	Metal connector, M12, 4-pin, 90° rotatable					●	
	4-pin M8 metal connector, 90° rotatable		●	●			
							
Approvals and Certificates							
Protection class	II	●			●	●	●
UL approval	cULus	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

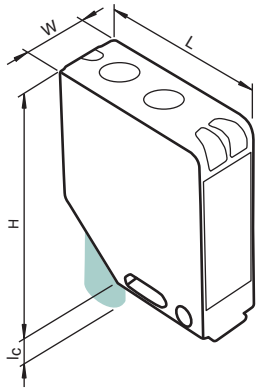
Dimensions			
Length L [mm]	41.5		
Width W [mm]	15		
Height H [mm]	49		
Connector area l_c [mm]	0	12	16

Properties

- Background suppression
- Rectangular compact housing
- Die cast zinc frame housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Adjustable switchpoint
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

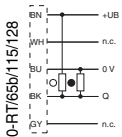
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Electrical Connection

❍ = light on, ● = dark on



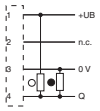
Option /65b/115/128



MLV12-8-H-250-RT/65b/115/128

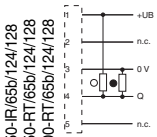


Option /65b/95/128



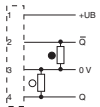
MLV12-8-H-250-RT/65b/95/128

Option /65b/124/128



MLV12-8-H-250-IR/65b/124/128
MLV12-8-H-250-RT/65b/124/128
MLV12-8-H-100-RT/65b/124/128

Option /47/65b/92
Option /47/65b/95



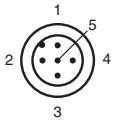
MLV12-8-H-250-RT/47/65b/95
MLV12-8-H-250-RT/47/65b/92

Wire colors in accordance with EN 60947-5-2



1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Wire colors in accordance with EN 60947-5-2



1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Background evaluation	✔
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	50 ... 150 mm , adjustable
Adjustment range	50 ... 150 mm
Light type	modulated visible red light , 680 nm
Diameter of the light spot	4 mm at Tw 150 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 55 mA
Switching type	light/dark on switchable
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, 0.2 A / 30 V DC
Switching current	max. 0.2 A
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number		MLV12-8-HW-RT/65b/115/128	MLV12-8-HW-RT/65b/95/128	MLV12-8-HW-RT/65b/124/128
Connection	2500 mm fixed cable , PUR	●		
	5-pin M12 metal connector, 90° rotatable			●
	4-pin M8 metal connector, 90° rotatable		●	
				
Approvals and Certificates				
Protection class	II	●		●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			41.5	
Width W [mm]			15	
Height H [mm]			49	
Connector area l_c [mm]		0	12	16

Properties

- Background evaluation
- Rectangular compact housing
- Die cast zinc frame housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

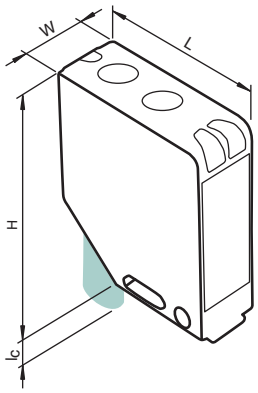
- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Adjustable switchpoint
- Extreme low-temperature operation

Further Products

In this series, we offer additionally:

MLV12-8-HW-RT/47/65b/124

Tech. spec. like MLV12-8-HW-RT/65b/124/128 but: Signal output: 2 complementary PNP outputs



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

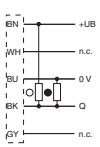
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Electrical Connection

❍ = light on, ● = dark on

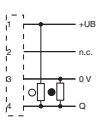


MLV12-8-HW-RT/65b/115/128

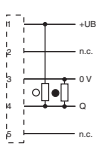




MLV12-8-HW-RT/65b/95/128



MLV12-8-HW-RT/65b/124/128

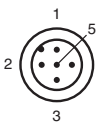


Wire colors in accordance with EN 60947-5-2



1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Wire colors in accordance with EN 60947-5-2



1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

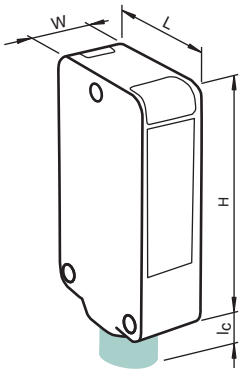


Properties

- Background suppression
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red and infrared light versions

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Minimal black/white difference
- Adjustable long range version
- Corrosion resistant Delta-Seal housing
- Extreme low-temperature operation

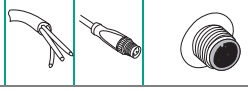


Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	50 ... 350 mm , adjustable
Adjustment range	50 ... 350 mm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 25 mA
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number		MLV41-8-H-350-IR/59/115/136	MLV41-8-H-350-RT/59/115/136	MLV41-8-H-350-IR/59/115b/136	MLV41-8-H-350-RT/59/115b/136	MLV41-8-H-350-IR/59/95/136	MLV41-8-H-350-RT/59/95/136	MLV41-8-H-350-IR/59/92/136	MLV41-8-H-350-RT/59/92/136
	green = preferred type								
Light type	modulated infrared light , 880 nm	●		●		●		●	
	modulated visible red light , 660 nm		●		●		●		●
Diameter of the light spot	approx. 18 mm at 350 mm sensor range	●		●		●		●	
	approx. 8 mm at 350 mm sensor range		●		●		●		●
Connection	2500 mm fixed cable	●	●						
	fixed cable 300 mm with M12 connector, 4-pin			●	●				
	connector M12 x 1, 4-pin							●	●
	M8 x 1 connector, 4-pin					●	●		



Approvals and Certificates									
Protection class	II	●	●	●	●			●	●
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions				
Length L [mm]	31			
Width W [mm]	13.6			
Height H [mm]	56.5			
Connector area l_c [mm]	3	12.5	16	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-40	Mounting bracket
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

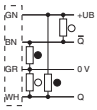
Electrical Connection

❍ = light on, ● = dark on



MLV41-8-H-350-IR/59/115/136
MLV41-8-H-350-IR/59/115b/136
MLV41-8-H-350-RT/59/115b/136
MLV41-8-H-350-RT/59/115/136

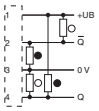
Option 59/115/136





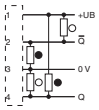
MLV41-8-H-350-IR/59/92/136
MLV41-8-H-350-RT/59/92/136

Option 59/92/136



MLV41-8-H-350-IR/59/95/136
MLV41-8-H-350-RT/59/95/136

Option 59/95/136





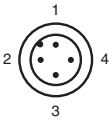
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)



Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



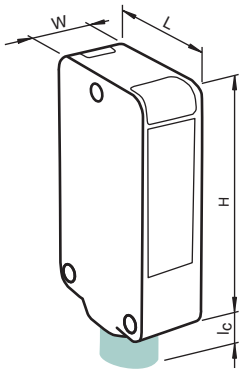
IO-Link

Properties

- Background suppression
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output with IO-Link
- Connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Easily adapts to the application by the standard communication IO-Link interface
- Minimal black/white difference
- Adjustable long range version
- Corrosion resistant Delta-Seal housing



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC, class 2
No-load supply current	max. 25 mA @ 24 V supply voltage
Interface	IO-Link
Protocol	IO-Link V1.0
Mode	COM 2 (38.4 kbaud)
Signal output	2 Push-pull (4 in 1) outputs, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	200 Hz
Ambient temperature	-20 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	MLV41-8-H-120-RT-IO/65b/95/136	MLV41-8-H-500-RT-IO/65b/95/136	MLV41-8-H-120-RT-IO/65b/95/136	MLV41-8-H-500-RT-IO/65b/95/136
Detection range	20 ... 120 mm, black/white difference <3%	●		●	
	20 ... 500 mm, black/white difference <5%		●		●
Diameter of the light spot	approx. 4 mm at 100 mm sensor range	●		●	
	approx. 25 mm at 500 mm sensor range		●		●
Connection	connector M12 x 1, 4-pin			●	●
	M8 x 1 connector, 4-pin	●	●		

Approvals and Certificates					
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	31	
Width W [mm]	13.6	
Height H [mm]	56.5	
Connector area l_c [mm]	9	12

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-40	Mounting bracket
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable

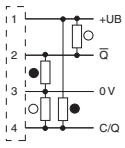
Electrical Connection

❍ = light on, ● = dark on



MLV41-8-H-120-RT-IO/65a/95/136
MLV41-8-H-120-RT-IO/65a/92/136
MLV41-8-H-500-RT-IO/65a/95/136
MLV41-8-H-500-RT-IO/65a/92/136

Option /92/136
Option /95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	MLV41-8-HV-60-IR/110/124/167
Foreground suppression	0 ... 15 mm
Background suppression	starts from 70 mm
Detection range	20 ... 60 mm fixed
Light type	modulated infrared light , 880 nm
Diameter of the light spot	max. 6 mm at a distance of 70 mm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 25 mA
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	250 Hz
Output of the pre-fault indication	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Test input	emitter deactivation at $+U_B$
Ambient temperature	0 ... 70 °C (32 ... 158 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

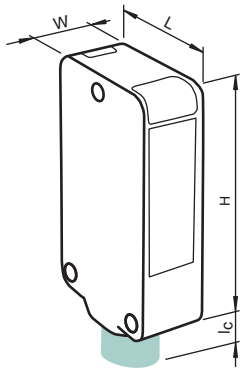
Dimensions	
Length L [mm]	31
Width W [mm]	13.6
Height H [mm]	56.5
Connector area l_c [mm]	16

Properties

- Foreground and background suppression
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output
- Connector version
- Infrared light

Your Benefit

- Special version for web-break monitoring
- Reliable detection of printed materials of any kind
- Extremely sharp background suppression
- Antistatic optical face inhibits dust in paper and printing applications
- Corrosion resistant Delta-Seal housing
- Patented design monitors lens contamination



Accessories

This and more accessories can be found in chapter 10

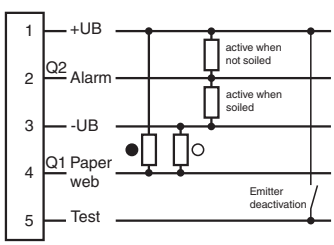
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

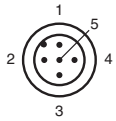
OMH-MLV41-8-HV-L	Mounting bracket
OMH-MLV41-8-HV-U	Mounting bracket
OMH-40	Mounting bracket
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting

Electrical Connection

❍ = light on, ● = dark on







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	20 ... 400 mm
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable
Switching frequency	250 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

Model Number		RL28-8-H-400-RT/47/115	RL28-8-H-400-RT/105/110	RL28-8-H-400-RT/47/105	RL28-8-H-400-FFP-RT/47/105	RL28-8-H-400-RT-Z/110/116
Timer						●
Adjustment range	150 ... 400 mm				●	
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	●	●	●		●
	4 mm x 4 mm at a distance of 250 mm				●	
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●			●
	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors	●		●	●	
Switching current	max. 100 mA		●			●
	max. 200 mA	●		●	●	
Connection	2500 mm fixed cable	●				
	M12 x 1 connector, 5-pin		●	●	●	
	terminal compartment					●
						

Approvals and Certificates						
Protection class	II	●	●	●	●	●
UL approval	cULus				●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

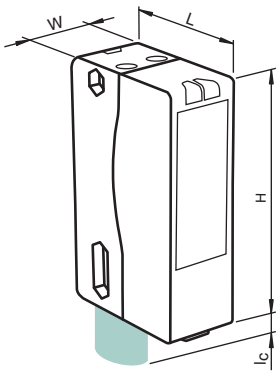
Dimensions				
Length L [mm]	54.3			65.5
Width W [mm]	25.8			
Height H [mm]	88			
Connector area l_c [mm]	5	12		0

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and terminals versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp

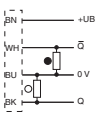
Electrical Connection

❍ = light on, ● = dark on

RL28-8-H-400-RT/47/115



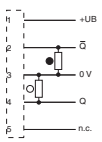
Option /47/115



RL28-8-H-400-FFP-RT/47/105
RL28-8-H-400-RT/47/105

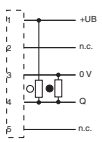


Option /47/105



RL28-8-H-400-RT/105/110

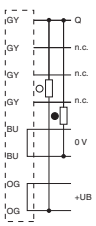
Option /105/110

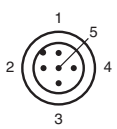


RL28-8-H-400-RT-Z/110/116



Option /110/116





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and terminals versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint

Technical Data

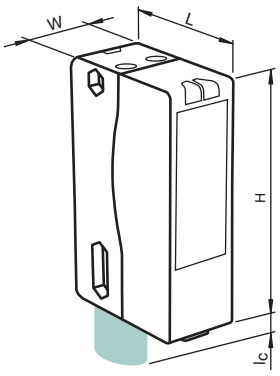
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	20 ... 700 mm
Light type	modulated visible red light , 660 nm
Diameter of the light spot	approx. 15 mm at a distance of 700 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable
Switching frequency	250 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

Model Number	green = preferred type	RL28-8-H-700-RT/105/110	RL28-8-H-700-RT/47/105	RL28-8-H-700-RT-Z/47/116
Timer				●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●		
	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors		●	●
Switching current	max. 100 mA	●		
	max. 200 mA		●	●
Connection	M12 x 1 connector, 5-pin	●	●	
	terminal compartment			●
				

Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions		
Length L [mm]	54,3	65,5
Width W [mm]	25,8	
Height H [mm]	88	
Connector area l_c [mm]	12	0



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21 / OHM-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

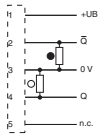
Electrical Connection

❍ = light on, ● = dark on



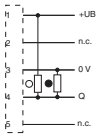
RL28-8-H-700-IR/47/105
RL28-8-H-700-RT/47/105

Option /47/105



RL28-8-H-700-RT/105/110

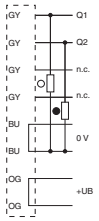
Option /105/110

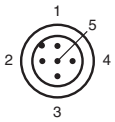




RL28-8-H-700-RT-Z/47/116

Option /47/116





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	20 ... 2000 mm
Light type	modulated infrared light , 880 nm
Diameter of the light spot	approx. 70 mm at a distance of 2000 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable
Switching frequency	250 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

Model Number	green = preferred type	RL28-8-H-2000-IR/47/115	RL28-8-H-2000-IR/105/110	RL28-8-H-2000-IR/47/105
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●	
	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors	●		●
Switching current	max. 100 mA		●	
	max. 200 mA	●		●
Connection	2500 mm fixed cable	●		
	M12 x 1 connector, 5-pin		●	●
				

Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

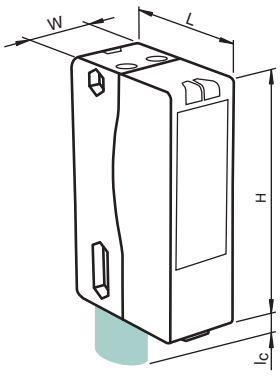
Dimensions			
Length L [mm]	54,3		
Width W [mm]	25,8		
Height H [mm]	88		
Connector area l_c [mm]	5	12	

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable long range version
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

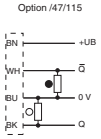
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

Electrical Connection

❍ = light on, ● = dark on

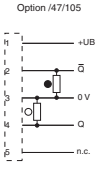


RL28-8-H-2000-IR/47/115

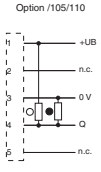


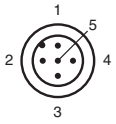


RL28-8-H-2000-IR/47/105



RL28-8-H-2000-IR/105/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	100 ... 1500 mm
Light type	modulated visible red light
Laser class	1
Wave length	650 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable
Switching frequency	140 Hz
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

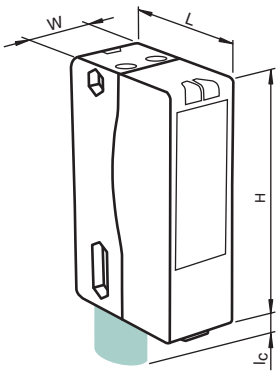
Model Number	green = preferred type	RL28-8-H-1500-LAS/47/115b	RL28-8-H-1500-LAS/105/110	RL28-8-H-1500-LAS/47/105
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●	
	2 PNP outputs, complementary, short-circuit protected, reverse polarity protected, open collector	●		●
Switching current	max. 100 mA		●	
	max. 200 mA	●		●
Connection	5-pin, M12 x 1 plastic connector		●	●
	0.2 m fixed cable with 4-pin, M12 connector	●		
				
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			54,3	
Width W [mm]			25,8	
Height H [mm]			88	
Connector area l_c [mm]		5	12	

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and pigtailed connector versions
- Laser red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable long range version



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

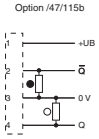
OMH-05	Mounting aid for round steel ø 12 mm ... 3 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

Electrical Connection

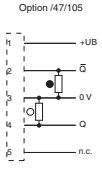
❍ = light on, ● = dark on

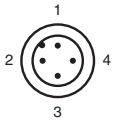


RL28-8-H-1500-LAS/47/115b



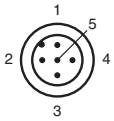
RL28-8-H-1500-LAS/105/110
RL28-8-H-1500-LAS/47/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Timer	✔
Sensing range adjustment	✔
Light/dark switch	✔
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Switching type	light/dark on, switchable
Signal output	Relay, 1 alternator
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment with 8 spring-loaded terminals



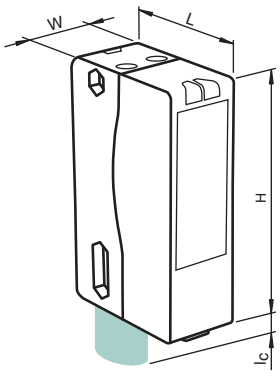
Model Number	green = preferred type	RLK28-8-H-400-RT-Z/31/116	RLK28-8-H-700-RT-Z/31/116	RLK28-8-H-2000-IR-Z/31/116
Detection range	20 ... 400 mm	●		
	20 ... 700 mm		●	
	20 ... 2000 mm			●
Adjustment range	150 ... 400 mm	●		
	200 ... 700 mm		●	
	200 ... 2000 mm			●
Light type	modulated infrared light , 880 nm			●
	modulated visible red light , 660 nm	●	●	
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	●		
	approx. 15 mm at a distance of 700 mm		●	
	approx. 70 mm at a distance of 2000 mm			●
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●
Dimensions				
Length L [mm]			65.5	
Width W [mm]			25.8	
Height H [mm]			88	
Connector area l_c [mm]			0	

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Terminals version
- Visible red and infrared light versions

Your Benefit

- Universal usage with AC or DC power supply
- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21 / OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket

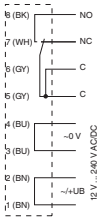
Electrical Connection

❍ = light on, ● = dark on



RLK28-8-H-2000-IR-Z/31/116
RLK28-8-H-400-RT-Z/31/116
RLK28-8-H-700-RT-Z/31/116

Option /31/116



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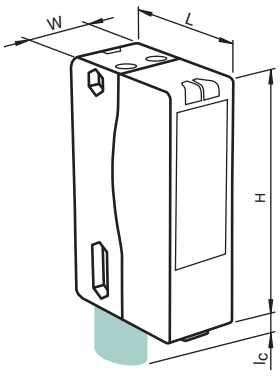


Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- AS interface
- Connector version
- Visible red and infrared light versions

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint
- Extreme low-temperature operation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Operating voltage	26.5 ... 31.6 V via AS-Interface network , min. 18.5 V
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable via AS-i bus system
Signal output	AS-Interface
Switching frequency	250 Hz
Test input	Data bit D2: 0: emitter on, 1: emitter off
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67
Connection	connector M12 x 1, 4-pin



Model Number		RL28-8-H-400-RT-B3B/73c	RL28-8-H-700-RT-B3B/73c	RL28-8-H-2000-IR-B3B/73c
Detection range	20 ... 400 mm	●		
	20 ... 700 mm		●	
	20 ... 2000 mm			●
Light type	modulated infrared light , 880 nm			●
	modulated visible red light , 660 nm	●	●	
Diameter of the light spot	approx. 12 mm at a distance of 400 mm	●		
	approx. 15 mm at a distance of 700 mm		●	
	approx. 70 mm at a distance of 2000 mm			●
Approvals and Certificates				
Protection class	II	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			54.3	
Width W [mm]			25.8	
Height H [mm]			88	
Connector area l_c [mm]			12	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VBP-HH1	Handheld programming device
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

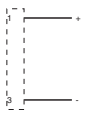
Electrical Connection

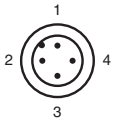
❍ = light on, ● = dark on



RL28-8-H-2000-IR-B3B/73c
RL28-8-H-400-RT-B3B/73c
RL28-8-H-700-RT-B3B/73c

Option AS-Interface





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS
SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	30 ... 1200 mm , adjustable
Light type	modulated visible red light
Diameter of the light spot	approx. 25 mm at a distance of 1200 mm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	≤ 40 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	125 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP65

Model Number	green = preferred type	RL29-8-H-1200-RT/115/136	RL29-8-H-1200-RT/59/73c/136	RL29-8-H-1200-RT/73c/136
Switching type	dark on		●	
	light on	●		●
Connection	2500 mm fixed cable	●		
	Plastic connector M12 x 1, 4-pin		●	●

Approvals and Certificates				
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

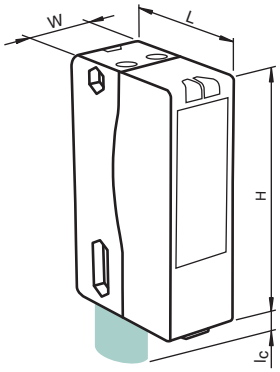
Dimensions			
Length L [mm]	54.3		
Width W [mm]	25.8		
Height H [mm]	88		
Connector area l_c [mm]	5	12	

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Reliable detection of all surfaces, regardless of color and texture
- Small black/white difference
- Adjustable switchpoint



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

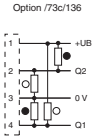
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

Electrical Connection

❍ = light on, ● = dark on

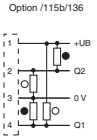
RL29-8-H-1200-RT/115/136



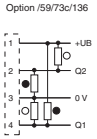


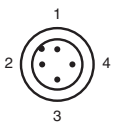


RL29-8-H-1200-RT/115b/136
RL29-8-H-1200-RT/73c/136



RL29-8-H-1200-RT/59/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



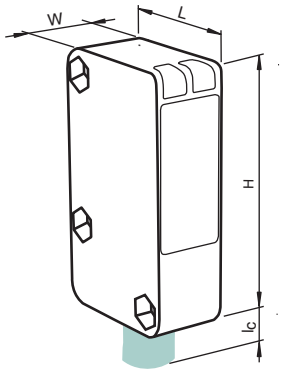
IO-Link

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output with IO-Link
- Cable and connector versions
- Visible red light

Your Benefit

- Measuring photoelectric sensor with 4 selectable operating modes
- Easily adapts to the application by the standard communication IO-Link interface
- Simplest alignment and set-up with ultra-bright Power-Beam emitter LED
- Minimal black/white difference
- Adjustable



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data			
Background suppression	✔		
Background analysis	✔		
Sensing range adjustment	✔		
Detection range	50 ... 800 mm		
Adjustment range	100 ... 800 mm		
Light type	modulated visible red light		
Diameter of the light spot	approx. 25 mm at a distance of 800 mm		
Operating voltage	10 ... 30 V DC , class 2		
No-load supply current	max. 25 mA at 24 V supply voltage		
Interface			
Interface type	IO-Link		
Mode	COM 2 (38.4 kBaud)		
Switching output			
Switching type	dark on		
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected		
Switching current	max. 100 mA		
Switching frequency	200 Hz		
Ambient temperature	-30 ... 55 °C (-22 ... 131 °F)		
Material			
Housing	Polycarbonate		
Optical face	PMMA		
Protection degree	IP67		
Model Number		RL31-8-H-800-RT-IO/59/115/136	RL31-8-H-800-RT-IO/59/73c/136
	green = preferred type		
Connection	2 m fixed cable , 4-wire	●	
	connector M12 x 1, 4-pin		●
			
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		35	
Width W [mm]		18	
Height H [mm]		62	
Connector area l_c [mm]		0	10,3

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

PACTware 4.X	
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
OMH-RL31-01	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

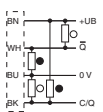
Electrical Connection

❍ = light on, ● = dark on



RL31-8-H-800-RT-IO/59/115/136

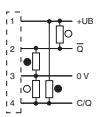
Option 59/115/136

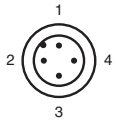




RL31-8-H-800-RT-IO/59/73c/136

Option /59/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	10 ... 300 mm
Light type	modulated visible red light , 630 nm
Convergent mode	≥ 450 mm
Diameter of the light spot	approx. 8 mm at a distance of 300 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Switching type	light on
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	≤ 500 Hz
Ambient temperature	-30 ... 55 °C (-22 ... 131 °F)
Material	
Housing	plastic
Optical face	PMMA
Protection degree	IP67

Model Number		RL31-8-HGU-300-RT/115b/136	RL31-8-HGU-300-RT/73c/136
Connection	300 mm fixed cable with M12 x 1, 4-pin connector	●	
	connector M12 x 1, 4-pin		●
			

Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

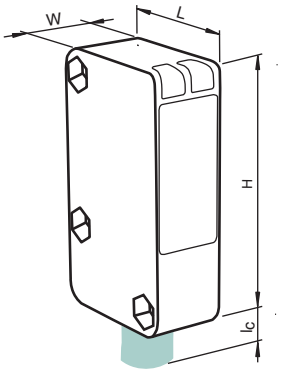
Dimensions		
Length L [mm]	35	
Width W [mm]	18	
Height H [mm]	62	
Connector area l_c [mm]	0	10,3

Properties

- Diffuse type with convergent beam
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and pigtailed connector versions
- Visible red light

Your Benefit

- Convergent sensing ignores some objects in the background



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket

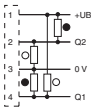
Electrical Connection

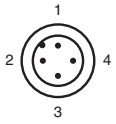
❍ = light on, ● = dark on



RL31-8-HGU-300-RT/115b/136
RL31-8-HGU-300-RT/73c/136

Option /25/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

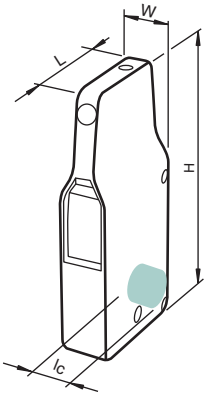


Properties

- Background suppression
- Application specific housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Infrared light

Your Benefit

- Congested track scanner optimized for roller conveyor
- Mounts under and between rollers to protect against damage
- Large sensing range
- Connection for motor or valve



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	40 ... 900 mm
Adjustment range	340 ... 900 mm
Light type	modulated infrared light , 880 nm
Diameter of the light spot	approx. 60 mm at detection range 900 mm
Operating voltage	24 VDC -20% +10%
No-load supply current	max. 20 mA
Switching frequency	100 Hz
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Material	
Housing	plastic
Optical face	plastic lens
Protection degree	IP65
Connection	connector M12 x 1, 4-pin



Model Number		SBL-8-H-900-IR/25/30/65b/73	SBL-8-H-900-IR/25/32/65b/73	SBL-8-H-900-IR/25/65b/73/136	SBL-8-H-900-IR/30/59/65b/73	SBL-8-H-900-IR/32/59/65b/73	SBL-8-H-900-IR/40a/65b/73/110	SBL-8-H-900-IR/59/65b/73/120	SBL-8-H-900-IR/59/65b/73/136
Switching type	dark on				●	●		●	●
	light/dark on, switchable						●		
	light on	●	●	●					
Signal output	1 Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected						●		
	1 NPN, short-circuit protected, reverse polarity protected	●			●				
	1 PNP, short-circuit protected, reverse polarity protected		●			●			
	2 Push-pull outputs, short-circuit protected, reverse polarity protected			●					●
	2 PNP, complementary, short-circuit protected, open collectors							●	
Switching current	max. 100 mA			●			●	●	●
	max. 200 mA	●	●		●	●			
Approvals and Certificates									
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								
Dimensions									
Length L [mm]		46							
Width W [mm]		18							
Height H [mm]		100							
Connector area l_c [mm]		12							

Accessories

This and more accessories can be found in chapter 10

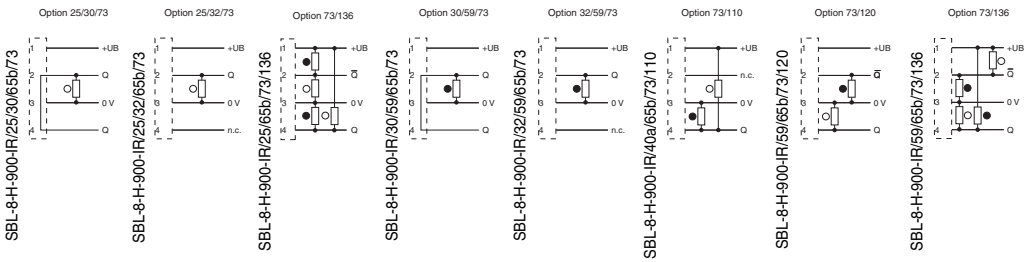
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

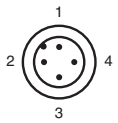
OMH-SBL-01	Mounting bracket for sensors of SBL series
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
Schraubendreher 0,5 x 3,0 mm	Screwdriver

Electrical Connection

❍ = light on, ● = dark on







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS

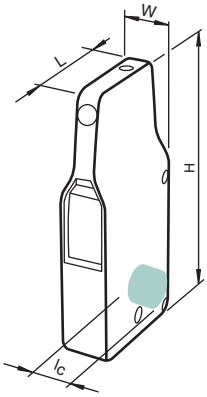


Properties

- Background suppression
- Application specific housing
- Plastic housing
- DC sensor
- Discrete output and pneumatic valve
- Connector/pigtailed connector version
- Infrared light

Your Benefit

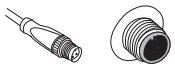
- Congested track scanner optimized for roller conveyor
- Mounts under and between rollers to protect against damage
- Large sensing range
- 3 in 1: Sensor, pneumatic valve and integrated control logic
- Integral control logic for linking up to 30 devices
- Double timing relay for congestion-minimized conveying



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Detection range	40 ... 900 mm
Adjustment range	340 ... 900 mm
Light type	modulated infrared light , 880 nm
Diameter of the light spot	approx. 60 mm at detection range 900 mm
Cascadability	At 20°C max. 64 sensors per line
Operating voltage	24 V DC ± 20 %
No-load supply current	max. 70 mA
Switching type	dark on
Signal output	1 PNP, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Switching frequency	100 Hz
Pneumatic output	3/2 way valve
Type of valve	currentless closed
Operating pressure	2 ... 8 bar (2.9 ... 11.6 psi)
Ambient temperature	-15 ... 50 °C (5 ... 122 °F)
Material	
Housing	plastic
Optical face	plastic lens
Protection degree	IP65
Connection	connector M12 x 1, 4-pin ; Connecting cable with Socket, straight M12 x 1 ; Length: 1930 mm



Model Number	SBL-8-H-900-IR-SL-V/32/59/73	SBL-8-H-900-IR-SL-V-Z/32/59/73
Timer		●
Approvals and Certificates		
UL approval	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions	
Length L [mm]	46
Width W [mm]	18
Height H [mm]	100
Connector area l_c [mm]	12

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

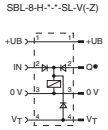
OMH-SBL-01	Mounting bracket for sensors of SBL series
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-5M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-5M-PUR	Cable socket, M12, 4-pin, PUR cable
V1S-TEE-V1/V1S	T-Distributor, M12 connector to M12 socket/connector
Schraubendreher 0,5 x 3,0 mm	Screwdriver

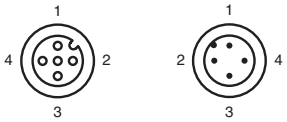
Electrical Connection

❍ = light on, ● = dark on



SBL-8-H-900-IR-SL-V/32/59/73
SBL-8-H-900-IR-SL-V-Z/32/59/73





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



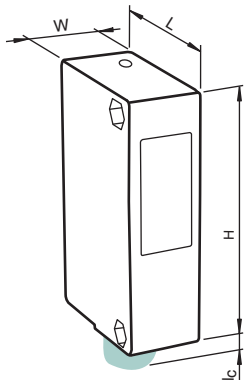
0102

Properties

- Background suppression
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Visible red and infrared light versions

Your Benefit

- ATEX-approval for zone 2 and zone 22



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range adjustment	✔
Operating voltage	10 ... 30 V DC
No-load supply current	40 mA
Signal output	2 PNP, complementary, short-circuit protected, reverse polarity protected
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	250 Hz
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Optical face	glass
Protection degree	IP65
Connection	Plastic connector M12 x 1, 4-pin



Model Number	green = preferred type	RL32-8-H-2482-400-Ex2/47/73c	RL32-8-H-800-Ex2/47/73c	RL32-8-H-800-RT-EX2/47/73c
Detection range	30 ... 400 mm , adjustable	●		
	30 ... 800 mm		●	
	40 ... 800 mm			●
Light type	modulated infrared light	●	●	
	modulated visible red light			●
Diameter of the light spot	approx. 10 mm at 800 mm sensor range			●
	approx. 12 mm at 400 mm sensor range	●		
	approx. 25 mm at 800 mm sensor range		●	
Material				
Housing	ABS			●
	Terluran GV15	●	●	
Use in the Hazardous Area				
Marking	Zone 2: ⟨Ex⟩ II 3G Ex nA op is IIC T4 Zone 22: ⟨Ex⟩ II 3D Ex tD A22 IP65 T 75°C	●	●	●
Approvals and Certificates				
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		45,5		
Width W [mm]		22		
Height H [mm]		72		
Connector area l_c [mm]		13,5		

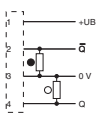
Electrical Connection

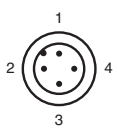
❍ = light on, ● = dark on



RL32-8-H-800-RT-EX2/47/73c
RL32-8-H-2482-400-Ex2/47/73c
RL32-8-H-800-Ex2/47/73c

Option /47/73c





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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CE

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KT10-8-80
Detection range	0 ... 80 mm
Light type	modulated infrared light , 870 nm
Operating voltage	see accessory: signal transformer
Signal output	see accessory: signal transformer
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303
Optical face	glass
Protection degree	IP65
Connection	1500 mm fixed cable



Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	25
Diameter D [mm]	4
Thread length l_t [mm]	25
Connector area l_c [mm]	0

Properties

- Diffuse type
- Cylindrical threaded housing
- Stainless steel housing
- DC sensor
- Requires external amplifier
- Cable version
- Infrared light

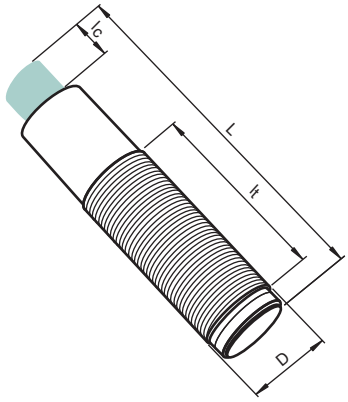
Your Benefit

- Smallest sensor design for space-saving mounting

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

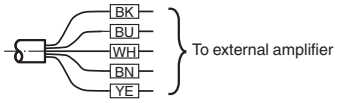
SU11/40a/49/92	External amplifier
SU11/32/40a/82b/92	External amplifier
SU11/40a/49/115	External amplifier
SU10/40a/49/116	External amplifier
BF 4	Mounting flange, 4 mm



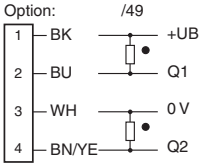
Electrical Connection

❍ = light on, ● = dark on

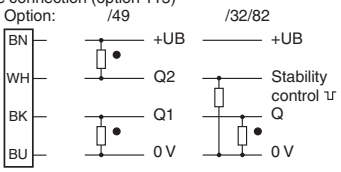
KT10-H/KT10-80



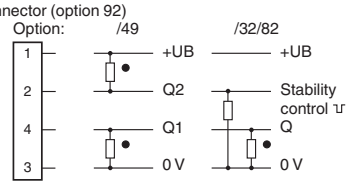
External amplifier SU10 ...



External amplifier SU11 ...
Cable connection (option 115)



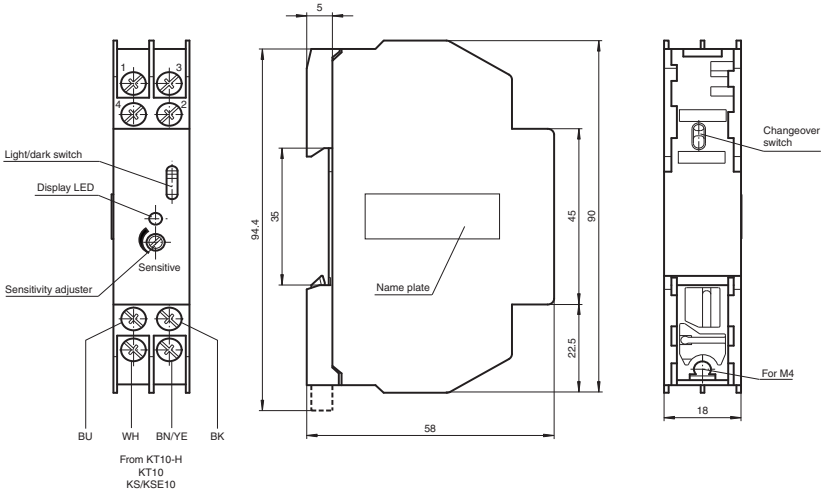
Connector (option 92)



Date of issue 04/08/2015

External amplifier SU10/40a/49/116





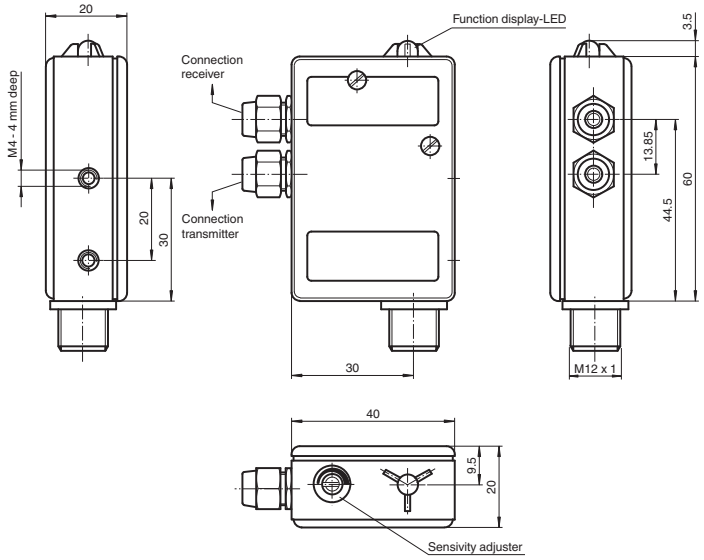
External amplifier for mounting on a standard top hat rail.

Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output
Output current:	max. 200 mA

External amplifier SU11.../92



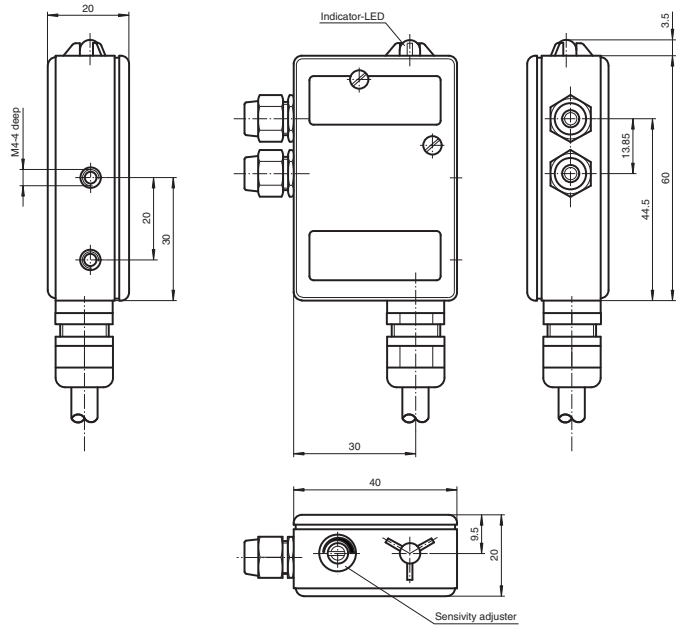


Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

External amplifier SU11.../115





Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light/dark switch	✔
Detection range	0 ... 200 mm
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Switching type	light/dark on
Switching current	max. 300 mA
Switching frequency	≤ 700 Hz
Control input	light on +UB dark on: 0 V
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67

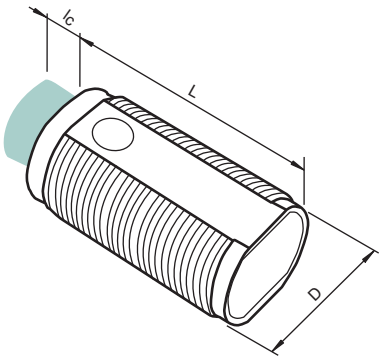
Model Number	green = preferred type	GLV12-8-200/36/40b/115	GLV12-8-200/37/40b/115	GLV12-8-200/36/40b/92	GLV12-8-200/37/40b/92
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, protected from reverse polarity, open collector		●		●
Connection	2 m fixed cable	●	●		
	connector M12 x 1, 4-pin			●	●
					

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions				
Length L [mm]	55		65	
Diameter D [mm]	12			
Thread length l_t [mm]	35			
Connector area l_c [mm]	0		12	

Properties

- Diffuse type
- Cylindrical threaded housing
- nickel-plated brass housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

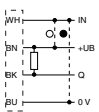
Electrical Connection

❍ = light on, ● = dark on



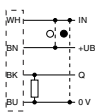
GLV12-8-200/36/40b/115

Option 36/40b/115



GLV12-8-200/37/40b/115

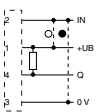
Option 37/40b/115





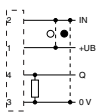
GLV12-8-200/36/40b/92

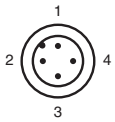
Option 36/40b/92



GLV12-8-200/37/40b/92

Option 37/40b/92





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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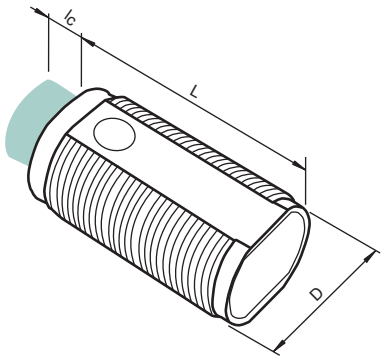


Properties

- Diffuse type
- Cylindrical threaded housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number		GLV18-8-200/115/120	GLV18-8-200/25/102/115	GLV18-8-450/115/120	GLV18-8-450/25/102/115	GLV18-8-200/73/120	GLV18-8-200/25/102/159	GLV18-8-450/73/120	GLV18-8-450/25/102/159
	green = preferred type								
Detection range	50 ... 200 mm adjustable	●	●			●	●		
	50 ... 450 mm adjustable			●	●			●	●
Signal output	1 NPN, short-circuit protected open collector		●		●		●		●
	2 PNP, complementary, short-circuit protected, open collectors	●		●		●		●	
Switching type	light/dark on	●		●		●		●	
	light on		●		●		●		●
Connection	2 m fixed cable	●	●	●	●				
	Connector M12 x 1, 3-pin						●		●
	connector M12 x 1, 4-pin					●		●	

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]		33							
Diameter D [mm]		18							
Connector area l_c [mm]		7				11			

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

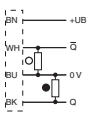
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on



GLV18-8-200/115/120
GLV18-8-450/115/120
Option /115/120

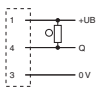


GLV18-8-200/25/102/115
GLV18-8-450/25/102/115
Option 25/102/115

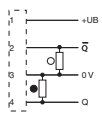




GLV18-8-200/25/102/159
GLV18-8-450/25/102/159
Option 25/102/159



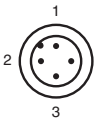
GLV18-8-200/73/120
GLV18-8-450/73/120
Option 73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light type	modulated visible red light , 640 nm
Optical face	lateral
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number		GLV18-8-200-S/115/120	GLV18-8-200-S/25/102/115	GLV18-8-400-S/115/120	GLV18-8-400-S/25/102/115	GLV18-8-200-S/73/120	GLV18-8-200-S/25/102/159	GLV18-8-400-S/73/120	GLV18-8-400-S/25/102/159
	green = preferred type								
Detection range	50 ... 200 mm adjustable	●	●			●	●		
	50 ... 400 mm adjustable			●	●			●	●
Signal output	1 NPN, short-circuit protected open collector		●		●		●		●
	2 PNP, complementary, short-circuit protected, open collectors	●		●		●		●	
Switching type	light/dark on	●		●		●		●	
	light on		●		●		●		●
Connection	2 m fixed cable	●	●	●	●				
	Connector M12 x 1, 3-pin						●		●
	connector M12 x 1, 4-pin					●		●	

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

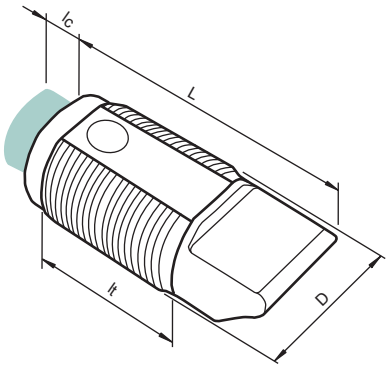
Dimensions								
Length L [mm]	46							
Diameter D [mm]	18							
Connector area l_c [mm]	7				11			

Properties

- Diffuse type
- Cylindrical threaded housing, side view
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

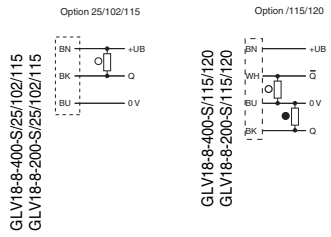
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

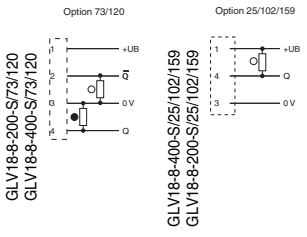
Electrical Connection

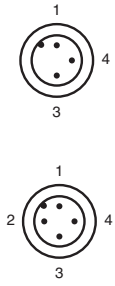
❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Signal output	N-channel MOSFET, short circuit protected
Switching type	light on
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

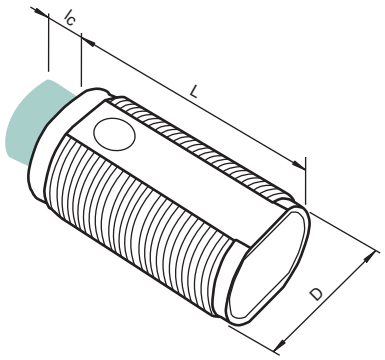
Model Number		GLK18-8-200/25/115/161	GLK18-8-450/25/115/161	GLK18-8-200/25/161/166	GLK18-8-450/25/161/166
Detection range	20 ... 200 mm adjustable	●		●	
	50 ... 450 mm adjustable		●		●
Connection	Micro AC connector, 1/2" V124 ; 4-pin			●	●
	2 m, 3 x 0.34 mm², PVC cable	●	●		
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●
Dimensions					
Length L [mm]		49			
Diameter D [mm]		18			
Connector area l_c [mm]		7		11	

Properties

- **Diffuse type**
- **Cylindrical threaded housing**
- **Plastic housing**
- **AC/DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Visible red light**

Your Benefit

- **Universal usage with AC or DC power supply**



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

Electrical Connection

❍ = light on, ● = dark on

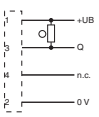


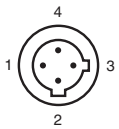
GLK18-8-200/25/115/161
GLK18-8-450/25/115/161





GLK18-8-200/25/161/166
GLK18-8-450/25/161/166





Wire colors

1	RD/BK	(red/black)
2	RD/WH	(red/white)
3	RD	(red)
4	GN	(green)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light type	modulated visible red light , 640 nm
Optical face	lateral
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Signal output	N-channel MOSFET, short circuit protected
Switching type	light on
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

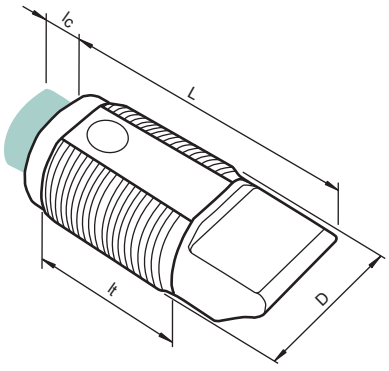
Model Number		GLK18-8-200-S/25/115/161	GLK18-8-400-S/25/115/161	GLK18-8-200-S/25/161/166	GLK18-8-400-S/25/161/166
Detection range	50 ... 200 mm adjustable	●		●	
	50 ... 400 mm adjustable		●		●
Connection	Micro AC connector, 1/2" V124 ; 4-pin			●	●
	2 m, 3 x 0.34 mm², PVC cable	●	●		
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●
Dimensions					
Length L [mm]		64			
Diameter D [mm]		18			
Connector area l_c [mm]		7		11	

Properties

- **Diffuse type**
- **Cylindrical threaded housing, side view**
- **Plastic housing**
- **AC/DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Visible red light**

Your Benefit

- **Universal usage with AC or DC power supply**



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

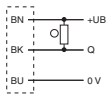
Electrical Connection

❍ = light on, ● = dark on



GLK18-8-400-S/25/115/161
GLK18-8-200-S/25/115/161

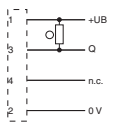
Option 25/115/161

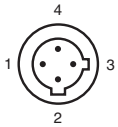




GLK18-8-200-S/25/161/166
GLK18-8-400-S/25/161/166

Option 25/161/166





Wire colors

1	RD/BK	(red/black)
2	RD/WH	(red/white)
3	RD	(red)
4	GN	(green)

Date of issue 04/08/2015



Properties

- Diffuse type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light/dark switch	✔
Light type	infrared
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	≤ 25 mA
Switching type	light/dark on electrically switchable
Switching current	max. 100 mA
Switching frequency	≤ 500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PC
Protection degree	IP67

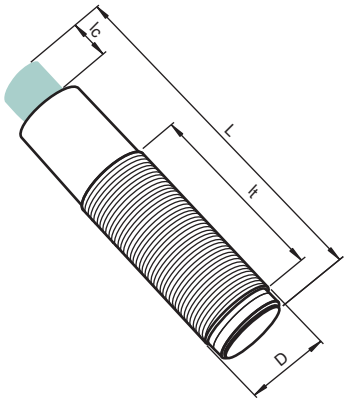
Model Number	green = preferred type	OBT200-18GM60-E4	OBT200-18GM60-E5	OBT500-18GM60-E4	OBT500-18GM60-E5	OBT200-18GM60-E4-V1	OBT200-18GM60-E5-V1	OBT500-18GM60-E4-V1	OBT500-18GM60-E5-V1
Detection range	0 ... 200 mm	●	●			●	●		
	0 ... 500 mm			●	●			●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●		●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●		●		●
Connection	2 m fixed cable	●	●	●	●				
	connector M12 x 1, 4-pin					●	●	●	●





Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	60	70
Diameter D [mm]	18	
Thread length l_t [mm]	38	
Connector area l_c [mm]	0	10



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled

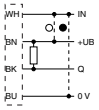
Electrical Connection

❍ = light on, ● = dark on



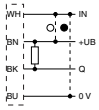
OBT200-18GM60-E4
OBT500-18GM60-E4

Option E4



OBT200-18GM60-E5
OBT500-18GM60-E5

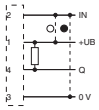
Option E5





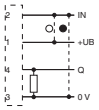
OBT200-18GM60-E4-V1
OBT500-18GM60-E4-V1

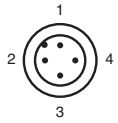
Option E4-V1



OBT200-18GM60-E5-V1
OBT500-18GM60-E5-V1

Option E5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VT18-8-400-M/40a/118/128
Light/dark switch	✔
Detection range	0 ... 400 mm , adjustable
Light type	modulated visible red light
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 30 mA
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching type	light/dark on, switchable
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Optical face	plastic
Protection degree	IP67
Connection	M12 connector, 4-pin (Vario-Quick quick connect technology)

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Thread length l_t [mm]	41
Connector area l_c [mm]	13

Properties

- Diffuse type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Further Products

In this series, we offer additionally:

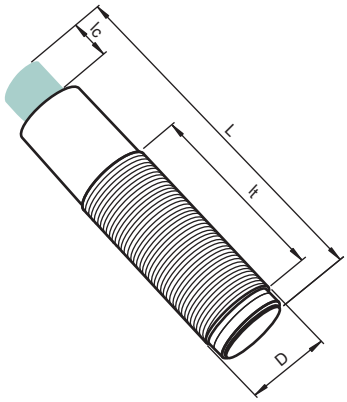
VT18-8-400-M-LAS/32/40a/118

Tech. spec. like VT18-8-400-M/40a/118/128 but:
Signal output: 1 PNP output, short-circuit protected, reverse polarity protected, open collector

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-VL18	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled



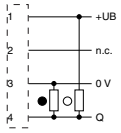
Electrical Connection

❍ = light on, ● = dark on



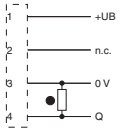
VT18-8-400-M/40a/118/128

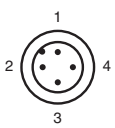
Option 40a/118/128



VT18-8-400-M/32/40a/118

Option 32/40a/118





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Diffuse type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Connector version
- Laser red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

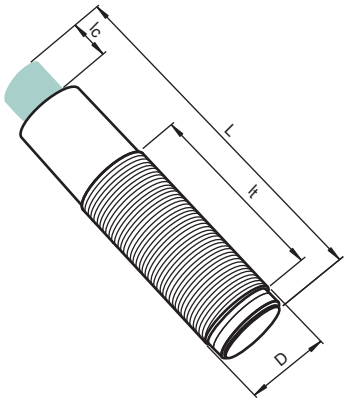
Model Number	VT18-8-400-M-LAS/40a/118/128
Light/dark switch	✔
Detection range	0 ... 400 mm , adjustable
Light type	modulated visible red light
Laser class	1
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching type	light/dark on, switchable
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	plastic
Protection degree	IP67
Connection	connector M12 x 1, 4-pin (Vario-Quick quick connect technology)
	
Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Thread length l_t [mm]	41
Connector area l_c [mm]	13

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-VL18	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled



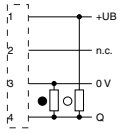
Electrical Connection

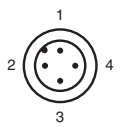
❍ = light on, ● = dark on



VT18-8-400-M-LAS/40a/118/128

Option 40a/118/128





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS





Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

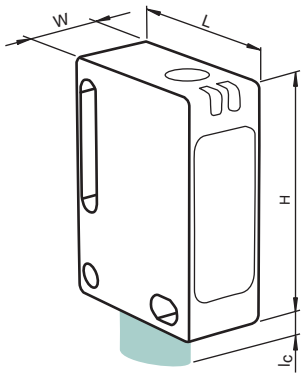
- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate

Further Products

In this series, we offer additionally:

ML7-8-200/25/103/115b

Technical data like ML7-8-200/25/103/115 but:
Connection: fixed cable 200 mm with M12 connector, 4-pin



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Detection range	20 ... 200 mm
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number	green = preferred type	ML7-8-200/25/102/115	ML7-8-200/25/103/115	ML7-8-200/25/102/143	ML7-8-200/25/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	M8 x 1 connector, 4-pin			●	●





Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions			
Length L [mm]	23		
Width W [mm]	11		
Height H [mm]	31		
Connector area l_c [mm]	7,6		9,1

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, straight
V31-WM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, angled

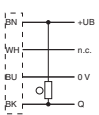
Electrical Connection

❍ = light on, ● = dark on



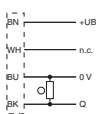
ML7-8-200/25/102/115

Option /25/102/115



ML7-8-200/25/103/115

Option 103/115

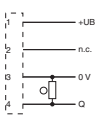






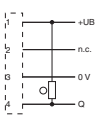
ML7-8-200/25/103/115b
ML7-8-200/25/103/143

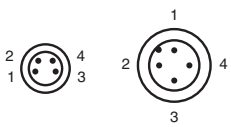
Option /25/103



ML7-8-200/25/102/143

Option /25/102





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

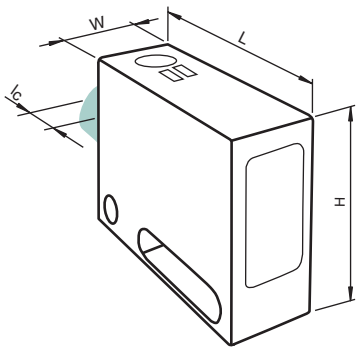


Properties

- Diffuse type
- Rectangular miniature housing, side view
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Detection range	20 ... 200 mm
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		ML71-8-200/25/102/115	ML71-8-200/25/103/115	ML71-8-200/25/102/143	ML71-8-200/25/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	4-pin, M8 plastic connector			●	●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	31	
Width W [mm]	11	
Height H [mm]	23	
Connector area l_c [mm]	7,6	9,1

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, straight
V31-WM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, angled

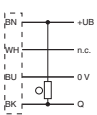
Electrical Connection

❍ = light on, ● = dark on



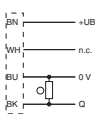
ML71-8-200/25/102/115

Option /25/102/115



ML71-8-200/25/103/115

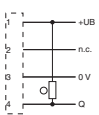
Option 103/115





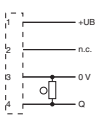
ML71-8-200/25/102/143

Option /25/102



ML71-8-200/25/103/143

Option /25/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	20 ... 200 mm
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light on
Switching current	max. 100 mA
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67

Model Number		ML8-8-200-RT/102/115	ML8-8-200-RT/103/115b	ML8-8-200-RT/102/143	ML8-8-200-RT/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●			
	fixed cable 300 mm with M12 connector, 4-pin		●		
	M8 x 1 connector, 4-pin			●	●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

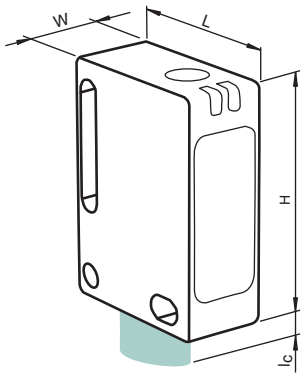
Dimensions		
Length L [mm]	23	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	7,6	9,1

Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Tamper-proof, no operating controls



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, straight
V31-WM-2M-PVC	Connecting cable, M8 x 1, 4-pin, PVC cable, angled

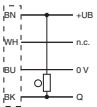
Electrical Connection

❍ = light on, ● = dark on

ML8-8-200-RT/102/115



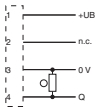
Option /25/102/115





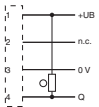
ML8-8-200-RT/103/115b
ML8-8-200-RT/103/143

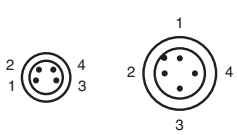
Option /25/103



ML8-8-200-RT/102/143

Option /25/102





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	10 ... 450 mm
Light type	modulated infrared light , 950 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected, overvoltage protected
Switching type	light/dark on
Switching current	max. 100 mA per output
Switching frequency	500 Hz
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)
Material	
Housing	ABS
Optical face	Acrylic
Protection degree	IP67

Model Number		ML17-8-450/115/136	ML17-8-450/115b/136	ML17-8-450/136/143	ML17-8-450/73/136
Connection	150 mm PVC cable with 4-pin, M12 connector		●		
	2 m PVC cable	●			
	4-pin , M12 x 1 connector				●
	4-pin , M8 x 1 connector			●	
					
Approvals and Certificates					
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

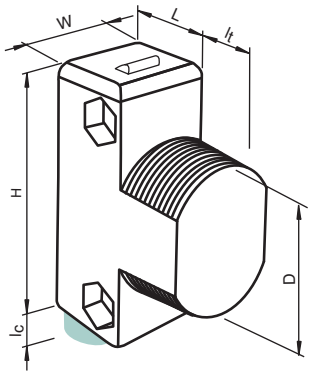
Dimensions			
Length L [mm]	19		
Width W [mm]	15		
Height H [mm]	34,5		
Connector area l_c [mm]	0	9,8	18

Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Threaded face and side thru-holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

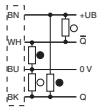
Electrical Connection

❍ = light on, ● = dark on



ML17-8-450/115/136

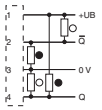
Option 59/115/136





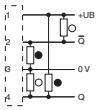
ML17-8-450/73/136

Option 73/136



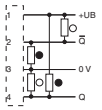
ML17-8-450/115b/136

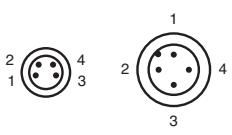
Option 59/115b/136



ML17-8-450/136/143

Option 59/136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Detection range	0 ... 1000 mm
Light type	modulated visible red light
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	ML100-8-1000-RT/102/115	ML100-8-1000-RT/103/115	ML100-8-1000-RT/95/102	ML100-8-1000-RT/95/103	ML100-8-1000-RT/98/102	ML100-8-1000-RT/98/103
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●		●
Connection	2 m fixed cable	●	●				
	Male connector M8 x 1 , 3-pin					●	●
	Male connector M8 x 1 , 4-pin			●	●		
							
Approvals and Certificates							
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						
Dimensions							
Length L [mm]		20					
Width W [mm]		11					
Height H [mm]		31					
Connector area l_c [mm]		0		10			

Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

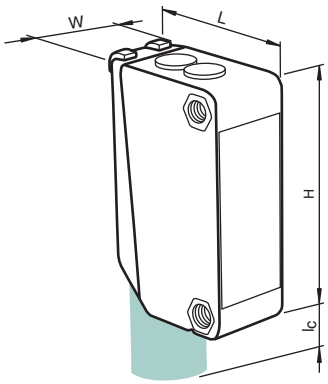
- Simplest alignment and set-up with ultra-bright Power-Beam emitter LED
- Rugged housing has metal-reinforced mounting holes

Further Products

In this series, we offer additionally:

ML100-8-1000-RT/103/115b

Technical data like ML100-8-1000-RT/103/115 but:
Connection: 300 mm fixed cable with 4-pin, M12 x 1 connector



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

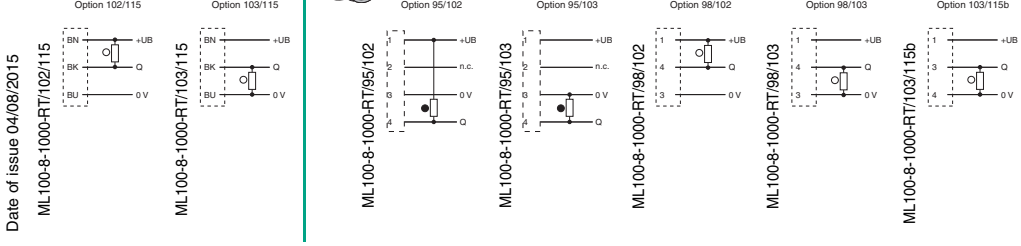
OMH-ML100-01	Mounting bracket
OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-ML100-02	Mounting bracket
OMH-ML100-04	Mounting bracket
OMH-ML100-05	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

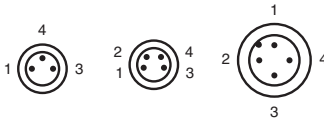
Electrical Connection

❍ = light on, ● = dark on





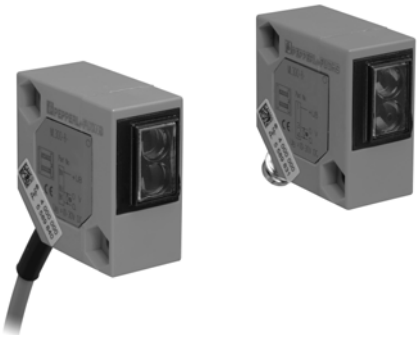




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	0 ... 600 mm
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	ABS
Optical face	plastic
Protection degree	IP65

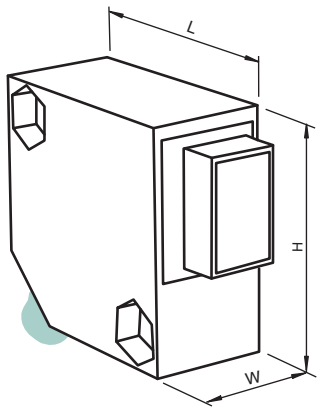
Model Number		ML300-8-600-RT/59/103/115	ML300-8-600-RT/25/103/115	ML300-8-600-RT/59/102/115	ML300-8-600-RT/25/102/115	ML300-8-600-RT/59/98/103	ML300-8-600-RT/25/98/103	ML300-8-600-RT/59/98/102	ML300-8-600-RT/25/98/102
No-load supply current	max. 30 mA	●		●		●		●	
	max. 35 mA		●		●		●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
Switching type	dark on	●		●		●		●	
	light on		●		●		●		●
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 3-pin					●	●	●	●





Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30
Width W [mm]	15
Height H [mm]	30



Accessories

This and more accessories can be found in chapter 10

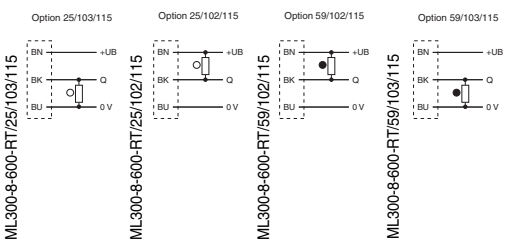
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
V3-GM-2M-PVC	Cable socket, M8, 3-pin, PVC cable
V3-WM-2M-PVC	Cable socket, M8, 3-pin, PVC cable
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

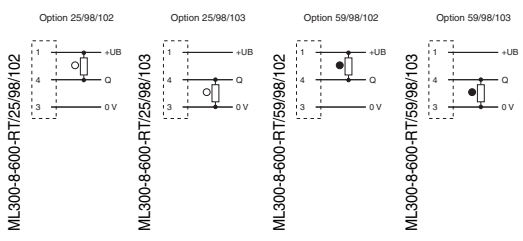
Electrical Connection

❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

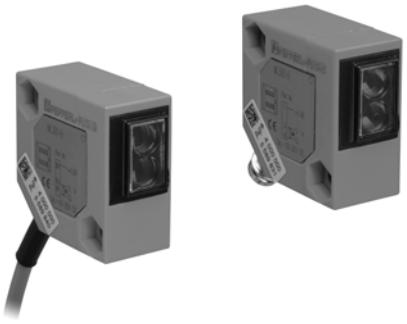
1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	0 ... 1200 mm
Light type	modulated infrared light , 880 nm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 20 mA
Switching type	light on / dark on
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	PBT
Optical face	glass pane
Protection degree	IP67

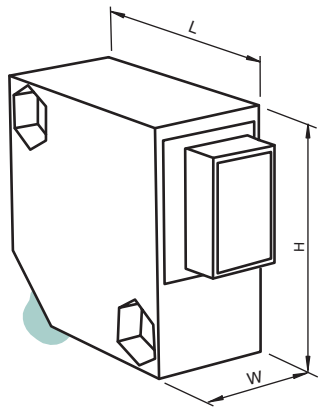
Model Number		ML300-8-1200-IR/25/115/120	ML300-8-1200-IR/25/115/127	ML300-8-1200-IR/25/82d/103/115	ML300-8-1200-IR/25/95/120	ML300-8-1200-IR/25/95/127	ML300-8-1200-IR/25/82d/95/103
Signal output	2 NPN outputs, complementary, short-circuit proof, reverse-polarity protected, open collector		●			●	
	2 PNP outputs, complementary, short-circuit protected, reverse polarity protected, open collector	●		●	●		●
Output of the pre-fault indication	1 PNP, inactive when falling short of the stability control , open collector , short-circuit protected, reverse polarity protected , 100 mA max			●			●
Connection	2 m fixed cable	●	●	●			
	M8 x 1 connector, 4-pin				●	●	●
							

Approvals and Certificates							
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions	
Length L [mm]	30
Width W [mm]	15
Height H [mm]	30

Properties

- Diffuse type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light



Accessories

This and more accessories can be found in chapter 10

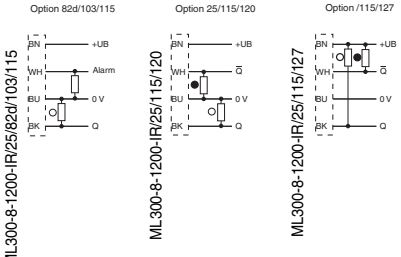
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

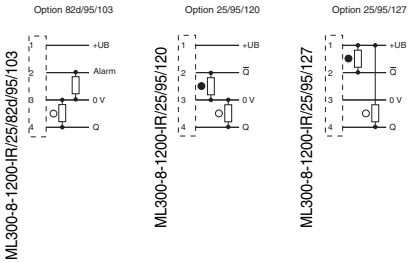
Electrical Connection

❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015





Properties

- Diffuse type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

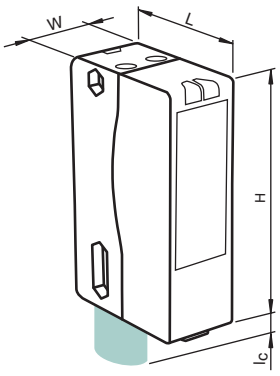
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	20 ... 2000 mm , adjustable
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	125 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP65
Connection	Plastic connector M12 x 1, 4-pin



Model Number		RL29-8-2000/73c/136	RL29-8-2000/59/73c/136
Switching type	dark on		●
	light on	●	
Approvals and Certificates			
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure		●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		54,3	
Width W [mm]		25,8	
Height H [mm]		88	
Connector area l_c [mm]		14	



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

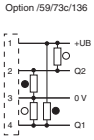
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled
V1-G-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled

Electrical Connection

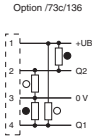
❍ = light on, ● = dark on

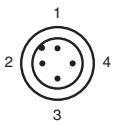


RL29-8-2000/59/73c/136



RL29-8-2000/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data				
Operating voltage	10 ... 30 V DC			
No-load supply current	≤ 20 mA			
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected			
Switching type	light on			
Switching current	max. 100 mA			
Switching frequency	≤ 500 Hz			
Ambient temperature	-30 ... 55 °C (-22 ... 131 °F)			
Material				
Housing	Polycarbonate			
Optical face	PMMA			
Protection degree	IP67			
Model Number		RL31-8-2500-IR/115/136	RL31-8-1200-RT/73c/136	RL31-8-2500-IR/73c/136
	green = preferred type			
Detection range	0 ... 1200 mm adjustable		●	
	0 ... 2500 mm adjustable	●		●
Light type	modulated infrared light , 850 nm	●		●
	modulated visible red light , 630 nm		●	
Connection	2 m fixed cable , 4-wire	●		
	connector M12 x 1, 4-pin		●	●
				
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]			35	
Width W [mm]			18	
Height H [mm]			62	
Connector area l_c [mm]		0	10,2	

Properties

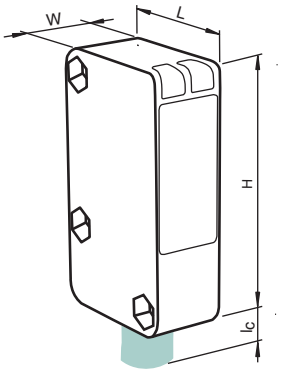
- **Diffuse type**
- **Rectangular full-size housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Visible red and infrared light versions**

Further Products

In this series, we offer additionally:

RL31-8-2500-IR/59/73c/136

Tech. spec. like RL31-8-2500-IR/73c/136 but:
Switching type: dark on



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled
V1-G-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled

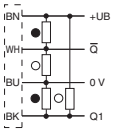
Electrical Connection

❍ = light on, ● = dark on



RL31-8-2500-IR/115/136

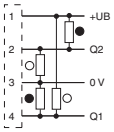
Option 115/136

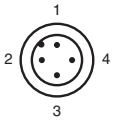




RL31-8-2500-IR/73c/136
RL31-8-1200-RT/73c/136

Option /25/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Diffuse type
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Cable version
- Visible red and infrared light versions

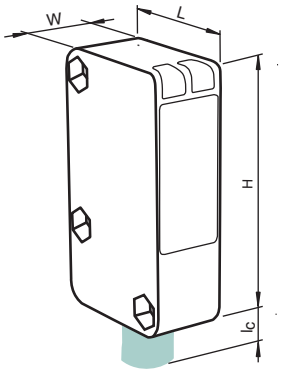
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	24 ... 240 V AC 12 ... 240 V DC
No-load supply current	≤ 40 mA
Power consumption	≤ 2 VA
Signal output	Relay, 1 alternator
Switching type	light on
Switching current	max. 3 A
Switching power	DC: max. 150 W AC: max. 750 VA
Switching frequency	≤ 20 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	Polycarbonate
Optical face	PMMA
Protection degree	IP67
Connection	2 m fixed cable , 5-wire



Model Number		RLK31-8-1200-RT/31/115	RLK31-8-2500-IR/31/115
	green = preferred type		
Detection range	0 ... 1200 mm adjustable	●	
	0 ... 2500 mm adjustable		●
Light type	modulated infrared light , 850 nm		●
	modulated visible red light , 630 nm	●	
Approvals and Certificates			
Protection class	II	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●
Dimensions			
Length L [mm]		35	
Width W [mm]		18	
Height H [mm]		62	
Connector area l_c [mm]		0	



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket

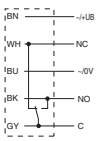
Electrical Connection

❍ = light on, ● = dark on



RLK31-8-2500-IR/31/115
RLK31-8-1200-RT/31/115

Option 31/115



Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light , 850 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 35 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection
Switching type	light/dark on, switchable
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

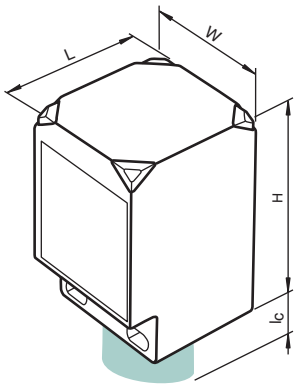
Model Number		RL61-8-1000-Z/115/136	RL61-8-4000-Z/115/136	RL61-8-1000-Z/92/136	RL61-8-4000-Z/92/136
Threshold detection range	1.5 m	●		●	
	4.7 m		●		●
Detection range	0 ... 1000 mm adjustable	●		●	
	0 ... 4000 mm adjustable		●		●
Connection	fixed cable	●	●		
	M12 connector, 4-pin			●	●
					
Approvals and Certificates					
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		49			
Width W [mm]		45			
Height H [mm]		74			
Connector area l_c [mm]		18		28	

Properties

- Diffuse type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Ultra-bright four-corner LEDs for sensor status indication
- Threaded base and side thru-holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB06	Ball and Swivel Mounting Bracket
MPZB07	Ball and Swivel Vertical Mounting Plate
V1-G-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-2M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled
V1-G-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, straight
V1-W-5M-PUR	Connecting cable, M12 x 1, 4-pin, PUR cable, angled

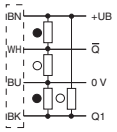
Electrical Connection

❍ = light on, ● = dark on



RL61-8-1000-Z/115/136
RL61-8-4000-Z/115/136

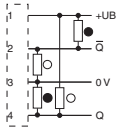
Option 115/136

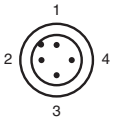




RL61-8-1000-Z/92/136
RL61-8-4000-Z/92/136

Option 92/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

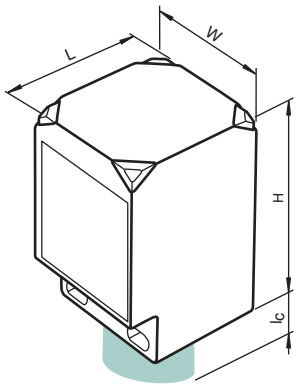


Properties

- Diffuse type
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Cable and connector versions
- Infrared light

Your Benefit

- Ultra-bright four-corner LEDs for sensor status indication
- Threaded base and side thru-holes provide flexible mounting options
- Universal usage with AC or DC power



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Timer	✔
Light/dark switch	✔
Light type	modulated infrared light , 850 nm
Operating voltage	24 ... 240 V AC 12 ... 240 V DC
No-load supply current	≤ 35 mA
Power consumption	≤ 2 VA
Signal output	Relay, Form C
Switching type	light/dark on, switchable
Switching current	max. 3 A
Switching power	DC: max. 150 W AC: max. 750 VA
Switching frequency	20 Hz
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number		RLK61-8-4000-Z/31/115	RLK61-8-1000-Z/31/115	RLK61-8-1000-Z/31/135	RLK61-8-4000-Z/31/135
Threshold detection range	1.5 m		●	●	
	4.7 m	●			●
Detection range	0 ... 1000 mm adjustable		●	●	
	0 ... 4000 mm adjustable	●			●
Connection	fixed cable	●	●		
	V95 quick disconnect			●	●

Approvals and Certificates					
UL approval	cULus	●	●	●	●

Dimensions		
Length L [mm]	49	
Width W [mm]	45	
Height H [mm]	74	
Connector area l_c [mm]	18	28

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB07	Ball and Swivel Vertical Mounting Plate
MPZB06	Ball and Swivel Mounting Bracket
V95-W-2M-PVC	Connecting cable, 5-pin, PVC cable, angled
V95-W-5M-PVC	Connecting cable, 5-pin, PVC cable, angled
V95-G	Field attachable connector, 5-pin, straight

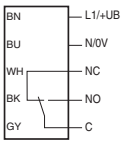
Electrical Connection

❍ = light on, ● = dark on



RLK61-8-1000-Z/31/115
RLK61-8-4000-Z/31/115

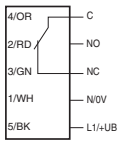
Option 31/115

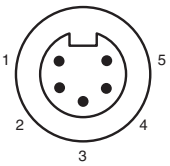




RLK61-8-1000-Z/31/135
RLK61-8-4000-Z/31/135

Option 31/135





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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection range	2 ... 12 mm
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 70 mA
Switching type	light on
Switching current	max. 100 mA
Switching frequency	100 Hz
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Material	
Housing	PC + ABS
Optical face	Scratch resistant mineral glass lens
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin

Model Number		WTS10-12/20/105	WTS10-12/21/105
Signal output	2 switch outputs NPN, NO short-circuit protected reverse polarity protected		●
	2 switch outputs PNP, NO short-circuit protected reverse polarity protected	●	
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		20	
Width W [mm]		50	
Height H [mm]		90	
Connector area l_c [mm]		10	

Properties

- Multiple beams
- Special application housing, side view
- Plastic housing
- DC sensor
- Discrete outputs
- Connector version
- Visible red light

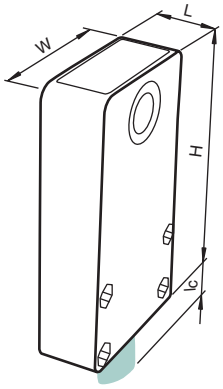
Your Benefit

- Specifically for quality checks of weld tips
- Upper and lower weld tips checked simultaneously
- High position and angle tolerance insensitivity

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-WTS10-01	Mounting bracket for sensors of WTS10 series
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PUR	Cable socket, M12, 5-pin, PUR cable

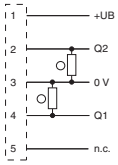


Electrical Connection

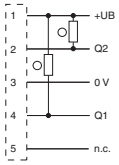
❍ = light on, ● = dark on

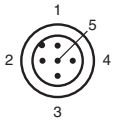


WTS10-12/20/105



WTS10-12/21/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

- Diffuse type
- Rectangular compact housing
- Plastic housing
- DC sensor
- NAMUR output
- Connector version
- Infrared light

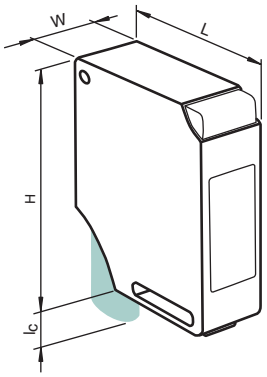
Your Benefit

- ATEX-approval for zone 1
- Intrinsically safe, Ex op is ia IIC T6

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	MLV11-8-500-Ex/40b/112
Sensing range adjustment	✔
Detection range	0 ... 500 mm
Light type	modulated infrared light , 860 nm
Operating voltage	6 ... 15.5 V DC (R_i approx. 0 Ohm)
Signal output	1 NAMUR output NC/NO programmable
Switching type	light/dark on, programmable
Current consumption	
Reference target detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Reference target not detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Switching frequency	≥ 100 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	scratch resistant plastic lens
Protection degree	IP67
Connection	V1 connector (M12 x 1), 4-pin, rotatable through 90°
Use in the Hazardous Area	
Marking	Zone 1: Ex II 2G Ex op is ia IIC T6
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
EC-Type Examination Certificate	PTB 99 ATEX 2036 X
Dimensions	
Length L [mm]	45
Width W [mm]	18
Height H [mm]	50
Connector area l_c [mm]	18 / 0

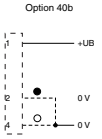


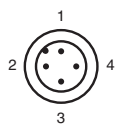
Electrical Connection

❍ = light on, ● = dark on

MLV11-8-500-Ex/40b/112







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

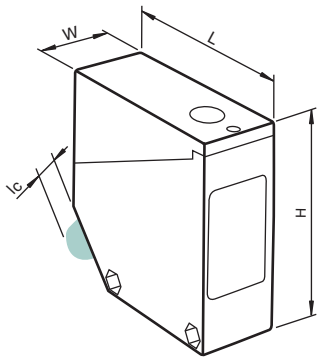
Model Number	RL36-8-2000-Ex/40b/116
Sensing range adjustment	✔
Detection range	0 ... 2000 mm
Light type	modulated infrared light
Operating voltage	6 ... 20 V DC (R_i approx. 0 Ohm)
Signal output	1 NAMUR output NC/NO programmable
Switching type	light/dark on, programmable
Current consumption	
Reference target detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Reference target not detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Switching frequency	≥ 100 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PMMA
Optical face	PMMA
Protection degree	IP54
Connection	terminal compartment PG9, ≤ 2.5 mm²
Use in the Hazardous Area	
Marking	II 2G Ex op is ia IIC T4
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	85
Width W [mm]	34
Height H [mm]	80
Connector area l_c [mm]	0 (PG9)

Properties

- **Diffuse type**
- **Rectangular full-size housing**
- **Plastic housing**
- **DC sensor**
- **NAMUR output**
- **Terminal version**
- **Infrared light**

Your Benefit

- **ATEX-approval for zone 1**
- **Intrinsically safe, Ex op is ia IIC T4**

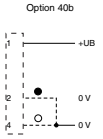


Electrical Connection

❍ = light on, ● = dark on



RL36-8-2000-Ex/40b/116



Date of issue 2015-04-08

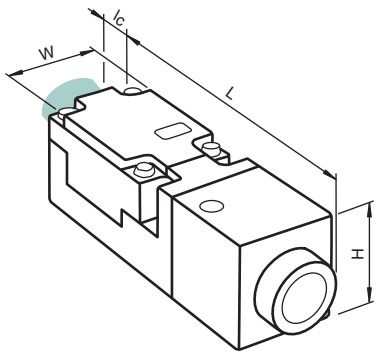


Properties

- **Diffuse type**
- **Rectangular compact housing**
- **Plastic housing**
- **DC sensor**
- **NAMUR output**
- **Terminal version**
- **Infrared light**

Your Benefit

- **ATEX approval for zone 20 (Dust) and zone 1 (Gas)**
- **Intrinsically safe, Ex op is ia IIC T6**
- **FM and CSA approval**



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**OCT300-M1K-N2**
Sensing range adjustment	✔
Light/dark switch	✔
Detection range	0 ... 300 mm
Light type	modulated infrared light
Operating voltage	6 ... 20 V DC (R_i approx. 0 Ohm)
Signal output	1 NAMUR output NC/NO programmable
Switching type	light/dark on, programmable
Current consumption	
Reference target detected	connection 1, 2: ≤ 1 mA connection 3, 4: ≥ 2.7 mA
Reference target not detected	connection 1, 2: ≥ 2.7 mA connection 3, 4: ≤ 1 mA
Switching frequency	≤ 100 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	Scratch resistant mineral glass lens
Protection degree	IP67
Connection	terminal compartment PG9, ≤ 2.5 mm²
	
Use in the Hazardous Area	
Marking	Zone 1: Ex II 2G Ex op is ia IIC T6 Zone 20/21: Ex II 1D Ex iaD 20 T 85°C
Approvals and Certificates	
FM approval	
Approved for	IS / I,II,III / 1 / ABCDEFG / T5 - 116-0110; Entity NI / I / 2 / ABCD / T6 Entity Parameters: VMax = 12.6 V, IMax = 20 mA, Ci = 1.11 µF, Li = 0 mH (Groups A, B, C, D, E, F, G). VMax = 15.5 V, IMax = 52 mA, Ci = 1.11 µF, Li = 0 mH (Groups C, D, E, F, G).
CSA approval	
Approved for	Class I, Division 2, Groups A, B, C and D Rated 20V (max), 50mA. These sensors are suitable for installation in (or through the wall of) a suitable enclosure with provision for connection of rigid metal conduit, as acceptable to the local inspection authority having jurisdiction.
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	100
Width W [mm]	30
Height H [mm]	30
Connector area l_c [mm]	0

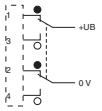
Electrical Connection

❍ = light on, ● = dark on



OCT300-M1K-N2

Option 40b



Date of issue: 2015-04-08

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CE

Properties

- Polarized type
- Cylindrical threaded housing
- Nickel plated brass housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

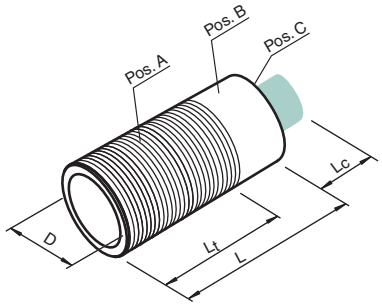
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Threshold detection range	1200 mm
Effective detection range	0 ... 1000 mm
Reference target	H85 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Control input	light on +UB dark on: 0 V
Switching type	light/dark on
Switching current	max. 300 mA
Switching frequency	≤ 700 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GLV12-54/36/40b/115	GLV12-54/37/40b/115	GLV12-54/36/40b/92	GLV12-54/37/40b/92
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	connector M12 x 1, 4-pin			●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	55	
Diameter D [mm]	12	
Thread length l_t [mm]	34	
Connector area l_c [mm]	0	10
LED position	Pos. B	



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
REF-H85	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

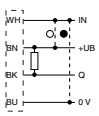
Electrical Connection

❍ = light on, ● = dark on



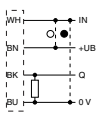
GLV12-54/36/40b/115

Option 36/40b/115



GLV12-54/37/40b/115

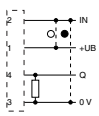
Option 37/40b/115





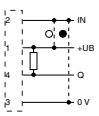
GLV12-54/37/40b/92

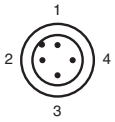
Option 37/40b/92



GLV12-54/36/40b/92

Option 36/40b/92





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



CE

Properties

- Non-polarized type
- Cylindrical threaded housing
- Nickel plated brass housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

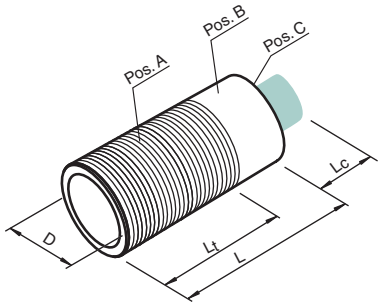
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Threshold detection range	2500 mm
Effective detection range	0 ... 2000 mm
Reference target	H85 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Control input	light on +UB dark on: 0 V
Switching type	light/dark on
Switching current	max. 300 mA
Switching frequency	≤ 700 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GLV12-6/36/40b/115	GLV12-6/37/40b/115	GLV12-6/36/40b/92	GLV12-6/37/40b/92
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	connector M12 x 1, 4-pin			●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	55	
Diameter D [mm]	12	
Thread length l_t [mm]	34	
Connector area l_c [mm]	0	10
LED position	Pos. B	



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
REF-H85	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

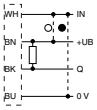
Electrical Connection

❍ = light on, ● = dark on



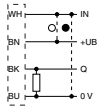
GLV12-6/36/40b/115

Option 36/40b/115



GLV12-6/37/40b/115

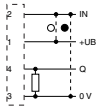
Option 37/40b/115





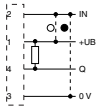
GLV12-6/37/40b/92

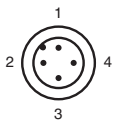
Option 37/40b/92



GLV12-6/36/40b/92

Option 36/40b/92





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	5.5 m
Effective detection range	0 ... 4 m
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GLV18-55/115/120	GLV18-55/59/102/115	GLV18-55/59/102/159	GLV18-55/59/103/159	GLV18-55/73/120
Signal output	1 NPN, short-circuit protected open collector		●	●		
	1 PNP, short-circuit protected, open collector				●	
	2 PNP, complementary, short-circuit protected, open collectors	●				●
Switching type	dark on		●	●	●	
	light/dark on	●				●
Connection	2 m fixed cable	●	●			
	Connector M12 x 1, 3-pin			●	●	
	connector M12 x 1, 4-pin					●





Approvals and Certificates						
Protection class	II	●	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

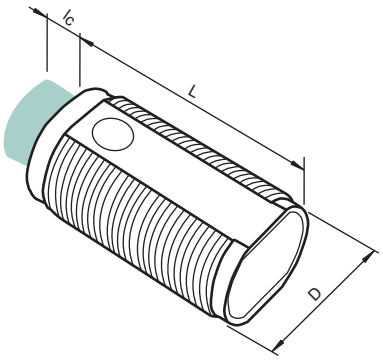
Dimensions						
Length L [mm]				33		
Diameter D [mm]				18		
Connector area l_c [mm]		7			11	

Properties

- Polarized type
- Cylindrical threaded housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

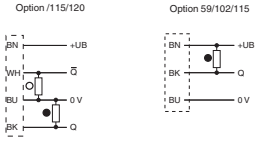
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on

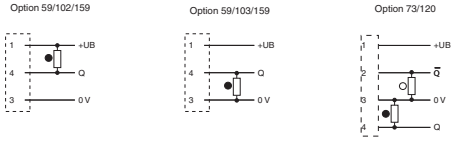


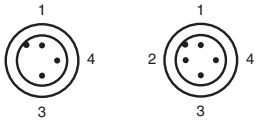
GLV18-55/115/120 GLV18-55/59/102/115





GLV18-55/59/102/159 GLV18-55/59/103/159 GLV18-55/73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	4.5 m
Effective detection range	0 ... 3.5 m
Reference target	reflector C110-2
Light type	modulated visible red light, 640 nm
Optical face	lateral
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

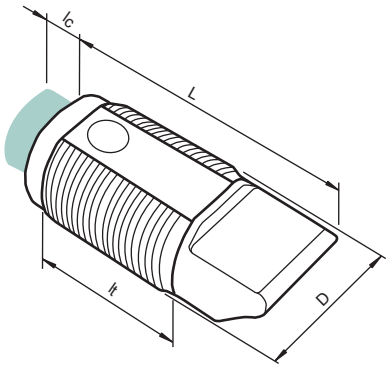
Model Number	green = preferred type	GLV18-55-S/115/120	GLV18-55-S/59/102/115	GLV18-55-S/59/102/159	GLV18-55-S/73/120
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Switching type	dark on		●	●	
	light/dark on	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		46			
Diameter D [mm]		18			
Connector area l_c [mm]		7		11	

Properties

- **Polarized type**
- **Cylindrical threaded housing, side view**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Visible red light**

Your Benefit

- **Short sensor design for space-saving mounting**



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

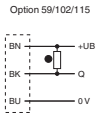
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

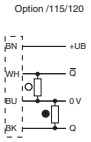
❍ = light on, ● = dark on



GLV18-55-S/59/102/115

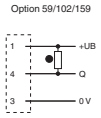


GLV18-55-S/115/120

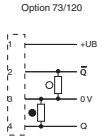


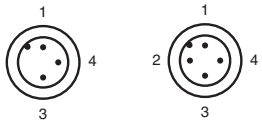


GLV18-55-S/59/102/159



GLV18-55-S/73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Glass detection	✔
Threshold detection range	6.5 m
Effective detection range	0 ... 2.5 m in glass mode; 0 ... 5 m in normal mode
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	< 15 mA
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GLV18-55-G/115/120	GLV18-55-G/59/102/115	GLV18-55-G/59/102/159	GLV18-55-G/73/120
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Switching type	dark on		●	●	
	light/dark on	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

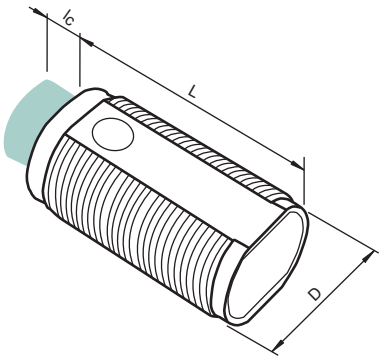
Dimensions			
Length L [mm]	33		
Diameter D [mm]	18		
Connector area l_c [mm]	7	11	

Properties

- Clear object detection type
- Cylindrical threaded housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting
- Automatic threshold adjustment compensates for presence of dust and moisture



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
REF-H85	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
ORR50	Reflector, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

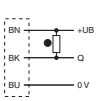
Electrical Connection

❍ = light on, ● = dark on



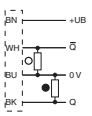
GLV18-55-G/59/102/115

Option 59/102/115



GLV18-55-G/115/120

Option /115/120





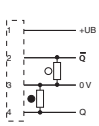
GLV18-55-G/59/102/159

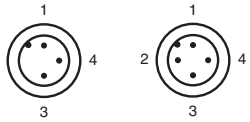
Option 59/102/159



GLV18-55-G/73/120

Option 73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	8 m
Effective detection range	0 ... 6.5 m
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

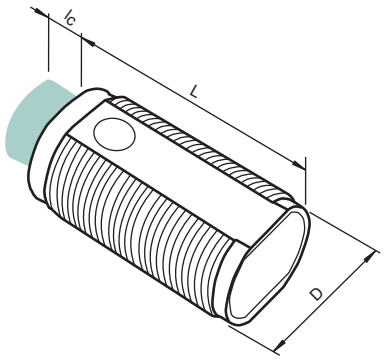
Model Number		GLV18-6/115/120	GLV18-6/59/102/115	GLV18-6/59/102/159	GLV18-6/73/120
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Switching type	dark on		●	●	
	light/dark on	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		33			
Diameter D [mm]		18			
Connector area l_c [mm]		7		11	

Properties

- Non-polarized type
- Cylindrical threaded housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on



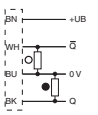
GLV18-6/59/102/115

Option 59/102/115



GLV18-6/115/120

Option /115/120





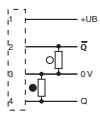
GLV18-6/59/102/159

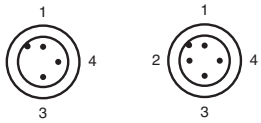
Option 59/102/159



GLV18-6/73/120

Option 73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Threshold detection range	6.5 m
Effective detection range	0 ... 5.5 m
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	lateral
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number		GLV18-6-S/115/120	GLV18-6-S/59/102/115	GLV18-6-S/59/102/159	GLV18-6-S/73/120
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Switching type	dark on		●	●	
	light/dark on	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

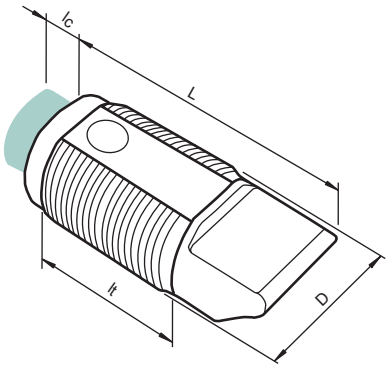
Dimensions		
Length L [mm]	46	
Diameter D [mm]	18	
Connector area l_c [mm]	7	11

Properties

- Non-polarized type
- Cylindrical threaded housing, side view
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

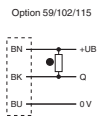
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

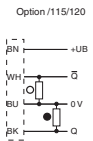
Electrical Connection

❍ = light on, ● = dark on

GLV18-6-S/59/102/115 GLV18-6-S/115/120

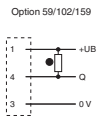


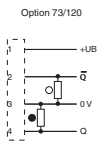


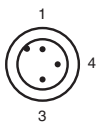


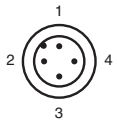
GLV18-6-S/59/102/159 GLV18-6-S/73/120











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Polarized type
- Cylindrical threaded housing, side view
- Plastic housing
- AC/DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Universal usage with AC or DC power supply

Technical Data

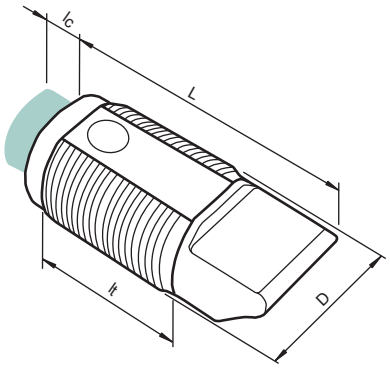
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	lateral
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Signal output	N-channel MOSFET, short circuit protected
Switching type	dark on
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

Model Number		GLK18-55-S/59/115/161	GLK18-6-S/59/115/161	GLK18-55-S/59/161/166	GLK18-6-S/59/161/166
Polarization filter		●		●	
Threshold detection range	4.5 m	●		●	
	6.5 m		●		●
Effective detection range	0 ... 3.5 m	●		●	
	0 ... 5.5 m		●		●
Connection	Micro AC connector, 1/2" V124 ; 4-pin			●	●
	2 m, 3 x 0.34 mm², PVC cable	●	●		

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●

Dimensions					
Length L [mm]		64			
Diameter D [mm]		18			
Thread length l_t [mm]		43			
Connector area l_c [mm]		7		11	



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

Electrical Connection

❍ = light on, ● = dark on



GLK18-6-S/59/115/161
GLK18-55-S/59/115/161

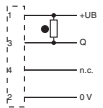
Option 59/115/161

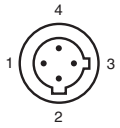




GLK18-6-S/59/161/166
GLK18-55-S/59/161/166

Option 59/161/166





Wire colors

1	RD/BK	(red/black)
2	RD/WH	(red/white)
3	RD	(red)
4	GN	(green)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Reference target	reflector C110-2
Light type	modulated visible red light , 640 nm
Optical face	frontal
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Signal output	N-channel MOSFET, short circuit protected
Switching type	dark on
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

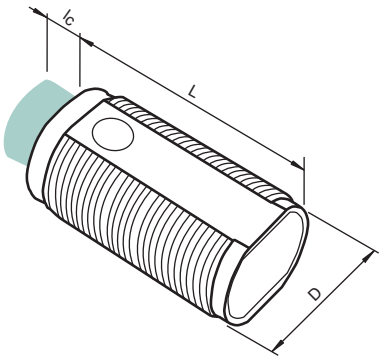
Model Number		GLK18-55/59/115/161	GLK18-6/59/115/161	GLK18-55/59/161/166	GLK18-6/59/161/166
Polarization filter		●		●	
Threshold detection range	5.5 m	●		●	
	8 m		●		●
Effective detection range	0 ... 4 m	●		●	
	0 ... 6.5 m		●		●
Connection	Micro AC connector, 1/2" V124 ; 4-pin			●	●
	2 m, 3 x 0.34 mm², PVC cable	●	●		
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●
Dimensions					
Length L [mm]		49			
Diameter D [mm]		18			
Thread length l_t [mm]		43			
Connector area l_c [mm]		7		11	

Properties

- Non-polarized type
- Cylindrical threaded housing
- Plastic housing
- AC/DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Universal usage with AC or DC power supply



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

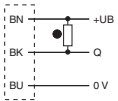
Electrical Connection

❍ = light on, ● = dark on



GLK18-6/59/115/161
GLK18-55/59/115/161

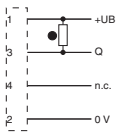
Option 59/115/161

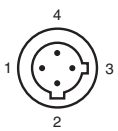




GLK18-6/59/161/166
GLK18-55/59/161/166

Option 59/161/166





Wire colors

1	RD/BK	(red/black)
2	RD/WH	(red/white)
3	RD	(red)
4	GN	(green)

Date of issue 04/08/2015



Properties

- Polarized type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

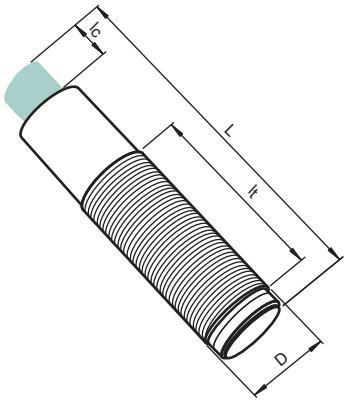
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Threshold detection range	4.5 m
Effective detection range	0 ... 4 m
Reference target	H50 reflector
Light type	modulated visible red light , 660 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	≤ 25 mA
Switching type	light/dark on electrically switchable
Switching current	max. 100 mA
Switching frequency	≤ 500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	OBS4000-18GM60-E4	OBS4000-18GM60-E5	OBS4000-18GM60-E4-V1	OBS4000-18GM60-E5-V1
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	connector M12 x 1, 4-pin			●	●
					

Approvals and Certificates						
UL approval	cULus Listed, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	60		70	
Diameter D [mm]		18		
Thread length l_t [mm]		38		
Connector area l_c [mm]	0		10	



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

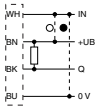
Electrical Connection

❍ = light on, ● = dark on



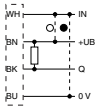
OBS4000-18GM60-E4

Option E4



OBS4000-18GM60-E5

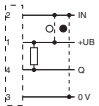
Option E5





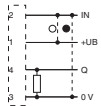
OBS4000-18GM60-E4-V1

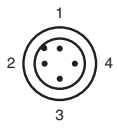
Option E4-V1



OBS4000-18GM60-E5-V1

Option E5-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VL18-54-M/40a/118/128
Polarization filter	✔
Sensitivity adjustment	✔
Threshold detection range	4 m
Effective detection range	0 ... 3.5 m
Reference target	H50 reflector
Light type	modulated visible red light , 632 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching type	light/dark on, switchable
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67
Connection	connector M12 x 1, 4-pin

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Connector area l_c [mm]	13

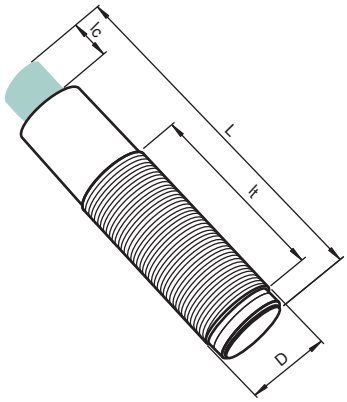
Properties

- Polarized type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



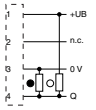
Electrical Connection

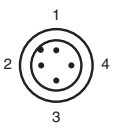
❍ = light on, ● = dark on

VL18-54-M/40a/118/128



Option 40a/118/128





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



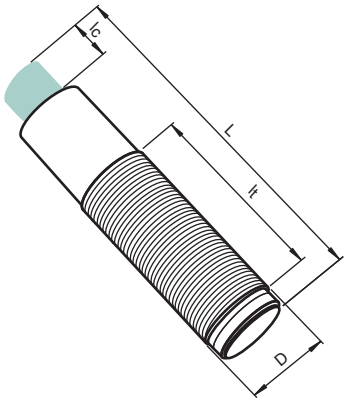
Properties

- Polarized type
- Cylindrical threaded housing
- Nickel-plated brass housing
- DC sensor
- Discrete output
- Connector version
- Laser red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VL18-54-M-LAS/40a/118/128
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	20 m
Effective detection range	0 ... 18 m
Reference target	H85 reflector
Light type	modulated visible red light
Laser class	1
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching type	light/dark on, switchable
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67
Connection	connector M12 x 1, 4-pin
	
Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Connector area l_c [mm]	13
LED position	Pos. B



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-VL18	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
REF-MH23	Reflector with Micro-structure, rectangular 23 mm x 13.8 mm, diagonal mounting hole
REF-H85	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-H100	Reflector, rectangular 122 mm x 99.35 mm, mounting holes
ORR50	Reflector, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

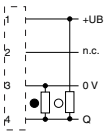
Electrical Connection

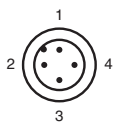
❍ = light on, ● = dark on



VL18-54-M-LAS/40a/118/128

Option 40a/118/128





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VL18-54-MS/40a/118/128
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	4 m
Effective detection range	0 ... 3.5 m
Reference target	H50 reflector
Light type	modulated visible red light , 632 nm
Optical face	lateral
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching type	light/dark on, switchable
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67
Connection	connector M12 x 1, 4-pin

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Cap length l_1 [mm]	15
Connector area l_c [mm]	13
LED position	Pos. B

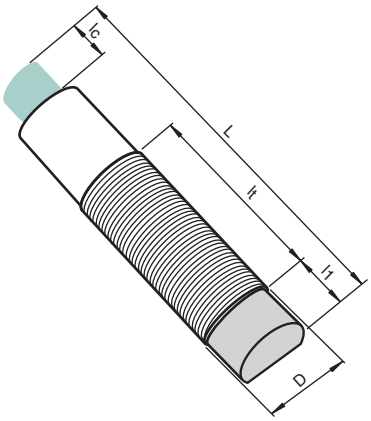
Properties

- **Polarized type**
- **Cylindrical threaded housing, side view**
- **Nickel-plated brass housing**
- **DC sensor**
- **Discrete output**
- **Connector version**
- **Visible red light**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



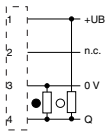
Electrical Connection

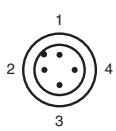
❍ = light on, ● = dark on



VL18-54-MS/40a/118/128

Option 40a/118/128





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Polarized type
- Rectangular ultra-small housing
- Plastic housing
- DC sensor
- Discrete output
- Cable connection
- Visible red light

Your Benefit

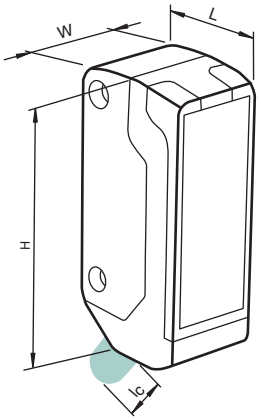
- Improved machine availability with abrasion-resistant, antistatic glass front

Further Products

In this series, we offer additionally:

OBR1000-R2-E2-0,2M-V31

Technical data like OBR1000-R2-E2 but:
Connection: 200 mm fixed cable with M8, 4-pin connector



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Test input	✔
Threshold detection range	1.4 m
Effective detection range	0 ... 1 m
Reference target	H40 reflector
Light type	modulated visible red light , 630 nm
Switching type	dark on
Operating voltage	10 ... 30 V DC, class 2
No-load supply current	< 10 mA
Switching current	max. 50 mA
Switching frequency	800 Hz
Test Input	emitter deactivation at 0 V
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC, ABS and PBT
Optical face	glass pane
Cable	PUR
Protection degree	IP67
Connection	2 m fixed cable



Model Number		OBR1000-R2-E0	OBR1000-R2-E2
Signal output	1 PNP, open collector, short-circuit protected		●
	1 NPN, open collector, short-circuit protected	●	
Approvals and Certificates			
UL approval	cULus Recognized, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		11.2	
Width W [mm]		7.5	
Height H [mm]		24	
Connector area l_c [mm]		0	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

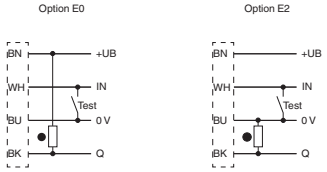
MH-R2-01	Mounting bracket
MH-R2-02	Mounting bracket
MH-R2-03	Mounting bracket
MH-R2-04	Mounting bracket

Electrical Connection

❍ = light on, ● = dark on

OBR1000-R2-E0 OBR1000-R2-E2





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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	6 m
Effective detection range	0 ... 5 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA at 24 V DC
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	ML4.2-54-F/40b/110/115	ML4.2-54-F/40b/103/115b	ML4.2-54-F/40b/110/115b	ML4.2-54-F/40b/95/103	ML4.2-54-F/40b/95/110	ML4.2-54-F/95/110/126b
Output of the pre-fault indication							●
Light/dark switch		●	●	●	●	●	
Signal output	PNP, open collector, short-circuit protected		●		●		
	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●		●		●	●
Switching type	light/dark on electrically switchable	●	●	●	●	●	
	light on						●
Output of the pre-fault indication	1 NPN function reserve output (alarm), short-circuit protected, reverse polarity protected, open collector						●
Connection	2 m fixed cable	●					
	300 mm fixed cable with M12 x 1, 4-pin connector		●	●			
	M8 x 1 connector, 4-pin				●	●	●
							

Approvals and Certificates		
UL approval	cULus Listed	● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

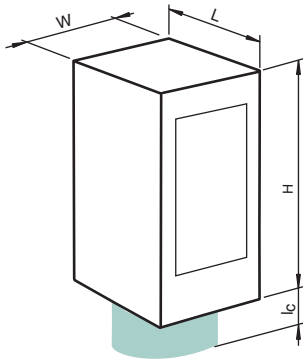
Dimensions		
Length L [mm]	18	
Width W [mm]	13,9	
Height H [mm]	25,4	
Connector area l_c [mm]	7,5	13,9

Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Antistatic optical face inhibits dust in paper and printing applications



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
OFR-100/100	Reflective tape 100 mm x 100 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

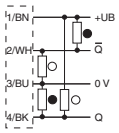
Electrical Connection

❍ = light on, ● = dark on



ML4.2-54-F/40b/110/115

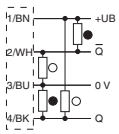
Option 25/136

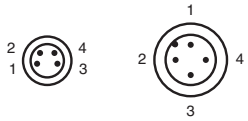




ML4.2-54-F/40b/103/115b
ML4.2-54-F/40b/110/115b
ML4.2-54-F/40b/95/103
ML4.2-54-F/40b/95/110
ML4.2-54-F/95/110/126b

Option 25/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics

Technical Data

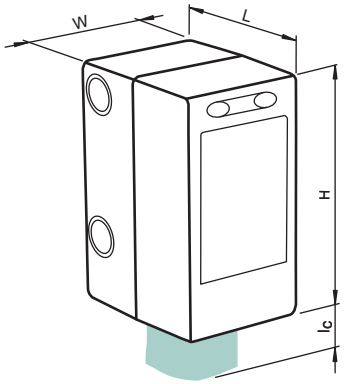
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	6 m
Effective detection range	0 ... 5 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA at 24 V DC
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	ML6-54-F/25/115/136	ML6-54-F/110/115a	ML6-54-F/25/95/136	ML6-54-F/82b/95/110
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●		●
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●		●	
Switching type	light/dark on, programmable	●		●	
	light on		●		●
Output of the pre-fault indication	1 PNP function reserve output (alarm), short-circuit protected, reverse polarity protected, open collector				●
Connection	2 m fixed cable	●			
	200 mm fixed cable with 3-pin, M8 x 1 connector		●		
	M8 x 1 connector, 4-pin			●	●
					

Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions			
Length L [mm]	18		
Width W [mm]	13,9		
Height H [mm]	25,4		
Connector area l_c [mm]	7,5	13,9	



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-Z	Mounting bracket
OMH-ML6-U	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V3-GM-2M-PVC	Cable socket, M8, 3-pin, PVC cable
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole

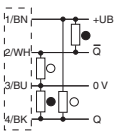
Electrical Connection

❍ = light on, ● = dark on



ML6-54-F/25/115/136

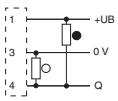
Option 25/136





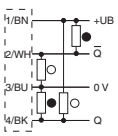
ML6-54-F/110/115a

Option 110/115a



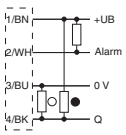
ML6-54-F/25/95/136

Option 25/136



ML6-54-F/82b/95/110

Option 82b/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	6 m
Effective detection range	0 ... 3.5 m in TEACH mode 0 ... 5 m at switch position "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 15 mA at 24 V DC
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching type	light/dark on, programmable
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67

Model Number		ML6-54-G/25/115/136	ML6-54-G/25/95/136
	green = preferred type		
Connection	2 m fixed cable	●	
	M8 x 1 connector, 4-pin		●
			
Approvals and Certificates			
UL approval	cULus Listed	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

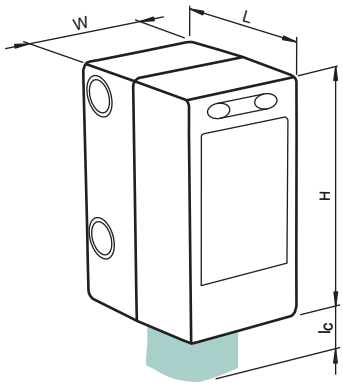
Dimensions		
Length L [mm]	18	
Width W [mm]	13,9	
Height H [mm]	25,4	
Connector area l_c [mm]	7,5	13,9

Properties

- Clear object detection type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most relaible detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
OFR-100/100	Reflective tape 100 mm x 100 mm
REF-MH23	Reflector with Micro-structure, rectangular 23 mm x 13.8 mm, diagonal mounting hole
REF-H50HT	Reflector, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap

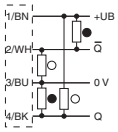
Electrical Connection

❍ = light on, ● = dark on



ML6-54-G/25/115/136

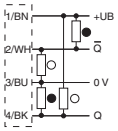
Option 25/136





ML6-54-G/25/95/136

Option 25/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015





Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

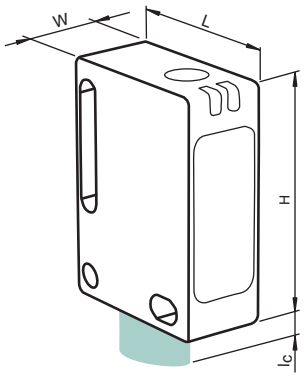
- Flexible use with versatile mounting opportunities
- ECOLAB certificate

Further Products

In this series, we offer additionally:

ML7-55/25/103/143

Technical data like ML7-55/59/103/143 but:
Switching type: light on



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Teach-In	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number	green = preferred type	ML7-55/59/102/115	ML7-55/59/102/115/126b	ML7-55/59/103/115	ML7-55/59/82b/103/115	ML7-55/59/103/115a	ML7-55/59/102/115b	ML7-55/59/82b/103/115b	ML7-55/59/102/143	ML7-55/59/102/126b/143	ML7-55/59/103/143	ML7-55/59/82b/103/143
Output of the pre-fault indication			●		●		●	●		●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●				●		●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●	●		●			●	●
Output of the pre-fault indication	1 NPN		●							●		
	1 PNP			●				●				●
Connection	2 m fixed cable	●	●	●	●							
	fixed cable 200 mm with M12 connector, 4-pin						●	●				
	M8 x 1 connector, 4-pin								●	●	●	●
	with fixed cable and 4-pin, M8 connector					●						

Approvals and Certificates												
Protection class	II	●	●	●	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.											

Dimensions												
Length L [mm]		23										
Width W [mm]		11										
Height H [mm]		31										
Connector area I_c [mm]		7,6								9,1		

Accessories

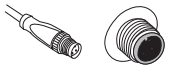
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

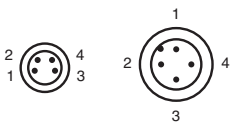
Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

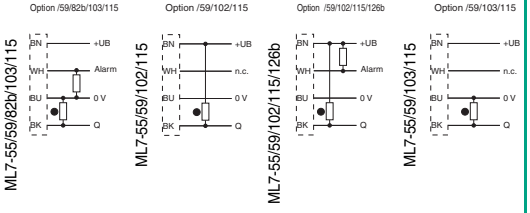
Electrical Connection

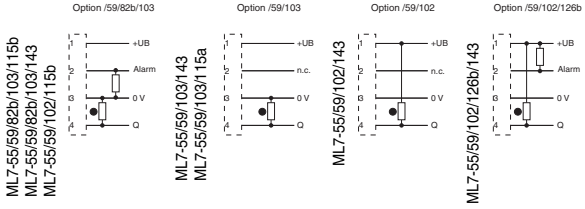
❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		ML7-6/59/102/115	ML7-6/59/102/115/126b	ML7-6/59/103/115	ML7-6/59/82b/103/115	ML7-6/59/102/126b/143	ML7-6/59/102/143	ML7-6/59/103/143	ML7-6/59/82b/103/143
Output of the pre-fault indication			●		●	●	●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Output of the pre-fault indication	1 NPN		●			●			
	1 PNP				●				●
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 4-pin					●	●	●	●

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

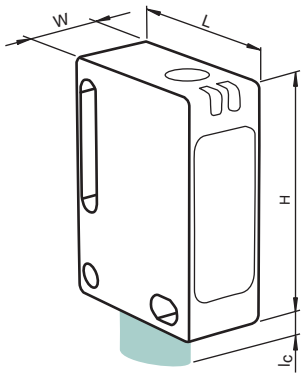
Dimensions		
Length L [mm]	23	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	7,6	9,1

Properties

- Non-polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

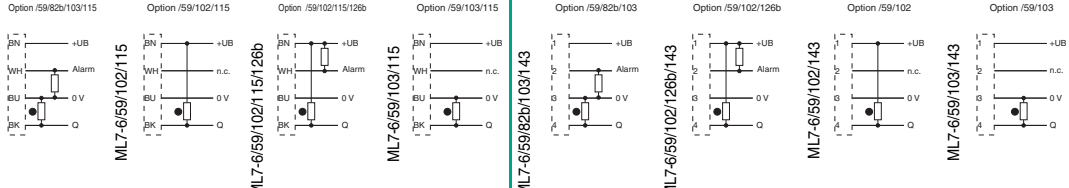
Electrical Connection

❍ = light on, ● = dark on









Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

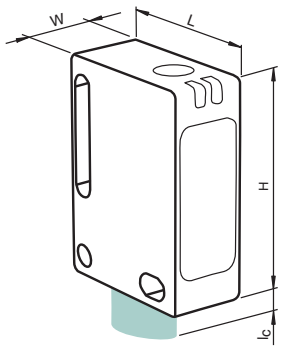


Properties

- Clear object detection type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most relaible detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- ECOLAB certificate



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	7.6 m
Effective detection range	0 ... 3.5 m in TEACH mode 0 ... 5.7 m at switch position "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA at 24 V DC
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number	green = preferred type	ML7-54-G/102/115/126b	ML7-54-G/25/115/127	ML7-54-G/25/136/115	ML7-54-G/82b/103/115	ML7-54-G/33/59/103/115a 0,5M	ML7-54-G/102/115b/126b	ML7-54-G/25/136/115b	ML7-54-G/82b/103/115b	ML7-54-G/102/126b/143	ML7-54-G/25/110/123/143	ML7-54-G/25/136/143	ML7-54-G/82b/103/143
Pre-fault indication output		●			●	●	●		●	●			●
Function input	Ext. Teach-In input (ET)										●		
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected										●		
	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●					●			●			
	1 PNP output, short-circuit protected, reverse polarity protected, open collector				●	●			●				●
	2 NPN outputs, short-circuit protected, reverse polarity protected, open collector		●										
	2 Push-pull outputs, complementary, short-circuit proof, reverse polarity protected			●				●				●	
Switching type	dark on	●			●	●	●		●	●			●
	light on		●	●				●			●	●	
Pre-fault indication output	1 NPN	●					●			●			
	1 PNP				●				●				●
Connection	200 mm cable with 4-pin, M12x1 connector						●	●	●				
	2 m fixed cable	●	●	●	●								
	500 mm cable with 3-pin, M8 x 1 connector					●							
	M8 x 1 connector, 4-pin									●	●	●	●
													

Approvals and Certificates													
Protection class	II	●	●	●	●	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.												

Dimensions			
Length L [mm]	23		
Width W [mm]	11		
Height H [mm]	31		
Connector area I_c [mm]	7,6		9,1

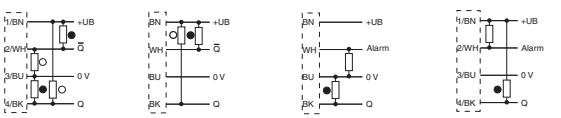
Electrical Connection

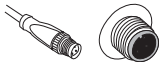
❍ = light on, ● = dark on



ML7-54-G/25/136/115 ML7-54-G/25/115/127 ML7-54-G/82b/103/115 ML7-54-G/102/115/126b

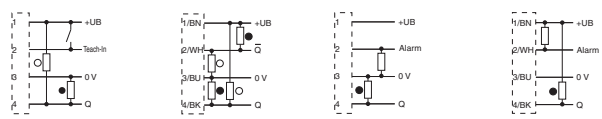
Option 25/136 Option /115/127 Option /59/82b/103/115 Option /102/126b





ML7-54-G/25/110/123/143 ML7-54-G/25/136/115b ML7-54-G/25/136/143 ML7-54-G/82b/103/115b ML7-54-G/33/59/103/115a 0,5MML7-54-G/82b/103/143 ML7-54-G/102/115b/126b ML7-54-G/102/126b/143

Option 25/110/123/143 Option 25/136 Option /59/82b/103 Option /102/126b





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Properties

- Polarized type
- Rectangular miniature housing, side view
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate

Technical Data

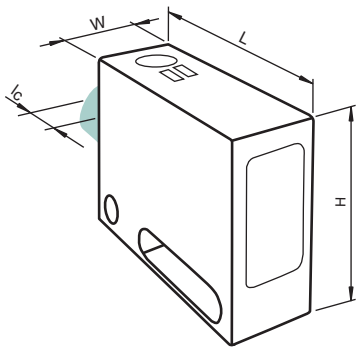
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Teach-In	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number	green = preferred type	ML71-55/59/102/115	ML71-55/59/102/115/126b	ML71-55/59/103/115	ML71-55/59/82b/103/115	ML71-55/59/102/126b/143	ML71-55/59/102/143	ML71-55/59/103/143	ML71-55/59/82b/103/143
Pre-fault indication output					●				●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Pre-fault indication output	1 NPN		●			●			
	1 PNP				●				●
Connection	2 m fixed cable	●	●	●	●				
	4-pin, M8 plastic connector					●	●	●	●

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions		
Length L [mm]	31	
Width W [mm]	11	
Height H [mm]	23	
Connector area l_c [mm]	7,6	9,1



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on

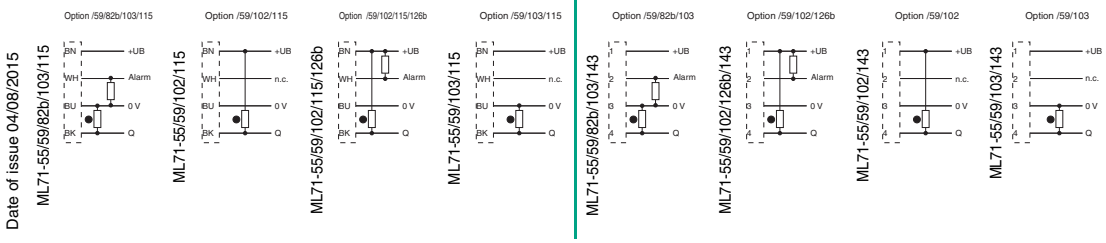






Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		ML71-6/59/102/115	ML71-6/59/102/115/126b	ML71-6/59/103/115	ML71-6/59/82b/103/115	ML71-6/59/102/126b/143	ML71-6/59/102/143	ML71-6/59/103/143	ML71-6/59/82b/103/143
Pre-fault indication output			●		●	●			●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Pre-fault indication output	1 NPN		●			●			
	1 PNP				●				●
Connection	2 m fixed cable	●	●	●	●				
	Plastic connector M8 x 1 , 4-pin					●	●	●	●

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

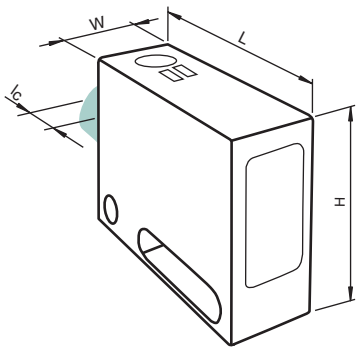
Dimensions									
Length L [mm]		31							
Width W [mm]		11							
Height H [mm]		23							
Connector area l_c [mm]		7.6				9.1			

Properties

- Non-polarized type
- Rectangular miniature housing, side view
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate



Accessories

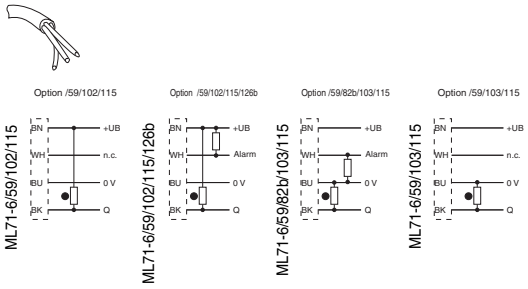
This and more accessories can be found in chapter 10

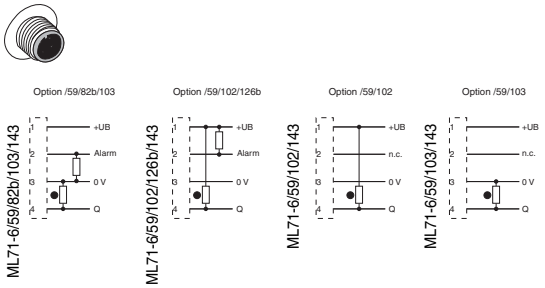
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 12 mA
Switching type	dark on
Switching current	max. 100 mA
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67

Model Number		ML8-55/102/115	ML8-55/103/115	ML8-55/102/143	ML8-55/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	M8 x 1 connector, 4-pin			●	●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

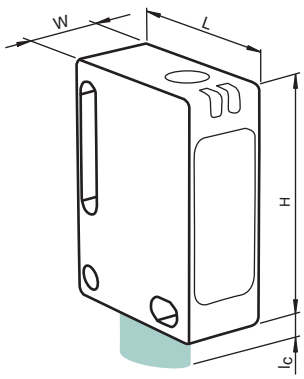
Dimensions		
Length L [mm]	31	
Width W [mm]	11	
Height H [mm]	23	
Connector area l_c [mm]	7,6	9,1

Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Tamper-proof, no operating controls



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

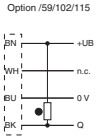
Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

Electrical Connection

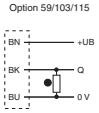
❍ = light on, ● = dark on



ML8-55/102/115

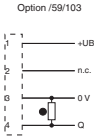


ML8-55/103/115

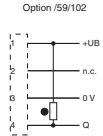


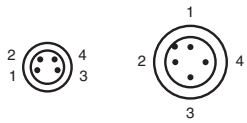


ML8-55/103/115b
ML8-55/103/143



ML8-55/102/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Non-polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable version
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Tamper-proof, no operating controls

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	ML8-6/102/115
Threshold detection range	3.5 m
Effective detection range	0 ... 3 m
Reference target	H85-2 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 12 mA
Switching type	dark on
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector
Switching current	max. 100 mA
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67
Connection	2 m fixed cable
	

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

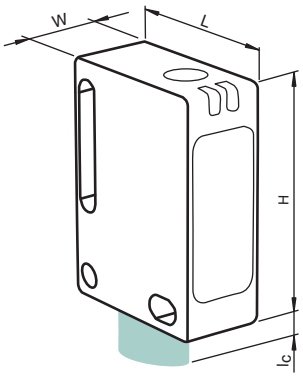
Dimensions	
Length L [mm]	23
Width W [mm]	11
Height H [mm]	31
Connector area l_c [mm]	2

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable



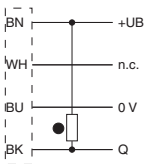
Electrical Connection

❍ = light on, ● = dark on



ML8-6/102/115

Option /59/102/115



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Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Threaded face and side thru-holes provide flexible mounting options

Technical Data

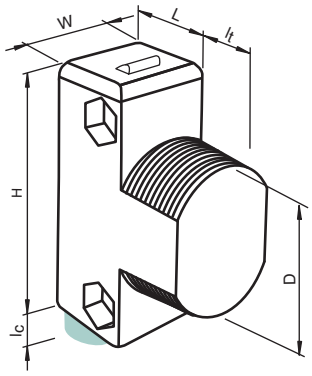
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Threshold detection range	5 m
Effective detection range	0 ... 3.5 m
Reference target	FE-RR1 reflector
Light type	modulated visible red light , 626 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected, overvoltage protected
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)
Material	
Housing	ABS
Optical face	Acrylic
Protection degree	IP67

Model Number		ML17-54/115/136	ML17-54/115b/136	ML17-54/136/143	ML17-54/73/136
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●		
	2 m fixed cable	●			
	connector M12 x 1, 4-pin				●
	M8 x 1 connector, 4-pin			●	
					

Approvals and Certificates					
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	19,1
Width W [mm]	15
Height H [mm]	34,5
Thread length l_t [mm]	10,2
Connector area l_c [mm]	10



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

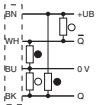
Electrical Connection

❍ = light on, ● = dark on

ML17-54/115/136



Option 115/136

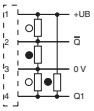






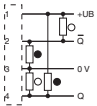
ML17-54/115b/136

Option 115b/136



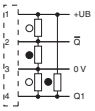
ML17-54/73/136

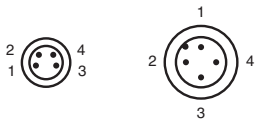
Option 73/136



ML17-54/136/143

Option 136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

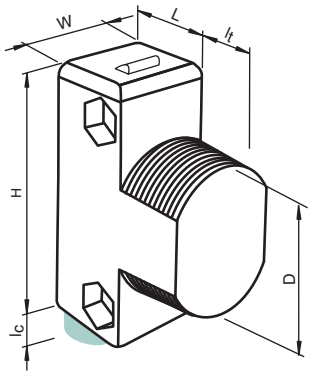


Properties

- Non-polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and pigtailed connector versions
- Visible red light

Your Benefit

- Threaded face and side thru-holes provide flexible mounting options



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Effective detection range	0 ... 6.5 m
Reference target	FE-RR1 reflector
Light type	modulated visible red light , 626 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected, overvoltage protected
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)
Material	
Housing	ABS
Optical face	Acrylic
Protection degree	IP67

Model Number		ML17-6/115/136	ML17-6/115b/136	ML17-6/136/143	ML17-6/73/136
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●		
	2 m fixed cable	●			
	connector M12 x 1, 4-pin				●
	M8 x 1 connector, 4-pin			●	
					
Approvals and Certificates					
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	19,1
Width W [mm]	15
Height H [mm]	34,5
Thread length l_t [mm]	10,2
Connector area l_c [mm]	10

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

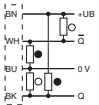
Electrical Connection

❍ = light on, ● = dark on



ML17-6/115/136

Option 115/136

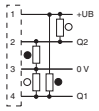






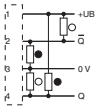
ML17-6/115b/136

Option /115b/136



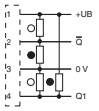
ML17-6/73/136

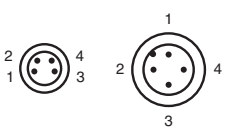
Option 73/136



ML17-6/136/143

Option 136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	7 m
Effective detection range	0 ... 5 m
Reference target	H50 reflector
Light type	modulated visible red light
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	1000 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	ML100-55/102/115	ML100-55/103/115	ML100-55/103/115a	ML100-55/103/115b	ML100-55/98/102	ML100-55/98/103	ML100-55/95/102	ML100-55/95/103
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●				●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●	●	●		●		●
Connection	2 m fixed cable	●	●						
	300 mm fixed cable with 4-pin, M12 x 1 connector				●				
	300 mm fixed cable with 4-pin, M8 x 1 connector			●					
	M8 x 1 connector, 3-pin					●	●		
	connector M8 x 1 , 4-pin							●	●

Approvals and Certificates									
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]	20								
Width W [mm]	11								
Height H [mm]	31								
Connector area l_c [mm]	0				10				

Properties

- **Polarized type**
- **Rectangular miniature housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable, connector and pigtailed connector versions**
- **Visible red light**

Your Benefit

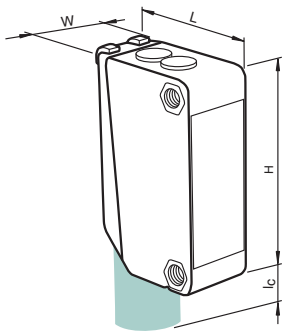
- **Simplest alignment and set-up with ultra-bright Power-Beam emitter LED**
- **Rugged housing has metal-reinforced mounting holes**

Further Products

In this series, we offer additionally:

ML100-55/25/103/115b/154
ML100-55/25/95/103/154

Technical data like ML100-55/103/115b and ML100-55/95/103 but:
No adjusters and light-on switching



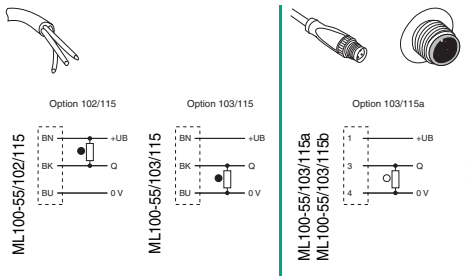
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-F10-ML100	Mounting aid for ML100 series
OMH-ML100-01	Mounting bracket
OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

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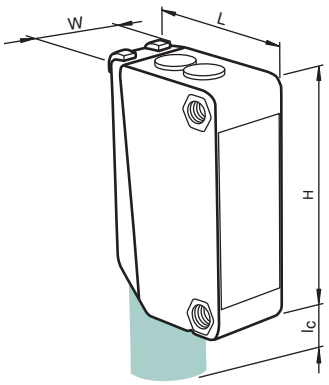


Properties

- Non-polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Rugged housing has metal-reinforced mounting holes



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	7 m
Effective detection range	0 ... 5 m
Reference target	H50 reflector
Light type	modulated infrared light
Optical face	frontal
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	1000 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number		ML100-6-IR/102/115	ML100-6-IR/103/115	ML100-6-IR/95/102	ML100-6-IR/95/103
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	fixed cable	●	●		
	connector M8 x 1 , 4-pin			●	●

Approvals and Certificates					
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	20	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	0	10

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

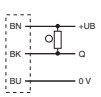
OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-ML100-02	Mounting bracket
OMH-ML100-04	Mounting bracket
OMH-ML100-05	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series
OMH-10	Mounting aid
REF-H33	Reflector with screw fixing
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
OMH-ML100-01	Mounting bracket

Electrical Connection

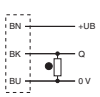
❍ = light on, ● = dark on



ML100-6-IR/102/115

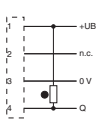


ML100-6-IR/103/115

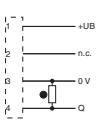




ML100-6-IR/95/102



ML100-6-IR/95/103





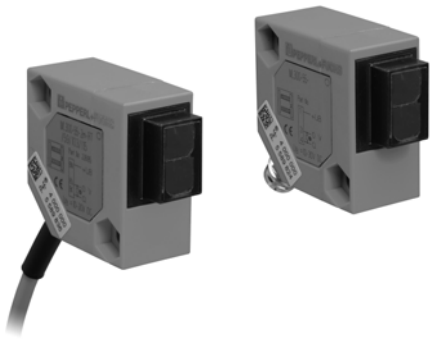
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Threshold detection range	3.5 m
Effective detection range	0 ... 2 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	ABS
Optical face	plastic
Protection degree	IP65

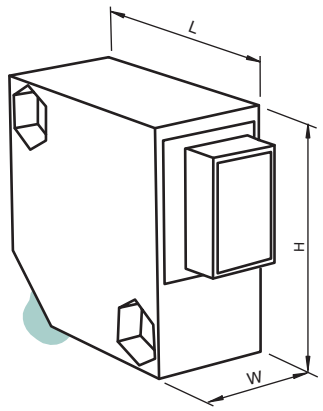
Model Number		ML300-55-2m-RT/59/102/115	ML300-55-2m-RT/25/102/115	ML300-55-2m-RT/59/103/115	ML300-55-2m-RT/25/103/115	ML300-55-2m-RT/59/98/102	ML300-55-2m-RT/25/98/102	ML300-55-2m-RT/59/98/103	ML300-55-2m-RT/25/98/103
No-load supply current	max. 20 mA	●		●		●		●	
	max. 25 mA		●		●		●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Switching type	dark on	●		●		●		●	
	light on		●		●		●		●
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 3-pin					●	●	●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30
Width W [mm]	15
Height H [mm]	30

Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
REF-C110-2	Reflector, round ø 84 mm, central mounting hole
REF-H50	Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap
REF-H60-2	Reflector with mounting holes
REF-VR10-2	Reflector, rectangular 60 mm x 19 mm, mounting holes
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
OFR-100/100	Reflective tape 100 mm x 100 mm
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on



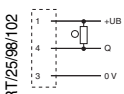
Option 25/102/115 — ML300-55-2m-RT/25/102/115

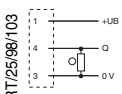

Option 25/103/115 — ML300-55-2m-RT/25/103/115

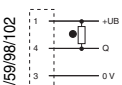

Option 59/102/115 — ML300-55-2m-RT/59/102/115

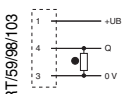

Option 59/103/115 — ML300-55-2m-RT/59/103/115




Option 98/102 — ML300-55-2m-RT/25/98/102


Option 98/103 — ML300-55-2m-RT/25/98/103


Option 59/98/102 — ML300-55-2m-RT/59/98/102


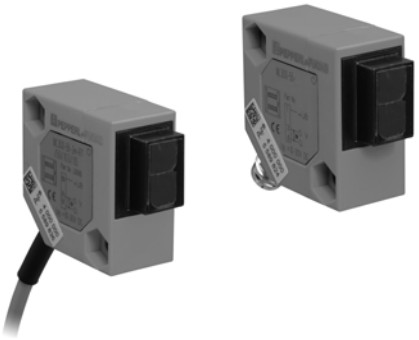
Option 59/98/103 — ML300-55-2m-RT/59/98/103




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Polarized type
- Rectangular miniature housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

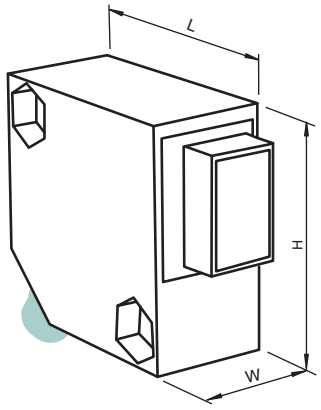
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Threshold detection range	7 m
Effective detection range	0 ... 6 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 20 mA
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	PBT
Optical face	glass pane
Protection degree	IP67

Model Number		ML300-55-6m-RT/25/115/120	ML300-55-6m-RT/25/82d/103/115	ML300-55-6m-RT/25/115/127	ML300-55-6m-RT/25/95/120	ML300-55-6m-RT/25/82d/95/103	ML300-55-6m-RT/25/95/127
Output of the pre-fault indication			●			●	
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●			●	
	2 PNP outputs, complementary, short-circuit protected, reverse polarity protected, open collector	●		●	●		●
Switching type	light on		●			●	
	light on / dark on	●		●	●		●
Output of the pre-fault indication	1 PNP		●			●	
Connection	2 m fixed cable	●	●	●			
	M8 x 1 connector, 4-pin				●	●	●

Approvals and Certificates							
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions	
Length L [mm]	30
Width W [mm]	15
Height H [mm]	30



Accessories

This and more accessories can be found in chapter 10

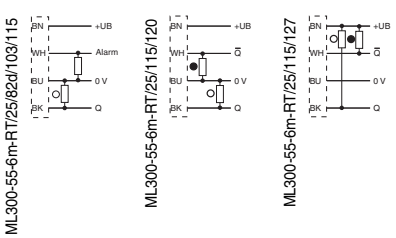
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

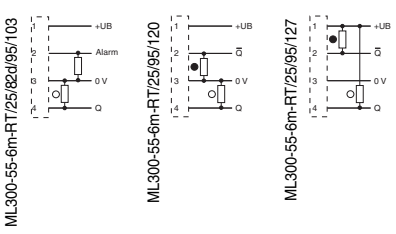
Electrical Connection

❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	5.1 m
Effective detection range	0 ... 3.2 m in TEACH mode 0 ... 4 m by operating mode "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 20 mA at 24 V DC
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching type	light on
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		MLE75-54-G/25/115/136	MLE75-54-G/25/95/136
Connection	2 m fixed cable	●	
	M8 x 1 connector, 4-pin		●
			
Approvals and Certificates			
UL approval	cULus	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

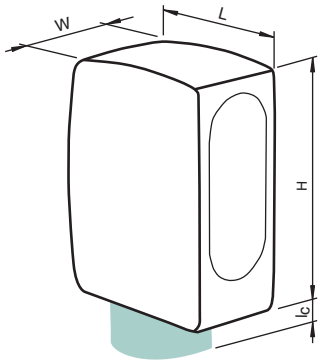
Dimensions	
Length L [mm]	25,1
Width W [mm]	12,9
Height H [mm]	32,9
Connector area l_c [mm]	12

Properties

- Clear object detection type
- Rectangular miniature housing
- Stainless steel housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Chemical and corrosion resistant housing for rough enviroments
- Wash down design for applications in food & beverages industry
- Reflector distance down to 0 mm due to coaxial optics
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- ECOLAB certificate



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
Reflector REF-A25-HYG-01	flange mount reflector
Reflector REF-A25-HYG-02	direct mount reflector

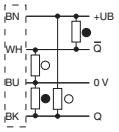
Electrical Connection

❍ = light on, ● = dark on



MLE75-54-G/25/115/136

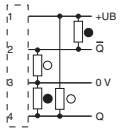
Option 25/115/136





MLE75-54-G/25/95/136

Option 25/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

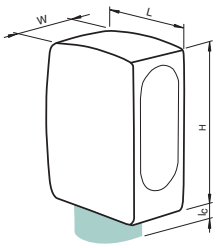


Properties

- Clear object detection type
- Rectangular miniature housing
- Stainless steel housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Chemical and corrosion resistant housing for rough enviroments
- Hygienic design according to EHEDG for applications in food & beverages industry
- Reflector distance down to 0 mm due to coaxial optics
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- ECOLAB and EHEDG certificate, integrated mounting solution is part of certificates
- Special accessories in safe hygienic design



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	5.1 m
Effective detection range	0 ... 3.2 m in TEACH mode / 0 ... 4 m by operating mode "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA at 24 V DC
Function input	Ext. Teach-In input (ET)
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching type	light on
Switching current	max. 100 mA
Switching frequency	1 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		MLE76000-54-G/25/110/115/123	MLE76100-54-G/25/110/115/123	MLE76150-54-G/25/110/115/123	MLE76200-54-G/25/110/115/123	MLE76250-54-G/25/110/115/123	MLE76300-54-G/25/110/115/123	MLE76350-54-G/25/110/115/123	MLE76400-54-G/25/110/115/123	MLE76100-54-G/25/92/110/123	MLE76150-54-G/25/92/110/123
Mounting adapter	Flanged mounting		●							●	
	Flanged mounting, right angle			●							●
	Flanged mounting with spherical head				●						
	Pipe mounting with spherical head					●					
	16 mm pipe mount						●				
	Right-angled 16 mm pipe mount							●			
	Bendable shaft								●		
Connection	2 m fixed cable	●	●	●	●	●	●	●	●		
	connector M12 x 1, 4-pin									●	●

Approvals and Certificates											
UL approval	cULus	●	●	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.										

Dimensions										
Length L [mm]	25,1									
Width W [mm]	12,9									
Height H [mm]	32,9									
Connector area I_c [mm]	12	50	32	73	84	97	171	118	41	30

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

REF-A25-HYG-01	Reflector in hygienic design, ø approx. 25 mm
REF-A25-HYG-02	Reflector in hygienic design, ø approx. 25 mm
MH-16H-02	Screw connection for pipe mount
OMH-MLE76-16x300	Pipe mount for flange/ball versions and reflectors
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

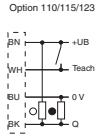
Electrical Connection

❍ = light on, ● = dark on



MLE76000-54-G/25/110/115/123
MLE76100-54-G/25/110/115/123
MLE76150-54-G/25/110/115/123
MLE76200-54-G/25/110/115/123
MLE76250-54-G/25/110/115/123
MLE76300-54-G/25/110/115/123
MLE76350-54-G/25/110/115/123
MLE76400-54-G/25/110/115/123

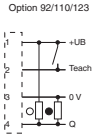
Option 110/115/123

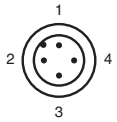




MLE76100-54-G/25/92/110/123
MLE76150-54-G/25/92/110/123

Option 92/110/123





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Polarized type
- Rectangular compact housing
- Die-cast zinc frame housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Extreme low-temperature operation

Technical Data

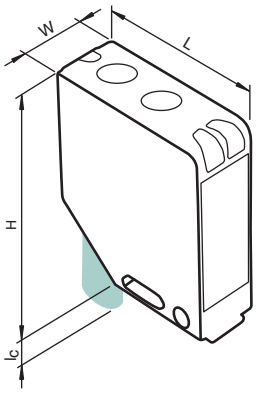
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	9 m
Effective detection range	0 ... 6.5 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 40 mA
Switching type	light/dark on switchable
Switching current	max. 0.2 A
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	MLV12-54/76b/95/128	MLV12-54/32/82b/124	MLV12-54/49/124	MLV12-54/76b/124/128
Output of the pre-fault indication			●		
Test input	emitter deactivation at 0 V	●			●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●			●
	1 NPN and 1 PNP output, direct switching, short-circuit protected, reverse polarity protected, open collector			●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		
Output of the pre-fault indication	1 PNP		●		
Connection	Metal connector, M12, 5-pin, 90° rotatable		●	●	●
	Metal connector, M8, 4-pin, 90° rotatable	●			

Approvals and Certificates					
Protection class	II		●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	41,5	
Width W [mm]	15	
Height H [mm]	49	
Connector area l_c [mm]	12	16



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

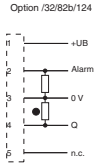
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Electrical Connection

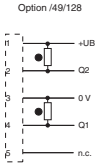
❍ = light on, ● = dark on



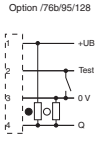
MLV12-54/32/82b/124



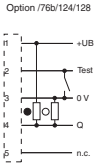
MLV12-54/49/124



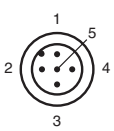
MLV12-54/76b/95/128



MLV12-54/76b/124/128







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

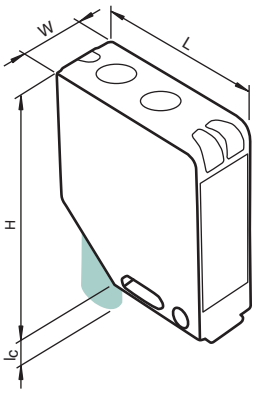


Properties

- Clear object detection type
- Rectangular compact housing
- Die-cast zinc frame housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- Extreme low-temperature operation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Light/dark switch	✔
Threshold detection range	5.6 m
Effective detection range	0 ... 4.2 m
Reference target	H85-2 reflector
Light type	modulated visible red light, 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 55 mA
Switching type	light/dark on switchable
Switching current	max. 0.2 A
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	MLV12-54-G/76b/115/128	MLV12-54-G/76b/95/128	MLV12-54-G/30/124/126g	MLV12-54-G/32/124	MLV12-54-G/32/82g/124	MLV12-54-G/76b/124/128
Output of the pre-fault indication				●		●	
Test input	emitter deactivation at 0 V	●	●				●
Function input	Ext. Teach-In input (ET)	●		●	●	●	●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●	●				●
	1 NPN output, short-circuit protected, reverse polarity protected, open collector			●			
	1 PNP output, short-circuit protected, reverse polarity protected, open collector				●	●	
Output of the pre-fault indication	1 NPN function reserve output			●			
	1 PNP function reserve output				●	●	
Connection	2500 mm fixed cable , PUR	●					
	Metal connector, M12, 5-pin, 90° rotatable			●	●	●	●
	Metal connector, M8, 4-pin, 90° rotatable		●				

Approvals and Certificates							
Protection class	II	●		●	●	●	●
UL approval	cULus	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions				
Length L [mm]	41,5			
Width W [mm]	15			
Height H [mm]	49			
Connector area I_c [mm]	0	12	16	

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

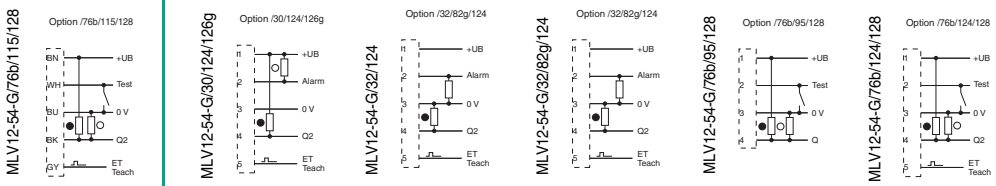
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors

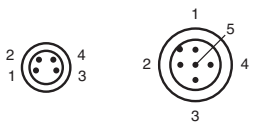
Electrical Connection

❍ = light on, ● = dark on









Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Polarized type
- Rectangular compact housing
- Die-cast zinc frame housing
- DC sensor
- Discrete output
- Connector version
- Laser red light

Technical Data

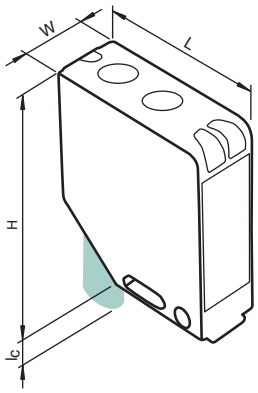
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	5.6 m
Effective detection range	100 ... 450 mm
Reference target	MH82 reflector
Light type	modulated visible red light
Laser class	1
Operating voltage	10 ... 30 V DC
No-load supply current	max. 40 mA
Test input	emitter deactivation at 0 V
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching type	light/dark on switchable
Switching current	max. 0.1 A
Switching frequency	2500 Hz
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number		MLV12-54-LAS-300/76b/95/110	MLV12-54-LAS-300/76b/110/124
Connection	Metal connector, M12, 5-pin, 90° rotatable		●
	Metal connector, M8, 4-pin, 90° rotatable	●	

Approvals and Certificates			
Protection class	II		●
UL approval	cULus Listed, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	41,5	
Width W [mm]	15	
Height H [mm]	49	
Connector area l_c [mm]	12	16



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
OMH-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
REF-MH82	Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes
REF-MH50	Reflector with Micro-structure, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap

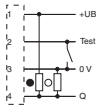
Electrical Connection

❍ = light on, ● = dark on



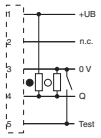
MLV12-54-LAS/76b/95/110
MLV12-54-LAS-300/76b/95/110

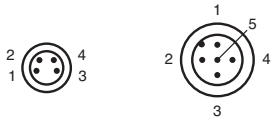
Option /76b/95/110



MLV12-54-LAS/76b/110/124
MLV12-54-LAS-300/76b/110/124

Option /76b/110/124





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

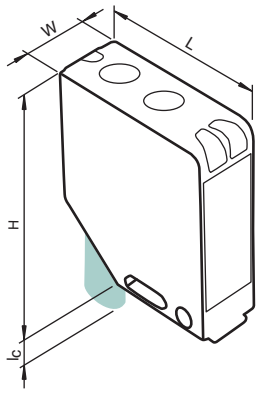
- **Polarized type**
- **Rectangular compact housing**
- **Die-cast zinc frame housing**
- **DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Laser red light**

Further Products

In this series, we offer additionally:

MLV12-54-LAS/92/120

Technical data like products on this page but:
No test input
Connection: Metal connector, M12, 4-pin
Signal output: 2 pnp outputs, NO/NC



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	21 m
Effective detection range	0 ... 15 m
Reference target	MH82 reflector
Light type	modulated visible red light
Laser class	1
Operating voltage	10 ... 30 V DC
No-load supply current	max. 40 mA
Test input	emitter deactivation at 0 V
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching type	light/dark on switchable
Switching current	max. 0.1 A
Switching frequency	2500 Hz
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	MLV12-54-LAS/76b/110/115	MLV12-54-LAS/76b/95/110	MLV12-54-LAS/76b/110/124
Connection	2500 mm fixed cable , PUR	●		
	Metal connector, M12, 5-pin, 90° rotatable			●
	Metal connector, M8, 4-pin, 90° rotatable		●	
				

Approvals and Certificates				
Protection class	II	●		●
UL approval	cULus Listed, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions				
Length L [mm]		41.5		
Width W [mm]		15		
Height H [mm]		49		
Connector area l_c [mm]		0	12	16

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
OMH-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
REF-MH82	Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes
REF-MA21	Reflector with Micro-structure, round ø 21 mm, self-adhesive

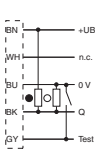
Electrical Connection

❍ = light on, ● = dark on



MLV12-54-LAS/76b/110/115

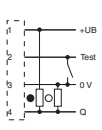
Option /76b/110/115





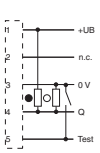
MLV12-54-LAS/76b/95/110
MLV12-54-LAS-300/76b/95/110

Option /76b/95/110



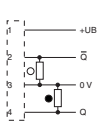
MLV12-54-LAS/76b/110/124
MLV12-54-LAS-300/76b/110/124

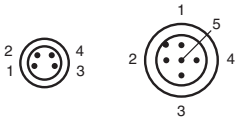
Option /76b/110/124



MLV12-54-LAS/92/120

Option /92/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	10 m
Effective detection range	0 ... 8 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 625 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	max. 30 mA
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number		MLV41-55/25/95/136	MLV41-55/25/92/136	MLV41-55/40a/82b/92/103	MLV41-55/40a/92/102/126b
Output of the pre-fault indication				●	●
Light/dark switch				●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector				●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●		
Switching type	light/dark on switchable			●	●
Output of the pre-fault indication	1 NPN				●
	1 PNP			●	
Connection	connector M12 x 1, 4-pin		●		●
	connector M8 x 1, 4-pin	●		●	



Approvals and Certificates					
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

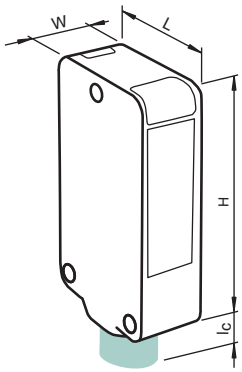
Dimensions		
Length L [mm]	31	
Width W [mm]	13,6	
Height H [mm]	56,5	
Connector area l_c [mm]	12,5	16

Properties

- Polarized type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal coated housing



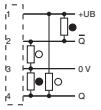
Electrical Connection

❍ = light on, ● = dark on



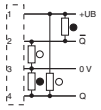
MLV41-55/25/92/136

Option 25/92/136



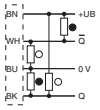
MLV41-55/25/95/136

Option 25/95/136



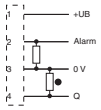
MLV41-55/25/115/136

Option 25/115/136



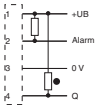
MLV41-55/40a/82b/92/103

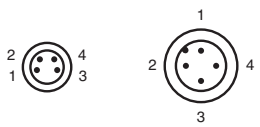
Option 82b/92/103



MLV41-55/40a/92/102/126b

Option 92/102/126b





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

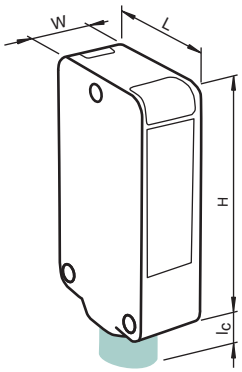


Properties

- Polarized type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output with IO-Link
- Connector version
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal coated housing
- Easy configuration and diagnosis via standard communication IO-Link interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	10 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 625 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	max. 30 mA
Interface type	IO-Link
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	MLV41-55-IO/98/103	MLV41-55-IO/95/136	MLV41-55-IO/92/136
Effective detection range	0 ... 7 m	●		
	0 ... 8 m		●	●
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●		
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected		●	●
Connection	M12 x 1 connector, 4-pin			●
	M8 x 1 connector, 3-pin	●		
	M8 x 1 connector, 4-pin		●	

Approvals and Certificates				
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	31		
Width W [mm]	13.6		
Height H [mm]	56.5		
Connector area l_c [mm]	12.5		16

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

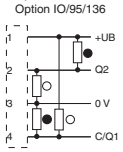
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
OMH-40	Mounting bracket
IO-Link-Master01-USB	IO-Link Master
IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
PACTware 4.X	FDT frame application
V3-G-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

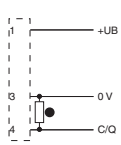
❍ = light on, ● = dark on



MLV41-55-IO/92/136
MLV41-55-IO/95/136



MLV41-55-IO/98/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	12 m
Effective detection range	0 ... 9.5 m
Reference target	OFR-22800/76 , H85-2 reflector
Light type	modulated visible red light , 625 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	max. 30 mA
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number		MLV41-6/25/95/136	MLV41-6/25/92/136	MLV41-6/82b/92/103	MLV41-6/92/102/126b
Output of the pre-fault indication				●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector				●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●		
Output of the pre-fault indication	1 NPN				●
	1 PNP			●	
Connection	M12 x 1 connector, 4-pin		●	●	●
	M8 x 1 connector, 4-pin	●			



Approvals and Certificates					
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

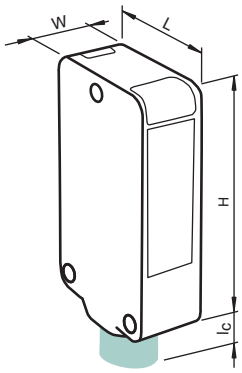
Dimensions		
Length L [mm]	31	
Width W [mm]	13,6	
Height H [mm]	56,5	
Connector area l_c [mm]	12,5	16

Properties

- Non-polarized type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal coated housing



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

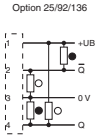
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
OMH-40	Mounting bracket
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

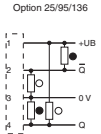
❍ = light on, ● = dark on



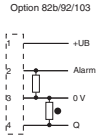
MLV41-6/25/92/136



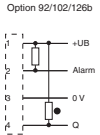
MLV41-6/25/95/136

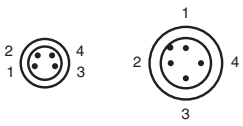


MLV41-6/82b/92/103



MLV41-6/92/102/126b





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



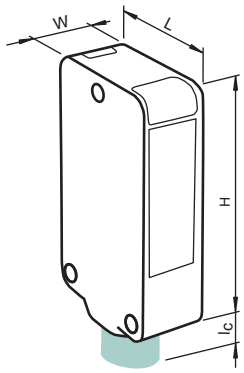
VISC+ IO-Link CE cULus

Properties

- Non-polarized type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output with IO-Link
- Connector version
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal coated housing
- Easy configuration and diagnosis via standard communication IO-Link interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	12 m
Effective detection range	0 ... 9.5 m
Reference target	OFR-22800/76 , H85-2 reflector
Light type	modulated visible red light , 625 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC
No-load supply current	max. 30 mA
Interface type	IO-Link
Switching current	max. 100 mA
Switching frequency	1000 Hz
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number		MLV41-6-IO/92/136	MLV41-6-IO/95/136	MLV41-6-IO/98/103
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			●
	-40 ... 60 °C (-40 ... 140 °F)	●	●	
Connection	M12 x 1 connector, 4-pin	●		
	M8 x 1 connector, 3-pin			●
	M8 x 1 connector, 4-pin		●	



Approvals and Certificates				
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	31		
Width W [mm]	13,6		
Height H [mm]	56,5		
Connector area l_c [mm]	16	12,5	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
OMH-40	Mounting bracket
IO-Link-Master01-USB	IO-Link Master
IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
PACTware 4.X	FDT frame application
V3-G-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V31-GM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V31-WM-2M-PUR	Cable socket, M8, 4-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

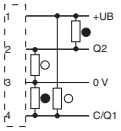
❍ = light on, ● = dark on



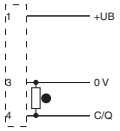
MLV41-6-IO/92/136
MLV41-6-IO/95/136

MLV41-6-IO/98/103

Option IO/92/136
Option IO/95/136



Option IO/98/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	6.5 m
Effective detection range	0 ... 4 m in TEACH mode , 0 ... 5.2 m at switch position "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	max. 35 mA
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	MLV41-54-G/25/115/123/136	MLV41-54-G/25/95/136	MLV41-54-G/25/123/124/136	MLV41-54-G/25/76a/124/136	MLV41-54-G/82b/103/123/124	MLV41-54-G/102/123/124/126g
Test input	emitter deactivation with +Ub				●		
Function input	Ext. Teach-In input (ET)	●		●		●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector						●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector					●	
	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected	●	●	●	●		
Switching type	light/dark on switchable					●	●
Output of the pre-fault indication	1 NPN function reserve						●
	1 PNP function reserve output					●	
Connection	2500 mm fixed cable	●					
	M12 x 1 connector, 5-pin			●	●	●	●
	M8 x 1 connector, 4-pin		●				

Approvals and Certificates							
Protection class	II	●		●	●	●	●
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

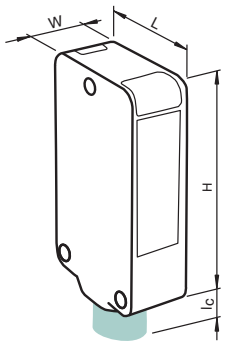
Dimensions				
Length L [mm]	31			
Width W [mm]	13,6			
Height H [mm]	56,5			
Connector area l_c [mm]	3	12,5	16	

Properties

- Clear object detection type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal housing
- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

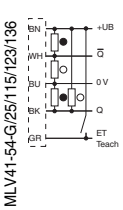
OMH-41	Mounting bracket
OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting

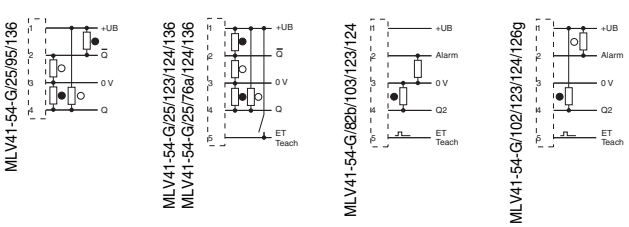
Electrical Connection

❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



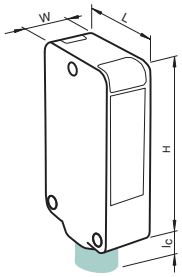
IO-Link

Properties

- Clear object detection type
- Rectangular compact housing
- Aluminium with Delta®-Seal coating housing
- DC sensor
- Discrete output with IO-Link
- Connector version
- Visible red light

Your Benefit

- Corrosion resistant Delta-Seal coated housing
- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- Easy configuration and diagnosis via standard communication IO-Link interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	MLV41-54-G-IO/25/92/136
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Threshold detection range	6.5 m
Effective detection range	0 ... 4 m in TEACH mode 0 ... 5.2 m at switch position "N"
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Optical face	frontal
Operating voltage	10 ... 30 V DC when operating in IO-Link mode: 18 ... 30 V
No-load supply current	max. 35 mA
Interface type	IO-Link
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	glass pane
Protection degree	IP67
Connection	connector M12 x 1, 4-pin

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	31
Width W [mm]	13.6
Height H [mm]	56.5
Connector area l_c [mm]	16

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-09	Mounting bracket for Sensors series MLV41 for M12 rod mounting
OMH-41	Mounting bracket
IO-Link-Master01-USB	IO-Link Master
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
PACTware 4.x	FDT frame application
ORR50G	Reflector, rectangular 50.9 mm x 60.9 mm, mounting holes, fixing strap and polarization filter
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

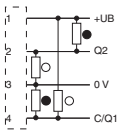
Electrical Connection

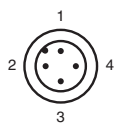
❍ = light on, ● = dark on



MLV41-54-G-IO/25/92/136

Option IO/92/136
Option IO/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and terminals versions
- Visible red light

Your Benefit

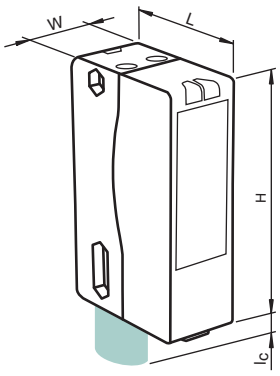
- Extreme low-temperature operation

Further Products

In this series, we offer additionally:

RL28-55/47/73c

Technical data like RL28-55/47/82b/105 but:
No output of the pre-fault indication
Connection: M12 x 1 connector, 4-pin



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Output of the pre-fault indication	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	21 m
Effective detection range	0 ... 17 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	40 mA
Switching type	light/dark on switchable
Switching frequency	1000 Hz
Output of the pre-fault indication	1 PNP
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

Model Number	green = preferred type	RL28-55/47/82b/115	RL28-55/82b/110/115	RL28-55/47/82b/105	RL28-55/49/82b/105	RL28-55-Z/47/76a/82b/116	RL28-55-Z/49/76a/82b/116	RL28-55-Z/76a/82b/110/116
Timer						●	●	●
Test input	emitter deactivation at $+U_B$					●	●	●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●					●
	1 NPN, 1 PNP synchronized-switching, short-circuit protected, reverse polarity protected, open collectors				●		●	
	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors	●		●		●		
Switching current	max. 100 mA		●					●
	max. 200 mA	●		●	●	●	●	
Connection	2500 mm fixed cable	●	●					
	M12 x 1 connector, 5-pin			●	●			
	terminal compartment					●	●	●

Approvals and Certificates								
Protection class	II	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							

Dimensions				
Length L [mm]	54,3			65,5
Width W [mm]	25,8			
Height H [mm]	90			
Connector area l_c [mm]	5,5	12		0

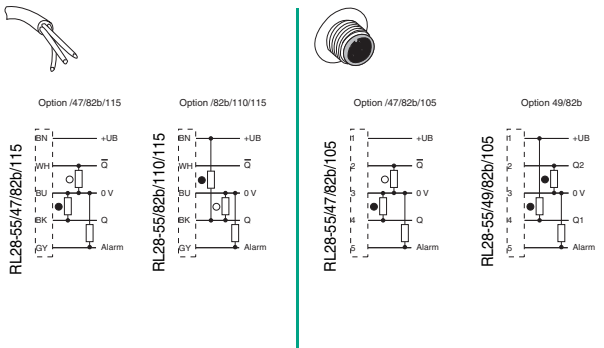
Accessories

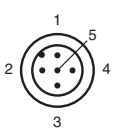
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-RLK29	Mounting bracket

Electrical Connection

❍ = light on, ● = dark on





Wire colors in accordance with EN 60947-5-2

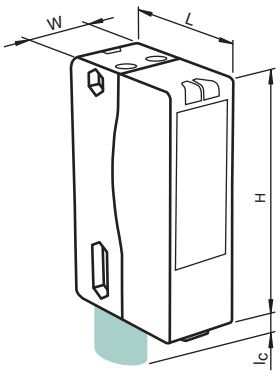
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

- **Polarized type**
- **Rectangular full-size housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable and connector versions**
- **Laser red light**



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Output of the pre-fault indication	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	42 m
Effective detection range	0 ... 30 m
Reference target	MH82 reflector
Light type	modulated visible red light
Laser class	1
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 35 mA
Switching type	light/dark on switchable
Switching frequency	1000 Hz
Output of the pre-fault indication	1 PNP
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	RL28-55-LAS/47/82b/115	RL28-55-LAS/76a/82b/110/115	RL28-55-LAS/47/82b/105	RL28-55-LAS/76a/82b/105/110
Test input	emitter deactivation with +Ub		●		●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●		●
	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors	●		●	
Switching current	max. 100 mA		●		●
	max. 200 mA	●		●	
Connection	2.5 m, 5-wire, fixed cable, Euronorm		●		
	2500 mm fixed cable	●			
	5-pin, M12 x 1 plastic connector			●	●
					

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	54.3	
Width W [mm]	25.8	
Height H [mm]	90	
Connector area I_c [mm]	5.5	12

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

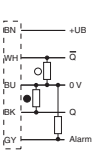
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RL28-C	Protective cover

Electrical Connection

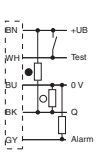
❍ = light on, ● = dark on



RL28-55-LAS/47/82b/115

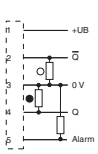


RL28-55-LAS/76a/82b/110/115

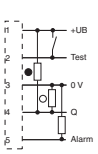


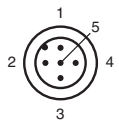


RL28-55-LAS/47/82b/105



RL28-55-LAS/76a/82b/105/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS

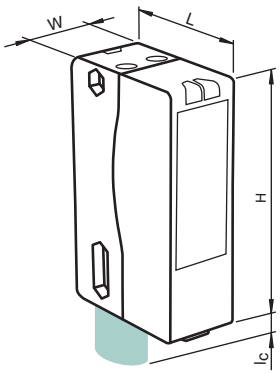


Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Terminals version
- Visible red light and laser red light versions

Your Benefit

- Universal usage with AC or DC power supply
- Extreme low-temperature operation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light type	modulated visible red light , 660 nm
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Signal output	Relay, 1 alternator
Switching type	light/dark on switchable
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment with 8 spring-loaded terminals



Model Number		RLK28-55/31/116	RLK28-55-Z/31/116	RLK28-55-LAS-Z/31/116
	green = preferred type			
Timer			●	●
Threshold detection range	21 m	●	●	
	42 m			●
Effective detection range	0 ... 17 m	●	●	
	0 ... 30 m			●
Reference target	H85-2 reflector	●	●	
	MH82 reflector			●
Laser class	1			●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)			●
	-40 ... 60 °C (-40 ... 140 °F)	●	●	
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed , Class 2 power source	●	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●	●

Dimensions	
Length L [mm]	65,5
Width W [mm]	25,8
Height H [mm]	90
Connector area I_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RL28-C	Protective cover

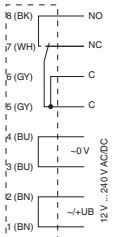
Electrical Connection

❍ = light on, ● = dark on



RLK28-55/31/116
RLK28-55-LAS-Z/31/116
RLK28-55-Z/31/116

Option /31/116



Date of issue 04/08/2015

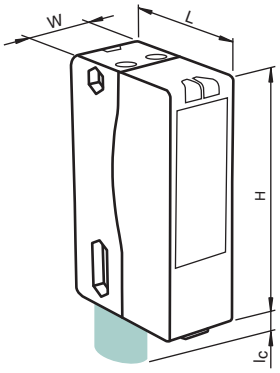


Properties

- Clear object detection type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, connector and terminals versions
- Visible red light

Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- Extreme low-temperature operation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Light/dark switch	✔
Threshold detection range	7 m
Effective detection range	0 ... 5.6 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 50 mA
Function input	Ext. Teach-In input (ET)
Switching type	light/dark on switchable
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	RL28-54-G/47/115	RL28-54-G/76a/110/115	RL28-54-G/47/105	RL28-54-G-Z/47/116	RL28-54-G-Z/76a/110/116
Timer					●	●
Test input	emitter deactivation with +Ub		●			●
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●			●
	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors	●		●	●	
Switching current	max. 100 mA	●	●			●
	max. 200 mA			●	●	
Connection	2500 mm fixed cable	●	●			
	M12 x 1 connector, 5-pin			●		
	terminal compartment				●	●
						

Approvals and Certificates						
Protection class	II	●	●	●	●	●
UL approval	cULus	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions				
Length L [mm]	54,3		65,5	
Width W [mm]	25,8			
Height H [mm]	90			
Connector area l_c [mm]	5,5	12	0	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RL28-C	Protective cover

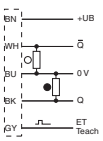
Electrical Connection

❍ = light on, ● = dark on



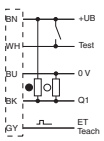
RL28-54-G/47/115

Option /47/115



RL28-54-G/76a/110/115

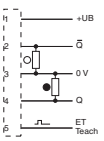
Option /76a/110/115





RL28-54-G/47/105

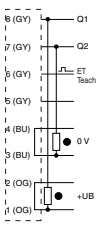
Option /47/105





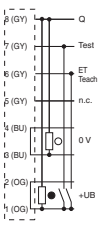
RL28-54-G-Z/47/116

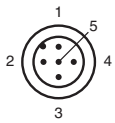
Option 47



RL28-54-G-Z/76a/110/116

Option /76a/110/116





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RLK28-54-G/31/116
Polarization filter	✔
Glass detection	✔
Teach-In	✔
Light/dark switch	✔
Threshold detection range	7 m
Effective detection range	0 ... 5.6 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Signal output	Relay, 1 alternator
Switching type	light/dark on switchable
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment
	
Approvals and Certificates	
Protection class	II
UL approval	cULus Listed , Class 2 power source
CCC approval	Certified by China Compulsory Certification (CCC)
Dimensions	
Length L [mm]	65.5
Width W [mm]	25.8
Height H [mm]	90
Connector area l_c [mm]	0

Properties

- Clear object detection type
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Terminals version
- Visible red light

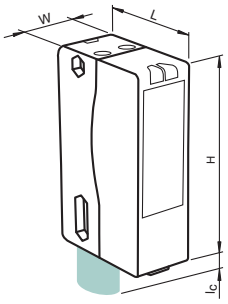
Your Benefit

- Reflector distance down to 0 mm due to coaxial optics
- Two in one sensor - high operating range or clear class detection
- 3 selectable contrast levels
- Most reliable detection of PET-bottles in use with patended reflector with pole filter
- Automatic threshold adjustment compensates for presence of dust and moisture
- Universal usage with AC or DC power supply
- Extreme low-temperature operation

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover



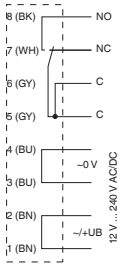
Electrical Connection

❍ = light on, ● = dark on



RLK28-54-G/31/116

Option /31/116



Date of issue 04/08/2015



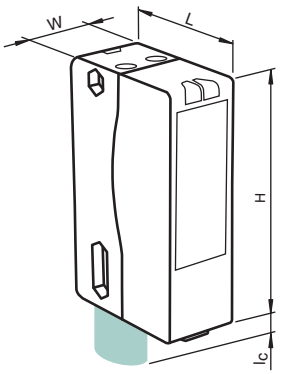


Properties

- Foreground suppression type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and terminals versions
- Visible red light

Your Benefit

- Most reliable detection of shrink wrapped objects
- Extreme low-temperature operation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Foreground suppression	✔
Output of the pre-fault indication	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	17 m
Effective detection range	0 ... 13 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Switching type	light/dark on switchable
Switching current	max. 200 mA
Switching frequency	1000 Hz
Output of the pre-fault indication	1 PNP
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67

Model Number	green = preferred type	RL28-55-V/47/82b/105	RL28-55-V/49/82b/105	RL28-55-V-Z/47/82b/116
Timer				●
Signal output	1 NPN, 1 PNP synchronized-switching, short-circuit protected, reverse polarity protected, open collectors		●	
	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors	●		●
Connection	M12 x 1 connector, 5-pin	●	●	
	terminal compartment			●
				

Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	54.3		65.5
Width W [mm]	25.8		
Height H [mm]	90		
Connector area l_c [mm]	12		0

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RL28-C	Protective cover

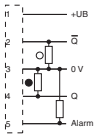
Electrical Connection

❍ = light on, ● = dark on



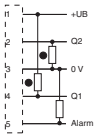
RL28-55-V/47/82b/105

Option /47/82b/105



RL28-55-V/49/82b/105

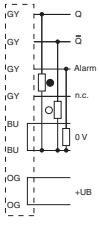
Option 49/82b

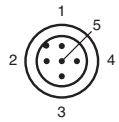




RL28-55-V-Z/47/82b/116

Option /47/82b/116





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

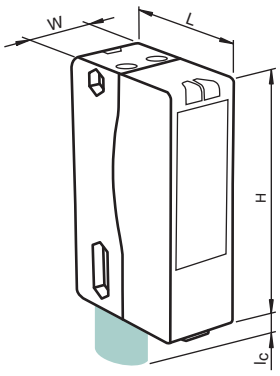
Model Number	RLK28-55-V-Z/31/116
Polarization filter	✔
Foreground suppression	✔
Timer	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	17 m
Effective detection range	0 ... 13 m
Reference target	H85-2 reflector
Light type	modulated visible red light , 660 nm
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Signal output	Relay, 1 alternator
Switching type	light/dark on, switchable (selectable, light/dark switching is only activated if the receiver has 'dark on' selected.)
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment with 
Approvals and Certificates	
Protection class	II
UL approval	cULus
CCC approval	Certified by China Compulsory Certification (CCC)
Dimensions	
Length L [mm]	65.5
Width W [mm]	25.8
Height H [mm]	90
Connector area l_c [mm]	0

Properties

- **Foreground suppression type**
- **Rectangular full-size housing**
- **Plastic housing**
- **AC/DC sensor**
- **Relay output**
- **Terminals version**
- **Visible red light**

Your Benefit

- **Most reliable detection of shrink wrapped objects**
- **Universal usage with AC or DC power supply**
- **Extreme low-temperature operation**



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

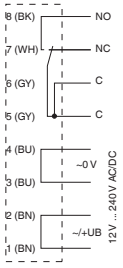
Electrical Connection

❍ = light on, ● = dark on



RLK28-55-V-Z/31/116

Option /31/116



Date of issue 04/08/2015



Properties

- Polarized and foreground suppression types
- Rectangular full-size housing
- Plastic housing
- AS interface
- Connector version
- Visible red light and laser red light versions

Technical Data

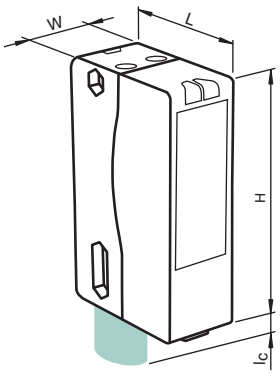
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light type	modulated visible red light , 660 nm
Operating voltage	26.5 ... 31.6 V via AS-Interface network , min. 18.5 V
No-load supply current	≤ 40 mA
Test input	Data bit D2:
Signal output	AS-Interface
Switching type	light/dark on switchable via AS-i bus system
Switching frequency	1000 Hz
Output of the pre-fault indication	Data bit D1
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP67
Connection	connector M12 x 1, 4-pin

Model Number	green = preferred type	RL28-55-B3B/73c	RL28-55-LAS-B3B/73c	RL28-55-V-B3B/73c
Foreground suppression				●
Output of the pre-fault indication			●	●
Timer			●	
Threshold detection range	17 m			●
	21 m	●		
	42 m		●	
Effective detection range	0 ... 13 m			●
	0 ... 17 m	●		
	0 ... 30 m		●	
Reference target	H85-2 reflector	●		●
	MH82 reflector		●	
Laser class	1		●	
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)		●	
	-40 ... 60 °C (-40 ... 140 °F)	●		●

Approvals and Certificates				
Protection class	II	●		●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	54.3
Width W [mm]	25.8
Height H [mm]	90
Connector area l_c [mm]	12



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1	Handheld programming device
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
REF-MH82	Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes

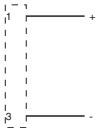
Electrical Connection

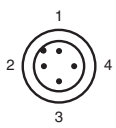
❍ = light on, ● = dark on



RL28-55-B3B/73c
RL28-55-LAS-B3B/73c
RL28-55-V-B3B/73c

Option AS-Interface





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Teach-In	✔
Threshold detection range	5.6 m
Effective detection range	0 ... 4 m
Reference target	H60 reflector , H85-2 reflector , Foil reflector OFR-100/100
Light type	modulated visible red light , 625 nm
Operating voltage	12 ... 30 V DC Power from Class 2 Power Source
No-load supply current	max. 50 mA
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	230 Hz
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

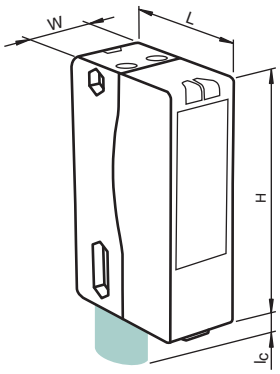
Model Number	green = preferred type	RLG28-55/115b/136	RLG28-55/40a/115b/136	RLG28-55/40a/73c/136
Light/dark switch			●	●
Connection	300 mm fixed cable with M12 x 1, 4-pin connector	●	●	
	connector M12 x 1, 4-pin			●
				
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		54.4		
Width W [mm]		25.8		
Height H [mm]		90		
Connector area l_c [mm]		5.5		12

Properties

- Polarized type with multiple beams
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and pigtailed connector versions
- Visible red light

Your Benefit

- Area sensor with 6 light beams for reliable detection of objects regardless of texture
- Reliable detection of the front edge of the object regardless of its shape and position
- Consistently detects objects as small as 12 mm within the entire detection area
- Use in low temperature environments down to -30°C



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-K01	dove tail mounting clamp
REF-H60	Reflector, rectangular 40.5 mm x 60 mm, mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

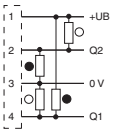
Electrical Connection

❍ = light on, ● = dark on



RLG28-55/115b/136
RLG28-55/40a/115b/136

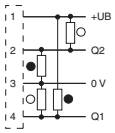
Option /115b/136

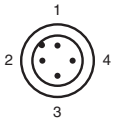




RLG28-55/40a/73c/136

Option /73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

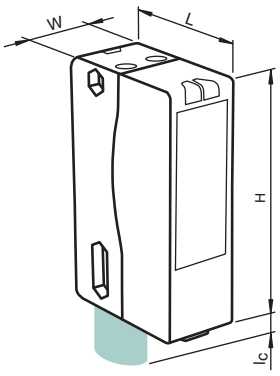


Properties

- Polarized and foreground suppression types
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector and pigtailed connector versions
- Visible red light

Your Benefit

- Most reliable detection of shrink wrapped objects



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Reference target	H85 reflector
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	plastic
Protection degree	IP65

Model Number	green = preferred type	RL29-55/115b/136	RL29-55-V/115b/136	RL29-55/73c/136	RL29-55-V/73c/136
Foreground suppression			●		●
Threshold detection range	10 m	●		●	
	8 m		●		●
Effective detection range	0.1 ... 7 m	●		●	
	0.4 ... 6 m		●		●
No-load supply current	≤ 30 mA		●	●	●
	≤ 40 mA	●			
Connection	Plastic connector M12 x 1, 4-pin			●	●
	0.2 m fixed cable with 4-pin, M12 connector	●	●		
					

Approvals and Certificates					
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions		
Length L [mm]	54,3	
Width W [mm]	25,8	
Height H [mm]	90	
Connector area I_c [mm]	5,5	12

Accessories

This and more accessories can be found in chapter 10
See pages 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

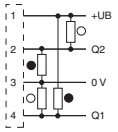
Electrical Connection

❍ = light on, ● = dark on



RL29-55/115b/136
RL29-55-V/115b/136

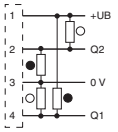
Option /115b/136

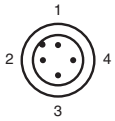




RL29-55/73c/136
RL29-55-V/73c/136

Option /73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Threshold detection range	12 m
Effective detection range	0 ... 9000 mm
Reference target	reflector C110-2
Light type	modulated visible red light , 630 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	≤ 500 Hz
Ambient temperature	-30 ... 55 °C (-22 ... 131 °F)
Material	
Housing	plastic
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	RL31-54/115/136	RL31-54/115b/136	RL31-54/73c/136
Connection	2 m fixed cable	●		
	300 mm fixed cable with M12 x 1, 4-pin connector		●	
	connector M12 x 1, 4-pin			●

Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	35		
Width W [mm]	18		
Height H [mm]	62		
Connector area l_c [mm]	0	10	

Properties

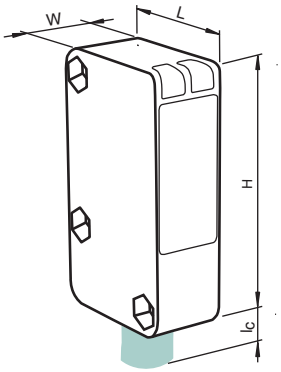
- **Polarized type**
- **Rectangular full-size housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable, connector and pigtailed connector versions**
- **Visible red light**

Further Products

In this series, we offer additionally:

RL31-54/25/73c/136

Technical data like RL31-54/73c/136 but:
Switching type: light on



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

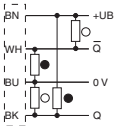
Electrical Connection

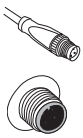
❍ = light on, ● = dark on



RL31-54/115/136

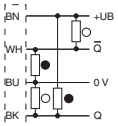
Option 59/115/136





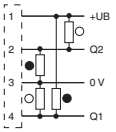
RL31-54/115b/136

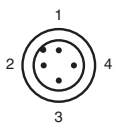
Option 59/115/136



RL31-54/73c/136

Option /59/73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Polarized and non-polarized types
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Cable version
- Visible red light

Your Benefit

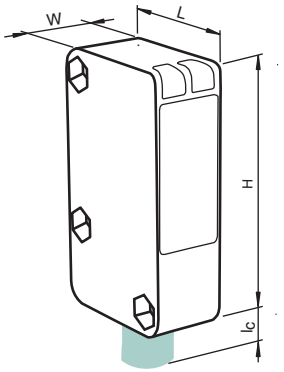
- Universal usage with AC or DC power supply

Further Products

In this series, we offer additionally:

RLK31-54/25/31/115
RLK31-54/25/31/115 SET

Technical data like RLK31-54/31/115 but:
Switching type: light on
SET includes reflector C110-2, mounting bracket OMH-RL31-01 and installation material



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated visible red light , 630 nm
Operating voltage	24 ... 240 V AC / 12 ... 240 V DC
No-load supply current	≤ 40 mA
Power consumption	≤ 2 VA
Signal output	Relay, 1 alternator
Switching type	dark on
Switching current	max. 3 A
Switching power	DC: max. 150 W AC: max. 750 VA
Switching frequency	20 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	Polycarbonate
Optical face	PMMA
Protection degree	IP67
Connection	2 m fixed cable , 5-wire



Model Number	green = preferred type	RLK31-6/31/115	RLK31-54/31/115
Polarization filter			●
Threshold detection range	12 m		●
	16.5 m	●	
Effective detection range	0 ... 9 m		●
	0 ... 14 m	●	
Reference target	reflector C110-2		●
	H85-2 reflector	●	
Approvals and Certificates			
Protection class	II	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●

Dimensions	
Length L [mm]	35
Width W [mm]	18
Height H [mm]	62
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket

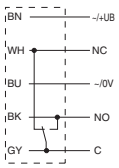
Electrical Connection

❍ = light on, ● = dark on



RLK31-54/31/115
RLK31-6/31/115

Option 31/115



Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Timer	✔
Light/dark switch	✔
Threshold detection range	25 m
Effective detection range	0 ... 18 m
Reference target	FE-RR1 reflector
Light type	modulated visible red light , 630 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 35 mA
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching type	light/dark on, switchable
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number		RL61-55-Z/115/136	RL61-55-Z/92/136
Connection	fixed cable	●	
	connector M12 x 1, 4-pin		●

Approvals and Certificates			
UL approval	cULus	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

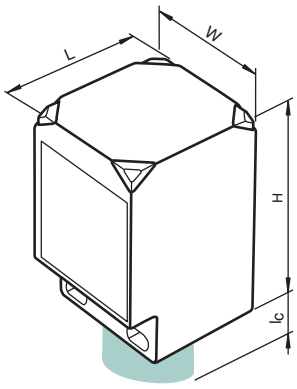
Dimensions		
Length L [mm]	49	
Width W [mm]	45	
Height H [mm]	74	
Connector area l_c [mm]	18	30

Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Ultra-bright four-corner LEDs for sensor status indication
- Threaded base and side thru-holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB06	Ball and Swivel Mounting Bracket
MPZB07	Ball and Swivel Vertical Mounting Plate
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

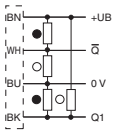
Electrical Connection

❍ = light on, ● = dark on



RL61-55-Z/115/136

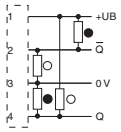
Option 115/136

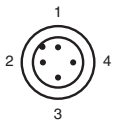




RL61-55-Z/92/136

Option 92/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

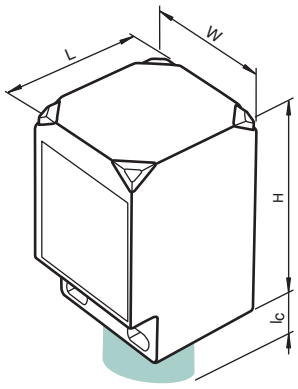


Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Cable and connector versions
- Visible red light

Your Benefit

- Universal usage with AC or DC power supply
- Ultra-bright four-corner LEDs for sensor status indication
- Threaded base and side thru-holes provide flexible mounting options



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Timer	✔
Light/dark switch	✔
Threshold detection range	25 m
Effective detection range	0 ... 18 m
Reference target	FE-RR1 reflector
Light type	modulated visible red light, 630 nm
Operating voltage	24 ... 240 V AC / 12 ... 240 V DC
No-load supply current	≤ 35 mA
Power consumption	≤ 2 VA
Signal output	Relay, Form C
Switching type	light/dark on, switchable
Switching current	max. 3 A
Switching power	DC: max. 150 W AC: max. 750 VA
Switching frequency	20 Hz
Ambient temperature	-40 ... 55 °C (-40 ... 131 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number		RLK61-55-Z/31/115	RLK61-55-Z/31/135
Connection	fixed cable	●	
	V95 quick disconnect		●
			
Approvals and Certificates			
UL approval	cULus	●	●
Dimensions			
Length L [mm]		49	
Width W [mm]		45	
Height H [mm]		74	
Connector area l_c [mm]		18	30

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MPZB01	Mounting bracket with vertical slots
MPZB02	Mounting bracket with circular slots
MPZB06	Ball and Swivel Mounting Bracket
MPZB07	Ball and Swivel Vertical Mounting Plate

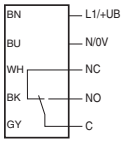
Electrical Connection

❍ = light on, ● = dark on



RLK61-55-Z/31/115

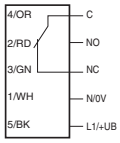
Option 31/115

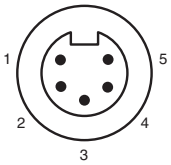




RLK61-55-Z/31/135

Option 31/135





Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

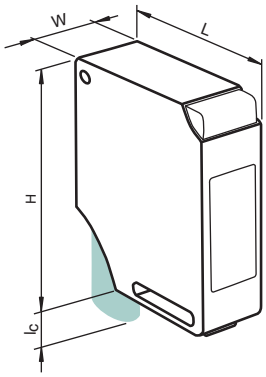
Model Number	MLV11-54-Ex/40b/112
Polarization filter	✔
Threshold detection range	3 m
Effective detection range	0 ... 3 m
Reference target	H85 reflector
Light source	LED
Light type	modulated visible red light , 660 nm
Operating voltage	6 ... 15.5 V DC (R_i approx. 0 Ohm)
Switching type	light/dark on, programmable
Signal output	1 NAMUR output NC/NO programmable
Switching frequency	≥ 100 Hz
Current consumption	
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	scratch resistant plastic lens
Protection degree	IP67
Connection	V1 connector (M12 x 1), 4-pin, rotatable through 90°
	
Use in the Hazardous Area	
Marking	Zone 1: ⟨Ex⟩ II 2G Ex op is ia IIC T6
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
EC-Type Examination Certificate	PTB 99 ATEX 2036 X
Dimensions	
Length L [mm]	45
Width W [mm]	18
Height H [mm]	50
Connector area l_c [mm]	16 / 0

Properties

- Polarized type
- Rectangular compact housing
- Plastic housing
- DC sensor
- NAMUR output
- Connector version
- Visible red light

Your Benefit

- ATEX-approval for zone 1
- Intrinsically safe, Ex op is ia IIC T6



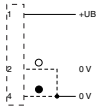
Electrical Connection

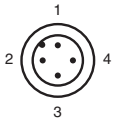
❍ = light on, ● = dark on

MLV11-54-Ex/40b/112



Option 40b





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2015-04-08



0102

Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- ATEX-approval for zone 2 and zone 22

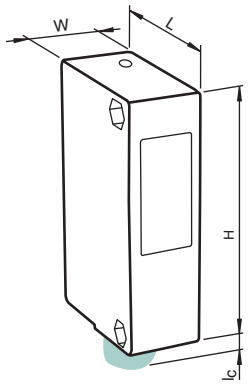
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Polarization filter	✔
Reference target	H60 reflector
Light source	LED
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	40 mA
Switching type	light/dark on
Signal output	2 PNP, complementary, short-circuit protected, reverse polarity protected
Switching current	max. 50 mA
Switching frequency	250 Hz
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Material	
Housing	Terluran GV15
Optical face	glass
Protection degree	IP65
Connection	Plastic connector M12 x 1, 4-pin



Model Number	green = preferred type	RL32-54-Ex2/47/73c	RL32-55-Ex2/47/73c
Threshold detection range	14 m		●
	7 m	●	
Effective detection range	0 ... 10 m		●
	0 ... 4 m	●	
Use in the Hazardous Area			
Marking	Zone 2: ⟨Ex⟩ II 3G Ex nA op is IIC T4; Zone 22: ⟨Ex⟩ II 3D Ex tD A22 IP65 T 75°C	●	●
Approvals and Certificates			
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
Dimensions			
Length L [mm]		45,5	
Width W [mm]		22	
Height H [mm]		72	
Connector area l_c [mm]		13,5	

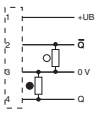


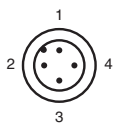
Electrical Connection

❍ = light on, ● = dark on



RL32-55-Ex2/47/73c
RL32-54-Ex2/47/73c
Option /47/73c





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

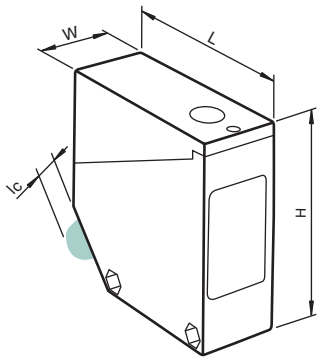
Model Number	RL36-55-Ex/40b/116
Polarization filter	✔
Threshold detection range	11.5 m
Effective detection range	0 ... 8 m
Reference target	H85 reflector
Light source	LED
Light type	modulated visible red light , 660 nm
Operating voltage	6 ... 20 V DC (R_i approx. 0 Ohm)
Switching type	light/dark on, programmable
Signal output	1 NAMUR output NC/NO programmable
Switching frequency	≥ 100 Hz
Current consumption	
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PMMA
Optical face	Scratch resistant mineral glass lens
Protection degree	IP54
Connection	terminal compartment PG9, ≤ 2.5 mm²
	
Use in the Hazardous Area	
Marking	II 2G Ex op is ia IIC T4
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	85
Width W [mm]	34
Height H [mm]	80
Connector area l_c [mm]	4

Properties

- Polarized type
- Rectangular full-size housing
- Plastic housing
- DC sensor
- NAMUR output
- Terminal version
- Visible red light

Your Benefit

- ATEX-approval for zone 1
- Intrinsically safe Ex op is ia IIC T4



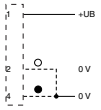
Electrical Connection

❍ = light on, ● = dark on

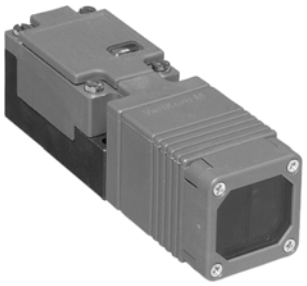


RL36-55-Ex/40b/116

Option 40b



Date of issue 2015-04-08

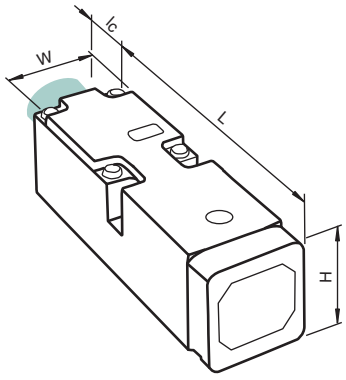


Properties

- Polarized type
- Rectangular compact housing
- Plastic housing
- DC sensor
- NAMUR output
- Terminal version
- Visible red light

Your Benefit

- ATEX approval for zone 20 (Dust) and zone 1 (Gas)
- Intrinsically safe, Ex op is ia IIC T6
- FM and CSA approval



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

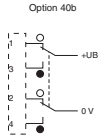
Model Number	**OCS2000-M1K-N2**
Polarization filter	✔
Threshold detection range	2 m
Effective detection range	0 ... 2 m
Reference target	Retro-reflector C110-2
Light source	LED , 660 nm
Light type	modulated visible red light
Operating voltage	6 ... 20 V DC (R_i approx. 0 Ohm)
Switching type	light/dark on, programmable
Signal output	1 NAMUR output NC/NO programmable
Switching frequency	≥ 100 Hz
Current consumption	
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	Scratch resistant mineral glass lens
Protection degree	IP67 according to EN 60529, Class II insulation
Connection	terminal compartment PG9, ≤ 2.5 mm²
	
Use in the Hazardous Area	
Marking	Zone 1: Ex II 2G Ex op is ia IIC T6 Zone 20/21: Ex II 1D Ex iaD 20 T 85°C
Approvals and Certificates	
Approved for	IS / I,II,III / 1 / ABCDEFG / T5 - 116-0110; Entity NI / I / 2 / ABCD / T6 Entity Parameters: VMax = 12.6 V, IMax = 20 mA, Ci = 1.11 µF, Li = 0 mH (Groups A, B, C, D, E, F, G). VMax = 15.5 V, IMax = 52 mA, Ci = 1.11 µF, Li = 0 mH (Groups C, D, E, F, G).
Approved for	Class I, Division 2, Groups A, B, C and D Rated 20V (max), 50mA. These sensors are suitable for installation in (or through the wall of) a suitable enclosure with provision for connection of rigid metal conduit, as acceptable to the local inspection authority having jurisdiction.
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	102
Width W [mm]	30
Height H [mm]	30
Connector area l_c [mm]	0 (M16 X 1.5)

Electrical Connection

❍ = light on, ● = dark on



OCS2000-M1K-N2



Date of issue: 2015-04-08

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CE

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KS/KSE10
Threshold detection range	1500 mm
Effective detection range	0 ... 1000 mm
Light type	modulated infrared light , 870 nm
Operating voltage	see accessory: signal transformer
Signal output	see accessory: signal transformer
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303
Optical face	glass
Protection degree	IP65
Connection	fixed cable 2000 mm



Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	25
Diameter D [mm]	4
Thread length l_t [mm]	25
Connector area l_c [mm]	0

Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Stainless steel housing
- Requires external amplifier
- Cable version
- Infrared light

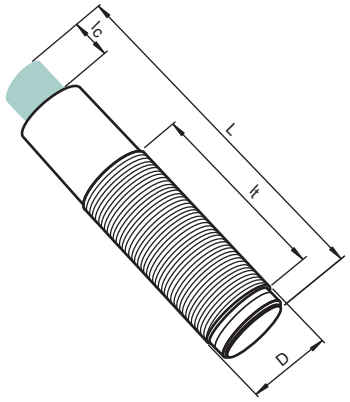
Your Benefit

- Smallest sensor design for space-saving mounting

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

SU11/40a/49/92	External amplifier
SU11/32/40a/82b/92	External amplifier
SU11/40a/49/115	External amplifier
SU10/40a/49/116	External amplifier
BF 4	Mounting flange, 4 mm

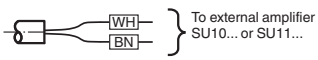


Electrical Connection

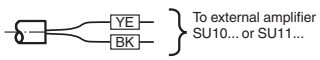
❍ = light on, ● = dark on



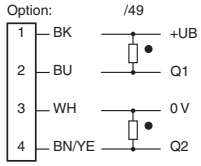
KS/KSE10
Emitter



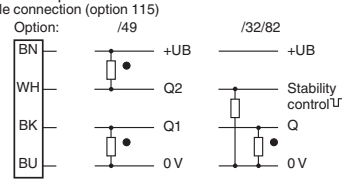
Receiver



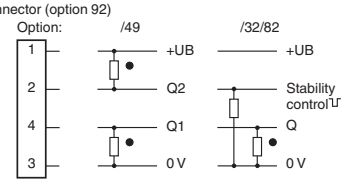
External amplifier SU10 ...



External amplifier SU11 ...
Cable connection (option 115)



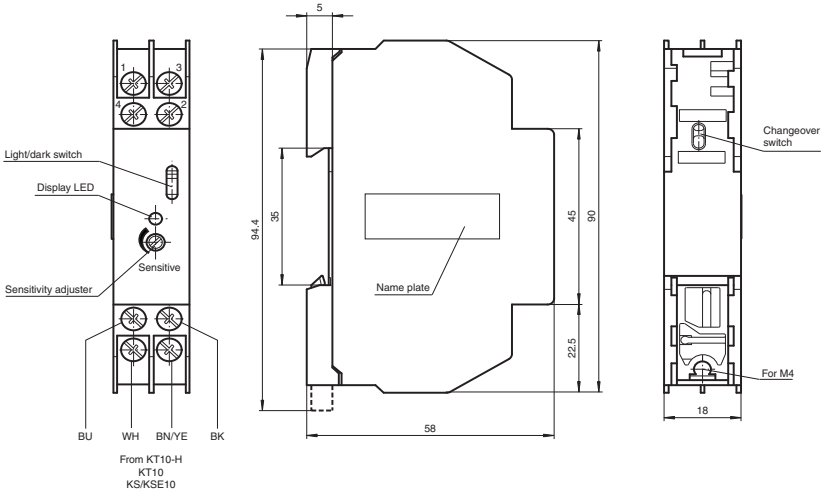
Connector (option 92)



Date of issue 04/08/2015

External amplifier SU10/40a/49/116





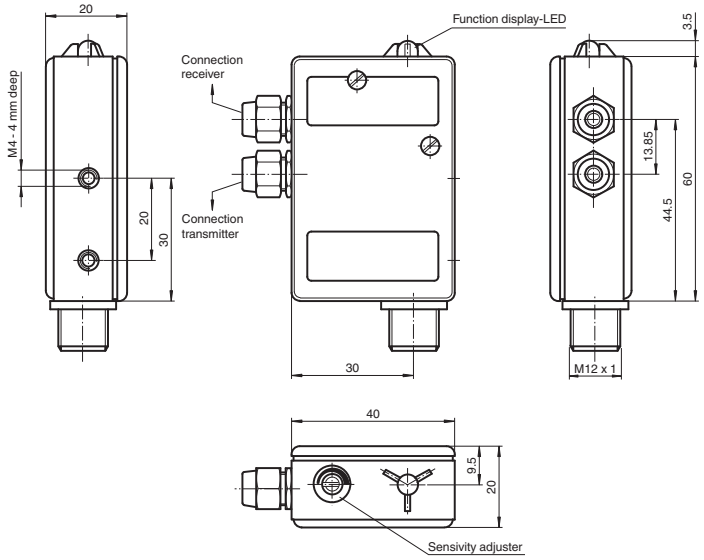
External amplifier for mounting on a standard top hat rail.

Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output
Output current:	max. 200 mA

External amplifier SU11.../92



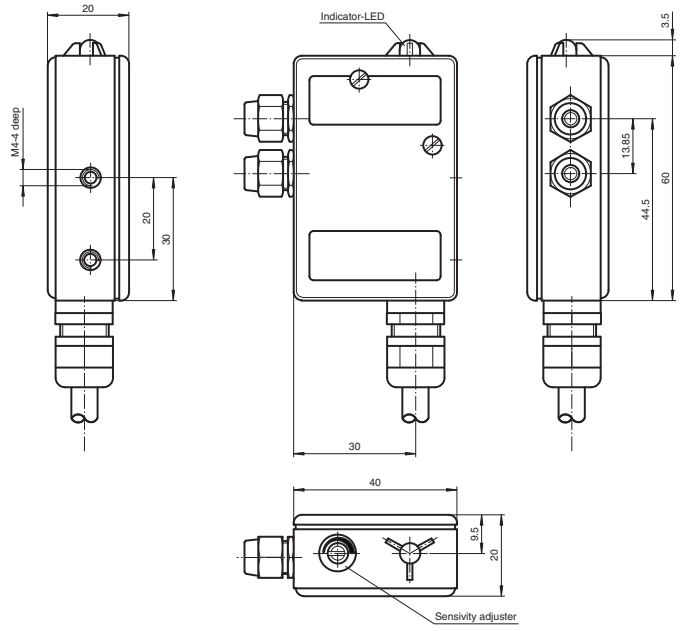


Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

External amplifier SU11.../115





Technical Data

Supply voltage:	10 ... 30 VDC
No load supply current:	40 mA
Signal output:	1 PNP + 1 NPN switching output or 1 PNP, open collector
Output current:	max. 200 mA

Date of issue: 2015-04-08

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CE

Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Nickel plated brass housing
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Effective detection range	0 ... 5000 mm
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 20 mA
Switching type	light/dark on
Switching current	max. 300 mA
Switching frequency	≤ 500 Hz
Control input	light on +UB dark on: 0 V
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PMMA
Protection degree	IP67

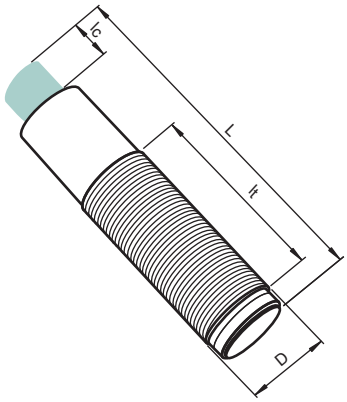
Model Number	green = preferred type	G12/GV12/36/40b/115	G12/GV12/37/40b/115	G12/GV12/36/40b/92	G12/GV12/37/40b/92
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	2 m fixed cable	●	●		
	connector M12 x 1, 4-pin			●	●





Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	55	65
Diameter D [mm]	12	
Thread length l_t [mm]	34	
Connector area l_c [mm]	0	10



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

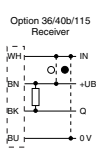
BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

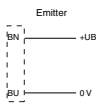
Electrical Connection

❍ = light on, ● = dark on

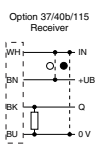


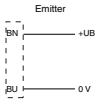
G12/GV12/36/40b/115





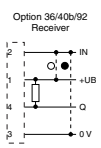
G12/GV12/37/40b/115

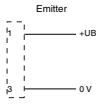




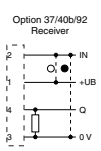


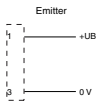
G12/GV12/36/40b/92

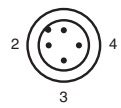




G12/GV12/37/40b/92







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	25 m
Effective detection range	0 ... 20 m
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	GD18/GV18/115/120	GD18/GV18/59/102/115	GD18/GV18/59/102/159	GD18/GV18/73/120
Switching type	dark on		●	●	
	light/dark on	●			●
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

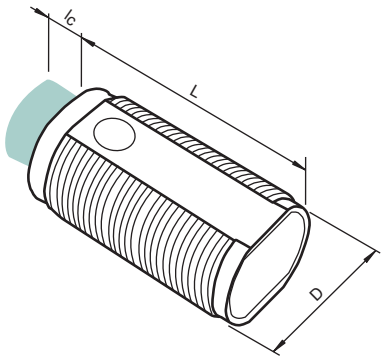
Dimensions			
Length L [mm]	33		
Diameter D [mm]	18		
Connector area l_c [mm]	7	11	

Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

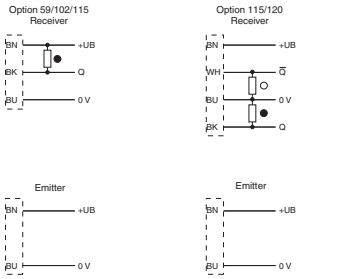
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable

Electrical Connection

❍ = light on, ● = dark on

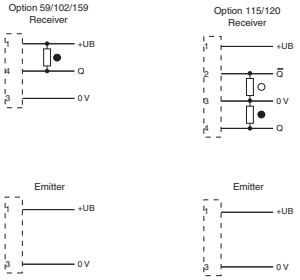


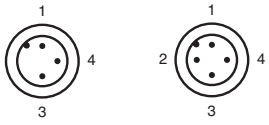
GD18/GV18/59/102/115 GD18/GV18/115/120





GD18/GV18/59/102/159 GD18/GV18/73/120





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	17.5 m
Effective detection range	0 ... 12 m
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC
No-load supply current	< 20 mA
Switching current	max. 100 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC
Optical face	PMMA
Protection degree	IP67

Model Number		GD18-S/GV18-S/115/120	GD18-S/GV18-S/59/102/115	GD18-S/GV18-S/59/102/159	GD18-S/GV18-S/73/120
Switching type	dark on		●	●	
	light/dark on	●			●
Signal output	1 NPN, short-circuit protected open collector		●	●	
	2 PNP, complementary, short-circuit protected, open collectors	●			●
Connection	2 m fixed cable	●	●		
	Connector M12 x 1, 3-pin			●	
	connector M12 x 1, 4-pin				●
					

Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

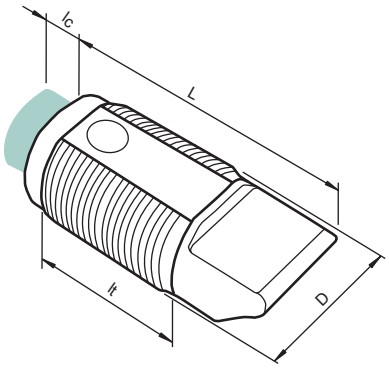
Dimensions			
Length L [mm]	46		
Diameter D [mm]	18		
Connector area l_c [mm]	7		11

Properties

- Emitter / receiver set
- Cylindrical threaded housing, side view
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Short sensor design for space-saving mounting



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

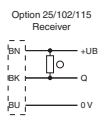
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V11-G-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V11-W-2M-PUR	Cable socket, M12, 3-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

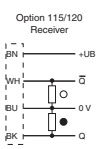
❍ = light on, ● = dark on

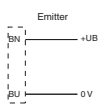


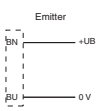
GD18-S/GV18-S/59/102/115



GD18-S/GV18-S/115/120

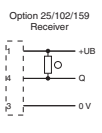




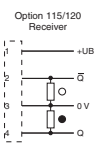


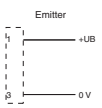


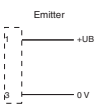
GD18-S/GV18-S/59/102/159

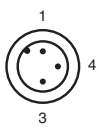


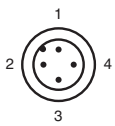
GD18-S/GV18-S/73/120











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	25 m
Effective detection range	0 ... 20 m
Light type	modulated visible red light , 640 nm
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Switching type	dark on
Signal output	N-channel MOSFET, short circuit protected
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

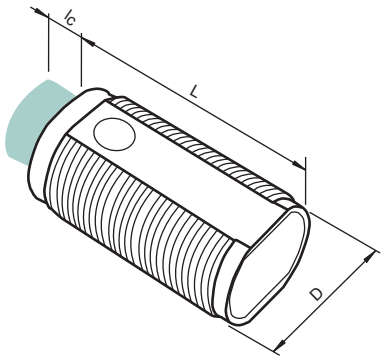
Model Number		GA18/GK18/59/115/161	GA18/GK18/59/161/166
Connection	2 m fixed cable ; 3 x 0.14 mm^2 , PVC	●	
	Micro AC connector, 1/2" V124 ; 4-pin		●
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●
Dimensions			
Length L [mm]		49	
Diameter D [mm]		18	
Connector area l_c [mm]		7	11

Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Plastic housing
- AC/DC sensor
- Cable and connector versions
- Visible red light

Your Benefit

- Universal usage with AC or DC power supply



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

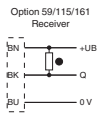
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

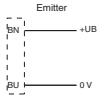
Electrical Connection

❍ = light on, ● = dark on

GA18/GK18/59/115/161

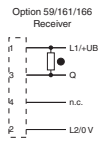


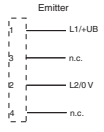


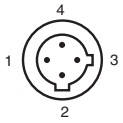


GA18/GK18/59/161/166









Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	17.5 m
Effective detection range	0 ... 12 m
Light type	modulated visible red light , 640 nm
Operating voltage	20 ... 250 V AC/DC
No-load supply current	< 2.5 mA
Switching type	dark on
Signal output	N-channel MOSFET, short circuit protected
Switching current	max. 200 mA
Switching frequency	50 Hz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC-PBT
Optical face	PMMA
Protection degree	IP67

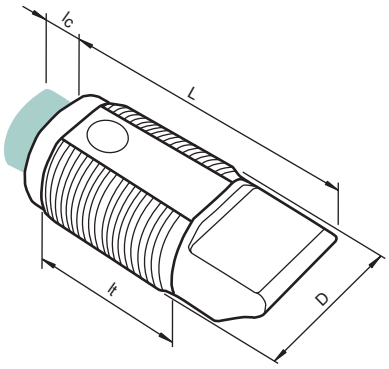
Model Number		GA18-S/GK18-S/59/115/161	GA18-S/GK18-S/59/161/166
Connection	2 m fixed cable ; 3 x 0.14 mm^2 , PVC	●	
	Micro AC connector, 1/2" V124 ; 4-pin		●
			
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Type 1 enclosure	●	●
Dimensions			
Length L [mm]		64	
Diameter D [mm]		18	
Connector area l_c [mm]		7	11

Properties

- Emitter / receiver set
- Cylindrical threaded housing, side view
- Plastic housing
- AC/DC sensor
- Cable and connector versions
- Visible red light

Your Benefit

- Universal usage with AC or DC power supply



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

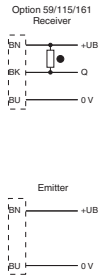
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V124-G-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable
V124-W-YE2M-PVC	Connecting cable, 1/2" - 20 UNF, 4-pin, PVC cable

Electrical Connection

❍ = light on, ● = dark on

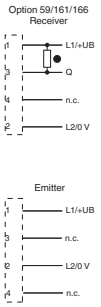
GA18-S/GK18-S/59/115/161

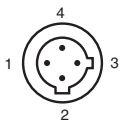




GA18-S/GK18-S/59/161/166







Date of issue 04/08/2015



Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Nickel plated brass housing
- Discrete output
- Cable and connector versions
- Red and infrared light versions

Technical Data

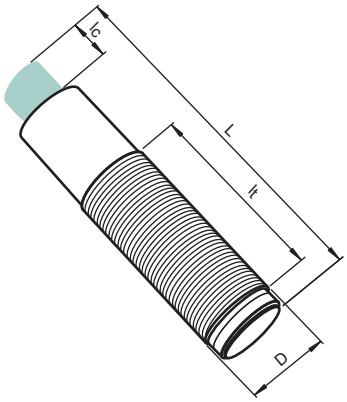
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Effective detection range	0 ... 10 m
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	≤ 25 mA (device)
Switching type	light/dark on electrically switchable
Switching current	max. 100 mA
Switching frequency	≤ 500 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	PC
Protection degree	IP67

Model Number	green = preferred type	OBE10M-18GM60-SE4	OBE10M-18GM60-SE5	OBE10M-18GM60-RT-SE4	OBE10M-18GM60-SE4-V1	OBE10M-18GM60-SE5-V1	OBE10M-18GM60-RT-SE4-V1	OBE10M-18GM60-RT-SE5-V1
Light type	880 nm IR light	●	●		●	●		
	660 nm visible red light			●			●	●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●			●		●
Connection	2 m fixed cable	●	●	●				
	connector M12 x 1, 4-pin				●	●	●	●
								

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions					
Length L [mm]	60		70		
Diameter D [mm]	18				
Thread length l_t [mm]	38				
Connector area l_c [mm]	0		10		



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

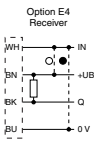
CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection

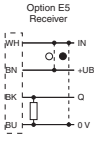
❍ = light on, ● = dark on



OBE10M-18GM60-SE4
OBE10M-18GM60-RT-SE4

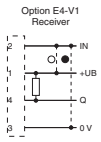


OBE10M-18GM60-SE5

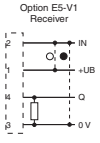


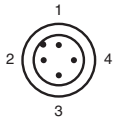


OBE10M-18GM60-SE4-V1
OBE10M-18GM60-RT-SE4-V1



OBE10M-18GM60-SE5-V1
OBE10M-18GM60-RT-SE5-V1





Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VS18/VSE18-M-LAS/40a/76a/118/128
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	85 m
Effective detection range	0 ... 60 m
Light type	modulated visible red light
Laser class	1
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: 20 mA , Receiver: 15 mA
Switching type	light/dark on, switchable
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching current	max. 200 mA
Switching frequency	5000 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	brass, nickel-plated
Optical face	plastic
Protection degree	IP67
Connection	connector M12 x 1, 4-pin (Vario-Quick quick connect technology)



Approvals and Certificates	
UL approval	cULus Listed, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

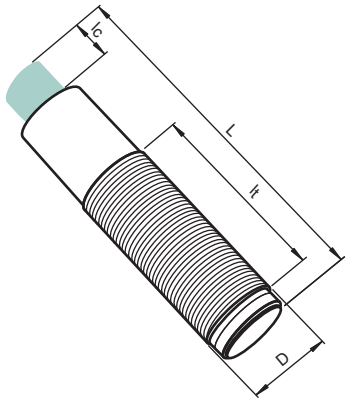
Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Thread length l_t [mm]	40
Connector area l_c [mm]	13

Properties

- Emitter / receiver set
- Cylindrical threaded housing
- Nickel plated brass housing
- Discrete output
- Connector version
- Laser red light

Your Benefit

- Best small part detection with adjustable focus



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

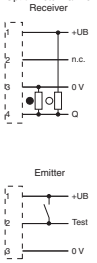
OMH-VL18	Mounting Bracket with swivel nut
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

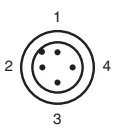
Electrical Connection

❍ = light on, ● = dark on

VS18/VSE18-M-LAS/40a/76a/118/128







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	OBE2000-R2-SE2-0,2M-V31
Control input	✔
Teach-In input	✔
Threshold detection range	Long range mode: 2.5 m High precision mode: 300 mm
Effective detection range	Long range mode: 0 ... 2 m High precision mode: 0 ... 200 mm
Light type	modulated visible red light, 630 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: max. 11 mA , Receiver: max. 8 mA
Switching type	normally open (NO)
Signal output	1 PNP output short-circuit protected, reverse voltage protected, open collector
Switching current	max. 50 mA
Switching frequency	approx. 800 Hz
Control input	not connected: long range mode connected to 0 V: high precision mode
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	PC/ABS and PBT
Optical face	glass
Cable	PUR
Protection degree	IP67
Connection	fixed cable 200 mm with connector M8 x 1, 4-pin



Approvals and Certificates	
UL approval	cULus Recognized, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

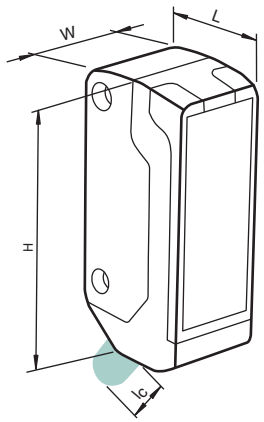
Dimensions	
Length L [mm]	11.2
Width W [mm]	7.5
Height H [mm]	24
Connector area l_c [mm]	0

Properties

- **Emitter / receiver set**
- **Rectangular ultra-small housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable connection**
- **Visible red light**

Your Benefit

- **Improved machine availability with abrasion-resistant, antistatic glass front**



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

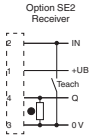
MH-R2-01	Mounting bracket
MH-R2-02	Mounting bracket
MH-R2-03	Mounting bracket
MH-R2-04	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable

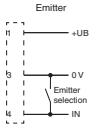
Electrical Connection

❍ = light on, ● = dark on



OBE2000-R2-SE2-0,2M-V31







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Light/dark switch	✔
Threshold detection range	10000 mm
Effective detection range	0 ... 8000 mm
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	< 15 mA at 24 V DC
Switching type	light/dark on electrically switchable
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	2000 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	ABS
Optical face	glass pane
Protection degree	IP67

Model Number	green = preferred type	M4.2/MV4.2-8000-RT/76a/110/115	ML4.2-P-8m-RT/40b/76a/95/110
Connection	2 m fixed cable	●	
	M8 x 1 connector, 4-pin		●
			

Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	18	
Width W [mm]	13,9	
Height H [mm]	25,4	
Connector area l_c [mm]	7,5	16,6

Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

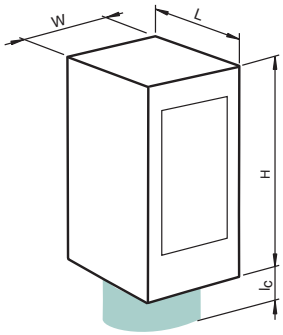
- Scratch-resistant, antistatic glass optical face
- Mount from back surface without additional mounting accessories

Further Products

In this series, we offer additionally:

ML4.2-P-20m-LAS/40b/76a/95/110

Tech. spec. like ML4.2-P-8m-RT/40b/76a/95/110 but:
Threshold detection range: 30 m
Effective detection range: 0 ... 20 m
Laser class: 1
Switching frequency: 4000 Hz



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

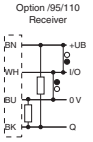
OMH-4.1	Mounting Clamp
OMH-ML6	Mounting bracket
OMH-ML6-U	Mounting bracket
OMH-ML6-Z	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable
V31-GM-5M-PUR	4-pin, M8 socket, PUR cable
V31-WM-5M-PUR	4-pin, M8 socket, PUR cable

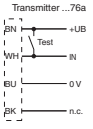
Electrical Connection

❍ = light on, ● = dark on



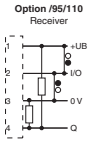
M4.2/MV4.2-8000-RT/76a/110/115

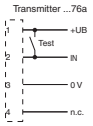






ML4.2-P-8m-RT/40b/76a/95/110
ML4.2-P-20m-LAS/40b/76a/95/110







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

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PEPPERL+FUCHS
SENSING YOUR NEEDS

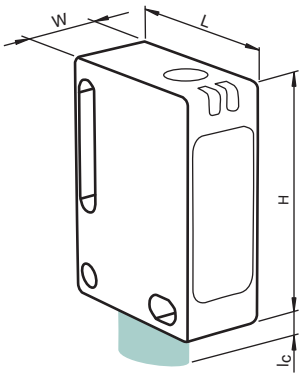


Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Teach-In	✔
Threshold detection range	4.5 m
Effective detection range	0 ... 3.5 m
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 17 mA Receiver: ≤ 15 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		M7/MV7/59/76a/102/115	M7/MV7/59/76a/102/115/126b	M7/MV7/59/76a/103/115	M7/MV7/59/76a/82b/103/115	M7/MV7/59/76a/102/126b/143	M7/MV7/59/76a/102/143	M7/MV7/59/76a/103/143	M7/MV7/59/76a/82b/103/143
	green = preferred type								
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Pre-fault indication output	1 NPN		●			●			
	1 PNP				●				●
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 4-pin					●	●	●	●

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions									
Length L [mm]	23								
Width W [mm]	11								
Height H [mm]	31								
Connector area l_c [mm]	7,6					9,1			

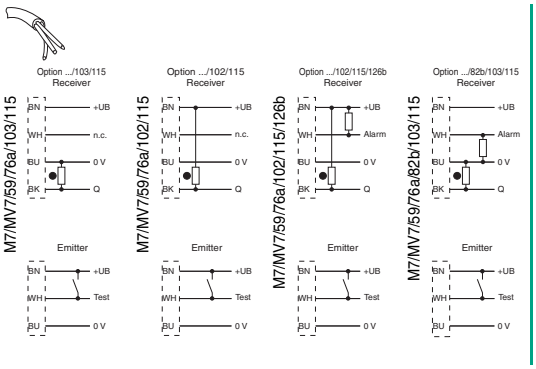
Accessories

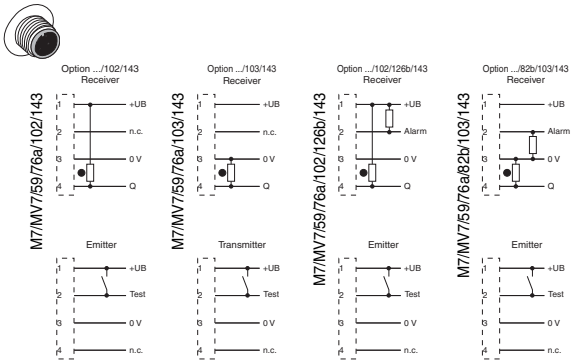
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

Electrical Connection

❍ = light on, ● = dark on







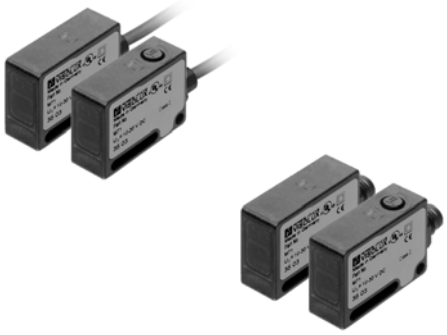
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Properties

- Emitter / receiver set
- Rectangular miniature housing, side view
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- ECOLAB certificate

Technical Data

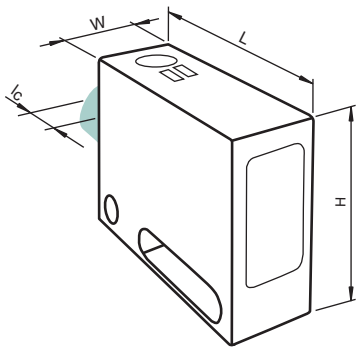
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Teach-In	✔
Threshold detection range	4.5 m
Effective detection range	0 ... 3.5 m
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 17 mA Receiver: ≤ 15 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67 / IP69K

Model Number		M71/MV71/59/76a/102/115	M71/MV71/59/76a/102/115/126b	M71/MV71/59/76a/103/115	M71/MV71/59/76a/82b/103/115	M71/MV71/59/76a/102/143	M71/MV71/59/76a/102/126b/143	M71/MV71/59/76a/103/143	M71/MV71/59/76a/82b/103/143
	green = preferred type								
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Pre-fault indication output	1 NPN		●				●		
	1 PNP				●				●
Connection	2 m fixed cable	●	●	●	●				
	4-pin, M8 plastic connector					●	●	●	●

Approvals and Certificates									
Protection class	II	●	●	●	●	●	●	●	●
UL approval	cULus	●	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.								

Dimensions		
Length L [mm]	31	
Width W [mm]	11	
Height H [mm]	23	
Connector area l_c [mm]	7,6	9,1



Accessories

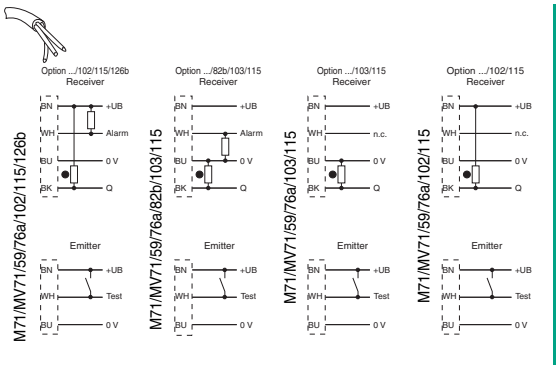
This and more accessories can be found in chapter 10

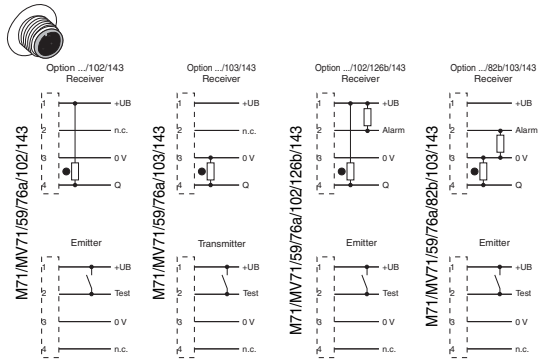
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

Electrical Connection

❍ = light on, ● = dark on







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

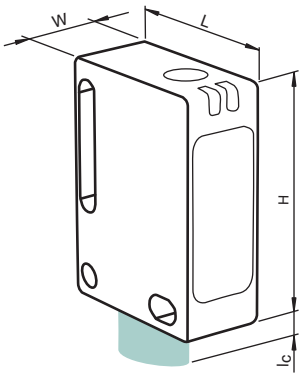


Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable, pigtail and connector versions
- Visible red light

Your Benefit

- Slotted mounting holes provide flexible mounting options
- Tamper-proof, no operating controls



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Threshold detection range	4.5 m
Effective detection range	0 ... 3.5 m
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 17 mA Receiver: ≤ 15 mA
Switching type	dark on
Switching current	max. 100 mA
Switching frequency	1000 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	PMMA
Protection degree	IP67

Model Number		M8/MV8/76a/102/115	M8/MV8/76a/103/115b	M8/MV8/76a/102/143	M8/MV8/76a/103/143
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		●	
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●		●
Connection	fixed cable 300 mm with M12 connector, 4-pin		●		
	M8 x 1 connector, 4-pin			●	●
	with 2 m fixed cable	●			
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		23			
Width W [mm]		11			
Height H [mm]		31			
Connector area l_c [mm]		7,6		9,1	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

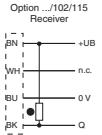
Montagekit OMH-ML7-01	Mounting set consisting of bracket OMH-ML-01 sheet ONH-ML7-03, and fastening material
Montagekit OMH-ML7-02	Mounting set consisting of bracket OMH-ML-02 sheet ONH-ML7-03, and fastening material
OMH-ML7-01	Mounting bracket
OMH-ML7-02	Mounting bracket
OMH-ML7-03	Fixing plate
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

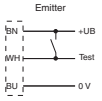
Electrical Connection

❍ = light on, ● = dark on

M8/MV8/76a/102/115

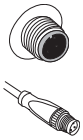


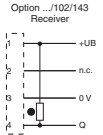


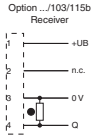


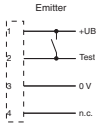
M8/MV8/76a/102/143

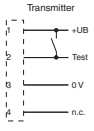
M8/MV8/76a/103/143
M8/MV8/76a/103/115b

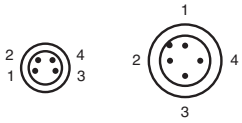












Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 15 mA Receiver: ≤ 8 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA
Test input	emitter deactivation
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67
Connection	2 m fixed cable



Model Number		M100/MV100-RT/35/76b/102/115	M100/MV100-RT/35/76a/103/115	M100/MV100-RT/76a/103/115	M100/MV100-RT/76b/102/115
Threshold detection range	15 m			●	●
	30 m	●	●		
Effective detection range	0 ... 10 m			●	●
	0 ... 20 m	●	●		
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●			●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●	●	
Switching frequency	1000 Hz			●	●
	250 Hz	●	●		
Approvals and Certificates					
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

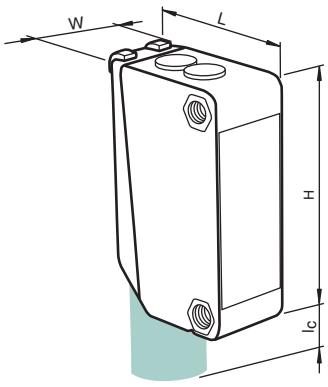
Dimensions	
Length L [mm]	20
Width W [mm]	11
Height H [mm]	31
Connector area I_c [mm]	0

Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable version
- Visible red light

Your Benefit

- Simplest alignment and set-up with ultra-bright Power-Beam emitter LED
- Rugged housing has metal-reinforced mounting holes



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

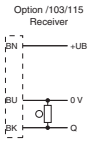
OMH-ML100-01	Mounting bracket
OMH-ML100-02	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series

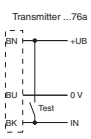
Electrical Connection

❍ = light on, ● = dark on

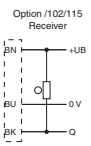


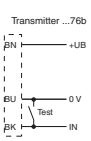
M100/MV100-RT/35/76a/103/115
M100/MV100-RT/76a/103/115





M100/MV100-RT/35/76b/102/115
M100/MV100-RT/76b/102/115





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Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Connector version
- Visible red light

Your Benefit

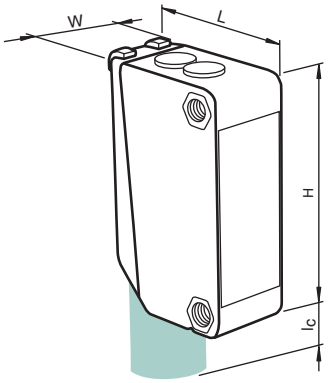
- Simplest alignment and set-up with ultra-bright Power-Beam emitter LED
- Rugged housing has metal-reinforced mounting holes

Further Products

In this series, we offer additionally:

M100/MV100-RT/76a/103/115a

Technical data like M100/MV100-RT/76a/98/103 but:
Connection: 300 mm fixed cable with M8 connector, 4-pin



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 15 mA Receiver: ≤ 8 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Test input	emitter deactivation
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	M100/MV100-RT/76b/98/102	M100/MV100-RT/35/76b/98/102	M100/MV100-RT/76a/98/103	M100/MV100-RT/35/76a/98/103	M100/MV100-RT/76b/95/102	M100/MV100-RT/35/76b/95/102	M100/MV100-RT/76a/95/103	M100/MV100-RT/35/76a/95/103
Threshold detection range	15 m	●		●		●		●	
	30 m		●		●		●		●
Effective detection range	0 ... 10 m	●		●		●		●	
	0 ... 20 m		●		●		●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
Switching frequency	1000 Hz	●		●		●		●	
	250 Hz		●		●		●		●
Connection	M8 x 1 connector, 3-pin	●	●	●	●				
	M8 x 1 connector, 4-pin					●	●	●	●

Approvals and Certificates		
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	● ● ● ● ● ● ● ●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	

Dimensions	
Length L [mm]	20
Width W [mm]	11
Height H [mm]	31
Connector area I_c [mm]	10

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-ML100-01	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V3-GM-2M-PVC	M8, 3-pin socket, PVC cable

Electrical Connection

❍ = light on, ● = dark on



M100/MV100-RT/35/76a/95/103
M100/MV100-RT/76a/95/103

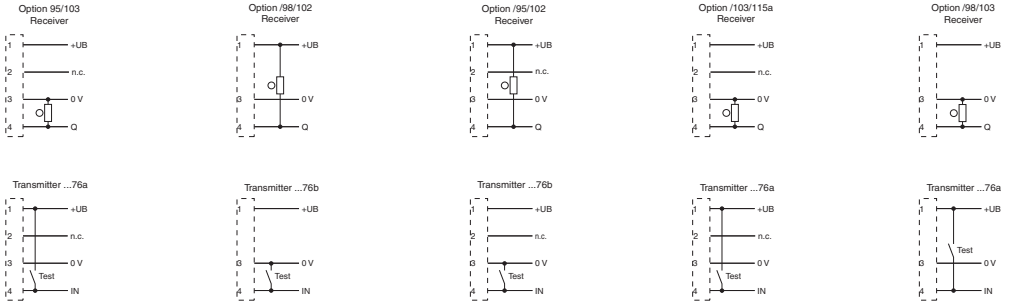
M100/MV100-RT/35/76b/98/102
M100/MV100-RT/76b/98/102

M100/MV100-RT/35/76b/95/102
M100/MV100-RT/76b/95/102

M100/MV100-RT/76a/103/115a

M100/MV100-RT/35/76a/98/103
M100/MV100-RT/76a/98/103





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	20 m
Effective detection range	0 ... 15 m
Light type	modulated infrared light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	Emitter: ≤ 15 mA Receiver: ≤ 8 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	250 Hz
Test input	emitter deactivation
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Protection degree	IP67

Model Number		M100/MV100-IR/76b/102/115	M100/MV100-IR/76a/103/115	M100/MV100-IR/76a/95/103
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector	●		
	1 PNP output, short-circuit protected, reverse polarity protected, open collector		●	●
Connection	2 m fixed cable	●	●	
	M8 x 1 connector, 4-pin			●
				
Approvals and Certificates				
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

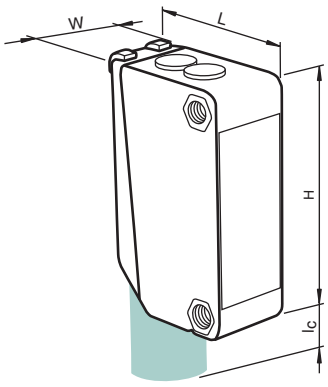
Dimensions		
Length L [mm]	20	
Width W [mm]	11	
Height H [mm]	31	
Connector area l_c [mm]	0	10

Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Infrared light

Your Benefit

- Rugged housing has metal-reinforced mounting holes



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

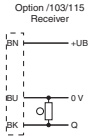
OMH-ML100-01	Mounting bracket
OMH-ML100-03	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-ML100-02	Mounting bracket
OMH-ML100-04	Mounting bracket
OMH-ML100-05	Mounting bracket
OMH-F10-ML100	Mounting aid for ML100 series
OMH-10	Mounting aid
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

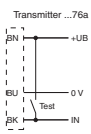
Electrical Connection

❍ = light on, ● = dark on

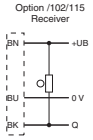


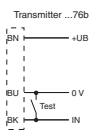
M100/MV100-IR/76a/103/115





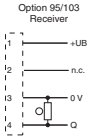
M100/MV100-IR/76b/102/115

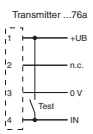






M100/MV100-IR/76a/95/103







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light

Technical Data

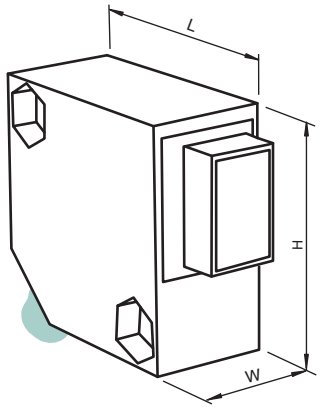
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Threshold detection range	8 m
Effective detection range	0 ... 6 m
Light type	modulated visible red light 660 nm
Operating voltage	10 ... 30 V DC
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	ABS
Optical face	plastic
Protection degree	IP65

Model Number		ML300-P-6m-RT/59/103/115	ML300-P-6m-RT/25/103/115	ML300-P-6m-RT/59/102/115	ML300-P-6m-RT/25/102/115	ML300-P-6m-RT/59/98/103	ML300-P-6m-RT/25/98/103	ML300-P-6m-RT/59/98/102	ML300-P-6m-RT/25/98/102
No-load supply current	Emitter: ≤ 20 mA Receiver: ≤ 15 mA	●		●		●		●	
	Emitter: ≤ 20 mA Receiver: ≤ 20 mA		●		●		●		●
Switching type	dark on	●		●		●		●	
	light on		●		●		●		●
Signal output	1 NPN output, short-circuit protected, reverse polarity protected, open collector			●	●			●	●
	1 PNP output, short-circuit protected, reverse polarity protected, open collector	●	●			●	●		
Connection	2 m fixed cable	●	●	●	●				
	M8 x 1 connector, 3-pin					●	●	●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	30	
Width W [mm]	15	
Height H [mm]	30	
Connector area l_c [mm]	2	11



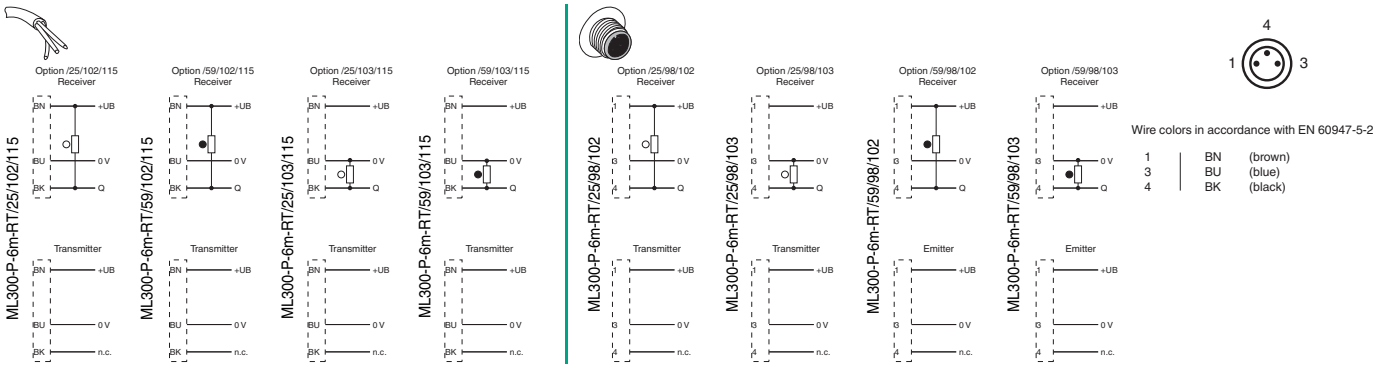
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
V3-GM-2M-PVC	M8, 3-pin socket, PVC cable
V3-WM-2M-PVC	M8, 3-pin socket, PVC cable

Electrical Connection

❍ = light on, ● = dark on



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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Threshold detection range	14 m
Effective detection range	0 ... 12 m
Light type	modulated infrared light 880 nm
Operating voltage	10 ... 30 V DC
No-load supply current	Emitter: ≤ 15 mA , Receiver: ≤ 10 mA
Switching current	max. 0.1 A
Switching frequency	1000 Hz
Test input	emitter: not activated: < 4 V, activated: > 8 V or open
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	PBT
Optical face	glass pane
Protection degree	IP67

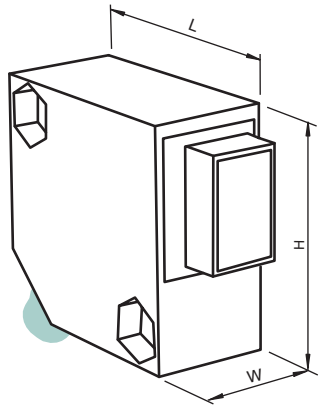
Model Number		ML300-P-12m-IR/76b/115/120	ML300-P-12m-IR/76b/115/127	ML300-P-12m-IR/76b/82d/103/115	ML300-P-12m-IR/76b/95/120	ML300-P-12m-IR/76b/95/127	ML300-P-12m-IR/76b/82d/95/103
Switching type	light on			●			●
	light on / dark on	●	●		●	●	
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●			●
	2 NPN outputs, complementary, short-circuit proof, reverse-polarity protection, open collector		●			●	
	2 PNP outputs, complementary, short-circuit protected, reverse polarity protected, open collector	●			●		
Output of the pre-fault indication	1 PNP			●			●
Connection	2 m fixed cable	●	●	●			
	M8 x 1 connector, 4-pin				●	●	●

Approvals and Certificates							
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions		
Length L [mm]	30	
Width W [mm]	15	
Height H [mm]	30	
Connector area l_c [mm]	2	11

Properties

- Emitter / receiver set
- Rectangular miniature housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Infrared light



Accessories

This and more accessories can be found in chapter 10

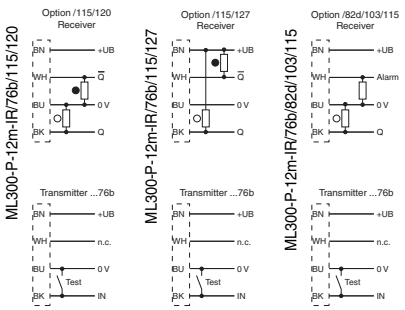
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-ML300-01	Bracket for mounting ML300 series sensors
OMH-ML300-02	Bracket for mounting ML300 series sensors on a 35 mm DIN rail
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

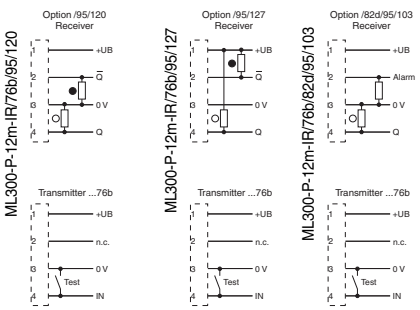
Electrical Connection

❍ = light on, ● = dark on











Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Teach-In	✔
Light/dark switch	✔
Threshold detection range	25 m
Effective detection range	0 ... 16 m
Operating voltage	10 ... 30 V DC
No-load supply current	Emitter: ≤ 35 mA Receiver: ≤ 45 mA
Switching type	light/dark on, switchable
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 0.2 A
Switching frequency	1000 Hz
Pre-fault indication output	1 PNP
Test input	emitter deactivation at 0 V
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67

Model Number		M12/MV12-F1/76b/82b/115/128	M12/MV12-F1/76b/82b/95/128	M12/MV12-F1/76b/82b/124/128	M12/MV12-F1-IR/76b/82b/124/128
Light type	modulated infrared light , 880 nm				●
	modulated visible red light , 660 nm	●	●	●	
Function input	Ext. Teach-In input (ET)	●		●	●
Connection	2500 mm fixed cable, PUR	●			
	5-pin M12 metal connector, 90° rotatable			●	●
	4-pin M8 metal connector, 90° rotatable		●		

Approvals and Certificates					
Protection class	II	●		●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

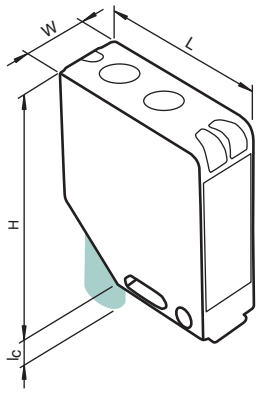
Dimensions			
Length L [mm]	41,5		
Width W [mm]	15		
Height H [mm]	49		
Connector area l_c [mm]	0	12	16

Properties

- Emitter / receiver set
- Rectangular compact housing
- Die cast zinc frame housing
- Discrete output
- Cable and connector versions
- Visible red and infrared light versions

Your Benefit

- Integral alignment aid LED simplifies setup
- Contrast detection mode automatically compensates for lens contaminants
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

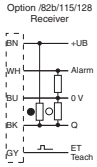
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
OMH-K01	dove tail mounting clamp
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V15-GM-2M-PVC	M12, 5-pin socket, PVC cable

Electrical Connection

❍ = light on, ● = dark on

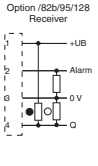


M12/MV12-F1/76b/82b/115/128

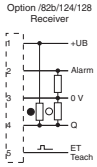


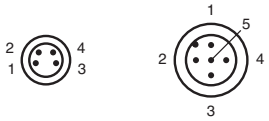


M12/MV12-F1/76b/82b/95/128



M12/MV12-F1-IR/76b/82b/124/128
M12/MV12-F1/76b/82b/124/128





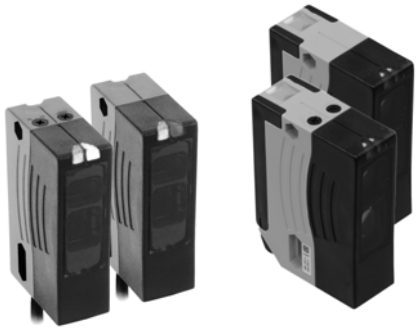
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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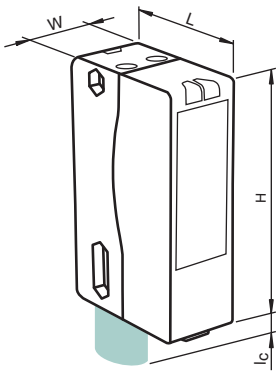


Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Cable, connector and terminals versions
- Visible red light

Your Benefit

- Integral alignment aid LED simplifies setup
- Extreme low-temperature operation



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	40 m
Effective detection range	0 ... 30 m
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	Emitter: ≤ 50 mA , Receiver: ≤ 35 mA
Switching type	light/dark on, switchable
Switching frequency	1000 Hz
Output of the pre-fault indication	1 PNP
Test input	emitter deactivation
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

Model Number		LD28/LV28-F1/47/76a/82b/115	LD28/LV28-F1/76a/82b/110/115	LD28/LV28-F1/47/76a/82b/105	LD28/LV28-Z-F1/76a/82b/110/116
Signal output	1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●		●
	2 PNP, complementary, short-circuit protected, reverse polarity protected , open collectors	●		●	
Switching current	max. 100 mA		●		
	max. 200 mA	●		●	●
Timer function	programmable adjustment interval 0.02 s ... 1 s				●
Connection	2.5 m, 5-wire, fixed cable, Euronorm	●	●		
	terminal compartment				●
	5-pin, M12 x 1 plastic connector			●	
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				
Dimensions					
Length L [mm]		54,3			65,5
Width W [mm]		25,8			
Height H [mm]		88			
Connector area l_c [mm]		4	14		0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

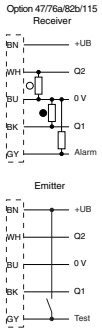
OMH-K01	dove tail mounting clamp
OMH-RL28-C	Protective cover

Electrical Connection

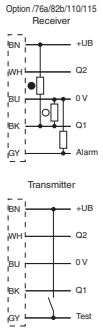
❍ = light on, ● = dark on



LD28/LV28-F1/47/76a/82b/115

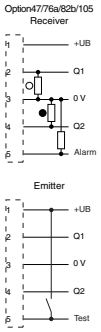


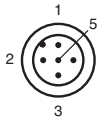
LD28/LV28-F1/76a/82b/110/115





LD28/LV28-F1/47/76a/82b/105



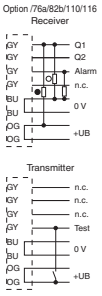


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)



LD28/LV28-Z-F1/76a/82b/110/116



Date of issue 04/08/2015

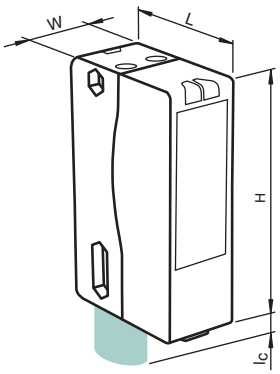


Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector and terminals versions
- Laser red light

Your Benefit

- Integral alignment aid LED simplifies setup
- High operating range and small light spot for gap monitoring



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	400 m
Effective detection range	0 ... 300 m
Light type	modulated visible red light
Laser class	2
Operating voltage	10 ... 30 V DC
No-load supply current	Emitter: ≤ 55 mA, Receiver: ≤ 35 mA
Switching type	light/dark on, switchable
Signal output	2 PNP, complementary, short-circuit protected, reverse polarity protected, open collectors
Switching current	max. 200 mA
Switching frequency	1000 Hz
Pre-fault indication output	1 PNP transistor, short-circuit protected, reverse polarity protected, open collector, Umax = 30 V DC, Imax = 0.2 A
Test input	emitter deactivation at $+U_B$
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

Model Number		LD28/LV28-LAS-F1/47/76a/82b/105	LD28/LV28-LAS-F1-Z/47/76a/116
Timer function	programmable adjustment interval 0.02 s ... 1 s		●
Connection	terminal compartment		●
	5-pin, M12 x 1 plastic connector	●	

Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed , Class 2 power source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	54,3	65,5
Width W [mm]	25,8	
Height H [mm]	88	
Connector area l_c [mm]	14	0

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

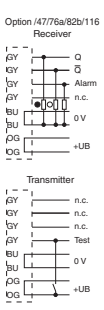
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

Electrical Connection

❍ = light on, ● = dark on

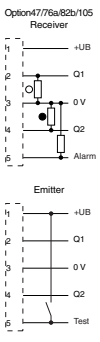


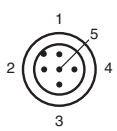
LD28/LV28-LAS-F1-Z/47/76a/116





LD28/LV28-LAS-F1/47/76a/82b/105





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	90 m
Effective detection range	0 ... 65 m
Light type	modulated visible red light , 660 nm
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Switching type	light/dark on, switchable
Signal output	Relay, 1 alternator
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Timer function	ON delay (GAN), OFF delay (GAB), one shot (IAB), ON delay-OFF delay (GAN-GAB), programmable adjustment range 0.1 ...10 s
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment



Model Number		LA28/LK28-Z-F1/31/116	LA28/LK28-Z-F2/31/116
Transmitter frequency	F1 = 25 kHz	●	
	F1 = 30 kHz		●
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed , Class 2 power source	●	●
CCC approval	Certified by China Compulsory Certification (CCC)	●	●

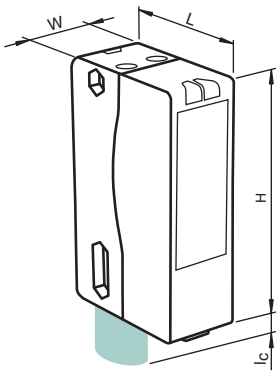
Dimensions	
Length L [mm]	65,5
Width W [mm]	25,8
Height H [mm]	88
Connector area l_c [mm]	0

Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Terminals
- Visible red light

Your Benefit

- Integral alignment aid LED simplifies setup
- Extreme low-temperature operation



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

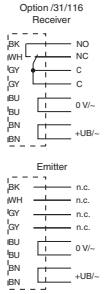
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

Electrical Connection

❍ = light on, ● = dark on



LA28/LK28-Z-F1/31/116
LA28/LK28-Z-F2/31/116



Date of issue 04/08/2015



Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Terminals
- Laser red light

Your Benefit

- Integral alignment aid LED simplifies setup
- High operating range and small light spot for gap monitoring

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LA28/LK28-LAS-F1-Z/31/116
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	400 m
Effective detection range	0 ... 300 m
Light type	modulated visible red light
Laser class	2
Operating voltage	12 ... 240 V AC/DC
Power consumption	≤ 3.5 VA
Switching type	light/dark on, switchable
Signal output	Relay, 1 alternator
Switching current	max. 2 A
Switching power	DC: max. 50 W AC: max. 500 VA
Switching frequency	25 Hz
Timer function	programmable adjustment range 0.1 ...10 s
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	terminal compartment

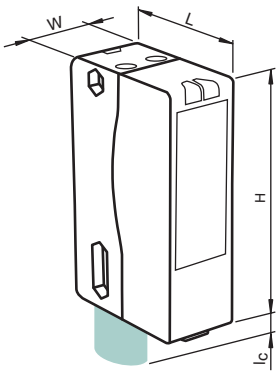
Approvals and Certificates	
Protection class	II
UL approval	cULus Listed
CCC approval	Certified by China Compulsory Certification (CCC)

Dimensions	
Length L [mm]	65.5
Width W [mm]	25.8
Height H [mm]	88
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover

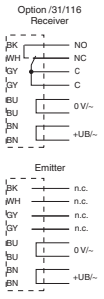


Electrical Connection

❍ = light on, ● = dark on



LA28/LK28-LAS-F1-Z/31/116



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LD28/LV28-LAS-F1-B3B/73c
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	400 m
Effective detection range	0 ... 300 m
Light type	modulated visible red light
Laser class	2
Operating voltage	26.5 ... 31.6 V via AS-Interface network , min. 18.5 V
No-load supply current	Emitter: ≤ 55 mA Receiver: ≤ 45 mA
Switching type	light/dark on switchable via AS-i bus system
Signal output	AS-Interface
Switching frequency	1000 Hz
Timer function	Impulsed off-delay IAB, 50 ms, switchable via AS-Interface
Output of the pre-fault indication	data bit D1
Test input	Data bit D2: 0: emitter on, 1: emitter off
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67
Connection	Plastic connector M12 x 1, 4-pin



Approvals and Certificates	
Protection class	II
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

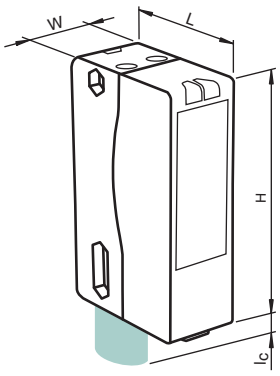
Dimensions	
Length L [mm]	54.3
Width W [mm]	25.8
Height H [mm]	88
Connector area l_c [mm]	14

Properties

- **Emitter / receiver set**
- **Rectangular full-size housing**
- **Plastic housing**
- **AS interface**
- **Connector version**
- **Laser red light**

Your Benefit

- **Integral alignment aid LED simplifies setup**



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

VBP-HH1	Handheld programming device
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover
V1-GM-2M-PUR	M12, 4-pin socket, PUR cable
V1-WM-2M-PUR	M12, 4-pin socket, PUR cable
V1-GM-5M-PUR	M12, 4-pin socket, PUR cable
V1-WM-5M-PUR	M12, 4-pin socket, PUR cable

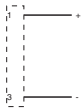
Electrical Connection

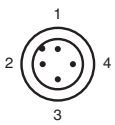
❍ = light on, ● = dark on

LD28/LV28-LAS-F1-B3B/73c



Option AS-Interface





Wire colors in accordance with EN 60947-5-2

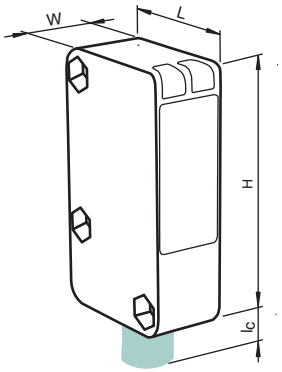
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Cable and connector versions
- Visible red light



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Test input	✔
Threshold detection range	43 m
Effective detection range	0 ... 30 m
Light type	modulated visible red light , 630 nm
Operating voltage	10 ... 30 V DC
No-load supply current	Emitter: ≤ 18 mA Receiver: ≤ 18 mA
Switching type	dark on
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	≤ 250 Hz
Test input	emitter deactivation at $+U_B$
Ambient temperature	-30 ... 55 °C (-22 ... 131 °F)
Material	
Housing	Polycarbonate
Optical face	PMMA
Protection degree	IP67

Model Number		LD31/LV31/76a/115/136	LD31/LV31/73c/76a/136
	green = preferred type		
Connection	connector M12 x 1, 4-pin		●
	Emitter: 2 m fixed cable , 3-wire Receiver: 2 m fixed cable , 4-wire	●	

Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions		
Length L [mm]	35	
Width W [mm]	18	
Height H [mm]	62	
Connector area l_c [mm]	0	10

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

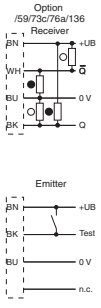
OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket
V1-GM-2M-PUR	M12, 4-pin socket, PUR cable
V1-WM-2M-PUR	M12, 4-pin socket, PUR cable
V1-GM-5M-PUR	M12, 4-pin socket, PUR cable
V1-WM-5M-PUR	M12, 4-pin socket, PUR cable

Electrical Connection

❍ = light on, ● = dark on

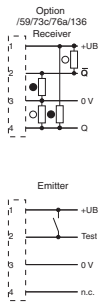
LD31/LV31/76a/115/136

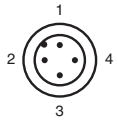




LD31/LV31/73c/76a/136







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- AC/DC sensor
- Relay output
- Cable version
- Visible red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LA31/LK31/31/115
Threshold detection range	43 m
Effective detection range	0 ... 30 m
Light type	modulated visible red light , 630 nm
Operating voltage	24 ... 240 V AC 12 ... 240 V DC
No-load supply current	Emitter: ≤ 20 mA Receiver: ≤ 20 mA
Power consumption	Emitter: ≤ 1 VA Receiver: ≤ 1 VA
Switching type	dark on
Signal output	Relay, 1 alternator
Switching current	max. 3 A
Switching power	DC: max. 150 W AC: max. 750 VA
Switching frequency	≤ 20 Hz
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Material	
Housing	Polycarbonate
Optical face	PMMA
Protection degree	IP67
Connection	Emitter: 2 m fixed cable , 2-wire Receiver: 2 m fixed cable , 5-wire



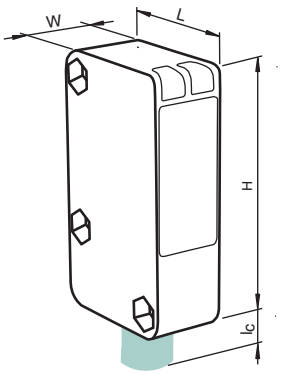
Approvals and Certificates	
Protection class	II
CCC approval	Certified by China Compulsory Certification (CCC)

Dimensions	
Length L [mm]	35
Width W [mm]	18
Height H [mm]	62
Connector area l_c [mm]	0

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-RL31-01	Mounting bracket
OMH-RL31-02	Mounting bracket
OMH-RL31-03	Mounting bracket
OMH-RL31-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-RL31-05	Mounting bracket
OMH-RL31-06	Mounting bracket

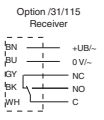


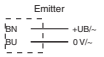
Electrical Connection

❍ = light on, ● = dark on

LA31/LK31/31/115







Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	M11/MV11-Ex/40b/112
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	10 m
Effective detection range	0 ... 10 m
Light source	LED
Light type	modulated visible red light , 660 nm
Operating voltage	6 ... 15.5 V DC (R_i approx. 0 Ohm)
Power consumption	max. 64 mW
Switching type	light/dark on, programmable
Signal output	1 NAMUR output NC/NO programmable
Switching frequency	≥ 100 Hz
Current consumption	Emitter: ≥ 2.2 mA , Receiver:
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	scratch resistant plastic lens
Protection degree	IP67
Connection	V1 connector (M12 x 1), 4-pin, rotatable through 90°

Use in the Hazardous Area	
Marking	Zone 1: Ex II 2G Ex op is ia IIC T6

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
EC-Type Examination Certificate	PTB 99 ATEX 2036 X

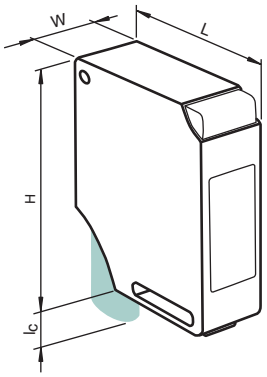
Dimensions	
Length L [mm]	45
Width W [mm]	18
Height H [mm]	50
Connector area l_c [mm]	18 / 0

Properties

- **Emitter / receiver set**
- **Rectangular compact housing**
- **Plastic housing**
- **NAMUR output**
- **Connector version**
- **Visible red light**

Your Benefit

- **ATEX-approval for zone 1**
- **Intrinsically safe Ex op is ia IIC T6**

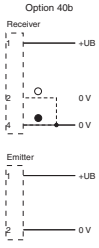


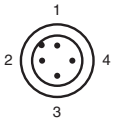
Electrical Connection

❍ = light on, ● = dark on



M11/MV11-Ex/40b/112





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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0102

Properties

- Emitter / receiver set
- Rectangular compact housing
- Plastic housing
- Discrete output
- Connector version
- Visible red light

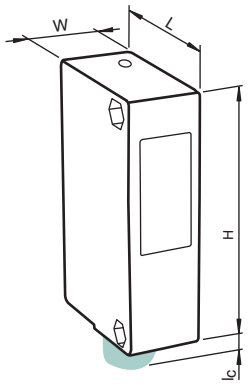
Your Benefit

- ATEX-approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	L32/LV32-EX2/35/47/73c
Threshold detection range	45 m
Effective detection range	0 ... 30 m
Light source	LED
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	50 mA
Switching type	light/dark on
Signal output	2 PNP, complementary, short-circuit protected, reverse polarity protected
Switching current	max. 50 mA
Switching frequency	150 Hz
Test input	Emitter deactivation
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Material	
Housing	Terluran GV15
Optical face	glass
Protection degree	IP65
Connection	Plastic connector M12 x 1, 4-pin
	
Use in the Hazardous Area	
Marking	Zone 2: II 3G Ex nA op is IIC T4; Zone 22: II 3D Ex tD A22 IP65 T 75°C
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	85
Width W [mm]	34
Height H [mm]	80
Connector area l_c [mm]	0 (PG9)

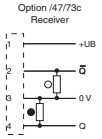


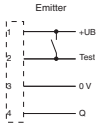
Electrical Connection

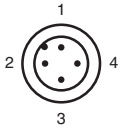
❍ = light on, ● = dark on

L32/LV32-EX2/35/47/73c









Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2015-04-08



Properties

- Emitter / receiver set
- Rectangular full-size housing
- Plastic housing
- NAMUR output
- Terminals version
- Visible red light

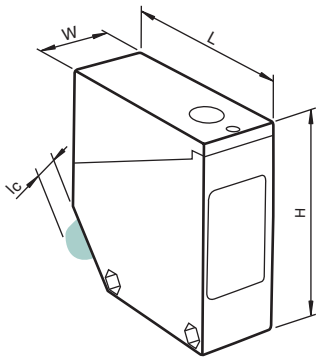
Your Benefit

- ATEX-approval for zone 1
- Intrinsically safe Ex op is ia IIC T4

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	L36/LV36-Ex/40b/116
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	30 m
Effective detection range	0 ... 30 m
Light source	LED , 660 nm
Light type	modulated visible red light
Operating voltage	6 ... 16 V DC (R_i approx. 0 Ohm)
Switching type	light/dark on, programmable
Signal output	1 NAMUR output NC/NO programmable
Switching frequency	≥ 100 Hz
Current consumption	Emitter: ≥ 2.2 mA , Receiver:
Reference target detected	connection 1, 2: ≥ 2.2 mA connection 1, 4: ≤ 1 mA
Reference target not detected	connection 1, 2: ≤ 1 mA connection 1, 4: ≥ 2.2 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PMMA
Optical face	PMMA
Protection degree	IP54
Connection	terminal compartment PG9, ≤ 2.5 mm²
	
Use in the Hazardous Area	
Marking	II 2G Ex op is ia IIC T4
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	45.5
Width W [mm]	22
Height H [mm]	72
Connector area l_c [mm]	13.5

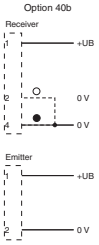


Electrical Connection

❍ = light on, ● = dark on



L36/LV36-Ex/40b/116



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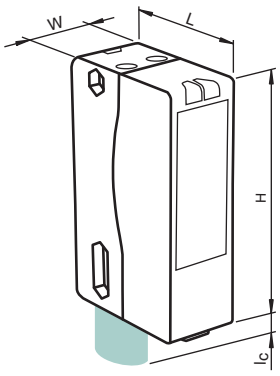


Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No cross-talk
- Secure measurement in difficult conditions, e.g. mist or dust
- High resistance to ambient light
- Measures distances consistently, regardless of surface color



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Measurement range	0.2 ... 8 m
Reference target	Kodak white (90%)
Light source	laser diode
Light type	modulated visible red light
Laser class	2
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 10 mm at a distance of 8 m at 20 °C
Operating voltage	10 ... 30 V DC / IO-Link mode: 18 ... 30 V DC
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Switching current	max. 100 mA
Switching frequency	50 Hz
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65

Model Number	green = preferred type	VDM28-8-L-IO/110/115b/122	VDM28-8-L-IO/115b/136	VDM28-8-L-IO/73c/110/122	VDM28-8-L-IO/73c/136
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●		●	
	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection		●		●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected	●		●	
Connection	300 mm fixed cable with M12 x 1, 4-pin connector	●	●		
	connector M12 x 1, 4-pin			●	●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●
Dimensions					
Length L [mm]		54,3			
Width W [mm]		25,8			
Height H [mm]		88			
Connector area l_c [mm]		5		14	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-21	Mounting bracket
OMH-K01	dove tail mounting clamp
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

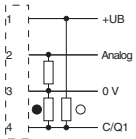
Electrical Connection

❍ = light on, ● = dark on



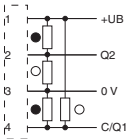
VDM28-8-L-IO/110/115b/122
VDM28-8-L1-IO/73c/110/122
VDM28-8-L-IO/73c/110/122

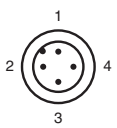
Option /110/122



VDM28-8-L-IO/115b/136
VDM28-8-L-IO/73c/136

Option /136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2015-04-08

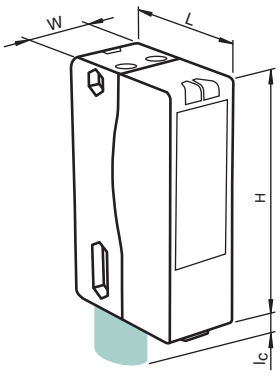


Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No cross-talk
- Secure measurement in difficult conditions, e.g. mist or dust
- High resistance to ambient light
- Measures distances consistently, regardless of surface color



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VDM28-15-L-IO/73c/110/122
Teach-In	✔
Measurement range	0.2 ... 15 m
Reference target	Kodak white (90%)
Light source	laser diode
Light type	modulated visible red light
Laser class	2
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 15 mm at a distance of 15 m at 20 °C
Operating voltage	10 ... 30 V DC / IO-Link mode: 18 ... 30 V DC
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	50 Hz
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65
Connection	connector M12 x 1, 4-pin



Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	54.3
Width W [mm]	25.8
Height H [mm]	88
Connector area l_c [mm]	14

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

PACTware 4.X	FDT frame application
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover
OMH-K01	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

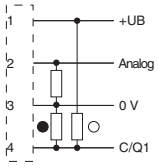
Electrical Connection

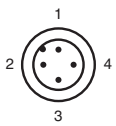
❍ = light on, ● = dark on



VDM28-15-L-IO/73c/110/122

Option /110/122





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



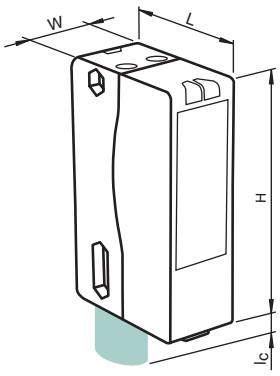
IO-Link

Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Long range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No cross-talk
- Secure measurement in difficult conditions, e.g. mist or dust
- High resistance to ambient light
- Measures distances consistently, regardless of surface color



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Teach-In	✔
Measurement range	0.2 ... 50 m
Reference target	OFR-100/100
Light source	laser diode
Light type	modulated visible red light
Laser class	2
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 50 mm at a distance of 50 m at 20 °C
Operating voltage	10 ... 30 V DC / IO-Link mode: 18 ... 30 V DC
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Switching current	max. 100 mA
Switching frequency	50 Hz
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65
Connection	connector M12 x 1, 4-pin



Model Number	green = preferred type	VDM28-50-R-IO/73c/110/122	VDM28-50-R-IO/73c/136
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected	●	
	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection		●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected	●	
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●

Dimensions	
Length L [mm]	54,3
Width W [mm]	25,8
Height H [mm]	88
Connector area l_c [mm]	14

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

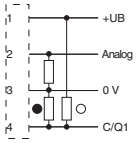
OMH-RLK29	Mounting bracket
OFR-100/100	Reflective tape 100 mm x 100 mm
REF-MH82	Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

Electrical Connection

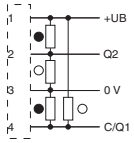
❍ = light on, ● = dark on

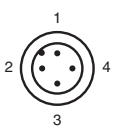


VDM28-50-R1-IO/73c/110/122
VDM28-50-R-IO/73c/110/122
Option /110/122



VDM28-50-R-IO/73c/136
Option /136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 2015-04-08

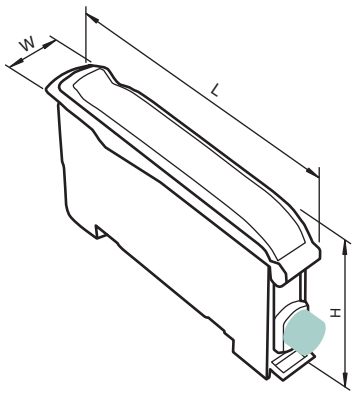


Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Cable version
- Visible red light

Your Benefit

- AGC (Automatic Gain Control) for simple and time-saving teaching
- High resolution four-digit percentage display for clear, unambiguous indication of signal statuses



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 150 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 450 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 660 nm
Gang mounting	maximum 20 units / 100 mA load current per unity
Diagnostics display	7-segment display
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on selectable programmable
Switching current	max. 100 mA , resistive load
Switching frequency	High speed mode: 16 kHz , Standard mode: 3 kHz , High resolution: 250 Hz , Automatic: 250 Hz ~ 3 kHz (selection by the sensor), Glass mode: 250 Hz
Timer function	ON-delay, OFF-delay, one shot, pulse extension ; adjustable 0 ... 999 ms in 1 ms increments
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50
Connection	2 m PVC cable, 4 x 0,14 mm²



Model Number	green = preferred type	SU19/102/115/123	SU19/102/115/126a	SU19/103/115/123	SU19/110/115/123	SU19/110/115/126a
Signal output	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected				●	●
	1 NPN, short-circuit protected open collector	●	●			
	1 PNP, short-circuit protected, open collector			●		
Output of the pre-fault indication	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected					●
	1 NPN, short-circuit protected open collector		●			
Function input	external Teach-In	●		●	●	
Approvals and Certificates						
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

Dimensions	
Length L [mm]	62,3
Width W [mm]	9
Height H [mm]	34,5
Connector area I_c [mm]	2

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Bracket SU	Mounting bracket for DIN rail

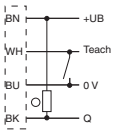
Electrical Connection

❍ = light on, ● = dark on



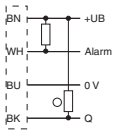
SU19/102/115/123

Option 102/115/123



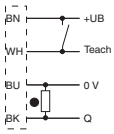
SU19/102/115/126a

Option 102/115/126a



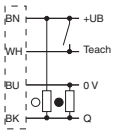
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Option /103/115/123



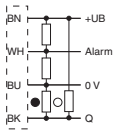
SU19/110/115/123

Option 110/115/123



SU19/110/115/126a

Option 110/115/126a



Date of issue: 2015-04-08

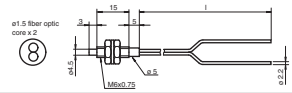
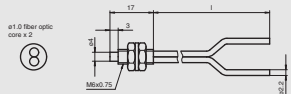
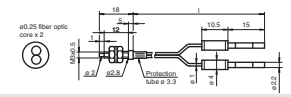
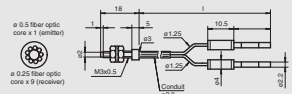
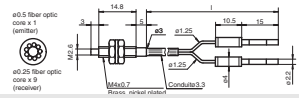
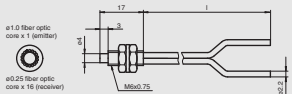
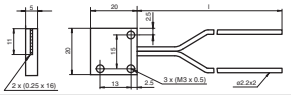
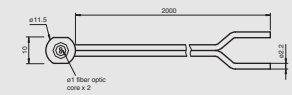
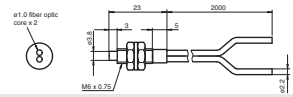
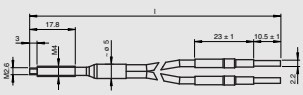
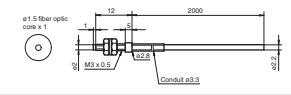
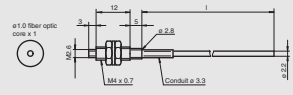
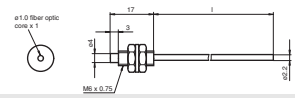
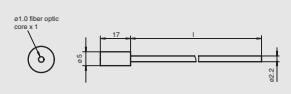
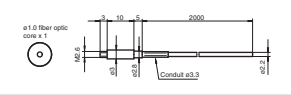
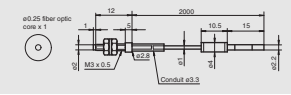
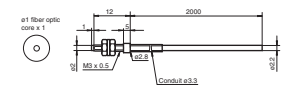
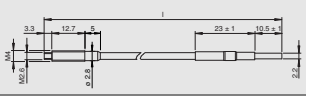
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PEPPERL+FUCHS
SENSING YOUR NEEDS

Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

Date of issue 2015-04-08

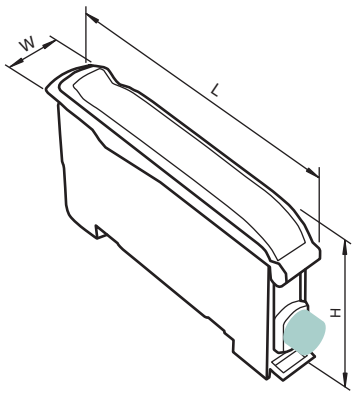


Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Cable version
- Visible red light

Your Benefit

- AGC (Automatic Gain Control) for simple and time-saving teaching
- High resolution four-digit percentage display for clear, unambiguous indication of signal statuses



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 150 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 450 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 660 nm
Gang mounting	maximum 20 units / 100 mA load current per unity
Diagnostics display	7-segment display
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on selectable programmable
Switching current	max. 100 mA , resistive load
Switching frequency	High speed mode: 16 kHz , Standard mode: 3 kHz , High resolution: 250 Hz ~ 3 kHz (selection by the sensor), Automatic: 250 Hz , Glass mode: 250 Hz
Timer function	ON-delay, OFF-delay, one shot, pulse extension ; adjustable 0 ... 999 ms in 1 ms increments
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50
Connection	2 m fixed cable , 1 x 0.25 mm^2 , PVC



Model Number		SU19.1/102/115	SU19.1/103/115	SU19.1/110/115
	green = preferred type			
Signal output	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected			●
	1 NPN, short-circuit protected open collector	●		
	1 PNP, short-circuit protected, open collector		●	
Approvals and Certificates				
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	62,3
Width W [mm]	9
Height H [mm]	34,5
Connector area l_c [mm]	2

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Bracket SU	Mounting bracket for DIN rail

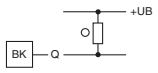
Electrical Connection

❍ = light on, ● = dark on



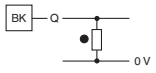
SU19.1/102/115

Option /102/115



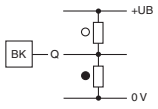
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Option /103/115



SU19.1/110/115

Option /110/115

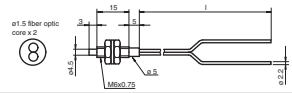
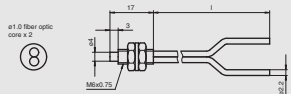
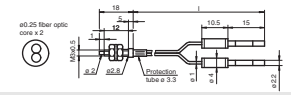
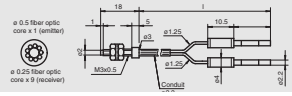
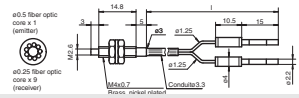
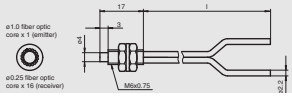
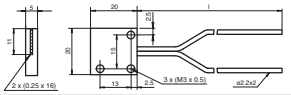
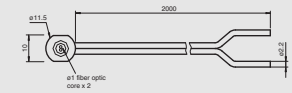
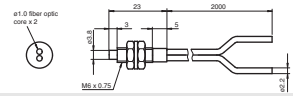
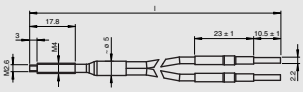
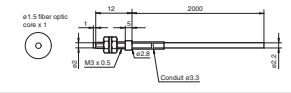
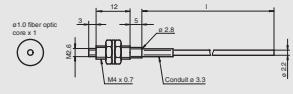
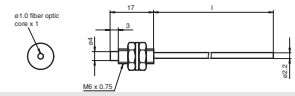
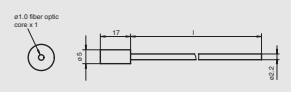
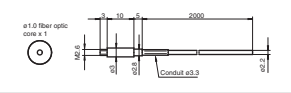
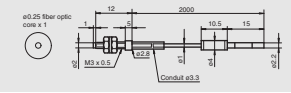
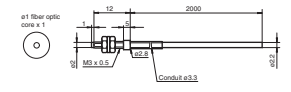
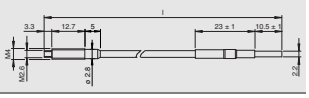


Date of issue: 2015-04-08

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS

Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 460 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 1500 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	Standard mode: 3 kHz , High power mode: 1 kHz , Ultra mode: 100 Hz
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50
Connection	2 m PVC cable, 4 x 0,14 mm²



Model Number		SU18/35/40a/102/115/126a	SU18/35/40a/102/115/123	SU18/35/40a/110/115/123	SU18/35/40a/110/115/126a	SU18/16/35/40a/110/115/126a
Signal output	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected			●	●	●
	1 NPN, short-circuit protected open collector	●	●			
Output of the pre-fault indication	1 push-pull output NPN/PNP , short-circuit protected				●	●
	1 NPN, short-circuit protected open collector	●				
Function input	external Teach-In		●	●		
Approvals and Certificates						
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.					

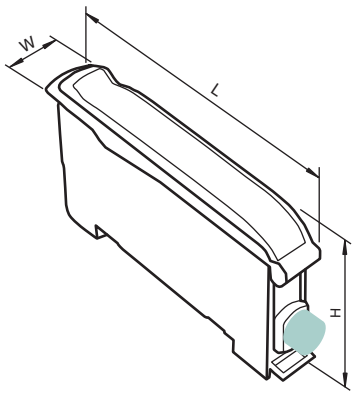
Dimensions	
Length L [mm]	62,3
Width W [mm]	9
Height H [mm]	34,5
Connector area I_c [mm]	2

Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Cable version
- Visible red light

Your Benefit

- High Power version for highest signal strength and detection ranges
- AGC (Automatic Gain Control) for simple and time-saving teaching



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

Bracket SU	Mounting bracket for DIN rail

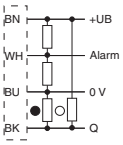
Electrical Connection

❍ = light on, ● = dark on



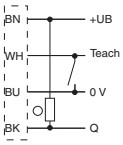
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SU18/35/40a/110/115/126a

Option 110/115/126a



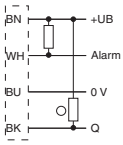
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Option 102/115/123



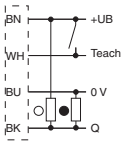
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Option 102/115/126a



SU18/35/40a/110/115/123

Option 110/115/123

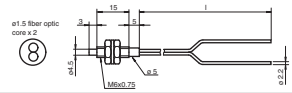
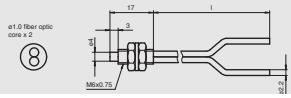
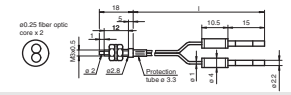
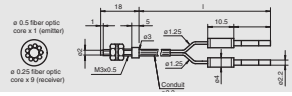
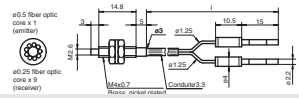
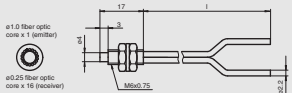
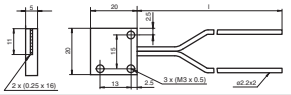
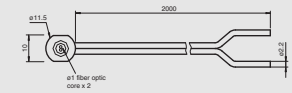
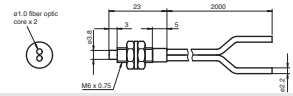
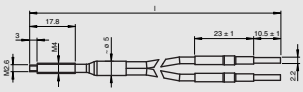
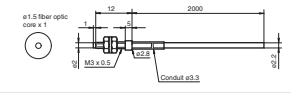
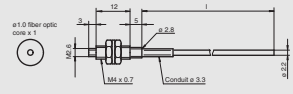
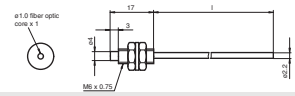
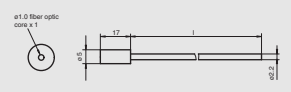
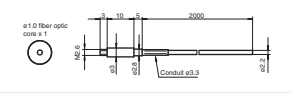
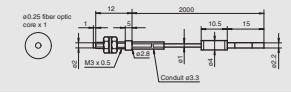
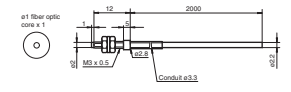
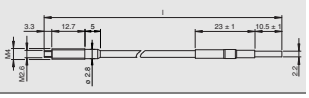


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Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

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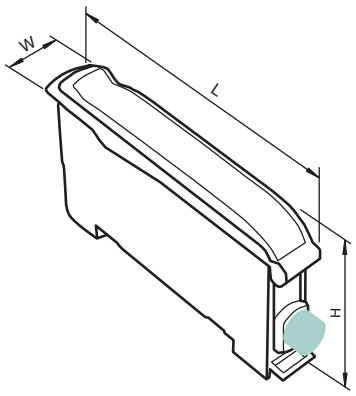


Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Pigtailed connector version
- Visible red light

Your Benefit

- High Power version for highest signal strength and detection ranges
- AGC (Automatic Gain Control) for simple and time-saving teaching



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 460 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 1500 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 640 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on, switchable
Signal output	1 push-pull output NPN/PNP , short-circuit protected
Switching current	max. 100 mA , resistive load
Switching frequency	Standard mode: 3 kHz , High power mode: 1 kHz , Ultra mode: 100 Hz
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50

Model Number	green = preferred type	SU18/16/35/40a/110/115a	SU18/35/40a/110/115a/126a	SU18/16/35/40a/110/115a/126a
Output of the pre-fault indication	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected		●	●
Connection	200 mm, PVC cable with M8 connector, 3-pin	●		
	200 mm, PVC cable with M8 connector, 4-pin		●	●
				
Approvals and Certificates				
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	62.3
Width W [mm]	9
Height H [mm]	34.5
Connector area I_c [mm]	2

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Bracket SU	Mounting bracket for DIN rail

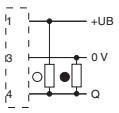
Electrical Connection

❍ = light on, ● = dark on



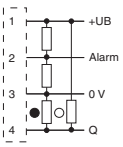
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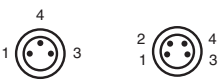
Option 40a/110/115a



SU18/16/35/40a/110/115a/126a
SU18/35/40a/110/115a/126a

Option 110/115a/126a





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

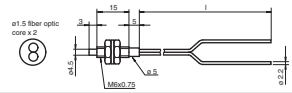
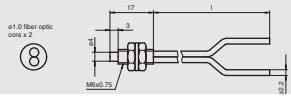
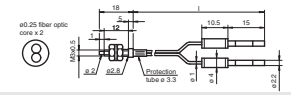
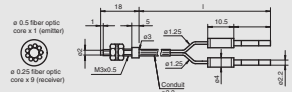
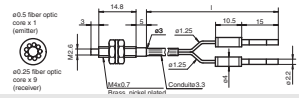
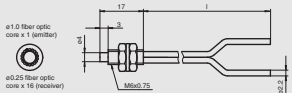
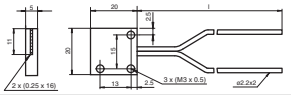
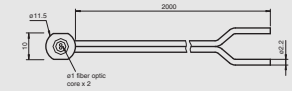
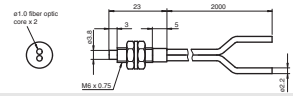
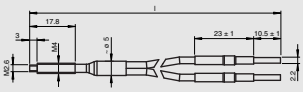
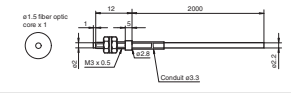
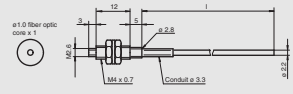
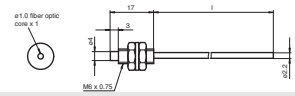
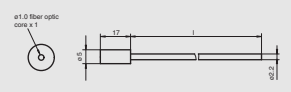
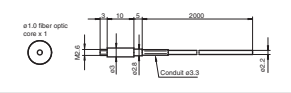
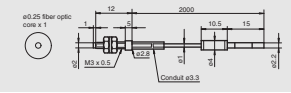
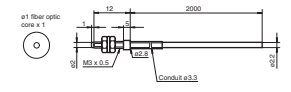
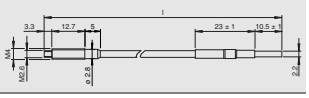
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Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 150 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 450 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	Standard mode: 3 kHz , High speed mode: 6 kHz , High resolution: 500 Hz
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50
Connection	2 m PVC cable, 4 x 0,14 mm²



Model Number		SU18-40a/102/115/123	SU18-40a/102/115/126a	SU18-16/40a/102/115/126a	SU18-40a/110/115/123	SU18-16/40a/110/115/126a	SU18-40a/110/115/126a
	green = preferred type						
Signal output	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected				●	●	●
	1 NPN, short-circuit protected open collector	●	●	●			
Output of the pre-fault indication	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected					●	●
	1 NPN, short-circuit protected open collector		●	●			
Function input	external Teach-In	●			●		
Approvals and Certificates							
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

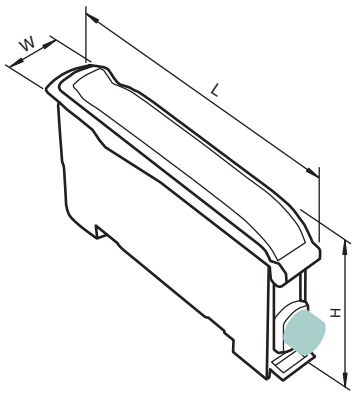
Dimensions	
Length L [mm]	62,3
Width W [mm]	9
Height H [mm]	34,5
Connector area l_c [mm]	2

Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Cable version
- Visible red light

Your Benefit

- High Speed Mode for high switching accuracy
- AGC (Automatic Gain Control) for simple and time-saving teaching



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

Bracket SU	Mounting bracket for DIN rail

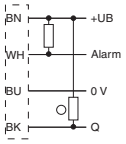
Electrical Connection

❍ = light on, ● = dark on



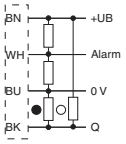
SU18-16/40a/102/115/126a
SU18-40a/102/115/126a

Option 102/115/126a



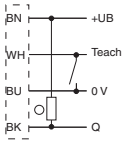
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SU18-40a/110/115/126a

Option 110/115/126a



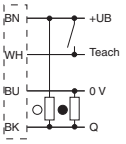
SU18-40a/102/115/123

Option 102/115/123



SU18-40a/110/115/123

Option 110/115/123



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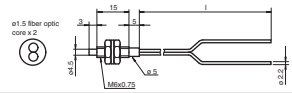
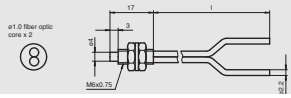
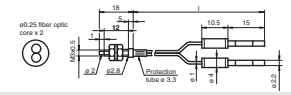
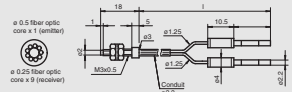
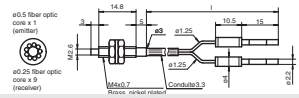
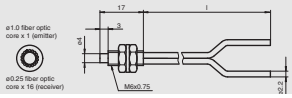
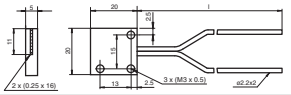
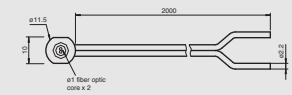
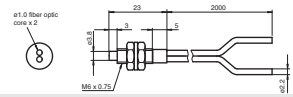
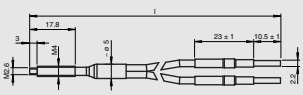
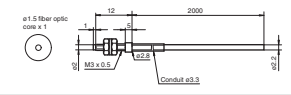
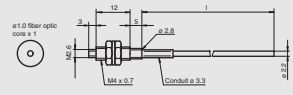
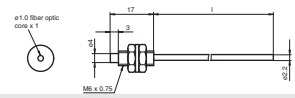
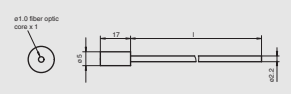
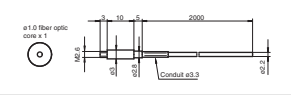
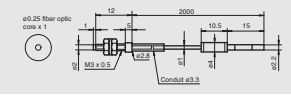
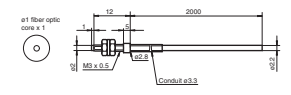
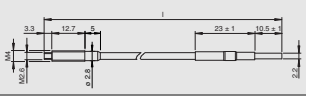
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PEPPERL+FUCHS SENSING YOUR NEEDS

Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

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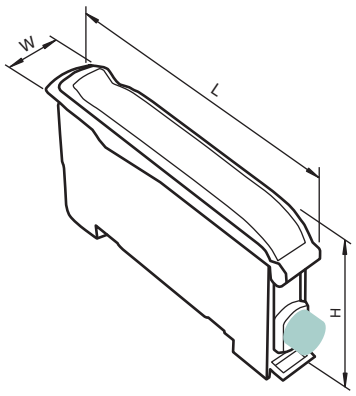


Properties

- Suitable for use with glass fiber optics and plastic fiber optics
- DIN rail housing
- Plastic housing
- Pigtailed connector version
- Visible red light

Your Benefit

- High Speed Mode for high switching accuracy
- AGC (Automatic Gain Control) for simple and time-saving teaching



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics and plastic fiber optics
Sensor range	up to 150 mm (KLR-C02-2,2-2,0-K146)
Detection range	up to 450 mm (KLE-C01-2,2-2,0-K116)
Light type	modulated visible red light , 660 nm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Switching type	light/dark on, switchable
Switching current	max. 100 mA , resistive load
Switching frequency	Standard mode: 3 kHz , High speed mode: 6 kHz , High resolution: 500 Hz
Ambient temperature	-10 ... 55 °C (14 ... 131 °F)
Housing	PC
Protection degree	IP50

Model Number	green = preferred type	SU18-40a/102/115a/123	SU18-40a/102/115a/126a	SU18-16/40a/110/115a	SU18-40a/110/115a	SU18-40a/110/115a/123	SU18-40a/110/115a/126a
Signal output	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected			●	●	●	●
	1 NPN, short-circuit protected open collector	●	●				
Output of the pre-fault indication	1 push-pull (4 in 1) output NPN/PNP , short-circuit protected				●	●	●
	1 NPN, short-circuit protected open collector	●	●				
Function input	external Teach-In	●				●	
Connection	200 mm, PVC cable with M8 connector, 3-pin			●	●		
	200 mm, PVC cable with M8 connector, 4-pin	●	●			●	●



Approvals and Certificates							
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

Dimensions	
Length L [mm]	62,3
Width W [mm]	9
Height H [mm]	34,5
Connector area I_c [mm]	2

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

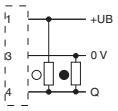
Bracket SU	Mounting bracket for DIN rail

Electrical Connection

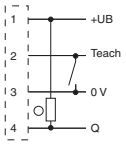
❍ = light on, ● = dark on



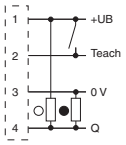
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SU18-40a/110/115a



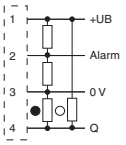
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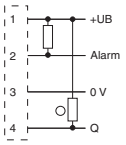
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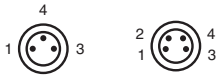


SU18-40a/110/115a/126a



SU18-40a/102/115a/126a





Wire colors in accordance with EN 60947-5-2

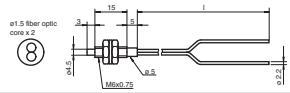
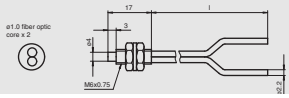
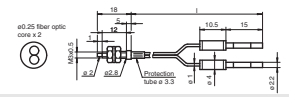
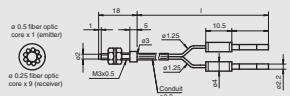
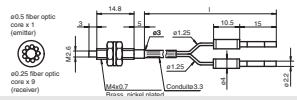
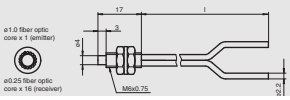
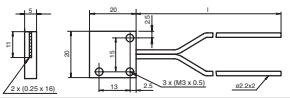
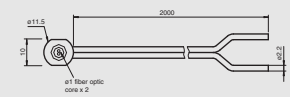
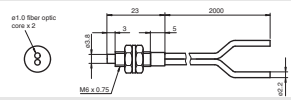
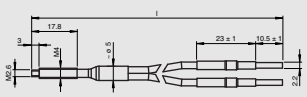
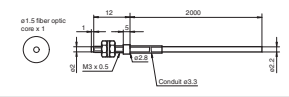
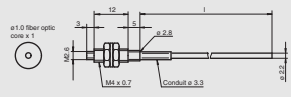
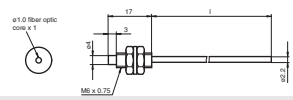
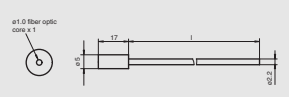
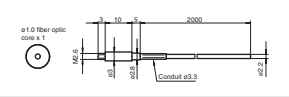
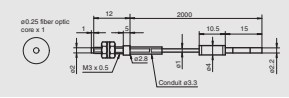
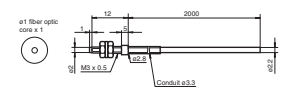
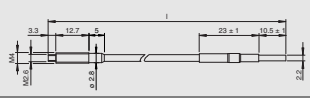
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	plastic	150 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	plastic	4 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4	**KLR-C09-1,25-2,0-K74**	plastic	30 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	plastic	85 mm	emitter: 1 x 1.0 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	plastic	35 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth / threaded	M6	**KHR-C02-2,2-2,0-K131**	plastic	60 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	plastic	80 mm	2 x 1.0	min. 25 mm	
	Threaded	M2.6 / M4	**LHR 00-0,8-1,0-20M4**	glass	40 mm		5 mm static	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	plastic	450 mm	1 x 1.5	min. 40 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	plastic	220 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K113**	plastic	200 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	plastic	20 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	plastic	200 mm	1 x 1.0	min. 2 mm	
	Threaded	M2.6 / M4	**LHE 00-1,1-1,0-20M4**	glass	195 mm		5 mm static	

Date of issue 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber Optic Diffuse and Thru-Beam Mode Sensor
Fiber optic	plastic
Sensitivity adjustment	✔
Effective detection range	depends on the fiber optic cable being used
Light type	modulated visible red light , 670 nm
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 25 mA
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, short-circuit protected, reverse polarity protection, overvoltage protected
Switching current	max 100 mA per output
Switching frequency	500 Hz
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)
Housing	ABS
Optical face	Acrylic
Protection degree	IP67

Model Number		ML17-LL-K/115/136	ML17-LL-K/115b/136	ML17-LL-K/136/143	ML17-LL-K/73/136
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●		
	2 m fixed cable	●			
	4-pin, M12 plastic connector				●
	4-pin, M8 plastic connector			●	
					

Approvals and Certificates					
UL approval	cULus	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

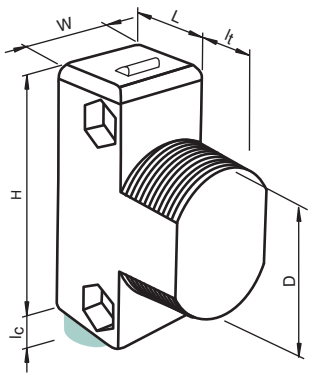
Dimensions		
Length L [mm]	19	
Width W [mm]	15	
Height H [mm]	35	
Diameter D [mm]	18	
Connector area l_c [mm]	10	18

Properties

- Suitable for use with plastic fiber optics
- Rectangular miniature housing
- Plastic housing
- Cable, pigtailed connector and connector versions
- Visible red light

Your Benefit

- Threaded face and side thru-holes provide flexible mounting options



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-ML17-EZ	Mounting bracket
OMH-ML17	Mounting bracket
OMH-ML17-1	Mounting bracket
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

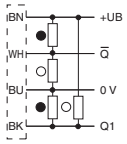
Electrical Connection

❍ = light on, ● = dark on

ML17-LL-K/115/136



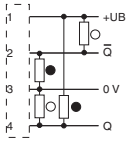
Option 115/136





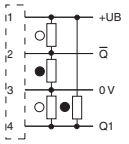
ML17-LL-K/73/136

Option 73/136



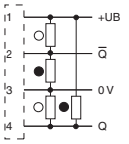
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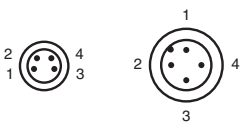
Option 115b/136



ML17-LL-K/136/143

Option 136/143





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

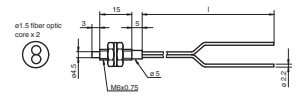
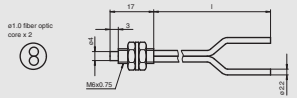
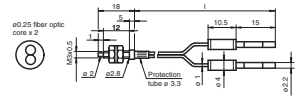
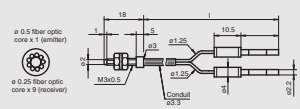
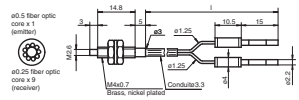
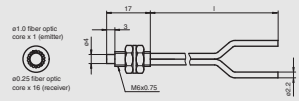
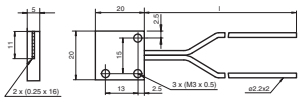
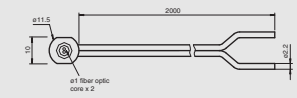
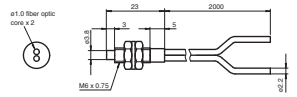
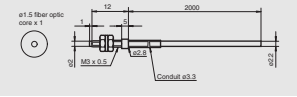
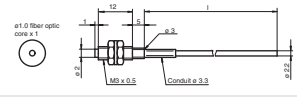
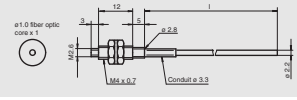
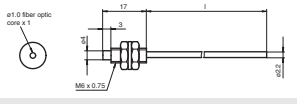
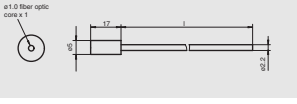
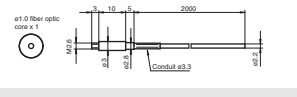
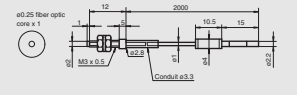
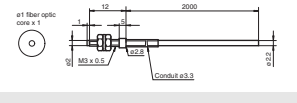
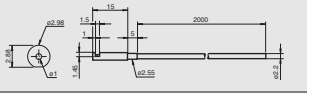
Date of issue: 2015-04-08

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS

Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Dimensions
Diffuse mode fiber optic cables	Threaded	M6	**KLR-C02-2,2-2,0-K146**	PMMA	85 mm	2 x 1.5	min. 40 mm	
	Threaded	M6	**KLR-C02-2,2-2,0-K70**	PMMA	45 mm	2 x 1.0	min. 25 mm	
	Threaded	M3	**KLR-C02-1,0-2,0-K75**	PMMA	2 mm	2 x 0.25	min. 10 mm	
	Threaded	M3	**KLR-C09-1,25-2,0-K76**	PMMA	16 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M4 / M2.6	**KLR-C09-1,25-2,0-K74**	PMMA	16 mm	emitter: 1 x 0.5 receiver: 9 x 0.25	min. 15 mm	
	Threaded	M6	**KLR-C16-2,2-2,0-K71**	PMMA	48 mm	emitter: 1 x 1 receiver: 16 x 0.25	min. 25 mm	
	Array		**KLR-A32-2,2-2,0-K83**	PMMA	19 mm	2 x (0.25 x 16)	min. 25 mm	
	Right angle smooth	M6	**KHR-C02-2,2-2,0-K131**	PMMA	34 mm	2 x 1.0	min. 2 mm	
	Threaded	M6	**KHTR-C02-2,2-2,0-K88**	PMMA	46 mm	2 x 1.0	min. 25 mm	
Thru-beam fiber optic cables	Threaded	M3	**KLE-C01-2,2-2,0-K116**	PMMA	241 mm		min. 40 mm	
	Threaded	M3	**KLE-C01-2,2-2,0-K103**	PMMA	140 mm		min. 25 mm	
	Threaded	M2.6 / M4	**KLE-C01-2,2-2,0-K102**	PMMA	140 mm	1 x 1.0	min. 25 mm	
	Threaded	M6	**KLE-C01-2,2-2,0-K100**	PMMA	140 mm	1 x 1.0	min. 25 mm	
	Cylindrical		**KLE-C01-2,2-2,0-K101**	PMMA	140 mm	1 x 1.0	min. 25 mm	
	Cylindrical	M2.6	**KLE-C01-2,2-2,0-K113**	PMMA	128 mm	1 x 1.0	min. 25 mm	
	Threaded	M3	**KLE-C01-1,0-2,0-K120**	PMMA	13 mm	1 x 0.25	min. 10 mm	
	Threaded	M3	**KHE-C01-2,2-2,0-K122**	PMMA	128 mm	1 x 1.0	min. 2 mm	
	Periskope		**KHTE-C01-2,2-2,0-K118**	PMMA	76 mm		min. 25 mm	

Date of issue 2015-04-08



Technical Data

*detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor principle	Fiber optic sensor for glass fiber optics
Operating voltage	10 ... 30 V DC
No-load supply current	max. 35 mA
Switching type	light/dark on switchable
Interface	IO-Link
Protocol	IO-Link V1.0
Mode	COM 2 (38.4 kbaud)
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	1000 Hz
Ambient temperature	-40 ... 60 °C (-40 ... 140 °F)
Material	
Housing	aluminum , Delta-Seal coated
Optical face	Fiber optic connection
Protection degree	IP67

Model Number	green = preferred type	MLV41-LL-RT-IO/115/136	MLV41-LL-IR-IO/115/136	MLV41-LL-RT-IO/95/136	MLV41-LL-IR-IO/95/136	MLV41-LL-RT-IO/92/136	MLV41-LL-IR-IO/92/136
Sensor range	up to 45 mm (LCR 04-1,6-0,5-Z1)	●		●		●	
	up to 90 mm (LCR 04-1,6-0,5-Z1)		●		●		●
Detection range	up to 120 mm (LCE 04-1,6-1,0-Z1)	●		●		●	
	up to 240 mm (LCE 04-1,6-1,0-Z1)		●		●		●
Light type	modulated infrared light , 880 nm		●		●		●
	modulated visible red light , 660 nm	●		●		●	
Connection	connector M12 x 1, 4-pin					●	●
	M8 x 1 connector, 4-pin			●	●		
	2 m fixed cable , 5-pin	●	●				

Approvals and Certificates							
Protection class	II	●	●			●	●
UL approval	cULus Listed 57M3 (Only in association with UL Class 2 power supply; Type 1 enclosure)	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.						

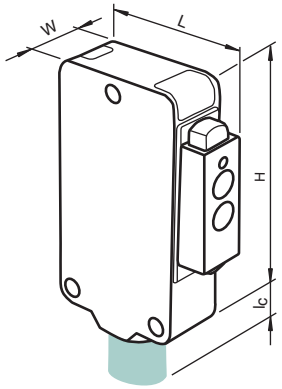
Dimensions			
Length L [mm]	37,6		
Width W [mm]	13,6		
Height H [mm]	56,5		
Connector area l_c [mm]	5	9	12,5

Properties

- Suitable for use with glass fiber optics
- Rectangular miniature housing
- Aluminum with Delta®-Seal coating housing
- Discrete output with IO-Link
- Cable and connector versions
- Visible red and infrared light versions

Your Benefit

- Corrosion resistant due to Delta®-Seal coating
- Time saving quick connection to fiber optic cables
- Easily adapts to the application by the standard communication IO-Link interface



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-41	Mounting bracket
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-WM-2M-PUR	4-pin, M8 socket, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V31-GM-2M-PUR	4-pin, M8 socket, PUR cable

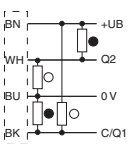
Electrical Connection

❍ = light on, ● = dark on



MLV41-LL-IR/115/136
MLV41-LL-RT/115/136

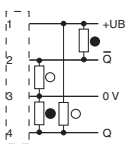
Option IO/115/136





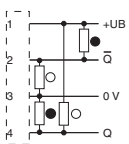
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MLV41-LL-RT/95/136

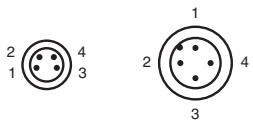
Option 25/95/136



MLV41-LL-RT/92/136
MLV41-LL-IR/92/136

Option 25/92/136





Wire colors in accordance with EN 60947-5-2

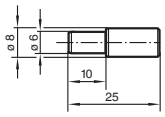
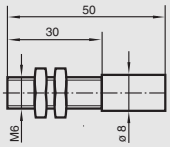
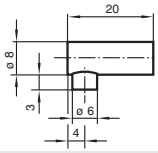
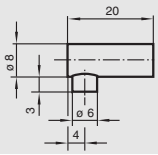
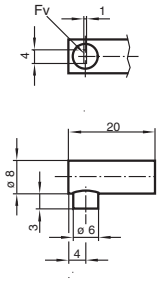
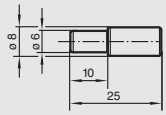
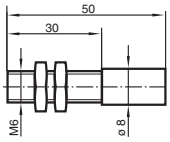
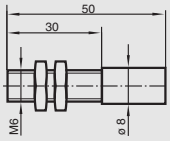
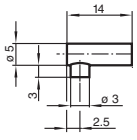
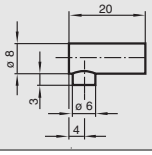
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Head dimensions
Diffuse mode fiber optic cables	Cylindrical		**LCR 04-1,6-0,5-Z1**	Glass	IR: 90 mm RT: 45 mm	1.8 mm	min. 10 mm	
	Threaded	M6	**LLR 04-1,6-0,5-G(M6x30)**	Glass	IR: 90 mm RT: 45 mm	1.6 mm	min. 20 mm	
	Right angle		**LCR 04-1,6-0,5-WC 3**	Glass	IR: 90 mm RT: 45 mm	1.8 mm	min. 15 mm	
	Right angle		**LLR 04-1,6-0,5-W C3**	Glass	IR: 90 mm RT: 45 mm	1.8 mm	min. 20 mm	
	Right angle		**LLR 04-1,6-0,5-QW 1x4**	Glass	IR: 90 mm RT: 45 mm	1 x 3.6 mm	min. 25 mm	
Thru-beam fiber optic cables	Cylindrical		**LCE 04-1,6-1,0-Z1**	Glass	IR: 240 mm RT: 120 mm	1.8 mm	min. 10 mm	
	Threaded	M6	**LCE 04-1,6-1,0 G**	Glass	IR: 240 mm RT: 120 mm	1.8 mm	min. 10 mm	
	Threaded	M6	**LLE 04-1,6-1,0-G**	Glass	IR: 240 mm RT: 120 mm	1.8 mm	min. 20 mm	
	Right angle		**LCE 04-1,6-1,0-W C3**	Glass	IR: 240 mm RT: 120 mm	1.8 mm	min. 10 mm	
	Right angle		**LLE 04-1,6-1,0-W C3**	Glass	IR: 240 mm RT: 120 mm	1.8 mm	min. 20 mm	

Legend:
IR = used on an infrared light sensor
RT = used on a visible red light sensor

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Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VL18LL-M/40a/118/128
Sensor principle	Fiber optic sensor for glass fiber optics
Sensor range	up to 70 mm (LMR 18-3,2-1,0-K4)
Detection range	up to 300 mm (LME 18-2,3-0,5-K3)
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC , class 2
No-load supply current	< 35 mA
Switching type	light/dark on, switchable
Signal output	Push-pull (4 in 1) output short-circuit protected overvoltage protected
Switching current	max. 200 mA
Switching frequency	500 Hz
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Optical face	plastic
Protection degree	IP67
Connection	M12 connector, 4-pin

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	78
Diameter D [mm]	18
Thread length l_t [mm]	41
Connector area l_c [mm]	13

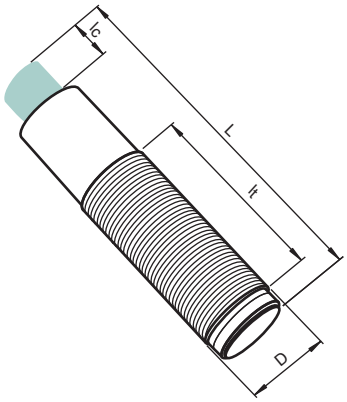
Properties

- **Suitable for use with glass fiber optics**
- **Cylindrical threaded housing**
- **Nickel-plated brass housing**
- **Connector version**
- **Visible red light**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

CPZ18B03	For Series CP18 Threaded Photoelectric Sensors
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



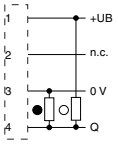
Electrical Connection

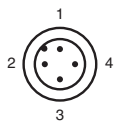
❍ = light on, ● = dark on

VL18LL-M/40a/118/128



Option 40a/118/128





Wire colors in accordance with EN 60947-5-2

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2	WH	(white)
3	BU	(blue)
4	BK	(black)

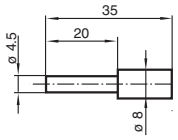
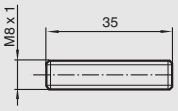
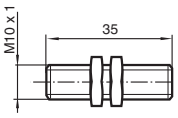
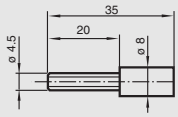
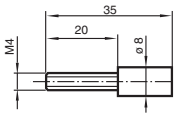
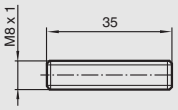
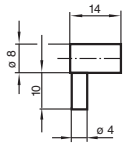
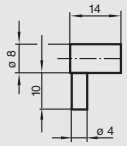
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Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Head dimensions
Diffuse mode fiber optic cables	Cylindrical		**LMR 18-3,2-0,5-K1**	Glass	70 mm	3.2 mm	min. 20 mm	
	Threaded	M8	**LCR 18-3,2-0,5-K5**	Glass	70 mm	3.2 mm	min. 15 mm	
	Threaded	M10	**LMR 18-3,2-0,5-K4**	Glass	70 mm	3.2 mm	min. 20 mm	
Thru-beam fiber optic cables	Cylindrical		**LME 18-2,3-0,5-K1**	Glass	300 mm	2.3 mm	min. 20 mm	
	Threaded	M4	**LME 18-2,3-0,5-K3**	Glass	300 mm	2.3 mm	min. 20 mm	
	Threaded	M8	**LME 18-2,3-0,5-K5**	Glass	300 mm	2.3 mm	min. 20 mm	
	Right angle smooth / threaded		**LSE 18-2,3-0,5-K1**	Glass	300 mm	2.3 mm	min. 20 mm	
	Right angle smooth / threaded		**LME 18-1,9-0,5-K9**	Glass	220 mm	1.9 mm	min. 20 mm	

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CE

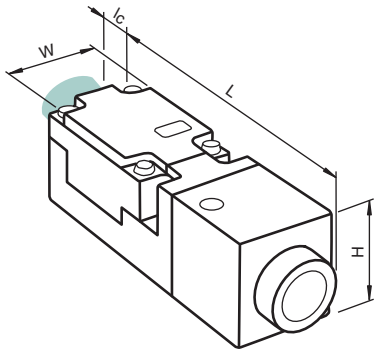
Properties

- Suitable for use with glass fiber optics
- Rectangular compact housing
- Plastic housing
- Terminal version
- Infrared light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	OJ500-M1K-E23
Light/dark switch	✔
Light type	modulated infrared light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 35 mA
Switching type	light/dark on
Signal output	1 PNP output, short-circuit protected, protected from reverse polarity, open collector
Switching current	≤ 200 mA
Switching frequency	≤ 1.5 kHz / 200 Hz switchable
Timer function	pulse extension 20 ms, switchable
Output of the pre-fault indication	1 PNP, active when falling short of the stability control
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Optical face	Scratch resistant mineral glass lens
Protection degree	IP67
Connection	M16 terminal compartment, core cross-section ≤ 2.5 mm² 
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	100
Width W [mm]	30
Height H [mm]	30
Connector area l_c [mm]	0 (M16 X 1.5)



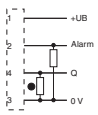
Electrical Connection

❍ = light on, ● = dark on



OJ500-M1K-E23

Option E23

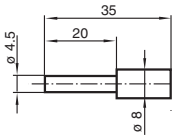
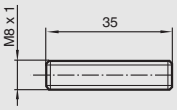
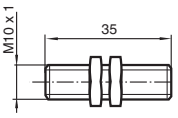
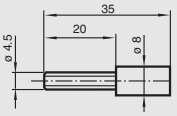
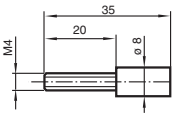
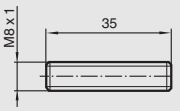
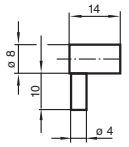
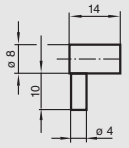


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Preferred fiber optic cables

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

	Head shape	Mounting	Model number	Core	Detection distance	Fiber cross-section	Bend radius	Head dimensions
Diffuse mode fiber optic cables	Cylindrical		**LMR 18-3,2-0,5-K1**	Glass	100 mm	3.2 mm	min. 20 mm	
	Threaded	M8	**LCR 18-3,2-0,5-K5**	Glass	100 mm	3.2 mm	min. 15 mm	
	Threaded	M10	**LMR 18-3,2-0,5-K4**	Glass	100 mm	3.2 mm	min. 20 mm	
Thru-beam fiber optic cables	Cylindrical		**LME 18-2,3-0,5-K1**	Glass	600 mm	2.3 mm	min. 20 mm	
	Threaded	M4	**LME 18-2,3-0,5-K3**	Glass	600 mm	2.3 mm	min. 20 mm	
	Threaded	M8	**LME 18-2,3-0,5-K5**	Glass	600 mm	2.3 mm	min. 20 mm	
	Right angle smooth / threaded		**LSE 18-2,3-0,5-K9**	Glass	600 mm	2.3 mm	min. 20 mm	
	Right angle smooth / threaded		**LME 18-1,9-0,5-K9**	Glass	440 mm	1.9 mm	min. 20 mm	

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Properties

- Suitable for very small print marks
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible red light

Technical Data

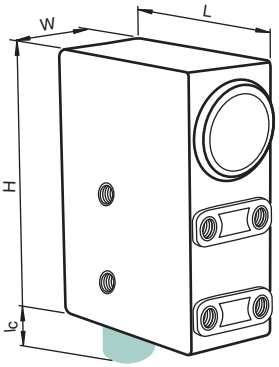
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Light source	laser diode
Light type	modulated visible red light
Laser class	2
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 55 mA
Switching type	light/dark on switchable
Switching current	max. 200 mA
Response time	30 µs
Test input	emitter deactivation with +Ub
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number		DK10-LAS/35/49	DK10-LAS/35/79b	DK10-LAS/49	DK10-LAS/76a/110/124	DK10-LAS/76a/79b/110/124	DK10-LAS/9S20	DK10-LAS/9S50/76a/110/124
Time function							●	●
Detection range	3 ... 300 mm			●	●	●	●	●
	3 ... 800 mm	●	●					
Light spot representation	approx. 0.8 mm at a distance of 300 mm			●	●	●	●	●
	approx. 2 mm at a distance of 800 mm	●	●					
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected		●		●	●	●	●
	1 PNP and 1 NPN short-circuit protected, open collector, synchronized-switching	●		●				
Timer function	rising edge , mono stable						●	●
Pulse length	20 ms						●	
	50 ms							●
Measurement output	Analog output 0.3 ... 10 mA		●			●		
Approvals and Certificates								
UL approval	cULus Listed , Class 2 power source	●	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.							

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

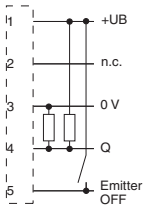
Electrical Connection

❍ = light on, ● = dark on



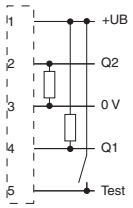
DK10-LAS/76a/110/124
DK10-LAS/9S20
DK10-LAS/9S50/76a/110/124

Option 76a/110



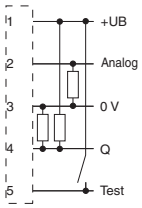
DK10-LAS/35/49
DK10-LAS/49

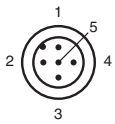
Option 49



DK10-LAS/35/79b
DK10-LAS/76a/79b/110/124

Option 79b/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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Properties

- Suitable for very small print marks
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible red light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	DK10-LAS-54/76/110/124
Sensitivity adjustment	✔
Light/dark switch	✔
Threshold detection range	12 m
Effective detection range	0 ... 10 m
Reference target	reflector C110-2
Light source	laser diode
Light type	modulated visible red light
Laser class	2
Light spot representation	approx. 10 mm at a distance of 10 m
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 55 mA
Switching type	light/dark on switchable
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Test input	emitter deactivation with +Ub
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin

Approvals and Certificates	
UL approval	cULus Listed , Class 2 power source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

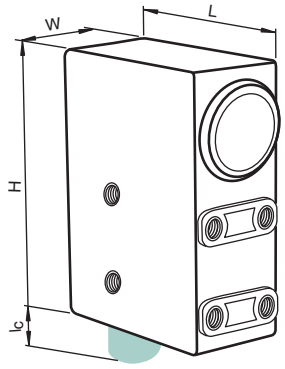
Dimensions	
Length L [mm]	60.8
Width W [mm]	33
Height H [mm]	85.6
Connector area l_c [mm]	19

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket



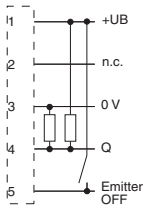
Electrical Connection

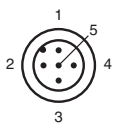
❍ = light on, ● = dark on

DK10-LAS-54/76/110/124



Option 76a/110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Static TEACH-IN	✔
Dynamic TEACH-IN	✔
Sensor range	11 mm ± 2 mm
Light source	3 LEDs (R,G,B)
Light type	Visible green/red/blue, modulated light
Teach-In	static and dynamic TEACH-IN
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 80 mA
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Response time	50 µs
Function input	Ext. Teach-In input (ET)
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67
Connection	Metal connector, M12, 5-pin, 90° rotatable



Model Number	green = preferred type	DK12-11/124/136	DK12-11/9s20/124/136	DK12-11/A/124/136
Time function			●	
Light spot representation	1 mm x 3 mm, light spot parallel to housing	●	●	
	3 mm x 1 mm, light spot perpendicular to housing			●
Timer function	Impulsed time element off-delay 20 ms		●	
Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed , Class 2 power source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

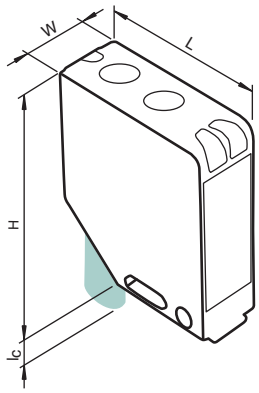
Dimensions	
Length L [mm]	41,5
Width W [mm]	15
Height H [mm]	49
Connector area l_c [mm]	16 / 0

Properties

- Suitable for contrast evaluation
- Rectangular compact housing
- Die-cast zinc frame housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

- Detection of the smallest contrasts
- Accurate registration mark detection without color jitter



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable

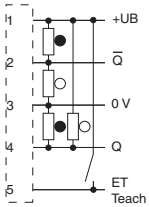
Electrical Connection

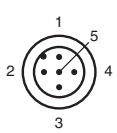
❍ = light on, ● = dark on



DK12-11/124/136
DK12-11/9s20/124/136
DK12-11/A/124/136

Option 124/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	DK12-11-IO/92/136
Static TEACH-IN	✔
Dynamic TEACH-IN	✔
Sensor range	11 mm ± 2 mm
Light source	3 LEDs (R,G,B)
Light type	Visible green/red/blue, modulated light
Light spot representation	1 mm x 3 mm , light spot parallel to housing
Teach-In	static and dynamic TEACH-IN
Operating voltage	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V
No-load supply current	≤ 60 mA at 24 V supply voltage
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Switching type	light/dark on
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Response time	40 µs
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67
Connection	4-pin, M12 metal connector , can be rotated 90°
	

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed , Class 2 power source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	41.5
Width W [mm]	15
Height H [mm]	49
Connector area l_c [mm]	16 / 0

Properties

- Suitable for contrast evaluation
- Rectangular compact housing
- Die-cast zinc frame housing
- Discrete output with IO-Link
- Connector version
- Visible green / red / blue light

Your Benefit

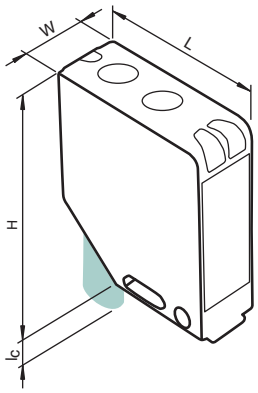
- Detection of the smallest contrasts
- Accurate registration mark detection without color jitter
- Easily adapts to the application by the standard communication IO-Link interface

Further Products

In this series, we offer additionally:

DK12-11-IO/A/92/136

Technical data like DK12-11-IO/92/136 but:
Light spot representation: orthogonal to housing



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
PACTware 4.X	FDT frame application
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master

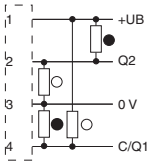
Electrical Connection

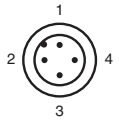
❍ = light on, ● = dark on



DK12-11-IO/92/136
DK12-11-IO/A/92/136

Option IO/92/136
Option IO/95/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Static TEACH-IN	✔
Sensor range	25 mm +/- 6 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Teach-In	static TEACH-IN
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 70 mA
Switching type	light/dark on switchable, results from the order of the TEACH-IN
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number		DK20-25/110/124	DK20-25/A/110/124	DK20-25/B/110/124
Light spot representation	Light spot diameter 3 mm			●
	2 mm x 8.5 mm	●		
	2 mm x 8.5 mm , light spot perpendicular to housing		●	
Approvals and Certificates				
UL approval	cULus Listed , Class 2 power source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

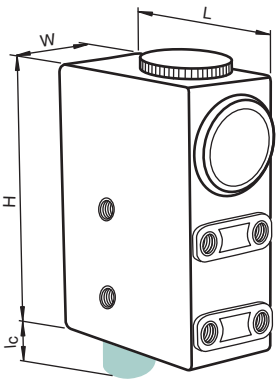
Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19

Properties

- Suitable for contrast evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

- Interchangable dual lens for mounting flexibility



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

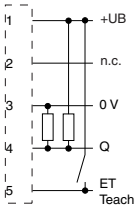
Electrical Connection

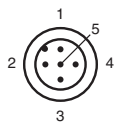
❍ = light on, ● = dark on



DK20-25/A/110/124
DK20-25/B/110/124
DK20-25/110/124

Option 110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Suitable for contrast evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

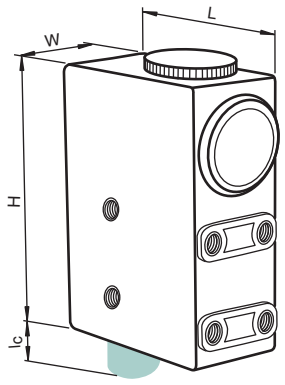
- Interchangable dual lens for mounting flexibility

Further Products

In this series, we offer additionally:

DKE20-9,5/110/124
Technical data like
DK20-9,5/110/124
but:
Housing: Stainless steel





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Static TEACH-IN	✔
Sensor range	9.5 mm +/-3 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Teach-In	static TEACH-IN
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 70 mA
Switching type	light/dark on switchable, results from the order of the TEACH-IN
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number	green = preferred type	DK20-9,5/110/124	DK20-9,5/9S20/110/124	DK20-9,5/A/110/124	DK20-9,5/B/110/124
Time function			●		
Light spot representation	Light spot diameter 1.5 mm				●
	rectangular 1 mm x 4 mm	●	●		
	1 mm x 4 mm , light spot perpendicular to housing			●	
Timer function	rising edge , mono stable		●		
Pulse length	20 ms		●		
Approvals and Certificates					
UL approval	cULus Listed , Class 2 power source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

Electrical Connection

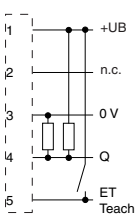
❍ = light on, ● = dark on



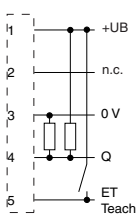
DK20-9,5/9S20/110/124

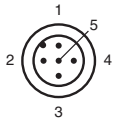
DKE20-9,5/110/124
DK20-9,5/A/110/124
DK20-9,5/B/110/124
DK20-9,5/110/124

Option 9S20/110



Option 110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08



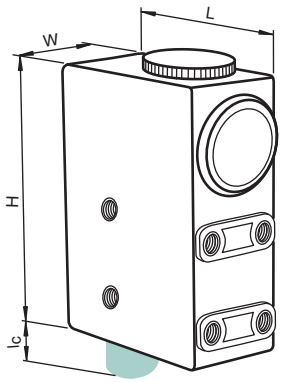
CE

Properties

- Suitable for contrast evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

- Interchangable dual lens for mounting flexibility



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Dynamic TEACH-IN	✔
Sensor range	25 mm +/- 6 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Teach-In	Dynamic Teach-In
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 60 mA
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number		DK21-25/110/124	DK21-25/B/110/124
Light spot representation	Light spot diameter 3 mm		●
	2 mm x 8.5 mm	●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

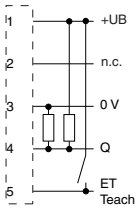
Electrical Connection

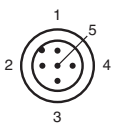
❍ = light on, ● = dark on



DK21-25/B/110/124
DK21-25/110/124

Option 110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



CE

Properties

- Suitable for contrast evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

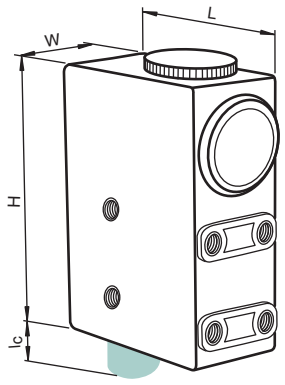
- Interchangable dual lens for mounting flexibility

Further Products

In this series, we offer additionally:

DKE21-9,5/110/124
Technical data like
DK21-9,5/110/124
but:
Housing: Stainless steel





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Dynamic TEACH-IN	✔
Sensor range	9.5 mm +/-3 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Teach-In	Dynamic Teach-In
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 60 mA
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number		DK21-9,5/110/124	DK21-9,5/9S20/110/124	DK21-9,5/A/110/124
Time function			●	
Light spot representation	rectangular 1 mm x 4 mm, light spot parallel to housing	●	●	
	1 mm x 4 mm , light spot perpendicular to housing			●
Timer function	rising edge , mono stable		●	
Pulse length	20 ms		●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

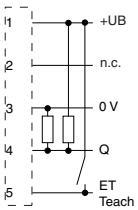
Electrical Connection

❍ = light on, ● = dark on



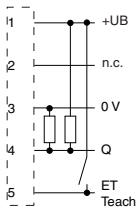
DK21-9,5/9S20/110/124

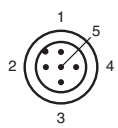
Option 9S20/110



DKE21-9,5/110/124
DK21-9,5/A/110/124
DK21-9,5/110/124

Option 110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08



CE

Properties

- Suitable for contrast evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

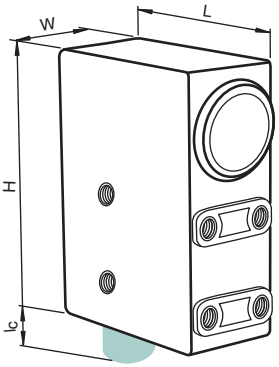
- Detection of the smallest contrasts

Further Products

In this series, we offer additionally:

DK31-9,5/110/124
Technical data like DK35-9,5/110/124 but:
axial light exit





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensor range	9.5 mm ± 3 mm
Light source	LED
Light type	Visible green/red/blue, modulated light
Light spot representation	rectangular 1 mm x 4 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 75 mA
Signal output	Push-pull (4 in 1) output, short-circuit protected, reverse polarity protected
Switching current	max. 200 mA
Response time	30 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number		DK34-9,5/110/124	DK34-9,5/8S50/110/124	DK35-9,5/110/124
Time function			●	
Static TEACH-IN		●	●	
Dynamic TEACH-IN				●
Teach-In	Dynamic Teach-In			●
	static TEACH-IN	●	●	
Switching type	Output switches to U_B when print mark is detected and to 0 V when background is detected			●
	light/dark on switchable, results from the order of the TEACH-IN	●	●	
Timer function	falling edge		●	
Off-delay	50 ms		●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,6
Connector area l_c [mm]	19

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-5M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-5M-PVC	Cable socket, M12, 5-pin, PVC cable
OMH-DK	Right-Angled Mounting Bracket
OMH-DK-1	Flat Mounting Bracket

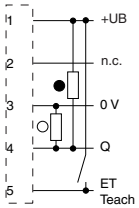
Electrical Connection

❍ = light on, ● = dark on



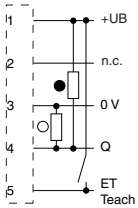
DK34-9,5/8S50/110/124

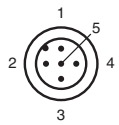
Option 8S50/110



DK31-9,5/110/124
DK34-9,5/110/124
DK35-9,5/110/124

Option 110





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Time function	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light source	LED
Light type	modulated UV light
Teach-In	Incremental or automatic
Operating voltage	10 ... 30 V DC
Switching type	light on / dark on
Signal output	1 PNP and 1 NPN short-circuit protected, reverse polarity protected
Switching current	150 mA
Material	
Housing	Polycarbonate
Optical face	Acrylic
Protection degree	IP67
Connection	150 mm, PVC cable with M12 x 1 connector, 5 pin



Model Number		DK50-UV-190/115b/147	DK50-UV-254/115b/147	DK50-UV-330/115b/147	DK50-UV-609/115b/147
Detection range	0 ... 190 mm	●			
	0 ... 254 mm		●		
	0 ... 330 mm			●	
	50.8 ... 609.6 mm				●
Light spot representation	2.2 mm at 25.4 mm sensor range	●			
	3.25 mm at 50.8 mm sensor range		●		
	4.1 mm at 101.6 mm sensor range			●	
	25.4 mm at 203 mm sensor range				●
No-load supply current	50 mA	●	●	●	
	65 mA				●
Response time	200 µs	●	●	●	
	750 µs				●
Ambient temperature	-15 ... 55 °C (5 ... 131 °F)				●
	-15 ... 70 °C (5 ... 158 °F)	●	●	●	

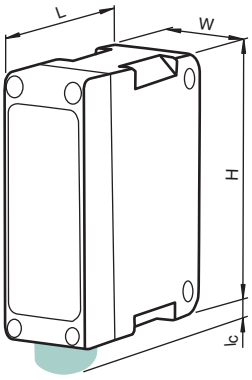
Dimensions	
Length L [mm]	55,5
Width W [mm]	22,6
Height H [mm]	64,9
Connector area l_c [mm]	7

Properties

- Suitable for luminescence evaluation
- Rectangular compact housing
- Plastic housing
- Discrete output
- Pigtailed connector version
- Ultraviolet light

Your Benefit

- Detection of invisible marks and/or marks on irregular surfaces
- Small focal point detects small parts



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

OMH-DK50	Right-Angled Mounting Bracket
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

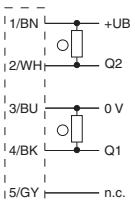
Electrical Connection

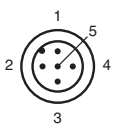
❍ = light on, ● = dark on



DK50-UV-254/115b/147
DK50-UV-190/115b/147
DK50-UV-330/115b/147
DK50-UV-609/115b/147

Option 115b/147





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

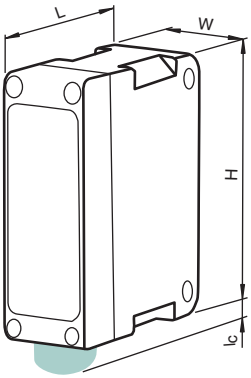


Properties

- Suitable for luminescence evaluation
- Rectangular compact housing
- Plastic housing
- Discrete output
- Pigtailed connector version
- Ultraviolet light

Your Benefit

- Detection of invisible marks and/or marks on irregular surfaces
- Small focal point detects small parts



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Time function	✔
Sensitivity adjustment	✔
Light/dark switch	✔
Light source	LED
Light type	modulated UV light
Teach-In	Incremental or automatic
Operating voltage	10 ... 30 V DC
Switching type	light on / dark on
Signal output	1 PNP and 1 NPN short-circuit protected, reverse polarity protected
Switching current	150 mA
Response time	Discrete Output 200 µs Analog output 1 ms
Measurement output	0 - 5 V DC R_{min} = 1 kΩ
Material	
Housing	Polycarbonate
Optical face	Acrylic
Protection degree	IP67
Connection	150 mm pigtail , quick disconnect type M12 (micro)



Model Number		DK50-UV-190/79d/115b/147	DK50-UV-254/79d/115b/147	DK50-UV-330/79d/115b/147	DK50-UV-609/79d/115b/147
Detection range	0 ... 190 mm	●			
	0 ... 254 mm		●		
	0 ... 330 mm			●	
	50.8 ... 609.6 mm				●
Light spot representation	2.2 mm at 25.4 mm sensor range	●			
	3.25 mm at 50.8 mm sensor range		●		
	4.1 mm at 101.6 mm sensor range			●	
	25.4 mm at 203 mm sensor range				●
No-load supply current	50 mA	●	●	●	
	65 mA				●
Ambient temperature	-15 ... 55 °C (5 ... 131 °F)				●
	-15 ... 60 °C (5 ... 140 °F)	●	●	●	

Dimensions	
Length L [mm]	55,5
Width W [mm]	22,6
Height H [mm]	64,9
Connector area l_c [mm]	7

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-DK50	Right-Angled Mounting Bracket
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

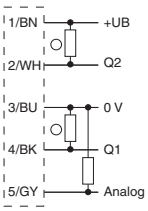
Electrical Connection

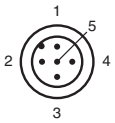
❍ = light on, ● = dark on



DK50-UV-190/79d/115b/147
DK50-UV-254/79d/115b/147
DK50-UV-330/79d/115b/147
DK50-UV-609/79d/115b/147

Option 79d/115b/147





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Function input	✔
Static TEACH-IN	✔
Sensor range	11 mm ± 2 mm
Light source	3 LEDs (R,G,B)
Light type	Visible green/red/blue, modulated light
Light spot representation	1 mm x 3 mm
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 40 mA
Signal output	3 Push-pull (4 in 1) outputs, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Response time	1 ms
Function input	Ext. Teach-In input (ET) Ext. blanking-input (AT)
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Optical face	Plastic pane
Protection degree	IP67
Connection	8-pin, M12 metal connector, 90° convertible (use V19 type connection cable)



Model Number green = preferred type	DF12-11-3K/145/151	DF12-11-3K/9s20/145/151
Timer function	Impulsed time element off-delay 20 ms	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

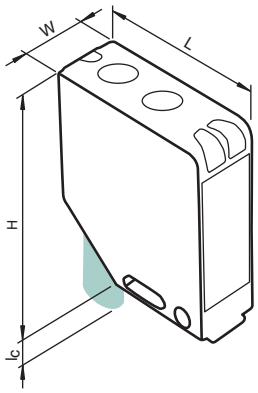
Dimensions	
Length L [mm]	41,5
Width W [mm]	15
Height H [mm]	49
Connector area l_c [mm]	16 / 0

Properties

- Suitable for color evaluation
- Rectangular compact housing
- Die-cast zinc frame housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

- Up to three different colors and tolerances can be stored
- One output for each color



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V19-G-5M-PVC	Cable socket, M12, 8-pin, PVC cable
V19-W-5M-PUR54	Cable connector, M12, 8-pin, welding-bead resistant, PUR cable
V19-G-15M-PVC	Cable socket, M12, 8-pin, PVC cable
V19-G-2M-PUR ABG	Cable socket, M12, 8-pin, shielded, PUR cable
V19-G-3M-PUR ABG	Cable socket, M12, 8-pin, shielded, PUR cable
V19-G-10M-PUR-ABG	Cable socket, M12, 8-pin, shielded, PUR cable

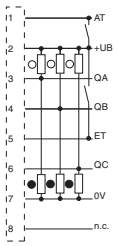
Electrical Connection

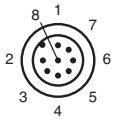
❍ = light on, ● = dark on



DF12-11-3K/145/151
DF12-11-3K/9s20/145/151

Option /145/151





Wire colors

1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Date of issue: 2015-04-08



CE

Properties

- Suitable for color evaluation
- Rectangular full-size housing
- Plastic housing
- Discrete output
- Connector version
- Visible green / red / blue light

Your Benefit

- Interchangable dual lens for mounting flexibility

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

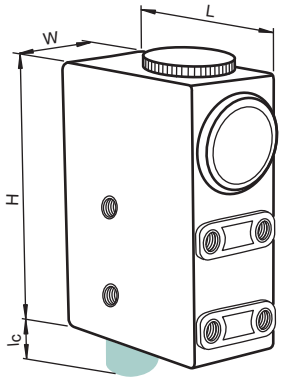
General Data	
Function input	✔
Static TEACH-IN	✔
Light source	3 LEDs (R,G,B)
Light type	Visible green/red/blue, modulated light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 55 mA
Switching type	PNP switches according to +U_B, NPN according to 0 V for detected mark
Signal output	1 PNP and 1 NPN short-circuit protected, open collector, synchronized-switching
Switching current	max. 200 mA
Response time	300 µs
Function input	TEACH-IN input
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	PC (glass-fiber-reinforced Makrolon)
Optical face	glass
Protection degree	IP67
Connection	M12 x 1 connector, 5-pin



Model Number	green = preferred type	DF20/49/124	DF20/9S20/49/124	DF20/B/49/124	DF20/35A/49/124
Sensor range	9.5 mm ± 2 mm	●	●	●	
	25 mm ± 4mm				●
Light spot representation	Light spot diameter 1.5 mm			●	
	rectangular 1 mm x 4 mm	●	●		
	rectangular 2 mm x 8.5 mm				●
Timer function	Impulsed time element off-delay 20 ms		●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	60,8
Width W [mm]	33
Height H [mm]	85,5
Connector area l_c [mm]	19



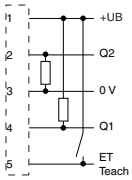
Electrical Connection

❍ = light on, ● = dark on



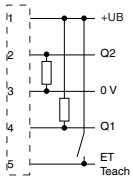
DF20/35A/49/124

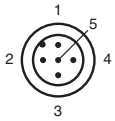
Option 35a/49/124



DF20/49/124
DF20/9S20/49/124
DF20/B/49/124

Option 49/124





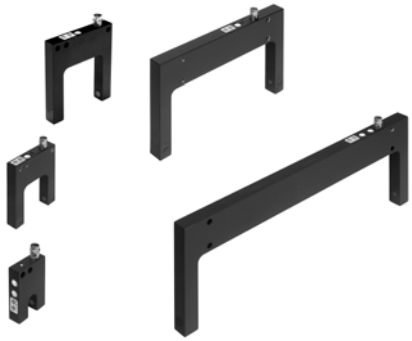
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Light source	LED
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC, class 2
No-load supply current	≤ 15 mA
Signal output	1 PNP, short-circuit protected, open collector
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	3 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP67
Connection	M8 connector, 3-pin



Properties

- Single beam type
- Rectangular compact housing
- Die-cast zinc and aluminium housing versions
- DC sensor
- Discrete output
- Connector version
- Visible red light

Your Benefit

- Optimized for small part detection
- No mutual interference for side by side mounting (no cross-talk)
- Suitable for high speed processes

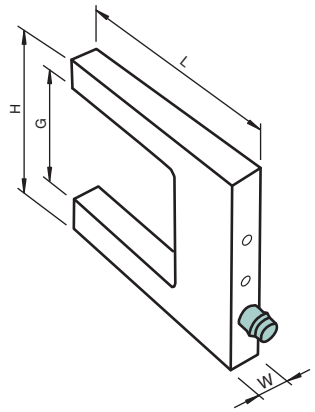
Model Number	green = preferred type	GL10-RT/32/40a/98a	GL20-RT/32/40a/98a	GL30-RT/32/40a/98a	GL40-RT/32/40a/98a	GL50-RT/32/40a/98a	GL80-RT/32/40a/98a	GL121-RT/32/40a/98a	GL220-RT/32/40a/98a
Fork width	10 mm	●							
	20 mm		●						
	30 mm			●					
	40 mm				●				
	50 mm					●			
	80 mm						●		
	121 mm							●	
	220 mm								●
Target size	0.3 mm	●	●	●	●	●	●	●	
	0.5 mm								●
Material									
Housing	black anodized aluminium	●	●		●				●
	powder coated diecast zinc			●		●	●	●	
Optical face	glass	●	●	●	●	●	●	●	●

Approvals and Certificates

CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions

Length L [mm]	46	46	60	70	80	80	90	90
Width W [mm]	10						12	
Height H [mm]	30	40	50	60	70	100	145	244
Fork width G [mm]	10	20	30	40	50	80	121	220



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

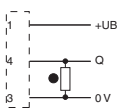
Electrical Connection

❍ = light on, ● = dark on



GL10-RT/32/40a/98a
GL20-RT/32/40a/98a
GL30-RT/32/40a/98a
GL50-RT/32/40a/98a
GL80-RT/32/40a/98a
GL121-RT/32/40a/98a
GL220-RT/32/40a/98a
GL40-RT/32/40a/98a

Option 32/40a/98a

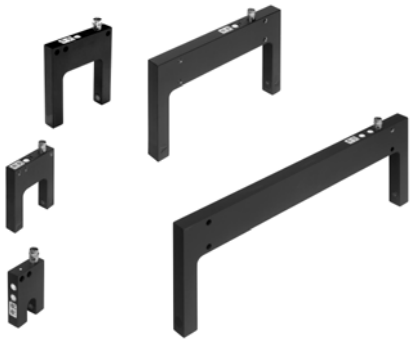




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Light type	modulated infrared light
Light source	IRED
Operating voltage	10 ... 30 V DC, class 2
No-load supply current	≤ 15 mA
Signal output	1 PNP, short-circuit protected, open collector
Switching type	light/dark on
Switching current	max. 100 mA
Switching frequency	2 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP67
Connection	M8 connector, 3-pin



Properties

- Single beam type
- Rectangular compact housing
- Die-cast zinc and aluminium housing versions
- DC sensor
- Discrete output
- Connector version
- Infrared light

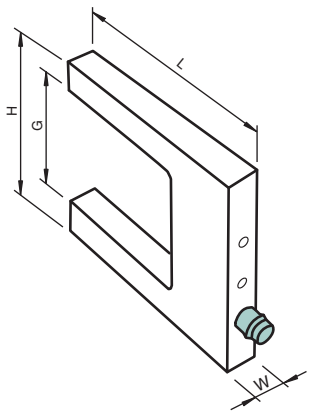
Your Benefit

- Optimized for small part detection
- No mutual interference for side by side mounting (no cross-talk)
- Suitable for high speed processes

Model Number	green = preferred type	GL10-IR/32/40a/98a	GL20-IR/32/40a/98a	GL30-IR/32/40a/98a	GL40-IR/32/40a/98a	GL50-IR/32/40a/98a	GL80-IR/32/40a/98a	GL121-IR/32/40a/98a	GL220-IR/32/40a/98a
Fork width	10 mm	●							
	20 mm		●						
	30 mm			●					
	40 mm				●				
	50 mm					●			
	80 mm						●		
	121 mm							●	
	220 mm								●
Target size	0.3 mm	●	●	●	●	●	●	●	
	0.5 mm								●
Material									
Housing	black anodized aluminium	●	●		●				●
	powder coated diecast zinc			●		●	●	●	
Optical face	glass	●	●	●	●	●	●	●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions								
Length L [mm]	46	46	60	70	80	80	90	90
Width W [mm]	10						12	
Height H [mm]	30	40	50	60	70	100	145	244
Fork width G [mm]	10	20	30	40	50	80	121	220



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

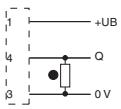
Electrical Connection

❍ = light on, ● = dark on



GL20-IR/32/40a/98a
GL30-IR/32/40a/98a
GL50-IR/32/40a/98a
GL10-IR/32/40a/98a
GL80-IR/32/40a/98a
GL121-IR/32/40a/98a
GL220-IR/32/40a/98a
GL40-IR/32/40a/98a

Option 32/40a/98a



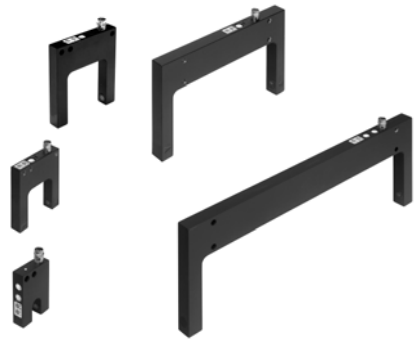


Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Single beam type
- Rectangular compact housing
- Aluminium housing
- DC sensor
- Discrete output
- Connector version
- Laser red light

Your Benefit

- Optimized for small part detection down to 0.05 mm
- Suitable for high speed processes

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

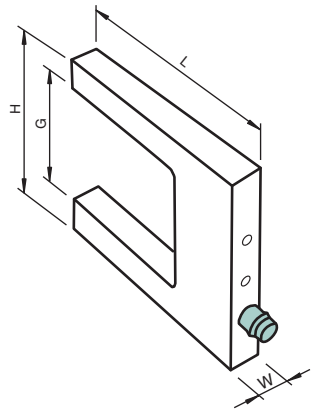
General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Light source	laser diode
Light type	red
Laser class	2
Target size	0.05 mm
Operating voltage	10 ... 30 V DC
No-load supply current	45 mA
Signal output	1 PNP output, short-circuit protected, protected from reverse polarity, open collector
Switching type	light/dark on
Switching current	max. 200 mA
Switching frequency	10000 Hz
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)
Material	
Housing	black anodized aluminium
Optical face	glass
Protection degree	IP65
Connection	M8 connector, 3-pin



Model Number		GL20-LAS/32/40a/98a	GL30-LAS/32/40a/98a	GL50-LAS/32/40a/98a	GL80-LAS/32/40a/98a	GL120-LAS/32/40a/98a	GL220-LAS/32/40a/98a
Fork width	20 mm	●					
Fork width	30 mm		●				
Fork width	50 mm			●			
Fork width	80 mm				●		
Fork width	120 mm					●	
Fork width	220 mm						●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions							
Length L [mm]	60		80		85	
Width W [mm]	10				12	
Height H [mm]	45	55	75	105	145	245
Fork width G [mm]	20	30	50	80	120	220



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

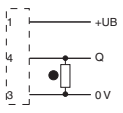
Electrical Connection

❍ = light on, ● = dark on



GL20-LAS/32/40a/98a
GL30-LAS/32/40a/98a
GL50-LAS/32/40a/98a
GL80-LAS/32/40a/98a
GL120-LAS/32/40a/98a
GL220-LAS/32/40a/98a

Option 32/40a/98a





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



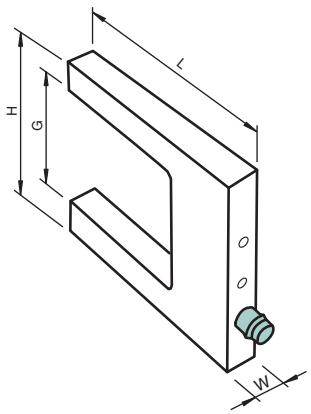
CE

Properties

- Array type
- Rectangular compact housing
- Aluminium housing
- DC sensor
- Discrete output
- Connector version
- Infrared light

Your Benefit

- Detecting randomly-positioned or falling objects
- Automatic suppression of stationary machine parts in the detection area



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Time function	✔
Sensitivity adjustment	✔
Light source	IRED
Light type	modulated infrared light
Operating voltage	24 V DC ± 20 %
No-load supply current	< 70 mA
Signal output	1 PNP output, short-circuit protected, protected from reverse polarity, open collector
Switching type	dark on
Switching current	200 mA
Switching frequency	5000 Hz
Repeat accuracy	0.1 mm
Pulse extension	0.1 ... 150 ms
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)
Material	
Housing	black anodized aluminium
Optical face	glass
Protection degree	IP67
Connection	M8 connector, 3-pin



Model Number	green = preferred type	RAL50-IR/32/98	RAL70-IR/32/98	RAL100-IR/32/98	RAL150-IR/32/98
Fork width	50 mm	●			
	70 mm		●		
	100 mm			●	
	150 mm				●
active zone	35 mm x 50 mm	●			
	70 mm x 64 mm		●		
	100 mm x 94 mm			●	
	150 mm x 144 mm				●
Resolution	0.5 mm	●			
	1 mm		●		
	2 mm			●	
	3 mm				●

Dimensions				
Length L [mm]	81	105	135	185
Width W [mm]	20			
Height H [mm]	90	110	140	190
Fork width G [mm]	50	70	100	150

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable

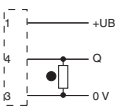
Electrical Connection

❍ = light on, ● = dark on



RAL100-IR/32/98
RAL150-IR/32/98
RAL50-IR/32/98
RAL70-IR/32/98

Option 32/98





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Single beam type
- Rectangular compact housing
- Plastic housing
- DC sensor
- Discrete output
- Cable, pigtailed connector and connector versions
- Visible red light

Your Benefit

- Special sensor for label detection
- One-touch automatic set-up for easy alignment
- Detection of some transparent labels

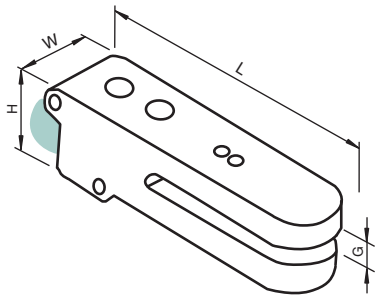
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensitivity adjustment	✔
Fork width	3 mm
Light source	LED
Light type	modulated visible red light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 45 mA
Signal output	1 NPN and 1 PNP Short circuit and overload protected Reverse polarity protected
Switching type	light/dark on
Switching current	max. 150 mA
Switching frequency	5 kHz
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Material	
Housing	Thermoplastic PPS
Optical face	zylex
Protection degree	IP66

Model Number		GLD3-RT/115/147	GLD3-RT/115b/123/147	GLD3-RT/95/147
Teach-In			●	
Connection	fixed cable 150 mm with M12 x 1 male connector, 4 pin		●	
	M8 x 1 connector, 4-pin			●
	2 m fixed cable	●		
				
Approvals and Certificates				
UL approval	cULus	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	92
Width W [mm]	25
Height H [mm]	27
Fork width G [mm]	3



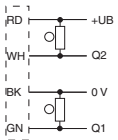
Electrical Connection

❍ = light on, ● = dark on

GLD3-RT/115/147



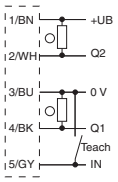
Option /115/147





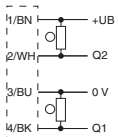
GLD3-RT/115b/123/147

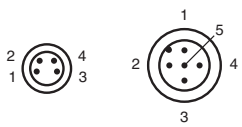
Option /115b/123/147



GLD3-RT/95/147

Option /95/147

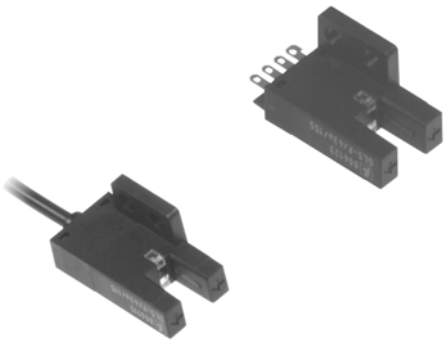




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



CE

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

Your Benefit

- High positioning accuracy

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-F/28a/115	GL5-F/43a/115	GL5-F/28a/155	GL5-F/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

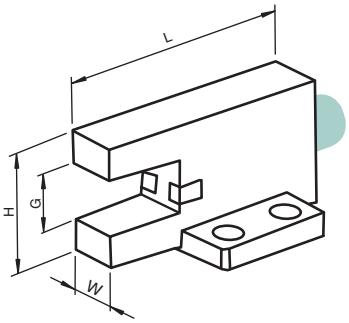
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Accessories

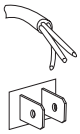
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

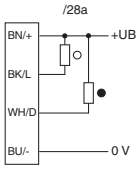


Electrical Connection

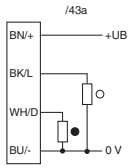
❍ = light on, ● = dark on



GL5-F/28a/115
GL5-F/28a/155

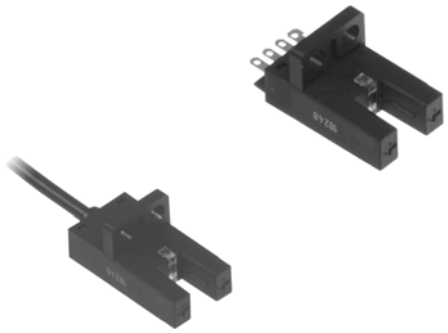


GL5-F/43a/115
GL5-F/43a/155



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-J/28a/115	GL5-J/43a/115	GL5-J/28a/155	GL5-J/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

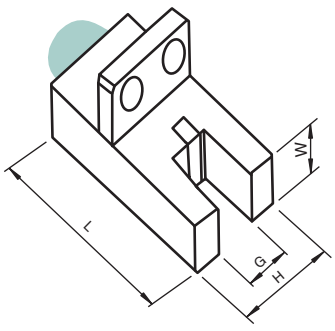
Your Benefit

- High positioning accuracy

Accessories

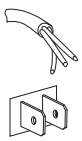
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

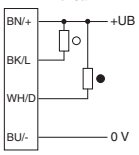


Electrical Connection

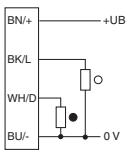
❍ = light on, ● = dark on



GL5-J/28a/115
GL5-J/28a/155
/28a

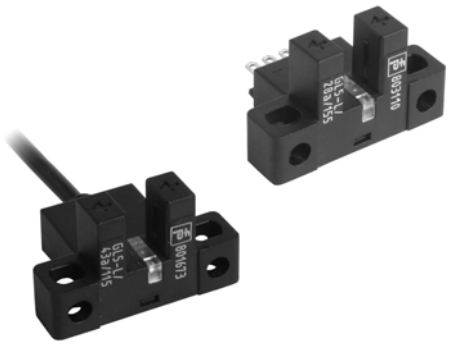


GL5-J/43a/115
GL5-J/43a/155
/43a



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-L/28a/115	GL5-L/43a/115	GL5-L/28a/155	GL5-L/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	15,5
Width W [mm]	6,4
Height H [mm]	13,4
Fork width G [mm]	5

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

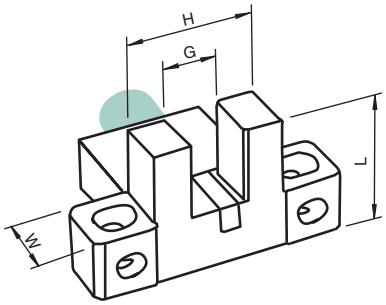
Your Benefit

- High positioning accuracy

Accessories

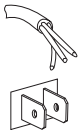
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

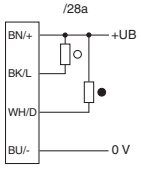


Electrical Connection

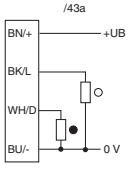
❍ = light on, ● = dark on



GL5-L/28a/115
GL5-L/28a/155

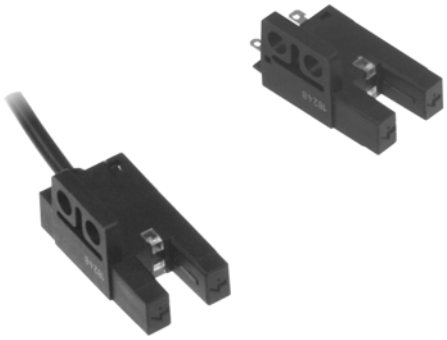


GL5-L/43a/115
GL5-L/43a/155



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-R/28a/115	GL5-R/43a/115	GL5-R/28a/155	GL5-R/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

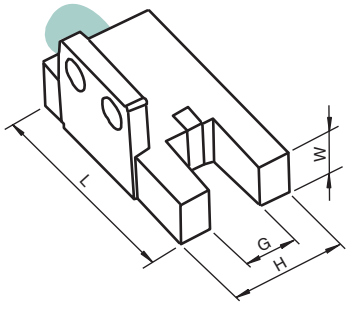
Your Benefit

- High positioning accuracy

Accessories

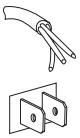
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

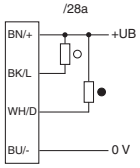


Electrical Connection

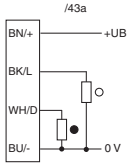
❍ = light on, ● = dark on



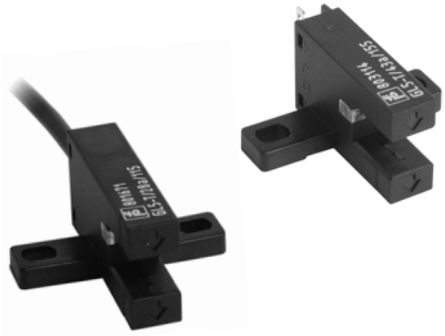
GL5-R/28a/115
GL5-R/28a/155



GL5-R/43a/115
GL5-R/43a/155



Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-T/28a/115	GL5-T/43a/115	GL5-T/28a/155	GL5-T/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

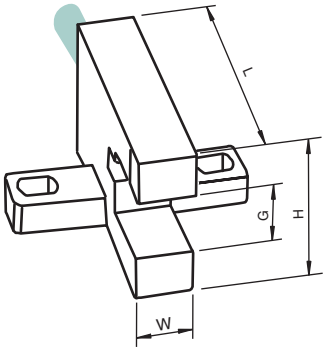
Your Benefit

- High positioning accuracy

Accessories

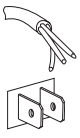
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

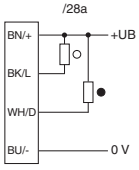


Electrical Connection

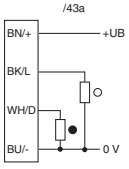
❍ = light on, ● = dark on



GL5-T/28a/115
GL5-T/28a/155

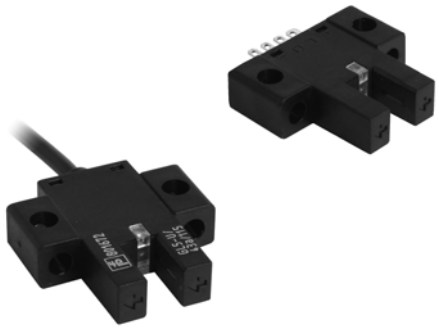


GL5-T/43a/115
GL5-T/43a/155



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-U/28a/115	GL5-U/43a/115	GL5-U/28a/155	GL5-U/43a/155
Operating voltage	5 ... 24 V DC	●		●	●
	5 ... 24 V DC, class 2		●		
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

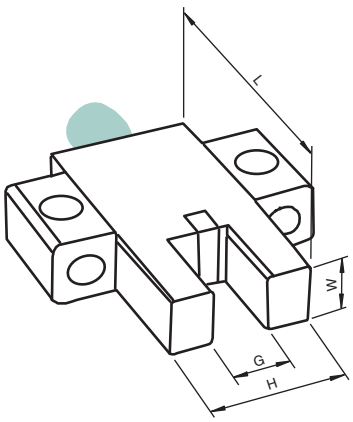
CBL SET GL5	Connection cable for GL5 series

Properties

- **Single beam type**
- **Rectangular nano housing**
- **Plastic housing**
- **DC sensor**
- **Discrete output**
- **Cable and solder pin versions**
- **Infrared light**

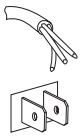
Your Benefit

- **High positioning accuracy**

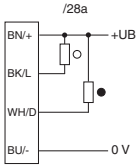


Electrical Connection

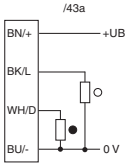
❍ = light on, ● = dark on



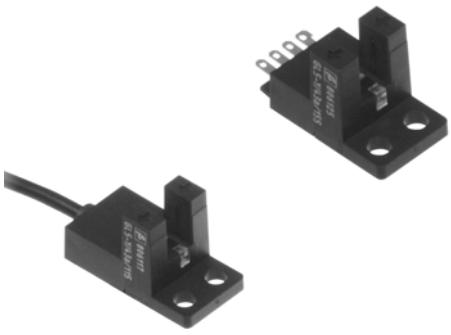
GL5-U/28a/115
GL5-U/28a/155



GL5-U/43a/115
GL5-U/43a/155



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CE

Properties

- Single beam type
- Rectangular nano housing
- Plastic housing
- DC sensor
- Discrete output
- Cable and solder pin versions
- Infrared light

Your Benefit

- High positioning accuracy

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Fork width	5 mm
Light source	IRED
Light type	Infrared, continuous light , 940 nm
Target size	0.8 x 1.8 mm
Operating voltage	5 ... 24 V DC
No-load supply current	max. 20 mA
Switching type	light/dark on
Switching current	max. 50 mA
Switching frequency	max. 5 kHz
Repeat accuracy	0.03 mm
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Housing	PBT
Protection degree	IP40

Model Number		GL5-Y/28a/115	GL5-Y/43a/115	GL5-Y/28a/155	GL5-Y/43a/155
Signal output	2 NPN complementary , overvoltage protected	●		●	
	2 PNP complementary , overvoltage protected		●		●
Connection	4-pin flat connector			●	●
	2 m PVC cable, 4 x 0.09 mm²	●	●		





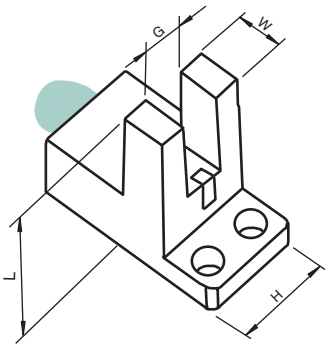
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions		
Length L [mm]	26,2	22,2
Width W [mm]	6,4	
Height H [mm]	13,4	
Fork width G [mm]	5	

Accessories

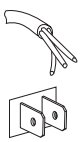
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

CBL SET GL5	Connection cable for GL5 series

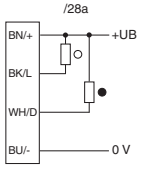


Electrical Connection

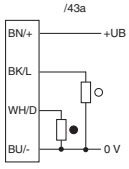
❍ = light on, ● = dark on



GL5-Y/28a/115
GL5-Y/28a/155

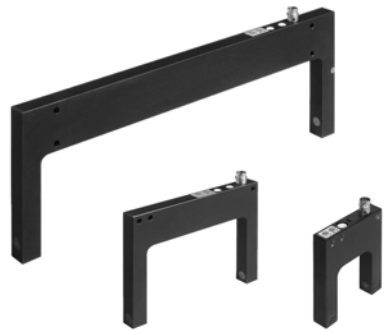


GL5-Y/43a/115
GL5-Y/43a/155



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Properties

- Single beam type
- Rectangular compact housing
- Die-cast zinc housing
- DC sensor
- Discrete output
- Connector version
- Infrared light

Your Benefit

- ATEX-approval for zone 2

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

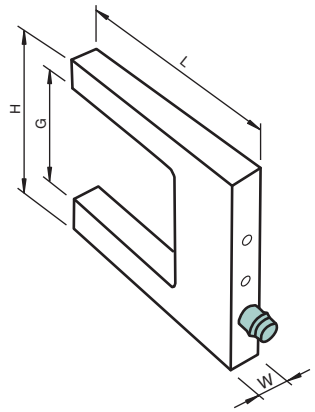
General Data	
Sensitivity adjustment	✔
Light/dark switch	✔
Target size	0.3 mm
Light source	IRED
Light type	modulated infrared light
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 15 mA
Signal output	1 PNP, short-circuit protected, open collector
Switching type	light/dark on
Switching current	max. 100 mA
Repeat accuracy	0.05 mm
Switching frequency	2 kHz
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	powder coated diecast zinc
Optical face	glass
Protection degree	IP67
Connection	M8 connector, 3-pin



Model Number		GL30-IR-EX2/32/40a/98a	GL50-IR-EX2/32/40a/98a	GL80-IR-EX2/32/40a/98a	GL121-IR-EX2/32/40a/98a
Fork width	30 mm	●			
	50 mm		●		
	80 mm			●	
	121 mm				●
Use in the Hazardous Area					
Marking	Ex II 3G Ex op is nA IIC T6 Gc X	●	●	●	●
Category	3G	●	●	●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Length L [mm]	60	80		90
Width W [mm]		10		12
Height H [mm]	50	70	100	145
Fork width G mm	30	50	80	121



Electrical Connection

❍ = light on, ● = dark on



GL121-IR-EX2/32/40a/98a
GL30-IR-EX2/32/40a/98a
GL80-IR-EX2/32/40a/98a
GL50-IR-EX2/32/40a/98a

Option 32/40a/98a





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



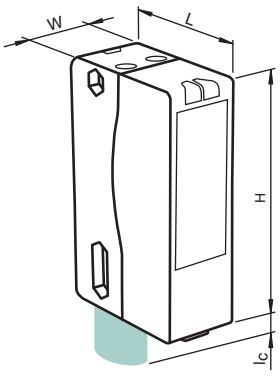


Properties

- Retro-reflective area sensor
- Self-contained
- Resolution 12 mm
- Parallel light beams
- Discrete output
- Pigtailed connector and connector versions

Your Benefit

- Reliable detection of the front edge of the object regardless of its shape and position
- Reliable detection of all surfaces regardless of the object texture
- Consistently detects objects as small as 12 mm within the entire detection area (60 mm)
- Use in low temperature environments down to -30°C



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	5.6 m
Effective detection range	0 ... 4 m
Detection area height	typical 60 mm
Reference target	H60 reflector , H85-2 reflector , Foil reflector OFR-100/100
Light type	modulated visible red light , 625 nm
Operating voltage	12 ... 30 V DC Power from Class 2 Power Source
Signal output	2 Push-pull (4 in 1) outputs, complementary, short-circuit proof, reverse polarity protected
Switching current	max. 100 mA
Number of beams	6
Response time	1 ms
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP67

Model Number	green = preferred type	RLG28-55/115b/136	RLG28-55/40a/115b/136	RLG28-55/40a/73c/136
Switching type	light/dark on	●		
	light/dark on, switchable		●	●
Connection	300 mm fixed cable with M12 x 1, 4-pin connector	●	●	
	connector M12 x 1, 4-pin			●
				

Approvals and Certificates				
Protection class	II	●	●	●
UL approval	cULus Listed, Class 2 Power Source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	54,4		
Width W [mm]	25,8		
Height H [mm]	90		
Connector area l_c [mm]	12		5,5

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-K01	dove tail mounting clamp
REF-H60	Reflector, rectangular 40.5 mm x 60 mm, mounting holes
REF-H85-2	Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

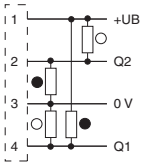
Electrical Connection

❍ = light on, ● = dark on



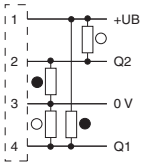
RLG28-55/40a/73c/136

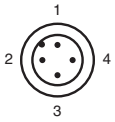
Option /73c/136



RLG28-55/115b/136
RLG28-55/40a/115b/136

Option /115b/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015/04/08

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PEPPERL+FUCHS SENSING YOUR NEEDS



CE

Properties

- Emitter / receiver set
- Self-contained
- Resolution 2.5 mm
- Parallel light beams
- Discrete output and parallel interface
- Pigtailed connector

Your Benefit

- Detecting randomly-positioned or falling objects
- Detecting any object shapes

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

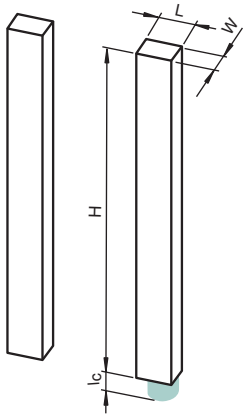
General Data	
Threshold detection range	1200 mm (applies to a operation period to 35,000 h)
Effective detection range	300 ... 1000 mm (applies to a operation period to 35,000 h)
Light type	modulated infrared light
Field height	482.5 mm
Beam spacing	2.5 mm
Number of beams	192
Operating voltage	24 V DC ± 15 %
Signal output	PNP, open collector, short-circuit protected
Switching type	dark on
Switching current	100 mA
Response time	< 5 ms
Function input	PNP, low aktiv (CAL-Input)
Ambient temperature	-28 ... 50 °C (-18.4 ... 122 °F)
Material	
Housing	aluminum , black anodized
Optical face	PMMA
Protection degree	IP54
Connection	fixed cable 70 mm with M16 x 1 male connector, 19-pin



Model Number		LG192-480-F1	LG192-480-F2
Measurement output	Gray Code D0...D8 The highest interrupted beam is emitted. PNP, open collector, short-circuit protected, low-active		●
	Gray Code D0...D8 The difference between the highest and the lowest interrupted beam is emitted. PNP, open collector, short-circuit protected, low-active	●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	40
Width W [mm]	20
Height H [mm]	627
Connector area l_c [mm]	25



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

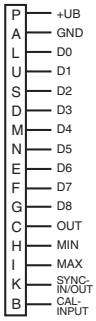
Mounting Bracket LGXX 620 ASM	Mounting aid for light grid of LG96 and LG192 series
V1619-G-5M-PVC	Connecting cable

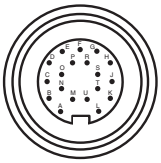
Electrical Connection

❍ = light on, ● = dark on



LG192-480-F1
LG192-480-F2





Date of issue: 2015/04/08



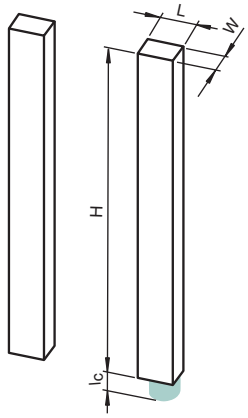
CE

Properties

- Emitter / receiver set
- Self-contained
- Resolution 2.5 mm
- Parallel light beams
- Discrete output and parallel interface
- Pigtailed connector

Your Benefit

- Detecting randomly-positioned or falling objects
- Detecting any object shapes



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	1200 mm (applies to a operation period to 35,000 h)
Effective detection range	300 ... 1000 mm (applies to a operation period to 35,000 h)
Light type	modulated infrared light
Field height	802.5 mm
Beam spacing	2.5 mm
Number of beams	320
Operating voltage	24 V DC ± 15 %
Signal output	PNP, open collector, short-circuit protected
Switching type	dark on
Switching current	100 mA
Response time	< 6 ms
Function input	PNP, low aktiv (CAL-Input)
Ambient temperature	-28 ... 50 °C (-18.4 ... 122 °F)
Material	
Housing	aluminum , black anodized
Optical face	PMMA
Protection degree	IP54
Connection	fixed cable 70 mm with M16 x 1 male connector, 19-pin



Model Number		LG320-800-F1	LG320-800-F2
Measurement output	Gray Code D0...D8 The highest interrupted beam is emitted. PNP, open collector, short-circuit protected, low-active		●
	Gray Code D0...D8 The difference between the highest and the lowest interrupted beam is emitted. PNP, open collector, short-circuit protected, low-active	●	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	40
Width W [mm]	20
Height H [mm]	947
Connector area l_c [mm]	25

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

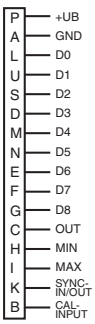
Mounting Bracket LGXX L940 ASM	Mounting aid for light grid
V1619-G-5M-PVC	Connecting cable

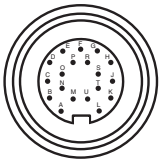
Electrical Connection

❍ = light on, ● = dark on



LG320-800-F1
LG320-800-F2





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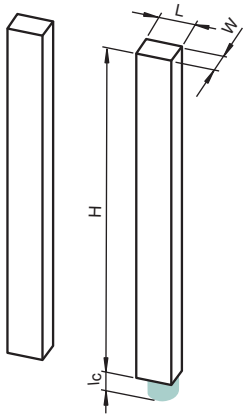
Properties

- **Emitter / receiver set**
- **Self-contained**
- **Resolution 8 mm**
- **Capable of 3-way beam crossover**
- **Discrete output and IO-Link**
- **Pigtailed connector**

Your Benefit

- **Can uniquely identify an object or gap**
- **Software-free configuration via Touch-Field**
- **Standby mode reduces power consumption**
- **Versions for use in low temperature environments down to -30°C**

For accurate selection of the suitable version see the LGS8 data sheet on page **www.pepperl-fuchs.com**.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**LGS8 Serie**
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Light type	modulated infrared light , 850 nm
Field height	100 mm ... 2100 mm in steps of 100 mm (see data sheet)
Beam spacing	8.33 mm
Optical resolution	without beam crossover: 8 mm with beam crossover: 4 mm with in 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	13 ... 253, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Switch output (detection field C/Q) 1 push-pull output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 Push-pull outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	3 ms ... 20 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Output of the pre-fault indication	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	259 ... 2259
Connector area l_c [mm]	25

Accessories

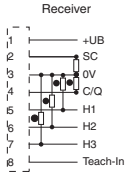
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

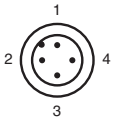
OMH-LGS-01	Attachment aid for light grid series LGS
OMH-SLCT-01	Quick clamp and adjustment system
OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid

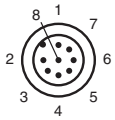
Electrical Connection

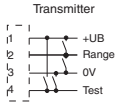
❍ = light on, ● = dark on











Date of issue: 2015/04/08



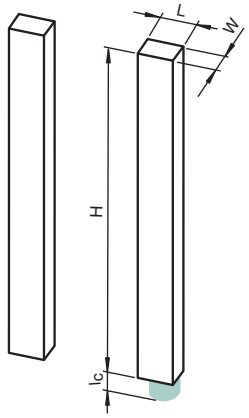
Properties

- **Emitter / receiver set**
- **Self-contained**
- **Resolution 17 mm**
- **Capable of 3-way beam crossover**
- **Discrete output and IO-Link**
- **Pigtailed connector**

Your Benefit

- **Can uniquely identify an object or gap**
- **Software-free configuration via Touch-Field**
- **Standby mode reduces power consumption**
- **Versions for use in low temperature environments down to -30°C**

For accurate selection of the suitable version see the LGS17 data sheet on page **www.pepperl-fuchs.com**.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**LGS17 Serie**
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Light type	modulated infrared light , 850 nm
Field height	100 mm ... 3200 mm in steps of 100 mm (see data sheet)
Beam spacing	16.67 mm
Optical resolution	without beam crossover: 17 mm with beam crossover: 8.5 mm with in 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	7 ... 193, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Switch output (detection field C/Q) 1 push-pull output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 Push-pull outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	2 ms ... 16 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Output of the pre-fault indication	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	259 ... 3359
Connector area l_c [mm]	25

Accessories

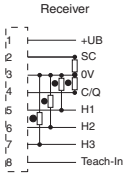
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

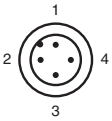
OMH-LGS-01	Attachment aid for light grid series LGS
OMH-SLCT-01	Quick clamp and adjustment system
OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid

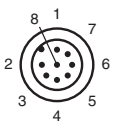
Electrical Connection

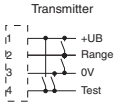
❍ = light on, ● = dark on











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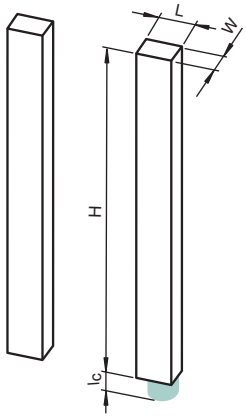
Properties

- Emitter / receiver set
- Self-contained
- Resolution 25 mm
- Capable of 3-way beam crossover
- Discrete output and IO-Link
- Pigtailed connector

Your Benefit

- Can uniquely identify an object or gap
- Software-free configuration via Touch-Field
- Standby mode reduces power consumption
- Versions for use in low temperature environments down to -30°C

For accurate selection of the suitable version see the LGS25 data sheet on page **www.pepperl-fuchs.com**.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LGS25 Serie
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Light type	modulated infrared light , 850 nm
Field height	100 mm ... 3200 mm in steps of 100 mm (see data sheet)
Beam spacing	25 mm
Optical resolution	without beam crossover: 25 mm with beam crossover: 12.5 mm with in 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	4 ... 129, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Switch output (detection field C/Q) 1 push-pull output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 Push-pull outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	2 ms ... 12 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Output of the pre-fault indication	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	259 ... 3359
Connector area l_c [mm]	25

Accessories

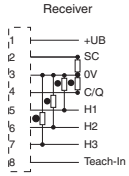
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

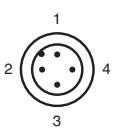
OMH-LGS-01	Attachment aid for light grid series LGS
OMH-SLCT-01	Quick clamp and adjustment system
AA SLCT-01	Profile alignment aid
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
OMH-SLCT-03	Mounting bracket including adjustment

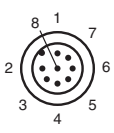
Electrical Connection

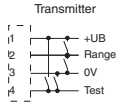
❍ = light on, ● = dark on











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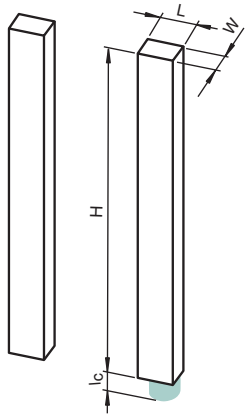
Properties

- Emitter / receiver set
- Self-contained
- Resolution 50 mm
- Capable of 3-way beam crossover
- Discrete output and IO-Link
- Pigtailed connector

Your Benefit

- Can uniquely identify an object or gap
- Software-free configuration via Touch-Field
- Standby mode reduces power consumption
- Versions for use in low temperature environments down to -30°C

For accurate selection of the suitable version see the LGS50 data sheet on page **www.pepperl-fuchs.com.**



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LGS50 Serie
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Light type	modulated infrared light , 850 nm
Field height	300 mm ... 3000 mm in steps of 300 mm (see data sheet)
Beam spacing	50 mm
Optical resolution	without beam crossover: 50 mm with beam crossover: 25 mm with in 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	7 ... 61, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Switch output (detection field C/Q) 1 push-pull output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 Push-pull outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	3 ms ... 8 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Output of the pre-fault indication	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	459 ... 3159
Connector area l_c [mm]	25

Accessories

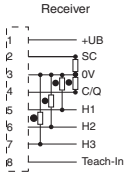
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

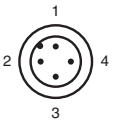
OMH-LGS-01	Attachment aid for light grid series LGS
OMH-SLCT-01	Quick clamp and adjustment system
OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid

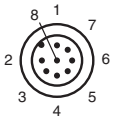
Electrical Connection

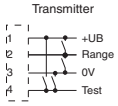
❍ = light on, ● = dark on





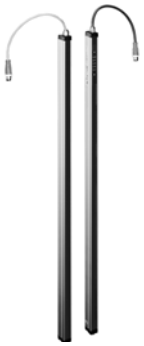






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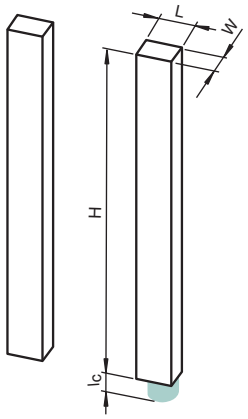
Properties

- **Emitter / receiver set**
- **Self-contained**
- **Resolution 100 mm**
- **Capable of 3-way beam crossover**
- **Discrete output and IO-Link**
- **Pigtailed connector**

Your Benefit

- **Can uniquely identify an object or gap**
- **Software-free configuration via Touch-Field**
- **Standby mode reduces power consumption**
- **Versions for use in low temperature environments down to -30°C**

For accurate selection of the suitable version see the LGS8 data sheet on page **www.pepperl-fuchs.com**.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**LGS100 Serie**
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Light type	modulated infrared light , 850 nm
Field height	300 mm ... 3000 mm in steps of 300 mm (see data sheet)
Beam spacing	100 mm
Optical resolution	without beam crossover: 100 mm with beam crossover: 50 mm with in 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	4 ... 31, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Switch output (detection field C/Q) 1 push-pull output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 Push-pull outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	2 ms ... 6 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Output of the pre-fault indication	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	459 ... 3159
Connector area l_c [mm]	25

Accessories

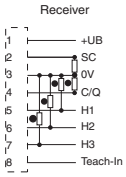
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

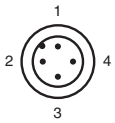
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OMH-SLCT-03	Mounting bracket including adjustment
OMH-SLCT-04	Mounting bracket including adjustment (with loose bearing)
OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid

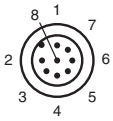
Electrical Connection

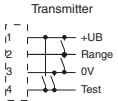
❍ = light on, ● = dark on











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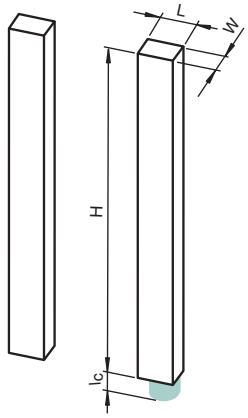
Properties

- Emitter / receiver set
- Self-contained
- Resolution 8 mm
- Capable of 3-way beam crossover
- Discrete output and IO-Link
- Pigtailed connector

Your Benefit

- Can uniquely identify an object or gap
- Output of an analog measured value, can be selected from a number of measuring functions
- Standby mode reduces power consumption
- Use in low temperature environments down to -30°C

For accurate selection of the suitable version see the LGM8 data sheet on page **www.pepperl-fuchs.com**.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	LGM8 Serie
Threshold detection range	Standard : 7.5 m
Effective detection range	Standard : 0.3 ... 6 m
Light type	modulated infrared light , 850 nm
Field height	100 mm ... 2100 mm in steps of 100 mm (see data sheet)
Beam spacing	8.33 mm
Optical resolution	without beam crossover: 8 mm with beam crossover: 4 mm within 25% and 75% of the range
Chipping	Factory setting: 3-way, deactivateable
Tuning-out of beam	adjustable max. 2 fixed suppressible beam areas (blanking)
Number of beams	13 ... 253, depending on field height (see data sheet)
Operating voltage	18 ... 30 V DC
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Signal output	Command interface: Pin 4 IO-Link interface C or used as switching output Q; 1 short-circuit proof reverse polarity protected push-pull output (receiver) Switch output: Pin 5 switching output Q; 1 short-circuit proof reverse polarity protected push-pull output (receiver) synchronized with pin 4
Switching type	Factory setting: dark ON , Switchable to light ON mode
Switching current	max. 100 mA
Response time	3 ms ... 20 ms, depending on number of beams (see data sheet)
Timer function	Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Pre-fault indication output	Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Test input	Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input	Range input activation from 1.6 m with +UB or 0 V on pin 2 (emitter) Teach-in input for programming on pin 8 (receiver)
Ambient temperature	Standard : -30 ... 60 °C (-22 ... 140 °F)
Material	
Housing	extruded aluminum section , Silver anodized
Optical face	Plastic pane , Polycarbonate
Protection degree	IP67
Connection	Emitter: 200 mm connecting cable with 4-pin, M12x1 connector Receiver: 200 mm connecting cable with 8-pin, M12 x 1 connector Cable cross section min. 0.25 mm^2 Max. cable length 30 m 

Approvals and Certificates	
Protection class	III (IEC 61140)
UL approval	cULus Listed
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	20
Height H [mm]	259 ... 2259
Connector area l_c [mm]	25

Accessories

This and more accessories can be found in chapter 10

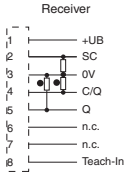
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

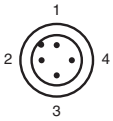
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OMH-SLCT-05	Mounting bracket including adjustment
AA SLCT-01	Profile alignment aid

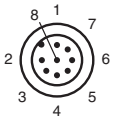
Electrical Connection

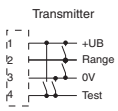
❍ = light on, ● = dark on











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CE

Properties

- Parallel interface
- Data rate up to 225 kBaud
- Terminals
- Infrared light

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light
Cycle time	35 ms
No-load supply current	40 mA
Data rate	225 Bit/s
Data sampling blanking	Enable input emitter deactivation
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	Terluran, black
Optical face	glass
Protection degree	IP67
Connection	2 M16 cable glands, tension spring terminals in the terminal compartment



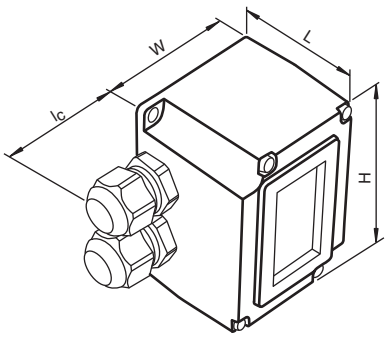
Model Number		DAD15-8P	DAD15-8P-NPN	DAD15-8P/35	DAD15-8P-NPN/35
Threshold detection range	2500 mm	●	●		
	5000 mm			●	●
Effective detection range	0 ... 1500 mm	●	●		
	0 ... 2500 mm			●	●
Diameter of the light spot	approx. 1000 mm at 1.5 m	●	●		
	approx. 500 mm at 1.5 m			●	●
Interface type	8 bit parallel, bidirectional 10 inputs, PNP , 10 outputs, PNP	●		●	
	8 bit parallel, bidirectional 10 inputs, NPN ; 10 outputs, NPN		●		●
Operating voltage	10 ... 30 V DC		●		●
	10 ... 60 V DC	●		●	

Dimensions	
Length L [mm]	51
Width W [mm]	56
Height H [mm]	76
Connector area l_c [mm]	24

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-DAD10	Mounting bracket



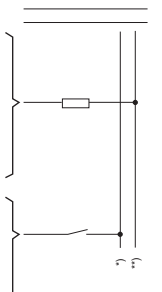
Electrical Connection



DAD15-8P
DAD15-8P/35
DAD15-8P-NPN
DAD15-8P-NPN/35

Pin	Function	Description
1, 14	0 V	- Supply voltage
2	+UB	+ Supply voltage
3	SYNC	Synchronization
4	REC	Receive indicator
5	D8OUT	Output data bit 8
6	D7OUT	Output data bit 7
7	D6OUT	Output data bit 6
8	D5OUT	Output data bit 5
9	D4OUT	Output data bit 4
10	D3OUT	Output data bit 3
11	D2OUT	Output data bit 2
12	D1OUT	Output data bit 1
13, 25	-	not connected
15	D8IN	Input data bit 8
16	D7IN	Input data bit 7
17	D6IN	Input data bit 6
18	D5IN	Input data bit 5
19	D4IN	Input data bit 4
20	D3IN	Input data bit 3
21	D2IN	Input data bit 2
22	D1IN	Input data bit 1
23	IN-Master/Slave	Master/Slave select
24	IN Enable	Input enable

Schematic



Date of issue: 2015/04/08



CE

Properties

- Serial interface
- Data rate up to 19.2 kBaud
- Connector version
- Visible red and infrared light versions

Technical Data

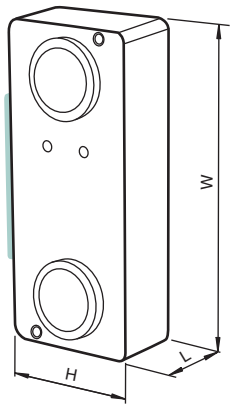
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Response delay	40 µs
Interface type	RS 232, RS 422, CL20 mA active/passive switchable
Operating voltage	24 V DC ± 25 %
No-load supply current	200 mA
Data rate	0 ... 19.2 kBit/s
Operation frequency	F1 = 83 kHz F2 = 118 kHz
Data sampling blanking	Input for incoming data blanking with +24 V DC
Pre-fault indication output	2 PNP-outputs, short-circuit protected, 30 V DC 0.1 A activated for single or sufficient stability control
Measurement output	+1.8 ... 5.8 V DC, max. 10 mA, simple stability control: 2.5 V triple stability control: 4.2 V
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Housing	aluminum
Protection degree	IP65
Connection	25-pin Sub-D connector



Model Number		DAD30-W	DAD30	DAD30/35	DAD30-RT/35
Threshold detection range	20 m	●			
	45 m		●		
	150 m			●	●
Effective detection range	0 ... 15 m	●			
	0 ... 30 m		●		
	0 ... 100 m			●	●
Light type	modulated infrared light	●	●	●	
	modulated visible red light				●
Diameter of the light spot	4200 mm at a distance of 15 m	●			
	500 mm at a distance of 30 m		●		
	1800 mm at a distance of 100 m			●	●
Optical face	glass	●			
	plastic lens		●	●	●

Dimensions	
Length L [mm]	34
Width W [mm]	150
Height H [mm]	64



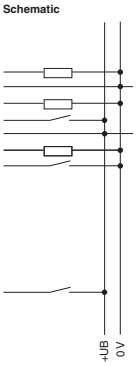
Electrical Connection



DAD30
DAD30/35
DAD30-RT/35
DAD30-W

Pin	Function	Description
2	RX232	RS 232 input
3	TX232	RS 232 output
5	TX-N	RS 422 Data- (A-output)
6	Alarm 1	1-fold stability control
7	0 V	- supply voltage
9	Analog	Measure output
10	RX-DIS	Data blanking
11	+UB	+ supply voltage
12	Alarm 2	sufficient stability control
13	RX-DIS/TTL	Data disable
14	RX-P	RS 422 (B-input)
15	RX-N	RS 422 (A-input)
16	TX-P	RS 422 (B-output)
17	TX-N	RS 422 (A-output)
18	CL-IN+	Current loop input
19	CL-IN-	Current loop input
21	CL-OUT-	Current loop output
22	TX-DIS	Emitter disable
25	CL-OUT+	Current loop output
1, 4, 5, 8, 20, 23, 24	-	not connected

Schematic



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light
Diameter of the light spot	2 m at a distance of 100 m
Interface type	RS 422 , galvanically isolated
Operating voltage	18 ... 30 V DC
No-load supply current	200 mA
Data rate	0 ... 2 MBit/s
Pre-fault indication output	1 PNP (switches if there is sufficient stability control) short-circuit protected, max. 200 mA
Housing	ABS / PC
Optical face	plastic
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12x1 connector, B-coded (Remote Bus In) , 5-pin, M12x1 socket, B-coded (Remote Bus Out)



Model Number		LS610-DA-IBS/F1	LS610-DA-IBS/F1/146	LS610-DA-IBS/F2	LS610-DA-IBS/F2/146	LS610-DA-IBS/F1/35	LS610-DA-IBS/F1/35/146	LS610-DA-IBS/F2/35	LS610-DA-IBS/F2/35/146
Threshold detection range	140 m	●	●	●	●				
	260 m					●	●	●	●
Effective detection range	0 ... 120 m	●	●	●	●				
	0 ... 240 m					●	●	●	●
Operation frequency	F1 = 8.25 MHz	●	●			●	●		
	F2 = 12.5 MHz			●	●			●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●		●		●		●	
	-30 ... 50 °C (-22 ... 122 °F) , For use in dry cold		●		●		●		●

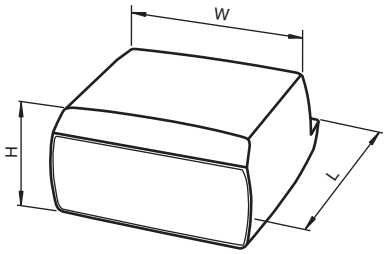
Dimensions	
Length L [mm]	171
Width W [mm]	170
Height H [mm]	90

Properties

- INTERBUS interface
- Data rate up to 2 MBaud
- Connector version
- Infrared light

Your Benefit

- Integral alignment aid LED simplifies setup
- Easy installation due to quick clamp tool-less mounting
- LED bar display indicates signal strength



Accessories

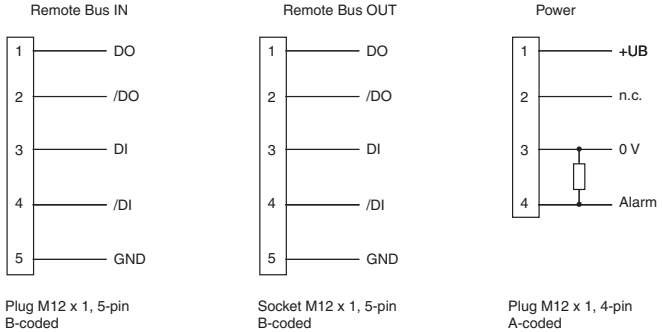
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
V15SB-G	Cable connector, M12, for PROFIBUS, adjustable
V15B-G	Cable socket, M12, for PROFIBUS, adjustable
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
Funktionserdung LS610/ VDM100 Zubehoer	Function grounding for LS610 / LS611 / VDM100 series
Schutzkappe LS610 Zubehoer	M12 protective cap set (connector + socket) for series LS610 / LS611
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts
OMH-LS610-03	Mounting bracket with deviation mirror for optical data coupler
OMH-LS610-04	
OMH-LS610-31	Mounting bracket for optical data coupler and distance measurement devices
OMH-LS610-32	Mounting bracket for optical data coupler and distance measurement devices

Electrical Connection





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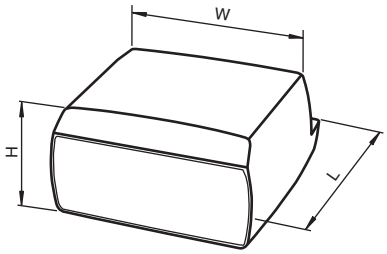


Properties

- PROFIBUS interface
- Data rate up to 1.5 MBaud
- Connector version
- Infrared light

Your Benefit

- Integral alignment aid LED simplifies setup
- Easy installation due to quick clamp tool-less mounting
- LED bar display indicates signal strength



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light
Diameter of the light spot	2 m at a distance of 100 m
Interface type	PROFIBUS, galvanically isolated
Operating voltage	18 ... 30 V DC
No-load supply current	200 mA
Data rate	93.75; 187.5;(350); 500;1500 kBit/s , adjustable
Function input	Keylock, internal Pull-up resistor keypad locked with 0 V
Pre-fault indication output	1 PNP (switches if there is sufficient stability control) short-circuit protected, max. 200 mA
Housing	ABS / PC
Optical face	plastic
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12x1 connector, B-coded (Bus In) , 5-pin, M12x1 socket, B-coded (Bus Out/Termination)



Model Number	green = preferred type	LS610-DA-P/F1	LS610-DA-P/F1/146	LS610-DA-P/F2	LS610-DA-P/F2/146	LS610-DA-P/F1/35	LS610-DA-P/F2/35
Threshold detection range	140 m	●	●	●	●		
	260 m					●	●
Effective detection range	0 ... 120 m	●	●	●	●		
	0 ... 240 m					●	●
Operation frequency	F1 = 8.25 MHz	●	●			●	
	F2 = 12.5 MHz			●	●		●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●		●		●	●
	-30 ... 50 °C (-22 ... 122 °F) , For use in dry cold		●		●		

Dimensions	
Length L [mm]	171
Width W [mm]	170
Height H [mm]	90

Accessories

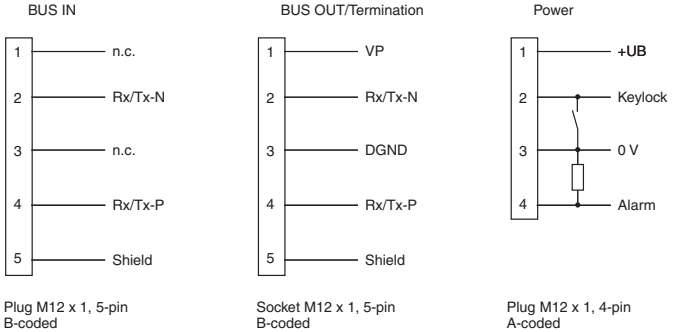
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
ICZ-TR-V15B	Terminal resistor for PROFIBUS
V15SB-G	Cable connector, M12, for PROFIBUS, adjustable
V15B-G	Cable socket, M12, for PROFIBUS, adjustable
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
Funktionserdung LS610/ VDM100 Zubehoer	Function grounding for LS610 / LS611 / VDM100 series
Schutzkappe LS610 Zubehoer	M12 protective cap set (connector + socket) for series LS610 / LS611
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-03	Mounting bracket with deviation mirror for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts
OMH-LS610-04	
OMH-LS610-31	Mounting bracket for optical data coupler and distance measurement devices
OMH-LS610-32	Mounting bracket for optical data coupler and distance measurement devices

Electrical Connection





Plug M12 x 1, 5-pin B-coded

Socket M12 x 1, 5-pin B-coded

Plug M12 x 1, 4-pin A-coded

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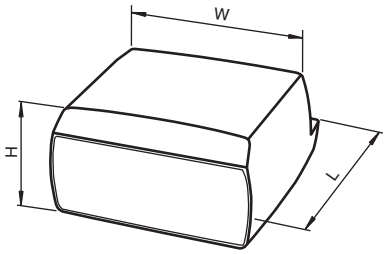


Properties

- PROFIBUS interface
- Data rate up to 1.5 MBaud
- Connector version
- Infrared light

Your Benefit

- 1:1 communication - identical units communicate with each other
- Integral alignment aid LED simplifies setup
- Easy installation due to quick clamp tool-less mounting
- LED bar display indicates signal strength



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light type	modulated infrared light
Diameter of the light spot	2 m at a distance of 100 m
Interface type	PROFIBUS DP-V0,-V1,-V2; FMS; MPI; FMS-DP mixed mode; galvanically isolated
Operating voltage	18 ... 30 V DC
No-load supply current	200 mA
Data rate	93.75/187.5/500/1500 kBit/s , adjustable
Operation frequency	8.25 MHz
Function input	Keyboard disabling, digital input (current sinking), closed ON
Pre-fault indication output	1 PNP (switches if there is sufficient stability control) short-circuit protected, max. 200 mA
Housing	ABS / PC
Optical face	plastic
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12x1 connector, B-coded (Bus In) , 5-pin, M12x1 socket, B-coded (Bus Out/Termination)



Model Number	green = preferred type	LS611-DA-P	LS611-DA-P/146	LS611-DA-P/35	LS611-DA-P/35/146
Threshold detection range	200 m	●	●		
	350 m			●	●
Effective detection range	0 ... 150 m	●	●		
	0 ... 300 m			●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●		●	
	-30 ... 50 °C (-22 ... 122 °F) , For use in dry cold		●		●
Approvals and Certificates					
UL approval	cULus	●	●	●	●
Dimensions					
Length L [mm]		171			
Width W [mm]		170			
Height H [mm]		90			

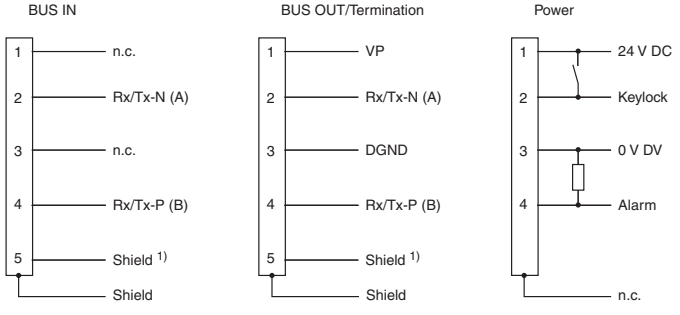
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
ICZ-TR-V15B	Terminal resistor for PROFIBUS
V15SB-G	Cable connector, M12, for PROFIBUS, adjustable
V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
V15B-G	Cable socket, M12, for PROFIBUS, adjustable
Schutzkappe LS610 Zubehoer	M12 protective cap set (connector + socket) for series LS610 / LS611
Funktionserdung LS610/ VDM100 Zubehoer	Function grounding for LS610 / LS611 / VDM100 series
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-31	Mounting bracket for optical data coupler and distance measurement devices
OMH-LS610-32	Mounting bracket for optical data coupler and distance measurement devices
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts
OMH-LS610-03	Mounting bracket with deviation mirror for optical data coupler

Electrical Connection





Plug M12 x 1, 5-pin
B-coded

Socket M12 x 1, 5-pin
B-coded

Plug M12 x 1, 4-pin
A-coded

Date of issue: 2015/04/08



Properties

- Ethernet interface
- Data rate 100 MBaud
- Connector version
- Visible red and infrared light versions

Your Benefit

- Works with all Industrial Ethernet-protocols
- Plug and Play usability, no configuration required
- LED bar display indicates signal strength
- Fast transmission of even live video

Further Products

In this series, we offer additionally:

LS670-DA-EN/F1
LS670-DA-EN/F2

Tech. spec. like LS680... but:
Diagnostics indicator: LED red, OVERLOAD
Data rate: 7.5 MBit/s

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Threshold detection range	180 m
Effective detection range	0 ... 150 m
Light source	laser diode
Laser class	1M
Diameter of the light spot	1.5 m at a distance of 100 m
Interface type	100 BASE-TX
Operating voltage	18 ... 30 V DC
No-load supply current	200 mA
Data rate	100 MBit/s (Fast Ethernet)
Pre-fault indication output	1 PNP, inactive when falling short of the stability control , short-circuit protected, max. 200 mA
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Housing	ABS / PC
Optical face	plastic
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 8-pin M12x1 connector, service , M12x1 socket, 4-pin, D-coded (LAN)

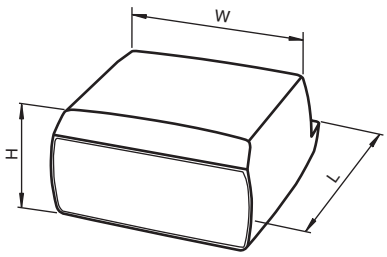


Model Number	green = preferred type	LS680-DA-EN/F1	LS680-DA-EN/F2
Light type	modulated infrared light	●	
	modulated visible red light		●
Approvals and Certificates			
UL approval	cULus Listed	●	●
Dimensions			
Length L [mm]		171	
Width W [mm]		170	
Height H [mm]		90	

Accessories

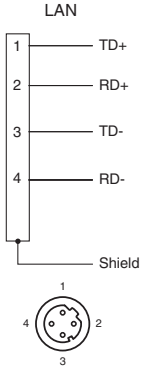
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts
OMH-LS610-03	Mounting bracket with deviation mirror for optical data coupler
OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices



Electrical Connection



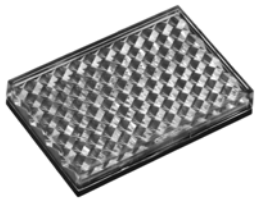


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Model number



REF-CLIP40

Reflector, rectangular 40 mm x 23.5 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	40 mm x 23.5 mm x 8 mm
Mounting	Snap-in

Model number

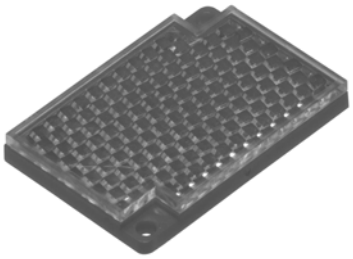


REF-H60

Reflector, rectangular 40.5 mm x 60 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 40.5 mm x 7.5 mm
Mounting	mounting holes

Model number



REF-H60F

Reflector, rectangular 40.5 mm x 60 mm, mounting holes

Ambient conditions	
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)
Mechanical specifications	
Material	PES
Dimensions	60 mm x 41 mm x 8 mm
Mounting	mounting holes

Model number



REF-H40

Reflector, rectangular 47.5 mm x 23.5 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	47.5 mm x 23.5 mm x 8 mm
Mounting	mounting holes

Date of issue: 2015-04-08

Model number



REF-A48

Reflector, rectangular 48 mm x 32.5 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	48 mm x 32.5 mm x 8 mm
Mounting	self-adhesive

Model number



REF-H50

Reflector, rectangular 51 mm x 51 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	51 mm x 51 mm x 8 mm
Mounting	mounting holes

Model number



REF-H50HT

Reflector, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 120 °C (-4 ... 248 °F) ; briefly (< 2 min) up to 160 °C (320 °F)
Mechanical specifications	
Material	PMMA
Dimensions	51.4 mm x 60.3 mm x 8.5 mm
Mounting	mounting holes

Model number



ORR50G

Reflector, rectangular 50.9 mm x 60.9 mm, mounting holes, fixing strap and polarization filter

Ambient conditions	
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	51 mm x 61 mm x 8 mm
Mounting	mounting holes

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Model number



REF-H85HT

Reflector, rectangular 51 mm x 94 mm, mounting holes, high temperature resistant up to 500 °C

Ambient conditions	
Ambient temperature	-50 ... 500 °C (-58 ... 932 °F)
Mechanical specifications	
Material	Borosilicate glass
Dimensions	51 mm x 94 mm
Mounting	mounting holes

Model number



REF-H116HT

Reflector, rectangular 55.5 mm x 132 mm, mounting holes, high temperature applications

Ambient conditions	
Ambient temperature	-20 ... 110 °C (-4 ... 230 °F)
Mechanical specifications	
Dimensions	55.5 mm x 132 mm x 9 mm
Mounting	mounting holes

Model number

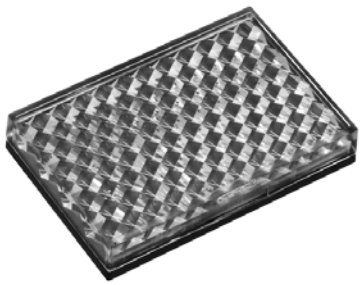


REF-VR10

Reflector, rectangular 60 mm x 19 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 19 mm x 6 mm
Mounting	mounting holes

Model number



REF-A80

Reflector, rectangular 80 mm x 50 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	80 mm x 50 mm x 7.2 mm
Mounting	self-adhesive

Date of issue: 2015-04-08

Model number



REF-H85-2

Reflector, rectangular 84.5 mm x 84.5 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	84.5 mm x 84.5 mm x 8.7 mm
Mounting	mounting holes

Model number



REF-HEATER120

Reflector, rectangular 120 mm x 51 mm, mounting holes, heatable 24 V DC

Electrical specifications	
Operating voltage U_B	24 V DC
Operating current	200 mA
Power consumption P_0	max. 4.8 W
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Connection	connector M12 x 1, 4-pin
Dimensions	119 mm x 51.5 mm x 27 mm
Mounting	mounting holes

Model number



REF-H50x100

Reflector, rectangular 122 mm x 49.5 mm, mounting holes

Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications	
Dimensions	122 mm x 49.5 mm x 8.4 mm
Mounting	mounting holes

Model number



REF-H100

Reflector, rectangular 122 mm x 99.35 mm, mounting holes

Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications	
Material	PMMA
Dimensions	122 mm x 99.35 mm x 8.5 mm
Mounting	mounting holes

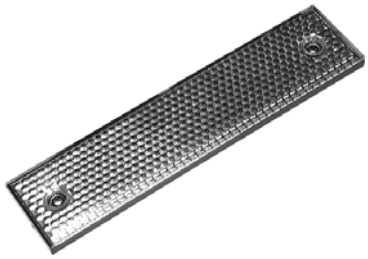
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Model number



REF-H180

Reflector, rectangular 180 mm x 40 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	180 mm x 40 mm x 7.4 mm
Mounting	mounting holes

Model number



REF-S20F

Reflector, round ø 20 mm, screw fixing M4

Ambient conditions	
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)
Mechanical specifications	
Material	PES
Dimensions	Diameter: 20 mm
Mounting	screw fixing

Model number



REF-A17

Reflector, round ø 20.5 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 20.5 mm
Mounting	self-adhesive

Model number



REF-S25

Reflector, round ø 25 mm, screw fixing M4

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25 mm
Mounting	screw fixing

Date of issue: 2015-04-08

Model number



REF-A25

Reflector, round ø 25 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25 mm
Mounting	self-adhesive

Model number



REF-CA24

Reflector, round ø 25 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25 mm
Mounting	self-adhesive

Model number



REF-CLIP25

Reflector, round ø 25.2 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 25.2 mm
Mounting	Snap-in

Model number



REF-A35

Reflector, round ø 35 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 35 mm
Mounting	self-adhesive

Date of issue: 2015-04-08

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Model number



REF-S42

Reflector, round ø 42 mm, screw fixing M5

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 42 mm
Mounting	screw fixing

Model number



REF-CLIP42

Reflector, round ø 42 mm, snap-in

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 42 mm
Mounting	Snap-in

Model number



REF-CLIP50HT

Reflector, round ø 50 mm, snap-in, high temperature applications

Ambient conditions	
Ambient temperature	-20 ... 110 °C (-4 ... 230 °F)
Mechanical specifications	
Dimensions	Diameter: 50 mm
Mounting	Snap-in

Model number



REF-C60

Reflector, round ø 58 mm, central mounting hole

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 58 mm
Mounting	mounting hole

Date of issue: 2015-04-08

Model number



REF-C110-2

Reflector, round ø 84 mm, central mounting hole

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 84 mm
Mounting	mounting hole

Model number



REF-H32G

Reflector, hexagonal 55 mm x 25 mm, with mounting holes and polarisation filter

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	55 mm x 25 mm x 9 mm
Mounting	mounting holes

Model number



REF-H32

Reflector, hexagonal 55 mm x 25 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	55 mm x 25 mm x 9 mm
Mounting	mounting holes

Model number



REF-H33

Reflector with screw fixing

Ambient conditions	
Ambient temperature	-25 ... 65 °C (-13 ... 149 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	33.3 mm x 12.8 mm x 11 mm
Mounting	M3 metal threaded insert

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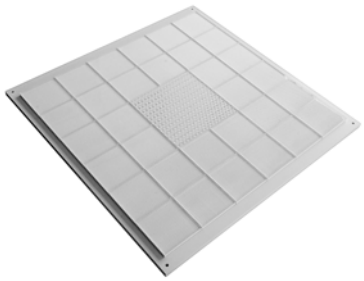
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Model number

REF-VDM01

Reflector for distance measurement devices



Ambient conditions	
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Mechanical specifications	
Material	Reflective tape, PMMA reflectors plastic base
Dimensions	500 mm x 500 mm
Mounting	mounting holes

Model number

REF-VDM02

Reflector for distance measurement devices



Ambient conditions	
Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Mechanical specifications	
Material	Reflective tape, PMMA reflectors plastic base
Dimensions	500 mm x 250 mm
Mounting	mounting holes

Model number

REF-H18x40HT

Reflector, rectangular 18.5 mm x 60 mm, mounting holes, high temperature applications



Ambient conditions	
Ambient temperature	-20 ... 120 °C (-4 ... 248 °F) ; briefly (< 2 min) up to 160 °C (320 °F)
Mechanical specifications	
Material	PMMA
Dimensions	18.5 mm x 60 mm x 7.1 mm
Mounting	mounting holes

Model number

REF-H20x40F

Reflector, rectangular 20 mm x 60 mm, mounting holes



Ambient conditions	
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)
Mechanical specifications	
Material	PES
Dimensions	60 mm x 20 mm x 6 mm
Mounting	mounting holes

Date of issue: 2015-04-08

Model number



REF-H50x100HT

Reflector, rectangular 49.5 mm x 122 mm, mounting holes, high temperature applications

Ambient conditions	
Ambient temperature	-20 ... 120 °C (-4 ... 248 °F) ; briefly (< 2 min) up to 160 °C (320 °F)
Mechanical specifications	
Material	PMMA
Dimensions	122 mm x 49.5 mm x 8.4 mm
Mounting	mounting holes

Model number

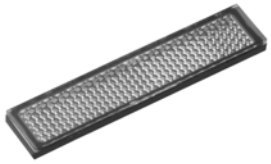


REF-H51x72

Reflector, rectangular 51 mm x 72 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Material	PMMA
Dimensions	51 mm x 72 mm x 7.5 mm
Mounting	mounting holes

Model number



REF-MA50

Reflector with Micro-structure, rectangular 10 mm x 50 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	10 mm x 50 mm x 5 mm
Mounting	self-adhesive

Model number



REF-MH23

Reflector with Micro-structure, rectangular 23 mm x 13.8 mm, diagonal mounting hole

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	23 mm x 13.8 mm x 4.9 mm
Mounting	mounting holes

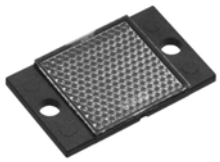
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Model number

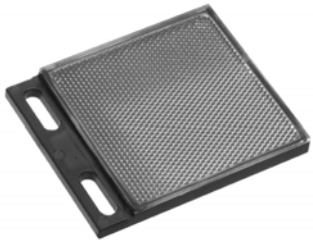


REF-MH20

Reflector with Micro-structure, rectangular 32 mm x 20 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	32 mm x 20 mm x 3 mm
Mounting	mounting holes

Model number

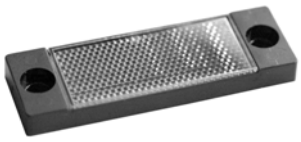


REF-MH50

Reflector with Micro-structure, rectangular 50.9 mm x 50.9 mm, mounting holes, fixing strap

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	50.9 mm x 50.9 mm x 8.5 mm
Mounting	mounting holes

Model number

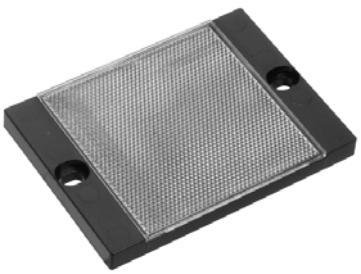


REF-MVR10

Reflector with Micro-structure, rectangular 60 mm x 19 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	60 mm x 19 mm x 6 mm
Mounting	mounting holes

Model number



REF-MH82

Reflector with Micro-structure, rectangular 82 mm x 60 mm, mounting holes

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	82 mm x 60 mm 7.4 mm
Mounting	mounting holes

Date of issue: 2015-04-08

Model number



REF-MCLIP15HT

Reflector with Micro-structure, round ø 15 mm, snap-in, high temperature applications

Ambient conditions	
Ambient temperature	-20 ... 110 °C (-4 ... 230 °F)
Mechanical specifications	
Dimensions	Diameter: 15 mm
Mounting	Snap-in

Model number



REF-MS21

Reflector with Micro-structure, round ø 21 mm, screw fixing M3

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 21 mm
Mounting	screw fixing

Model number



REF-MA21

Reflector with Micro-structure, round ø 21 mm, self-adhesive

Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 21 mm
Mounting	self-adhesive

Model number



REF-MCLIP21

Reflector with Micro-structure, round ø 21 mm, snap-in

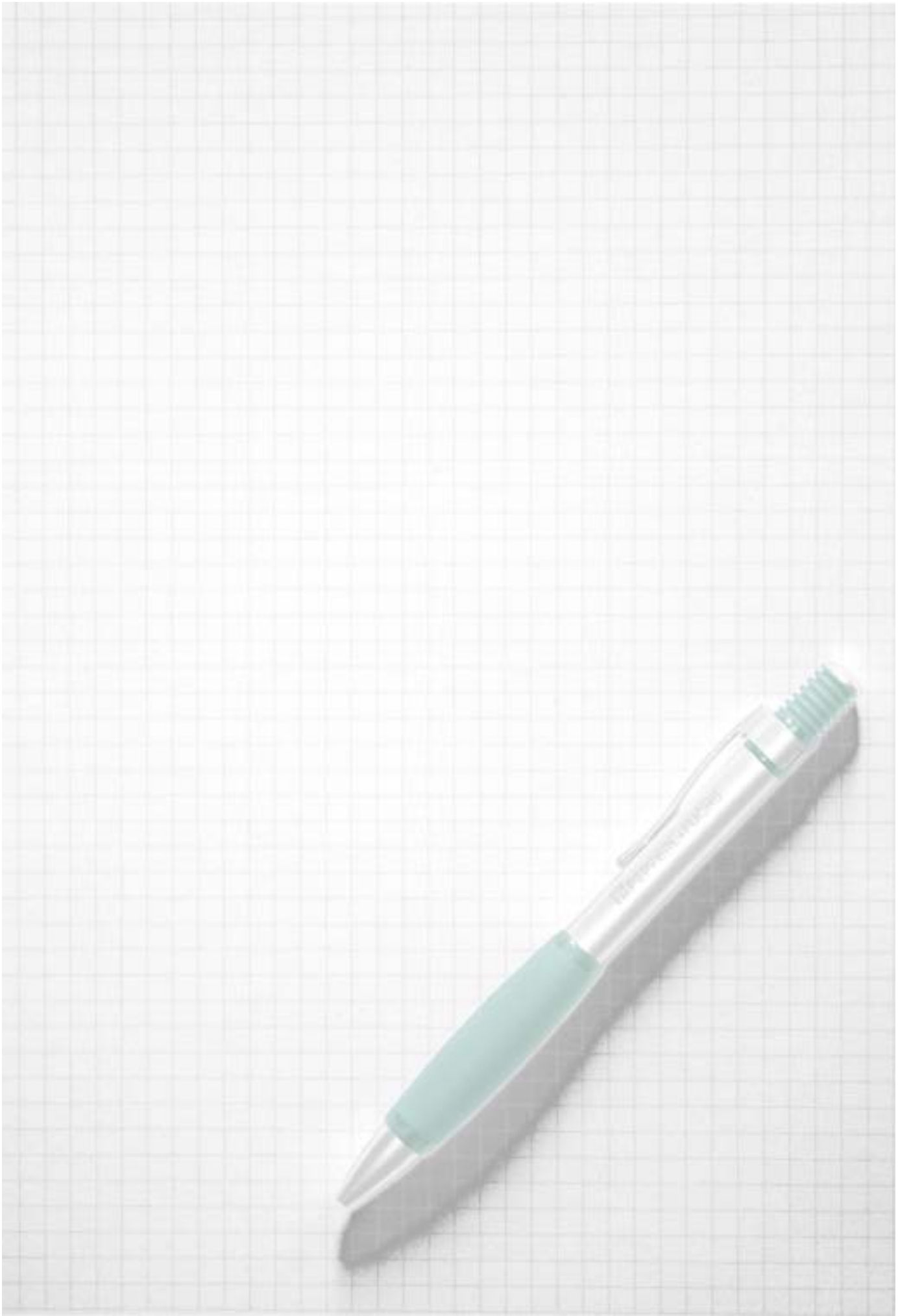
Ambient conditions	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)
Mechanical specifications	
Material	PMMA/ABS
Dimensions	Diameter: 21 mm
Mounting	Snap-in

Date of issue: 2015-04-08

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3. Ultrasonic Sensors

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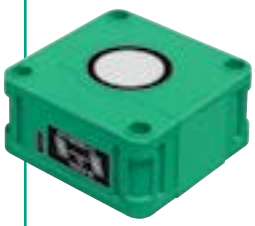
Ultrasonic diffuse mode sensor				
Series	**Ø 12 mm**	**Ø 18 mm**	**Ø 30 mm**	
	Page 603 ff	Page 607 ff	Page 618 ff	
Features	• *Compact design* • *Extremely small blind zone* • *Teach-in*	• *Very short housing design (18GM40)* • *Teach-in* • *Also with angled transducer* • *Synchronization options*	• *Wide detection range up to 6 m* • *Extensive product portfolio* • *Programmable and Teach-in* • *Synchronization options*	
Technical data				
Detection range	up to 400 mm	up to 1000 mm	up to 6000 mm	
Supply voltage	10 VDC ... 30 VDC	10 VDC ... 30 VDC	10 VDC ... 30 VDC	
Connection				
Plug connector	●	●	●	
Terminal compartment				
Output				
Switching output	●	●	●	
Relay output				
Analog output	●	●	●	
Frequency output		●		
PWM output		●		
Input				
Teach-in input	●	●	●	
Synchronization		●	●	
Interface				
RS 232 interface			●	
IO-Link		●	●	
Serial interface				
Special features				
Chemically resistant	●	●	●	
Hygienic design			●	
Rotatable transducer			●	
Separate transducer			●	
Angled transducer		●	●	
Height measurement	●			
Fill level measurement				

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						**Ultrasonic diffuse mode sensor**
	D1	**F77**	**F12**	**L2**	**F54**	**Series**
	Page 635	Page 636 ff	Page 638 ff	Page 641 ff	Page 644 ff	
	• *Single-hole mounting* • *3 relay outputs* • *AC/DC power supply* • *Ideal for filling level detection in small containers*	• *Miniature housing design* • *Teach-in* • *Diffuse mode and retroreflective sensors*	• *Compact design* • *Adjustable sound beam shape* • *Many mounting options* • *Teach-in or potentiometer adjustability* • *Synchronization*	• *Operating keys* • *Convertible transformer* • *Compact design* • *Programmable*	• *Teach-in* • *Temperature compensated*	**Features**
						Technical data
	550 mm	up to 400 mm	up to 800 mm	up to 4000 mm	up to 2000 mm	**Detection range**
	10 VDC ... 252 VDC 20 VAC ... 252 VAC	20 VDC ... 30 VDC	10 VDC ... 30 VDC	10 VDC ... 30 VDC	10 VDC ... 30 VDC	**Supply voltage**
						Connection
	●	●	●	●	●	**Plug connector**
						Terminal compartment
						Output
		●	●	●	●	**Switching output**
	●					**Relay output**
			●	●	●	**Analog output**
						Frequency output
						PWM output
						Input
		●	●	●	●	**Teach-in input**
			●	●	●	**Synchronization**
						Interface
						RS 232 interface
						IO-Link
				●		**Serial interface**
						Special features
						Chemically resistant
						Hygienic design
				●		**Rotatable transducer**
						Separate transducer
						Angled transducer
						Height measurement
	●					**Fill level measurement**

Ultrasonic diffuse mode sensor				
Series	**F43**	**F42**	***F65***	**F260**
	Page 646	Page 647 ff	Page 654 ff	Page 657
Features	• *Relay and analog outputs* • *Programmable via the RS 232 interface*	• *Wide detection range up to 6 m* • *Programming via membrane keys* • *Adjustable sensitivity* • *Adjustable sound beam shape* • *Synchronization*	• *Ideal for detecting filling levels* • *Programmable*	• *Very wide sensor detection range* • *Rotatable sensor head* • *Programmable* • *Supplied with mounting flange*
Technical data				
Detection range	up to 2000 mm	up to 6000 mm	up to 2500 mm	10000 mm
Supply voltage	10 VDC ... 30 VDC	10 VDC ... 30 VDC 20 VAC ... 253 VAC	12 VDC ... 30 VDC	15 VDC ... 30 VDC
Connection				
Plug connector	●	●	●	
Terminal compartment				●
Output				
Switching output		●	●	●
Relay output	●	●		
Analog output	●	●	●	●
Frequency output			●	
Input				
Teach-in input		●	●	
Synchronization		●		●
Interface				
RS 232 interface	●		●	●
IO-Link				
Parallel interface				
Special features				
Rotatable transducer				●
Fill level measurement			●	

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PEPPERL+FUCHS
SENSING YOUR NEEDS

			Ultrasonic Thru-Beam Sensors
Ø 18 mm	**Ø 30 mm**	**F77**	**Series**
Page 660 ff	Page 664	Page 665	
• *Compact design* • *Models with stainless steel housing*	• *Wide detection range* • *Adjustable sensitivity*	• *Miniature housing design* • *Fast response time*	
			Technical data
up to 1000 mm	4000 mm	800 mm	**Detection range**
100 Hz	15 Hz	100 Hz	**Switching frequency**
10 VDC ... 30 VDC	18 VDC ... 30 VDC	12 VDC ... 30 VDC	**Supply voltage**
			Connection
			Cable
●	●	●	**Plug connector**
			Terminal compartment
			Output
●		●	**1 switching output**
	●		**2 complementary switching outputs**
			Special features
●			**Chemically resistant**
●			**Angled transducer**
●			**Hygienic design**

Fundamentals of Ultrasonic Detection

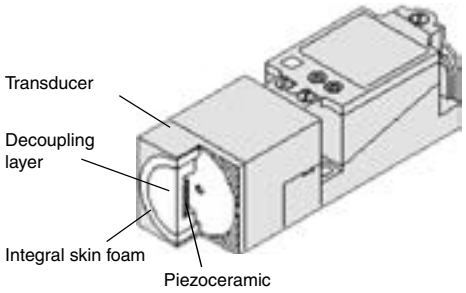
Physics and technology of ultrasonic sensors

Sound with a frequency higher than approx. 16 kHz cannot be detected by the human ear–this is referred to as ultrasound. Like sound in the audible frequency range, it propagates at a speed of around 344m/s in the air. The distance of an object can thus be accurately determined by evaluating the known speed of sound and the measured sound travel time.

Ultrasonic sensors are ideal for consistent object detection, even in harsh and problematic conditions. Objects made from different materials and with different shapes, colors, or consistencies are reliably detected.

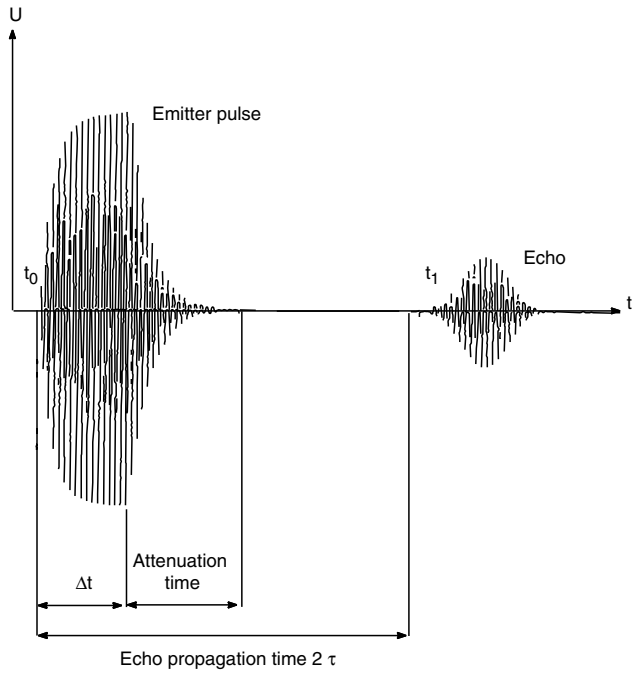
Pepperl+Fuchs ultrasonic sensors incorporate a piezoelectric converter as the sonic emitter and receiver. A patented decoupling layer made from a special plastic is used to couple the ultrasonic waves in the surrounding air.

Ultrasonic sensors are available with switching and/or analog outputs. Depending on the model, different output functions are available.



Blind zone

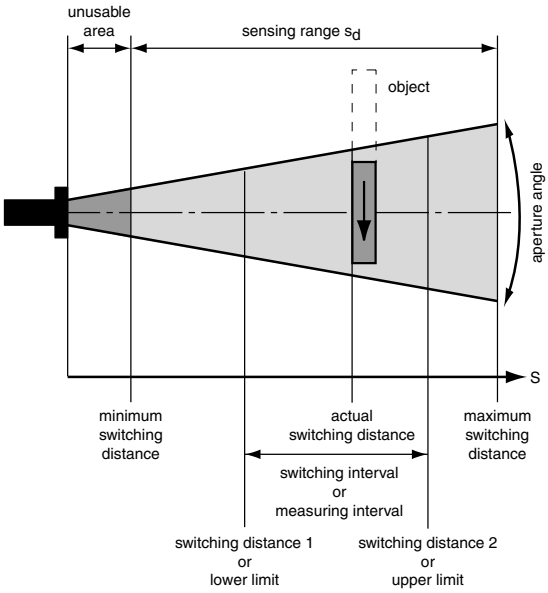
The ultrasonic converter transmits a burst of sound and converts the pulse echo into electric voltage. The integrated microcontroller calculates the distance of the object based upon the echo travel time and speed of sound. The transmission period and delay period of the ultrasonic converter result in a blind zone in which the ultrasonic sensor is not able to detect any objects.



Detection range

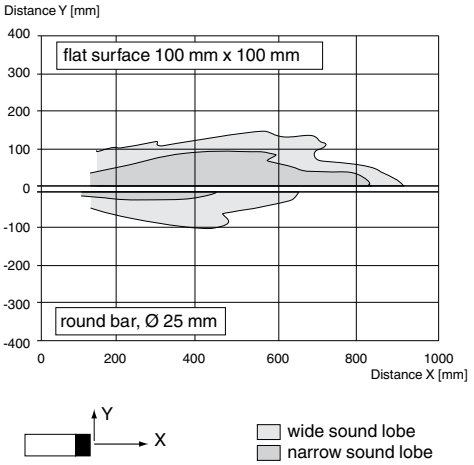
The active area of the ultrasonic sensor is known as the detection range and is limited by the shortest and longest operating distance. The longest operating distance is included in the model number.

The ultrasonic sensor detects objects within its detection range, regardless of whether they approach axially or move sideways in the sound beam.



Response curves

The following figure illustrates the response areas for two typical objects. The specified object is detected within this area.



The upper part of the diagram illustrates the response characteristic on a level panel measuring 100 mm x 100 mm, the lower part using a rod with a diameter of 25 mm as the object. Many sensors include a feature for setting the sound beam width. Both sound beam shapes are shown in the diagram.

The information in the type designation relates to a normal level panel measuring 100 mm x 100 mm. This panel must be perpendicular to the propagation direction of the ultrasonic signal. The sound is reflected away from upright objects and the echo does not reach the sensor.

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Environmental influences

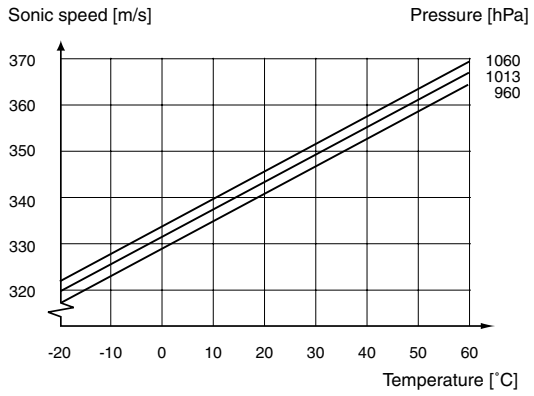
Due to the physical properties of sound propagation, the detection range and speed of the ultrasonic signal are influenced by the following factors:

-Air temperature

-Relative humidity

-Air pressure

The following diagram illustrates the theoretical relationship between air temperature, air pressure, and the speed of sound.



Daily air pressure fluctuations have a negligible effect on the speed of sound.

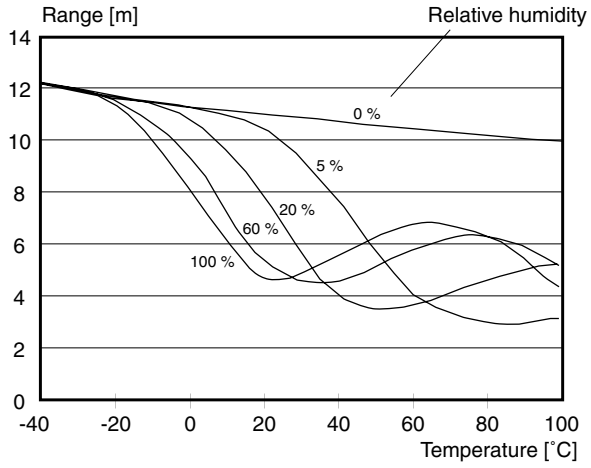
Temperature

Fluctuations in air temperature in the object area have an indirect effect upon the propagation of sound waves and therefore upon the accuracy of the sensor. Typically this changes the speed of sound by 0.17%/K. If, for example, the temperature increases from 20 °C ... 40 °C, the speed of sound increases by approx. 3.5% and a fixed object will appear closer to the sensor. To prevent this from happening, most ultrasonic sensors include temperature compensation; an electric probe measures the ambient temperature.

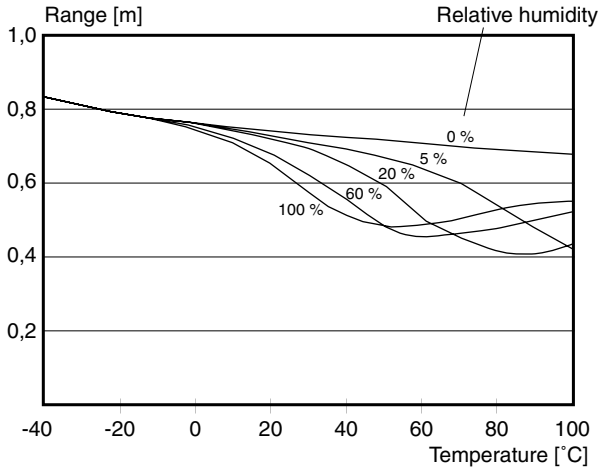
Ultrasonic sensors incur a certain amount of self-heating, which depends on the housing design and installation. During the first 60 minutes after switching on the sensor, this leads to an additional temperature error of max. 2%.

Erratic temperature changes cannot be compensated for due to the lag in the temperature probe.

The following diagram illustrates the effect of air temperature and humidity on the detection range of an ultrasonic sensor. In principle, the correlations apply to all ultrasonic sensors, in relation to the respective detection range.



UC4000-30GM-...



UC500-30GM-...

Low temperatures increase the detection range regardless of air humidity. At high temperatures, the detection range is reduced and this is increasingly influenced by relative air humidity.

The detection range details included in the data sheets relate to an ambient temperature of 20 °C and 50% relative air humidity.

Rain or snow

Light rain or snow does not affect the operation of ultrasonic sensors. Mounting the sensor at an inclined position prevents water or snow from collecting on the surface of the converter.

Object properties

Ultrasonic sensors can detect solid, liquid, and granular objects. Material properties such as transparency, color, or surface treatment (shiny or matt) do not affect detection reliability.

Level and flat surfaces located at a right angle to the converter axis provide an ideal reflection. The maximum angular deviation of the object from the ideal position is approx. ± 3°.

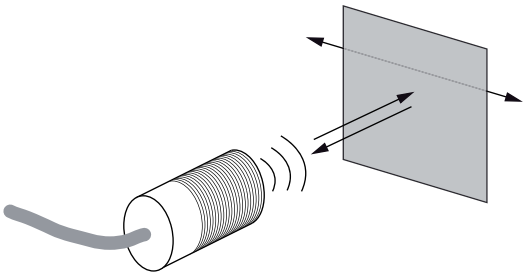
Rough surfaces result in diffuse reflection of a portion of the sound energy and the detection range decreases. The surface roughness does, however, allow for greater angular deviation.

Selecting and Commissioning an Ultrasonic Sensor

1. Operating principle

Ultrasonic diffuse mode sensor

The sender and receiver are located in the same housing. The object acts as a sound reflector.

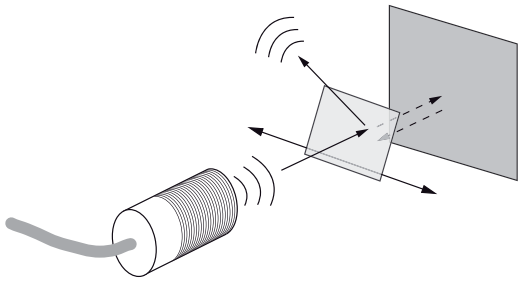


Features:

- *Simple installation, just one sensing head*
- *The detection range depends on the surface properties and the pitch angle of the object*
- *Measuring frequency is lower compared with a thru-beam sensor*
- *Background suppression*

Ultrasonic retroreflective sensor

The sender and receiver are located in the same housing. The ultrasonic beam is reflected by a fixed reflector. Objects that appear in the sound beam change the measured distance and absorb or deflect the sound.

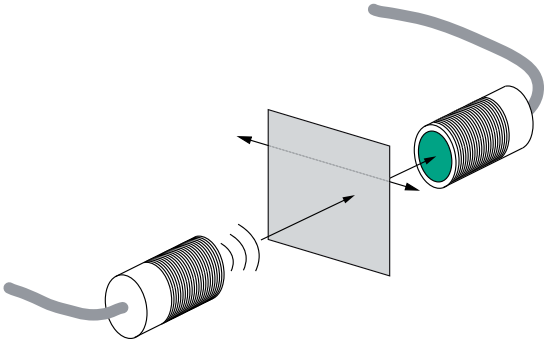


Features:

- *Simple installation, just one sensing head*
- *Reliable detection of problematic objects (sound-absorbing objects, angled surfaces)*

Ultrasonic thru-beam sensor

The emitter and receiver are separate and mounted opposite each other. If the ultrasonic beam is interrupted by an object, the switching output is activated.



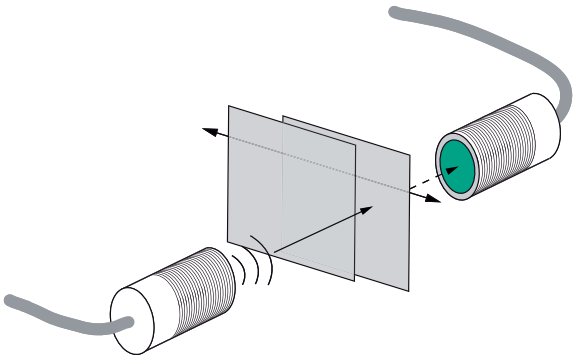
Features:

- *Large distance between emitter and receiver*
- *Low susceptibility to interference, suitable for difficult operating conditions*
- *Fast response times*
- *Two separate units to wire*

Ultrasonic double feed detection

Ultrasonic double feed detection is performed using ultrasonic thru-beam sensors, consisting of an ultrasonic emitter and an ultrasonic receiver with integrated evaluation that are optimized especially for these applications:

- *Double sheet control*
- *Label detection*
- *Adhesive strip detection*
- *Double feed detection*



Double sheet control can detect three different states:

- *No sheet*
- *Single sheet*
- *Double sheet*

During detection of labels and splices, the system can distinguish the tag material from the labels and the adhesive strip from the basic material.

Double feed detection is similar to double sheet control and distinguishes between no, one, or two instances of a material (e.g., sheet metals, wooden boards, glass panels).

2. Output function

Analog distance measurement

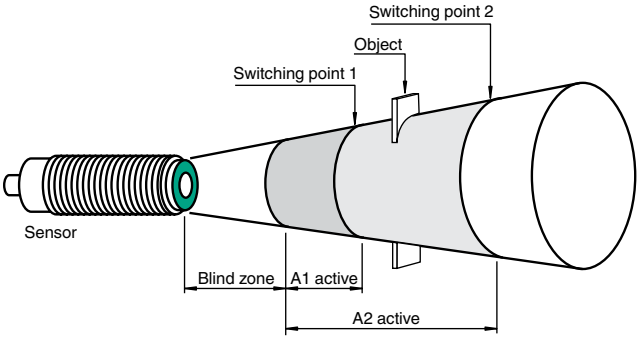
The sensor determines the distance from an object by measuring the time interval between emitting an ultrasonic signal and the arrival of the reflected echo. The sensors operate in diffuse mode. Depending on the model, different analog outputs are available:

- *Analog output voltage: 0 V ... 10 V*
- *Analog output current: 4 mA ... 20 mA*
- *Serial output, RS232*
- *IO-Link*

Trip point mode

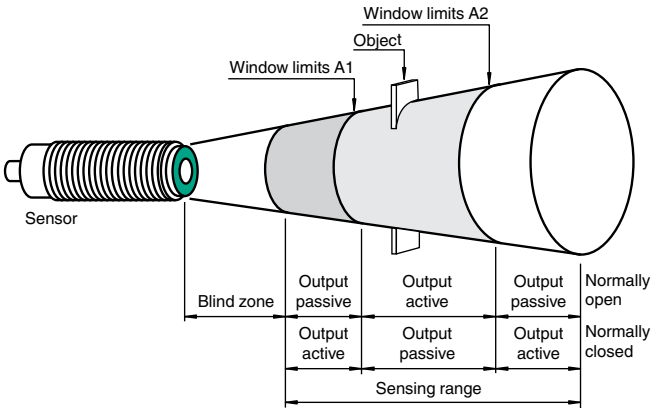
In the case of sensors with independent trip points, the output is activated if the object is located within the respective switching area.

This trip point can be set via Teach-in or a potentiometer.



Window mode

In window mode, the output is activated if the object is located in the switching window. The window limits are configurable.



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Retroflective mode

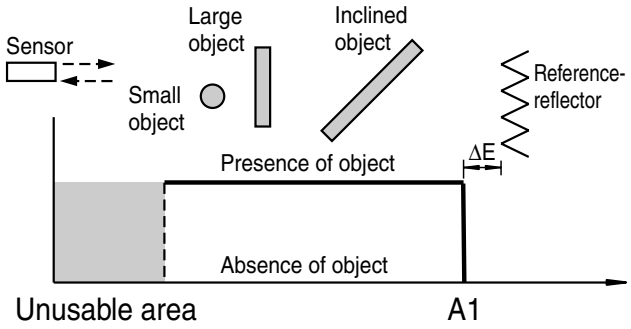
In retroflective mode, a fixed reflector is positioned.

The sensor output switches in the following cases:

- *The sensor detects an object that is located in front of the reflector. The echo from the reflector must not necessarily be suppressed.*
- *The sensor does not receive an echo.*

This can be caused by sound-absorbent material or an inclined reflector.

The position of the reference reflector must not be changed.



Hysteresis mode

In hysteresis mode, the evaluation window is limited by two trip points (near and far). If the object approaches the near switch point, the state of the switching output changes. To change the state of the switching output again, the object must reach the far trip point. Both trip points create an adjustable hysteresis window.

This operating mode can be used to control a pump. If the filling level reaches the filler mark, the pump is switched on. The pump then switches off again once the filling level has dropped to below the minimum level.

3. Electric outputs

For an overview of electric output types for our sensors, see page 14 onwards in our catalog.

NPN/PNP/push-pull transistor output

Ultrasonic sensors can have NPN, PNP, or push-pull outputs.

Relay output

Different ultrasonic sensors have relay contact outputs. The maximum switching power and type of voltage are included in the respective data sheet. The mechanical service life data relates to the number of switching operations for the unloaded relay contacts. These values are reached with a low electric load. Under nominal load, the service life reduces to that of the value specified for the electric service life. The service life data relates to MTBF values.

Analog output

Analog outputs are available as current outputs and voltage outputs. The output current and output voltage are proportional to the object's distance. The limits of the analog window can be programmed within the measuring range.

Serial interface

Sensors with a serial interface can be programmed via this interface. The measured distance of the object and the switching states are transferred.

Parameterization is carried out using the ULTRA 3000 service program or a terminal program and individual commands. A list of available commands is included in the respective sensor data sheets.

IO-Link

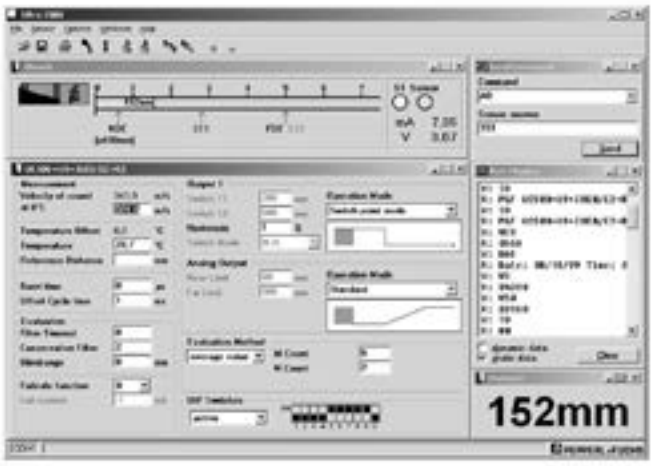
The bidirectional IO-Link interface enables the user to access the switching states and the object distance information directly in the control unit without the need for a complex analog value transfer. The sensor can be easily parameterized from the control unit. The IO-Link interface also transfers diagnosis data from the sensor to the control unit.

4. Programming

ULTRA 3000

The ULTRA 3000 parameterization software facilitates sensor programming by providing direct communication between an RS232 programmable ultrasonic sensor and a Windows computer. You can easily define and display the sensor parameters, display the commands transferred to and from the sensor, and call up the last measured distance. You also have precise control of functions that are not available in normal sensors, such as:

- *Detection range and limits*
- *Extended detection ranges*
- *Blind zone*
- *Sensitivity (sound beam width)*
- *Number of pulses evaluated per output*
- *Hysteresis*
- *Sound burst times*
- *Temperature offset*
- *Output mode*

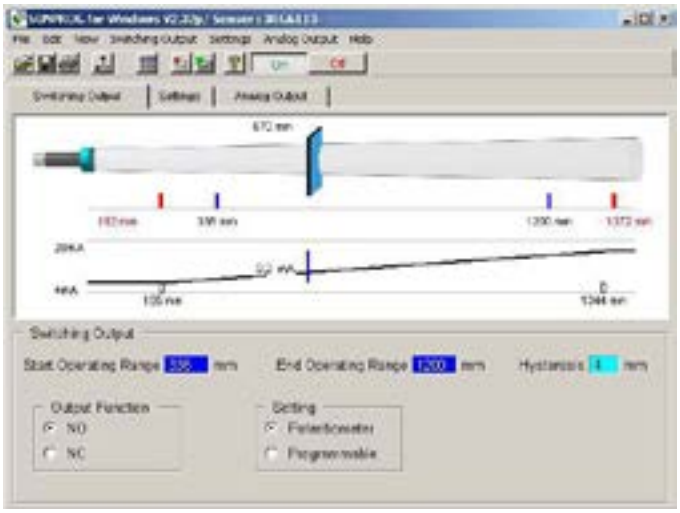


You can download ULTRA 3000 free of charge at www.pepperl-fuchs.com (Products -> Software) or via a direct link on the product page for each sensor compatible with ULTRA 3000.

SONPROG

The SONPROG PC interface and associated software enable the ultrasonic sensors in F65 and F260 housing designs to be adjusted individually in line with the needs of the respective application. For example, the following parameters can be set:

- *Start and end of the switching range*
- *Hysteresis*
- *Switching frequency*
- *Start and end of the analog characteristic*
- *Analog characteristic rising or falling*
- *End of the blind zone*
- *End of the detection range*
- *Averaging*
- *Attenuation*
- *Multiplex function*
- *Temperature compensation*
- *Function as a diffuse mode sensor or ultrasonic sensor*
- *Level measurement mode*



The start and end of the switching range and analog range can be taught at the touch of a button, and parameter sets can be copied from one sensor to another.

You can download SONPROG free of charge in the download area at www.pepperl-fuchs.com or via a direct link on the product page for each sensor compatible with SONPROG.

ULTRA-PROG-IR

The ULTRA-PROG-IR PC program and associated UC-18/30GM-IR programming device enable ultrasonic sensors with an infrared interface to be adjusted easily in line with the application requirements. The existing wiring to the sensor need not be removed as the programming device snaps on to the sensor. The distance and the quality of several echoes can be visualized in real time. Communication with the sensor does not affect the measuring task in the sensor.

Examples of adjustable parameters:

- *Start and end of the switching range*
- *Hysteresis*
- *Switching frequency*
- *Start and end of the analog characteristic*
- *Analog characteristic rising or falling*
- *End of the blind zone*
- *End of the detection range*
- *Averaging*
- *Attenuation*
- *Multiplex function*
- *Temperature compensation*
- *Function as a diffuse mode sensor or ultrasonic sensor*
- *Level measurement mode*

IO-Link/PACTware

The IO-Link interface enables ultrasonic sensors from the UC…-18GM-.. IO and UC…-30GM-..IO Series to be configured and parameterized with ease. It is also possible to carry out diagnostics for the connected sensor. The IO-Link Master01 USB is used to communicate between the sensor and the PC. ***PACTware*** parameterization and diagnostics software is used together with the corresponding DTM.



PACTware is an open, manufacturer-independent user interface that is used in areas such as the parameterization of ultrasonic sensors.

You can download ***PACTware*** free of charge at www.pepperl-fuchs.com or via a direct link on the product page for each sensor with an IO-Link.

5. Resolution/measurement accuracy

Resolution

Pepperl+Fuchs UC-type ultrasonic sensors are fitted internally with an integrated 12-bit D/A converter. A resolution of 12 bits corresponds to 4096 levels. The echo travel time is determined at a resolution of approx. 1 µs. This equates to a distance resolution of around 0.18 mm. This maximum sensor resolution is reached with a maximum measurement window of 750 mm. Up to this window size, the resolution depends solely on the pulse frequency of the microcontroller. The D/A converter determines the resolution by selecting a larger measurement window. This is calculated according to the following formula:

(upper limit – lower limit) / 4096

Example:

A UC4000-30GM-IUR2-V1 sensor is set with the following parameters.

Upper limit: 3500 mm

Lower limit: 800 mm

With this setting, the sensor resolution is

(3500 mm - 800 mm) / 4096 = 0.66 mm

Measurement accuracy/characteristic deviation

To determine the absolute accuracy of the measured value for an ultrasonic sensor, the following influencing factors must be taken into consideration:

- *Temperature*
- *Atmospheric pressure*
- *Relative humidity*
- *Atmospheric turbulence*
- *Hot spots in the ambient air around the sensor or the object*
- *Sensor at operating temperature state*

Consideration of these influences can provide measurement accuracy of better than 2%.

Reproducibility and linearity are better than 0.2% (under constant ambient conditions)

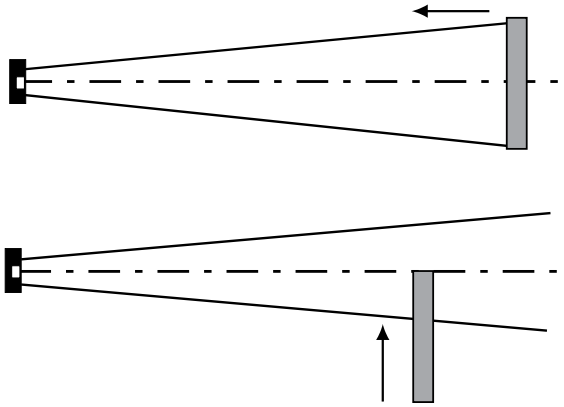
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6. Installation and operation

Ultrasonic sensors can be installed and operated in any location. However, the excessive build-up of dust or dirt should be avoided. When cleaning the ultrasonic sensors, make sure that the sensor area (decoupling layer) and the integral foam surrounding the converter are not damaged. Water droplets or crusting on the decoupling layer affect the functioning of the ultrasonic sensor. Minor deposits of dust are not critical.

Actuating direction

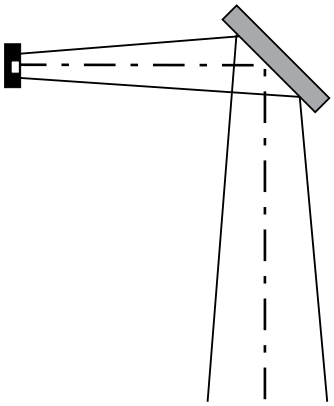
The objects to be detected can enter into the sound beam from all sides. The anticipated trip points are defined based on the detection ranges and response curves specified in the data sheets.



Deflection of the beam angle

The beam angle can be deflected using flat, level reflectors. However, the signal may not be deflected more than twice because the

signal attenuation that occurs with each deflection reduces the detection range.

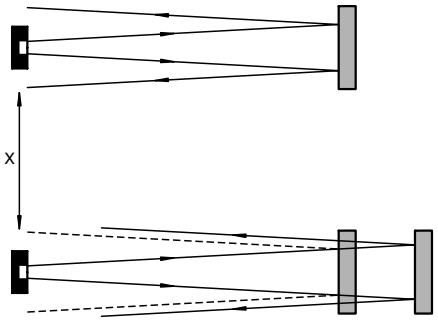


Note:

The reflector areas must be accurately aligned. For some of its sensor types, Pepperl+Fuchs offers reflectors designed for 90° angle deflection.

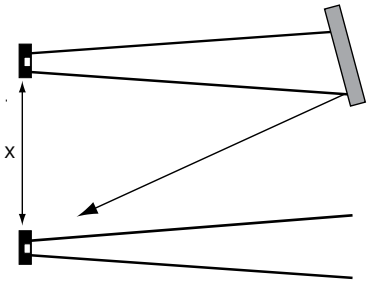
Mutual interference

To prevent mutual interference, the minimum distances between sensors with the same detection range must be taken into account, as specified in the following graphics.

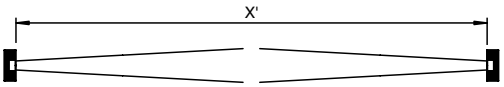


Detection range mm	X m	Detection range mm	X m
to 500 to 2000	> 0.3 > 1.0	to 4000 to 6000	> 2.0 > 2.5

The specified values are to be taken as guidelines. They apply if the beam angles are aligned parallel to one another and the object surfaces are located at right angles to the axes of the beam angle. The actual required distance "X" depends on the alignment, the type of target to be detected, and the conditions relating to other objects that are located in the beam angle.



The distances specified below must be taken into account when mounting sensors opposite one another.



Detection range mm	X' m	Detection range mm	X' m
to 500 to 2000	> 2.0 > 8.0	to 4000 to 6000	> 16.0 > 25.0

If interference occurs, it may be necessary to increase the distance "X" or activate the synchronization function if required. Pepperl+Fuchs offers a range of sensors that are fitted with synchronization inputs for this purpose. These sensors can be used in synchronous or multiplex mode.

Synchronization can be achieved using an external synchronization signal

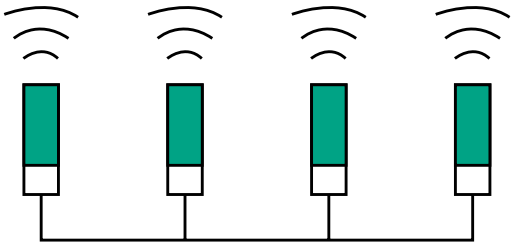
or even through self-synchronization for some sensor types. Synchronized and unsynchronized sensors must not be mounted opposite each other.

Avoiding interference

If several sensors are operated in very close proximity to each other, they can cause mutual interference, meaning that reliable detection is no longer possible. Synchronizing the transfer cycles for all sensors makes it possible to reduce the interference-free minimum distance between the sensors.

Multiplex mode

Operating the sensor in multiplex mode enables ultrasonic bursts to be staggered, which prevents one or more units from emitting signals at the same time.



Synchronization ports connected

The sensors are activated on a cycle over a short period. It should be noted that with this operation mode, the multiplex time T is extended by factor N, where N indicates the number of sensors operated in multiplex mode.

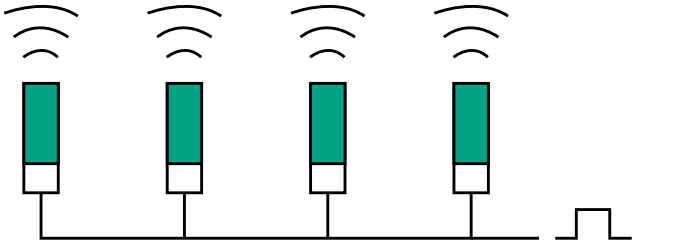
$T_{multiplex} = N \times T_{sensor}$ and $f_{sync} = 1/T_{multiplex}$

If different types of sensors are used, the entire cycle time equates to the total of the cycle times for the individual sensors.

$Tmultiplex = T_1 + T_2 + T_3 \ldots + T_N$

When using self-synchronization, the sensors operate in multiplex mode.

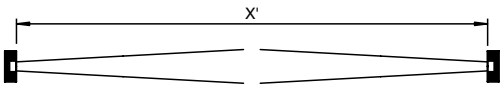
Synchronized mode



Synchronization ports conneted external clock

In this operating mode, the synchronization inputs for all sensors are linked and are controlled collectively by an external clock-pulse source. In contrast to multiplex mode, this does not increase the cycle time. Synchronization mode is suitable for monitoring larger areas but is also useful in confined spaces because little distance is required between the sensors.

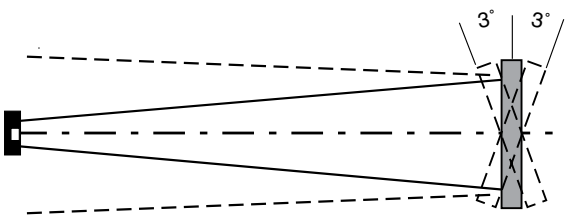
The distances specified below must be taken into account when mounting sensors opposite one another.



Detection range mm	X' m	Detection range mm	X' m
to 500 to 2000	> 2.0 > 8.0	to 4000 to 6000	> 16.0 > 25.0

Measuring plates/objects

Ultrasonic sensors can detect solid, liquid, and granulated objects. The surface properties of the object are important for the evaluation of the echo by the sensor. All level and flat surfaces that are positioned at a right angle to the beam angle enable an ideal reflection. The measuring plate may have a maximum angle deviation of +/- 3º in order to guarantee reliable detection.



Material properties such as transparency, color, or surface treatment (shiny or matt) do not affect detection reliability. Rough surfaces result in diffuse reflection of a portion of the sound energy, which decreases the detection range.

However, the roughness of the surface allows for greater angle deviation due to the predominantly diffuse reflection of the ultrasonic signal. This enables detection of the filling level or angle of repose for granular materials with an angle deviation of up to 45° (with reduced detection range).

The following objects are suitable for detection:

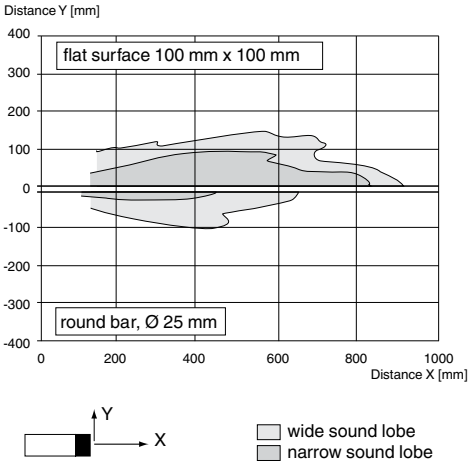
- *All flat and fixed objects that are aligned at a right angle to the beam angle*
- *All fixed objects that are randomly aligned and have a rough surface that causes a diffuse reflection*
- *Surfaces of fluids at an angle of < 3° from the axis of the beam angle*

The following materials are not suitable:

- *Materials that absorb ultrasonic signals such as felt, cotton, rough textiles, or foam*
- *Materials with temperatures exceeding 100 °C*

Sensors with an adjustable beam angle width

Some series offer an adjustable beam angle that enables the sensors to be used in confined spaces where objects can be spread out laterally in the beam angle. Such conditions would result in inaccurate switching characteristics or incorrect readings for sensors that do not include this function. Adjusting the shape of the beam angle does not affect the maximum detection range.



The graphic above illustrates the characteristic response curve of sensor UB500-F42 for two different objects:

- *Rod with 25 mm diameter (lower part) and*
- *Level area measuring 100 mm x 100 mm (upper part).*

It can be seen that the selection of a slim beam reduces the radial detection range. As a result, the sensor can be mounted in confined spaces.

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PEPPERL+FUCHS SENSING YOUR NEEDS

Special Sensor Properties for Special Applications

Chemically-resistant sensors

The range of UCC-type ultrasonic sensors from Pepperl+Fuchs includes a wide selection of sensors with increased resistance to chemically aggressive vapors and media. The housings of these sensors are made from stainless steel and the converter is coated with a PTFE film.



Sensors with a rotatable transducer

Sensors with a rotatable transducer offer total flexibility in terms of aligning the measurement beam. Rotatable converters are included in the *VariKont*, *VariKont* L, 30GM, and F260 Series.



Sensors with an offset transducer

The solution for applications where it is difficult to use an ultrasonic sensor due to space restrictions. To save space, the transducer is located in a small threaded housing that is connected to the control interface of the sensor via a cable. The sensor at the measurement site requires very little installation space. The rest of the sensor is mounted at another location where there is sufficient space.

A further benefit is the good accessibility to the display and operator elements on the amplifier when the measurement site is located at an inaccessible location within your plant or machine.



Sensors for the food industry

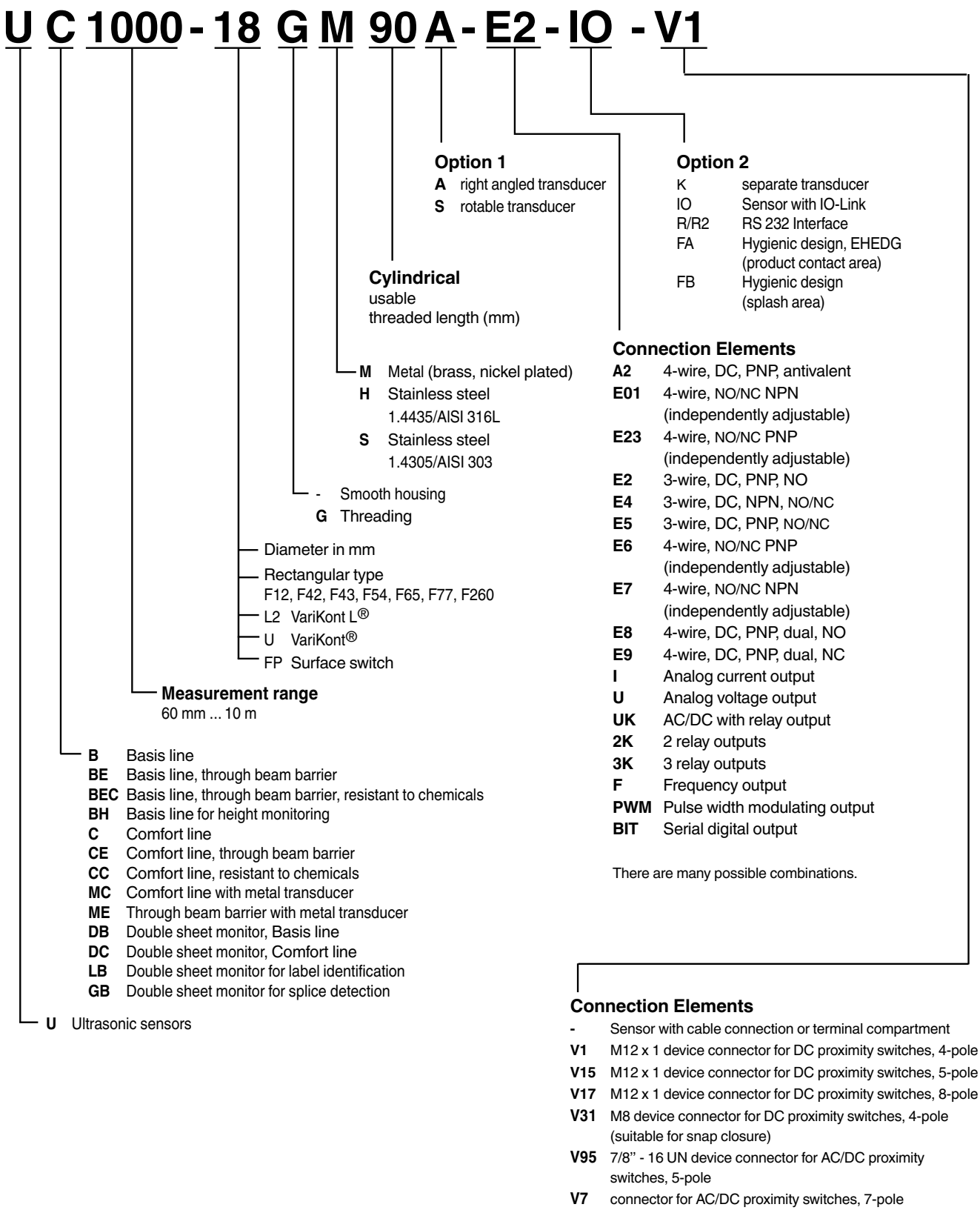
The food and drink industry environment places extremely high requirements on machinery and components. Pepperl+Fuchs has therefore developed sensors for this sector in line with current standards. Our sensor solutions fulfill the globally applicable standards and guidelines for the food and drink industry, such as EHEDG and FDA.



Benefits

- *Quick and ffiefficient cleaning*
- *Short cleaning times*
- *Microbiological safety*
- *Greater machine availability*

Type Code, Ultrasonic Sensors



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 30 mA
Rated operational current	100 mA , short-circuit/overload protected
Input type	1 program input
LED yellow	indication of the switching state flashing: program function object detected
LED red	solid red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type	UB120-12GM-E4-V1	UB120-12GM-E5-V1	UB200-12GM-E4-V1	UB200-12GM-E5-V1	UB400-12GM-E4-V1	UB400-12GM-E5-V1
Sensing range	15 ... 120 mm	●	●				
	15 ... 200 mm			●	●		
	30 ... 400 mm					●	●
Transducer frequency	approx. 850 kHz	●	●				
	approx. 400 kHz			●	●		
	approx. 310 kHz					●	●
Output type	1 switch output NPN Normally open/ closed , programmable	●		●		●	
	1 switch output PNP Normally open/ closed , programmable		●		●		●
Switching frequency	≤ 52 Hz	●	●				
	≤ 13 Hz			●	●		
	≤ 8 Hz					●	●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

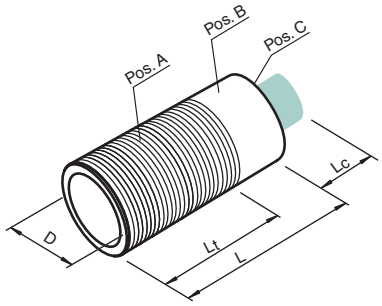
Dimensions	
Length L [mm]	64
Diameter D [mm]	12
Thread length l_t [mm]	41
Connector area l_c [mm]	6
LED position	Pos. B

Properties

- Up to 400 mm sensing range
- DC, switching output
- Ø12 mm cylindrical housing
- Connector version

Your Benefit

- Smallest diameter cylindrical model
- Teach-wire or UB-PROG2 pushbutton configurable



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

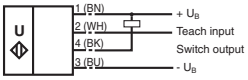
UB-PROG2	Programming unit
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
UVW90-M12	Ultrasonic -deflector

Electrical Connection



UB200-12GM-E4-V1
UB400-12GM-E4-V1
UB120-12GM-E4-V1

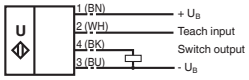
Standard symbol/Connections:
(version E4, npn)



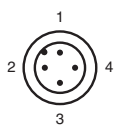
Core colours in accordance with EN 60947-5-2.

UB200-12GM-E5-V1
UB400-12GM-E5-V1
UB120-12GM-E5-V1

Standard symbol/Connections:
(version E5, pnp)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 30 mA
Resolution	0.17 mm
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input
LED yellow	solid yellow: object in the evaluation range yellow, flashing: program function, object detected
LED red	solid red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type	UB120-12GM-I-V1	UB120-12GM-U-V1	UB200-12GM-I-V1	UB200-12GM-U-V1	UB400-12GM-I-V1	UB400-12GM-U-V1
Sensing range	15 ... 120 mm	●	●				
	15 ... 200 mm			●	●		
	30 ... 400 mm					●	●
Transducer frequency	approx. 850 kHz	●	●				
	approx. 400 kHz			●	●		
	approx. 310 kHz					●	●
Operating voltage	10 ... 30 V DC , ripple 10 %SS	●		●		●	
	15 ... 30 V DC , ripple 10 %SS		●		●		●
Output type	1 analog output 0 ... 10 V		●		●		●
	1 analog output 4 ... 20 mA	●		●		●	
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

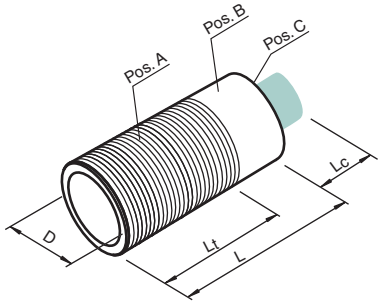
Dimensions	
Length L [mm]	64
Diameter D [mm]	12
Thread length l_t [mm]	41
Connector area l_c [mm]	6
LED position	Pos. B

Properties

- Up to 400 mm sensing range
- DC, analog output
- Ø12 mm cylindrical housing
- Connector version

Your Benefit

- Smallest diameter cylindrical model
- Teach-wire or UB-PROG2 pushbutton configurable



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

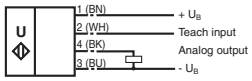
UB-PROG2	Programming unit
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
UVW90-M12	Ultrasonic -deflector

Electrical Connection



UB200-12GM-U-V1
UB400-12GM-U-V1
UB120-12GM-U-V1

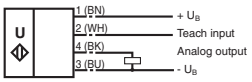
Standard symbol/Connections:
(version U)



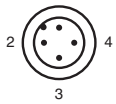
Core colors in accordance with EN 60947-5-2.

UB200-12GM-I-V1
UB400-12GM-I-V1
UB120-12GM-I-V1

Standard symbol/Connections:
(version I)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBC250-12GM-E5-V1
Sensing range	30 ... 250 mm
Transducer frequency	approx. 310 kHz
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	≤ 30 mA
Output type	1 switch output PNP Normally open/closed , programmable
Rated operational current	100 mA , short-circuit/overload protected
Switching frequency	≤ 8 Hz
Input type	1 program input
Ambient temperature	0 ... 70 °C (32 ... 158 °F)
Material	
Housing	Stainless steel 1.4435 / AISI 316L O-ring for cover sealing: EPDM
Transducer	PTFE (diaphragm surface)
Protection degree	IP68 / IP69K
Connection type	Device connector M12 x 1 , 4-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	65
Diameter D [mm]	12
Cap diameter D_1 [mm]	15
Thread length l_t [mm]	41
Cap length l_1 [mm]	12
Connector area l_c [mm]	7.5

Properties

- 250 mm sensing range
- DC, switching output
- Ø12 mm cylindrical housing
- Connector version

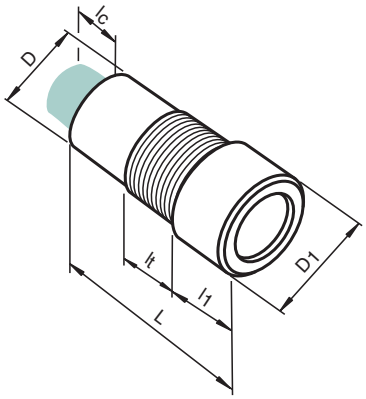
Your Benefit

- PTFE-coated transducer and 316L stainless steel barrel for maximum chemical resistance
- Teach-wire or UB-PROG2 pushbutton configurable

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

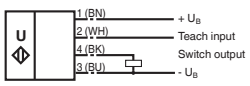


Electrical Connection

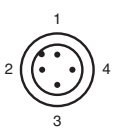


UBC250-12GM-E5-V1

Standard symbol/Connections:
(version E5, pnp)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBH60/30-12GM-U-V1
Measurement range	object thickness (d) : 0 ... 30 mm
Transducer frequency	approx. 850 kHz
Operating voltage	15 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 30 mA
Output type	1 analog output 0 ... 10 V
Resolution	0.17 mm
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 function input
LED yellow	solid: object in evaluation range
LED red	solid red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
Dimensions	
Length L [mm]	64
Diameter D [mm]	12
Thread length l_t [mm]	41
Connector area l_c [mm]	6
LED position	Pos. B

Properties

- 0 ... 30 mm high accuracy height measurement
- DC, analog output
- Ø12 mm cylindrical housing
- Connector version

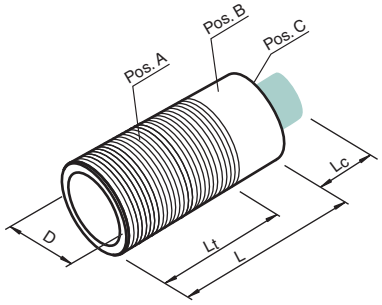
Your Benefit

- High-resolution thickness measurement
- Temperature compensation activated upon power-up

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

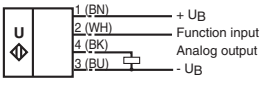
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
BF 12	Mounting flange, 12 mm
BF 12-F	Mounting flange with dead stop, 12 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



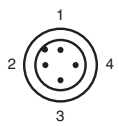
Electrical Connection

UBH60/30-12GM-U-V1

Standard symbol/Connections:



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
LED green	Power on
LED yellow	indication of the switching state flashing: program function object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type	UB300-18GM40-E5-V1	UB300-18GM40-E4-V1	UB800-18GM40-E4-V1	UB800-18GM40-E5-V1
Sensing range	30 ... 300 mm	●	●		
	50 ... 800 mm			●	●
Transducer frequency	approx. 390 kHz	●	●		
	approx. 255 kHz			●	●
Output type	1 switch output E4, NPN, NO/NC, programmable		●	●	
	1 switch output E5, PNP NO/NC, programmable	●			●
Switching frequency	≤ 13 Hz	●	●		
	≤ 4 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

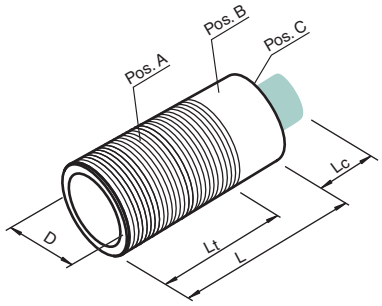
Dimensions	
Length L [mm]	39,2
Diameter D [mm]	18
Thread length l_t [mm]	24,5
Connector area l_c [mm]	10
LED position	Pos. C

Properties

- 300 mm and 800 mm sensing range versions
- DC, switching output
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Short barrel length for space-restricted mounting
- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

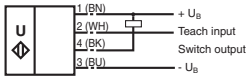
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



UB300-18GM40-E4-V1
UB800-18GM40-E4-V1

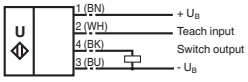
Standard symbol/Connections:
(version E4, npn)



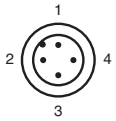
Core colours in accordance with EN 60947-5-2.

UB800-18GM40-E5-V1
UB300-18GM40-E5-V1

Standard symbol/Connections:
(version E5, pnp)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015

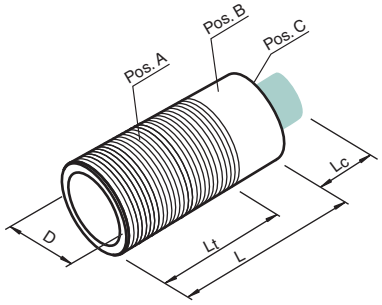


Properties

- 300 mm and 800 mm sensing range versions
- DC, analog output
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Short barrel length for space-restricted mounting
- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 20 mA
Resolution	0.4 mm at max. sensing range
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input
LED green	Power on
LED yellow	permanently yellow: object in the evaluation range yellow, flashing: program function, object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number	green = preferred type	UB300-18GM40-I-V1	UB300-18GM40-U-V1	UB800-18GM40-I-V1	UB800-18GM40-U-V1
Sensing range	30 ... 300 mm	●	●		
	50 ... 800 mm			●	●
Transducer frequency	approx. 390 kHz	●	●		
	approx. 255 kHz			●	●
Operating voltage	10 ... 30 V DC , ripple 10 %SS	●		●	
	15 ... 30 V DC , ripple 10 %SS		●		●
Output type	1 analog output 0 ... 10 V		●		●
	1 analog output 4 ... 20 mA	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions	
Length L [mm]	39,2
Diameter D [mm]	18
Thread length l_t [mm]	24,5
Connector area l_c [mm]	10
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

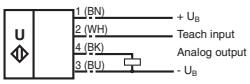
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



UB300-18GM40-U-V1
UB800-18GM40-U-V1

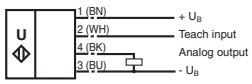
Standard symbol/Connections:
(version U)



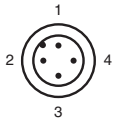
Core colors in accordance with EN 60947-5-2.

UB300-18GM40-I-V1
UB800-18GM40-I-V1

Standard symbol/Connections:
(version I)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBC400-18GH40-I-V1
Sensing range	40 ... 400 mm
Transducer frequency	approx. 255 kHz
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Output type	1 analog output 4 ... 20 mA, short-circuit/overload protected
Resolution	0.4 mm at max. sensing range
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input lower evaluation limit A1: -U_B ... +1 V, upper evaluation limit A2: +4 V ... +U_B input impedance: > 4.7 kΩ, pulse duration: ≥ 1 s
Ambient temperature	0 ... 70 °C (32 ... 158 °F)
Material	
Housing	Stainless steel 1.4435 / AISI 316L O-ring for cover sealing: EPDM
Transducer	PTFE
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	43
Diameter D [mm]	18
Head diameter D_1 [mm]	22
Head length l_1 [mm]	13
Thread length l_t [mm]	15
Connector area l_c [mm]	10

Properties

- 400 mm sensing range
- DC, analog output
- Ø18 mm cylindrical housing
- Connector version

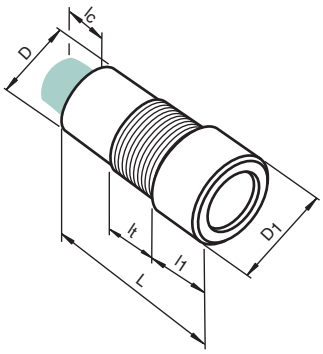
Your Benefit

- Short barrel length for space-restricted mounting
- PTFE-coated transducer and 316L stainless steel barrel for maximum chemical resistance
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

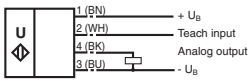


Electrical Connection

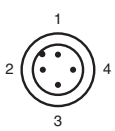


UBC400-18GH40-I-V1

Standard symbol/Connections:
(version I)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
LED green	Power on
LED yellow	indication of the switching state flashing: program function object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number		UB300-18GM40A-E4-V1	UB300-18GM40A-E5-V1	UB800-18GM40A-E4-V1	UB800-18GM40A-E5-V1
	green = preferred type				
Sensing range	30 ... 300 mm	●	●		
	50 ... 800 mm			●	●
Transducer frequency	approx. 390 kHz	●	●		
	approx. 255 kHz			●	●
Output type	1 switch output E4, NPN, NO/NC, programmable	●		●	
	1 switch output E5, PNP NO/NC, programmable		●		●
Switching frequency	≤ 13 Hz	●	●		
	≤ 4 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

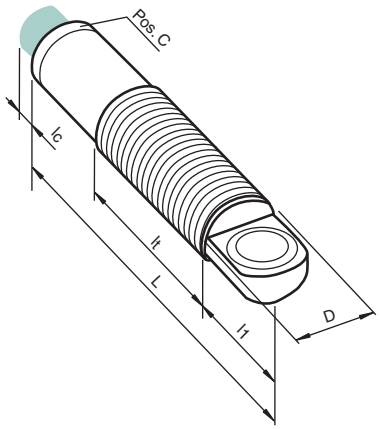
Dimensions	
Length L [mm]	57,7
Diameter D [mm]	18
Transducer length l_1 [mm]	18,5
Thread length l_t [mm]	24,5
Connector area l_c [mm]	10
LED position	Pos. C

Properties

- 300 mm and 800 mm sensing range versions
- DC, switching output
- Ø18 mm cylindrical housing, angled head
- Connector version

Your Benefit

- Right-angle transducer for space-restricted mounting
- Ultra bright LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

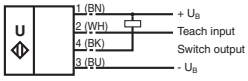
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



UB300-18GM40A-E4-V1
UB800-18GM40A-E4-V1

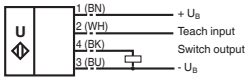
Standard symbol/Connections:
(version E4, npn)



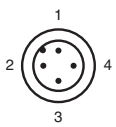
Core colours in accordance with EN 60947-5-2.

UB300-18GM40A-E5-V1
UB800-18GM40A-E5-V1

Standard symbol/Connections:
(version E5, pnp)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 20 mA
Resolution	0.4 mm at max. sensing range
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input
LED green	Power on
LED yellow	permanently yellow: object in the evaluation range yellow, flashing: program function, object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number		UB300-18GM40A-I-V1	UB300-18GM40A-U-V1	UB800-18GM40A-I-V1	UB800-18GM40A-U-V1
	green = preferred type				
Sensing range	30 ... 300 mm	●	●		
	50 ... 800 mm			●	●
Transducer frequency	approx. 390 kHz	●	●		
	approx. 255 kHz			●	●
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$	●		●	
	15 ... 30 V DC , ripple 10 %$_{SS}$		●		●
Output type	1 analog output 0 ... 10 V		●		●
	1 analog output 4 ... 20 mA	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

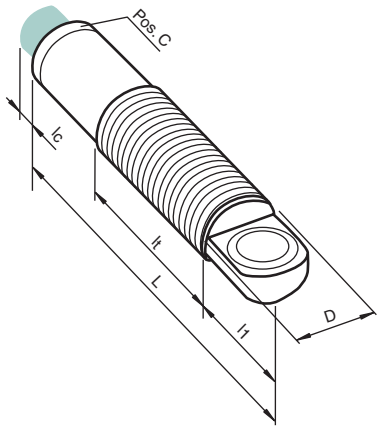
Dimensions	
Length L [mm]	57,7
Diameter D [mm]	18
Transducer length l_1 [mm]	18,5
Thread length l_t [mm]	24,5
Connector area l_c [mm]	10
LED position	Pos. C

Properties

- 300 mm and 800 mm sensing range versions
- DC, analog output
- Ø18 mm cylindrical housing, angled head
- Connector version

Your Benefit

- Right-angle transducer for space-restricted mounting
- Ultra bright LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

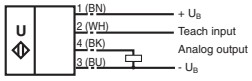
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



UB300-18GM40A-U-V1
UB800-18GM40A-U-V1

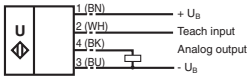
Standard symbol/Connections:
(version U)



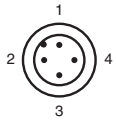
Core colors in accordance with EN 60947-5-2.

UB300-18GM40A-I-V1
UB800-18GM40A-I-V1

Standard symbol/Connections:
(version I)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input,
Synchronization	1 synchronous connection, bi-directional
LED yellow	indication of the switching state flashing: program function object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number	green = preferred type	UB500-18GM75-E4-V15	UB500-18GM75-E5-V15	UB1000-18GM75-E4-V15	UB1000-18GM75-E5-V15
Sensing range	30 ... 500 mm	●	●		
	70 ... 1000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 255 kHz			●	●
Output type	1 switch output NPN Normally open/ closed , programmable	●		●	
	1 switch output PNP Normally open/ closed , programmable		●		●
Switching frequency	max. 8 Hz	●	●		
	max. 3 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

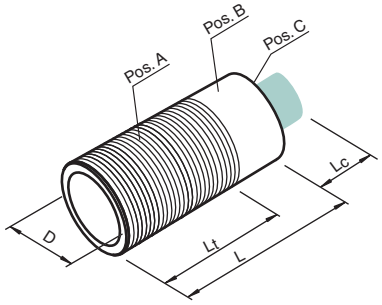
Dimensions	
Length L [mm]	75
Diameter D [mm]	18
Thread length l_t [mm]	48
Connector area l_c [mm]	10
LED position	Pos. C

Properties

- 500 mm and 1000 mm sensing range versions
- DC, switching output
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

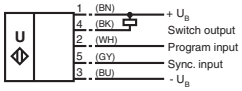
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-18GM75-E4-V15
UB1000-18GM75-E4-V15

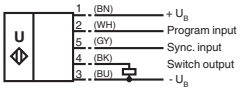
Standard symbol/Connections:
(version E4, npn)



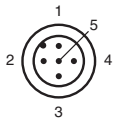
Wire colors in accordance with EN 60947-5-2.

UB500-18GM75-E5-V15
UB1000-18GM75-E5-V15

Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Rated operational current	2 x 100 mA , short-circuit/overload protected
Input type	1 program input,
LED yellow	indication of the switching state flashing: program function object detected
LED red	"Error", object uncertain in program function: No object detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



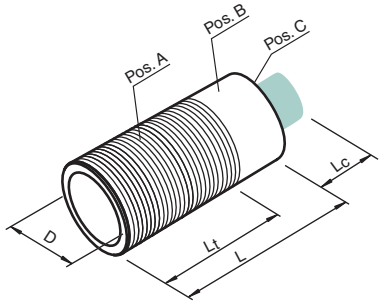
Model Number	green = preferred type	UB500-18GM75-E6-V15	UB500-18GM75-E7-V15	UB1000-18GM75-E6-V15	UB1000-18GM75-E7-V15
Sensing range	30 ... 500 mm	●	●		
	70 ... 1000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 255 kHz			●	●
Output type	2 switch outputs NPN, normally open/ closed , programmable		●		●
	2 switch outputs PNP, NO/NC, program-mable	●		●	
Switching frequency	max. 8 Hz	●	●		
	max. 3 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]		75			
Diameter D [mm]		18			
Thread length l_t [mm]		48			
Connector area l_c [mm]		10			
LED position		Pos. C			

Properties

- 500 mm and 1000 mm sensing range versions
- DC, 2 switching outputs
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Dual outputs, either both N.O. or N.C.
- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG3 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

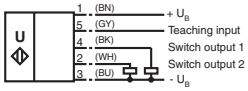
UB-PROG3	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-18GM75-E6-V15
UB1000-18GM75-E6-V15

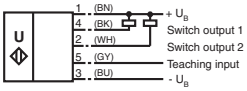
Standard symbol/Connections:
(version E6, pnp)



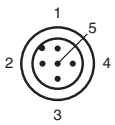
Core colours in accordance with EN 60947-5-2.

UB500-18GM75-E7-V15
UB1000-18GM75-E7-V15

Standard symbol/Connections:
(version E7, npn)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

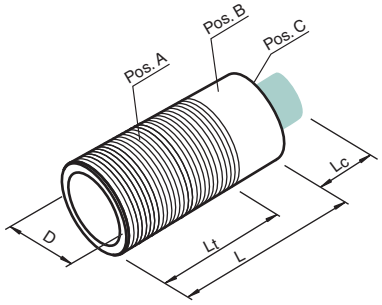


Properties

- 500 mm and 1000 mm sensing range versions
- DC, 2 switching outputs
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Dedicated N.O. (1) and N.C. (1) outputs
- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG3 pushbutton



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Rated operational current	2 x 100 mA , short-circuit/overload protected
Input type	1 program input,
LED yellow	indication of the switching state flashing: program function object detected
LED red	"Error", object uncertain in program function: No object detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UB500-18GM75-E01-V15	UB500-18GM75-E23-V15	UB1000-18GM75-E01-V15	UB1000-18GM75-E23-V15
Sensing range	30 ... 500 mm	●	●		
	70 ... 1000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 255 kHz			●	●
Output type	2 switch outputs NPN, normally open/ closed , programmable	●		●	
	2 switch outputs PNP, NO/NC, programmable		●		●
Switching frequency	max. 8 Hz	●	●		
	max. 3 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions	
Length L [mm]	75
Diameter D [mm]	18
Thread length l_t [mm]	48
Connector area l_c [mm]	10
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

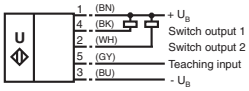
UB-PROG3	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-18GM75-E01-V15
UB1000-18GM75-E01-V15

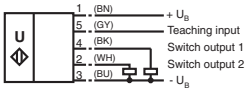
Standard symbol/Connections:
(version E01, npn)



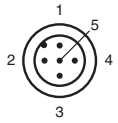
Core colours in accordance with EN 60947-5-2.

UB500-18GM75-E23-V15
UB1000-18GM75-E23-V15

Standard symbol/Connections:
(version E23, pnp)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input
Synchronization	1 synchronous connection, bi-directional
LED yellow	permanently yellow: object in the evaluation range yellow, flashing: program function, object detected
LED red	permanently red: Error red, flashing: program function, object not detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



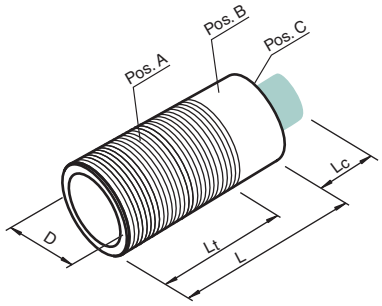
Model Number	green = preferred type	UB500-18GM75-U-V15	UB500-18GM75-I-V15	UB1000-18GM75-I-V15	UB1000-18GM75-U-V15
Sensing range	30 ... 500 mm	●	●		
	70 ... 1000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 255 kHz			●	●
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$		●	●	
	15 ... 30 V DC , ripple 10 %$_{SS}$	●			●
No-load supply current	≤ 45 mA		●	●	
	≤ 50 mA	●			●
Output type	1 analog output 0 ... 10 V	●			●
	1 analog output 4 ... 20 mA		●	●	
Resolution	0.11 mm at max. sensing range	●			
	0.13 mm at max. sensing range		●		
	0.35 mm			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]		75			
Diameter D [mm]		18			
Thread length l_t [mm]		48			
Connector area l_c [mm]		10			
LED position		Pos. C			

Properties

- 500 mm and 1000 mm sensing range versions
- DC, analog output
- Ø18 mm cylindrical housing
- Connector version

Your Benefit

- Ultra bright rear-view LEDs
- Flexible configuration via Teach-wire or UB-PROG2 pushbutton



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

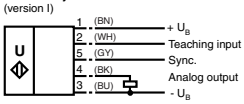
UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB1000-18GM75-I-V15
UB500-18GM75-I-V15

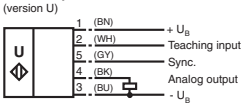
Standard symbol/Connections:
(version I)



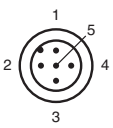
Core colours in accordance with EN 60947-5-2.

UB1000-18GM75-U-V15
UB500-18GM75-U-V15

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Resolution	1 mm
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 Parameterization input
Synchronization	1 synchronous connection, bi-directional
LED green	Power on
LED red	flashing: error(br>permanent: no object detected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin

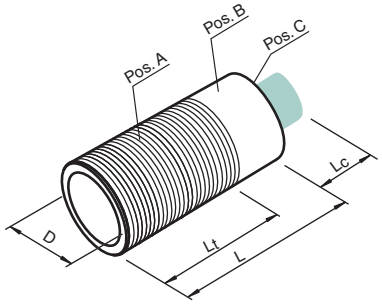


Model Number		UB500-18GM75-F-V15	UB500-18GM75-PWM-V15	UB500-18GM75-BIT-V15	UB1000-18GM75-F-V15	UB1000-18GM75-PWM-V15	UB1000-18GM75-BIT-V15
Sensing range	30 ... 500 mm	●	●	●			
	80 ... 1000 mm				●	●	●
Transducer frequency	approx. 380 kHz	●	●	●			
	approx. 255 kHz				●	●	●
Output type	1 frequency output, push/pull, programmable	●			●		
	1 PWM output, push/pull, programmable		●			●	
	1 serial output, push/pull, programmable			●			●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

Dimensions	
Length L [mm]	75
Diameter D [mm]	18
Thread length l_t [mm]	52
Connector area l_c [mm]	10
LED position	Pos. B

Properties

- 500 mm and 1000 mm sensing range versions
- DC, frequency output, PWM output and serial output versions
- Ø18 mm cylindrical housing
- Connector version



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

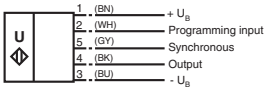
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection

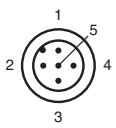


UB1000-18GM75-F-V15
UB500-18GM75-F-V15
UB500-18GM75-PWM-V15
UB1000-18GM75-PWM-V15
UB1000-18GM75-BIT-V15
UB500-18GM75-BIT-V15

Standard symbol/Connections:



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



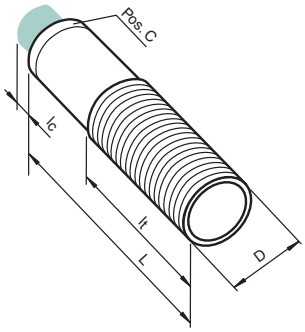
IO-Link

Properties

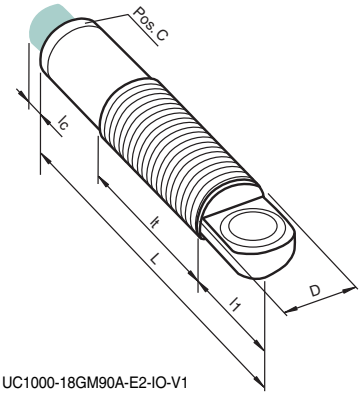
- 1000 mm sensing range
- DC, IO-Link / switching output
- Ø18 mm cylindrical housing, angled and straight versions
- Connector version

Your Benefit

- Continuous IO-Link accessibility to output status and configuration parameters



UC1000-18GM90-E2-IO-V1



UC1000-18GM90A-E2-IO-V1

Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Sensing range	100 ... 1000 mm
Transducer frequency	approx. 200 kHz
Linearity error	≤ ± 2 mm
Operating voltage	12 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Interface type	IO-Link
Output type	1 switch output PNP, NO SIO mode
Operating current	≤ 200 mA , short-circuit/overload protected
LED green	permanently green: Power on flashes: IO-Link ON
LED yellow	on: object within measuring range
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number		UC1000-18GM90-E2-IO-V1	UC1000-18GM90A-E2-IO-V1
Direction of radiation	frontal	●	
	lateral		●
Dimensions			
Length L [mm]		91	119
Diameter D [mm]		18	
Transducer length l_1 [mm]			28
Thread length l_t [mm]		65	
Connector area l_c [mm]		10	
LED position		Pos. C	

Accessories

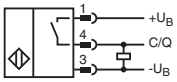
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

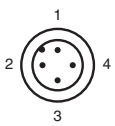
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-K18	Ultrasonic deflector
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable

Electrical Connection



UC1000-18GM90-E2-IO-V1
UC1000-18GM90A-E2-IO-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input,
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number	green = preferred type	UB500-30GM-E4-V15	UB500-30GM-E5-V15	UB2000-30GM-E4-V15	UB2000-30GM-E5-V15	UB4000-30GM-E4-V15	UB4000-30GM-E5-V15	UB6000-30GM-E4-V15	UB6000-30GM-E5-V15
Sensing range	30 ... 500 mm	●	●						
	80 ... 2000 mm			●	●				
	200 ... 4000 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 380 kHz	●	●						
	approx. 180 kHz			●	●				
	approx. 85 kHz					●	●		
	approx. 65 kHz							●	●
Output type	1 switch output NPN , Normally open/ closed , programmable	●		●		●		●	
	1 switch output PNP , Normally open/ closed , programmable		●		●		●		●
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

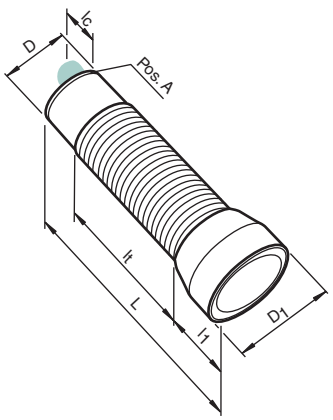
Dimensions				
Length L [mm]	94		108	112
Diameter D [mm]	30			
Transducer diameter D_1 [mm]	30		40	73
Transducer length l_1 [mm]	0		25	32,5
Thread length l_t [mm]	72		61	57,5
Connector area l_c [mm]	10			
LED position	Pos. A			

Properties

- Up to 6000 mm sensing range versions
- DC, switching output
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

- Teach-wire or UB-PROG2 pushbutton configurable



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

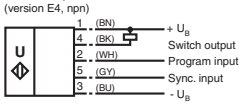
BF 30	Mounting flange, 30 mm
BF 30-F	Mounting flange with dead stop, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UB-PROG2	Programming unit
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
UVW90-M30	Ultrasonic -deflector
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UVW90-K30	Ultrasonic -deflector

Electrical Connection



UB500-30GM-E4-V15
UB4000-30GM-E4-V15
UB2000-30GM-E4-V15
UB6000-30GM-E4-V15

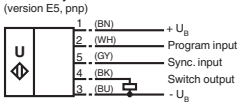
Standard symbol/Connections:
(version E4, npn)



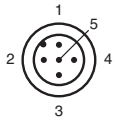
Wire colors in accordance with EN 60947-5-2.

UB2000-30GM-E5-V15
UB6000-30GM-E5-V15
UB4000-30GM-E5-V15
UB500-30GM-E5-V15

Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Interface type	RS 232, 9600 Bit/s , no parity, 8 data bits, 1 stop bit
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	stainless steel (1.4305 / AISI 303), PBT plastic parts
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-30GM-E6R2-V15	UC500-30GM-E7R2-V15	UC2000-30GM-E6R2-V15	UC2000-30GM-E7R2-V15	UC4000-30GM-E6R2-V15	UC4000-30GM-E7R2-V15	UC6000-30GM-E6R2-V15	UC6000-30GM-E7R2-V15
Sensing range	30 ... 500 mm	●	●						
	80 ... 2000 mm			●	●				
	200 ... 4000 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 380 kHz	●	●						
	approx. 180 kHz			●	●				
	approx. 85 kHz					●	●		
	approx. 65 kHz							●	●
Output type	2 switch outputs NPN, NO/NC, programmable		●		●		●		●
	2 switch outputs PNP, NO/NC, programmable	●		●		●		●	
Switching frequency	≤ 0.5 Hz							●	●
	≤ 1 Hz					●	●		
	≤ 2.5 Hz			●	●				
	≤ 7 Hz	●	●						
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

Dimensions				
Length L [mm]	94		108	112
Diameter D [mm]	30			
Transducer diameter D_1 [mm]	30		40	73
Transducer length l_1 [mm]	0		25	32,5
Thread length l_t [mm]	72		61	57,5
Connector area l_c [mm]	10			
LED position	Pos. A			
Temperature / program plug	Pos. A , 27,5 mm			

Properties

- **Up to 6000 mm sensing range versions**
- **DC, 2 switching outputs**
- **Ø30 mm cylindrical housing**
- **Connector version**

Your Benefit

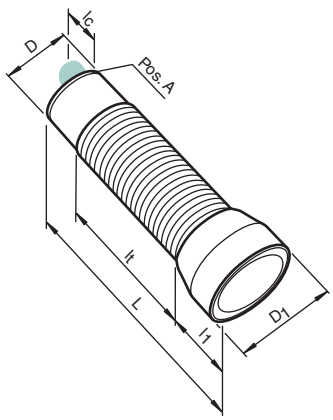
- **Potentiometer-free configuration via programming plug or ULTRA3000 software**

Further Products

In this series, we offer additionally:

UCC1000-30GM-E6R2-V15

Technical data like UC2000-30GM-E6R2-V15 but:
Sensing range: 1000 mm
Transducer: chemical resistant PTFE coated



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

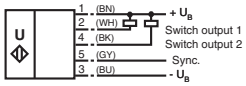
BF 30	Mounting flange, 30 mm
UC-30GM-R2	Programming cable
ULTRA3000	Software for ultrasonic sensors, comfort line
UVW90-M30	Ultrasonic -deflector
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UC500-30GM-E7R2-V15
UC2000-30GM-E7R2-V15
UC4000-30GM-E7R2-V15
UC6000-30GM-E7R2-V15

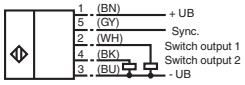
Standard symbol/Connection:
(version E7, npn)



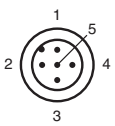
Core colors in accordance with EN 60947-5-2.

UC500-30GM-E6R2-V15
UC2000-30GM-E6R2-V15
UC4000-30GM-E6R2-V15
UC6000-30GM-E6R2-V15
UCC1000-30GM-E6R2-V15

Standard symbol/Connection:
(version E6, pnp)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

- Up to 6000 mm sensing range versions
- DC, analog outputs
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

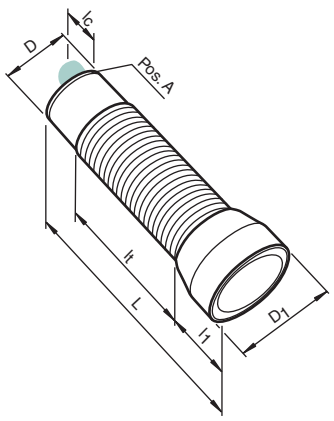
- Potentiometer-free configuration via programming plug or ULTRA3000 software

Further Products

In this series, we offer additionally:

UCC1000-30GM-IUR2-V15

Technical data like UC2000-30GM-IUR2-V15 but:
Sensing range: 1000 mm
Transducer: chemical resistant PTFE coated



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
Power consumption	≤ 900 mW
Interface type	RS 232, 9600 Bit/s , no parity, 8 data bits, 1 stop bit
Output type	1 current output 4 ... 20 mA 1 voltage output 0 ... 10 V
Deviation of the characteristic curve	≤ 0.2 % of full-scale value
Synchronization	bi-directional
Material	
Housing	stainless steel (1.4305 / AISI 303), PBT plastic parts
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC300-30GM-IUR2-V15	UC500-30GM-IUR2-V15	UC2000-30GM-IUR2-V15	UC4000-30GM-IUR2-V15	UC6000-30GM-IUR2-V15
Sensing range	15 ... 300 mm	●				
	30 ... 500 mm		●			
	80 ... 2000 mm			●		
	200 ... 4000 mm				●	
	350 ... 6000 mm					●
Transducer frequency	approx. 380 kHz	●	●			
	approx. 180 kHz			●		
	approx. 85 kHz				●	
	approx. 65 kHz					●
Resolution	evaluation range [mm]/4000, but ≥ 0.05 mm	●	●			
	evaluation range [mm]/4000, but ≥ 0.35 mm			●	●	●
Ambient temperature	0 ... 70 °C (32 ... 158 °F)	●				
	-25 ... 70 °C (-13 ... 158 °F)		●	●	●	●
Approvals and Certificates						
UL approval	cULus Listed, General Purpose	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●

Dimensions				
Length L [mm]	114		128	132
Diameter D [mm]	30			
Transducer diameter D_1 [mm]	30		40	73
Transducer length l_1 [mm]	0		25	32,5
Thread length l_t [mm]	92		81	77,5
Connector area l_c [mm]	10			
LED position	Pos. A			
Temperature / program plug	Pos. A , 27.5 mm			

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

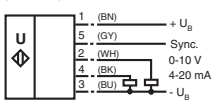
BF 30	Mounting flange, 30 mm
BF 30-F	Mounting flange with dead stop, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UC-30GM-R2	Programming cable
ULTRA3000	Software for ultrasonic sensors, comfort line
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection

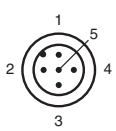


UC300-30GM-IUR2-V15
UC500-30GM-IUR2-V15
UC2000-30GM-IUR2-V15
UC4000-30GM-IUR2-V15
UC6000-30GM-IUR2-V15
UCC1000-30GM-IUR2-V15

Standard symbol/Connection:
(version IU)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	≤ 50 mA
Interface type	RS 232, 9600 Bit/s , no parity, 8 data bits, 1 stop bit
Output type	2 switch outputs PNP, NO/NC, programmable
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	stainless steel (1.4305 / AISI 303), PBT plastic parts
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	sensor head: IP67 connector sensor head/controller unit: IP52
Connection type	Device connector M12 x 1 , 5-pin



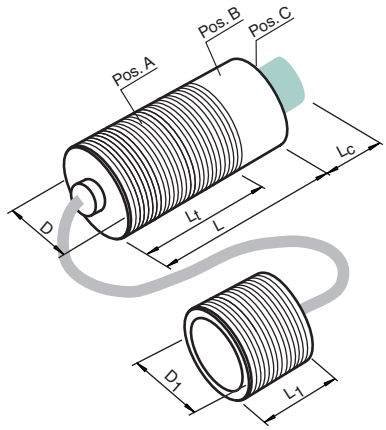
Properties

- 300 mm and 1000 mm sensing range versions
- DC, 2 switching outputs
- Ø30 mm cylindrical housing with separate head
- Connector version

Your Benefit

- Provides maximum sensing range in space-restricted mounting areas
- Potentiometer-free configuration via programming plug or ULTRA3000 software

Model Number		UC300-30GM-E6R2-K-V15	UC1000-30GM-E6R2-K-V15
Sensing range	30 ... 300 mm	●	
	80 ... 1000 mm		●
Transducer frequency	approx. 380 kHz	●	
	approx. 180 kHz		●
Switching frequency	≤ 2.5 Hz		●
	≤ 7 Hz	●	
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		93,5	112
Diameter D [mm]		30	
Transducer diameter D_1 [mm]		18	30
Transducer length l_1 [mm]		25	27
Thread length l_t [mm]		71,5	90
Connector area l_c [mm]		10	
LED position		Pos. C	
Temperature / program plug		Pos. C , 27.5 mm	



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

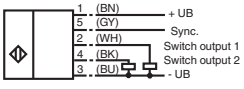
BF 30	Mounting flange, 30 mm
BF 30-F	Mounting flange with dead stop, 30 mm
BF 18	Mounting flange, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
BF 18-F	Mounting flange with dead stop, 18 mm
UC-30GM-R2	Programming cable
ULTRA3000	Software for ultrasonic sensors, comfort line
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection

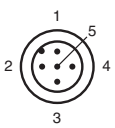


UC300-30GM-E6R2-K-V15
UC1000-30GM-E6R2-K-V15

Standard symbol/Connection:
(version E6, pnp)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

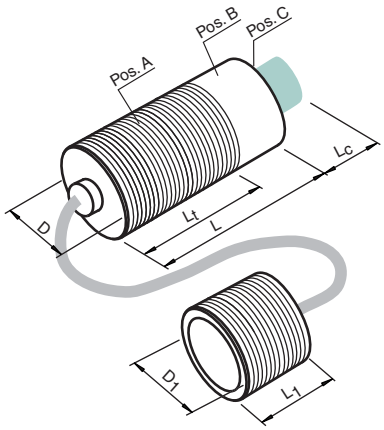


Properties

- 300 mm and 1000 mm sensing range versions
- DC, analog outputs
- Ø30 mm cylindrical housing with separate head
- Connector version

Your Benefit

- Provides maximum sensing range in space-restricted mounting areas
- Potentiometer-free configuration via programming plug or ULTRA3000 software



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
Power consumption	≤ 900 mW
Interface type	RS 232, 9600 Bit/s , no parity, 8 data bits, 1 stop bit
Output type	1 current output 4 ... 20 mA 1 voltage output 0 ... 10 V
Deviation of the characteristic curve	≤ 0.2 % of full-scale value
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	stainless steel (1.4305 / AISI 303), PBT plastic parts
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	sensor head: IP67 connector sensor head/controller unit: IP52
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC300-30GM-IUR2-K-V15	UC1000-30GM-IUR2-K-V15
Sensing range	30 ... 300 mm	●	
	80 ... 1000 mm		●
Transducer frequency	approx. 380 kHz	●	
	approx. 180 kHz		●
Resolution	evaluation range [mm]/4000, but ≥ 0.05 mm	●	
	evaluation range [mm]/4000, but ≥ 0.35 mm		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		112	
Diameter D [mm]		30	
Transducer diameter D_1 [mm]		18	30
Transducer length l_1 [mm]		25	27
Thread length l_t [mm]		90	
Connector area l_c [mm]		10	
LED position		Pos. C	
Temperature / program plug		Pos. C , 27.5 mm	

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

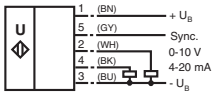
BF 18	Mounting flange, 18 mm
BF 30	Mounting flange, 30 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 30-F	Mounting flange with dead stop, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UC-30GM-R2	Programming cable
ULTRA3000	Software for ultrasonic sensors, comfort line
DA5-IU-2K-V	Process control and indication equipment
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection

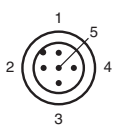


UC300-30GM-IUR2-K-V15
UC1000-30GM-IUR2-K-V15

Standard symbol/Connection:
(version IU)



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	12 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	Switching output 1 and Switching output 2 adjustable
Interface type	Infrared
Output type	2 switch outputs PNP, NO (NC programmable)
Operating current	Per 150 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-30GM70-2E2R2-V15	UC2000-30GM70-2E2R2-V15	UC3500-30GM70-2E2R2-V15	UC6000-30GM70-2E2R2-V15
Sensing range	45 ... 500 mm	●			
	100 ... 2000 mm		●		
	200 ... 3500 mm			●	
	350 ... 6000 mm				●
Transducer frequency	approx. 300 kHz	●			
	approx. 200 kHz		●		
	approx. 120 kHz			●	
	approx. 80 kHz				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

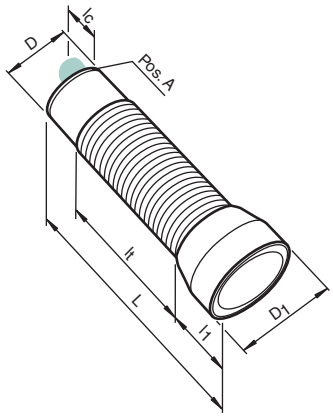
Dimensions					
Diameter D [mm]		30			
Length L [mm]		99,3			121,2
Thread length l_t [mm]		74,7			62
Transducer diameter D_1 [mm]		30			65
Transducer length l_1 [mm]		0,3		0,5	36,5
Connector area l_c [mm]		10,5			

Properties

- Up to 6000 mm sensing range versions
- DC, 2 switching outputs
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Accessories

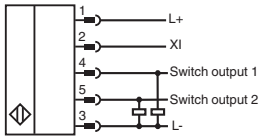
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

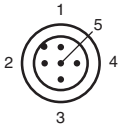
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70-2E2R2-V15
UC2000-30GM70-2E2R2-V15
UC3500-30GM70-2E2R2-V15
UC6000-30GM70-2E2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	12 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	Switching output 1 and Switching output 2 adjustable
Interface type	Infrared
Output type	2 switch outputs PNP, NO (NC programmable)
Operating current	Per 150 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-30GM70S-2E2R2-V15	UC2000-30GM70S-2E2R2-V15	UC3500-30GM70S-2E2R2-V15	UC6000-30GM70S-2E2R2-V15
Sensing range	45 ... 500 mm	●			
	100 ... 2000 mm		●		
	200 ... 3500 mm			●	
	350 ... 6000 mm				●
Transducer frequency	approx. 300 kHz	●			
	approx. 200 kHz		●		
	approx. 120 kHz			●	
	approx. 80 kHz				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

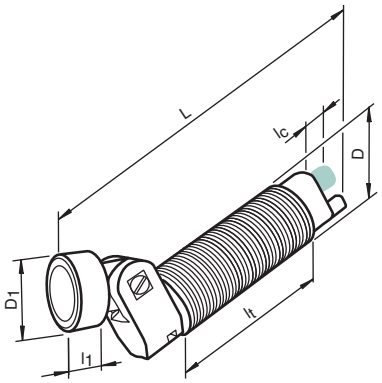
Dimensions		
Diameter D [mm]	30	
Length L [mm]	126	143,5
Thread length l_t [mm]	74,4	
Transducer diameter D_1 [mm]	30	65
Transducer length l_1 [mm]	28	37,2
Connector area l_c [mm]	10,5	

Properties

- Up to 6000 mm sensing range versions
- DC, 2 switching outputs
- Ø30 mm cylindrical housing with adjustable head
- Connector version

Your Benefit

- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Accessories

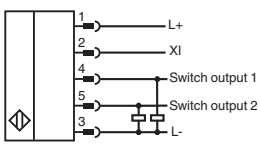
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See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

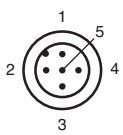
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70S-2E2R2-V15
UC2000-30GM70S-2E2R2-V15
UC3500-30GM70S-2E2R2-V15
UC6000-30GM70S-2E2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	12 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	Switching output 1 and Switching output 2 adjustable
Interface type	Infrared
Output type	2 switch outputs PNP, NO (NC programmable)
Operating current	Per 150 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



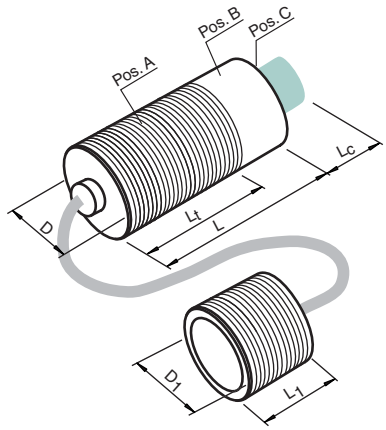
Model Number		UC500-30GM70-2E2R2-K-V15	UC2000-30GM70-2E2R2-K-V15
Sensing range	45 ... 500 mm	●	
	100 ... 2000 mm		●
Transducer frequency	approx. 300 kHz	●	
	approx. 200 kHz		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Diameter D [mm]		30	
Length L [mm]		111,3	
Thread length l_t [mm]		74,4	
Transducer diameter D_1 [mm]		18	
Transducer length l_1 [mm]		26,7	
Connector area l_c [mm]		10,5	

Properties

- 500 mm and 2000 mm sensing range versions
- DC, 2 switching outputs
- Ø30 mm cylindrical housing with separate head
- Connector version

Your Benefit

- Provides maximum sensing range in space-restricted mounting areas
- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Accessories

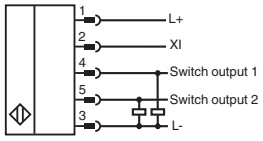
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See pages 1068 ... for mounting aids

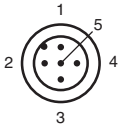
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70-2E2R2-K-V15
UC2000-30GM70-2E2R2-K-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

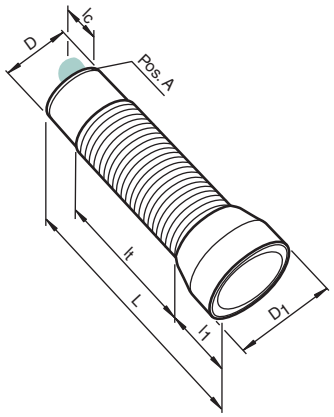


Properties

- Up to 6000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-30GM70-IE2R2-V15	UC500-30GM70-UE2R2-V15	UC2000-30GM70-IE2R2-V15	UC2000-30GM70-UE2R2-V15	UC3500-30GM70-IE2R2-V15	UC3500-30GM70-UE2R2-V15	UC6000-30GM70-UE2R2-V15	UC6000-30GM70-IE2R2-V15
	green = preferred type								
Sensing range	45 ... 500 mm	●	●						
	100 ... 2000 mm			●	●				
	200 ... 3500 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 300 kHz	●	●						
	approx. 200 kHz			●	●				
	approx. 120 kHz					●	●		
	approx. 80 kHz							●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●		●	●	
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●		●			●
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

Dimensions								
Diameter D [mm]	30							
Length L [mm]	99,3							121,2
Thread length l_t [mm]	74,7							62
Transducer diameter D_1 [mm]	30							65
Transducer length l_1 [mm]	0,3					0,5		36,5
Connector area l_c [mm]	10,5							

Accessories

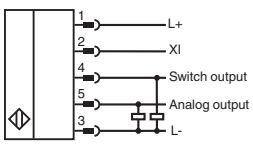
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See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

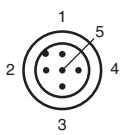
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70-IE2R2-V15
UC500-30GM70-UE2R2-V15
UC2000-30GM70-IE2R2-V15
UC2000-30GM70-UE2R2-V15
UC3500-30GM70-IE2R2-V15
UC3500-30GM70-UE2R2-V15
UC6000-30GM70-IE2R2-V15
UC6000-30GM70-UE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



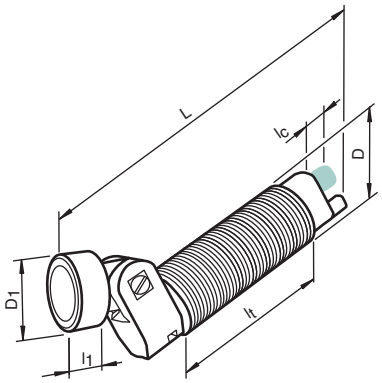
Properties

- Up to 6000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing with adjustable head
- Connector version

Your Benefit

- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface

Model Number		UC500-30GM70S-IE2R2-V15	UC500-30GM70S-UE2R2-V15	UC2000-30GM70S-IE2R2-V15	UC2000-30GM70S-UE2R2-V15	UC3500-30GM70S-IE2R2-V15	UC3500-30GM70S-UE2R2-V15	UC6000-30GM70S-IE2R2-V15	UC6000-30GM70S-UE2R2-V15
Sensing range	45 ... 500 mm	●	●						
	100 ... 2000 mm			●	●				
	200 ... 3500 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 300 kHz	●	●						
	approx. 200 kHz			●	●				
	approx. 120 kHz					●	●		
	approx. 80 kHz							●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●		●		●
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●		●		●	
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
Dimensions									
Diameter D [mm]		30							
Length L [mm]		126						143,5	
Thread length l_t [mm]		74,4							
Transducer diameter D_1 [mm]		30						65	
Transducer length l_1 [mm]		28						37,2	
Connector area l_c [mm]		10,5							



Accessories

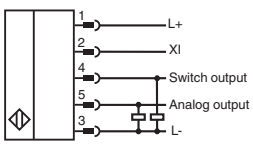
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See pages 1068 ... for mounting aids

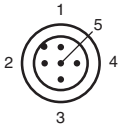
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70S-IE2R2-V15
UC500-30GM70S-UE2R2-V15
UC2000-30GM70S-IE2R2-V15
UC2000-30GM70S-UE2R2-V15
UC3500-30GM70S-IE2R2-V15
UC3500-30GM70S-UE2R2-V15
UC6000-30GM70S-IE2R2-V15
UC6000-30GM70S-UE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

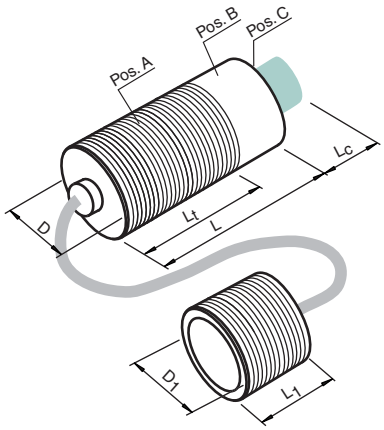


Properties

- 500 mm and 2000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing with separate head
- Connector version

Your Benefit

- Provides maximum sensing range in space-restricted mounting areas
- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number	green = preferred type	UC500-30GM70-IE2R2-K-V15	UC500-30GM70-UE2R2-K-V15	UC2000-30GM70-IE2R2-K-V15	UC2000-30GM70-UE2R2-K-V15
Sensing range	45 ... 500 mm	●	●		
	100 ... 2000 mm			●	●
Transducer frequency	approx. 300 kHz	●	●		
	approx. 200 kHz			●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions	
Diameter D [mm]	30
Length L [mm]	111,3
Thread length l_t [mm]	74,4
Transducer diameter D_1 [mm]	18
Transducer length l_1 [mm]	26,7
Connector area l_c [mm]	10,5

Accessories

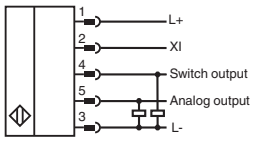
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

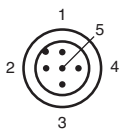
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UC500-30GM70-IE2R2-K-V15
UC500-30GM70-UE2R2-K-V15
UC2000-30GM70-IE2R2-K-V15
UC2000-30GM70-UE2R2-K-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	High grade stainless steel
Transducer	PTFE coated; epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Properties

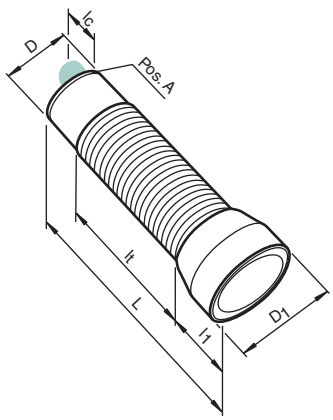
- Up to 6000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

- Chemically resistant PTFE-coated sensing face and corrosion resistant high grade stasinless steel housing
- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface

Model Number		UCC500-30GH70-IE2R2-V15	UCC500-30GH70-UE2R2-V15	UCC2000-30GH70-IE2R2-V15	UCC2000-30GH70-UE2R2-V15	UCC3500-30GH70-IE2R2-V15	UCC3500-30GH70-UE2R2-V15	UCC6000-30GH70-IE2R2-V15	UCC6000-30GH70-UE2R2-V15
Sensing range	45 ... 500 mm	●	●						
	100 ... 2000 mm			●	●				
	200 ... 3500 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 300 kHz	●	●						
	approx. 200 kHz			●	●				
	approx. 120 kHz					●	●		
	approx. 80 kHz							●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●		●		●
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●		●		●	
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

Dimensions								
Diameter D [mm]	30							
Length L [mm]	99,3							121,2
Thread length l_t [mm]	74,7							62
Transducer diameter D_1 [mm]	30							65
Transducer length l_1 [mm]	0,3					0,5		36,5
Connector area l_c [mm]	10,5							



Accessories

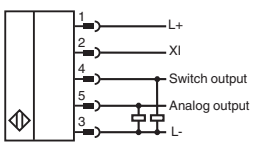
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

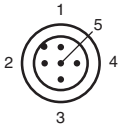
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UCC500-30GH70-IE2R2-V15
UCC500-30GH70-UE2R2-V15
UCC2000-30GH70-IE2R2-V15
UCC2000-30GH70-UE2R2-V15
UCC3500-30GH70-IE2R2-V15
UCC3500-30GH70-UE2R2-V15
UCC6000-30GH70-IE2R2-V15
UCC6000-30GH70-UE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	High grade stainless steel
Transducer	PTFE coated; epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UCC500-30GH70S-IE2R2-V15	UCC500-30GH70S-UE2R2-V15	UCC2000-30GH70S-IE2R2-V15	UCC2000-30GH70S-UE2R2-V15	UCC3500-30GH70S-IE2R2-V15	UCC3500-30GH70S-UE2R2-V15	UCC6000-30GH70S-IE2R2-V15	UCC6000-30GH70S-UE2R2-V15
Sensing range	45 ... 500 mm	●	●						
	100 ... 2000 mm			●	●				
	200 ... 3500 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 300 kHz	●	●						
	approx. 200 kHz			●	●				
	approx. 120 kHz					●	●		
	approx. 80 kHz							●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●		●		●
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●		●		●	
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

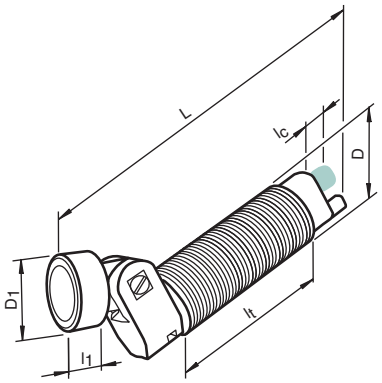
Dimensions							
Diameter D [mm]	30						
Length L [mm]	143,5						126
Thread length l_t [mm]	74,4						
Transducer diameter D_1 [mm]	30						65
Transducer length l_1 [mm]	28						37,2
Connector area l_c [mm]	10,5						

Properties

- Up to 6000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing with adjustable head
- Connector version

Your Benefit

- Chemically resistant PTFE-coated sensing face and corrosion resistant high grade stasinless steel housing
- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Accessories

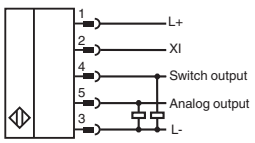
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

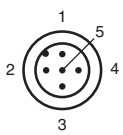
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UCC2000-30GH70S-UE2R2-V15
UCC3500-30GH70S-IE2R2-V15
UCC3500-30GH70S-UE2R2-V15
UCC6000-30GH70S-IE2R2-V15
UCC6000-30GH70S-UE2R2-V15
UCC500-30GH70S-IE2R2-V15
UCC500-30GH70S-UE2R2-V15
UCC2000-30GH70S-IE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC (including ripple)
No-load supply current	≤ 50 mA
Potentiometer	switch output adjustable
Interface type	Infrared
Output type	1 switch output PNP, NO (NC programmable)
Operating current	300 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional / TEACH-IN input, programmable
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	High grade stainless steel
Transducer	PTFE coated; epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UCC500-30GH70-IE2R2-K-V15	UCC500-30GH70-UE2R2-K-V15	UCC2000-30GH70-IE2R2-K-V15	UCC2000-30GH70-UE2R2-K-V15
Sensing range	45 ... 500 mm	●	●		
	100 ... 2000 mm			●	●
Transducer frequency	approx. 300 kHz	●	●		
	approx. 200 kHz			●	●
Output type	1 voltage output 0 ... 10 V , ascending/ descending programmable		●		●
	1 current output 4 ... 20 mA , ascending/ descending programmable	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

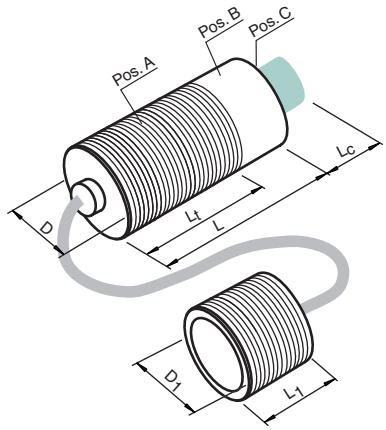
Dimensions	
Diameter D [mm]	30
Length L [mm]	111,3
Thread length l_t [mm]	74,4
Transducer diameter D_1 [mm]	18
Transducer length l_1 [mm]	26,7
Connector area l_c [mm]	10,5

Properties

- 500 mm and 2000 mm sensing range versions
- DC, analog and switching output
- Ø30 mm cylindrical housing with separate head
- Connector version

Your Benefit

- Chemically resistant PTFE-coated sensing face and corrosion resistant high grade stasinless steel housing
- Provides maximum sensing range in space-restricted mounting areas
- Simple potentiometer-based configuration
- Optional, expanded configuration control via ULTRA-PROG-IR software and interface



Accessories

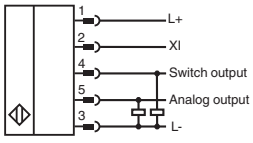
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

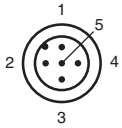
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UC-18/30GM-IR	Interface cable
ULTRA-PROG-IR	Service program

Electrical Connection



UCC500-30GH70-IE2R2-K-V15
UCC500-30GH70-UE2R2-K-V15
UCC2000-30GH70-IE2R2-K-V15
UCC2000-30GH70-UE2R2-K-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Properties

- Up to 6000 mm sensing range versions
- DC, IO-Link and switching output
- Ø30 mm cylindrical housing
- Connector version

Your Benefit

- Simple pushbutton-based configuration
- Continuous IO-Link accessibility to output status and configuration parameters
- Optional, expanded configuration control via PACTware
- High-visibility LED indicators

Technical Data

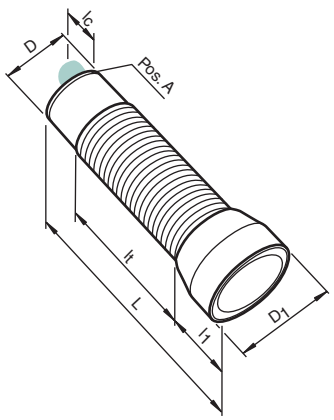
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 60 mA
Power consumption	≤ 1 W
Interface type	IO-Link
SIO mode support	✔
Output type	2 Push-pull outputs, short-circuit protected, reverse polarity protection
Rated operational current	200 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303, TPU, Polyamides
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65/IP67
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-30GM-2EP-IO-V15	UC2000-30GM-2EP-IO-V15	UC4000-30GM-2EP-IO-V15	UC6000-30GM-2EP-IO-V15
Sensing range	35 ... 500 mm	●			
	80 ... 2000 mm		●		
	200 ... 4000 mm			●	
	350 ... 6000 mm				●
Transducer frequency	approx. 380 kHz	●			
	approx. 180 kHz		●		
	approx. 85 kHz			●	
	approx. 65 kHz				●
Switching frequency	≤ 11 Hz	●			
	≤ 4 Hz		●		
	≤ 2 Hz			●	
	≤ 1.5 Hz				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions				
Diameter D [mm]	30			
Length L [mm]	81	86	93	
Thread length l_t [mm]	54	36		
Transducer diameter D_1 [mm]	30	40	73	
Transducer length l_1 [mm]	2	25	32	
Connector area l_c [mm]	11			



Accessories

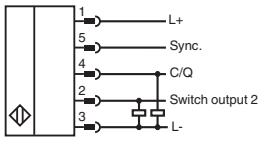
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See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

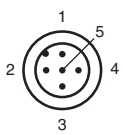
BF 30	Mounting flange, 30 mm
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
IO-Link-Master01-USB	IO-Link Master
IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
PACTware 4.X	FDT frame application

Electrical Connection



UC500-30GM-2EP-IO-V15
UC2000-30GM-2EP-IO-V15
UC4000-30GM-2EP-IO-V15
UC6000-30GM-2EP-IO-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$ 15 ... 30 V voltage output
No-load supply current	≤ 60 mA
Power consumption	≤ 1 W
Interface type	IO-Link
SIO mode support	✔
Output type	1 push-pull output, short-circuit protected, reverse polarity protected
Rated operational current	200 mA , short-circuit/overload protected
Analog output	Current output 4 mA ... 20 mA or voltage output 0 V ... 10 V configurable
Deviation of the characteristic curve	≤ 0.2 % of full-scale value
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303, TPU, Polyamides
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65/IP67
Connection type	Device connector M12 x 1 , 5-pin



Model Number	green = preferred type	UC500-30GM-IUEP-IO-V15	UC2000-30GM-IUEP-IO-V15	UC4000-30GM-IUEP-IO-V15	UC6000-30GM-IUEP-IO-V15
Sensing range	35 ... 500 mm	●			
	80 ... 2000 mm		●		
	200 ... 4000 mm			●	
	350 ... 6000 mm				●
Transducer frequency	approx. 380 kHz	●			
	approx. 180 kHz		●		
	approx. 85 kHz			●	
	approx. 65 kHz				●
Resolution	evaluation range [mm]/4000, but ≥ 0.05 mm	●			
	evaluation range [mm]/4000, but ≥ 0.35 mm		●	●	●
Switching frequency	≤ 11 Hz	●			
	≤ 4 Hz		●		
	≤ 2 Hz			●	
	≤ 1.5 Hz				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

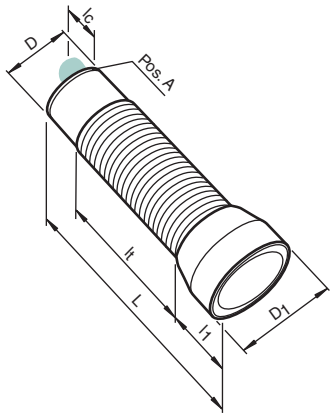
Dimensions				
Diameter D [mm]	30			
Length L [mm]	81	86	93	
Thread length l_t [mm]	54	36		
Transducer diameter D_1 [mm]	30	40	73	
Transducer length l_1 [mm]	2	25	32	
Connector area l_c [mm]	11			

Properties

- **Up to 6000 mm sensing range versions**
- **DC, IO-Link and analog output**
- **Ø30 mm cylindrical housing**
- **Connector version**

Your Benefit

- **Simple pushbutton-based configuration**
- **Continuous IO-Link accessibility to output status and configuration parameters**
- **Optional, expanded configuration control via PACTware**
- **High-visibility LED indicators**



Accessories

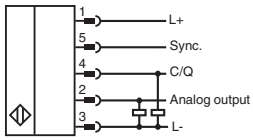
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

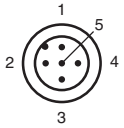
BF 30	Mounting flange, 30 mm
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
IO-Link-Master01-USB	IO-Link Master

Electrical Connection



UC500-30GM-IUEP-IO-V15
UC2000-30GM-IUEP-IO-V15
UC4000-30GM-IUEP-IO-V15
UC6000-30GM-IUEP-IO-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	200 ... 3000 mm
Transducer frequency	approx. 100 kHz
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 50 mA
Input type	1 program input
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Material	
Housing	Stainless steel 1.4404 / AISI 316L
Transducer	Stainless steel 1.4435 / AISI 316L
Protection degree	IP68 / IP69K
Connection type	cable PUR , 5 m



Model Number	green = preferred type	UMC3000-30H-E5-5M-FA	UMC3000-30H-I-5M-FA
Output type	1 analog output 4 ... 20 mA		●
	1 switch output, PNP NO/NC, programmable	●	
Rated operational current	200 mA , short-circuit/overload protected	●	
Resolution	Evaluation range [mm]/3200, however ≥ 0.4 mm		●
Deviation of the characteristic curve	≤ 0.2 % of full-scale value		●
Switching frequency	≤ 2.8 Hz	●	

Dimensions	
Length L [mm]	100
Diameter D [mm]	30
Thread length l_t [mm]	0
Connector area l_c [mm]	11

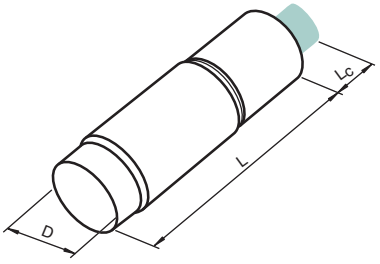
Properties

- 3000 mm sensing range
- DC, analog and switching output versions
- Ø30 mm cylindrical housing
- Cable version

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

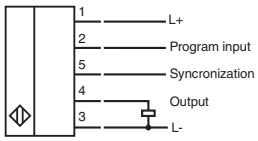
UC-PROG1	Programming adapter
V15S-G-0,3M-PUR-WAGO	Male cordset, M12, 5-pin, PUR cable with WAGO terminals
MH-30H-01-FA	Mounting aid, 30 mm acc. to EHEDG



Electrical Connection



UMC3000-30H-E5-5M-FA
UMC3000-30H-I-5M-FA



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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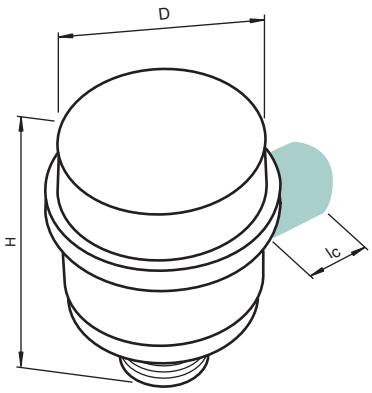
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UC500-D1-3K-V7
Sensing range	60 ... 550 mm
Transducer frequency	approx. 380 kHz
Operating voltage	10 ... 253 V DC 20 ... 253 V AC , 47 ... 63 Hz
No-load supply current	< 30 mA with U_B = 30 V DC < 110 mA at U_B = 10 V DC < 25 mA at U_B = 220 V AC
Output type	3 relay outputs, normally open/closed, selectable
Contact loading	253 V AC/150V DC, 3 A (ohm. load)
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Material	
Housing	cover: PC housing: PBT threaded flange: stainless steel installation connector/cable socket: PETP
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection	90° V7 (7-pin) cable connector Wire cross section: ≤1.5 mm² cable diameter Ø7 ... 9 mm
Approvals and Certificates	
CCC approval	Certified by China Compulsory Certification (CCC)
Dimensions	
Height H [mm]	106
Diameter D [mm]	75
Connector area l_c [mm]	79

Properties

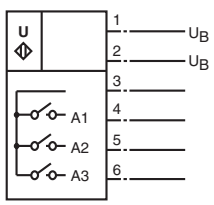
- **500 mm sensing range**
- **AC/DC, 3 relay outputs**
- **Ø30/75 mm cylindrical housing**
- **Connector version**



Electrical Connection

UC500-D1-3K-V7

Normsymbol/Anschluss:



Connector V7



Date of issue 04/08/2015



Properties

- 250 mm and 400 mm sensing range versions
- DC, switching output
- Sub-miniature F77 housing
- Connector version

Your Benefit

- Best-in-class immunity to acoustic interference
- Simple, intuitive range adjustment
- High-end performance and low cost
- Front-view output LED

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC , ripple 10 %$_{SS}$; 12 ... 20 V DC reduced sensitivity by 90 %
No-load supply current	≤ 20 mA
Output type	1 switch output PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Polycarbonate
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	M8 x 1 connector , 4-pin

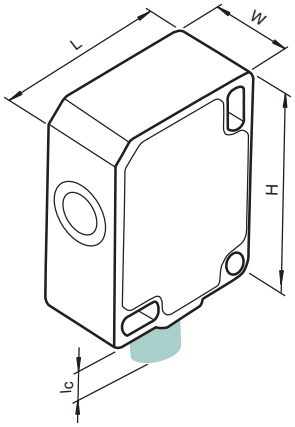


Model Number		UB250-F77-E2-V31	UB400-F77-E2-V31
	green = preferred type		
Sensing range	20 ... 250 mm	●	
	25 ... 400 mm		●
Transducer frequency	approx. 400 kHz	●	
	approx. 300 kHz		●
Switching frequency	10 Hz	●	
	5 Hz		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		23	
Width W [mm]		12	
Height H [mm]		31	
Connector area l_c [mm]		9	

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

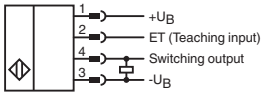
UB-PROG4-V31	Programming unit
OMH-ML7-01	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable



Electrical Connection



UB250-F77-E2-V31
UB400-F77-E2-V31





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... 30 V DC , ripple 10 %$_{SS}$; 12 ... 20 V DC reduced sensitivity by 90 %
No-load supply current	≤ 20 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Polycarbonate
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	M8 x 1 connector , 4-pin



Model Number		UBR250-F77-E2-V31	UBR250-F77-E3-V31	UBR400-F77-E2-V31	UBR400-F77-E3-V31
	green = preferred type				
Sensing range	0 ... 250 mm	●	●		
	0 ... 400 mm			●	●
Transducer frequency	approx. 400 kHz	●	●		
	approx. 300 kHz			●	●
Output type	1 switch output PNP , NC		●		●
	1 switch output PNP, NO	●		●	
Switching frequency	10 Hz	●	●		
	5 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]		23			
Width W [mm]		12			
Height H [mm]		31			
Connector area l_c [mm]		9			

Properties

- 250 mm and 400 mm sensing range versions
- DC, switching output
- Sub-miniature F77 housing
- Connector version

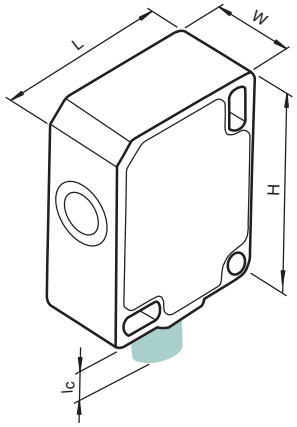
Your Benefit

- Retro-reflective operation
- Best-in-class immunity to acoustic interference
- Simple, intuitive range adjustment
- High-end performance and low cost

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

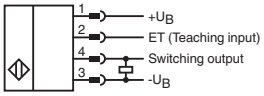
UB-PROG4-V31	Programming unit
OMH-ML7-01	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable



Electrical Connection



UBR250-F77-E2-V31
UBR400-F77-E2-V31
UBR250-F77-E3-V31
UBR400-F77-E3-V31





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
Output type	Push-pull output, short-circuit protected, reverse polarity protected
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	1 synchronous connection, bi-directional
Ambient temperature	-15 ... 70 °C (5 ... 158 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



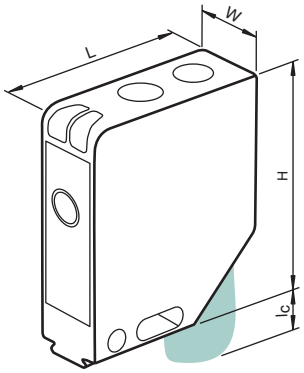
Model Number		UB120-F12P-EP-V15	UB250-F12P-EP-V15	UB800-F12P-EP-V15
Sensing range	15 ... 150 mm	●		
	20 ... 250 mm		●	
	30 ... 800 mm			●
Transducer frequency	approx. 850 kHz	●		
	approx. 400 kHz		●	
	approx. 310 kHz			●
No-load supply current	≤ 25 mA		●	●
	≤ 60 mA	●		
Switching frequency	max. 4 Hz			●
	20 Hz		●	
	50 Hz	●		
Input type	1 input for sound lobe adjustment		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●
Dimensions				
Length L [mm]			43	
Width W [mm]			15	
Height H [mm]			49	
Connector area l_c [mm]			16	

Properties

- Up to 800 mm sensing range versions
- DC, switching output
- Miniature F12 housing
- Connector version

Your Benefit

- Potentiometer configurable
- Selectable wide/narrow beam width
- Universal sinking-sourcing output
- Rugged metal housing



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

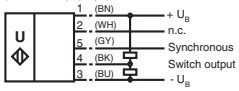
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB120-F12P-EP-V15

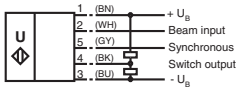
Standard symbol/Connections:
(version EP, pnp/npn)



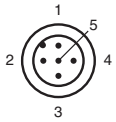
Core colours in accordance with EN 60947-5-2.

UB250-F12P-EP-V15
UB800-F12P-EP-V15

Standard symbol/Connections:
(version EP, pnp/npn)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 30 mA
Output type	Push-pull output, short-circuit protected, reverse polarity protected
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
Synchronization	1 synchronous connection, bi-directional
Ambient temperature	-15 ... 70 °C (5 ... 158 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



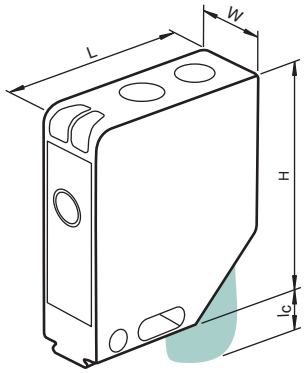
Properties

- 250 mm and 800 mm sensing range versions
- DC, switching output
- Miniature F12 housing
- Connector version

Your Benefit

- Simple pushbutton configuration
- Selectable wide/narrow beam width
- Universal sinking-sourcing output
- Rugged metal housing

Model Number		UB250-F12-EP-V15	UB800-F12-EP-V15
Sensing range	20 ... 250 mm	●	
	30 ... 800 mm		●
Transducer frequency	approx. 400 kHz	●	
	approx. 310 kHz		●
Switching frequency	20 Hz	●	
	6 Hz		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		43	
Width W [mm]		15	
Height H [mm]		49	
Connector area l_c [mm]		16	



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

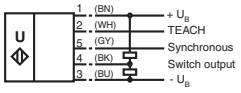
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection

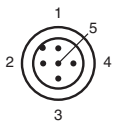


UB250-F12-EP-V15
UB800-F12-EP-V15

Standard symbol/Connections:
(version EP, pnp/npn)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

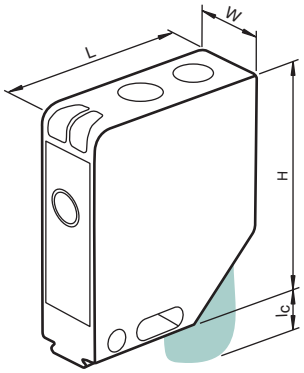


Properties

- Up to 800 mm sensing range versions
- DC, analog output
- Miniature F12 housing
- Connector version

Your Benefit

- Simple pushbutton configuration
- Selectable wide/narrow beam width
- Universal sinking-sourcing output
- Rugged metal housing



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 30 mA
Input type	1 program input
Synchronization	1 synchronous connection, bi-directional
Ambient temperature	-15 ... 70 °C (5 ... 158 °F)
Material	
Housing	Frame: nickel plated, die cast zinc, Laterals: glass-fiber reinforced plastic PC
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UB250-F12-I-V15	UB250-F12-U-V15	UB800-F12-I-V15	UB800-F12-U-V15
Sensing range	20 ... 250 mm	●	●		
	30 ... 800 mm			●	●
Transducer frequency	approx. 400 kHz	●	●		
	approx. 310 kHz			●	●
Operating voltage	10 ... 30 V DC	●		●	
	12 ... 30 V DC		●		●
Output type	1 analog output 0 ... 10 V		●		●
	1 analog output 4 ... 20 mA	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions	
Length L [mm]	43
Width W [mm]	15
Height H [mm]	49
Connector area I_c [mm]	16

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

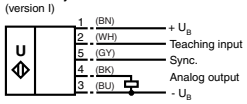
OMH-K01	dove tail mounting clamp
OMH-K02	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-01	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-06	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-MLV12-HWG	Mounting bracket for series MLV12 sensors
OMH-MLV12-HWK	Mounting bracket for series MLV12 sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB250-F12-I-V15
UB800-F12-I-V15

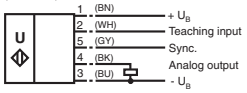
Standard symbol/Connections:
(version I)



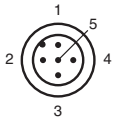
Core colours in accordance with EN 60947-5-2.

UB250-F12-U-V15
UB800-F12-U-V15

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 50 mA
Interface type	Serial interface (programming adapter required) 9600 BPS, no parity, 8 data bits, 1 stop bit
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA-GF35
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-L2-E4-V15	UC500-L2-E5-V15	UC2000-L2-E4-V15	UC2000-L2-E5-V15	UC4000-L2-E4-V15	UC4000-L2-E5-V15
Sensing range	35 ... 500 mm	●	●				
	60 ... 2000 mm			●	●		
	200 ... 4000 mm					●	●
Transducer frequency	approx. 380 kHz	●	●				
	approx. 175 kHz			●	●		
	approx. 85 kHz					●	●
Output type	1 switch output E4, NPN, NO/NC, programmable	●		●		●	
	1 switch output E5, PNP NO/NC, programmable		●		●		●
Switching frequency	≤ 14 Hz	●	●				
	≤ 5 Hz			●	●		
	≤ 2.8 Hz					●	●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

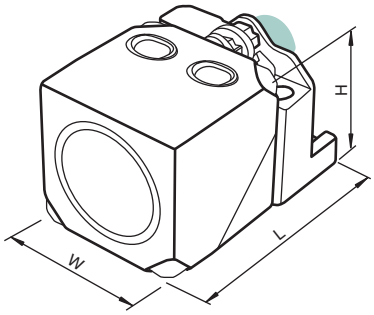
Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40

Properties

- Up to 4000 mm sensing range versions
- DC, switching output
- Compact *VariKont*-L housing
- Connector version

Your Benefit

- High-visibility corner LEDs
- Pushbutton and PACTware configurable
- 5-way, quick pivot sensing face



Accessories

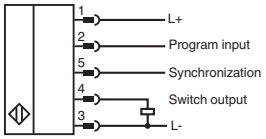
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

PACTware 3.6	
PACTware 4.X	
Ultraschall-Sensoren DTM	DTM devices for communication with cube style and UMC... sensors
UC-PROG1	Programming adapter
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UB-PROG2	Programming unit
Microsoft .NET	

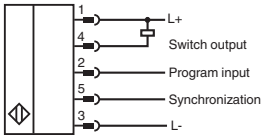
Electrical Connection

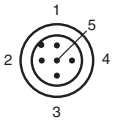


UC500-L2-E5-V15
UC2000-L2-E5-V15
UC4000-L2-E5-V15



UC2000-L2-E4-V15
UC500-L2-E4-V15
UC4000-L2-E4-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 50 mA
Interface type	Serial interface (programming adapter required) 9600 BPS, no parity, 8 data bits, 1 stop bit
Rated operational current	200 mA , short-circuit/overload protected
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA-GF35
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	Device connector M12 x 1 , 5-pin



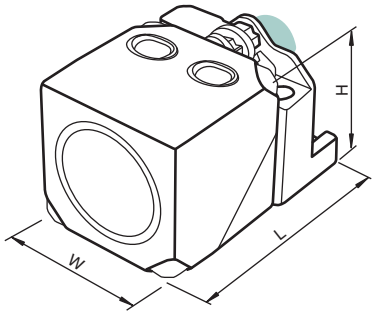
Model Number	green = preferred type	UC500-L2-E6-V15	UC500-L2-E7-V15	UC2000-L2-E6-V15	UC2000-L2-E7-V15	UC4000-L2-E6-V15	UC4000-L2-E7-V15
Sensing range	35 ... 500 mm	●	●				
	60 ... 2000 mm			●	●		
	200 ... 4000 mm					●	●
Transducer frequency	approx. 380 kHz	●	●				
	approx. 175 kHz			●	●		
	approx. 85 kHz					●	●
Output type	2 switch outputs NPN, NO/NC, programmable		●		●		●
	2 switch outputs PNP, NO/NC, programmable	●		●		●	
Switching frequency	≤ 14 Hz	●	●				
	≤ 5 Hz			●	●		
	≤ 2.8 Hz					●	●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
Dimensions							
Length L [mm]				67			
Width W [mm]				40			
Height H [mm]				40			

Properties

- Up to 4000 mm sensing range versions
- DC, 2 switching outputs
- Compact *VariKont*-L housing
- Connector version

Your Benefit

- High-visibility corner LEDs
- Pushbutton and PACTware configurable
- 5-way, quick pivot sensing face



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

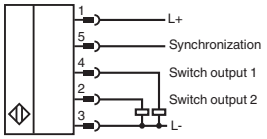
PACTware 3.6	
PACTware 4.X	
Ultraschall-Sensoren DTM	DTM devices for communication with cube style and UMC... sensors
UC-PROG1	Programming adapter
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
Microsoft .NET	

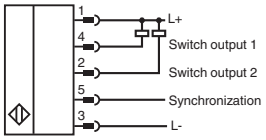
Electrical Connection

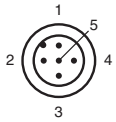


UC2000-L2-E6-V15
UC500-L2-E6-V15
UC4000-L2-E6-V15

UC500-L2-E7-V15
UC4000-L2-E7-V15
UC2000-L2-E7-V15







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 50 mA
Interface type	Serial interface (programming adapter required) 9600 BPS, no parity, 8 data bits, 1 stop bit
Deviation of the characteristic curve	≤ 0.2 % of full-scale value
Input type	1 program input
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA-GF35
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	Device connector M12 x 1 , 5-pin



Properties

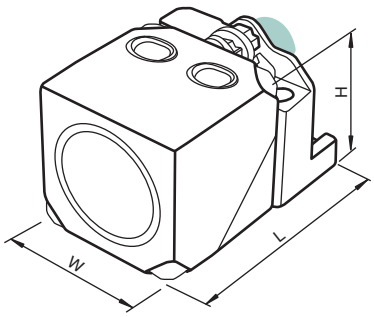
- Up to 4000 mm sensing range versions
- DC, analog output
- Compact *VariKont*-L housing
- Connector version

Your Benefit

- High-visibility corner LEDs
- Pushbutton and PACTware configurable
- 5-way, quick pivot sensing face

Model Number	green = preferred type	UC500-L2-I-V15	UC2000-L2-I-V15	UC4000-L2-I-V15	UC500-L2-U-V15	UC2000-L2-U-V15	UC4000-L2-U-V15
Sensing range	35 ... 500 mm	●			●		
	60 ... 2000 mm		●			●	
	200 ... 4000 mm			●			●
Transducer frequency	approx. 380 kHz	●			●		
	approx. 175 kHz		●			●	
	approx. 85 kHz			●			●
Operating voltage	10 ... 30 V DC	●	●	●			
	12 ... 30 V DC				●	●	●
Output type	1 analog output 4 ... 20 mA	●	●	●			
	1 analog output 0 ... 10 V				●	●	●
Resolution	Evaluation range [mm]/3200, but ≥ 0.05 mm	●					
	Evaluation range [mm]/3200, but ≥ 0.4 mm		●	●			
	evaluation range [mm]/4000, but ≥ 0.05 mm				●		
	evaluation range [mm]/4000, but ≥ 0.4 mm					●	●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●

Dimensions	
Length L [mm]	67
Width W [mm]	40
Height H [mm]	40



Accessories

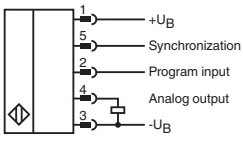
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

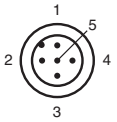
PACTware 3.6	Frame application
PACTware 4.X	Frame application
Ultraschall-Sensoren DTM	DTM devices for communication with cube style and UMC... sensors
UC-PROG1	Programming adapter
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
UB-PROG2	Programming unit
Microsoft .NET	Software

Electrical Connection



UC500-L2-I-V15
UC2000-L2-I-V15
UC4000-L2-I-V15
UC500-L2-U-V15
UC2000-L2-U-V15
UC4000-L2-U-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 55 mA
Rated operational current	200 mA , short-circuit/overload protected
Input type	1 program input,
Synchronization	1 synchronous input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number	green = preferred type	UB500-F54-E4-V15	UB500-F54-E5-V15	UB2000-F54-E4-V15	UB2000-F54-E5-V15
Sensing range	30 ... 500 mm	●	●		
	80 ... 2000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 175 kHz			●	●
Output type	1 switch output E4, NPN, NO/NC	●		●	
	1 switch output E5, PNP, NO/NC		●		●
Switching frequency	max. 10 Hz	●	●		
	max. 3 Hz			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions	
Length L [mm]	105
Width W [mm]	32
Height H [mm]	25
Connector area l_C [mm]	15

Properties

- 500 mm and 2000 mm sensing range versions
- DC, switching output
- Surface mount F54 housing
- Connector version

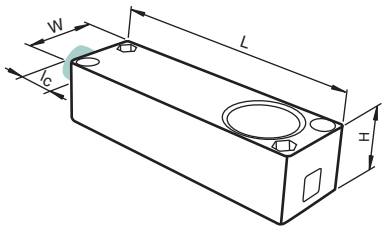
Your Benefit

- Low mounting profile

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

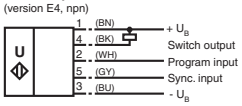


Electrical Connection



UB500-F54-E4-V15
UB2000-F54-E4-V15

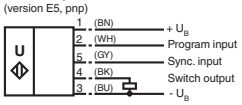
Standard symbol/Connections:
(version E4, npn)



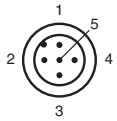
Wire colors in accordance with EN 60947-5-2.

UB500-F54-E5-V15
UB2000-F54-E5-V15

Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
No-load supply current	≤ 55 mA
Deviation of the characteristic curve	± 1 % of full-scale value
Input type	1 program input
Synchronization	1 synchronous input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



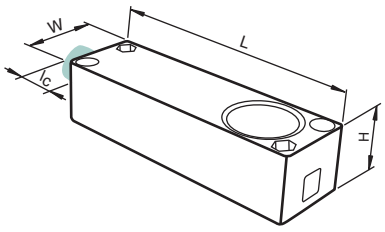
Model Number	green = preferred type	UB500-F54-I-V15	UB500-F54-U-V15	UB2000-F54-I-V15	UB2000-F54-U-V15
Sensing range	30 ... 500 mm	●	●		
	80 ... 2000 mm			●	●
Transducer frequency	approx. 380 kHz	●	●		
	approx. 175 kHz			●	●
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$	●		●	
	15 ... 30 V DC , ripple 10 %$_{SS}$		●		●
Output type	1 analog output 0 ... 10 V		●		●
	1 analog output 4 ... 20 mA	●		●	
Resolution	0.11 mm		●		
	0.13 mm	●			
	0.47 mm				●
	0.5 mm			●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]		105			
Width W [mm]		32			
Height H [mm]		25			
Connector area l_c [mm]		15			

Properties

- 500 mm and 2000 mm sensing range versions
- DC, analog output
- Surface mount F54 housing
- Connector version

Your Benefit

- Low mounting profile



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

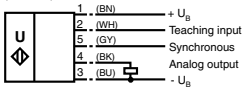
UB-PROG2	Programming unit
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-F54-I-V15
UB2000-F54-I-V15

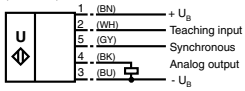
Standard symbol/Connections:
(version I)



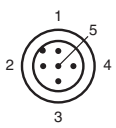
Core colours in accordance with EN 60947-5-2.

UB500-F54-U-V15
UB2000-F54-U-V15

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC, ripple ± 10 %$_{SS}$
Power consumption	≤ 2 W (all relays pulled-in, current output 20 mA) no-load power consumption ≤ 0.7 W
Interface type	RS 232, 9600 bit/s, no parity, 8 data bits, 1 stop bit
Output type	2 relay outputs, 1 analog output 4 ... 20 mA
Contact loading	60 V DC / 1 A (max. 24 W DC), ohmic
Deviation of the characteristic curve	< 0.2 % of full-scale value
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 8-pin screen connected to pin 8



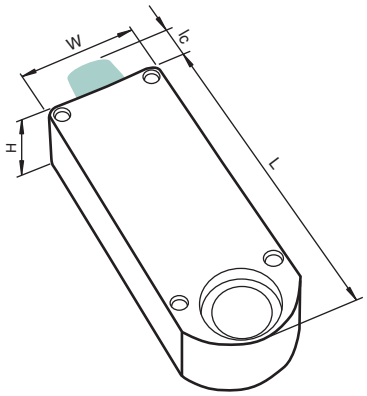
Model Number		UC300-F43-2KIR2-V17	UC2000-F43-2KIR2-V17
Sensing range	0 ... 300 mm	●	
	80 ... 2000 mm		●
Transducer frequency	approx. 390 kHz	●	
	approx. 175 kHz		●
Resolution	0.2 mm	●	
	0.6 mm		●
Ambient temperature	0 ... 70 °C (32 ... 158 °F)	●	
	-25 ... 70 °C (-13 ... 158 °F)		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Length L [mm]		134	
Width W [mm]		52	
Height H [mm]		30	
Connector area l_c [mm]		15	

Properties

- 300 mm and 2000 mm sensing range versions
- DC, relay and analog outputs
- Surface mount F43 housing
- Connector version

Your Benefit

- Low mounting profile
- Minimal unusable area
- Software-configurable parameters



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

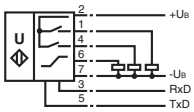
UC-F43-R2	Configuration Interface
ULTRA3000	Software for ultrasonic sensors, comfort line
V17-G-2M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-5M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable

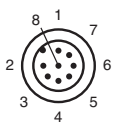
Electrical Connection



UC300-F43-2KIR2-V17
UC2000-F43-2KIR2-V17

Standard symbol/Connection:





Wire colors

1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Up to 6000 mm sensing range versions
- DC, switching output
- Surface mount F42 housing, front view
- Connector version

Your Benefit

- Simple pushbutton configuration

Technical Data

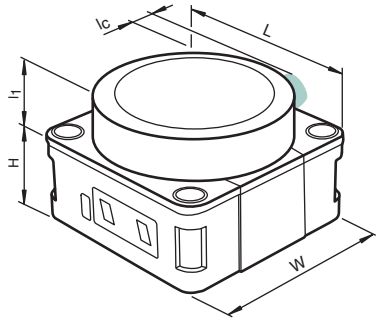
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UB500-F42-E4-V15	UB500-F42-E5-V15	UB2000-F42-E4-V15	UB2000-F42-E5-V15	UB4000-F42-E4-V15	UB4000-F42-E5-V15	UB6000-F42-E4-V15	UB6000-F42-E5-V15
Sensing range	30 ... 500 mm	●	●						
	60 ... 2000 mm			●	●				
	200 ... 4000 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 390 kHz	●	●						
	approx. 175 kHz			●	●				
	approx. 85 kHz					●	●		
	approx. 65 kHz							●	●
No-load supply current	≤ 50 mA	●	●	●	●				
	≤ 60 mA					●	●	●	●
Output type	1 switch output E4, NPN, NO/NC, programmable	●		●		●		●	
	1 switch output E5, PNP NO/NC, programmable		●		●		●		●
Switching frequency	≤ 0.6 Hz							●	●
	≤ 1.2 Hz					●	●		
	≤ 2.7 Hz			●	●				
	≤ 8 Hz	●	●						
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

Dimensions		
Length L [mm]	80	
Width W [mm]	80	
Height H [mm]	34	
Transducer length l_1 [mm]	0	16
Connector area l_c [mm]	16	



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

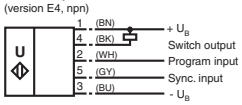
Electrical Connection



UB500-F42-E4-V15
UB2000-F42-E4-V15
UB4000-F42-E4-V15
UB6000-F42-E4-V15

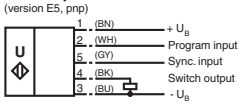
UB500-F42-E5-V15
UB2000-F42-E5-V15
UB4000-F42-E5-V15
UB6000-F42-E5-V15

Standard symbol/Connections:
(version E4, npn)

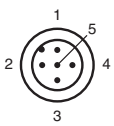


Wire colors in accordance with EN 60947-5-2.

Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

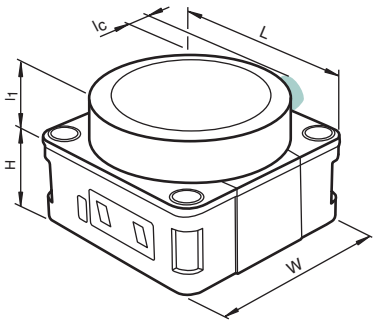


Properties

- Up to 6000 mm sensing range versions
- DC, 2 switching outputs
- Surface mount F42 housing, front view
- Connector version

Your Benefit

- Simple pushbutton configuration



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin

Model Number		UB500-F42-E6-V15	UB500-F42-E7-V15	UB2000-F42-E6-V15	UB2000-F42-E7-V15	UB4000-F42-E6-V15	UB4000-F42-E7-V15	UB6000-F42-E6-V15	UB6000-F42-E7-V15
	green = preferred type								
Sensing range	30 ... 500 mm	●	●						
	60 ... 2000 mm			●	●				
	200 ... 4000 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 390 kHz	●	●						
	approx. 175 kHz			●	●				
	approx. 85 kHz					●	●		
	approx. 65 kHz							●	●
No-load supply current	≤ 50 mA	●	●	●	●				
	≤ 60 mA					●	●	●	●
Output type	2 switch outputs NPN, normally open/ close selectable		●		●		●		●
	2 switch outputs PNP, NO/NC selectable	●		●		●		●	
Switching frequency	≤ 0.6 Hz							●	●
	≤ 1.2 Hz					●	●		
	≤ 2.7 Hz			●	●				
	≤ 8 Hz	●	●						

Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●

Dimensions									
Length L [mm]		80							
Width W [mm]		80							
Height H [mm]		34							
Transducer length l_1 [mm]		0						16	
Connector area l_c [mm]		16							

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

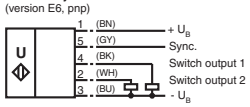
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-F42-E6-V15
UB2000-F42-E6-V15
UB4000-F42-E6-V15
UB6000-F42-E6-V15

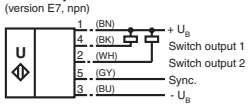
Standard symbol/Connections:
(version E6, pnp)



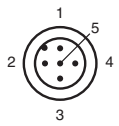
Core colours in accordance with EN 60947-5-2.

UB500-F42-E7-V15
UB2000-F42-E7-V15
UB4000-F42-E7-V15
UB6000-F42-E7-V15

Standard symbol/Connections:
(version E7, npn)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Deviation of the characteristic curve	± 1 % of full-scale value
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



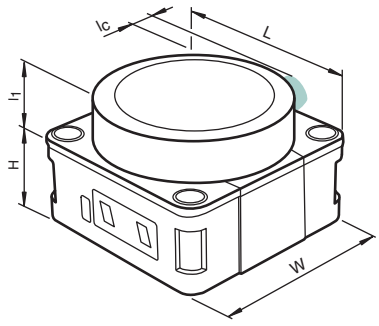
Model Number	green = preferred type	UB500-F42-I-V15	UB500-F42-U-V15	UB2000-F42-I-V15	UB2000-F42-U-V15	UB4000-F42-I-V15	UB4000-F42-U-V15	UB6000-F42-I-V15	UB6000-F42-U-V15
Sensing range	30 ... 500 mm	●	●						
	60 ... 2000 mm			●	●				
	200 ... 4000 mm					●	●		
	350 ... 6000 mm							●	●
Transducer frequency	approx. 390 kHz	●	●						
	approx. 175 kHz			●	●				
	approx. 85 kHz					●	●		
	approx. 65 kHz							●	●
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$	●		●		●		●	
	17 ... 30 V DC , ripple 10 %$_{SS}$		●		●		●		●
No-load supply current	≤ 50 mA	●	●	●	●				
	≤ 60 mA					●	●	●	●
Output type	1 analog output 0 ... 10 V		●		●		●		●
	1 analog output 4 ... 20 mA	●		●		●		●	
Resolution	0.2 mm at max. sensing range	●	●						
	0.7 mm			●	●	●	●	●	●
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
Dimensions									
Length L [mm]		80							
Width W [mm]		80							
Height H [mm]		34							
Transducer length l_1 [mm]		0						16	
Connector area l_c [mm]		16							

Properties

- Up to 6000 mm sensing range versions
- DC, analog output
- Surface mount F42 housing, front view
- Connector version

Your Benefit

- Simple pushbutton configuration



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

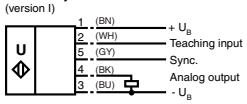
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors
DA5-IU-2K-V	Process control and indication equipment
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-F42-I-V15
UB2000-F42-I-V15
UB4000-F42-I-V15
UB6000-F42-I-V15

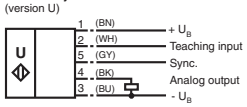
Standard symbol/Connections:
(version I)



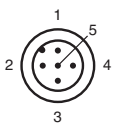
Core colours in accordance with EN 60947-5-2.

UB500-F42-U-V15
UB2000-F42-U-V15
UB4000-F42-U-V15
UB6000-F42-U-V15

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



CE

Properties

- Up to 5000 mm sensing range versions
- AC/DC, relay output
- Surface mount F42 housing, front view
- Connector version

Your Benefit

- Simple pushbutton configuration

Technical Data

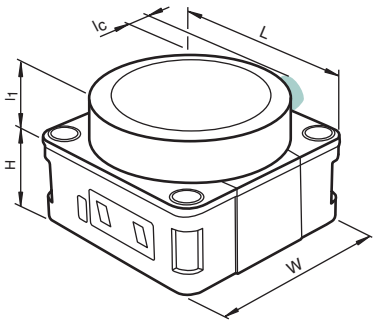
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... V DC ... 253 V AC
No-load supply current	≤ 60 mA
Output type	1 relay output
Rated operational current	3 A
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection	5-pin V95 connector (7/8"-16 UN 2A)



Model Number		UB400-F42-UK-V95	UB1500-F42-UK-V95	UB3000-F42-UK-V95	UB5000-F42-UK-V95
Sensing range	40 ... 400 mm	●			
	70 ... 1500 mm		●		
	200 ... 3000 mm			●	
	350 ... 5000 mm				●
Transducer frequency	approx. 390 kHz	●			
	approx. 175 kHz		●		
	approx. 85 kHz			●	
	approx. 65 kHz				●
Switching frequency	≤ 0.6 Hz				●
	≤ 1.5 Hz			●	
	≤ 3 Hz		●		
	≤ 8 Hz	●			

Dimensions					
Length L [mm]			80		
Width W [mm]			80		
Height H [mm]			34		
Transducer length l_1 [mm]			0		16
Connector area l_c [mm]			16		



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

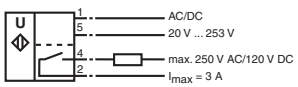
V95-G	Female connector, 7/8" - 16 UN, 5-pin, field attachable
V95-W-5M-PVC	Female connector, 7/8", 5-pin, PVC cable
V95-W	Field attachable female cordset
V95-W-2M-PVC	Female connector, 7/8", 5-pin, PVC cable
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors

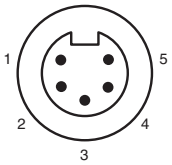
Electrical Connection



UB400-F42-UK-V95
UB1500-F42-UK-V95
UB3000-F42-UK-V95
UB5000-F42-UK-V95

Standard symbol/Connections:
(version UK)





Wire colors

1	WH	(white)
2	RD	(red)
3	GN	(green)
4	OR	(orange)
5	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 50 mA
Rated operational current	200 mA , short-circuit/overload protected
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



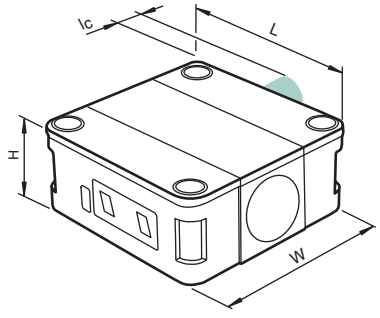
Model Number		UB500-F42S-E4-V15	UB500-F42S-E5-V15	UB500-F42S-E6-V15	UB500-F42S-E7-V15	UB2000-F42S-E4-V15	UB2000-F42S-E5-V15	UB2000-F42S-E6-V15	UB2000-F42S-E7-V15
Sensing range	30 ... 500 mm	●	●	●	●				
	60 ... 2000 mm					●	●	●	●
Transducer frequency	approx. 390 kHz	●	●	●	●				
	approx. 175 kHz					●	●	●	●
Output type	1 switch output E4, NPN, NO/NC, programmable	●				●			
	1 switch output E5, PNP NO/NC, programmable		●				●		
	2 switch outputs NPN, normally open/close selectable				●				●
	2 switch outputs PNP, NO/NC selectable			●				●	
Switching frequency	≤ 2.7 Hz					●	●	●	●
	≤ 8 Hz	●	●	●	●				
Approvals and Certificates									
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●	●	●
Dimensions									
Length L [mm]		80							
Width W [mm]		80							
Height H [mm]		34							
Transducer length l_1 [mm]		0							
Connector area l_c [mm]		16							

Properties

- 500 mm and 2000 mm sensing range versions
- DC, 1 and 2 switching outputs versions
- Surface mount F42 housing, side view
- Connector version

Your Benefit

- Simple pushbutton configuration



Accessories

This and more accessories can be found in chapter 3.5 from page 673

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

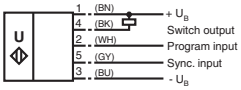
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-F42S-E4-V15
UB2000-F42S-E4-V15

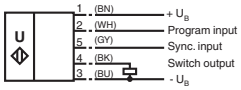
Standard symbol/Connections:
(version E4, npn)



Wire colors in accordance with EN 60947-5-2.

UB500-F42S-E5-V15
UB2000-F42S-E5-V15

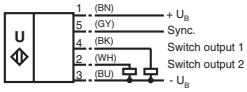
Standard symbol/Connections:
(version E5, pnp)



Wire colors in accordance with EN 60947-5-2.

UB500-F42S-E6-V15
UB2000-F42S-E6-V15

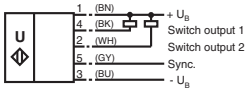
Standard symbol/Connections:
(version E6, pnp)



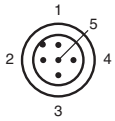
Core colours in accordance with EN 60947-5-2.

UB500-F42S-E7-V15
UB2000-F42S-E7-V15

Standard symbol/Connections:
(version E7, npn)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015



CE

Properties

- 400 mm and 1500 mm sensing range versions
- AC/DC, relay output
- Surface mount F42 housing, side view
- Connector version

Your Benefit

- Simple pushbutton configuration

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	20 ... V DC ... 253 V AC
No-load supply current	≤ 60 mA
Output type	1 relay output
Rated operational current	3 A
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP65
Connection	5-pin V95 connector (7/8"-16 UN 2A)



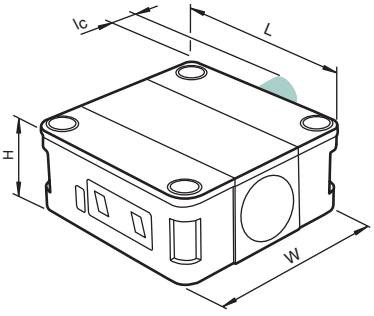
Model Number		UB400-F42S-UK-V95	UB1500-F42S-UK-V95
Sensing range	40 ... 400 mm	●	
	70 ... 1500 mm		●
Transducer frequency	approx. 390 kHz	●	
	approx. 175 kHz		●
Switching frequency	≤ 3 Hz		●
	≤ 8 Hz	●	

Dimensions	
Length L [mm]	80
Width W [mm]	80
Height H [mm]	34
Transducer length l_1 [mm]	0
Connector area l_c [mm]	16

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V95-G	Female connector, 7/8" - 16 UN, 5-pin, field attachable
V95-W-5M-PVC	Female connector, 7/8", 5-pin, PVC cable
V95-W	Field attachable female cordset
V95-W-2M-PVC	Female connector, 7/8", 5-pin, PVC cable
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors

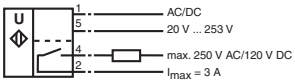


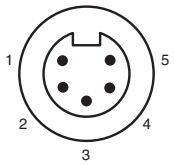
Electrical Connection



UB400-F42S-UK-V95
UB1500-F42S-UK-V95

Normsymbol/Anschluss:
(Version UK)





Wire colors

1	WH	(white)
2	RD	(red)
3	GN	(green)
4	OR	(orange)
5	BK	(black)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Deviation of the characteristic curve	± 1 % of full-scale value
Synchronization	bi-directional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP54
Connection type	Device connector M12 x 1 , 5-pin



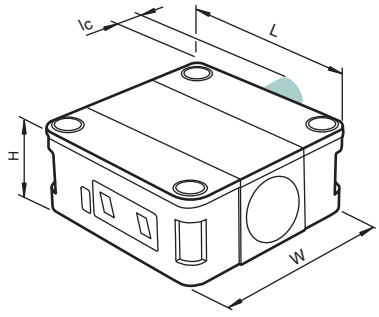
Model Number		UB500-F42S-I-V15	UB500-F42S-U-V15	UB2000-F42S-I-V15	UB2000-F42S-U-V15
Sensing range	30 ... 500 mm	●	●		
	60 ... 2000 mm			●	●
Transducer frequency	approx. 390 kHz	●	●		
	approx. 175 kHz			●	●
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$	●		●	
	17 ... 30 V DC , ripple 10 %$_{SS}$		●		●
No-load supply current	≤ 50 mA	●	●	●	●
Output type	1 analog output 0 ... 10 V		●		●
	1 analog output 4 ... 20 mA	●		●	
Resolution	0.2 mm at max. sensing range		●		
	0.2 mm for max. detection range	●			
	0.7 mm			●	●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]			80		
Width W [mm]			80		
Height H [mm]			34		
Transducer length l_1 [mm]			0		
Connector area l_c [mm]			16		

Properties

- 500 mm and 2000 mm sensing range versions
- DC, analogg output
- Surface mount F42 housing, side view
- Connector version

Your Benefit

- Simple pushbutton configuration



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

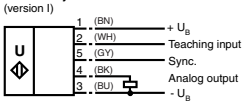
MH 04-3505	Mounting aid for FP sensors
MHW 11	Mounting brackets for sensors
DA5-IU-2K-V	Process control and indication equipment
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



UB500-F42S-I-V15
UB2000-F42S-I-V15

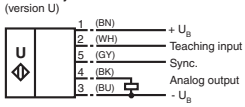
Standard symbol/Connections:
(version I)



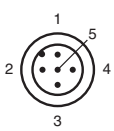
Core colours in accordance with EN 60947-5-2.

UB500-F42S-U-V15
UB2000-F42S-U-V15

Standard symbol/Connections:
(version U)



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

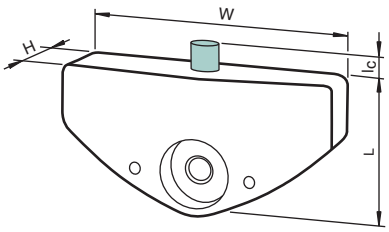


Properties

- Up to 2500 mm sensing range
- DC, 2 switching outputs and programming interface
- Level measurement optimized F65 housing
- Connector version

Your Benefit

- SONPROG programmable sensing limits and filtering
- Ultra-low 30 mm mounting height
- Gasketed transducer seals the tank/container



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	12 ... 30 V (including ripple) In supply voltage interval 12 ... 20 V reduced sensitivity by 20% ... 0%
No-load supply current	≤ 60 mA
Output type	2 switch outputs PNP, NO
Rated operational current	150 mA , short-circuit/overload protected
Input type	1 program input Teach-In of S_{min}
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-F65-E8R2-V15	UC1500-F65-E8R2-V15	UC2500-F65-E8R2-V15
Sensing range	60 ... 500 mm	●		
	200 ... 1500 mm		●	
	250 ... 2500 mm			●
Transducer frequency	approx. 300 kHz	●		
	approx. 200 kHz		●	
	approx. 120 kHz			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●

Dimensions	
Length L [mm]	64,4
Width W [mm]	125
Height H [mm]	30
Connector area l_c [mm]	12

Accessories

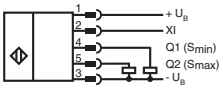
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

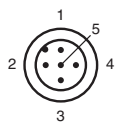
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable
3RX4000-PF	PC interface

Electrical Connection



UC500-F65-E8R2-V15
UC1500-F65-E8R2-V15
UC2500-F65-E8R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	15 ... 30 V (including ripple) In supply voltage interval 15 ... 20 V reduced sensitivity by 20% ... 0%
No-load supply current	≤ 60 mA
Output type	1 switch output PNP, NO
Operating current	≤ 300 mA , short-circuit/overload protected
Linearity error	≤ 1.5 %
Input type	1 Function input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin



Model Number		UC500-F65-IE2R2-V15	UC500-F65-UE2R2-V15	UC1500-F65-IE2R2-V15	UC1500-F65-UE2R2-V15	UC2500-F65-IE2R2-V15	UC2500-F65-UE2R2-V15
Sensing range	60 ... 500 mm	●	●				
	200 ... 1500 mm			●	●		
	250 ... 2500 mm					●	●
Transducer frequency	approx. 300 kHz	●	●				
	approx. 200 kHz			●	●		
	approx. 120 kHz					●	●
Output type	1 voltage output 0 ... 10 V , rising slope		●		●		●
	1 current output 4 ... 20 mA , rising slope	●		●		●	
Approvals and Certificates							
UL approval	cULus Listed, General Purpose	●	●	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●	●	●
Dimensions							
Length L [mm]		64,4					
Width W [mm]		125					
Height H [mm]		30					
Connector area l_c [mm]		12					

Properties

- Up to 2500 mm sensing range versions
- DC, analog output, switching output and programming interface
- Level measurement optimized F65 housing
- Connector version

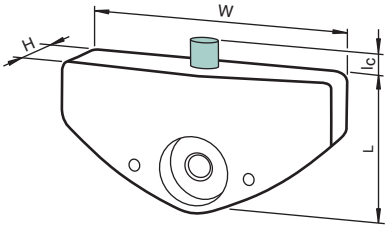
Your Benefit

- SONPROG programmable sensing limits and filtering
- Ultra-low 30 mm mounting height
- Gasketed transducer seals the tank/container

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

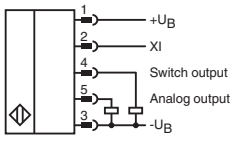
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable
3RX4000-PF	PC interface

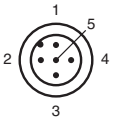


Electrical Connection



UC500-F65-IE2R2-V15
UC1500-F65-IE2R2-V15
UC2500-F65-IE2R2-V15
UC500-F65-UE2R2-V15
UC1500-F65-UE2R2-V15
UC2500-F65-UE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue 04/08/2015

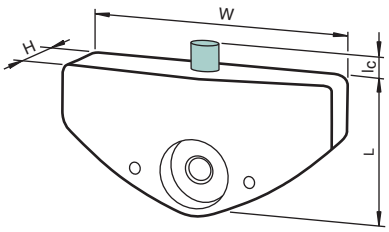


Properties

- Up to 2500 mm sensing range versions
- DC, frequency output, switching output and programming interface
- Level measurement optimized F65 housing
- Connector version

Your Benefit

- SONPROG programmable sensing limits and filtering
- Frequency (Hz) output provides continuous feedback to discrete input controllers
- Ultra-low 30 mm mounting height
- Gasketed transducer seals the tank/container



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	12 ... 30 V (including ripple) In supply voltage interval 12 ... 20 V reduced sensitivity by 20% ... 0%
No-load supply current	≤ 60 mA
Output type	1 Frequency output
Rated operational current	300 mA
Input type	1 Function input
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	Device connector M12 x 1 , 4-pin



Model Number		UC500-F65-FE2R2-V15	UC1500-F65-FE2R2-V15	UC2500-F65-FE2R2-V15
Sensing range	60 ... 500 mm	●		
	200 ... 1500 mm		●	
	250 ... 2500 mm			●
Transducer frequency	approx. 300 kHz	●		
	approx. 200 kHz		●	
	approx. 120 kHz			●
Output frequency	30 ... 250 Hz (300 ... 2500 Hz) , adjustable	●		
	20 ... 150 Hz (200 ... 1500 Hz) , adjustable		●	
	12.5 ... 125 Hz (125 ... 1250 Hz) , adjustable			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●

Dimensions	
Length L [mm]	64,4
Width W [mm]	125
Height H [mm]	30
Connector area l_c [mm]	12

Accessories

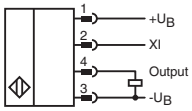
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

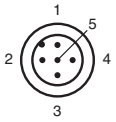
V1-G-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable
3RX4000-PF	PC interface

Electrical Connection



UC500-F65-FE2R2-V15
UC1500-F65-FE2R2-V15
UC2500-F65-FE2R2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	800 ... 10000 mm
Transducer frequency	approx. 60 kHz
Operating voltage	15 ... 30 V (including ripple) In supply voltage interval 15 ... 20 V reduced sensitivity by 20% ... 0%
No-load supply current	≤ 75 mA
Linearity error	≤ 1.5 %
Input/output type	1 synchronization connection, bidirectional
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	UP 1225 SF/R8
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	screw terminals , PG 13.5 cable gland



Model Number		UC10000-F260-IE8R2	UC10000-F260-IE9R2	UC10000-F260-UE8R2	UC10000-F260-UE9R2
Output type	2 switch outputs PNP, NC		●		●
	2 switch outputs PNP, NO	●		●	
Operating current	150 mA , short-circuit/overload protected		●		●
	300 mA , short-circuit/overload protected	●		●	
Output type	1 voltage output: 0 ... 10 V rising slope			●	●
	1 current output 4 ... 20 mA rising slope	●	●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●
Dimensions					
Length L [mm]			112		
Width W [mm]			160		
Height H [mm]			160		

Properties

- 10 m sensing range
- DC, analog output, switching outputs and programming interface
- Rotatable F260 housing
- Terminal compartment

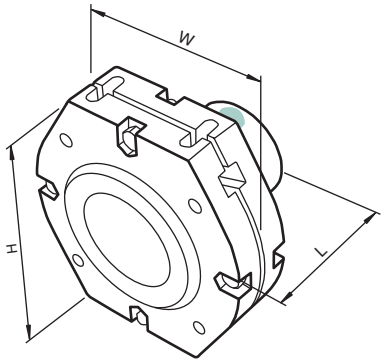
Your Benefit

- SONPROG programmable sensing limits and filtering

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

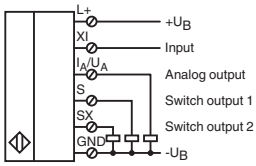
DA5-IU-C	Digital display unit
3RX4000-PF	PC interface
V1S-M12-500	Receptacles, M12/M16, 5-pin



Electrical Connection



UC10000-F260-IE9R2
UC10000-F260-UE8R2
UC10000-F260-UE9R2
UC10000-F260-IE8R2



Date of issue 04/08/2015



Properties

- Ø18 mm housing
- 1000 mm sensing range
- DC, 3-wire switching output
- Connector version

Technical Data

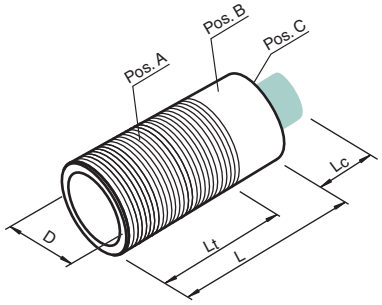
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBE1000-18GM40-SE2-V1
Sensing range	15 ... 1000 mm
Transducer frequency	approx. 255 kHz
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Output type	PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Switching frequency	≤ 100 Hz
Input type	1 program input free air path: -U_B ... +1 V, object: +6 V ... +U_B input impedance: > 4,7 kΩ program pulse: ≥ 1 s
LED green	Power on
LED yellow	switching state
LED red	error, object uncertain
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin
	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
Dimensions	
Length L [mm]	49.2
Diameter D [mm]	18
Thread length l_t [mm]	24.5
Connector area l_c [mm]	10
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



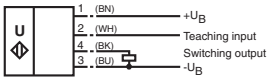
Electrical Connection



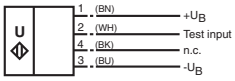
UBE1000-18GM40-SE2-V1

Standard symbol/Connection:
(version E2, pnp)

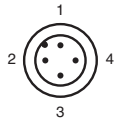
Receiver:



Emitter:



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBEC300-18GH40-SE2-V1
Sensing range	100 ... 300 mm
Transducer frequency	approx. 255 kHz
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Output type	PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Switching frequency	≤ 100 Hz
Input type	1 program input [receiver] switch point 1: -U_B ... +1 V, switch point 2: +6 V ... +U_B 1 test input [emitter] emitter deactivated: +6 V ... +U_B
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Stainless steel 1.4435 / AISI 316L O-ring for cover sealing: EPDM
Transducer	PTFE (diaphragm surface)
Protection degree	IP68 / IP69K
Connection type	Device connector M12 x 1 , 4-pin



Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	43
Diameter D [mm]	18
Head diameter D_1 [mm]	21
Thread length l_t [mm]	15
Head length l_1 [mm]	13
Connector area l_c [mm]	10

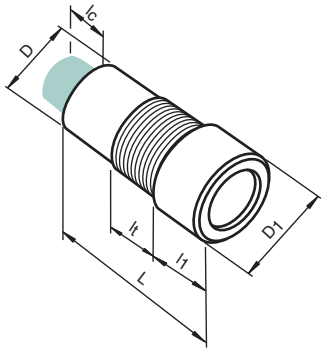
Properties

- Ø18 mm high grade steel housing
- 300 mm sensing range
- DC, 3-wire switching output
- Connector version

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
V1-GU-BK2M-PVC	Cable socket, M12 Ultra-Lock, 4-pin, PVC cable
V1-WU-BK2M-PVC	Cable socket, M12 Ultra-Lock, 4-pin, PVC cable



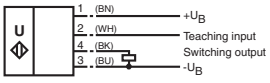
Electrical Connection



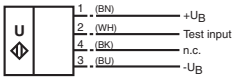
UBEC300-18GH40-SE2-V1

Standard symbol/Connection:
(version E2, pnp)

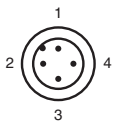
Receiver:



Emitter:



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue 04/08/2015



Properties

- Ø18 mm housing, angled head
- 1000 mm sensing range
- DC, 3-wire switching output
- Connector version

Technical Data

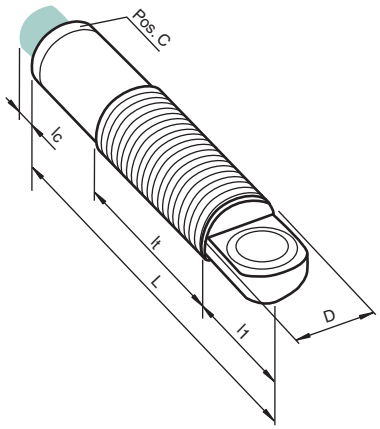
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBE1000-18GM40A-SE2-V1
Sensing range	15 ... 1000 mm
Transducer frequency	approx. 255 kHz
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 20 mA
Output type	PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Switching frequency	≤ 100 Hz
Input type	1 program input free air path: -U_B ... +1 V, object: +6 V ... +U_B input impedance: > 4,7 kΩ program pulse: ≥ 1 s
LED green	Power on
LED yellow	switching state
LED red	error, object uncertain
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	brass, nickel-plated
Transducer	epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin
	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose
Dimensions	
Length L [mm]	57.7
Diameter D [mm]	18
Transducer length l_1 [mm]	18.5
Thread length l_t [mm]	24.5
Connector area l_c [mm]	10
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

UB-PROG2	Programming unit
OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PUR	Cable socket, M12, 4-pin, PUR cable



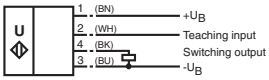
Electrical Connection



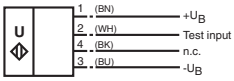
UBE1000-18GM40A-SE2-V1

Standard symbol/Connection:
(version E2, pnp)

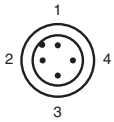
Receiver:



Emitter:



Core colours in accordance with EN 60947-5-2.



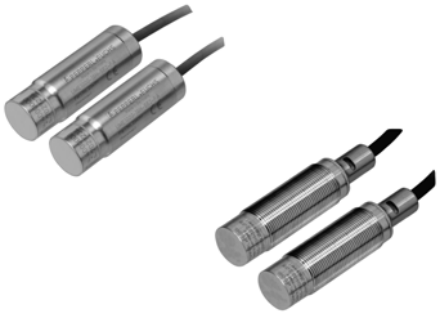
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 04/08/2015

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Properties

- Ø18 mm high grade steel housing, hygienic design
- 1000 mm sensing range
- DC, 3-wire switching output
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	15 ... 1000 mm
Transducer frequency	170 kHz
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	≤ 20 mA
Output type	1 switch output E2, PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Switching frequency	≤ 100 Hz
Input type	1 program input free air path: $-U_B$ ... +1 V, object: +6 V ... $+U_B$
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Material	
Housing	Stainless steel 1.4435 / AISI 316L
Transducer	Stainless steel 1.4435 / AISI 316L
Protection degree	IP68 / IP69K

Model Number		UME1000-18H-SE2-FA	UME1000-18H-SE2-FB	UME1000-18GH-SE2-FB
LED green	Power on		●	●
LED yellow	Receiver: switching state, uncertain object, Teach-In		●	●
LED red	Transducer: test input		●	●
Connection type	cable PUR , 2 m	●		
	cable PVC , 2 m		●	●

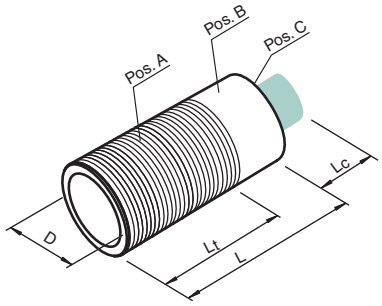
Approvals and Certificates				
UL approval	cULus Listed, General Purpose		●	●
CSA approval	cCSAus Listed, General Purpose		●	●

Dimensions			
Length L [mm]	55	66,7	
Diameter D [mm]	18		
Thread length l_t [mm]	0		32
Connector area l_c [mm]	0		
LED position	-	Pos. C	

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BF 18	Mounting flange, 18 mm
BF 18-F	Mounting flange with dead stop, 18 mm
MH-18H-01-FA	



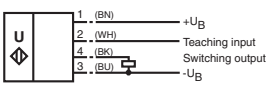
Electrical Connection



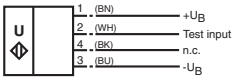
UME1000-18H-SE2-FA
UME1000-18GH-SE2-FB
UME1000-18H-SE2-FB

Standard symbol/Connection:
(version E2, pnp)

Receiver:



Emitter:



Date of issue 04/08/2015



Properties

- Ø30 mm housing
- 4 m sensing range
- DC, 4-wire complementary switching outputs
- Connector version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBE4000-30GM-SA2-V15
Sensing range	0 ... 4000 mm , distance emitter-receiver 500 mm ... 4000 mm
Transducer frequency	85 kHz
Operating voltage	18 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	35 mA emitter 25 mA receiver
Output type	2 switch outputs PNP, normally open/closed (complementary)
Rated operational current	200 mA
Switching frequency	≤ 15 Hz
LED green	alignment aid OFF: no ultrasonic signal flashing: uncertain area ON: positive reception
LED yellow	switching state
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Protection degree	IP65
Connection type	Device connector M12 x 1 , 5-pin

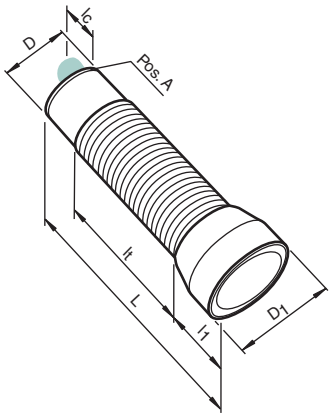
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	90
Diameter D [mm]	30
Transducer diameter D_1 [mm]	40
Transducer length l_1 [mm]	25
Thread length l_t [mm]	43
Connector area l_c [mm]	10
LED position	Pos. A

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

FP100	Remote potentiometer
BF 30	Mounting flange, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable



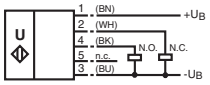
Electrical Connection



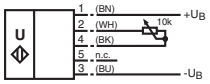
UBE4000-30GM-SA2-V15

Standard symbol/Connection:
(version A2, pnp)

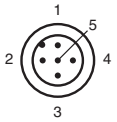
Receiver:



Emitter:



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UBE800-F77-SE2-V31
Sensing range	0 ... 800 mm emitter/receiver spacing
Transducer frequency	approx. 300 kHz
Operating voltage	20 ... 30 V DC , ripple 10 %$_{SS}$; 12 ... 20 V DC reduced sensitivity by 80 %
No-load supply current	≤ 20 mA
Output type	1 switch output PNP, NO
Rated operational current	200 mA , short-circuit/overload protected
Switching frequency	100 Hz
Input type	1 program input (receiver)
LED green	Power on (emitter)
LED yellow	switching state (receiver)
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	Polycarbonate
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	M8 x 1 connector , 4-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CSA approval	cCSAus Listed, General Purpose

Dimensions	
Length L [mm]	23
Width W [mm]	12
Height H [mm]	31
Connector area l_c [mm]	9

Properties

- Emitter / receiver set
- Miniature F77 housing
- 800 mm sensing range
- DC, 3-wire switching output
- Connector version

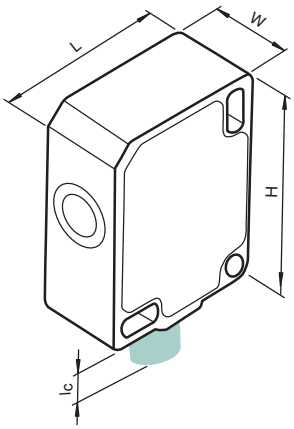
Your Benefit

- Best-in-class immunity to acoustic interference
- Excellent for detection of clear objects
- Fast, 100Hz switching frequency

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

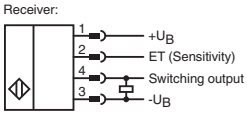
UB-PROG4-V31	Programming unit
OMH-ML7-01	Mounting bracket
V31-GM-2M-PVC	M8, 4-pin socket, PVC cable
V31-WM-2M-PVC	M8, 4-pin socket, PVC cable

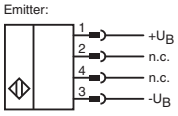


Electrical Connection



UBE800-F77-SE2-V31







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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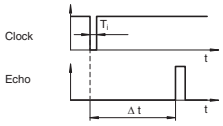


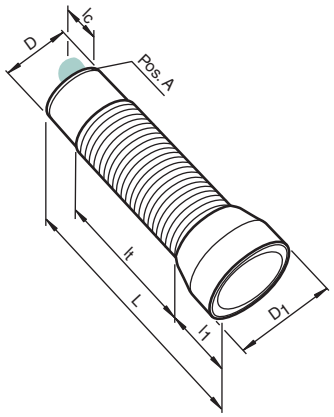
Properties

- Up to 6000 mm sensing range versions
- DC, clock input / echo output
- Requires external controller / amplifier
- Ø30 mm cylindrical housing
- Connector version

Function

The sensing range is determined in the downstream evaluation electronics such as PLC modules or other existing evaluation units.
The object distance in pulse-echo mode is obtained from the echo time Δt. The emission of an ultrasonic pulse starts simultaneously with the falling slope of the clock input signal.





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating voltage	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	≤ 30 mA
Input type	1 pulse input for transmitter pulse (clock)
Output type	1 pulse output for echo run time, short-circuit proof open collector PNP with pulldown resistor = 22 kOhm level 0 (no echo): -U_B level 1 (echo detected): ≥ (+U_B-2 V)
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	Device connector M12 x 1 , 4-pin



Model Number		UB500-30GM-H3-V1	UB2000-30GM-H3-V1	UB4000-30GM-H3-V1	UB6000-30GM-H3-V1
Sensing range	30 ... 500 mm	●			
	80 ... 2000 mm		●		
	200 ... 4000 mm			●	
	350 ... 6000 mm				●
Transducer frequency	approx. 380 kHz	●			
	approx. 180 kHz		●		
	approx. 85 kHz			●	
	approx. 65 kHz				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose	●	●	●	●
CSA approval	cCSAus Listed, General Purpose	●	●	●	●

Dimensions					
Length L [mm]		80		95	100
Diameter D [mm]			30		
Transducer diameter D_1 [mm]		30		40	74
Transducer length l_1 [mm]		0		25	32,5
Thread length l_t [mm]		60		49	47,5
Connector area l_c [mm]			10		

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

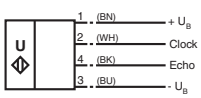
BF 30	Mounting flange, 30 mm
BF 30-F	Mounting flange with dead stop, 30 mm
BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
UVW90-M30	Ultrasonic deflector (only UB500... and UB2000...)
UVW90-K30	Ultrasonic deflector (only UB500... and UB2000...)
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable

Electrical Connection

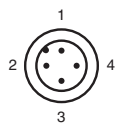


UB2000-30GM-H3-V1
UB4000-30GM-H3-V1
UB500-30GM-H3-V1
UB6000-30GM-H3-V1

Standard symbol/Connection:



2 = Emitter pulse input
4 = Echo propagation time output
Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Ø18 mm housing
- Wide range double sheet detection
- Very fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- 400-series is designed for detection of the broadest range of materials (typically paper)
- One sensor identifies zero-, single- and double-sheets

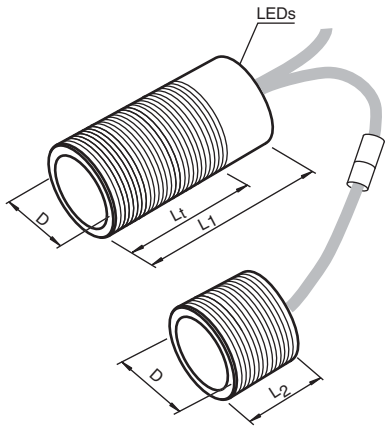
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	395 kHz
Operating voltage	18 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	< 80 mA
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 15 ms (shorter response time on request)
Switch-off delay	approx. 15 ms (shorter response time on request)
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	indication: single sheet detected
LED yellow	Indication: No sheet detected (Air)
LED red	indication: double sheet detected
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		UDC-18GM-400-3E1	UDC-18GM-400-3E2	UDC-18GM-400-3E3
Output type	3 switch outputs NPN, NC	●		
	3 Switch outputs PNP, NC			●
	3 switch outputs PNP, NO		●	
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Receiver length L1 [mm]			74	
Emitter length L2 [mm]			22	
Diameter D [mm]			18	
Receiver thread length l_t [mm]			45	



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

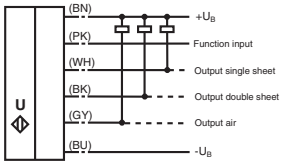
UDB-Cable-2M	Extension cable
MH-UDB01	Mounting bracket for double sheet monitor
UDB-Cable-1M	Extension cable

Electrical Connection



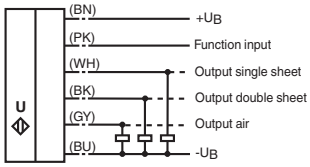
UDC-18GM-400-3E1

Standard symbol/Connection:
Double sheet control



UDC-18GM-400-3E2
UDC-18GM-400-3E3

Standard symbol/Connection:
Double sheet control



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Properties

- Ø18 mm housing with mounting bracket
- Wide range double sheet detection
- Very fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- 400-series is designed for detection of the broadest range of materials (typically paper)
- One sensor identifies zero-, single- and double-sheets

Technical Data

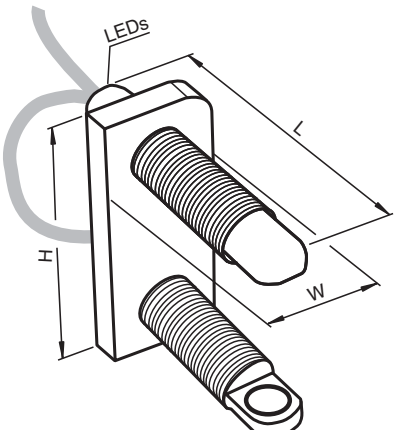
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	395 kHz
Operating voltage	18 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	< 80 mA
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 15 ms (shorter response time on request)
Switch-off delay	approx. 15 ms (shorter response time on request)
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	indication: single sheet detected
LED yellow	Indication: No sheet detected (Air)
LED red	indication: double sheet detected
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		UDC-18GMA-400-3E1	UDC-18GMA-400-3E3
Output type	3 switch outputs NPN, NC	●	
	3 switch outputs PNP, NC		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●

Dimensions	
Length L [mm]	87
Diameter D [mm]	18
Height H [mm]	86
Width W [mm]	36



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

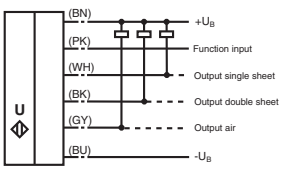
UDB-Cable-2M	Extension cable
UDB-Cable-1M	Extension cable

Electrical Connection



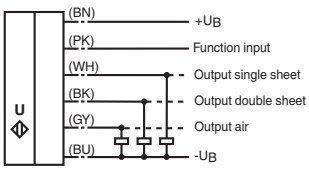
UDC-18GMA-400-3E1

Standard symbol/Connection:
Double sheet control



UDC-18GMA-400-3E3

Standard symbol/Connection:
Double sheet control



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	395 kHz
Operating voltage	18 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	< 50 mA
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 15 ms (shorter response time on request)
Switch-off delay	approx. 15 ms (shorter response time on request)
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	indication: single sheet detected
LED yellow	Indication: No sheet detected (Air)
LED red	indication: double sheet detected
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



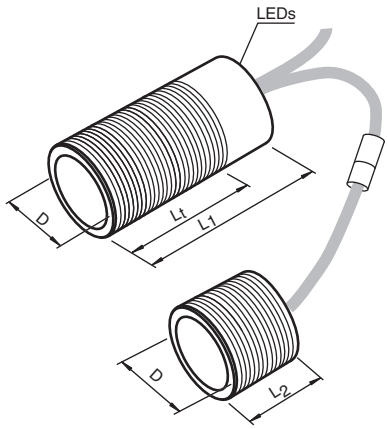
Model Number		UDC-18GM50-400-3E1	UDC-18GM50-400-3E2	UDC-18GM50-400-3E0	UDC-18GM50-400-3E3
Output type	3 switch outputs NPN, NC	●			
	3 switch outputs NPN, NO			●	
	3 switch outputs PNP, NC				●
	3 switch outputs PNP, NO		●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●	●	●
Dimensions					
Receiver length L1 [mm]			53		
Emitter length L2 [mm]			22		
Diameter D [mm]			18		
Receiver thread length l_t [mm]			30		

Properties

- Short Ø18 mm housing
- Wide range double sheet detection
- Very fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- Short-barrel design
- 400-series is designed for detection of the broadest range of materials
- One sensor identifies zero-, single- and double-sheets



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

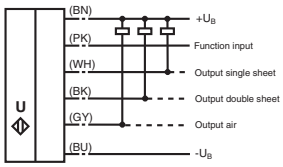
MH-UDB01	Mounting bracket for double sheet monitor
UDB-Cable-2M	Extension cable
UDB-Cable-1M	Extension cable

Electrical Connection



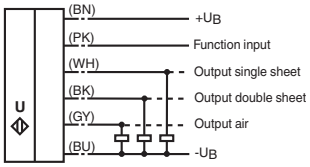
UDC-18GM50-400-3E1
UDC-18GM50-400-3E0

Standard symbol/Connection:
Double sheet control



UDC-18GM50-400-3E2
UDC-18GM50-400-3E3

Standard symbol/Connection:
Double sheet control



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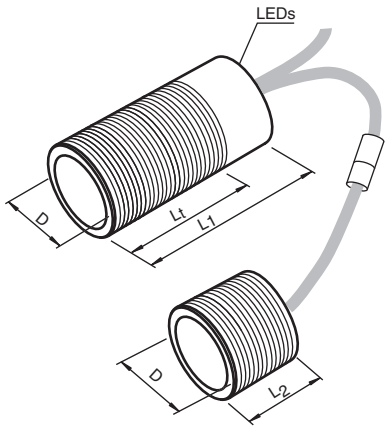


Properties

- Short Ø18 mm housing
- Wide range double sheet detection
- Very fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- Short-barrel design
- 255-series is designed for detection of the materials too thick for 400-series monitoring
- One sensor identifies zero-, single- and double-sheets



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	255 kHz
Operating voltage	18 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	< 50 mA
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 15 ms (shorter response time on request)
Switch-off delay	approx. 15 ms (shorter response time on request)
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	indication: single sheet detected
LED yellow	Indication: No sheet detected (Air)
LED red	indication: double sheet detected
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		UDC-18GM50-255-3E1	UDC-18GM50-255-3E0	UDC-18GM50-255-3E3
Output type	3 switch outputs NPN, NC	●		
	3 switch outputs NPN, NO		●	
	3 switch outputs PNP, NC			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Receiver length L1 [mm]			53	
Emitter length L2 [mm]			22	
Diameter D [mm]			18	
Receiver thread length l_t [mm]			30	

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

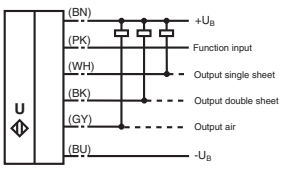
UDB-Cable-2M	Extension cable
MH-UDB01	Mounting bracket for double sheet monitor
UDB-Cable-1M	Extension cable

Electrical Connection



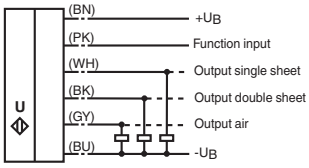
UDC-18GM50-255-3E1
UDC-18GM50-255-3E0

Standard symbol/Connection:
Double sheet control



UDC-18GM50-255-3E3

Standard symbol/Connection:
Double sheet control



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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	40 ... 100 mm optimal distance 75 mm
Transducer frequency	255 kHz
Operating voltage	18 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	< 65 mA
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 70 ms
Switch-off delay	approx. 70 ms
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	Indicator: single material detected
LED yellow	Indicator: no material detected (air)
LED red	Indicator: double material detected
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



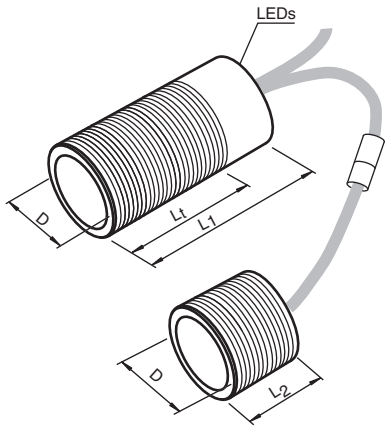
Model Number		UDC-18GM50-255S-3E0	UDC-18GM50-255S-3E1	UDC-18GM50-255S-3E3
Output type	3 switch outputs NPN, NC		●	
	3 switch outputs NPN, NO	●		
	3 switch outputs PNP, NC			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Receiver length L1 [mm]			53	
Emitter length L2 [mm]			40	
Diameter D [mm]			18	
Receiver thread length l_t [mm]			30	

Properties

- Short Ø18 mm housing
- Universal double material detection
- Fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- Short-barrel design
- 255S-series offers the maimum power possible in the 18 mm diameter housing
- Excellent for plastics (credit card thickness), cardboard and thin metals
- One sensor identifies zero-, single- and double-sheets



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

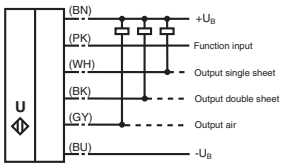
UDB-Cable-2M	Extension cable
MH-UDB01	Mounting bracket for double sheet monitor
UDB-Cable-1M	Extension cable

Electrical Connection



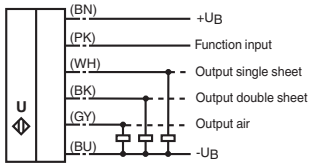
UDC-18GM50-255S-3E0
UDC-18GM50-255S-3E1

Standard symbol/Connection:
Double sheet control



UDC-18GM50-255S-3E3

Standard symbol/Connection:
Double sheet control



Date of issue 2015-04-08



Properties

- Short Ø18 mm housing
- Universal splice detection
- Extraordinary fast response
- DC, 2 switching outputs
- Cable version

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	255 kHz
Operating voltage	18 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	< 60 mA
Rated operational current	2 x 100 mA , short-circuit/overload protected
Switch-on delay	≤ 600 µs
Switch-off delay	≤ 600 µs
Pulse extension	≥ 120 ms programmable
Input type	TEACH-IN input
LED green	Display: readiness
LED yellow	Display: splice detected
LED red	Indication: No sheet detected (Air)
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m

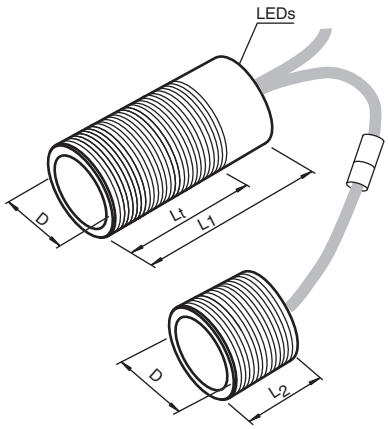


Model Number		UGB-18GM50-255-2E3	UGB-18GM50-255-2E1
Output type	2 switch outputs NPN, NC		●
	2 switch outputs PNP, NC	●	
Approvals and Certificates			
UL approval	cULus Listed, General Purpose	●	●
CSA approval	cCSAus Listed, General Purpose	●	●
Dimensions			
Receiver length L1 [mm]		53	
Emitter length L2 [mm]		22	
Diameter D [mm]		18	
Receiver thread length l_t [mm]		30	

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MH-UDB01	Mounting bracket for double sheet monitor

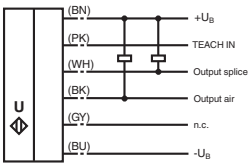


Electrical Connection



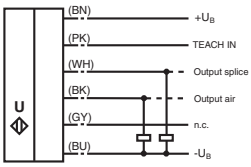
UGB-18GM50-255-2E1

Standard symbol/Connection:
Splice control



UGB-18GM50-255-2E3

Standard symbol/Connection:
Splice control



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Sensing range	20 ... 60 mm , optimal distance: 45 mm
Transducer frequency	255 kHz
Operating voltage	18 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current	< 60 mA
Rated operational current	2 x 100 mA , short-circuit/overload protected
Switch-on delay	≤ 600 µs
Switch-off delay	≤ 600 µs
Input type	TEACH-IN input
LED green	Display: readiness
LED yellow	indication: label detected
LED red	Display: error
Ambient temperature	0 ... 60 °C (32 ... 140 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP67
Connection type	cable PVC , 2 m



Model Number		ULB-18GM50-255-2E3	ULB-18GM50-255-2E1
Output type	2 switch outputs NPN, NC		●
	2 switch outputs PNP, NC	●	
Approvals and Certificates			
UL approval	C-UL listed: 57M3, IND CONT. EQ., "Powered by Class 2 Power Source"	●	●

Dimensions	
Receiver length L1 [mm]	53
Emitter length L2 [mm]	22
Diameter D [mm]	18
Receiver thread length l_t [mm]	30

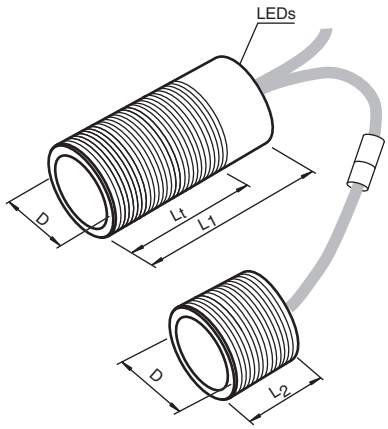
Properties

- Short Ø18 mm housing
- Universal label detection
- Extraordinary fast response
- DC, 2 switching outputs
- Cable version

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MH-UDB01	Mounting bracket for double sheet monitor

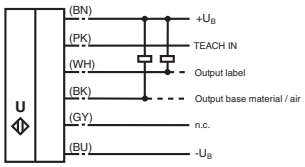


Electrical Connection



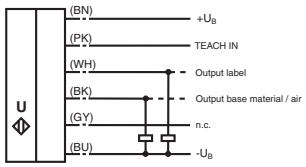
ULB-18GM50-255-2E1

Standard symbol/Connection:
Label monitor



ULB-18GM50-255-2E3

Standard symbol/Connection:
Label monitor



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Properties

- Ø30 mm housing
- Powerful material detection
- Fast response
- DC, 3 switching outputs
- Cable version

Your Benefit

- Short-barrel design
- Maximum possible material burn-through power
- Excellent for thick plastics and cardboard
- One sensor identifies zero-, single- and double-sheets

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	UDC-30GM-085-3E3
Sensing range	50 ... 150 mm , optimal distance: 80 mm
Transducer frequency	85 kHz
Operating voltage	18 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	< 200 mA
Output type	3 switch outputs PNP, NC
Rated operational current	3 x 100 mA , short-circuit/overload protected
Switch-on delay	approx. 30 ms
Switch-off delay	approx. 30 ms
Pulse extension	min. 120 ms programmable
Input type	Function input
LED green	Display: single-layer material detected
LED yellow	Display: no material (air)
LED red	Display: 2-layer or multi-layer material detected
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Material	
Housing	nickel plated brass; plastic components: PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Protection degree	IP65
Connection type	cable PVC , 2 m
	

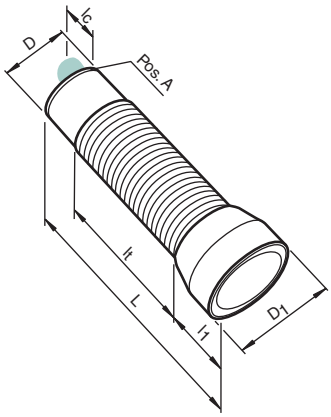
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	88 / 52
Diameter D [mm]	30
Transducer diameter D_1 [mm]	40
Transducer length l_1 [mm]	25
Thread length l_t [mm]	41 / 27
Connector area l_c [mm]	0
LED position	Pos. C

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

MH-UDB02	Mounting bracket for double sheet metal monitor
UDB-Cable-2M	Extension cable
UDB-Cable-1M	Extension cable

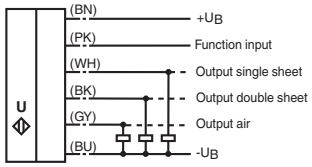


Electrical Connection



UDC-30GM-085-3E3

Standard symbol/Connection:
Double sheet control



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Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	MH-UDB01
Material	Stainless steel
Description	Rotatable mounting bracket with angle scale for ultrasonic double sheet control.

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	M-105
Material	PTFE
Description	Universal mounting bracket for cylindrical sensors with ø 30 mm and a thread that extends to the front end of the sensor (UB/UC300, -500, and -2000).

- **Secure fastening**
- **Easy installation**
- **Robust design**
- **Resistant to chemicals**

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	PA-02
Material	PVC
Description	Mounting flange for all square-shaped sensors in the FP series

- **Secure fastening**
- **Easy installation**
- **Robust design**

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Common data	
Material	PA
Description	Plastic nuts with centering ring for vibration-free mounting of cylindrical sensors. These plastic nuts must be used in applications where a sensor is affixed at the front third of the housing, and operated at temperatures < 0 °C.

Model number		M12K-VE	M18K-VE	M30K-VE
For sensor diameter	12 mm	●		
	18 mm		●	
	30 mm			●

Issue date:26.08.2014

Technical Data



- Clamp mounting
- 90° sound deflection for difficult mounting conditions
- Universal mounting position

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Common data	
Material	PMMA
Description	Ultrasonic deviation reflector for cylindrical ultrasonic sensors. The ultrasonic deviation reflector has an opening across the entire width at the lower end of the inclined position. Any falling dust particles cannot collect in the ultrasonic deviation reflector. This ensures ongoing operation even in dusty environments.

Model number		UVW90-K18	UVW90-K30
For sensors from the series	-18GM	●	
	-30GM		●

Technical Data



- Suitable for universal mounting
- 90° sound deflection for difficult mounting conditions
- Universal mounting position

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	UVW90-M12
Material	Stainless steel
Description	Ultrasonic deviation reflector for cylindrical ultrasonic sensors in the -12GM Series.

Technical Data



- Suitable for universal mounting
- 90° sound deflection for difficult mounting conditions
- Universal mounting position
- Ultrasonic focusing effect
- Increase in detection range (through focus)
  - approx. 40% with UB/UC500 (measurement L = 10 mm)
  - approx. 20% with UB/UC2000 (measurement L = 35 mm +/- 5 mm)

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	UVW90-M30
Material	Stainless steel
Description	Focusing ultrasonic deviation reflector for cylindrical ultrasonic sensors in the -30GM series.

Issue date:26.08.2014

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Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***



- **For LUC4T-type ultrasonic sensors**
- **8 mm connector**
- **Swivel-free single-hole mounting**

Model number	**UC-30GM-TEMP**
Function	External temperature probe
Description	As an alternative to the supplied temperature probe, the UC-30GM-TEMP external temperature probe can be connected to LUC4T-type ultrasonic sensors. The UC-30GM-TEMP temperature probe can be used to detect the ambient temperature of the measurement path, irrespective of the sensor mounting conditions, with a view to minimizing temperature effects to the greatest extent possible.

Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***



- **For LUC4T-type ultrasonic fill level sensors**
- **8 mm connector.**
- **Single-hole mounting in thread: G½A (LUC4-Z30-G2V) ½NPT (LUC4-Z30-N2V).**

Common data			
Function	External temperature probe		
Description	As an alternative to the supplied temperature probe, this external temperature probe can be connected to LUC4T-type ultrasonic sensors. The LUC4-Z30 sensor can be used to detect the ambient temperature of the measurement path, in line with the process and irrespective of the mounting conditions of the sensor, with a view to minimizing temperature effects to the greatest extent possible.		
Model number		**LUC4-Z30-G2V**	**LUC4-Z30-N2V**
Thread	G½A	●	
	½NPT		●

Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***



Model number	**USB-0.8M-PVC ABG-SUBD9**
Function	USB/RS232 interface adapter
Description	Interface adapter USB-0.8M-PVC ABG-SUBD9 provides an RS232 interface at a free USB port. It can be connected to a free USB port on the computer either directly or using the 800 mm USB extension cable provided. The available interface cable can then be connected to the 9-pin SUB-D plug in the usual way.

Issue date:26.08.2014

Technical Data



- **For sensors UC300-F43-2KIR2-V17 and UC2000-F43-2KIR2-V17.**
- **Simple intermediate switching in the sensor connection line.**

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**UC-F43-R2**
Function	RS232 interface
Description	The device can be switched between the V17 cable connection box and the V17 plug connection at the sensor for the Teach-in process. The parameterized functions are retained after the programming unit has been removed and/or the operating voltage has been turned off at the sensor.

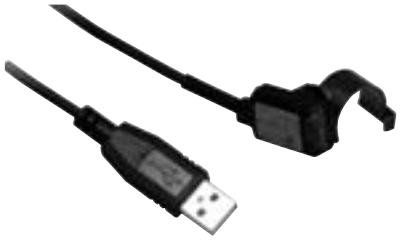
Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**UC-30GM-R2**
Function	Interface cable
Description	Interface cable UC-30GM-R2 enables type UC...-30GM-..R2-V15 ultrasonic sensors to be parameterized using service program ULTRA 2001. The cable establishes a connection between the PC's internal RS232 interface and the connector of the temperature/programming plug at the sensor.

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**UC-18/30GM-IR**
Function	Interface cable

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**UC-30GM-PROG**
Function	Extension cable
Description	Extension cable UC-30GM-PROG enables UC...-30GM-... and LUC-type ultrasonic sensors to be taught in, even at installation locations that are difficult to access. The sensor end of the extension cable is connected to the socket for the temperature plug at the sensor. Sensors can be programmed at the other end of the cable using the temperature plug.

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Common data	
Connectors	M8 x 1, male connector, 3-pin and M8 x 1, female connector, 3-pin
Cable material	PUR
Cable color	black
Description	Extension cable for ultrasonic double sheet monitors

Model number		**UDB-Cable-1M**	**UDB-Cable-2M**
Cable length	1 m	●	
	2 m		●

Issue date:26.08.2014

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Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	3RX4000-PF
Function	PC interface
Description	Using this PC interface and the corresponding software, you can adapt ultrasonic sensors of a specific series to the requirements of your application. It is also possible to parameterize several sensors identically. The start and end of a sensor's detection range can be stored and copied to other sensors at the press of a button.

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	UB-PROG2
Function	Programming unit
Description	The device can be switched between the V15 cable connection box and the V15 plug connection at the sensor for the Teach-in process. The trip points/measurement window and the output function are taught in using sensors A1 and A2 in accordance with the diagram provided. The taught in trip points and functions are retained after the programming unit has been removed and/or the operating voltage has been turned off at the sensor.

- **Simple Teach-in of trip points A1/ A2 or the measurement window.**
- **Easy selection of output function: window operation, NO contact/NC contact function.**
  One trip point, NO contact/NC contact function.
  Monitoring of detection range.

For the following types of ultrasonic sensors:

UB300			
UB400	**-12GM**		
UB500	**-18GM40**	**-E4**	
UB800	**-18GM75**	**-E5**	**-V15**
UB1000	**-30GM**	**-I**	
UB2000	**-F42(S)**	**-U**	
UB4000	**-F54**		
UB6000			

... where the Teach-in input is at pin 2.

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	UB-PROG3
Function	Programming unit
Description	The unit can be switched between the V15 cable connection box and the V15 plug connection at the sensor for the Teach-in process. The trip points/measurement window and the output function are taught in using sensors A1 and A2 in accordance with the diagram provided. The taught in trip points and functions are retained after the programming unit has been removed and/or the operating voltage has been turned off at the sensor.

- **Simple Teach-in of trip points A1/ A2 or the measurement window.**
- **Easy selection of output function: window operation, NO contact/NC contact function.**
  One trip point, NO contact/NC contact function.
  Monitoring of detection range.

For the following types of ultrasonic sensors:

UB500	**-18GM75**	**-E01**	**-V15**
UB1000		**-E23**	
		-E6	
		-E7	

... where the Teach-in input is at pin 2.

Issue date:26.08.2014

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Contents

Rotary encoders



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4. Rotary Encoders

Overview of Rotary Encoders/Selection Tables

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Absolute rotary encoders				
Series	**Ø 36 mm**	**Ø 42 mm**	**Ø 58 mm**	
	Page 692 ff	Page 694	Page 695 ff	
	• Small housing design • Magnetic sensing	• Magnetic sensing • Robust heavy load design • Stainless steel housing	• Aluminium or stainless steel housing • Clamping flange and servo flange	
Resolution				
Singleturn	up to 13 bits	up to 12 bits	up to 16 bits	
Multiturn	up to 12 bits	up to 12 bits	up to 14 bits	
Total resolution	up to 25 bits	up to 24 bits	up to 30 bits	
Mechanics				
Solid shaft	●	●	●	
Hollow shaft			●	
Recessed hollow shaft	●		●	
Interface				
Parallel			●	
SSI	●		●	
AS-Interface			●	
CANopen	●	●		
DeviceNet				
PROFIBUS				
EtherNet, TCP/IP				
EtherNet Powerlink				
EtherNet/IP				
PROFINET				
Modbus				
EtherCAT				
Special features				
Magnetic sensing	●	●	See ENA58IL series on *www.pepperl-fuchs.com*	
Heavy load		●		
With safety function				
For applications in hazardous areas				

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Absolute rotary encoders

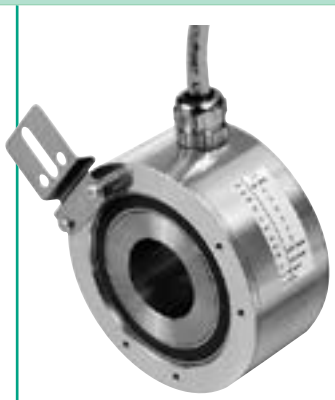
Ø 58 mm	Ø 58 mm	Ø 78 mm	Series
Page 702 ff	Page 706	Page 709	
• Removable bus cover • Terminal compartment or plug connector • Clamping flange and servo flange	• Assessed for safety in accordance with SIL3/PLe • TÜV-certified • Clamping flange and servo flange	• Removable bus cover • EC-Type-Examination Certificate • IEC Ex certificate • Flameproof enclosure	
			Resolution
up to 16 bits	up to 16 bits	up to 16 bits	**Singleturn**
up to 14 bits	up to 14 bits	up to 14 bits	**Multiturn**
up to 30 bits	up to 30 bits	up to 30 bits	**Total resolution**
			Mechanics
●	●	●	**Solid shaft**
			Hollow shaft
●	●		**Recessed hollow shaft**
			Interface
			Parallel
		●	**SSI**
			AS-Interface
●	●	●	**CANopen**
●		●	**DeviceNet**
●		●	**PROFIBUS**
●			**EtherNet, TCP/IP**
●			**EtherNet Powerlink**
●			**EtherNet/IP**
●			**PROFINET**
●			**Modbus**
●			**EtherCAT**
			Special features
See ENA58IL series on *www.pepperl-fuchs.com*			**Magnetic sensing**
			Heavy load
	●		**With safety function**
● (Page 707 ff)		●	**For applications in hazardous areas**

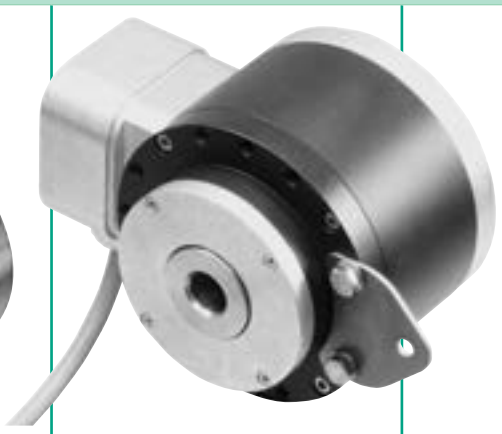
Incremental rotary encoders					
Series	**MNI20 / MNI40**	**Ø 40 mm**	**Ø 50 mm**	**Ø 58 mm**	**Ø 2.5“**
	Page 710 ff	Page 712 ff	Page 715 ff	Page 717 ff	Page 726
	• Magnetic sensing • No moving parts • High degree of protection • Speed up to 30,000 rpm • Diagnostic functions	• Miniature housing design • Loadable metal disk	• Robust and compact housing design	• Industry standard with 58 mm diameter • Extended temperature range • Very high resolution	• Industry standard housing 2.5 “ • Servo flange or square flange
Resolution					
Max. pulse count	5000	1024	2500	50,000	5000
Max. frequency				2048	
Mechanics					
Solid shaft	-	●	●	●	●
Hollow shaft	-	●	●	●	
Recessed hollow shaft	-	●	●	●	
Cone shaft					
Connection technology					
Cable	●	●	●	●	●
Plug					●
Terminals					
Output type					
Push-pull output	●	●	●	●	●
RS422 compatibility	●	●	●	●	●
Sine/cosine				● Page 730 ff	
Special features					
Hygienic design				● Page 725	
IP69K degree of protection	● *)				
With safety function				● Page 733	
For applications in hazardous areas				● Page 734 ff	

*) MNI40 only, MNI20 is protection degree IP67

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Incremental rotary encoders

	Ø 70 mm	Ø 90 mm	Ø 110 mm	Series
	Page 736	Page 727 ff	Page 729	
	• EC-Type-Examination Certificate • Flameproof enclosure	• Hollow shaft 16 mm to 45 mm • Short housing design • Gentle shaft clamping	• Suitable for heavy duty applications • Highly shock and vibration resistant • Protected against shaft currents • Rotatable connection box • Suitable for high bearing loads	
Resolution				
	5000	50,000	2500	**Max. pulse count**
		2048		**Max. frequency**
Mechanics				
	●			**Solid shaft**
		●	●	**Hollow shaft**
				Recessed hollow shaft
			●	**Cone shaft**
Connection technology				
	●	●	●	**Cable**
		●	●	**Plug**
			●	**Terminals**
Output type				
	●	●	●	**Push-pull output**
	●	●	●	**RS422 compatibility**
		● Page 732		**Sine/cosine**
Special features				
				Hygienic design
				IP69K degree of protection
				With safety function
	●			**For applications in hazardous areas**

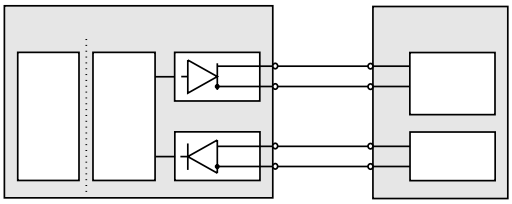
Technology and Functional Principle

Rotary encoders are used in automation technology as sensors for angles, positions, speed, and acceleration. Spindles, gear racks, measuring wheels, or cable pulls can also be used to detect linear movements.

They convert the actual value of a mechanical movement into electric signals that can be evaluated by counters, tachometers, PLCs, and industrial PCs.

Transparent and nontransparent fields are applied to a plastic or glass pane.

Placing a light source on one side of the pane and a light receiver on the other enables rotation to be detected in a noncontact manner. If the light beam hits a transparent field, the receiver circuit detects a pulse. However, if the path of the beam is interrupted by a dark field, no pulse is triggered. LEDs that emit light in the infrared range are usually used as the light source. Photo diodes or photo transistors are used as the receiver.



If no further functions are added to this principle, the device simply detects that the disk is rotating. It is not possible to specify the direction of rotation or even an absolute position.

Rotary encoders differ in terms of their functional principle, mechanical design, and mounting.



1. Different Functional Principles

1.1 Incremental rotary encoders

Incremental rotary encoders provide a defined number of pulses per shaft revolution.

The speed of a movement is determined by measuring the period duration or counting the pulses per time unit. If you add together the pulses from a reference point, the counted value represents a measurement for the angle passed or the distance traveled.

Two-channel rotary encoders–with 90° phase-shifted output signals–enable the downstream electronics to determine the direction of rotation of the shaft and thereby also enable bidirectional positioning tasks.

Three-channel incremental rotary encoders issue a zero signal once per revolution.

For further information, see the section "Application Notes for Incremental Rotary Encoders."

1.2 Absolute rotary encoders

Absolute rotary encoders output a uniquely coded numerical value at each shaft position.

For positioning applications in particular, absolute rotary encoders perform the counting tasks instead of the subsequent electronics, eliminating the need for complex and expensive input components. Furthermore, reference runs do not need to be performed when switching the machine on or if the supply voltage fails, because the current position value is available immediately.

Singleturn absolute rotary encoders divide one shaft revolution into a defined number of measuring steps. The maximum resolution is 16 bits, i.e., up to 65,536 different positions.

Multiturn absolute rotary encoders do not just detect angular positions within a revolution, they also detect the number of revolutions using a multistage gear. The resolution of the multiturn part is up to 14 bits, i.e., up to 16,384 revolutions can be identified. This results in a total resolution of 30 bits or a total of 1,073,741,824 measuring steps.

Parallel absolute rotary encoders transfer the position value to the evaluation electronics in parallel over several lines.

In the case of serial absolute rotary encoders, the output data is issued via standard interfaces and standardized protocols. Point-to-point connections were often used in the past to perform a data transfer, whereas nowadays fieldbus systems are increasingly used.

For further information, see the section "Application Notes for Absolute Rotary Encoders."

2. Different Designs and Mounting

2.1 Rotary encoders with solid shaft

These rotary encoders are fitted with a solid shaft. The rotary encoder is connected to the drive shaft via an additional coupling. The coupling connects both shafts mechanically and compensates the axle offset.

Straps, pinions, measuring wheels, and cable pulls can also be used to connect a rotary encoder to the driving shaft.

Generally, attention must be paid to the permissible shaft load. Depending on the coupling type, there are different levels of risk of destroying the measuring device due to radial and/or axial forces that are too strong.



Advantages of rotary encoders with solid shaft:

- Simple construction
- Higher degree of protection possible
- Mechanically and, depending on coupling, also electrically decoupled

Disadvantages of rotary encoders with solid shaft:

- Many parts for mounting the rotary encoder: rotary encoder, mounting flange, coupling

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2.2 Hollow shaft rotary encoders

The rotary encoder shaft for this design has either a thru-hole or a blind hole (rotary encoder with recessed hollow shaft).

The rotary encoder and drive can be connected easily via the integrated shaft and hub connection.

Hollow shaft rotary encoders have an integrated or attached torque rest that compensates an axle offset of the rotary encoder and drive. Coupling is unnecessary in this case.



Advantages of hollow shaft rotary encoders:

- Compact system of motor and encoder
- Easy mounting

Disadvantages of hollow shaft rotary encoders:

- Complex internal structure

2.3 Mounting

Clamping flange

This type of flange enables the rotary encoder to be

- mounted on the clamping flange with simultaneous centering of the rotational axis (mounting bracket), or
- mounted on the existing front-face threads.



Servo flange

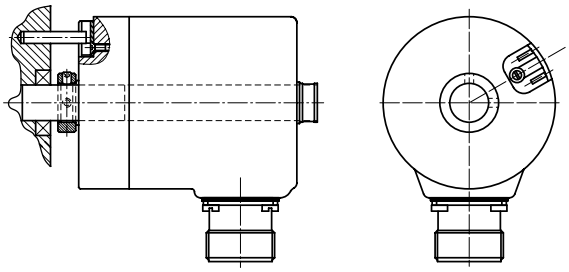
This type of flange enables the rotary encoder to be

- fixed to the servo groove of the rotary encoder using mounting clamps, or
- screwed to existing front-face threads, or
- mounted using a mounting bell.



Hollow shaft rotary encoder

Hollow shaft rotary encoders have a thru-hole for the drive shaft.

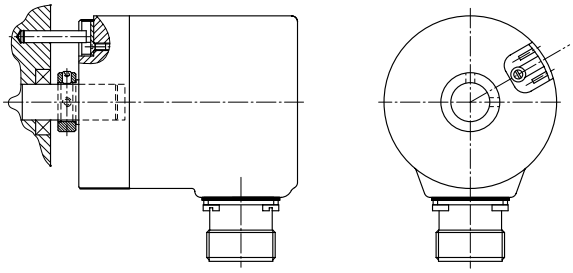


The shaft and hub connection is already integrated in these rotary encoders. It must simply be ensured that the torque is transferred correctly.

A simple and cost-effective option for this is the integrated torque rest. With this type of mounting, the drive shaft bears the weight of the rotary encoder. The inclusion of a pin on the periphery of the rotary encoder prevents rotation about the hollow shaft. All other levels of freedom must not be restricted.

Rotary encoder with recessed hollow shaft

Rotary encoders with recessed hollow shaft offer the same functionality as the hollow shaft rotary encoders described above. However, in contrast to the hollow shaft rotary encoders, they have a blind hole.

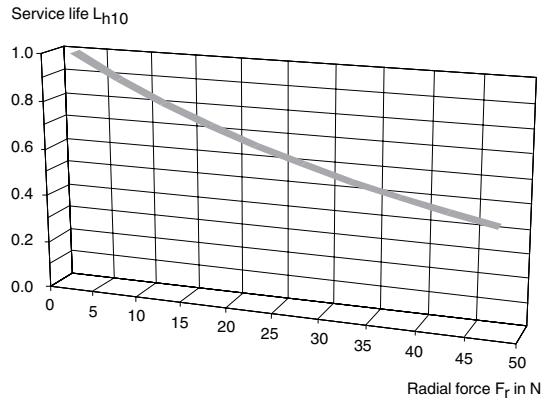


2.4 Shaft load

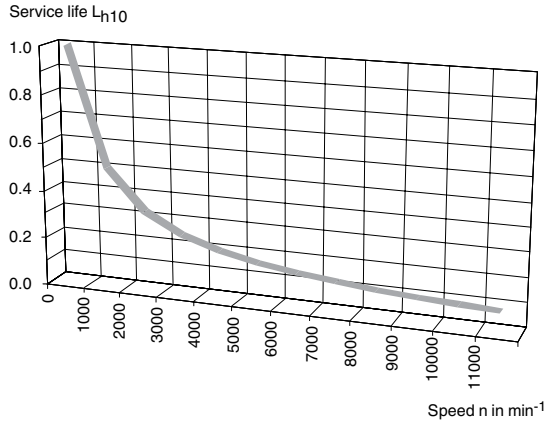
The shaft of a rotary encoder is mounted free of play using two axially tensioned ball bearings.

Due to the characteristics of the system, the permissible radial force (Fr) is always greater than the axial force (Fa). The anticipated service life of the bearing depends on three parameters: axial force, radial force, and speed.

The diagram below illustrates the course of the anticipated service life Lh10 in relation to the radial force (Fr).



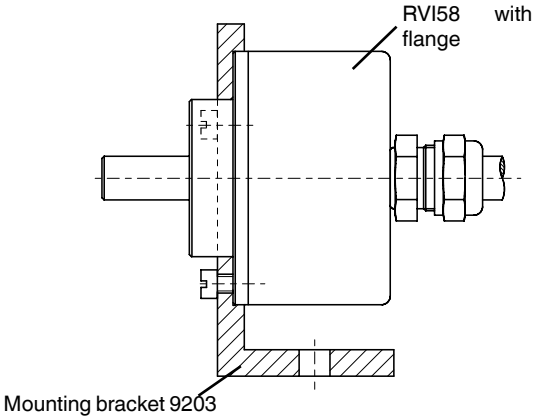
The correlation between service life and speed is illustrated by the following diagram. The maximum permissible speed is specified in the data sheets for the rotary encoders. Note that this refers to the maximum permissible mechanical speed. The permissible electric speed depends on the type of interface used.



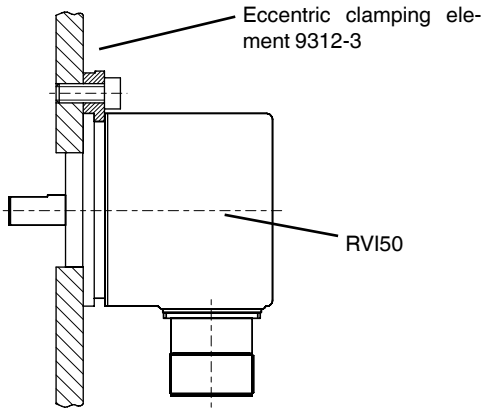
3. Mounting Instructions

3.1 Mounting rotary encoders

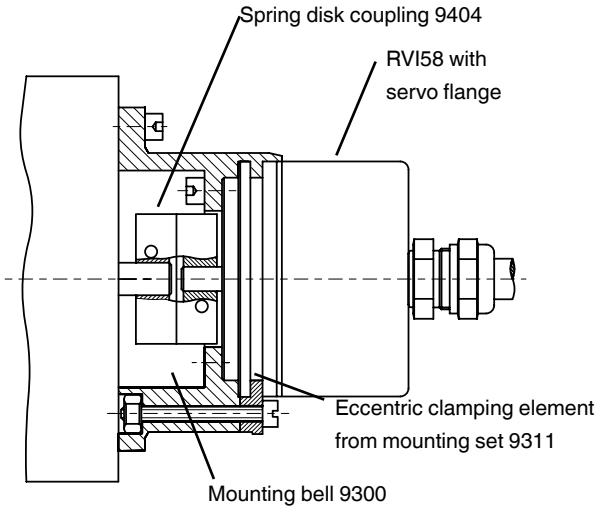
Mounting rotary encoders with solid shaft using a mounting bracket



Mounting rotary encoders with solid shaft using an eccentric clamping element



Mounting rotary encoders with solid shaft using a mounting bell



3.2 Use of couplings

To prevent prohibited high loads on the bearing, a flexible coupling must be used to connect the rotary encoder with solid shaft and the drive shaft.

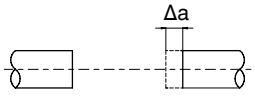
Shaft offsets such as a radial, axial, or angular offset occur despite very precise production and mounting of the drive shaft. This is often caused by temperature effects. A rigidly mounted rotary encoder creates an over-determined system with its clearance-free mount and the drive shaft mount. The forces generated destroy the rotary encoder as a result of increased axial and radial forces.

The higher the torsional rigidity of the coupling, the lower the torsional error between the rotary encoder and drive.

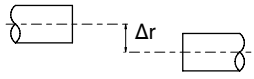
The restoring forces of the coupling are directly related to the compensating movement of the coupling. These forces must not exceed the permissible axial and radial forces.

See the data sheets for details on the permissible radial, axial, and angular offset.

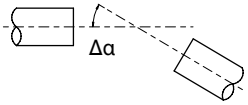
Axial offset Δa



Radial offset Δr



Angular offset Δα



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4. Installation Notes

4.1 Interference suppression measures

The use of sophisticated microelectronics requires a consistently designed interference suppression and wiring concept. This applies increasingly as housing designs become smaller and performance requirements become higher in modern machines.

The following installation notes and proposals apply to "normal industrial environments." There is no single optimum solution to suit every interfering environment. The encoder should function correctly when applying the following measures:

- Abschließen der seriellen Leitung mit 120 W-Widerstand (zwischen Receive/Transmit und Receive/Transmit) am Anfang und Ende der seriellen Leitung (z. B. die Steuerung und der letzte Geber).
- Place the wiring for the rotary encoder far away from power lines loaded with interference.
- The cable diameter of the shield must be minimum 4 mm^2.
- The cable diameter must be minimum 0.14 mm^2.
- The wiring of the shield and 0 V must be kept in star formation if possible.
- Do not bend or clamp the cable.
- Maintain a minimum radius of curvature in accordance with the data in the data sheet, and avoid sheer and tensile stress.

4.2 Operating notes

- Every Pepperl+Fuchs rotary encoder leaves our factory in perfect condition. To maintain this quality and guarantee undisturbed operation, note the following specifications:
- Avoid shock impacts to the housing and the encoder shaft in particular, as well as axial and radial overloading of the encoder shaft.
- The accuracy and service life of the encoder are guaranteed only when a suitable coupling is used.
- The operating voltage must be switched on or off at the same time for the rotary encoder and connecting device (e.g., control unit).
- Any wiring activity may be carried out only when de-energized.
- The maximum operating voltages must not be exceeded. The devices must be operated with safety extra-low voltages.

4.3 Notes on fitting the shield

The immunity of a system is largely determined by the correct choice of shield. Installation errors often occur in precisely this area. The shield is often laid only on one side and soldered to the grounding terminal by a wire, which is authorized in LF technology. However, with EMC it is the rules of HF technology that apply.

A basic objective of HF technology is that HF energy is led to the ground with as little impedance as possible because it otherwise discharges in the cable. Low impedance is achieved through a large-area connection with metal areas.

You must note the following:

- Connect the shield on both sides to a large area on a "common ground," provided there is no risk of potential equalization currents.
- Pull back the entire shield behind the isolation and clamp it to a large area below a tension relief.
- When using a cable connection, connect the tension relief directly to a grounded area on the screw terminal, ensuring all-round contact.
- When using plugs, only metalized plugs may be used (e.g., SUB-D plugs with metalized housing). Ensure the direct connection of the tension relief to the housing.

5. Safety Notices



Warning

You must note the national safety and accident prevention regulations as well as the following safety information in these operating instructions when working with a rotary encoder.

If faults cannot be rectified, the device must be switched off and protected against inadvertent startup.

Repairs may be carried out only by the manufacturer.

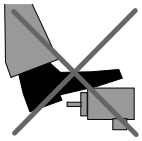
Access and modifications to the device are not permitted.



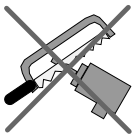
Caution

Only tighten the clamping ring if a shaft is inserted into the area of the clamping ring (hollow shaft rotary encoder).

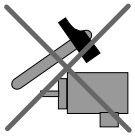
Tighten all screws and connectors before the rotary encoder is put into operation.



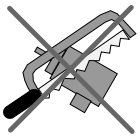
Do not stand on the rotary encoder!



Do not make subsequent modifications to the drive shaft!



Avoid impact!



Do not make subsequent modifications to the housing!

Application Notes for Incremental Rotary Encoders

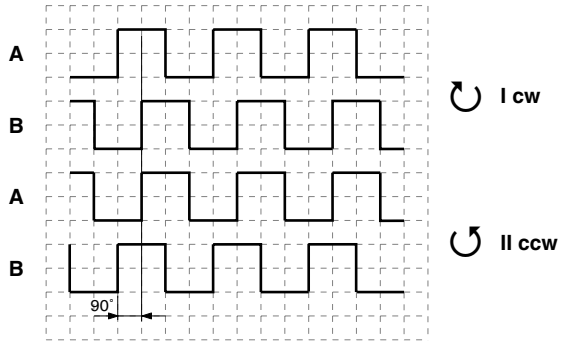
Incremental rotary encoders are rotary encoders that only emit pulses. The angular position can be calculated from the resolution (Z) and the number of pulses per revolution. The angular speed (w) can be calculated from the signal frequency. The period duration of the angular acceleration (a) can also be calculated from the temporal change.

Rotational direction monitoring with incremental rotary encoders

To detect the direction of rotation of a movement, the detection principle is extended to include a receiver on channel A and channel B. Rotational direction monitoring is enabled by the 90° phase-shifted detection (see graphic).

In the first graphic (I cw), channel A runs ahead of channel B. This indicates clockwise rotation, whereas II ccw indicates counter-clockwise rotation. The direction of rotation is specified on the rotary encoder shaft from the perspective of the viewer.

Depending on the type of incremental rotary encoder, channel A or channel B is the lead channel. Further details are included in the respective data sheets.

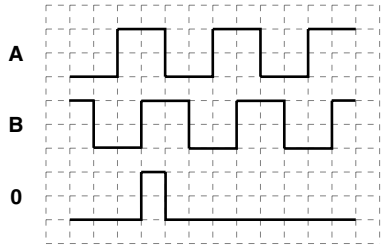


Zero signal

The actual measurement or, more precisely, the evaluation (counting) of the pulses takes place in an additional control interface. This could be, for example, a counter, a control device (PLC), or a tachometer.

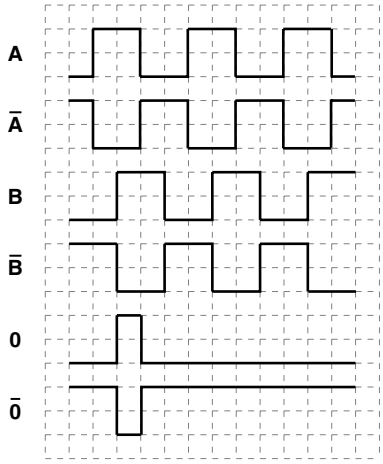
If detection should not be limited to within one revolution, a further signal is required that appears only once per revolution. This signal (third channel) is known as a zero signal, channel N, or spur N. The zero signal is often also used as the reference value.

The graphic illustrates the signal sequence of a three-channel incremental rotary encoder.

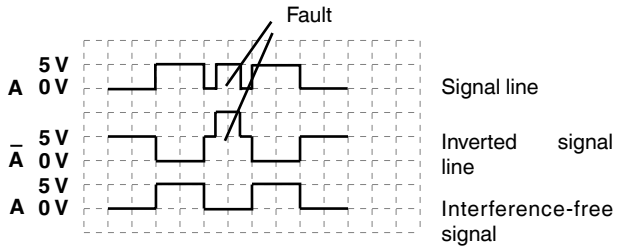


Inverted channels

The inverted signals are used in addition to spurs A, B, and 0 to improve signal transmission. This transmission is available as an option with the RS422 standard interface and with push-pull.



The advantage is that unwanted signals can be blanked. If a noise pulse occurs, it is induced equally in all lines if the strands are twisted in pairs. The noise pulse can be blanked by calculating the difference. The working principle is illustrated in the graphic below.



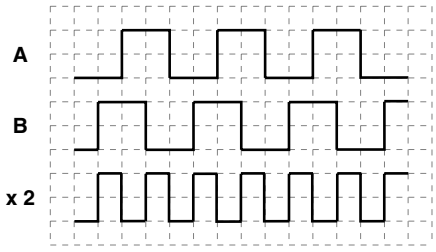
Pulse multiplication

Pulse multiplication is used to increase the measuring steps or reduce the output frequency of the incremental rotary encoder. The signals of an incremental rotary encoder can be doubled or multiplied by linking channels A and B (see following graphics).

Example:

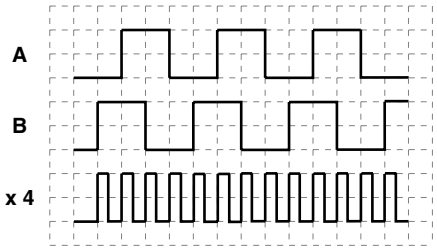
An application requires 20,000 measuring steps per revolution at a speed of 3000 min^{-1}. If the control units (PLC, counter, tachometer) offer the "multiplication" option, it is possible to revert to the more cost-effective incremental rotary encoders with 5000 pulses. The output frequency of the incremental rotary encoder is also reduced.

- Without multiplication: 1 MHz (this frequency is too high for most control units)
- With multiplication: 250 kHz



Signal doubling

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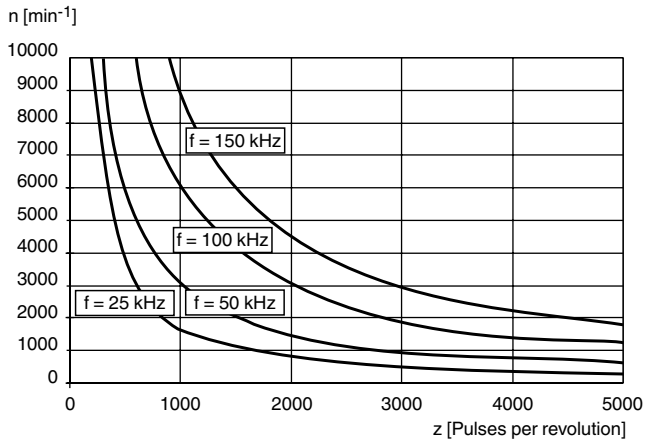
Signal multiplication

The information about rotational direction is lost as a result of linking both channels A and B.

Correlation between operating speed and output frequency

$$f = \frac{n}{60\ s} \times Z \qquad n \text{ in } min^{-1}$$

$$n_{max} = \frac{f_{max} \times 60\ s}{Z} \qquad f_{max} \text{ in Hz, } n_{max} \text{ in } min^{-1}$$

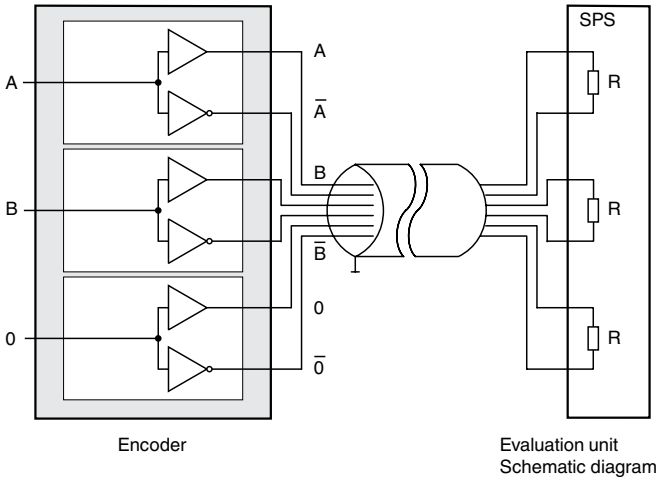


Interfaces

Line driver (RS422)

This symmetrical interface is always recommended if a high level of immunity and/or a long line length are required. The associated strand pairs must be twisted to achieve maximum immunity.

This interface can also be used as an alternative to the TTL interface. In this case, the inverted outputs are not used.



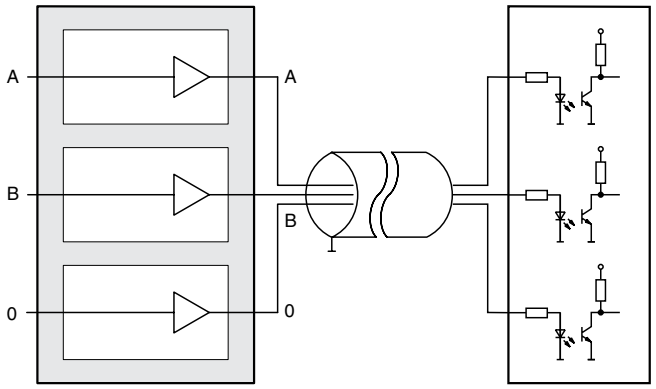
Encoder

Evaluation unit
Schematic diagram

Push-pull output

The push-pull output is a combination of NPN and PNP outputs. Compared with the Open Collector outputs (OC), the push-pull output is characterized by its better slew rate and increased level of immunity. An external circuit, such as is necessary with NPN or PNP, is not required.

In addition to improved immunity, this output also still has the inverted channels. The main area of application for this output is that of medium switching frequencies. The OC outputs can be replaced by this interface. In this case, only the non-inverted signals are used.



Encoder

Evaluation unit
Schematic diagram

Application Notes for Sine/Cosine Rotary Encoders

Sine/cosine rotary encoders are incremental rotary encoders that provide analog signals instead of rectangular signals at their outputs stages. The output voltages of channels A and B have a sine-shaped signal sequence. Compared with the digital signals of an incremental rotary encoder, such sine and cosine-shaped signals offer a few advantages in terms of reprocessing in downstream connected control units.

The angular position can be calculated from the number of periods per revolution and the measured signal periods. The angular speed (w) can be calculated from the signal frequency. The period duration of the angular acceleration can also be calculated from the temporal change.

Rotational direction monitoring with sine/cosine rotary encoders

Both these sine-shaped pulses are electrically phase-shifted by 90°. As with incremental rotary encoders with rectangular output signals, rotational direction monitoring is also possible for (see graphic).

In the earlier graphic (cw), channel A runs ahead of channel B. This indicates clockwise rotation, whereas ccw indicates counter-clockwise rotation. The direction of rotation is specified on the rotary flange from the perspective of the viewer.

The actual measurement, more precisely the evaluation (counting) of the signal periods, takes place in an additional control interface on the plant side. This could be, for example, a counting and control device (PLC) or tachometer.

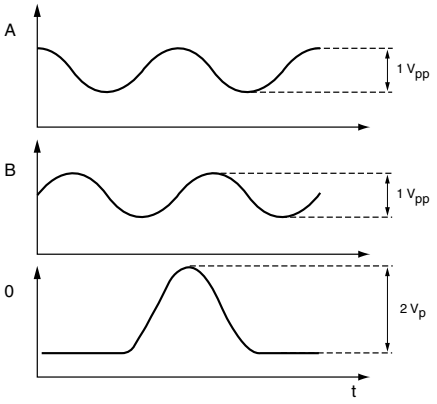
Depending on the type of sine/cosine rotary encoder, channel A or channel B is the lead channel. Further details are included in the respective data sheets.

Zero signal

If detection should not be limited to within a revolution, a further signal is required that appears only once per revolution. This signal (third channel) is known as a zero signal, channel 0 or spur 0. The zero signal is often also used as the reference signal.

The reference mark signal for the zero position is issued in analog form. It has a triangular voltage sequence.

The graphic illustrates the signal sequence of a three-channel sine/cosine rotary encoder.



Pulse multiplication

Pulse multiplication is used to increase the measuring steps or reduce the output frequency of an incremental rotary encoder. The analog phase-shifted signals for a sine/cosine rotary encoder can be multiplied virtually any number of times by linking the channels A and B in an analog control unit on the plant side.

Correlation between operating speed and output frequency

See the application notes for incremental rotary encoders.

Properties of sine/cosine rotary encoders

The comparably flat, sine-shaped signal sequence at the outputs of a sine/cosine rotary encoder results in a number of beneficial features when compared with incremental rotary encoders with pulse outputs. These are:

- Longer available line lengths,
- Good filtering options compared with line-coupled interfering signals,
- Excellent suitability for frequency multiplication without the loss of rotational direction information,
- Very low phase jitter,
- High suitability for monitoring extremely long movements.

Application Notes for Absolute Rotary Encoders

In the case of absolute rotary encoders, both pulses and entire data words are generated. The detection function that has been developed especially for this reads the position of the shaft from the code disk. The data words are transferred in parallel or serial depending on the interface.

Singleturn

In the case of singleturn absolute rotary encoders, one encoder revolution (360°) is divided into a maximum of 65,536 measuring steps (16 bits). After each complete revolution, encryption commences once more at the start value. The encoder electronics do not recognize how many revolutions have been completed.

Multiturn

In addition to the encrypted disk that is used with singleturn, a gear is also integrated for multiturn absolute rotary encoders. This gear is specified and encrypted in such a way that up to 16,384 revolutions (14 bits) can be detected. The total resolution is 16 bits (singleturn resolution) in addition to 14 bits (multiturn resolution), equating to 30 bits. Due to the high number of measuring steps (over one billion), this type of encoder can also divide very long linear distances into small measuring steps.

Interfaces

The Pepperl+Fuchs product portfolio incorporates rotary encoders for the wide range of common interfaces that are available on the market for absolute rotary encoders:

Parallel interface

The focus of this interface is on rapid data transfer. The position data is read directly from the gray-coded material measure.

SSI interface

The SSI (Synchronous Serial Interface) interface was developed especially for transferring output data from an absolute rotary encoder to a control system. The control unit transmits a start sequence and the absolute rotary encoder responds with a position value.

AS-Interface

Binary sensors are generally networked using AS-Interface in modern machines and plants. In order to meet real-time requirements, a multi-slave solution was developed in the form of the AS-Interface rotary encoder.

CAN

Pepperl+Fuchs offers CANopen rotary encoders in accordance with DSP406 (Class 1 and Class 2).

DeviceNet

Device Net rotary encoders add to our range of products. The integrated interface supports all DeviceNet functions.

PROFIBUS

The absolute rotary encoders in this series comply with the PROFIBUS profiles for encoders, order no. 3062. They support operation according to Class 1 and Class 2.

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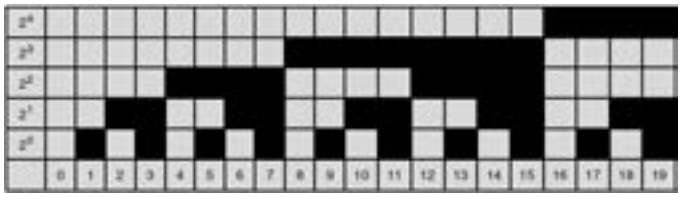
Ethernet

The absolute rotary encoders with Ethernet interface support TCP/IP, EtherNet/IP, Powerlink, and PROFINET IO protocols. Parameterization is carried out using the Java Applets provided by the internal web server. The protocols provided enable data to be transferred from the control level to the plant periphery and back in a quick and verifiable manner, which enables parameterization, diagnosis, and remote maintenance.

Code types

Binary code

Binary code is the classic code of the dual number system. This code can be used to perform calculations as is the case with the decimal number system. It is a multistep code.

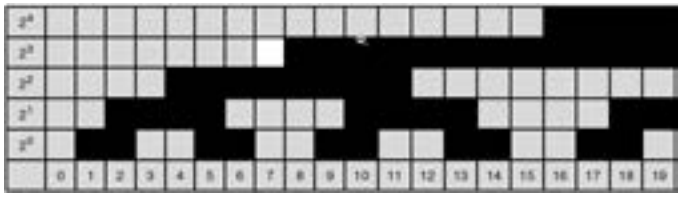


This encryption can be used to change several bits at the same time from step to step. If the transition from seven to eight is executed, bits 0, 1, 2, and 3 change.

To ensure high transfer safety, it is recommended that you use a code where just one bit changes from step to step. The evaluating control unit can then check whether the associated condition has been fulfilled and, if this is not the case, implement the necessary fault repair.

Gray code

The Gray code is a one-step code.



If you look at the transitions from step to step, you can see that just one bit changes in each case. To calculate using this code, it must first be converted into a binary code. This code type is recommended if the data is transferred via a parallel interface. In order to check the single-step code, each code change must be detectable by the test logic.

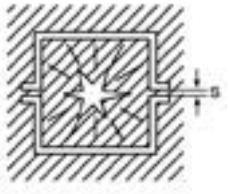
Gray excess code

The Gray excess code, also known as the capped gray code, is an extract from the complete Gray code. It is always symmetrically capped, so only even-numbered extracts can be used. The logic behind this is that another number of measuring steps can be achieved when this is required by the power of two. For instance, there is often a need to reduce a 9-bit value (512 measuring steps) to 360 measuring steps. The one-step code remains unaffected.

Application Notes for Rotary Encoders for Hazardous Areas

"Flameproof enclosure“ type of protection (EEx d) DIN EN 50016/VDE/0170/0171 Part 5





"Type of protection where the parts that can ignite a potentially explosive atmosphere are placed in an enclosure which can withstand the pressure caused by an explosion inside the housing and prevents the transmission of the explosion to the surrounding explosive atmosphere."

The housings are not gas-tight but have a flameproof joint that acts as a pressure relief opening. Any emerging gases are cooled down to such an extent that they are unable to ignite a potentially explosive atmosphere outside of the housing. Ignition is prevented if the minimum ignition temperature and the minimum ignition energy of the surrounding potentially explosive atmosphere are not reached. The apparatus for this type of protection is therefore permitted for explosion groups I, IIA, IIB, and IIC with different minimum joint lengths and maximum joint widths (see Tables 1 and 2 of EN 50018) depending on the type of joint.

The most important detail in the flameproof enclosure "d" type of protection is the flameproof joint that can be neither enlarged (rough removal of rust) nor made smaller (lubrication with resinous fat).

If apparatus is used that is protected through flameproof enclosure, the electric lines are usually installed on the basis of the "increased safety" type of protection.

The devices in series 14 and 74 are designed in accordance with the "flameproof enclosure" type of protection with EC-Type Examination Certificate ZELM 02 ATEX 0078.



CE CANopen SSI

Properties

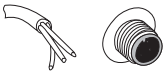
- SSI and CANopen interface versions
- 36 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- Compact design for space saving mounting
- Wear-free sensing technology for long life-time

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	magnetic sampling
Operating voltage	10 ... 30 V DC
Operating temperature	cable, flexing: -5 ... 70 °C (-23 ¿ 158 °F), cable, fixed: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Material	
Housing	nickel-plated steel
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		AVS36M-******	AVM36M-******	CVS36M-******	CVM36M-******
Device type	Multiturn absolute encoder		●		●
	Singleturn absolute encoder	●		●	
Interface type	CANopen			●	●
	SSI	●	●		
Resolution					
Single turn	up to 13 Bit (hysteresis: 0.1 °)	●	●	●	●
Multiturn	up to 12 Bit		●		●
Overall resolution	up to 13 Bit	●		●	
	up to 25 Bit		●		●
Transfer rate	max. 1 MBit/s			●	●
	0.1 ... 2 MBit/s	●	●		
Input type	Selection of counting direction (cw/ccw)	●	●		
Input type	zero-set (PRESET 1)	●	●		
Dimensions					
Length L [mm]		46			
Diameter D [mm]		36,5			

Ordering Information

.V.36M – 03S.1.0.0.N – .1.1.1

Number of bits singleturn
12 4096 (standard)
13 8192 (max)

Number of bits multiturn
12 4096 (standard)
00 Singleturn encoder

Output code
B Binary
G Gray (only on data format SSI)

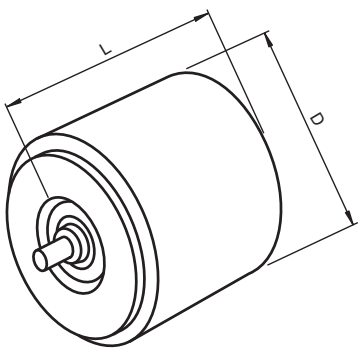
Exit position
A axial
R radial (only connection type K1)

Connection type
K1 Cable ø6 mm, 4 x 2 x 0.14 mm^2, 1 m
BD Connector, M12 x 1, 5-pin (only on data format CANopen)
BE Connector, M12 x 1, 8-pin (only on data format SSI)

Shaft dimensions/flange version
03S Shaft ø6 mm x 11.5 mm with servo flange

Device type
S Singleturn
M Multiturn

Data format
A SSI
C CANopen



Example of order:
AVS36M-03SK1A0BN-0012

Accessories

This and more accessories can be found in chapter 4.4 from page 741

V19-G-5M-PUR-ABG	Cable socket, M12, 8-pin, shielded, PUR cable
V19-G-10M-PUR-ABG	Cable socket, M12, 8-pin, shielded, PUR cable

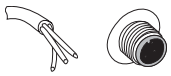
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	magnetic sampling
Operating voltage	10 ... 30 V DC
Operating temperature	cable, flexing: -5 ... 70 °C (-23 ¿ 158 °F), cable, fixed: -30 ... 70 °C (-22 ... 158 °F) connector models: -30 ... 85 °C (-22 ... 185 °F)
Material	
Housing	nickel-plated steel
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Properties

- SSI and CANopen interface versions
- 36 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- Compact design for space saving mounting
- Wear-free sensing technology for long life-time

Model Number		ASS36M-*****	ASM36M-*****	CSS36M-*****	CSM36M-*****
Device type	Multiturn absolute encoder		●		●
	Singleturn absolute encoder	●		●	
Interface type	CANopen			●	●
	SSI	●	●		
Resolution					
Single turn	up to 13 Bit (hysteresis: 0.1 °)	●	●	●	●
Multiturn	up to 12 Bit		●		●
Overall resolution	up to 13 Bit	●		●	
	up to 25 Bit		●		●
Transfer rate	max. 1 MBit/s			●	●
	0.1 ... 2 MBit/s	●	●		
Input type	Selection of counting direction (cw/ccw)	●	●		
Input type	zero-set (PRESET 1)	●	●		
Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source			●	
Dimensions					
Length L [mm]		54			
Diameter D [mm]		36,5			

Ordering Information

.S.36M – F4A . . . 0 . N – . . . .

Number of bits singleturn
12 4096 (standard)
13 8192 (max)

Number of bits multiturn
12 4096 (standard)
00 Singleturn encoder

Output code
B Binary
G Gray (only on data format SSI)

Exit position
A axial
R radial (only connection type K1)

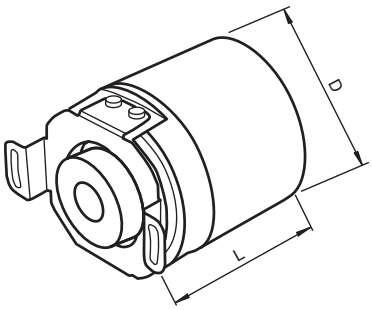
Connection type
K1 Cable ø6 mm, 4 x 2 x 0.14 mm^2, 1 m
BD Connector, M12 x 1, 5-pin (only on data format CANopen)
BE Connector, M12 x 1, 8-pin (only on data format SSI)

Shaft dimensions/flange version
F4A Recessed hollow shaft ø6 mm

Device type
S Singleturn
M Multiturn

Data format
A SSI
C CANopen

Example of order:
CSM36-F4ABDA0BN-1212



Accessories

This and more accessories can be found in chapter 4.4 from page 741

V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
V19-G-ABG-PG9	Cable socket, M12, 8-pin, shielded, non pre-wired
V15-G-YE2M-PVC	Cable socket, M12, 5-pin, PVC cable
V19-G-2M-PUR ABG	Cable socket, M12, 8-pin, shielded, PUR cable
V19-G-5M-PUR-ABG	Cable socket, M12, 8-pin, shielded, PUR cable

Date of issue 2015-04-08



CE CANopen

Properties

- CANopen interface
- 42 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 24 bit resolution

Your Benefit

- Robust design with very high shock and vibration resistance
- Stainless steel housing with high protection degree, suitable for harsh environmental conditions
- Compact design for space saving mounting

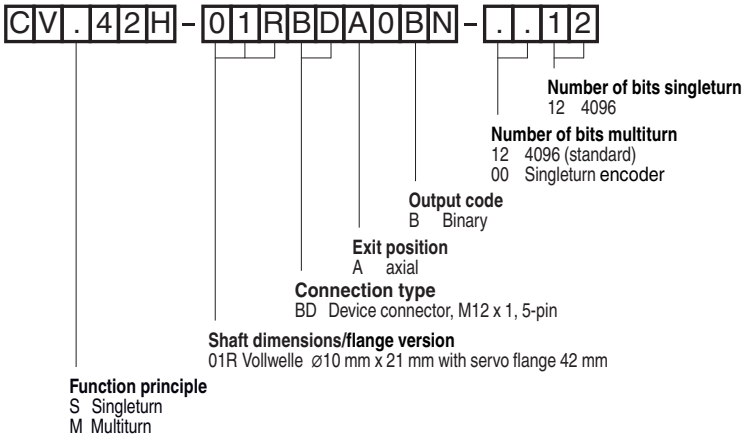
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

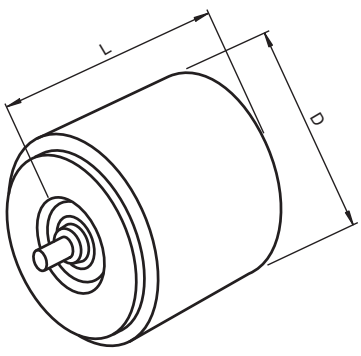
General Data	
Detection type	magnetic sampling
Operating voltage	10 ... 30 V DC
Interface type	CANopen
Transfer rate	max. 1 MBit/s
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Material	
Housing	Stainless steel 1.4305 / AISI 303
Flange	Stainless steel 1.4305 / AISI 303
Shaft	stainless steel 1.4104 / AISI 430F
Protection degree	IP66 / IP68 / IP69K
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	270 N
Radial	270 N
Connection	

Model Number		CVS42H	CVM42H
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	12 Bit	●	●
Multiturn	12 Bit		●
Overall resolution	12 Bit	●	
	24 Bit		●
Dimensions			
Length L [mm]		66	
Diameter D [mm]		42	

Ordering Information



Example of order:
CVS42H-01RBDA0BN-0012



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Properties

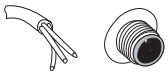
- SSI interface
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Choose between standard industrial flange versions
- High-speed data transfer
- Function inputs available for zero-set (preset) and counting direction
- Optional zero-set pushbutton

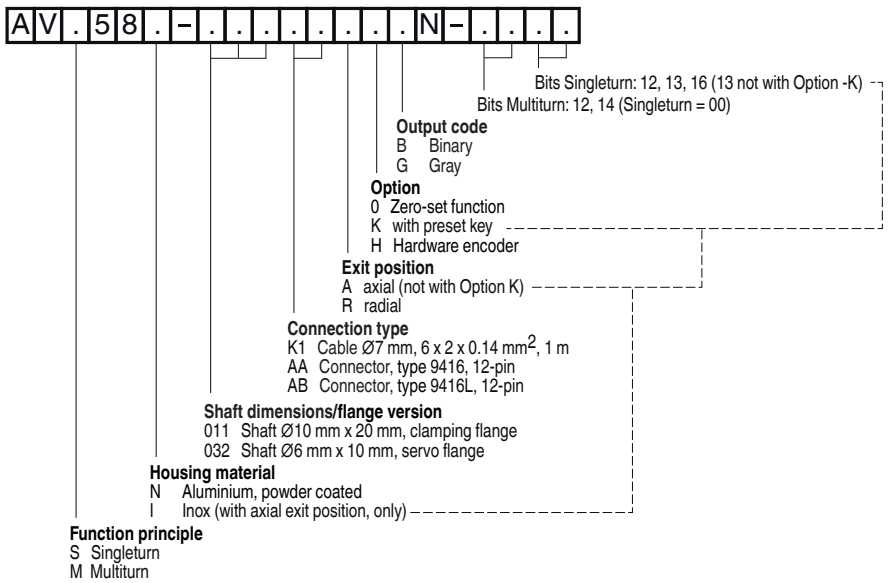
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

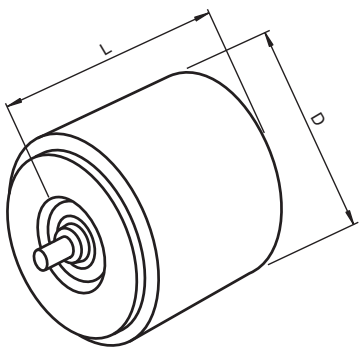
General Data	
Detection type	photoelectric sampling
Operating voltage	4.5 ... 30 V DC
Interface type	SSI
Transfer rate	0.1 ... 2 MBit/s
Input type	Selection of counting direction (cw/ccw)
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		AVS58-0	AVS58-K	AVS58-H	AVM58-0	AVM58-K	AVM58-H
Device type	Multiturn absolute encoder				●	●	●
	Singleturn absolute encoder	●	●	●			
Resolution							
Single turn	up to 16 Bit	●	●	●	●	●	●
Multiturn	14 Bit				●	●	●
Overall resolution	up to 16 Bit	●	●	●			
	up to 30 Bit				●	●	●
Input type	zero-set (PRESET 1)	●	●		●	●	
Approvals and Certificates							
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●
Dimensions							
Length L [mm]	depending on the version: 45 ... 63	●		●			
	depending on the version: 56 ... 63		●		●		●
	depending on the version: 57 ... 64					●	
Diameter D [mm]		aluminum: 59 Stainless steel: 61					

Ordering Information



Example of order:
AVM58N-011K1A0B-1212



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

Date of issue 2015-04-08



Properties

- SSI interface
- 58 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Recessed hollow shaft up to 15 mm in 58 mm housing
- High-speed data transfer
- Function inputs available for zero-set (preset) and counting direction
- Optional zero-set pushbutton

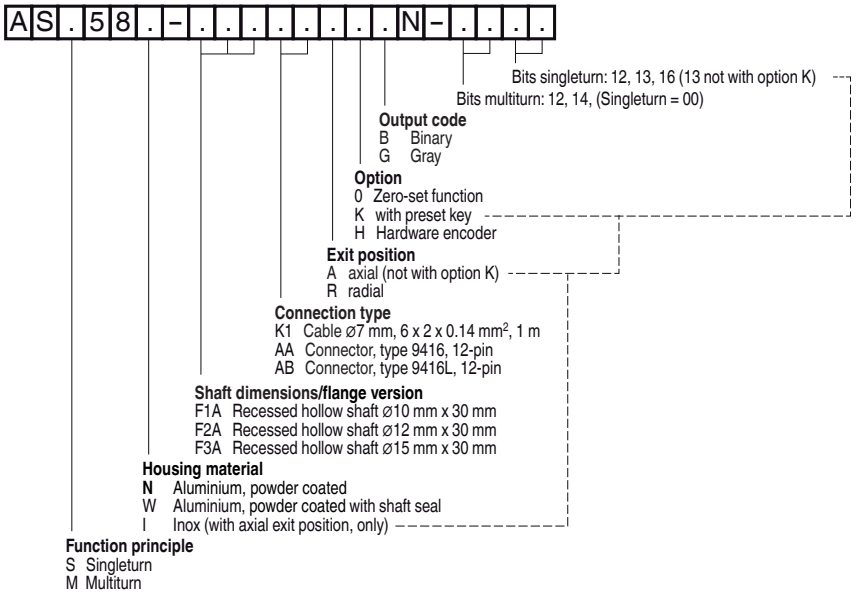
Technical Data

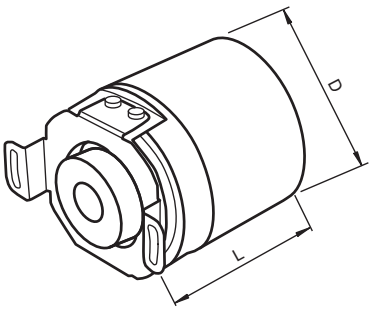
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	4.5 ... 30 V DC
Interface type	SSI
Transfer rate	0.1 ... 2 MBit/s
Input type	Selection of counting direction (cw/ccw)
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm
Connection	

Model Number		ASS58-0	ASS58-K	ASS58-H	ASM58-0	ASM58-K	ASM58-H
Device type	Multiturn absolute encoder				●	●	●
	Singleturn absolute encoder	●	●	●			
Resolution							
Single turn	up to 16 Bit	●	●	●	●	●	●
Multiturn	14 Bit				●	●	●
Overall resolution	up to 16 Bit	●	●	●			
	up to 30 Bit				●	●	●
Input type	zero-set (PRESET 1)	●	●		●	●	
Approvals and Certificates							
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●
Dimensions							
Length L [mm]	depending on the version: 61 ... 72	●		●			
	depending on the version: 73 ... 81				●		●
	72		●				
	73					●	
Diameter D [mm]		aluminum: 59 Stainless steel: 61					

Ordering Information





Example of order:
AVS58W-F3AABRKB-1212

Accessories

This and more accessories can be found in chapter 4.4 from page 741

9416	Cable connector

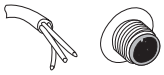
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	4.5 ... 30 V DC
Interface type	SSI
Transfer rate	0.1 ... 2 MBit/s
Input type	Selection of counting direction (cw/ccw)
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Combination 1	Housing: aluminium Flange: aluminium Shaft: stainless steel
Rotational speed	max. 3000 min $^{-1}$
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm
Connection	

Model Number		AHS58-0	AHS58-H	AHM58-0	AHM58-H
Device type	Multiturn absolute encoder			●	●
	Singleturn absolute encoder	●	●		
Resolution					
Single turn	up to 16 Bit	●	●	●	●
Multiturn	14 Bit			●	●
Overall resolution	up to 16 Bit	●	●		
	up to 30 Bit			●	●
Input type	zero-set (PRESET 1)	●		●	
Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●
Dimensions					
Length L [mm]		36		49	
Diameter D [mm]		59			

Properties

- SSI interface
- 58 mm housing
- Hollow shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- High-speed data transfer
- Function inputs available for zero-set (preset) and counting direction

Ordering Information

AH.58N-0.A..R..N-....

Function principle
S Singleturn
M Multiturn

Shaft dimensions/flange version
OAA Hollow shaft with Ø10 mm
OBA Hollow shaft with Ø12 mm

Connection type
K1 Cable Ø7 mm, 6 x 2 x 0.14 mm², 1 m
AA Connector, type 9416, 12-pin
AB Connector, type 9416L, 12-pin

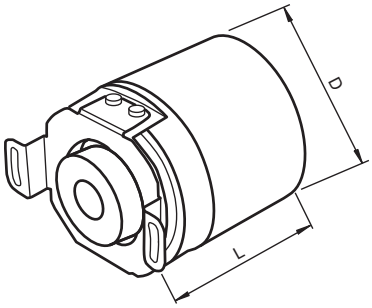
Option
0 Zero-set function
H Hardware encoder

Output code
B Binary
G Gray

Bits multiturn: 12, 14 (singleturn = 00)

Bits singleturn: 12, 13, 16

Example of order:
AHM58N-0AAABR0BN-1213



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9416	Cable connector

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Properties

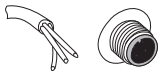
- Parallel interface
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- High code change frequency up to 400 kHz
- Inputs for PRESET, LATCH and counting direction selection

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Interface type	Push-pull, parallel , short-circuit protected
Code change frequency	400 kHz
Input type	Selection of counting direction (cw/ccw)
Input type	Temporary storage (LATCH)
Input type	zero-set (PRESET)
Operating temperature	-40 ... 85 °C (-40 ... 185 °F) cable models: -30 ... 70 °C (rigid wiring) -5 ... 70 °C (flexible wiring)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		FVS58	FVM58
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	13 Bit	●	●
Multiturn	12 Bit		●
Overall resolution	13 Bit	●	
	25 Bit		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]	depending on the version: 45 ... 63	●	
	depending on the version: 65 ... 72		●
Diameter D [mm]		aluminum: 59 Stainless steel: 61	

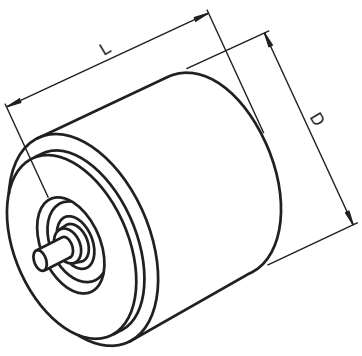
Ordering Information

FV.58.-.....3.N-....

- Bits singleturn *): 13
- Bits multiturn *): 08, 12 (singleturn = 00)
- **Output code**: B Binary; G Gray
- **Exit position**: A axial; R radial
- **Connection type** *): K2 Cable Ø7 mm, 6 x 2 x 0.14 mm^2, 1 m; AE Connector type 9426, 26-pin (with axial exit position, only)
- **Shaft dimensions/flange version**: 011 Shaft Ø10 mm x 20 mm, clamping flange; 032 Shaft Ø6 mm x 10 mm, servo flange
- **Material**: N Aluminium, powder coated; I Inox
- **Function principle**: S Singleturn; M Multiturn

*) maximum number of bits (singleturn + multiturn) = max. 25 (cable version)
maximum number of bits (singleturn + multiturn) = max. 21 (connector version)

Example of order:
FVS58N-032K2A3BN-0013



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9213	Mounting bracket, spring-loaded for clamping flange
9203	Angled flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

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Properties

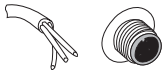
- Parallel interface
- 58 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- Recessed hollow shaft up to 15 mm in 58 mm housing
- High code change frequency up to 400 kHz
- Inputs for PRESET, LATCH and counting direction selection

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Interface type	Push-pull, parallel , short-circuit protected
Code change frequency	400 kHz
Input type	Selection of counting direction (cw/ccw)
Input type	Temporary storage (LATCH)
Input type	zero-set (PRESET)
Operating temperature	-40 ... 85 °C (-40 ... 185 °F) cable models: -30 ... 70 °C (rigid wiring) -5 ... 70 °C (flexible wiring)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Connection	

Model Number		FSS58	FSM58
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	13 Bit	●	●
Multiturn	12 Bit		●
Overall resolution	13 Bit	●	
	25 Bit		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]		72	80
Diameter D [mm]		aluminum: 59 Stainless steel: 61	

Ordering Information

FS.58.-.....3.N-....

Bits singleturn *): 13
Bits multiturn *): 08, 12 (singleturn = 00)

Output code
B Binary
G Gray

Exit position
A axial
R radial

Connection type *)
K2 Cable Ø7 mm, 6 x 2 x 0.14 mm^2, 1 m
AE Connector type 9426, 26-pin (with axial exit position, only)

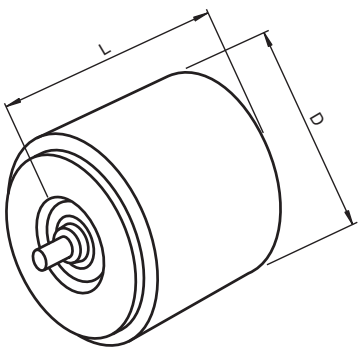
Shaft dimensions/flange version
F1A Recessed hollow shaft Ø10 mm x 30 mm
F2A Recessed hollow shaft Ø12 mm x 30 mm
F3A Recessed hollow shaft Ø15 mm x 30 mm

Material
N Aluminium, powder coated
I Inox

Function principle
S Singleturn
M Multiturn

*) maximum number of bits (singleturn + multiturn) = max. 25 (cable version)
maximum number of bits (singleturn + multiturn) = max. 21 (connector version)

Example of order:
FSM58I-F1AK2A3GN-0813



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9426
9424

Date of issue 2015-04-08



Properties

- AS-Interface
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- Position data transfer using 4 AS-Interface addresses
- Configuration and addressing via AS-Interface

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Detection type	photoelectric sampling	
Operating voltage	29.5 ... 31.6 V DC	
Interface type	AS-Interface	
Transfer rate	max. 0.167 MBit/s	
Operating temperature	-20 ... 70 °C (-4 ... 158 °F)	
Material		
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel	
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel	
Connection		

Model Number		BVS58	BVM58
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	up to 13 Bit	●	●
Multiturn	up to 12 Bit		●
Overall resolution	13 Bit	●	
	25 Bit		●
Rotational speed	max. 10000 min $^{-1}$	●	
	max. 6000 min $^{-1}$		●
Shaft load			
Axial	40 N		●
	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}	●	
Radial	60 N		●
	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}	●	
Dimensions			
Length L [mm]	depending on the version: 64 ... 67	●	●
Diameter D [mm]		58	

Ordering Information

BV.58. - ... AVR0NN - ....

Number of bits singleturn *)
03 ... 13 8192 (max.)

Number of bits multiturn *)
01 ... 12 4096 (max.)
00 Singleturn encoder

Output code
N selectable, Binary/Gray

Exit position
R radial

Connection type
AV Device connector M12 x 1, 4-pin

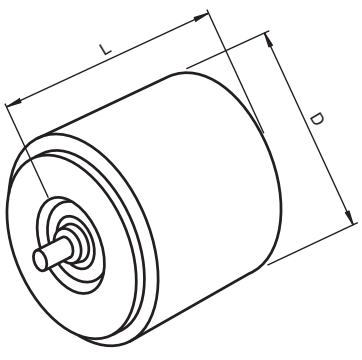
Shaft dimensions/flange version
011 Shaft ø10 mm x 20 mm, clamping flange
032 Shaft ø6 mm x 10 mm, servo flange

Housing material
N Aluminium, powder coated
I Inox

Function principle
S Singleturn
M Multiturn

*) possible combinations see data sheet

Example of order:
BVS58N-011AVR0NN-0013



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

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Properties

- AS-Interface
- 58 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 25 bit resolution

Your Benefit

- Position data transfer using 4 AS-Interface addresses
- Configuration and addressing via AS-Interface

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	29.5 ... 31.6 V DC
Interface type	AS-Interface
Transfer rate	max. 0.167 MBit/s
Operating temperature	-20 ... 70 °C (-4 ... 158 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		BSS58	BSM58
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	up to 13 Bit	●	●
Multiturn	up to 12 Bit		●
Overall resolution	13 Bit	●	
	25 Bit		●
Rotational speed	max. 10000 min $^{-1}$	●	
	max. 6000 min $^{-1}$		●
Dimensions			
Length L [mm]		68	
Diameter D [mm]		58	

Ordering Information

BS.58. - ... AVR0NN - ....

Number of bits singleturn *)
03 ... 13 8192 (max.)

Number of bits multiturn *)
01 ... 12 4096 (max.)
00 Hardware encoder

Output code
N selectable, Binary/Gray

Exit position
R radial

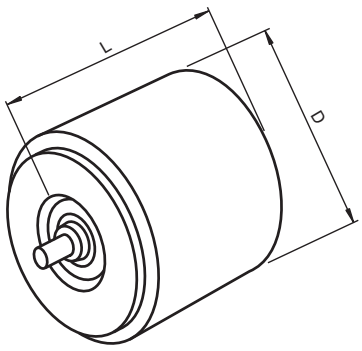
Connection type
AV Device connector M12 x 1, 4-pin

Shaft dimensions/flange version
01A Recessed hollow shaft ⌀10 mm x 21 mm
02A Recessed hollow shaft ⌀12 mm x 21 mm

Housing material
N Aluminium, powder coated
I Inox

Device type
S Singleturn
M Multiturn

Example of order:
BSM58I/02AAVR0NN/1213



Accessories

This and more accessories can be found in chapter 4.4 from page 741

V1-G-BK	4-pin, M12 female field-attachable connector
V1-G-YE2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-G-YE5M-PVC	Cable socket, M12, 4-pin, PVC cable

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Properties

- CANopen, DeviceNet and PROFIBUS interface versions
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Fast and easy installation due to removable housing cover
- Manually set baudrate, address, and termination resistor in the housing cover
- Wide range of programming functions, such as resolution, scaling, limit switches etc.
- Optional shaft seal for higher IP protection

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		CVS58	DVS58	PVS58	CVM58	DVM58	PVM58
Device type	Multiturn absolute encoder				●	●	●
	Singleturn absolute encoder	●	●	●			
Interface type	CANopen	●			●		
	DeviceNet		●			●	
	PROFIBUS			●			●
Resolution							
Single turn	up to 16 Bit	●	●	●	●	●	●
Multiturn	14 Bit				●	●	●
Overall resolution	up to 16 Bit	●	●	●			
	up to 30 Bit				●	●	●
Transfer rate	max. 0.5 MBit/s		●			●	
	max. 1 MBit/s	●			●		
	0.0096 ... 12 MBit/s			●			●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●
Dimensions							
Length L [mm]	depending on the version: 73 ... 79	●	●	●			
	depending on the version: 84 ... 90				●	●	●
Diameter D [mm]		58					
Connector area l_c [mm]		25					

Ordering Information

.V.58. – .....R0BN – ....

Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Connection type
AG removable cover with terminal compartment
AN removable cover with connectors M12 x 1

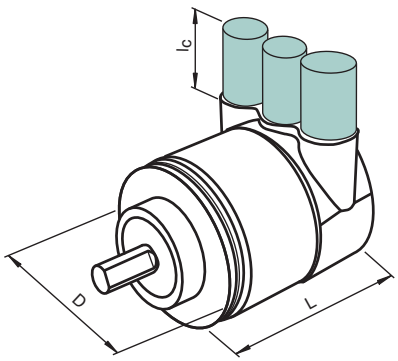
Shaft dimensions/flange version
011 Shaft ø10 mm x 20 mm, clamping flange
032 Shaft ø6 mm x 10 mm, servo flange

Housing material
N Aluminium, powder coated
I Inox
W Aluminium, powder coated with shaft seal

Function principle
S Singleturn
M Multiturn

Data format
C CAN-Bus
D DeviceNet
P PROFIBUS

Example of order:
PVM58N-032AGR0BN-1213



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

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Properties

- CANopen, DeviceNet and PROFIBUS interface versions
- 58 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Fast and easy installation due to removable housing cover
- Manually set baudrate, address, and termination resistor in the housing cover
- Wide range of programming functions, such as resolution, scaling, limit switches etc.
- Optional shaft seal for higher IP protection

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Operating temperature	-40 ... 85 °C (-40 ... 185 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm
Connection	

Model Number		CSS58	DSS58	PSS58	CSM58	DSM58	PSM58
Device type	Multiturn absolute encoder				●	●	●
	Singleturn absolute encoder	●	●	●			
Interface type	CANopen	●			●		
	DeviceNet		●			●	
	PROFIBUS			●			●
Resolution							
Single turn	up to 16 Bit	●	●	●	●	●	●
Multiturn	14 Bit				●	●	●
Overall resolution	up to 16 Bit	●	●	●			
	up to 30 Bit				●	●	●
Transfer rate	max. 0.5 MBit/s		●			●	
	max. 1 MBit/s	●			●		
	0.0096 ... 12 MBit/s			●			●
Approvals and Certificates							
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●
Dimensions							
Length L [mm]			87			98	
Diameter D [mm]				59			
Connector area l_c [mm]				25			

Ordering Information

.S.58. – . . . . R0BN – . . . .

Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Connection type
AG removable housing cover with terminal compartment
AZ removable housing cover with connectors M12 x 1

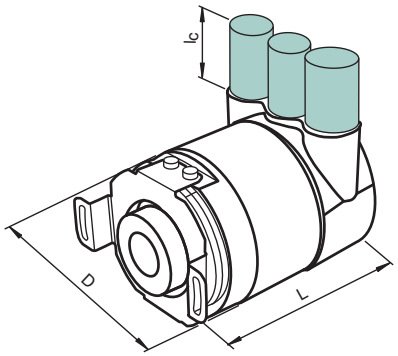
Shaft dimensions/flange version
F1A Recessed hollow shaft ø10 mm x 30 mm
F2A Recessed hollow shaft ø12 mm x 30 mm
F3A Recessed hollow shaft ø15 mm x 30 mm

Housing material
N Aluminium, powder coated
I Inox
W Aluminium, powder coated with shaft seal

Function principle
S Singleturn
M Multiturn

Data format
C CAN-Bus
D DeviceNet
P PROFIBUS

Example of order:
CSS58W/F2AAGR0BN-0013



Accessories

This and more accessories can be found in chapter 4.4 from page 741

AH 58-B1CA-2BW

Date of issue 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Physical	Ethernet
Material	housing: powder coated aluminium or stainless steel, flange: aluminium, shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		EVS58-TZ	EVS58-PZ	EVS58-PN	EVS58-IZ	EVS58-MB	EVS58-EC	EVM58-TZ	EVM58-PZ	EVM58-PN	EVM58-IZ	EVM58-MB	EVM58-EC
Device type	Multiturn absolute encoder							●	●	●	●	●	●
	Singleturn absolute encoder	●	●	●	●	●	●						
Interface type	TCP/IP	●						●					
	Powerlink		●						●				
	ProfiNet IO			●						●			
	Ethernet IP				●						●		
	Modbus					●						●	
	EtherCAT						●						●
Resolution													
Single turn	up to 16 Bit	●	●	●	●	●	●	●	●	●	●	●	●
Multiturn	14 Bit							●	●	●	●	●	●
Overall resolution	up to 16 Bit	●	●	●	●	●	●						
	up to 30 Bit							●	●	●	●	●	●
Transfer rate	10 MBit/s / 100 MBit/s	●	●			●	●	●	●			●	●
	100 MBit/s			●	●					●	●		
Operating temperature	0 ... 60 °C (32 ... 140 °F)				●						●		
	-40 ... 85 °C (-40 ... 185 °F)	●	●	●		●	●	●	●	●		●	●
Approvals and Certificates													
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●		●	●	●	●	●		●
Dimensions													
Length L [mm]	depending on the version: 81 ... 87	●	●										
	depending on the version: 83 ... 90			●	●	●	●			●	●	●	●
	depending on the version: 92 ... 98							●	●				
Diameter D [mm]		59											
Connector area l_c [mm]		23											

Properties

- Ethernet versions with
  - TCP/IP
  - Powerlink
  - ProfiNet-IO
  - EtherNet/IP
  - Modbus
  - EtherCAT
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Choice of many Ethernet protocols
- Optional shaft seal for higher IP protection

Ordering Information

EV.58.-.....R0BN-....

Potocol
PN Profinet
PZ Powerlink
TZ TCP/IP
IZ Eternet/IP
MB Modbus
EC EtherCAT

Number of bits singleturn
13 8192 (standard)
16 65536

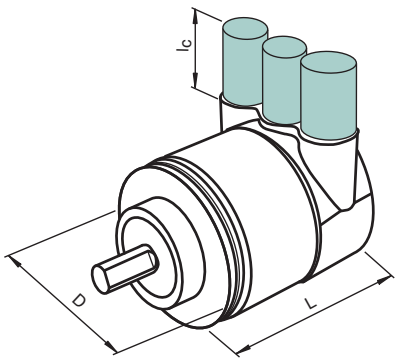
Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Shaft dimensions/flange version
011 Shaft ø10 mm x 20 mm, clamping flange
032 Shaft ø6 mm x 10 mm, Servo flange

Housing material
N Aluminium, powder coated
W Aluminium, powder coated with shaft seal
I Stainless steel

Function principle
S Singleturn
M Multiturn

Example of order:
EVM58N-032PNR0BN-1416



Accessories

This and more accessories can be found in chapter 4.4 from page 741

9203	Angled flange
9310-3	Synchro clamping element
V1SD-G-2M-PUR-ABG-V45X-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e
V1SD-G-2M-PUR-ABG-V45-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e
9300	Mounting bracket for servo flange
V15-G-YE2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-G-YE5M-PVC	Cable socket, M12, 5-pin, PVC cable

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Physical	Ethernet
Material	housing: powder coated aluminium or stainless steel flange: aluminium, shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm
Connection	

Model Number		ESS58-TZ	ESS58-PZ	ESS58-PN	ESS58-IZ	ESM58-TZ	ESM58-PZ	ESM58-PN	ESM58-IZ
Device type	Multiturn absolute encoder					●	●	●	●
	Singleturn absolute encoder	●	●	●	●				
Interface type	Ethernet/IP				●				●
	Powerlink		●				●		
	ProfiNet IO			●				●	
	TCP/IP	●				●			
Resolution									
Single turn	up to 16 Bit	●	●	●	●	●	●	●	●
Multiturn	14 Bit					●	●	●	●
Overall resolution	up to 16 Bit	●	●	●	●				
	up to 30 Bit					●	●	●	●
Transfer rate	10 MBit/s / 100 MBit/s	●	●			●	●		
	100 MBit/s			●	●			●	●
Operating temperature	0 ... 60 °C (32 ... 140 °F)				●				●
	-40 ... 85 °C (-40 ... 185 °F)	●	●	●		●	●	●	
Approvals and Certificates									
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●	●	●

Dimensions										
Length L [mm]		95				106				
Diameter D [mm]	59									
Connector area l_c [mm]	23									

Properties

- Ethernet versions with
  - TCP/IP
  - Powerlink
  - ProfiNet-IO
  - Ethernet/IP
  - EtherCAT
- 58 mm housing
- Recessed hollow shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Choice of many Ethernet protocols
- Optional shaft seal for higher IP protection

Ordering Information

ES.58.-.....R0BN-....

Protocol
PN Profinet
PZ Powerlink
TZ TCP/IP
IZ Eternet/IP
MB Modbus
EC EtherCAT

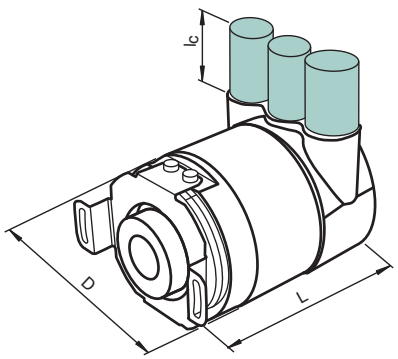
Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits multiturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Shaft dimensions/flange version
F1A Recessed hollow shaft ø10 mm x 30 mm
F2A Recessed hollow shaft ø12 mm x 30 mm
F3A Recessed hollow shaft ø15 mm x 30 mm

Housing material
N Aluminium, powder coated
W Aluminium, powder coated with shaft seal
I Stainless steel

Function principle
S Singleturn
M Multiturn



Example of order:
ESS58W-F1ATZR0BN-0016

Accessories

This and more accessories can be found in chapter 4.4 from page 741

V15-G-PG9	Cable socket, M12, 5-pin, ready for assembly
V15-G-YE2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-G-YE5M-PVC	Cable socket, M12, 5-pin, PVC cable
V1SD-G-ABG-PG9	Cable connector, M12, 4-pin, D-coded, shielded, non pre-wired
V1SD-G-2M-PUR-ABG-V45-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e
V1SD-G-5M-PUR-ABG-V45-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e
V1SD-G-2M-PUR-ABG-V45X-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e

Date of issue 2015-04-08



Properties

- CANopen safety interface
- 58 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 30 bit resolution

Your Benefit

- Suitable for systems up to SIL3 and PLe
- Integrated functional safety by means of twin processor structure and dual sensing for extra safety

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	12 ... 30 V DC
Interface type	CANopen / CANopen Safety
Transfer rate	max. 1 MBit/s
Output type	DSP 406/301/304, CLASS 1 and 2
Operating temperature	-30 ... 70 °C (-22 ... 158 °F)
Material	
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Combination 2 (Inox)	housing: stainless steel flange: stainless steel shaft: stainless steel
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		CVS58S	CVM58S
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	CANopen: up to 16 Bit CANopen Safety: 10 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]	depending on the version: 54 ... 92	●	
	depending on the version: 83 ... 118		●
Diameter D [mm]		aluminum: 59 Stainless steel: 61	

Ordering Information

CV.58S-.....0B.-....

Number of bits singleturn
13 8192
16 65536

Number of bits multiturn
14 16384
00 Singleturn encoder

Option 2
N Aluminum housing (standard)
I Stainless steel housing
W Aluminum housing with shaft seal

Output code
B Binary

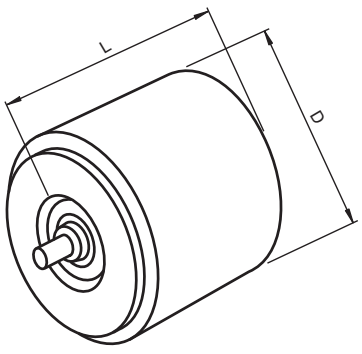
Exit position
A axial (Connection type K1, without bus cover)
R radial (Connection type AG, AN, AW)

Connection type
AG removable cover with terminal compartment
AN 1 Device connector, M12 x 1, 5-pin
AW 1 Device connector and 1 socket, M12 x 1, 5-pin
K1 Cable, 1 m long

Shaft dimensions/flange version
011 solid shaft Ø10 mm x 20 mm with clamping flange
012 solid shaft Ø10 mm x 20 mm with servo flange
032 solid shaft Ø6 mm x 10 mm with servo flange

Function principle
S Singleturn
M Multiturn

Example of order:
CVM58S-032AGR0BN-1416



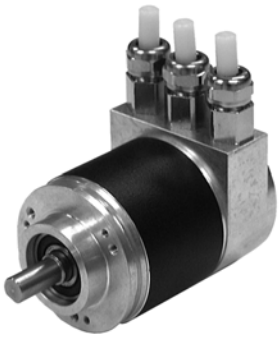
Accessories

This and more accessories can be found in chapter 4.4 from page 741

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Interface type	PROFIBUS
Transfer rate	0.0096 ... 12 MBit/s
Operating temperature	-30 ... 55 °C (-22 ... 131 °F)
Protection degree	DIN EN 60529, shaft side: IP64 (without shaft seal)/IP66 (with shaft seal) housing side: IP65
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	110 N
Connection	

Model Number		PVS58X	PVM58X
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	up to 16 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Use in the Hazardous Area			
Group, category, type of protection	II 3G Ex nA IIB T4 II 3D Ex tD A22 IP64 T120°C	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]		86	96
Diameter D [mm]		aluminum: 59 Stainless steel: 61	
Connector area l_c [mm]		32	

Properties

- **PROFIBUS interface**
- **Ø58 mm housing**
- **Solid shaft**
- **Single- and multiturn encoders, up to 30 bit total resolution**

Your Benefit

- **ATEX approval for zone 2 and zone 22**
- **Fast and easy installation due to removable housing cover**
- **Manually set baudrate, address, and termination resistor in the housing cover**
- **Wide range of programming functions, such as resolution, scaling, limit switches etc.**

Ordering Information

PV.58X-.AGR0BN-.

Number of bits singleturn
13 8192 (standard)
16 65536

Number of bits muliturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Output code
B Binary

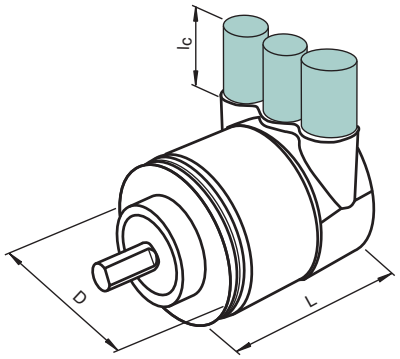
Exit position
R radial (connection type AG, AN, AW)

Connection type
AG removable cover with terminal compartment

Shaft dimensions/flange version
011 solid shaft ø10 mm x 20 mm with clamping flange
032 solid shaft ø6 mm x 10 mm with servo flange

Device type
S Singleturn
M Multiturn

Example of order:
PVS58X-032AGR0BN-0016



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

9203	Angled flange
9213	Mounting bracket, spring-loaded for clamping flange
9310-3	Synchro clamping element
9300	Mounting bracket for servo flange

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Interface type	PROFIBUS
Transfer rate	0.0096 ... 12 MBit/s
Operating temperature	-30 ... 55 °C (-22 ... 131 °F)
Protection degree	DIN EN 60529, shaft side: IP64 (without shaft seal)/IP66 (with shaft seal) housing side: IP65
Combination 1	housing: powder coated aluminium flange: aluminium shaft: stainless steel
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	± 0.9 °
Axial offset	static: ± 0.3 mm, dynamic: ± 0.1 mm
Radial offset	static: ± 0.5 mm, dynamic: ± 0.2 mm
Connection	

Model Number		PSS58X	PSM58X
Device type	Multiturn absolute encoder		●
	Singleturn absolute encoder	●	
Resolution			
Single turn	up to 16 Bit	●	●
Multiturn	14 Bit		●
Overall resolution	up to 16 Bit	●	
	up to 30 Bit		●
Use in the Hazardous Area			
Group, category, type of protection	Ex II 3G Ex nA IIB T4 Ex II 3D Ex tD A22 IP64 T120°C	●	●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]		100	112
Diameter D [mm]		aluminum: 59 Stainless steel: 61	
Connector area l_c [mm]		32	

Properties

- **PROFIBUS interface**
- **Ø58 mm housing**
- **Recessed hollow shaft**
- **Single- and multiturn encoders, up to 30 bit total resolution**

Your Benefit

- **ATEX approval for zone 2 and zone 22**
- **Fast and easy installation due to removable housing cover**
- **Manually set baudrate, address, and termination resistor in the housing cover**
- **Wide range of programming functions, such as resolution, scaling, limit switches etc.**

Ordering Information

PS . 58X – . . . AGR0BN – . . . .

Device type
S Singleturn
M Multiturn

Shaft dimensions/flange version
F1A Recessed hollow shaft ø10 mm x 30 mm
F2A Recessed hollow shaft ø12 mm x 30 mm
F3A Recessed hollow shaft ø15 mm x 30 mm

Connection type
AG removable cover with terminal compartment

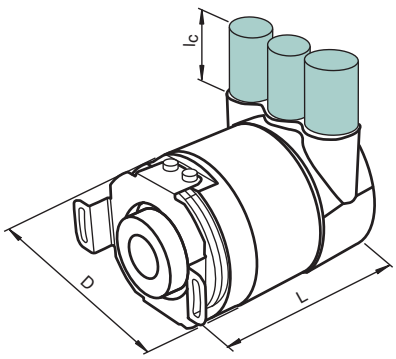
Exit position
A axial (connection type AG, AN, AW)

Output code
B Binary

Number of bits muliturn
12 4096 (standard)
14 16384
00 Singleturn encoder

Number of bits singleturn
13 8192 (standard)
16 65536

Example of order:
PSM58X-F1AAGR0BN-1213



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Operating voltage	10 ... 30 V DC
Operating temperature	-40 ... 70 °C (-40 ... 158 °F)
Protection degree	DIN EN 60529, IP66
Material	
Combination 1	housing: anodized aluminium flange: aluminium, blank shaft: Stainless steel 1.4401 / AISI 316
Combination 2 (Inox)	housing: stainless steel 1.4404 / AISI 316L flange: stainless steel 1.4404 / AISI 316L shaft: Stainless steel 1.4401 / AISI 316
Rotational speed	max. 3000 min $^{-1}$
Shaft load	
Axial	60 N
Radial	80 N

Model Number		AVS78E	AVM78E	CVS78E	CVM78E	DVS78E	DVM78E	PVS78E	PVM78E
Device type	Multiturn absolute encoder		●		●		●		●
	Singleturn absolute encoder	●		●		●		●	
Interface type	SSI	●	●						
	CANopen			●	●				
	DeviceNet					●	●		
	PROFIBUS							●	●
Resolution									
Single turn	up to 16 Bit	●	●	●	●	●	●	●	●
Multiturn	up to 14 Bit		●		●		●		●
Overall resolution	up to 30 Bit		●		●		●		●
Transfer rate	0.1 ... 2 MBit/s	●	●						
	max. 1 MBit/s			●	●				
	max. 0.5 MBit/s					●	●		
	0.0096 ... 12 MBit/s							●	●
Input 1									
Input type	Selection of counting direction (cw/ccw)	●	●						
Input 2									
Input type	zero-set (PRESET)	●	●						

Use in the Hazardous Area									
EC-Type Examination Certificate	TÜV 11 ATEX 084272X IECEx TUN 11.0017X	●	●	●	●	●	●	●	●
Group, category, type of protection	Ex II 2G Ex d IIC T5 Gb Ex II 2D Ex tb IIIC T100°C Db IP6X	●	●	●	●	●	●	●	●

Dimensions	
Length L [mm]	depending on the version: 109 ... 125
Diameter D [mm]	78

Properties

- SSI, CANopen, DeviceNet and PROFIBUS versions
- Ø78 mm housing
- Solid shaft
- Single- and multiturn encoders, up to 30 bit total resolution

Your Benefit

- Suitable for global usage due to ATEX and IECEx approval for zone1 and zone 21
- Fast and easy installation by means of removable wiring cover and access to control elements
- Reliable and robust for rough environmental conditions

Ordering Information

.V.78E - . . . . . 0 . . - . . . .

Number of bits singleturn
12 4096
13 8192 (only on data format Profibus)
16 65536

Number of bits multiturn
00 Singleturn encoders
12 4096
14 16384

Material combination
N Aluminium (combination 1)
I Stainless steel (combination 2)

Output code
B binary
G Gray code (only on data format SSI)

Exit position
A axial
R radial

Connection type
K2 Cable, 2 m
K5 Cable, 5 m
KR Terminal compartment (1 cable gland, 1 stopping plug)

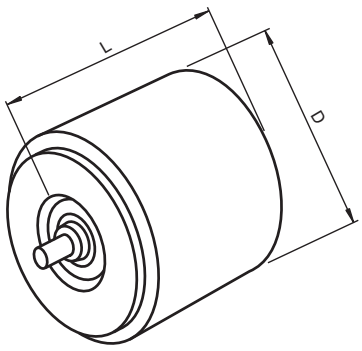
Flange version
1 Clamping flange
2 Servo flange

Device type
S Singleturn
M Multiturn

Shaft dimensions
01 Solid shaft ø10 mm x 20 mm
02 Solid shaft ø12 mm x 25 mm

Data format
A SSI (Synchronous Serial Interface)
C CANopen
D DeviceNet
P PROFIBUS

Example of order:
AVM78E-011K2R0BI-1212



Date of issue: 2015-04-08



CE

Properties

- Surface mount 32 x 22 mm housing
- Separate magnetic wheel
- Up to 7,200 pulses per revolution

Your Benefit

- Cost-effective, bearing-free encoder for rotational speed measurement
- Simple installation reduces time and cost
- Status LED
- Robust and flexible magnetic wheel provides resistance to dirt as well as thermal and mechanical shock
- Long service life at high speeds and temperatures

Function

The magnetic incremental encoder MNI20 is an exceptionally robust measurement system in the smallest space. Its highly compact encapsulated housing gives the sensor its high resistance to harsh environmental conditions. The installation-friendly design reduces the installation time considerably.

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	MNI20N
Detection type	magnetic sampling
Pulse count	max. 7200
Operating voltage	10 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 800 kHz
Operating temperature	-25 ... 85 °C (-13 ... 185 °F)
Protection degree	DIN EN 60529, IP67
Material	
Housing	PA
Cable	PUR
Magnetic wheel	PA, ferrite
Rotational speed	max. 20000 min $^{-1}$
Connection	

Dimensions	
Length L [mm]	32
Width W [mm]	22.4
Diameter D [mm]	depending on the version: 15 or 25
Connector area l_c [mm]	15

Ordering Information

MNI20N-.....K24.N-.....

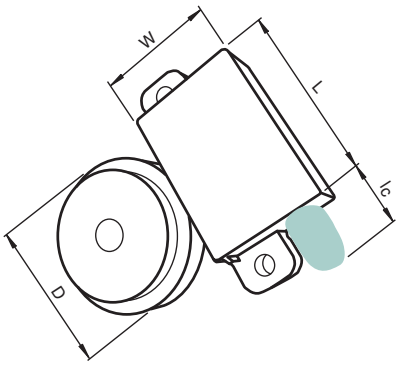
Pulse count (see magnetic wheel specifications)

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422

Signal output
4 A + B and $\overline{A}$ + $\overline{B}$

Connection type
K2 PUR cable 4 x 2 x 0.128 mm^2, 2 m

Magnetic wheel specifications
OTB2 Ø15 mm, 32 poles, pulse count: 32, 64, 128, 256, 512, 800, 1024, 1600, 3200
OH02 Ø25 mm, 50 poles, pulse count: 50, 100, 500, 1000, 1250, 1600, 2400, 2500, 5000, 7200



Example of order:
MNI20N-OH02K241N-02400

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CE

Properties

- Surface mount 32 x 22 mm housing
- Separate magnetic wheel
- Up to 7,200 pulses per revolution

Your Benefit

- Two-color (red, green) LEDs provide clear indication of magnetic wheel alignment
- Simple installation and adjustment reduce costs
- An elastomer-coated magnetic wheel resists dirt as well as thermal and mechanical shock
- Long service life at high speeds and temperatures

Function

The magnetic incremental encoder MNI40 combines an exceptionally robust measurement system with intelligent diagnosis and alignment functions in the smallest space. Its highly compact encapsulated housing gives the sensor its high resistance to harsh environmental conditions. The installation-friendly design and simple guided adjustment of the sensor using two-color status LED reduces the installation time considerably.

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**MNI40N**
Detection type	magnetic sampling
Pulse count	max. 7200
Operating voltage	10 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 1 MHz
Operating temperature	-40 ... 100 °C (-40 ... 212 °F)
Protection degree	DIN EN 60529, IP67 , IP68 , IP69K
Material	
Housing	PA
Cable	PUR
Magnetic wheel	cured ferrite filled rubber
Rotational speed	max. 30000 min $^{-1}$
Connection	

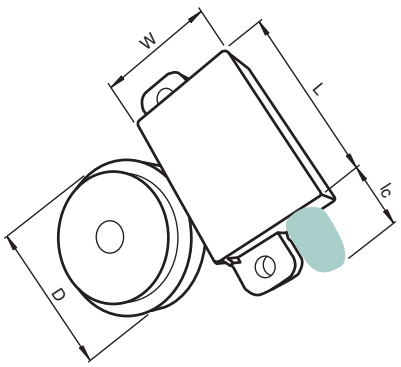
Dimensions	
Length L [mm]	32
Width W [mm]	22.4
Diameter D [mm]	depending on the version: 31.7 ... 45.7
Connector area l_c [mm]	15

Ordering Information

MNI40N-.-.-.K26.N-.-.-.-.-

- Pulse count see below
- **Output circuit**
  - 1 10 V ... 30 V, Push-Pull
  - 6 5 V, RS 422
- **Signal output**
  - 6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$
- Connection type
  - K2 PUR cable 4 x 2 x 0.128 mm^2, 2 m
- Magnetic wheel properties
  - 01 50 Poles, Ø31,7 mm, pulse numbers: 100, 500, 1000, 1250, 1600, 2400, 2500
  - A1 64 Poles, Ø40,6 mm, pulse numbers: 128, 512, 1024, 2048, 3072, 3200
  - E1 72 Poles, Ø46 mm, pulse numbers: 360, 1800, 3600, 7200
- Magnetic wheel center borehole
  - 0S Ø6 mm
  - 0A Ø10 mm
  - 0B Ø12 mm
  - 0T Ø15 mm

Example of order:
MNI40N-0A01K261N-01000



Date of issue 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	TVI40N
Detection type	photoelectric sampling
Pulse count	max. 1024
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 100 kHz (max. 100 kHz)
Nickel disk	-10 ... 70 °C (14 ... 158 °F)
Protection degree	DIN EN 60529, IP54
Material	
Housing	Polycarbonate
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	max. 20 N
Radial	max. 30 N
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	42
Diameter D [mm]	40

Properties

- Ø40 mm housing
- Solid shaft
- Up to 1024 pulses per revolution

Your Benefit

- Economical design
- Small housing for restricted ares

Function

The TVI40 continues the new economical target line of Pepperl+Fuchs. With a small outside diameter of 40 mm, the unit is ideal for use in industrial areas where very little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.
The appearance of this rotary encoder is the tangential cable outlet. This ensures a buckling-free, carefully laying of the connection cable in tangential, radial or axial manner.

Ordering Information

TVI40N-..TK.T6TN-.....

Pulse numbers
25, 50, 100, 200, 360, 400
500, 1000, 1024

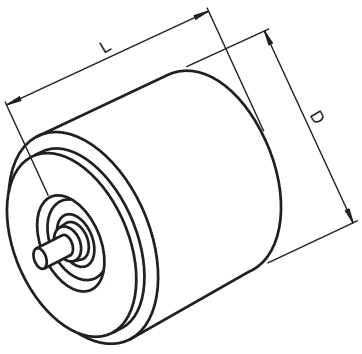
Signal output
6 A + B + 0 und $\bar{A}$ + $\bar{B}$ + $\bar{0}$

Exit position
T tangential

Connection type
K0 Cable Ø6 mm, 8 x 0.128 mm^2, 0.5 m
K2 Cable Ø6 mm, 8 x 0.128 mm^2, 2 m

Flange version
T Clamping flange

Shaft dimensions
09 Shaft Ø8 mm x 15 mm
14 Shaft Ø6 mm x 15 mm
17 Shaft Ø1/4" x 15 mm
19 Shaft Ø1/8" mm x 15 mm



Example of order:
TVI40N-14TK2T6TN-01024

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	TSI40N
Detection type	photoelectric sampling
Pulse count	max. 1024
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 100 kHz (max. 100 kHz)
Nickel disk	-10 ... 70 °C (14 ... 158 °F)
Protection degree	DIN EN 60529, IP54
Material	
Housing	Polycarbonate
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	43
Diameter D [mm]	40

Properties

- Ø40 mm housing
- Recessed hollow shaft
- Up to 1024 pulses per revolution

Your Benefit

- Economical design
- Small housing for restricted ares

Function

The TVI40 continues the new economical target line of Pepperl+Fuchs with a recessed hollw shaft version. With a small outside diameter of 40 mm, the unit is ideal for use in industrial areas where very little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.
The appearance of this rotary encoder is the tangential cable outlet. This ensures a buckling-free, carefully laying of the connection cable in tangential, radial or axial manner.

Ordering Information

T	S	I	4	0	N	–	.	.	.	K	.	T	6	T	N	–	.	.	.	.	.

Pulse numbers
25, 50, 100, 150, 180, 200, 250, 360, 400 500, 1000, 1024

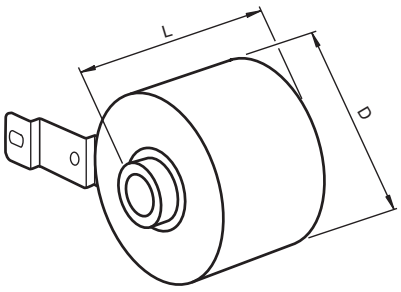
Signal output
6 $\overline{A}$ + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
T tangential

Connection type
K0 Cable Ø6 mm, 8 x 0.128 mm^2, 0.5 m
K2 Cable Ø6 mm, 8 x 0.128 mm^2, 2 m

Shaft dimensions/flange version
16A Recessed hollow shaft Ø4 mm x 15 mm
14A Recessed hollow shaft Ø6 mm x 15 mm
27A Recessed hollow shaft Ø8 mm x 15 mm
20A Recessed hollow shaft Ø3/8" x 15 mm
21A Recessed hollow shaft Ø3/16" x 15 mm
22A Recessed hollow shaft Ø5/16" x 15 mm

Example of order:
TSI40N-27AK0T6TN-00250



Date of issue 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	THI40N
Detection type	photoelectric sampling
Pulse count	max. 1024
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 100 kHz (max. 100 kHz)
Nickel disk	-10 ... 70 °C (14 ... 158 °F)
Protection degree	DIN EN 60529, IP54
Material	
Housing	aluminum
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 6000 min $^{-1}$
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	20.7
Diameter D [mm]	40

Properties

- Ø40 mm housing
- Hollow shaft
- Up to 1024 pulses per revolution

Your Benefit

- Economical design
- Small housing for restricted ares

Function

The THI40 continues the new economical target line of Pepperl+Fuchs. With a small outside diameter of 40 mm, the unit is ideal for use in industrial areas where very little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.

Ordering Information

T H I 4 0 N – . . A K 2 R 6 T N – . . . . .

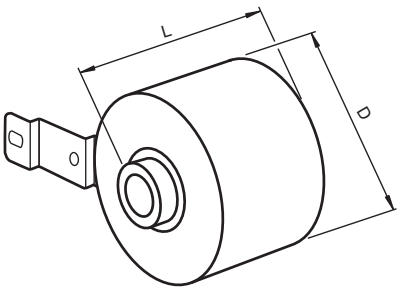
Pulse numbers
25, 50, 100, 150, 180, 200, 250, 360, 400, 500, 1000, 1024

Signal output
6 $A+B+0$ and $\overline{A}+\overline{B}+\overline{0}$

Exit position
R radial

Connection type
K2 Cable Ø5 mm, 8 x 0.08 mm^2, 2 m

Shaft dimensions/flange version
09 Shaft Ø8 mm x 15 mm
0S Hollow shaft Ø6 mm, clamping ring on both sides
0U Hollow shaft Ø6.35 mm, clamping ring on flange side
0C Hollow shaft Ø8 mm, clamping ring on flange side
0X Hollow shaft Ø3/16", clamping ring on flange side
2A Hollow shaft Ø5/16", clamping ring on flange side
1S Hollow shaft Ø6 mm, clamping ring on cover side
1U Hollow shaft Ø6.35 mm, clamping ring on cover side
1C Hollow shaft Ø8 mm, clamping ring on cover side
1X Hollow shaft Ø3/16", clamping ring on cover side
3A Hollow shaft Ø5/16", clamping ring on cover side



Example of order:
THI40N-0CAK2R6TN-00500

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	TVI50N-09BK0**T
Detection type	photoelectric sampling
Pulse count	max. 1024
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 100 kHz (max. 100 kHz)
Nickel disk	-10 ... 70 °C (14 ... 158 °F)
Protection degree	DIN EN 60529, IP40, IP54
Material	
Housing	aluminium, blank
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	20 N
Radial	40 N
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	44
Diameter D [mm]	50

Properties

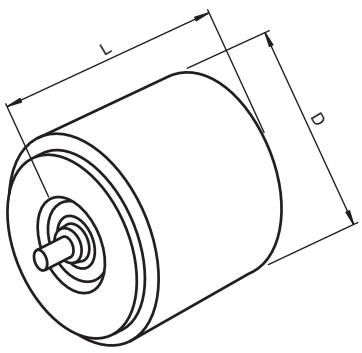
- Ø50 mm housing
- Solid shaft
- Up to 1024 pulses per revolution

Your Benefit

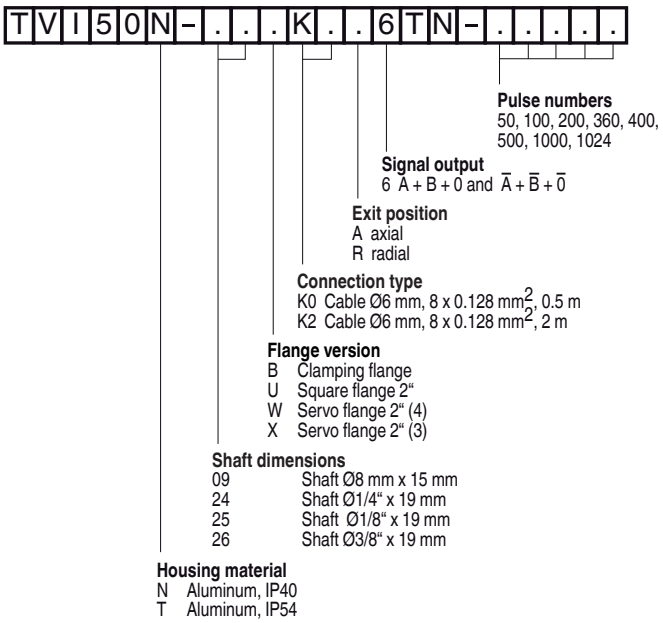
- Sturdy and compact design
- Cost-effective version

Function

The TVI50 is the starting point for the new economical target line of Pepperl+Fuchs. With a small outside diameter of 50 mm, the unit is ideal for use in industrial areas where little space is available.
The technology of the rotary encoder is adapted to the new requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1024 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.



Ordering Information



Example of order:
TVI50N-25BK2A6TN-01024

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Properties

- Ø50 mm housing
- Solid shaft
- Up to 2500 pulses per revolution

Your Benefit

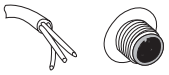
- Sturdy and compact design
- Choice of mechanical and electrical options

Function

The RVI50 is charcterised by its small housing diameter of 50 mm with equal technical data compared to other encoder series.
The centering shoulder makes it possible to fit the unit very precisely. In addition to the three M3 holes, the encoder has a servo infeed on the circumference. This allows you to make a slight adjustment to the reference point of the incremental rotary encoder by turning the housing.
The clamping element that grips into the servo infeed ensures that the incremental rotary encoder stays firmly in place without slipping out of adjustment.
The pulse disk is designed in plastic up to 600 pulses. Beyond that, glass is used.

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 2500
Output frequency	max. 160 kHz
Operating temperature	
Glass disk	-20 ... 70 °C (-4 ... 158 °F)
Plastic disk	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	DIN EN 60529, IP50
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 10000 min $^{-1}$
Shaft load	
Axial	30 N
Radial	50 N
Connection	

Model Number		RVI50N-09B**A*6	RVI50N-09B**A*T
Operating voltage	4.75 ... 30 V DC		●
	5 V DC ± 5 %	●	
Output type	push-pull, incremental		●
	RS 422, incremental	●	
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
Dimensions			
Length L [mm]		55	
Diameter D [mm]		50	

Ordering Information

RVI50N-09B.A.N-.....

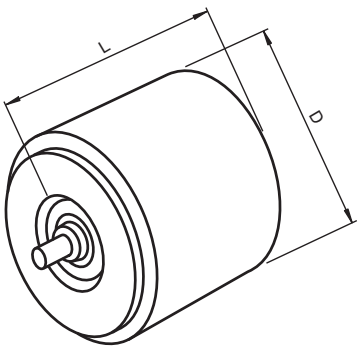
Pulse numbers
30, 60, 90, 100, 180, 200, 250, 300, 314, 360, 400, 500, 600, 720, 900, 1000, 1024, 1200, 1250, 1440, 1500, 1800, 2000, 2048, 2400, 2500

Connection type, Exit position, Signal output, Output circuit
AAA3T Connector type 9416, 12-pin, axial, A + B + 0, 4.75 V ... 30 V, Push-Pull
AAA66 Connector type 9416, 12-pin, axial, A + B + 0 und $\overline{A}$ + $\overline{B}$ + 0.5 V, RS 422
K0A3T Cable Ø6 mm, 5 x 0.38 mm^2, 0.5 m, axial, A + B + 0, 4.75 V ... 30 V, Push-Pull

Flange version
B Clamping flange

Shaft dimensions
09 Shaft Ø8 mm x 15 mm

Example of order:
RVI50N-09BK0A3TN-00360



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	TVI58N
Detection type	photoelectric sampling
Pulse count	max. 1500
Operating voltage	4.75 ... 30 V DC 5 V DC for RS 422
Output type	push-pull, incremental (RS 422, incremental)
Output frequency	max. 100 kHz (max. 100 kHz)
Nickel disk	-10 ... 70 °C (14 ... 158 °F)
Protection degree	DIN EN 60529, IP54
Material	
Housing	aluminium, blank
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	20 N
Radial	40 N
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Dimensions	
Length L [mm]	47
Diameter D [mm]	58

Properties

- Ø58 mm housing
- Solid shaft
- Up to 1500 pulses per revolution

Your Benefit

- Cost-effective version

Function

The TVI58 extends the economical target line of Pepperl+Fuchs. With its outside diameter of 58 mm, the device is fully mechanical compatible to the usual industry standard.
The technology of the rotary encoder is optimally adapted to the requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1500 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.

Ordering Information

TVI58N-.-.-K-.-6TN-.-.-.-.

Pulse numbers
100, 125, 250, 360, 500, 512, 600, 1000, 1024, 1500

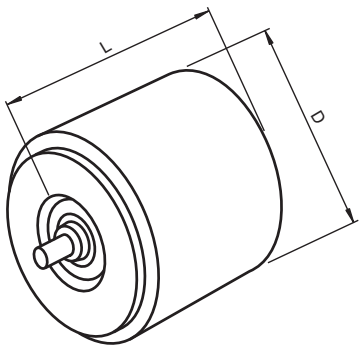
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
K0 Cable Ø6 mm, 8 x 0.14 mm^2, 0,5 m, UL-Style 2571
K2 Cable Ø6 mm, 8 x 0.14 mm^2, 2 m, UL-Style 2571

Shaft dimensions/flange versio
01N Shaft Ø10 mm x 20 mm, clamping flange, 3 x M3 and 3 x M4
032 Shaft Ø6 mm x 10 mm, servo flange

Example of order:
TVI58N-032K2R6TN-00512



Date of issue 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
Detection type	photoelectric sampling	
Pulse count	max. 1500	
Nickel disk	-10 ... 70 °C (14 ... 158 °F)	
Protection degree	DIN EN 60529, IP54	
Material		
Housing	aluminium, blank	
Flange	3.1645 aluminum	
Shaft	Stainless steel 1.4305 / AISI 303	
Rotational speed	max. 6000 min $^{-1}$	
Shaft load		
Angle offset	1 °	
Axial offset	max. 1 mm	
Connection		
Model Number		THI58N / THI58N-*******X
Operating voltage	10 ... 30 V DC	●
	4.75 ... 30 V DC 5 V DC for RS 422	●
Output type	push-pull, incremental (RS 422, incremental)	●
	RS 422, incremental	●
Output frequency	max. 100 kHz	●
	max. 100 kHz (max. 100 kHz)	●
Approvals and Certificates		
UL approval	cULus Listed, General Purpose, Class 2 Power Source	● / ●
Dimensions		
Length L [mm]		31
Diameter D [mm]		58

Properties

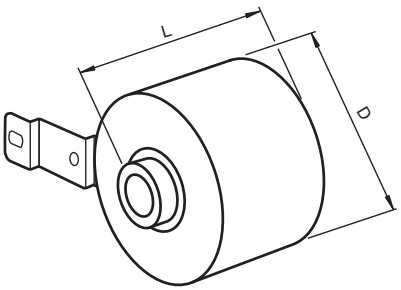
- Ø58 mm housing
- Hollow shaft
- Up to 1500 pulses per revolution

Your Benefit

- Cost-effective version

Function

The Pepperl+Fuchs target line is extended by the THI58, an economical hollow shaft encoder. With its outside diameter of 58 mm, the device is fully mechanical compatible to the usual industry standard.
The technology of the rotary encoder is optimally adapted to the requirements of the rotary encoder market. Innovative fast technology with Opto-ASIC forms the central basis of the device. The rotary encoder is available with a pulse count of up to 1500 pulses per revolution.
The rotary encoder is equipped with a metal disk that can accept a high load. It provides the ideal combination of non-sensitivity to temperature and high resolution.



Ordering Information

THI58N-..AK.R6.N-.....

Pulse numbers
100, 125, 250, 360, 500, 512, 600, 1000, 1024, 1500

Output circuit
T 4,75 V ... 30 V, Push-Pull
X 10 V ... 30 V, RS 422

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K0 Cable Ø6 mm, 8 x 0.14 mm^2, 0.5 m, UL-Style 2571
K2 Cable Ø6 mm, 8 x 0.14 mm^2, 2 m, UL-Style 2571

Shaft dimensions/flange version
0A Hollow shaft Ø10 mm, clamping ring on flange side
0B Hollow shaft Ø12 mm, clamping ring on flange side
0T Hollow shaft Ø15 mm, clamping ring on flange side
1A Hollow shaft Ø10 mm, clamping ring on cover side
1B Hollow shaft Ø12 mm, clamping ring on cover side
1T Hollow shaft Ø15 mm, clamping ring on cover side

Example of order:
THI58N-0AAK2R6XN-01500

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

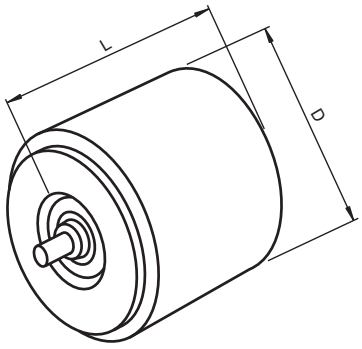
- Ø58 mm housing
- Solid shaft
- Up to 5000 pulses per revolution

Your Benefit

- General-purpose encoder series
- Choice of mechanical and electrical options

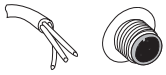
Function

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
The pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available either in clamping flange design with a shaft 10 mm in diameter x 20 mm or in servo flange design with a shaft 6 mm in diameter x 10 mm.
The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a cable connector.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 200 kHz
Operating temperature	
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F) , fixed cable
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F) , fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Connection	

Model Number		RVI58N-*******1	RVI58N-*******6	RVI58N-*******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]		depending on the version: 46 ... 56		
Diameter D [mm]		58		

Ordering Information

RVI58N-.....6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 $\overline{A}$ + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1m

Shaft dimensions/flange versio
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange
044 Shaft Ø10 mm x 20 mm (flattening 1 mm x 20 mm) with clamping flange

Example of order:
RVI58N-032AAR6XN-02500

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Properties

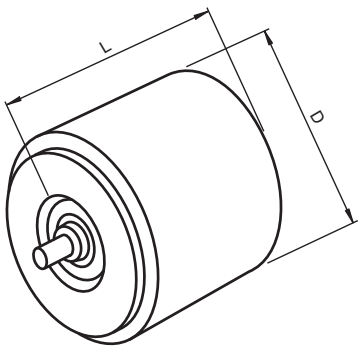
- Ø58 mm housing
- Solid shaft
- Up to 50,000 pulses per revolution

Your Benefit

- Designed for applications that require the highest resolutions
- Choice of mechanical and electrical options
- Optional extended temperature

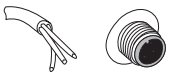
Function

High performance are key words for this rotary encoder. The outstanding features of this encoder include a high angle resolution and an optional extended temperature range.
Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available as a clamping flange version with a Ø10 mm x 20 mm shaft or a servo flange version with a Ø6 mm x 10 mm shaft.
The electrical connection is made via a 12-pin round connector. A version with a cable co-nnection is also available.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 50000
Output frequency	max. 200 kHz
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F) , fixed cable -40 ... 80 °C (-40 ... 176 °F) with Option T , fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Connection	

Model Number		RVI58N-******1	RVI58N-******6	RVI58N-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●

Dimensions	
Length L [mm]	depending on the version: 50 ... 56
Diameter D [mm]	58

Ordering Information

RVI58N-.....6..-.....

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Option
N normal
T extended temperature range, -40 °C

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 $\bar{A} + B + \bar{0}$ and $\bar{A} + \bar{B} + \bar{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange versio
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange
044 Shaft Ø10 mm x 20 mm (flattening 1 mm x 20 mm) with clamping flange

Example of order:
RVI58N-011K1A66T-10000

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Properties

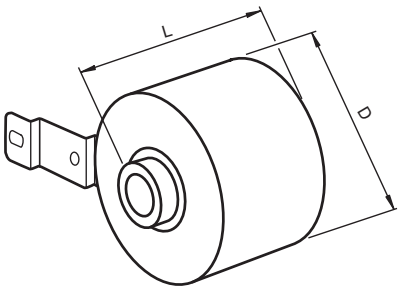
- Ø58 mm housing
- Recessed hollow shaft
- Up to 5000 pulses per revolution

Your Benefit

- General-purpose encoder series
- Choice of mechanical and electrical options

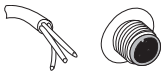
Function

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
The pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available in recessed hollow shaft design with a shaft 10 mm in diameter x 20 mm or with a shaft 12 mm in diameter x 20 mm. The rotary encoder is held in place by an included torque rest.
The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a cable connector.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 200 kHz
Operating temperature	
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F), fixed cable
Protection degree	DIN EN 60529, IP54
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		RSI58N-*******1	RSI58N-*******6	RSI58N-*******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]		depending on the version: 42.4 ... 50		
Diameter D [mm]		58		

Ordering Information

RSI58N-..A...6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Flange version
A Hollow shaft

Shaft dimensions
01 Recessed hollow shaft Ø10 mm x 20 mm
02 Recessed hollow shaft Ø12 mm x 20 mm

Example of order:
RSI58N-01AAAR61N-01250

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Properties

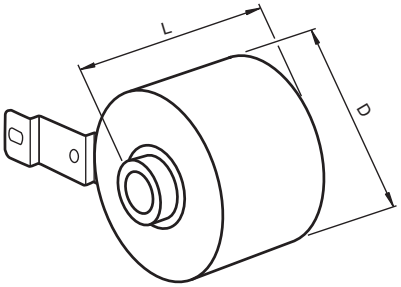
- Ø58 mm housing
- Recessed hollow shaft
- Up to 50,000 pulses per revolution

Your Benefit

- Designed for applications that require the highest resolutions
- Choice of mechanical and electrical options

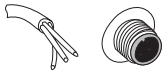
Function

High performance are key words for this rotary encoder. Its outstanding feature is the high resolution angle.
Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available in a recessed hollow shaft version with a Ø10 mm x 20 mm shaft or a Ø12 mm x 20 mm shaft. The rotary encoder must be mounted using a torque support. The torque support supplied with the unit or provided by the customer can be used.
The electrical connection is made via a 12-pin round connector. A version with a cable connection is also available.



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 50000
Output frequency	max. 200 kHz
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Protection degree	DIN EN 60529, IP54
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		RSI58N-******1	RSI58N-******6	RSI58N-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]		depending on the version: 44 ... 50		
Diameter D [mm]		58		

Ordering Information

RSI58N-.A...6.N-.....

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
01 Recessed hollow shaft Ø10 mm x 20 mm
02 Recessed hollow shaft Ø12 mm x 20 mm

Example of order:
RSI58N-02AK1A61N-20000

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Properties

- Ø58 mm housing
- Hollow shaft
- Up to 5000 pulses per revolution

Your Benefit

- General-purpose encoder series
- Choice of mechanical and electrical options

Function

Compatibility says it all for this incremental rotary encoder.
All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
Usually the pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
This incremental rotary encoder is available as hollow shaft design with a shaft Ø10 mm or Ø12 mm.
The rotary encoder is held in place by an included torque rest.
The electrical connection is made with a cable connector.

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 200 kHz
Operating temperature	
Glass disk	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Plastic disk	-5 ... 60 °C (23 ... 140 °F) , movable cable -20 ... 60 °C (-4 ... 140 °F), fixed cable
Protection degree	DIN EN 60529, IP54
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		RHI58N-*******1	RHI58N-*******6	RHI58N-*******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			38	
Diameter D [mm]			58	

Ordering Information

RHI58N-..AK1R6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

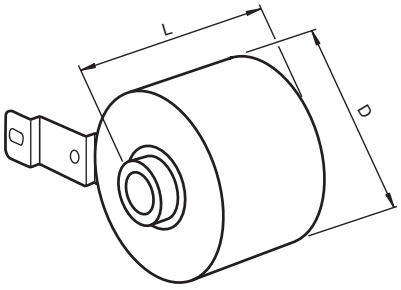
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K1 Cable, 1 m

Shaft dimensions
0A Hollow shaft ø10 mm
0B Hollow shaft ø12 mm
0S Hollow shaft ø1/2˝

Example of order:
RHI58N-0AAK1R61N-00512



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 50000
Output frequency	max. 200 kHz
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Protection degree	DIN EN 60529, IP54
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		RHI58N-******1	RHI58N-******6	RHI58N-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			44,1	
Diameter D [mm]			58	

Properties

- Ø58 mm housing
- Hollow shaft
- Up to 50,000 pulses per revolution

Your Benefit

- Designed for applications that require the highest resolutions
- Choice of mechanical and electrical options

Function

High performance are key words for this rotary encoder. Its outstanding feature is the high resolution angle.
Usually all six output channels of this incremental rotary encoder are assigned to ensure flexible use of the encoder in a wide range of applications.
This incremental rotary encoder is available as hollow shaft design with a shaft Ø10 mm, Ø12 mm or Ø15 mm.
The rotary encoder is held in place by an included torque rest.
The electrical connection is made with a cable connector.

Ordering Information

RHI58N-..AK1R6.N-.....

Pulse numbers
1024, 2048, 2500, 4096, 5000, 8192, 10000, 20000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

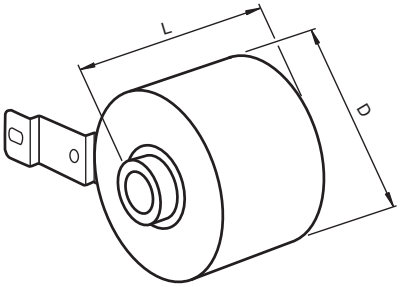
Signal output
6 $\overline{A}$ + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1 m

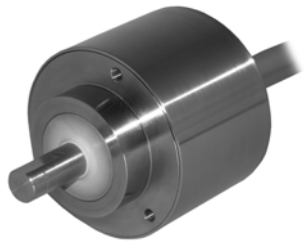
Shaft dimensions
2A Hollow shaft Ø10 mm, clamps on both sides
2B Hollow shaft Ø12 mm, clamps on both sides
2T Hollow shaft Ø15 mm, clamps on both sides

Example of order:
RHI58N-2BAK1R6XN-50000



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RVI58L
Detection type	photoelectric sampling
Pulse count	50, 100, 150, 200, 360, 500, 1000, 1024, 1250, 2048, 2500, 4096, 5000
Operating voltage	10 ... 30 V DC or 5 V DC
Output type	push-pull, incremental or RS 422, incremental
Output frequency	max. 600 kHz
Operating temperature	-20 ... 80 °C (-4 ... 176 °F)
Material	
Housing	stainless steel V4A
Flange	stainless steel V4A
Shaft	stainless steel V4A
Rotational speed	max. 3600 min $^{-1}$
Shaft load	
Axial	max. 40 N
Radial	max. 60 N
Connection	

Approvals and Certificates	
ECOLAB	material compatibility attested for: P3-topactive DES P3-topax 19 P3-topax 56 P3-topax 66 P3-topax 91 de-mineralized water as zero value

Dimensions	
Length L [mm]	depending on the version: 52 ... 63
Diameter D [mm]	58

Properties

- Ø58 mm housing
- Solid shaft
- Up to 5000 pulses per revolution

Your Benefit

- High-grade steel version, especially suitable in applications for food and beverage industry
- Cleaning compatible according to EHEDG
- Approval for ECOLAB detergents
- IP69K protection degree

Function

Due to its extremely high protection degree IP69K, this stainless steel incremental encoder is best suitable for all areas of food industry. By means of the used material and the superior design, this encoder is certified according to EHEDG (European Hygienic Engineering & Design Group) and ECOLAB (resistance against agents and desinfectants).
Typical applications for this encoder can be found in food production, food machinery, filling and pakkaging machines.
The fixation of this encoder can be carried out by either clamping at the flange or screw fixation using the frontal bore holes.
For the electrical connection the RVI58L is provided with a fixed cable.

Ordering Information

R	V	I	5	8	L	-	0	1	1	K	2	.	6	1	N	-	.	.	.	.	.

Pulse numbers
50, 100, 150, 200, 360, 500, 1000, 1024, 1250, 2048, 2500, 4096, 5000

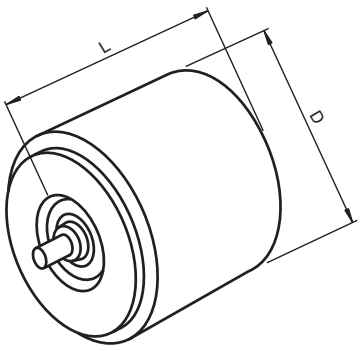
Signal output
6 $\overline{A}$ + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
K2 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 2 m

Shaft dimensions/flange version
011 Shaft Ø10 mm x 20 mm with clamping flange

Example of order:
RVI58L-011K2A61N-01024

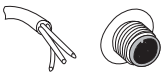


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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 100 kHz
Operating temperature	
Glass disk	-20 ... 80 °C (-4 ... 176 °F)
Plastic disk	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	DIN EN 60529, IP54 (without shaft seal)/IP65 (with shaft seal)
Material	
Housing	diecast zinc, not laquered or coated
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min $^{-1}$
Shaft load	
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Connection	

Model Number		RVI25*-******1	RVI25*-******6	RVI25*-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			55,5	
Diameter D [mm]			57,8	

Properties

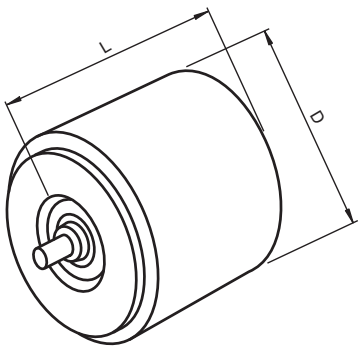
- Ø2.5'' housing
- Solid shaft
- Up to 5000 pulses per revolution

Your Benefit

- General-purpose encoder series
- Choice of mechanical and electrical options

Function

The RVI25 series is Pepperl+Fuchs' industrial standard size 2,5" encoder. This encoder is well-suited for many applications with its rugged, industrial housing and variety of options. Standard mounting configurations include 1/4" and 3/8" shafts and servo or face mounts.
The pulse disk is designed in plastic up to 1500 pulses. Beyond that, glass is used.
Electrical options include push-pull and RS 422 outputs on either Mil-Spec connectors or cables. An optional shaft seal protects the encoder and gives it a protection rating of IP65.



Ordering Information

RVI25.-...N-....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
3 A + B + 0
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AR Connector type 9415, 7-pin
AS Connector type 9419, 10-pin
BF Connector type 9419, 10-pin, industrial
K2 Cable Ø7.8 mm, 6 x 2 x 0.14 mm², 2 m
K5 Cable Ø7.8 mm, 6 x 2 x 0.14 mm², 5 m

Flange version
D Square flange 2,65" x 2,65"
E Servo flange Ø2,625"
F Clamping flange Ø2,5"
G Clamping flange Ø2,5"
H Clamping flange Ø2,5"

Shaft dimensions
06 Shaft Ø3/8" x 0,875"
11 Shaft Ø1/4" x 0,875"

Housing
N Normal, protection degree IP54
P with shaft seal, protection degree IP65

Example of order:
RVI25P-06DK2R61N-02500

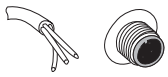
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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 50000
Output frequency	max. 200 kHz
Operating temperature	-5 ... 70 °C (23 ... 158 °F) , movable cable -20 ... 70 °C (-4 ... 158 °F), fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	aluminium, blank
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 3500 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	

Model Number		RHI90N-*******1	RHI90N-*******6	RHI90N-*******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			48,5	
Diameter D [mm]			87,1	

Properties

- Ø90 mm housing
- Hollow shaft
- Up to 50,000 pulses per revolution

Your Benefit

- Designed for applications that require the highest resolutions
- Choice of mechanical and electrical options
- Larger diameter, hollow shaft version available

Function

The hollow shaft encoder RHI90 is a product, which has been developed specially for mechanical drive and lift engineering. It combines the advantages of modern technics and cost effective design.
The hollow shaft encoder is available with shaft diameters between Ø16 mm and Ø45 mm. Thanks to its comparatively small outside diameter it can also be used if only little mounting space is available. The shaft fastening is designed in a way that the shaft of the customer is not being damaged.

Ordering Information

RHI90N-.A..R6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 4096, 5000, 8192, 10000, 25000, 50000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

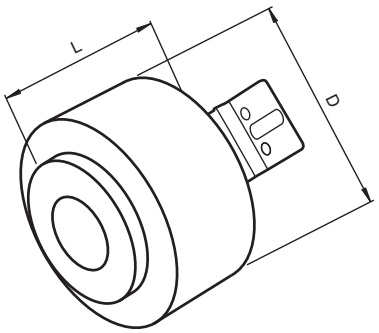
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector typep 9416L, 12-pin
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1m

Shaft dimensions/flange version
0E Hollow shaft Ø16 mm
0F Hollow shaft Ø20 mm
0G Hollow shaft Ø24 mm
0H Hollow shaft Ø25 mm
0Z Hollow shaft Ø1´´
0I Hollow shaft Ø30 mm
0L Hollow shaft Ø38 mm
0N Hollow shaft Ø45 mm

Example of order:
RHI90N-0HAAAR61N-05000



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RHI90O
Detection type	photoelectric sampling
Pulse count	max. 2.500
Operating voltage	10 ... 30 V DC
Output type	HTL, incremental, TTL
Output frequency	max. 120 kHz
Operating temperature	-20 ... 70 °C (23 ... 158 °F)
Protection degree	DIN EN 60529, IP65
Material	
Housing	aluminium, coated, salt water resistant
Flange	aluminium, coated, salt water resistant
Shaft	Stainless steel 1.4404 / AISI 316L
Rotational speed	max. 3000 min $^{-1}$
Shaft load	
Radial offset	max. 0.04 mm
Connection	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
Dimensions	
Length L [mm]	55
Diameter D [mm]	87.1

Properties

- Ø90 mm housing
- Hollow shaft
- Up to 1.024 pulses per revolution

Your Benefit

- Sturdy version for harsh environmental conditions
- Best suitable for offshore applications
- Easy shaft to collar connection by means of double shaft flattening
- Shaft isolation by means of highly resilient plastic bushing

Function

This hollow shaft encoder was specially developed for use in regions heavily influenced by maritime conditions or for offshore use.
The sea-waterproof coated housing material and the 316L stainless steel shaft are perfectly suited for these tough environmental influences. The internal electronics also meet these high requirements.
The durable metal disc ensures that the encoder can be used for applications exposed to extreme shock and vibration loads. High line counts of up to 2500 pulses/revolution allow for use in applications with demanding requirements in terms of measurement accuracy and resolution.
The robust properties of the hollow shaft encoder are appropriately present in the extremely sturdy plastic bushing as well. The bushing electrically isolates the rotary encoder from the shaft, thereby preventing unwanted shunt currents.

Ordering Information

RHI90O-.A.R6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500

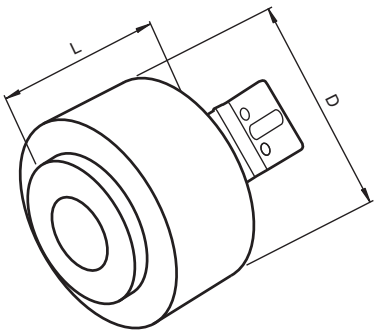
Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
AA Connection type 9416, 12-pin
AB Connection type Typ 9416L, 12-pin
K1 Cable Ø7 mm, 4 x 2 x 0.14 mm^2, 1m

Shaft dimensions/flange version
YY Hollow shaft Ø16 mm with double shaft flattening



Example of order:
RHI90O-YYAAAR61N-01024

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CE

Properties

- Ø110 mm housing
- Hollow and recessed hollow shaft versions
- Up to 2.500 pulses per revolution

Your Benefit

- Highly shock and vibration resistant
- Protected against shaft currents
- Variable connection by means of rotating terminal box with plug-in terminals
- High bearing loads

Function

When conditions are tough, the ENI11HD heavy duty rotary encoders provide reliable speed feedback for large asynchronous motors.
Heat, cold, dirt, permanent vibration, strong shocks, and electromagnetic interference pose no problem for these heavy duty encoders. The same applies to leakage currents that are generated as a result of induced voltage in the shaft of the drive motor.
ENI11HD rotary encoders combine a long service life with a high level of reliability. The cover on the junction box, which can be rotated 4 x 90°, provides greater flexibility when installing and maintaining the device while also helping to save costs.

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	ENI11HD
Detection type	photoelectric sampling
Pulse count	max. 2.500
Operating voltage	10 V ... 30 V DC or 5 V DC ± 5 %, (see Ordering Information, below)
Output type	push-pull or RS 422, incremental or (see Ordering Information, below)
Output frequency	max. 200 kHz
Operating temperature	-40 ... 80 °C (240 ... 176 °F)
Protection degree	DIN EN 60529, IP66, IP67 or IP69K
Material	
Housing	aluminium 3.1645
Flange	aluminium 3.1645
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 3000 min $^{-1}$
Shaft load	
Axial	max. 300 N
Radial	max. 400 N
Angle offset	1°
Radial offset	max. 1 mm
Connection	

Dimensions	
Length L [mm]	depending on the version: 99.5 ... 105.5
Diameter D [mm]	108.5

Ordering Information

ENI11HD-	R	.	.	.	.	-	.	.	.	.	.	.	-	T	.	.

Shaft type
H Hollow shaft
R Recessed hollow shaft

Shaft diameter
16 16 mm
20 20 mm
25 25 mm (only H shaft)
28 28 mm (only H shaft)
T1 17 mm cone (only R shaft)

Flange
NA Support plate, 70 mm
T1 Support plate with articulated arm, 70 mm

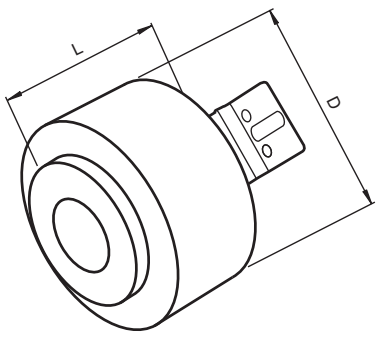
Degree of protection
E IP66/IP67
9 IP69K

Pulse numbers
0100, 0360, 0500, 0512, 0600, 1000
1024, 1250, 2048, 2500 (others on request)

Electrical interface
PP5 Push-pull, 6-wire, increased EMC
RS4 RS 422, U_S = 5 V, increased EMC

Connection type
C1 Cable, 1 m
C2 Cable, 2 m
C5 Cable, 5 m
C10 Cable, 10 m
AA M23 male connector, cw
AB M23 male connector, ccw
TC Terminal compartment

Example of order:
ENI11HD-RT1NAE-2048PP5-TC5

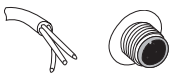


Date of issue 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RVS58N-*******Z
Detection type	photoelectric sampling
Pulse count	1024 and 2048
Operating voltage	5 V ± 5 %
Output type	sine / cosine
Amplitude	1 V_{ss} ± 10 %
Output frequency	max. 200 kHz (3 dB limit)
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	powder coated aluminum
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 12000 min^{-1}
Shaft load	
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Connection	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
Dimensions	
Length L [mm]	depending on the version: 50 ... 56
Diameter D [mm]	58

Properties

- **Ø58 mm housing**
- **Solid shaft**
- **Up to 2048 signal periods per revolution**

Your Benefit

- **Choice of mechanical options**
- **Sine/cosine enables position and speed computation**

Function

Compatibility says it all for this incremental rotary encoder.
The RVS58 provides sinusodial / cosinusodial signals at a resolution of up to 2.048 signal periods per revolution. All six output channels are fitted for this incremental rotary encoder. It can thus be used universally in many different applications.
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
This incremental rotary encoder is available either in clamping flange design with a shaft 10 mm in diameter x20 mm or in servo flange design with a shaft 6 mm in diameter x10 mm.
The electrical connection is made by a 12-pin round plug connector. It is also possible to obtain a version with a cable connector.

Ordering Information

R V S 5 8 N – . . . . . 6 Z N – . . . . .

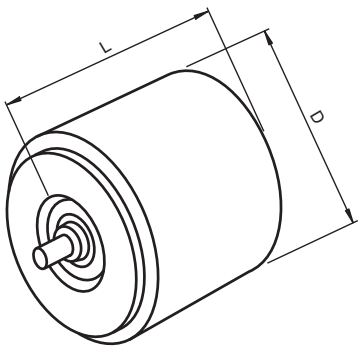
Signal periods
1024, 2048

Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
AA Connector type 9416, 12-pin
AB Connector type 9416L, 12-pin
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange
041 Shaft Ø10 mm x 20 mm with clamping flange, flattening 1 mm x 20 mm
282 Shaft Ø6 mm x 10 mm with servo flange, flattening 1 mm x 20 mm



Example of order:
RVS58N-011ABR6ZN-02048

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RHS58N-*******Z
Pulse count	max. 2048
Operating voltage	5 V DC ± 5 %
Output type	sine / cosine
Amplitude	1 V_{ss} ± 10 %
Output frequency	max. 200 kHz (3 dB limit)
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Protection degree	DIN EN 60529, IP54
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
Dimensions	
Length L [mm]	44.1
Diameter D [mm]	58

Properties

- Ø58 mm housing
- Hollow shaft
- Up to 2048 signal periods per revolution

Your Benefit

- Choice of mechanical options
- Sine/cosine enables position and speed computation

Function

Compatibility says it all for this incremental rotary encoder.
The RHS58 provides sinusodial / cosinusodial signals at a resolution of up to 2.048 signal periods per revolution
Focussing on the designs that are most often required has allowed us to offer rapid availability at an attractive price.
This rotary encoder is available as hollow shaft design with a shaft Ø10 mm, Ø12 mm or Ø15 mm.
The rotary encoder is held in place by an included torque rest.
The electrical connection is made with a cable.

Ordering Information

RHS58N-..AK1R6ZN-.....

Signal periods
1024, 2048

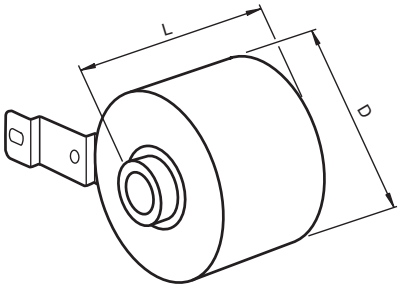
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
2A Hollow shaft Ø10 mm, clamping rings on both sides
2B Hollow shaft Ø12 mm, clamping rings on both sides
2T Hollow shaft Ø15 mm, clamping rings on both sides

Example of order:
RHS58N-2TAK1R6ZN-01024



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RHS90N-*******Z
Detection type	photoelectric sampling
Pulse count	max. 2048
Operating voltage	5 V DC ± 5 %
Output type	sine / cosine
Amplitude	1 V_{ss} ± 10 %
Output frequency	max. 200 kHz (3 dB limit)
Operating temperature	-5 ... 70 °C (23 ... 158 °F) , movable cable -20 ... 70 °C (-4 ... 158 °F), fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	aluminium, blank
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 3500 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection	
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
Dimensions	
Length L [mm]	48.5
Diameter D [mm]	87.1

Properties

- Ø90 mm housing
- Hollow shaft
- Up to 2048 signal periods per revolution

Your Benefit

- Choice of mechanical options
- Sine/cosine enables position and speed computation
- Larger diameter, hollow shaft version available

Function

The RHS90 provides the user with sine/cosine signals with a resolution of up to 2048 signal periods per revolution.
Typical applications for these rotary encoders are found in drive technology (motor feedback in assembly applications). Thanks to the 1 Vss sine/cosine interface the RHS90 is compatible with the current drive converters available on the market, as are required for the fine positioning of drives and servo-drive systems in industrial applications.
A clear increase in precision and improved drive running characteristics at an attractive price are the strengths of this series of rotary encoders.

Ordering Information

R	H	S	9	0	N	–	.	.	.	K	1	R	6	Z	N	–	.	.	.	.	.

Signal periods
1024, 2048

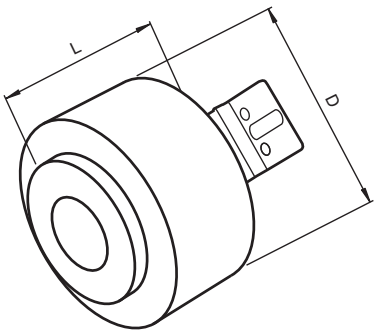
Signal output
6 A + B + 0 und $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
R radial

Connection type
K1 Cable Ø6.5 mm, 4 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
2CA Hollow shaft Ø19 mm
0FA Hollow shaft Ø20 mm
0HA Hollow shaft Ø25 mm
0NA Hollow shaft Ø45 mm

Example of order:
RHS90N-0FAK1R6ZN-01024



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RVS58S-*******Z
Detection type	photoelectric sampling
Pulse count	1024 and 2048
Operating voltage	5 V DC ± 5 %
Output type	sine / cosine
Amplitude	1 V_{ss} ± 10 %
Output frequency	max. 200 kHz (3 dB limit)
Operating temperature	-5 ... 80 °C (23 ... 176 °F) , movable cable -20 ... 80 °C (-4 ... 176 °F), fixed cable
Protection degree	DIN EN 60529, IP65
Material	
Housing	powder coated aluminum
Flange	3.1645 aluminum
Shaft	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 12000 min^{-1}
Shaft load	
Axial	40 N at max. 6000 min^{-1} 10 N at max. 12000 min^{-1}
Radial	60 N at max. 6000 min^{-1} 20 N at max. 12000 min^{-1}
Connection	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source

Length L [mm]	50.5
Diameter D [mm]	58

Properties

- **Ø58 mm housing**
- **Solid shaft**
- **Up to 2048 signal periods per revolution**

Your Benefit

- **Suitable for systems up to SIL3 and PLe**
- **Integrated functional safety**
- **TÜV certified**
- **Suitable as motor feedback system for safe drives in accordance with IEC 61800-5-2**
- **Thermally stabilized with highest precission for high resolution interpolation**

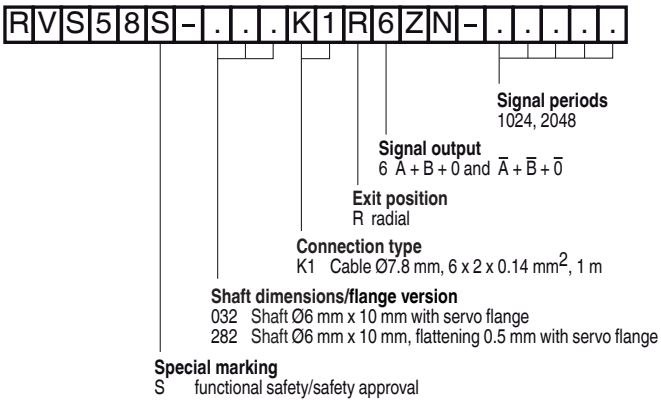
Function

The RVS58S – a combination of precision and integrated safety technology for demanding requirements.
The RVS58S rotary encoder is suitable for use in safety-aligned systems up to

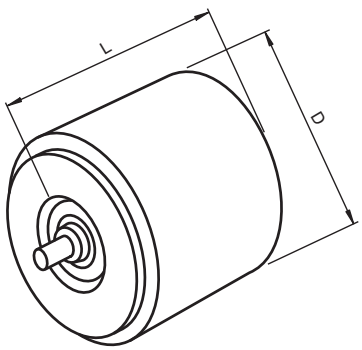
- SIL3 in accordance with IEC 61508
- Performance Level e in accordance with IEC 13849
- Category 4 in accordance with DIN EN 954-1

given the corresponding prerequisites with regard to the diagnostic capability of the higher level control/evaluation system.
Typical applications for this rotary encoder are found in safety-evaluated drive technology (Motor feedback). Thanks to the 1 Vss sine/cosine interface the RVS58S is compatible with the current drive converters available on the market, as are required for the fine positioning of drives and servo-drive systems in industrial applications.
A clear increase in precision and the smooth running of the drive at an attractive price, including certificated safety in accordance with the applicable standards, enable this rotary encoder to be used in a wide variety of applications.

Ordering Information



Example of order:
RVS58S-032K1R6ZN-02048



Date of issue 08.04.2015



Properties

- Ø58 mm housing
- Solid shaft
- Up to 5000 pulses per revolution

Your Benefit

- ATEX approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 200 kHz
Protection degree	DIN EN 60529, IP64
Operating temperature	
Glass disk	-30 ... 70 °C (-22 ... 158 °F) , fixed cable
Plastic disk	-30 ... 60 °C (-22 ... 140 °F) , fixed cable
Material	
Housing	powder coated aluminum
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	40 N
Radial	60 N
Connection type	

Model Number		RVI58X-******1	RVI58X-******6	RVI58X-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Use in the Hazardous Area				
Group, category, type of protection	II 3G Ex nA IIB T4 II 3D Ex tD A22 IP64 T105°C	●	●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			50.5	
Diameter D [mm]			58	

Ordering Information

RVI58X-.....6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

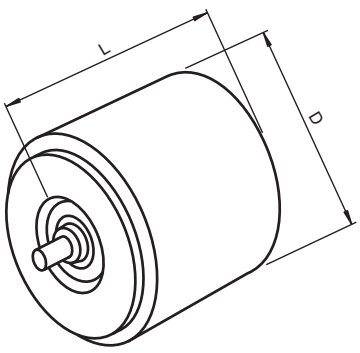
Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

Signal output
6 A + B + 0 and $\bar{A}$ + $\bar{B}$ + $\bar{0}$

Exit position
A axial
R radial

Connection type
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Shaft dimensions/flange version
011 Shaft Ø10 mm x 20 mm with clamping flange
032 Shaft Ø6 mm x 10 mm with servo flange



Example of order:
RVI58X-032K1A66N-02500

Date of issue: 2015-04-08

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Properties

- Ø58 mm housing
- Recessed hollow shaft
- Up to 5000 pulses per revolution

Your Benefit

- ATEX approval for zone 2 and zone 22

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Detection type	photoelectric sampling
Pulse count	max. 5000
Output frequency	max. 200 kHz
Protection degree	DIN EN 60529, IP54
Operating temperature	
Glass disk	-30 ... 60 °C (-22 ... 140 °F) , fixed cable
Plastic disk	-30 ... 60 °C (-22 ... 140 °F) , fixed cable
Material	
Housing	powder coated aluminum
Flange	aluminum
Shaft	Stainless steel
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Angle offset	1 °
Axial offset	max. 1 mm
Connection type	

Model Number		RSI58X-******1	RSI58X-******6	RSI58X-******X
Operating voltage	10 ... 30 V DC	●		●
	5 V DC ± 5 %		●	
Output type	push-pull, incremental	●		
	RS 422, incremental		●	●
Use in the Hazardous Area				
Group, category, type of protection	II 3G Ex nA IIB T4 II 3D Ex tD A22 IP54 T105°C	●	●	●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
Dimensions				
Length L [mm]			44.5	
Diameter D [mm]			58	

Ordering Information

RSI58X-.A.6.N-.....

Pulse numbers
100, 360, 500, 512, 1000, 1024, 1250, 2048, 2500, 3600, 4096, 5000

Output circuit
1 10 V ... 30 V, Push-Pull
6 5 V, RS 422
X 10 V ... 30 V, RS 422

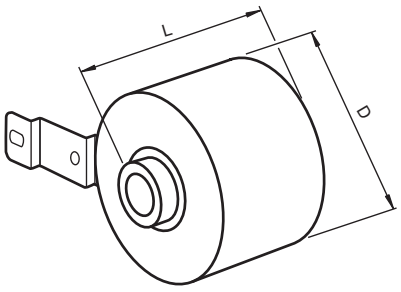
Signal output
6 A + B + 0 and $\overline{A}$ + $\overline{B}$ + $\overline{0}$

Exit position
A axial
R radial

Connection type
K1 Cable Ø7.8 mm, 6 x 2 x 0.14 mm^2, 1 m

Flange version
A Hollow shaft

Shaft dimensions
01 Recessed hollow shaft Ø10 mm x 20 mm
02 Recessed hollow shaft Ø12 mm x 20 mm



Example of order:
RSI58X-01AK1R61N-00512

Date of issue: 2015-04-08



0102

Properties

- Ø70 mm housing
- Solid shaft
- Up to 5000 pulses per revolution

Your Benefit

- ATEX and IECEx approval for zone 1 and zone 21

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	RVI70E
Detection type	photoelectric sampling
Pulse count	max. 5000
Operating voltage	10 V ... 30 V DC or 5 V DC ± 5 %, (see Ordering Information, below)
Output type	push-pull or RS 422, incremental or (see Ordering Information, below)
Output frequency	max. 200 kHz
Protection degree	DIN EN 60529, IP66 DIN EN 60529, IP67
Operating temperature	
Gas Ex-area	-40 ... 70 °C (-40 ... 158 °F)
Dust Ex-area	-40 ... 70 °C (-40 ... 158 °F)
Material	
Housing	anodized aluminum or stainless steel 1.4404 / AISI 316L
Flange	anodized aluminum or stainless steel 1.4404 / AISI 316L
Shaft	Stainless steel 1.4401 / AISI 316
Rotational speed	max. 6000 min $^{-1}$
Shaft load	
Axial	110 N
Radial	150 N
Connection type	

Use in the Hazardous Area	
Group, category, type of protection	II 2G Ex d IIC T6-T4 Gb II 2D Ex tb IIIIC T80°C Db IP6X
EC-Type Examination Certificate	ZELM 14 ATEX 0519 X IECEx ZLM 14.0003X

Dimensions	
Length L [mm]	depending on the version: 78 mm ... 87 mm
Diameter D [mm]	69 mm (euro flange: 115 mm diameter)

Ordering Information

RVI70E-.. .K.. 6TN-....

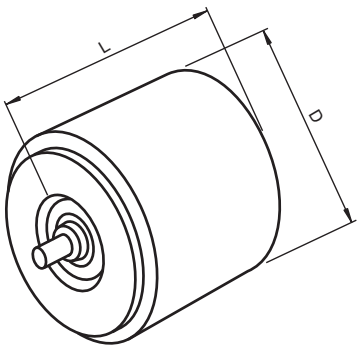
Pulse numbers
100, 125, 250, 360, 500, 512, 600, 1000, 1024, 1500

Signal output
6 $A+B+0$ and $\overline{A}+\overline{B}+\overline{0}$

Exit position
A axial
R radial

Connection type
K0 Cable 1 m
K2 Cable 2 m
K5 Cable 5 m
K10 Cable 10 m

Shaft dimensions/flange versio
01N Shaft Ø10 mm x 20 mm, clamping flange, 3 x M3 and 3 x M4
032 Shaft Ø6 mm x 10 mm, servo flange



Example of order:
RVI70E-01NK5R6TN-0500

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CE

Properties

- Up to 5 m measuring range
- Fits to Ø6 x 10 mm solid shaft encoders with servo flange

Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Scope of delivery	Cable pull , Coupling
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Shock resistance	25 g
Shaft dimensions	6 mm x 10 mm , servo flange
Protection degree	IP65
Housing	anodized aluminium
Rope	Stainless steel 1.4401/316

Model Number		SL02-X1/GS80-200	SL03-X1/GS80-200	SL05-X1/GS130-333
Measuring range	2000 mm	●		
	3000 mm		●	
	5000 mm			●
Drum perimeter	200 mm	●	●	
	333.3 mm			●
Resolution	200 mm / steps per revolution of mounted encoder	●	●	
	333.3 mm / steps per revolution of mounted encoder			●

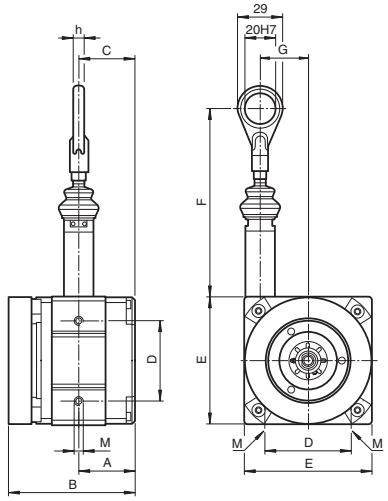
Dimensions				
A	[mm]	34,7	56,4	59,5
B	[mm]	78,2	99,9	106
C	[mm]	34,7	56,4	59,5
D	[mm]	50		80
E	[mm]	80		130
F	[mm]	approx. 115 mm		
G	[mm]	30,5		54
M		M6 x 7		M8 x 8

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

SL-RP/GS80	Guide pulley

Dimensions



Date of issue 04/08/2015



CE

Properties

- Up to 3 m measuring range
- Fits to Ø10 x 20 mm solid shaft encoders with clamping flange

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Drum perimeter	200 mm
Resolution	200 mm / steps per revolution of mounted encoder
Scope of delivery	Cable pull , Coupling
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Shock resistance	25 g
Shaft dimensions	10 mm x 20 mm , clamping flange
Protection degree	IP65
Housing	anodized aluminium
Rope	Stainless steel 1.4401/316

Model Number		SL02-X2/GS80-200	SL03-X2/GS80-200
Measuring range	2000 mm	●	
	3000 mm		●
Dimensions			
A	[mm]	34,7	56,4
B	[mm]	78,2	99,9
C	[mm]	34,7	56,4
D	[mm]	50	
E	[mm]	80	
F	[mm]	approx. 115	
G	[mm]	30,5	
M		M6 x 7	

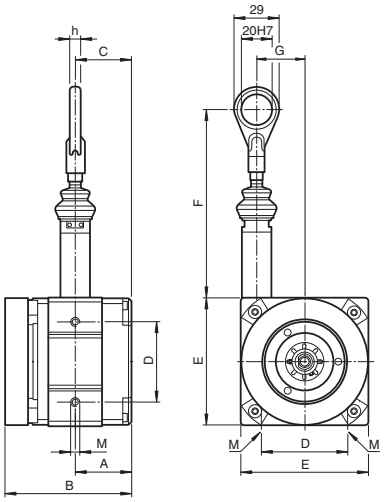
Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

SL-RP/GS80	Guide pulley

Dimensions



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CE

Properties

- **Up to 40 m measuring range**
- **Fits to Ø6 x 10 mm solid shaft encoders with servo flange**

Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

General Data	
Scope of delivery	Cable pull , Coupling
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Shock resistance	25 g
Shaft dimensions	6 mm x 10 mm , servo flange
Protection degree	IP65
Housing	anodized aluminium
Rope	Stainless steel 1.4401/316

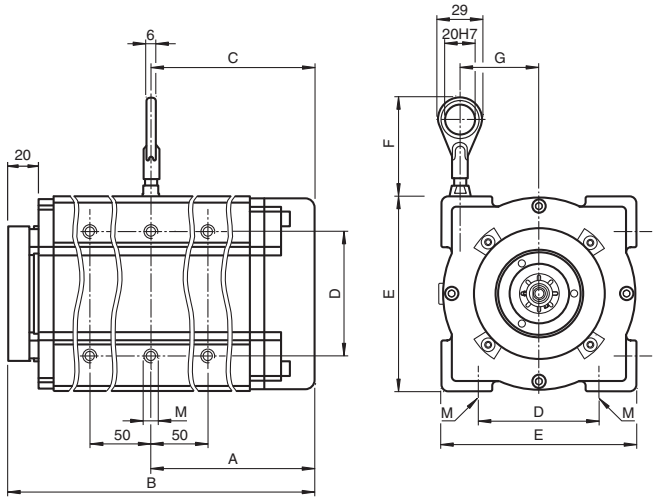
Model Number		SL3001-X1/GS80	SL3002-X1/GS80	SL3003-X1/GS80	SL3005-X1/GS130	SL3010-X1/GS130	SL3015-X1/GS130	SL3020-X1/GS130	SL3025-X1/GS130	SL3030-X1/GS130	SL3040-X1/GS190
Measuring range	[m]	1	2	3	5	10	15	20	25	30	40
Drum perimeter	[mm]	200			334,1						
Resolution	200 mm / steps per revolution of mounted encoder	●	●	●							
	334.1 mm / steps per revolution of mounted encoder				●	●	●	●	●	●	●
Spring housing	PPO/PS				●						
Dimensions											
A	[mm]	34	41.5	60	77.2	99.6	146.2	168.9	215.4	237.9	203
B	[mm]	77	92	118	141.3	186.3	256	301	370	415	366
C	[mm]	34	41.5	60	77.2	99.6	146.2	168.9	215.4	237.9	203
D	[mm]	50			80						140
E	[mm]	80			130						190
F	[mm]	approx. 60									
G	[mm]	31,5			52						79
M		M6 x 7			M8 x 8						M10 x 10

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

SL-RP/GS130/GS190	Guide pulley for cable pulls SL30.../GS130 and SL30.../GS190
SL-RP/GS80	Guide pulley

Dimensions



Date of issue 04/08/2015



Properties

- Up to 25 m measuring range
- Fits to Ø10 x 20 mm solid shaft encoders with clamping flange

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Scope of delivery	Cable pull , Coupling
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Shock resistance	25 g
Shaft dimensions	10 mm x 20 mm , clamping flange
Protection degree	IP65
Housing	anodized aluminium
Rope	Stainless steel 1.4401/316

Model Number		SL3001-X2/GS80	SL3002-X2/GS80	SL3003-X2/GS80	SL3005-X2/GS130	SL3010-X2/GS130	SL3015-X2/GS130	SL3025-X2/GS130
Measuring range	[m]	1	2	3	5	10	15	25
Drum perimeter	[mm]	200			334,1			
Resolution	200 mm / steps per revolution of mounted encoder	●	●	●				
	334.1 mm / steps per revolution of mounted encoder				●	●	●	●
Dimensions								
A	[mm]	34	41.5	60	77.2	99.7	146.2	215.4
B	[mm]	93.8	108.8	134.8	156.1	201.1	270.1	384.1
C	[mm]	34	41.5	60	77.2	99.7	146.2	215.4
D	[mm]	50			80			
E	[mm]	80			130			
F	[mm]	approx. 60						
G	[mm]	31,5			52			
L_F	[mm]	36,8			36,8			
M		M6 x 7			M8 x 8			

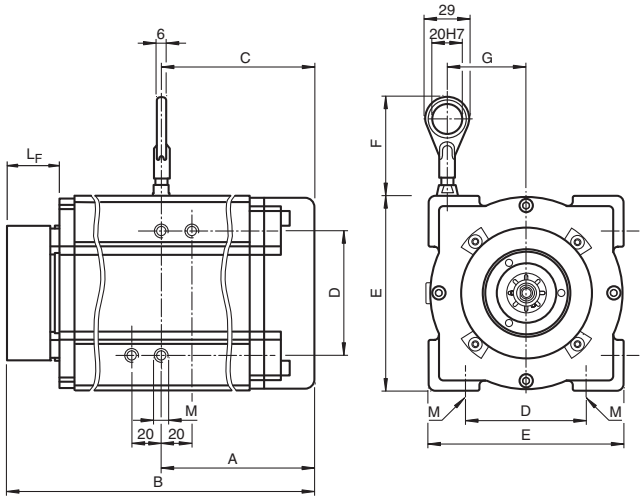
Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

SL-RP/GS130/GS190	Guide pulley for cable pulls SL30.../GS130 and SL30.../GS190
SL-RP/GS80	Guide pulley

Dimensions



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Properties

- Shafts from Ø6 to Ø10 mm
- Anodized aluminium
- Helical coupling

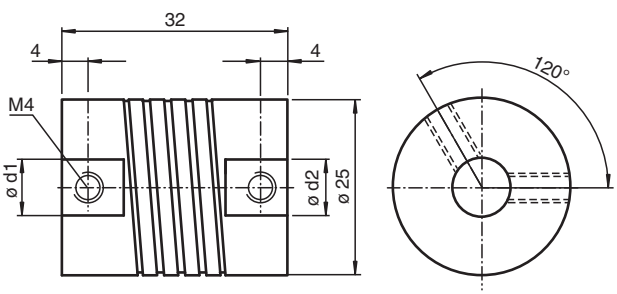
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Material	anodized aluminium
Rotational speed	max. 8000 min $^{-1}$
Max. torque	1 Nm
Radial offset	max. ± 0.3 mm
Axial offset	max. ± 0.5 mm
Angle error	max. ± 4 °
Torsion spring stiffness	18 Nm / rad
Radial spring stiffness	50 N / mm
Moment of inertia	30 kg m^2 x 10^{-7}
Mounting	clamp screws M4 x 6, DIN 916

Model Number		KW-6/6	KW-6/8	KW-6/10	KW-8/8	KW-8/10	KW-10/10
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●					
	d1 = 6 mm , d2 = 8 mm		●				
	d1 = 6 mm , d2 = 10 mm			●			
	d1 = 8 mm , d2 = 8 mm				●		
	d1 = 8 mm , d2 = 10 mm					●	
	d1 = 10 mm , d2 = 10 mm						●

Dimensions



Date of issue 04/08/2015



Properties

- Shafts from Ø6 to Ø12 mm
- Spring steel, nickel plated
- Spring steel coupling

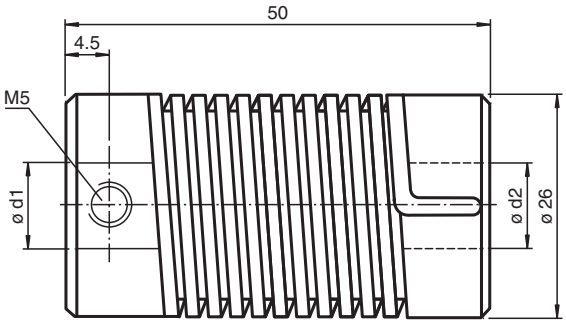
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Spring	spring steel, nickel plated
End piece	Diecast zinc
Rotational speed	max. 3000 min
Max. torque	1.5 Nm
Radial offset	max. ± 1.5 mm
Axial offset	max. ± 1 mm
Angle error	max. ± 5 °
Torsion angle	at torque 0.75 Nm drive shaft view
CW rotation direction	40 °
CCW rotation direction	60 °
Moment of inertia	95 kg m^2 x 10^{-7}
Mounting	clamp screws M5 x 6, DIN 916

Model Number		9401 6*6	9401 6*10	9401 8*8	9401 8*10	9401 10*10	9401 10*12	9401 12*12
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●						
	d1 = 6 mm , d2 = 10 mm		●					
	d1 = 8 mm , d2 = 8 mm			●				
	d1 = 8 mm , d2 = 10 mm				●			
	d1 = 10 mm , d2 = 10 mm					●		
	d1 = 10 mm , d2 = 12 mm						●	
	d1 = 12 mm , d2 = 12 mm							●

Dimensions



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Properties

- Shafts from Ø6 to Ø8 mm
- Spring steel, nickel plated
- Spring steel coupling

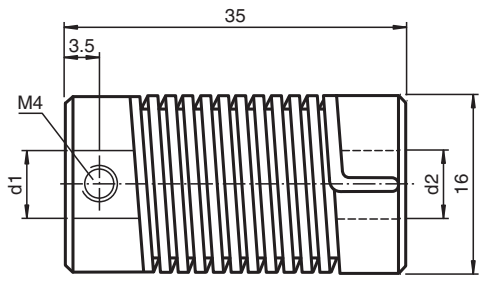
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Spring	spring steel, nickel plated
End piece	Diecast zinc
Rotational speed	max. 3000 min
Max. torque	0.5 Nm
Radial offset	max. ± 1 mm
Axial offset	max. ± 1 mm
Angle error	max. ± 5 °
Torsion angle	at torque 0.25 Nm drive shaft view
CW rotation direction	50 °
CCW rotation direction	70 °
Moment of inertia	10 kg m^2 x 10^{-7}
Mounting	clamp screws M4 x 4, DIN 916

Model Number		9402 6*6	9402 8*8
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●	
	d1 = 8 mm , d2 = 8 mm		●

Dimensions



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Technical Data

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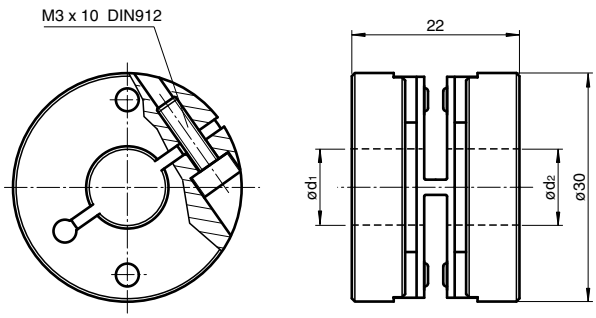
General Data	
Flange	aluminum
Spring washers	plastic
Rotational speed	max. 12000 min $^{-1}$
Max. torque	0.6 Nm
Radial offset	max. ± 0.3 mm
Axial offset	max. ± 0.4 mm
Angle error	max. ± 2.5 °
Torsional rigidity	50 Nm / rad
Mounting	clamping flange

Model Number		9404 6*6	9404 10*10	9404 12*12
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●		
	d1 = 10 mm , d2 = 10 mm		●	
	d1 = 12 mm , d2 = 12 mm			●

Properties

- Shafts from Ø6 to Ø12 mm
- Aluminium
- Spring disk coupling

Dimensions



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Properties

- Shafts from Ø6 to Ø12 mm
- Brass, nickel plated
- Bellows coupling

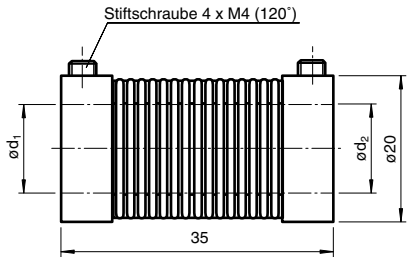
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Material	CuZn20, nickel-plated
Rotational speed	max. 8000 min $^{-1}$
Max. torque	0.8 Nm
Radial offset	max. ± 0.3 mm
Axial offset	max. ± 0.5 mm
Angle error	max. ± 4 °
Moment of inertia	22 kg m^2 x 10^{-7}
Mounting	clamp screws

Model Number		9409 6*6	9409 6*8	9409 6*10	9409 8*8	9409 10*10	9409 12*12
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●					
	d1 = 6 mm , d2 = 8 mm		●				
	d1 = 6 mm , d2 = 10 mm			●			
	d1 = 8 mm , d2 = 8 mm				●		
	d1 = 10 mm , d2 = 10 mm					●	
	d1 = 12 mm , d2 = 12 mm						●

Dimensions



Date of issue 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

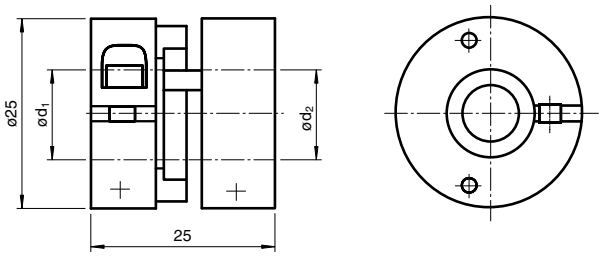
General Data	
Material	Delrin 107, AlMgSi1, hard coated
Rotational speed	max. 15000 min $^{-1}$
Max. torque	1 Nm
Radial offset	max. ± 0.5 mm
Axial offset	max. ± 0.3 mm
Angle error	max. ± 1.5 °
Torsional rigidity	50 Nm / rad
Moment of inertia	20 kg m^2 x 10^{-7}
Mounting	clamping flange

Model Number		9410 6*6	9410 10*10	9410 12*12
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●		
	d1 = 10 mm , d2 = 10 mm		●	
	d1 = 12 mm , d2 = 12 mm			●

Properties

- **Shafts from Ø6 to Ø12 mm**
- **Aluminium, hard coated, electrically isolated**
- **Precission coupling**

Dimensions



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

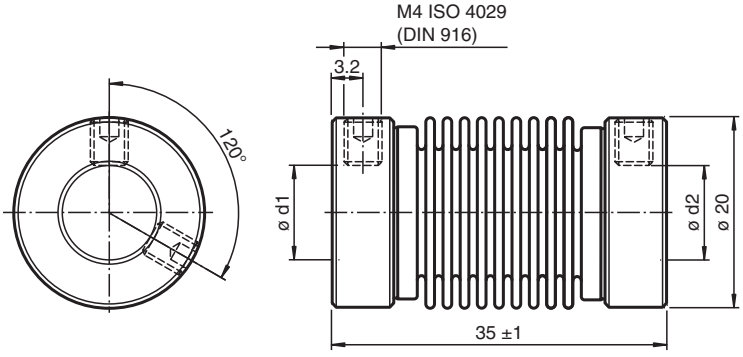
General Data	
Material	Stainless steel 1.4305 / AISI 303
Rotational speed	max. 10000 min
Max. torque	0.8 Nm
Radial offset	max. ± 0.3 mm
Axial offset	max. ± 0.5 mm
Angle error	max. ± 4 °
Torsion spring stiffness	140 Nm / rad
Radial spring stiffness	10 N / mm
Moment of inertia	18.81 kg m^2 x 10^{-7}
Mounting	clamp screws , M4 DIN 916

Model Number		9460 6*6	9460 10*10	9460 12*12
Shaft diameter	d1 = 6 mm , d2 = 6 mm	●		
	d1 = 10 mm , d2 = 10 mm		●	
	d1 = 12 mm , d2 = 12 mm			●

Properties

- **Shafts from Ø6 to Ø12 mm**
- **Stainless steel**
- **Bellows coupling**

Dimensions



Date of issue 04/08/2015

9109 series



Model Number		9101, 8	9101, 10	9101, 12
Surface	plastic Hytrel 4056	●	●	●
Diameter	D = 159 mm	●	●	●
Circumference	500 mm	●	●	●
Width	B = 25 mm	●	●	●
Shaft diameter	d = 8 mm	●		
	d = 10 mm		●	
	d = 12 mm			●

Properties

- Plastic coating
- 500 mm circumference

9102 series



Model Number		9102, 8	9102, 10	9102, 12
Surface	pimpled rubber Nitril (NBR)-Blend	●	●	●
Diameter	D = 159 mm	●	●	●
Circumference	500 mm	●	●	●
Width	B = 25 mm	●	●	●
Shaft diameter	d = 8 mm	●		
	d = 10 mm		●	
	d = 12 mm			●

Properties

- Pimpled rubber coating
- 500 mm circumference

9103 series

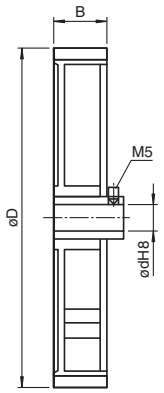


Model Number		9103, 8	9103, 10	9103, 12
Surface	knurled aluminum	●	●	●
Diameter	D = 159 mm	●	●	●
Circumference	500 mm	●	●	●
Width	B = 25 mm	●	●	●
Shaft diameter	d = 8 mm	●		
	d = 10 mm		●	
	d = 12 mm			●

Properties

- Knurled aluminium
- 500 mm circumference

Dimensions



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9108 series



Model Number		9108, 6	9108, 8	9108, 10
Surface	plastic Hytrel 4056	●	●	●
Diameter	D = 63.7 mm	●	●	●
Circumference	200 mm	●	●	●
Width	B = 12 mm	●	●	●
Shaft diameter	d = 6 mm	●		
	d = 8 mm		●	
	d = 10 mm			●

Properties

- Plastic coating
- 200 mm circumference

9109 series



Model Number		9109, 6	9109, 8	9109, 10
Surface	pimpled rubber Nitril (NBR)-Blend	●	●	●
Diameter	D = 63.7 mm	●	●	●
Circumference	200 mm	●	●	●
Width	B = 12 mm	●	●	●
Shaft diameter	d = 6 mm	●		
	d = 8 mm		●	
	d = 10 mm			●

Properties

- Pimpled rubber coating
- 200 mm circumference

9110 series

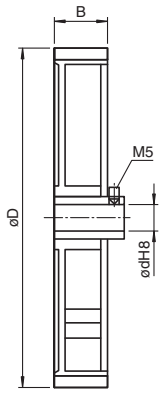


Model Number		9110, 6	9110, 8	9110, 10
Surface	knurled aluminum	●	●	●
Diameter	D = 63.7 mm	●	●	●
Circumference	200 mm	●	●	●
Width	B = 12 mm	●	●	●
Shaft diameter	d = 6 mm	●		
	d = 8 mm		●	
	d = 10 mm			●

Properties

- Knurled aluminium
- 500 mm circumference

Dimensions



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9112 series



Model Number		9112, 8	9112, 10	9112, 12
Surface	knurled plastic Hytrel 4056	●	●	●
Diameter	D = 159 mm	●	●	●
Circumference	500 mm	●	●	●
Width	B = 25 mm	●	●	●
Shaft diameter	d = 8 mm	●		
	d = 10 mm		●	
	d = 12 mm			●

Properties

- Knurled plastic
- 500 mm circumference

9113 series

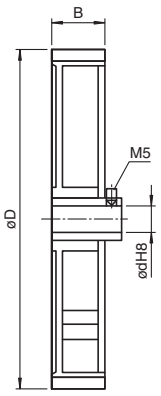


Model Number		9113, 6	9113, 8	9113, 10
Surface	knurled plastic Hytrel 4056	●	●	●
Diameter	D = 63.7 mm	●	●	●
Circumference	200 mm	●	●	●
Width	B = 12 mm	●	●	●
Shaft diameter	d = 6 mm	●		
	d = 8 mm		●	
	d = 10 mm			●

Properties

- Knurled plastic
- 200 mm circumference

Dimensions



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Model number



9416
Cable connector

General specifications	
Type	Cable connector
Number of pins	12-pin round connection (Binder, Series 423)
Construction type	straight, clockwise rotation
Standard conformity	
Protection degree	IP68

Model number



9416L
Cable connector

General specifications	
Type	Cable connector
Number of pins	12-pin round connection (Binder, Series 423)
Construction type	straight, counter clockwise rotation
Standard conformity	
Protection degree	IP68

Model number



9420
Cable connector

General specifications	
Type	Cable connector
Number of pins	16-pin
Construction type	straight
Standard conformity	
Protection degree	IP68

Model number



9424
Cable connector

General specifications	
Type	Cable connector
Number of pins	19-pin
Construction type	straight
Standard conformity	
Protection degree	IP68

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Model number



9426
Cable connector

General specifications	
Type	Cable connector
Number of pins	26-pin
Construction type	straight
Standard conformity	
Protection degree	IP67

Model number



Connection covers with M12 connectors

AH 58-B1CA-2BW	CANopen connection cover with 2 M12 connectors
AH 58-B1DA-2BW	DeviceNet connection cover with 2 M12 connectors
AH 58-B1DP-3BW	Profibus connection cover with 3 M12 connectors

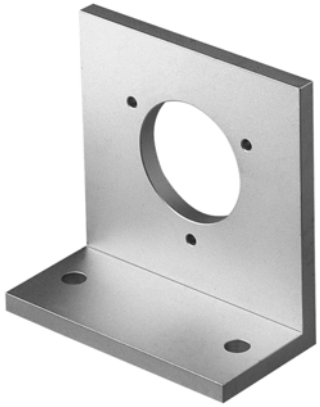
Model number



9301
Angled flange

General specifications	
Suitable for	Series 30 encoders
Mechanical specifications	
Material	aluminum

Model number



9203
Angled flange

General specifications	
Suitable for	Series 10 and series 58 encoders
Material	Aluminium

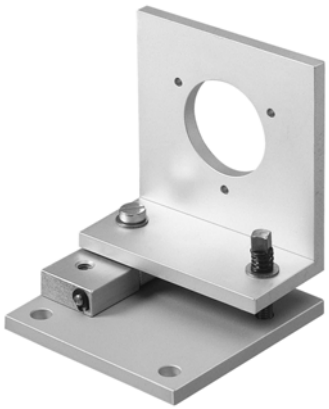
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Model number



9213
Mounting bracket, spring-loaded for clamping flange

General specifications	
Suitable for	Series 10 and series 58 encoders
Ambient conditions	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Mechanical specifications	
Material	aluminum

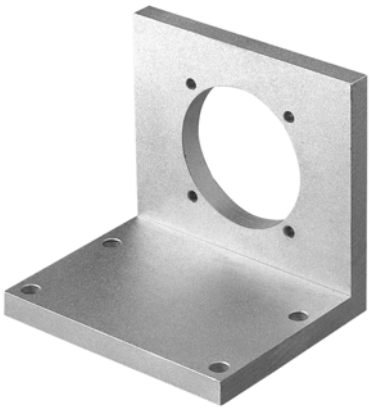
Model number



9250
Angled flange

General specifications	
Suitable for	Series RVI50 encoders
Mechanical specifications	
Material	aluminum

Model number



9278
Angled flange

General specifications	
Suitable for	Series RVI78 encoders
Mechanical specifications	
Material	aluminum

Model number



9300
Mounting bracket for servo flange

General specifications	
Suitable for	Series 10 and series 58 encoders
Mechanical specifications	
Material	plastic

Date of issue: 2015-04-08

Model number



9311

Mounting set

General information	
Suitable for	9300 mounting bracket
Scope of delivery	3 screws 3 nuts 3 Synchro clamping element 9310-3

Model number



9310-3

Synchro clamping element

General information	
Suitable for	Series 10 and series 58 encoders
Scope of delivery	3 item(s)

Model number



9312-3

Synchro clamping element

General information	
Suitable for	RVI50, RVI78, RVI84 and TRD-G encoders
Scope of delivery	3 item(s)

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Model number



SL-RP/GS80
Guide pulley

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-40 ... 80 °C (-40 ... 176 °F)
Mechanical specifications	
Material	ABS, anthracite
Mass	100 g

Model number



SL-RP/GS130/GS190
Guide pulley for cable pulls SL30.../GS130 and SL30.../GS190

Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-40 ... 80 °C (-40 ... 176 °F)
Mechanical specifications	
Material	ABS, anthracite
Mass	100 g

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

	Safe Speed Monitor
Rated operational voltage	20 ... 30 V DC, PELV at AUX
Rated operational current	≤ 350 mA / ≤ 4 A off AUX
Interface 1	
Interface type	Chip card slot
Interface 2	
Interface type	Micro USB
Input	
Number/Type	2 inputs for incremental rotary encoders AMP mini-IO connector
Output	
Number/Type	Output circuits 1 and 2 max. contact rating: 700 m A_{DC-13} at 24 V
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Housing	PA 66-FR
Mounting	DIN rail
Connection	removable terminals
Scope of delivery	1 AS-Interface safety module VAS/M-2A8L-KE4-8SE-C1 1 AS-Interface safety module VBA-2E-KE4-ENC-S
Dimensions	
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL e
Mission Time (T_M)	20 a
PFH_d	7.85 E-9
Dimensions	
Length L [mm]	113
Width W [mm]	45
Height H [mm]	99

Properties

- **Applicable up to SIL 3 / PLe**
- **Connection of 2 safety incremental encoders**
- **DIN rail mounting**
- **Terminal version**

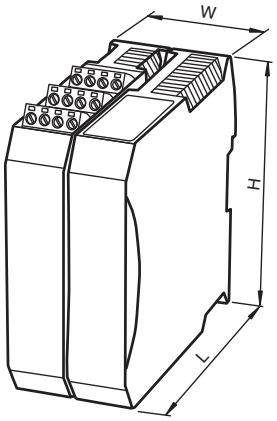
Your Benefit

- **Monitors safe stadstill, safe speed and safe direction of rotation**
- **Fulfills safety requirements up to SIL 3 / PLe with a single safety encoder per axis**
- **User friendly configuration by PC software**
- **Expandable up to 40 axes**

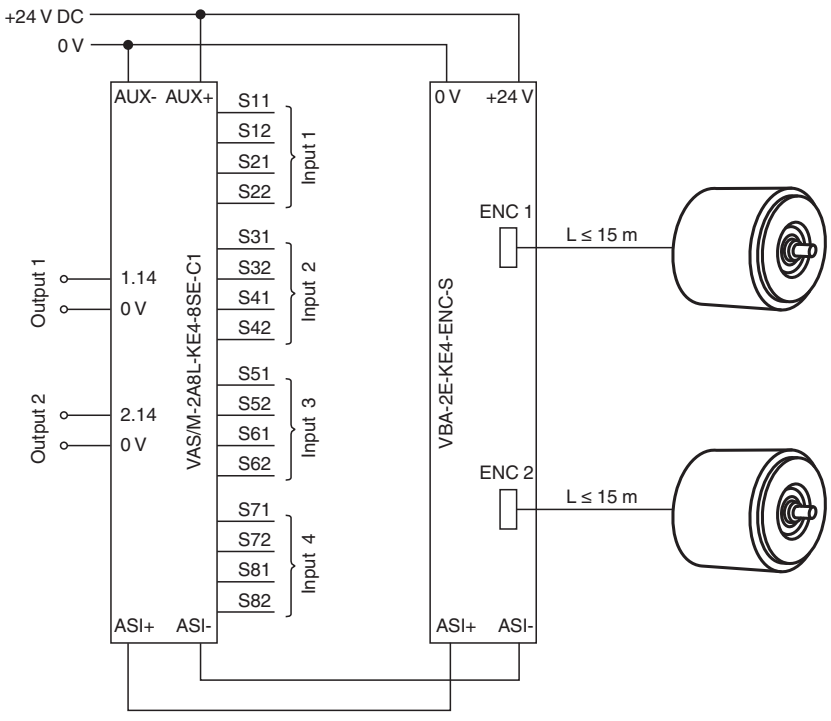
Description
The speed monitor from Pepperl+Fuchs fulfills all safety requirements up to SIL3 /PLe and allows the implementation of safety functions while keeping conventional drive technology. An additional failsafe PLC, other safety relays, or a second sensor are not required.
The system has a modular design. The simplest version consists of a compact safety control, a speed monitor module, and a safe sine/cosine rotary encoder. The functions "safe stop" and "safe speed" for monitoring the drive shaft(s) are available via two safe outputs. Previous knowledge of PLC programming is not required because parameterization is intuitive. Configurations stored on a memory card allow the user to change programs or transfer data to other hardware in the blink of an eye, for example, when replacing defective components. The speed monitor can even be linked to a higher-level fieldbus such as PROFINET or PROFIBUS-DP, etc., using gateways if required. The monitor is equipped with four safe inputs and can be upgraded to a maximum of 40 axes. The monitor for a second axis is already integrated in the basic device.

Accessories

RVS58S-282YYR4ZN-01024	Safety incremental encoder
VAZ-SW-SIMON+	Software for configuration of K30 Master Monitors/K31 Safety Monitors
VAZ-ENC-1,5M-PVC	Connection cable for connecting encoders to a speed monitor

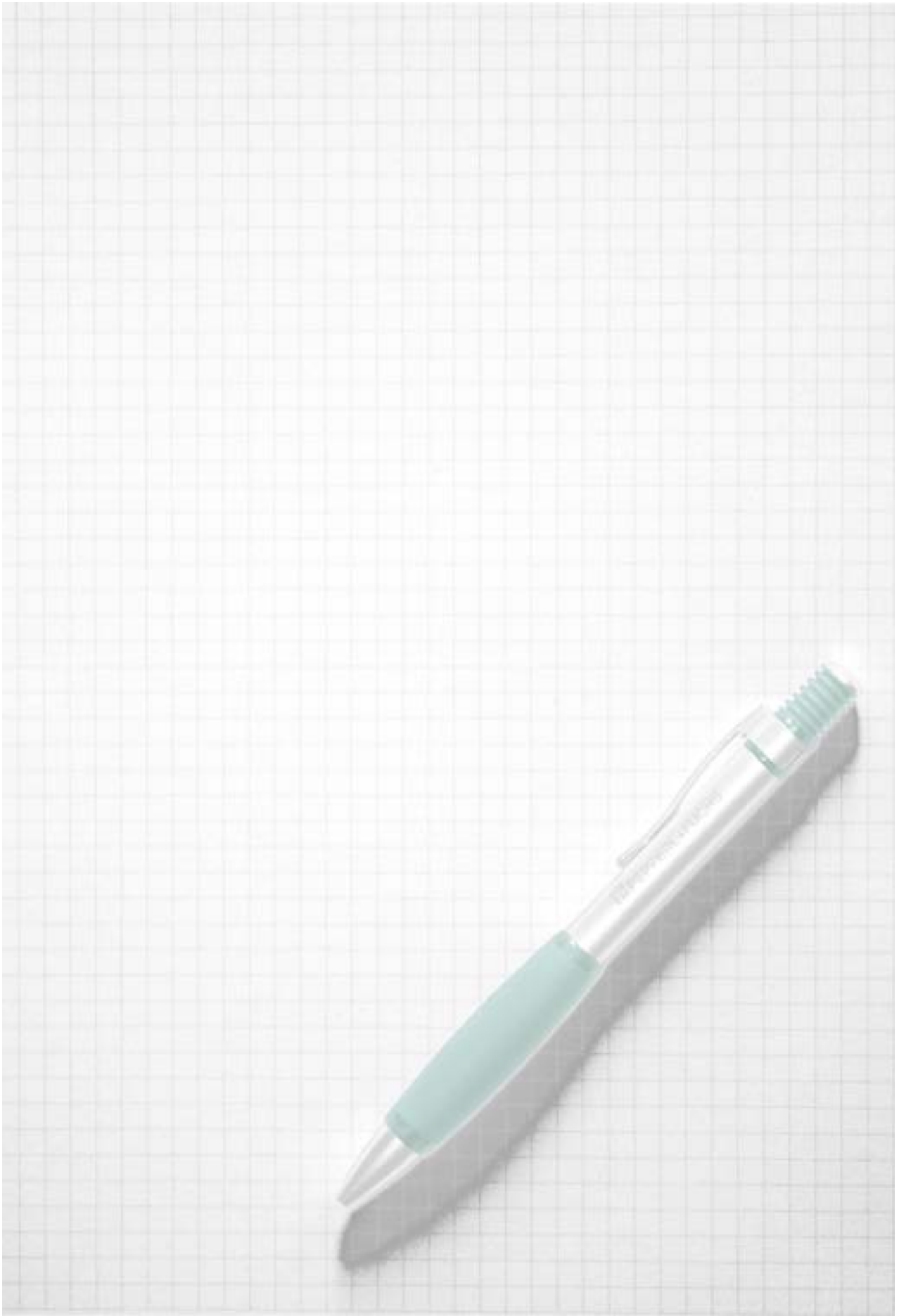


Electrical connection



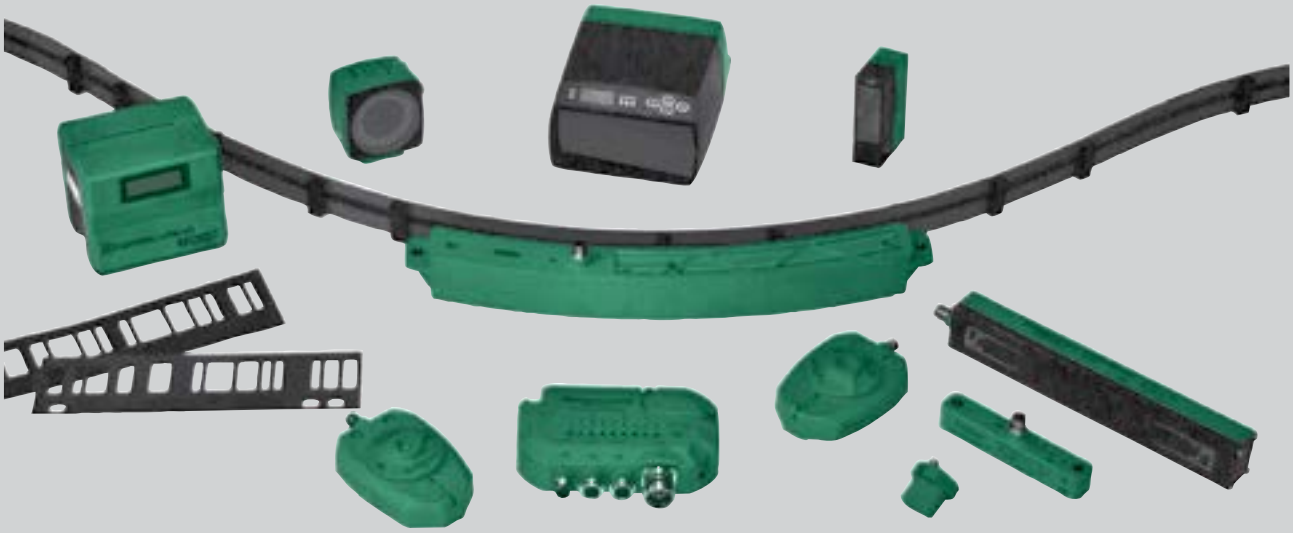
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Positioning Systems



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5. Positioning systems

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5.5 Electronic Cam-Operated Switch Group PAX 812

5.6 Accessories 814

Inductive Positioning systems



Series	F112	F90	F110	F130
	Page 768 ff	Page 770 ff	Page 772	Page 773 ff
	• Programmable measuring range	• Programmable trip points	• Analog output • Long measuring distances	• Programmable switch points and measuring ranges • Programmable zero point
Specifications				
Measuring distance	14 mm	up to 120 mm	up to 810 mm	
Measurement angle				360°
Resolution	33 µm	125 µm	210 µm	0.2°
Repeatability	0.05 mm	0.1 mm	< 0.5 mm	0.25°
Target	Actuator made from construction steel	Actuator made from construction steel	Actuator made from construction steel	Actuator made from construction steel
Operating voltage	18 VDC ... 30 VDC	18 VDC ... 30 VDC	18 VDC ... 30 VDC	18 VDC ... 30 VDC
Interface				
Analog output	●	●	●	●
Switch output	●	●		●
IO-Link	●			
RS485				
RS422				
SSI				
PROFIBUS				

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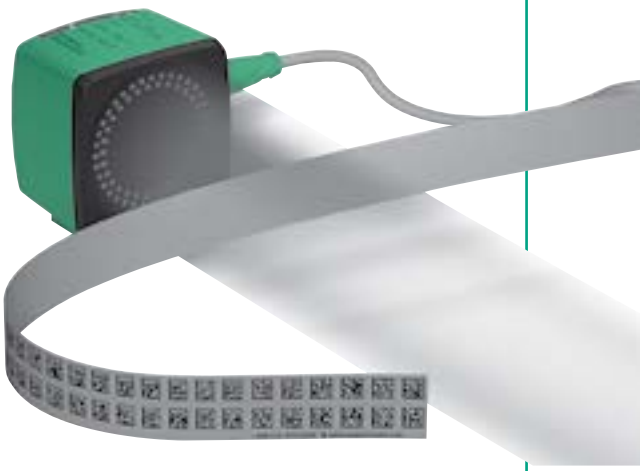






Laser Distance Measurement Devices

	VDM18	VDM28	VDM70	VDM100	Series
	Page 776	Page 777 ff	Page 780 ff	Page 782 ff	
	• Miniature housing design • Master-slave operation • Very fast response time	• Pulse Ranging Technology measurement method • Precise, clear, and reproducible measurement results	• Pulse Ranging Technology measurement method • Integrated pilot laser for simple alignment	• Pulse Ranging Technology measurement method • Dynamic control • Extremely fast measured value acquisition • Alignment laser	
					Specifications
	up to 300 mm	up to 15 m/50 m	10 mm/250 m	up to 300 m	**Measuring distance**
					Measurement angle
	< 0.1 %	1 mm	0.1 mm	0.1 mm	**Resolution**
		< 5 mm	4 mm/2 mm	< 0.5 mm	**Repeatability**
	< 0.25 %	25 mm	12 mm/8 mm	2.5 mm	**Absolute accuracy**
	Object	Object/reflector	Object/reflector	Reflector	**Target**
	18 VDC ... 30 VDC	10 VDC ... 30 VDC	18 VDC ... 30 VDC	18 VDC ... 30 VDC	**Operating voltage**
					Interface
	●	●	●		**Analog output**
	●	●	●		**Switch output**
		●			**IO-Link**
	●				**RS485**
			●		**RS422**
			●	●	**SSI**
				●	**PROFIBUS**

WCS position encoding system **PCV Data Matrix positioning system**		
Series	**WCS**	**PCV**
	Page 784 ff	Page 802 ff
	• Noncontact absolute position • Automatic contamination detection • Position and speed outputs • Code reel made from plastic or stainless steel • Interface modules for all common field buses and networks	• Noncontact positioning on Data Matrix code reel • Travel ranges up to 10 km, in X and Y direction • Mechanical robustness: no wear, long service life, maintenance-free • High resolution and precise positioning, especially for systems with curves, track switches, and inclines
Specifications		
Measuring distance	max. 327 m	max. 10,000 m
Measurement angle		
Resolution	0.4 mm	0.1 mm
Speed/ rotational speed	max. 12.5 m/s	max. 12.5 m/s
Detection type	Optical	Optical
Target	Code rail	Code reel
Operating voltage	10 VDC ... 30 VDC	15 VDC ... 30 VDC
Interface		
Switching outputs		
Analog outputs		
USB 2.0		
RS485	●	●
SSI	●	●
CANopen	●	
PROFIBUS		●
Profinet		●

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PAX electronic cam-operated switch group

PAX	**Series**
Page 812 ff	

- Arbitrary positioning
- Easy installation
- Simple operating software
- Robust and insensitive to environmental influences
- Suitable for use in the field

Specifications

	Measuring distance
360° (max. 200 revolutions)	**Measurement angle**
0.2 °	**Resolution**
max. 100 rpm	**Speed/ rotational speed**
Inductive	**Detection type**
Actuator made from construction steel (BT-F130)	**Target**
20 VDC ... 30 VDC	**Operating voltage**

Interface

●	**Switching outputs**
●	**Analog outputs**
●	**USB 2.0**
	RS485
	SSI
	CANopen
	PROFIBUS
	Profinet

PMI Inductive Analog Measuring Systems

From switch to positioning measuring technology

The sensors used in inductive positioning measuring technology (PMI) are a further development of the traditional inductive proximity switch. By arranging several coils next to each other, a processor can be used to calculate the exact position of a metallic actuator. Based on this measurement, the sensor provides the result as an output signal that is proportional to the path or angle.

In addition to the analog current signal (4 mA ... 20 mA) or voltage signal (0 V ... 10 V), PMI sensors often also offer binary switching element functions. This enables limit switch positions to be implemented in addition to the measured path information.

Special technical features:

Noncontact path and angle positioning

The inductive functional principle of these sensors enables contact-free position measurement. This measuring technique operates entirely without wear and provides reliable position and switching signals even in the most extreme ambient conditions.

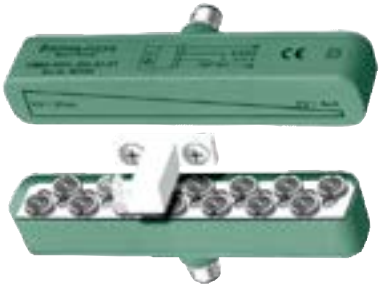
Simple steel actuator

PMI sensors react to a simple steel actuator. The actuating element can therefore be designed as a part of the machine module or the machine bed.

Three-in-one – combined measuring and switching element functions

The combination of measuring and switching element functions can replace up to three standard sensors. For comprehensive hub valve control, in addition to the continuous determination of the current opening state, both end stop positions valve OPEN and valve CLOSED can be fed back separately.

Functional description of inductive positioning sensors

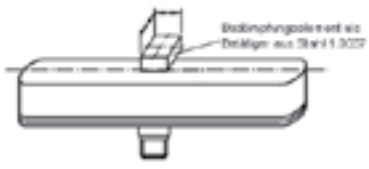


In PMI technology, multiple coils are positioned in two rows on a coil carrier. If an actuator passes over the coil arrangement, this results in a path-dependent attenuation pattern over the coils. The attenuation level for adjacent coils is compared in order to determine the exact position of the actuator.

Actuators are offered as original accessories, however, an actuator can be produced as part of a machine module. In order to achieve the specified performance data, certain mechanical dimensions and mounting conditions must be adhered to when reproducing the actuator.

Material and dimensions of the actuator

Actuators for PMI sensors are made out of mild steel. Construction steel 1.0037 (formerly ST37) is used as the reference material. When using other materials, you must take into account that the sensor will not provide the specified measurement accuracy. To provide protection against corrosion, the actuator's surface can be burnished, varnished, or galvanized.

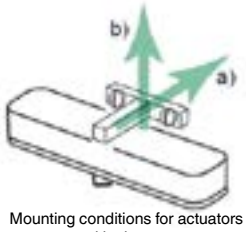


The actuator must present a coplanar surface with two non-rounded edges to the measuring surface of the sensor. The required width of the actuator is 8 mm or 13 mm depending on the sensor type. The actuator must be long enough to completely overlap the active sensor area. The type-related detailed dimensions are included in the corresponding data sheet.

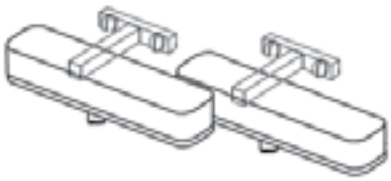
Mounting conditions

The sensor and actuator together make up the positioning system. To ensure proper performance with the corresponding measurement accuracy, the actuator must neither leave the detection range [a] of the sensor, nor exceed the type-specific distance [b]. The type-related mounting conditions are included in the corresponding data sheet.

Inductive positioning systems can be flush-mounted on a machine element. They can be mounted side-by-side or end to end. To avoid crosstalk between the sensors, either two different actuators or one actuator with an insulation layer [B] are to be used between the sensors. The detailed dimensions for reproducing the actuator are included in the corresponding data sheet.

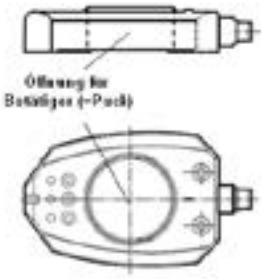


Mounting conditions for actuators on positioning sensors

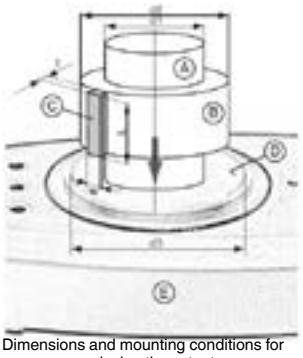


Side-by-side arrangement, cascading of positioning sensors

Inductive positioning systems



Outline of angular positioning system with central opening for the actuator



Dimensions and mounting conditions for reproducing the actuator

PMI-F90

The PMI-F90 inductive positioning system is available in three different measured lengths of 80 mm, 104 mm, and 120 mm. In addition to the positioning types with analog signal output designed solely for positioning, types are also available with combined analog interface and binary switching element functions.

PMI-F110

For longer measuring ranges, the PMI-F110 types are available in five different measured lengths from 210 mm to 960 mm. The sensors in the F110 Series provide an analog output signal that is either 0 V ... 10 V or 4 mA ... 20 mA. They can be mounted flexibly in the machine bed using steplessly adjustable t-slides.

PMI-F112

The PMI-F112 Series offers a measuring range of up to 14 mm and has a compact housing design. The analog voltage signal (0 V ... 10 V) is continuously adjustable between 7 mm and 14 mm on the measuring range. In addition to the standard type with analog interface, a configurable version is available with an IO-Link interface.

Inductive angular positioning system

PMI-F130

The angle-measuring PMI-F130 types are constructed similarly to the linear positioning sensors. The metallic actuator is integrated in a puck as an accessory that can be mounted onto a rotating drive shaft. The air gap between the sensor and the puck enables wear-free pick-up of the rotation angle.

The PMI-F130 Series includes three different function types. In its basic function, the sensor feeds back the measured rotation angle as an analog current signal (4 mA ... 20 mA) or a voltage signal (0 V ... 10 V). The desired rotation angle range can be scaled for the output range. Similarly to the PMI-F90 positioning sensor, the F130 is also available as an angular sensor with two configurable switching window functions. A further type is also available with three separately configurable switching window functions. This version can be used as an electronic cam-operated switch.

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
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VDM Laser Distance Measurement Device

Even the smallest model, the VDM18, is an exceptional solution for a wide range of measuring and positioning tasks. It works with laser background/foreground suppression and offers an analog output. All other sensors in the VDM Series use Pulse Ranging Technology (PRT) and have long detection ranges, offering completely reliable measurement results. Through the use of intense impulses of laser light, PRT offers a high level of reliability even in extreme ambient conditions with excessive light and dust.

Equipped with analog outputs and/or a maximum of two switching outputs, the sensors are used for presence checking, threshold monitoring, the positioning of industrial trucks, measuring distances on monorail conveyors, manufacturing systems, cranes and gantries, for stack height control, dip monitoring, and much more.

VDM18, Laser background/foreground suppression for short distances



The VDM18 is based upon the principle of laser background/foreground suppression and has measuring ranges of 30 mm ... 100 mm and 80 mm ... 300 mm. The VDM18 not only offers a space-saving housing style but also optimal measurement accuracy. Its analog output can be scaled to any measurement distance in the measuring range. Furthermore, it is fully equipped with two configurable switching outputs and is available with an RS485 interface option.

VDM28, Sensing by ranging



The VDM28 is a universal measuring and monitoring device. It can be used in a wide range of industries and applications. With its PRT-based measurement principle, it is used where sensors with background suppression have reached their limitations. The VDM28 has a small, extremely visible red light spot and always provides accurate, reliable, clear, and reproducible results, regardless of ambient conditions such as surface texture, dark color, or ambient light. Thanks to the Teach-in option or the IO-Link interface for service and process data, the VDM28 is flexible for your application.

VDM70, Distance measurement to reflector or object



The VDM70 quickly and precisely determines the distance to a reflector (VDM70-250-R version) or to any object (VDM70-10-L version) down to the millimeter. The measured values are available via integrated digital interfaces. The VDM70 operates according to the principle of Pulse Ranging Technology (PRT).

The VDM70-250-R is ideal for positioning transfer cars, cranes, stock feeders as well as use in small-parts and high-bay warehouses.

The VDM70-10-L is suitable for use in many automation technology applications that require parts to be detected or measured over long distances.

VDM100, Further than the eye can see



The VDM100 works with perfect vision up to 300 m. It achieves a measuring frequency of 1000 measurements per second using light pulses in the range of nanoseconds.

Using noncontact technology that is completely eye-safe, this modern and robust device is used for fast and accurate positioning tasks on stock feeders, moving carriages, and gantry cranes. The Pulse Ranging Technology (PRT) measuring method certainly demonstrates its strengths in this area, even at travel speeds of up to 15 m/s.

The VDM100 is the perfect enhancement to the LS611 optical data coupler that is already popular on the market–together these form a strong duo to fulfill your requirements for a flexible and scalable solution for automation activities.

Distance Measurement using PRT (Pulse Ranging Technology)



A wide range of sensors with different measuring methods are available for measuring distances. However, many measuring procedures are inadequate because the ambient conditions, the object to be measured, or simply the distance are not "standard."

Incorrect or inaccurate measurement results are often the result of indirect measuring methods. Examples of where this might occur include reflective or dark objects, excessive ambient light, several objects in a beam, or the use of several sensors in one application.

Cause

Using indirect measuring methods, phase correlation, or chip-based processes generates only weak emitted light levels signals. These technologies do not offer long-term solutions to problems.

What is PRT?

PRT is an abbreviation for Pulse Ranging Technology–a direct measuring method for distance measurement. It is the most precise industry-grade distance measuring method.

PRT operating principles

In this most advanced of all optical measuring methods, a laser diode emits short light pulses that are reflected from the target and then recaptured by a light-sensitive receiver element. The power of a single pulse is up to one thousand times more intense than with sensors that permanently emit light beams. The exact distance(s) from the target is calculated using the measured signal travel time and the speed of light (c).

In modern sensors, this procedure is repeated up to 250,000 times per second.

The benefits of PRT

The benefits of Pulse Ranging Technology (PRT) lie in its direct measuring method, which achieves accurate, reliable, and clear measurements with repeat accuracy and short response times. Only sensors with PRT always achieve accurate, reliable, clear, and repeatable results regardless of ambient and object conditions such as surface texture, dark color, or extraneous light.

Benefit from the advantages of PRT!

- *Accuracy*
- *Immunity*
- *Unambiguity*
- *Target independence*
- *Farsightedness*

Optical Position Encoding Systems WCS and PCV

Position encoding system WCS

The automation of material handling systems requires information about the moving vehicle or forklift truck that is accurate to the millimeter. The position encoding system WCS by Pepperl+Fuchs provides the operator with a reliable and proven positioning system. The WCS combines two important characteristics: noncontact technology and absolute positioning. You need just two components for positioning within your application–the read head and the code rail.

The read head

The U-shaped read head is used for noncontact optical scanning of the code rail. This enables the position encoding system to detect a new position value every 0.8 mm. Position values are determined regardless of temperature fluctuations and in real time, even at high travel speeds. The read heads have an internal light intensity regulation function. This allows the position value to be determined accurately even in harsh ambient conditions.

The mounting base is a special mechanical head support that enables the read head to be installed quickly. No adjustments are necessary.

The data is transferred directly from the read head to the control unit via a serial RS485, SSI, or CANopen interface. A wide range of interface modules are available for connecting to bus systems, such as PROFIBUS DP, PROFINET RT, MODBUS/RTU, DeviceNet, or Interbus S.

The code rail

The code rail–which carries absolute path information–is positioned parallel to the travel path and assigns a clear and exactly reproducible position at each point of the travel path. In addition to branches and curves, it is also possible to install the code rail only where positioning is required. Bracketry is available for quickly mounting the code rail, which is supplied in stainless steel or laminated plastic.



Intelligence on rails: precise, flexible, noncontact, and absolute position feedback!

Outstanding features ...

- *Absolute measuring type*
- *No reference points*
- *Variable path lengths up to 325 m*
- *Noncontact*
- *Resolution = 0.8 mm*
- *Suitable for curved paths*
- *Protected against power failure*
- *Speed up to 12 m/s*
- *Easy to maintain*

... proven in many applications

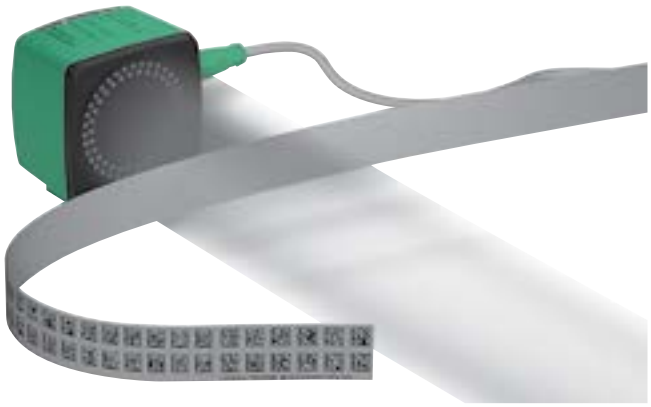
- *Automatic cranes*
- *Elevators*
- *Moving vehicles*
- *Rotating cranes*
- *Lifters*
- *Monorail conveyors*
- *Stock feeders*
- *Galvanic plants*
- *Vehicle detection*

Data Matrix positioning system PCV

The Data Matrix positioning system uses individual Data Matrix codes arranged beside and above one another in the form of a code reel that serves as an information carrier. The PCV read head uses modern camera technology to detect codes two-dimensionally, which are then decoded and finally output as an exact position in an X and Y direction.

The data bits of the Data Matrix code are divided into two dimensions and provide a high degree of data density over a small surface area.

The PCV read head and the Data Matrix code reel together are suitable for a wide range of positioning tasks in all applications. The unique code reel is available in lengths of up to 10 km and is ideal for use in material handling, the automotive industry, elevator technology, and general machine construction. Several Data Matrix code lines on the reel can also be used to evaluate the vertical position. Benefit from the many years of practical experience that Pepperl+Fuchs has acquired in the area of Data Matrix technology and position detection.



Always in focus: the read head unit with power illumination and two-row Data Matrix code reel

Benefits

- *Positioning along two axes*
- *High mechanical robustness, no moving parts*
- *Long service life as no laser diodes are used*
- *Insensitive to dirt and damage to the code reel*
- *Consistent laying of the code reel*
- *Extremely narrow code reel*
- *Small read field enables the smallest curve radii and inclines*
- *Event markers for generating control signals*
- *DC output and input signals can be activated at freely selectable positions*
- *Camera parameterization using a PC or code cards*

Application examples

Monorail conveyor

The Data Matrix code reel is affixed directly above the power rails and the PCV read head attached to the hanger. Each hanger is optimally positioned.

Skid conveyor

The simple attachment of the code reel and its insensitivity mean that the PCV system is ideal for positioning skids, in shell constructions for example.

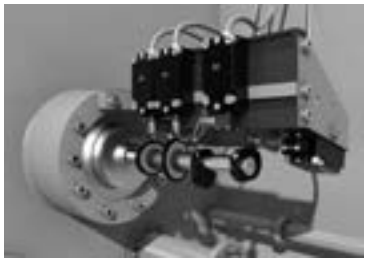
High-bay warehouse

The Data Matrix positioning system is always the best choice for moving and positioning in an X or Y-direction.

Refer to “General Notes Relating to Pepperl+Fuchs Product Information”.
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Electronic Cam-Operated Switch Group PAX

Complex mechanical switch controllers?



Cam switch controllers are used wherever control is required relevant to the machine position. With mechanical cam switch controllers, and particularly with rotational movements, mechanical cams are positioned on a shaft. These cams must be intricately positioned according to their switching characteristics in order to actuate the mechanical switches for drive shift rotation.

There is an easier option!

The electronic cam-operated switch group PAX provides a far easier alternative. The position of the drive shaft is detected using a wear- and maintenance-free PMI inductive rotation angle sensor and is transferred as an absolute value to the robust PAX box.

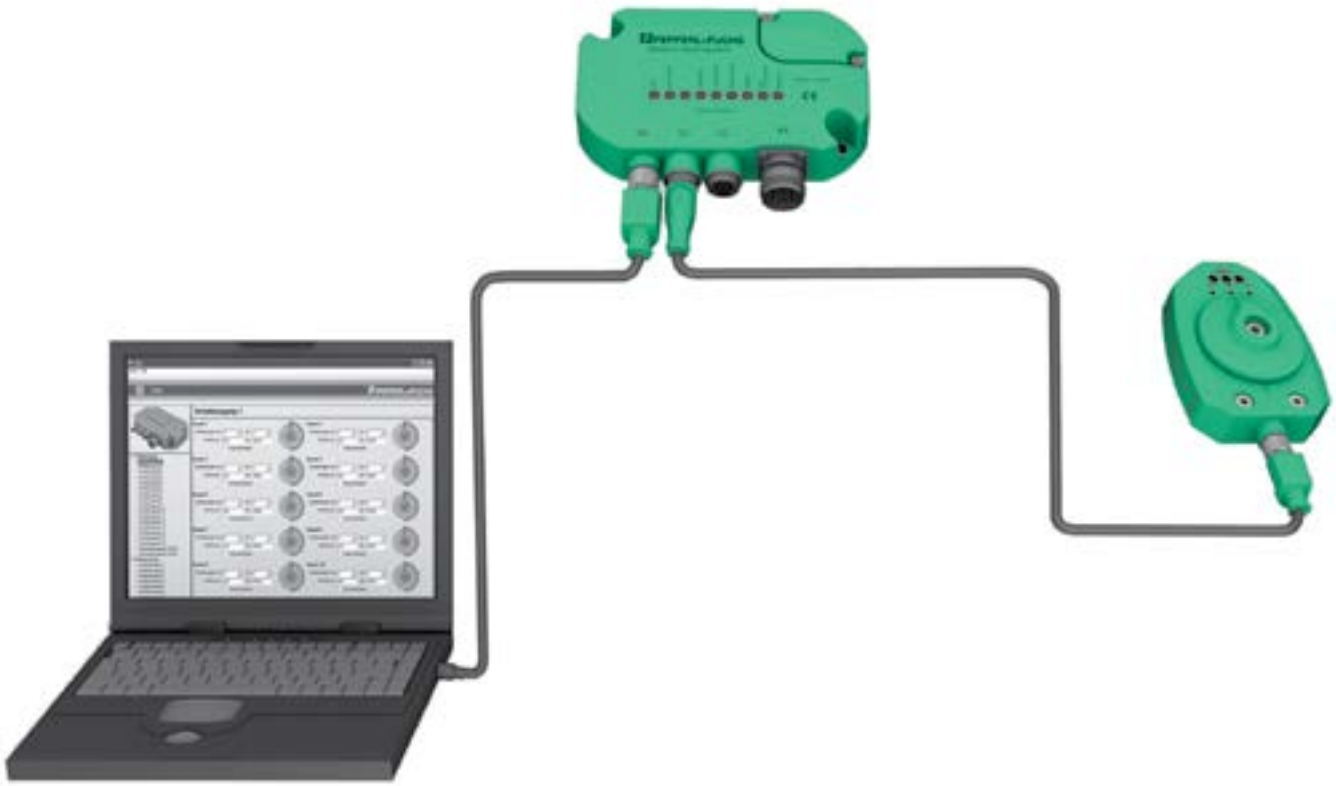


A PC and USB interface can be used to parameterize individual switching windows, trip points, or switching ramps in the cam switch controller. The ewasy-to-use software is integrated into the PAX and starts automatically when a PC connection is established. Up to 12 switching outputs each with 250 mA, two power outputs each with 2.5 A, and six analog power outputs (4 mA ... 20 mA) can all be individually configured and activated in the PAX.

All the data and parameters are stored on a micro SD card that is integrated into the cam switch controller and that can be easily removed and reinserted. This micro SD card also contains the configuration software. No installation is required on the PC.

Benefits

- *Replaces mechanical switches, multiple limit switches, and geared limit switches*
- *Cost savings as it is easy and quick to mount*
- *Wear-free, durable, and maintenance-free*
- *Multiturn capability of up to 200 revolutions*
- *PAX control box suitable for use in the field, can be freely positioned outside of the control cabinet*
- *Twelve switching outputs and two additional power outputs*
- *Six freely programmable analog outputs*
- *Generation of up to 16 switching points or analog cams per output*
- *All data stored on an integral micro SD card*





Properties

- F112 housing style
- 14 mm measuring range
- Analog output
- Pushbutton configurable

Your Benefit

- Non-contact position measurement
- Position proportional analog value
- Up to 2.5 mm reading distance
- No specialized targets or magnets needed

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PMI14V-F112-U-V3
Measurement range	0 ... 14 mm
Object distance	max. 2.5 mm
Switching element function	Analog voltage output
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 20 mA
Linearity error	± 0.3 mm
Resolution	33 µm
Reverse polarity protected	✔
Analog output	
Output type	1 voltage output: 0 ... 10 V
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA 6
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M8 x 1 connector, 3-pin



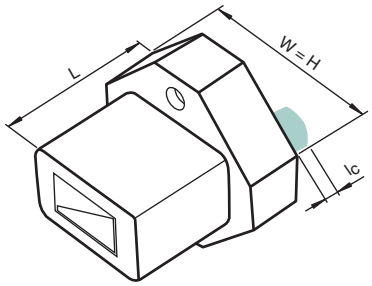
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	35
Height H [mm]	35
Connector area l_c [mm]	10.5

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

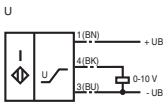
BT-F90-W	Damping element; lateral screw holes
V3-GM-2M-PUR	Cable socket, M8, 3-pin, PUR cable
V3-WM-2M-PUR	Cable socket, M8, 3-pin, PUR cable



Electrical Connection



PMI14V-F112-U-V3



Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
3	BU	(blue)
4	BK	(black)

Ausgabedatum: 08.04.2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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IO-Link

Properties

- F112 housing style
- 14 mm measuring range
- IO-Link interface
- Network configurable

Your Benefit

- Non-contact position measurement
- Position proportional analog value
- Up to 2.5 mm reading distance
- No specialized targets or magnets needed

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PMI14V-F112-U-IO-V31
Measurement range	0 ... 14 mm
Object distance	max. 2.5 mm
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 20 mA
Reverse polarity protected	✔
Resolution	33 µm
Interface type	IO-Link
Mode	COM 2 (38.4 kBaud)
Analog output	
Output type	voltage output 0 ... 10 V
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA 6
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M8 x 1 connector, 4-pin



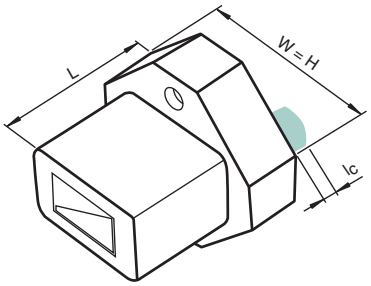
Approvals and Certificates	
UL approval	cULus Listed, General Purpose
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	30.5
Width W [mm]	35
Height H [mm]	35
Connector area l_c [mm]	10.5

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

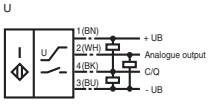
BT-F90-W	Damping element; lateral screw holes
V31-GM-2M-PUR-V1-G	Connection cable, M8 to M12, PUR cable, 4-pin
IO-Link-Master01-USB	IO-Link Master



Electrical Connection



PMI14V-F112-U-IO-V31



Core colors in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Ausgabedatum 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Object distance	0.5 ... 3 mm , recommended: 2 mm
Switching element function	analog, current or voltage output
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 40 mA
Reverse polarity protected	✔
Linearity error	within measuring range: ± 0.8 mm within linearity range: ± 0.4 mm
Resolution	125 µm
Analog output	(only one output can be used at the same time)
Output type	1 current output: 4 ... 20 mA 1 voltage output: 0 ... 10 V
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	connector M12 x 1, 4-pin



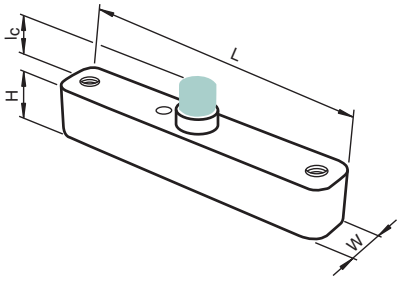
Model Number	green = preferred type	PMI80-F90-IU-V1	PMI104-F90-IU-V1	PMI120-F90-IU-V1
Measurement range	0 ... 80 mm	●		
	0 ... 104 mm		●	
	0 ... 120 mm			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			
Dimensions				
Length L [mm]		102	126	142
Width W [mm]			23	
Height H [mm]			22	
Connector area l_c [mm]			19	

Properties

- F90 housing style
- Up to 120 mm measuring range versions
- Current or voltage analog output
- Fixed setting

Your Benefit

- Non-contact position measurement
- Position proportional analog value
- Up to 3 mm reading distance
- No specialized targets or magnets needed



Accessories

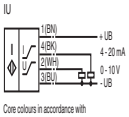
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See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

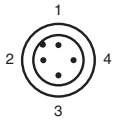
BT-F90-W	Damping element for F90 sensors; lateral screw holes
MH-F90	Mounting bracket for mounting of F90 sensors
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable

Electrical Connection



PMI104-F90-IU-V1
PMI120-F90-IU-V1
PMI80-F90-IU-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Ausgabedatum: 08.04.2015

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- F90 housing style
- Up to 120 mm measuring range versions
- 1 Analog and 2 switching outputs
- Pushbutton configurable

Your Benefit

- 3 functions in a single sensor
- Non-contact position measurement
- 2 teachable limit switches
- Up to 3 mm reading distance
- No specialized targets or magnets needed

Technical Data

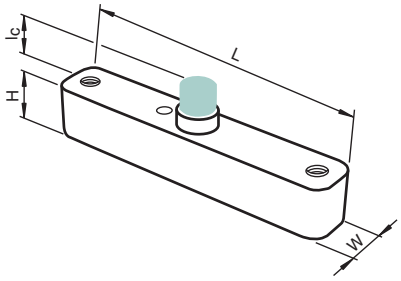
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Object distance	0.5 ... 3 mm , recommended: 2 mm
Switching element function	Analog current output with 2 PNP NO switching outputs
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 40 mA
Reverse polarity protected	✔
Linearity error	within measuring range: ± 0.8 mm within linearity range: ± 0.4 mm
Resolution	125 µm
Switching outputs	
Output type	2 switch outputs PNP, NO , reverse polarity protected , short-circuit protected
Operating current	≤ 100 mA
Short-circuit protection	pulsing
Analog output	
Output type	1 current output: 4 ... 20 mA
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	ABS
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin



Model Number	green = preferred type	PMI80-F90-IE8-V15	PMI104-F90-IE8-V15	PMI120-F90-IE8-V15
Measurement range	0 ... 80 mm	●		
	0 ... 104 mm		●	
	0 ... 120 mm			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions			
Length L [mm]	102	126	142
Width W [mm]		23	
Height H [mm]		22	
Connector area l_c [mm]		19	



Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

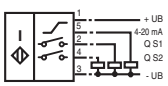
BT-F90-W	Damping element for F90 sensors; lateral screw holes
MH-F90	Mounting bracket for mounting of F90 sensors
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable

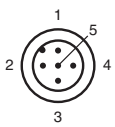
Electrical Connection



PMI104-F90-IE8-V15
PMI120-F90-IE8-V15
PMI80-F90-IE8-V15

IE8





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Object distance	max. 6 mm
Switching element function	analog, current or voltage output
Operating voltage	18 ... 30 V DC
Reverse polarity protected	✔
Analog outputs	
Output type	1 current output: 4 ... 20 mA 1 voltage output: 0 ... 10 V
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PA 6 / AL
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP65
Connection type	connector M12 x 1, 4-pin



Properties

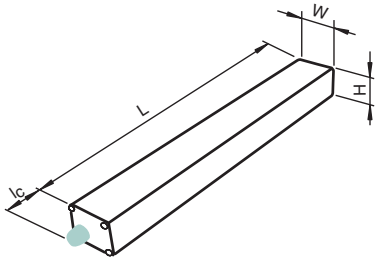
- F110 housing style
- Up to 810 mm measuring range
- Current or voltage analog output
- Fixed setting

Your Benefit

- Non-contact position measurement
- Position proportional analog value
- Up to 6 mm reading distance
- No specialized targets or magnets needed

Model Number		PMI210-F110-IU-V1	PMI360-F110-IU-V1	PMI510-F110-IU-V1	PMI810-F110-IU-V1
Measurement range	0 ... 210 mm	●			
	0 ... 360 mm		●		
	0 ... 510 mm			●	
	0 ... 810 mm				●
No-load supply current	≤ 40 mA	●	●		
	≤ 65 mA			●	
	≤ 70 mA				●
Linearity error	± 0.4 mm	●	●		
	± 0.6 mm			●	
	± 0.8 mm				●
Resolution	210 µm	●			
	360 µm		●		
	550 µm			●	
	950 µm				●
Approvals and Certificates					
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.				

Dimensions				
Length L [mm]	250	400	550	850
Width W [mm]	41			
Height H [mm]	30,5			
Connector area l_c [mm]	17			



Accessories

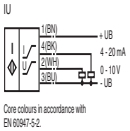
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

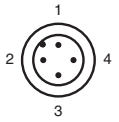
BT-F110-G	Damping element for F110 housing sensors; front screw holes
BT-F110-W	Damping element for F110 housing sensors; lateral screw holes
V1-G-2M-PVC	Cable socket, M12, 4-pin, PVC cable
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable
MH-F110	Mounting bracket for mounting F110 series sensors

Electrical Connection



PMI210-F110-IU-V1
PMI360-F110-IU-V1
PMI510-F110-IU-V1
PMI810-F110-IU-V1





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Ausgabedatum: 08.04.2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PMI360DV-F130-IU-V15
Measurement range	max. 360° min. 45°
Adjustment range	45° ... 360° analog range and 2 switch frames programmable
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 45 mA
Reverse polarity protected	✔
Resolution	0.2 °
Repeat accuracy	±0.25°
Linearity	±0.6° (with original actuator)
Analog output	
Output type	current output or voltage output (depends on load) 4 ... 20 mA (R_L < 400 Ω) 0 ... 10 V (R_L > 3.3 kΩ)
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	110
Width W [mm]	76.5
Height H [mm]	26
Connector area l_c [mm]	20

Properties

- **F130 housing style**
- **360° measuring range**
- **Analog output**
- **Pushbutton configurable**

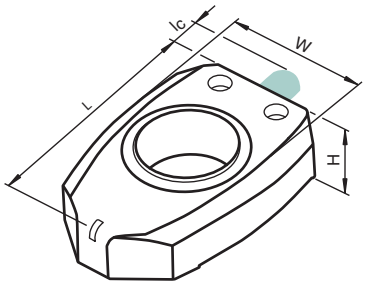
Your Benefit

- **Non-contact position measurement**
- **Angle proportional analog value**
- **No specialized targets or magnets needed**

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

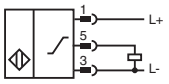
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable

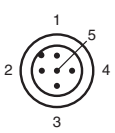


Electrical Connection



PMI360DV-F130-IU-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PMI360DV-F130-3E2-V15
Adjustment range	3 switch frames programmable , min. 5°, max. 360°
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 45 mA
Reverse polarity protected	✔
Resolution	0.2 °
Repeat accuracy	±0.25°
Switching outputs	
Output type	3 switch outputs PNP, NO , reverse polarity protected , short-circuit protected , programmable
Operating current	≤ 100 mA
Short-circuit protection	pulsing
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin



Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	110
Width W [mm]	76,5
Height H [mm]	26
Connector area l_c [mm]	20

Properties

- F130 housing style
- 360° measuring range
- 3 switching outputs
- Pushbutton configurable

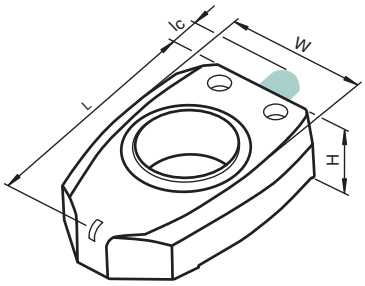
Your Benefit

- Non-contact cam switch
- 3 teachable cams
- No specialized targets or magnets needed

Accessories

This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

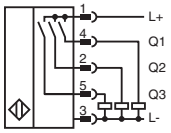
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable

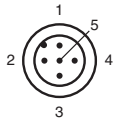


Electrical Connection



PMI360DV-F130-3E2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum: 08.04.2015

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Singapore: +65 6779 9091 fa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- F130 housing style
- 360° measuring range
- 1 analog output and 2 switching outputs
- Pushbutton configurable

Your Benefit

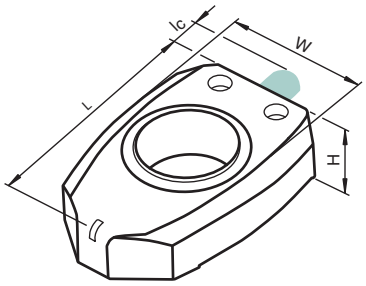
- 3 functions in a single sensor
- Non-contact position measurement
- Angle proportional analog value
- 2 teachable cams
- No specialized targets or magnets needed

Further Products

In this series, we offer additionally:

PMI360D-F130-IE8-V15

Technical data like PMI360DV-F130-IU2E2-V15 but:
Analog output: 1 Current output 4 ... 20 mA
Analog range: 360°
Switching outputs: 2 PNP outputs, NO, with programmable switching points



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	max. 360° min. 45°
Adjustment range	45° ... 360° analog range, programmable 2 switch frames programmable , min. 5°, max. 360°
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 45 mA
Reverse polarity protected	✔
Resolution	0.2 °
Repeat accuracy	±0.25°
Linearity	±0.6° (with original actuator)
Switching outputs	
Operating current	≤ 100 mA
Short-circuit protection	pulsing
Analog output	
Output type	current output or voltage output (depends on load) 4 ... 20 mA (R_L < 400 Ω) 0 ... 10 V (R_L > 3.3 kΩ)
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Material	
Housing	PBT
Target	mild steel, e. g. 1.0037, SR235JR (formerly St37-2)
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin



Model Number	PMI360DV-F130-IU2E0-V15	PMI360DV-F130-IU2E2-V15
Output type		
2 switch outputs NPN, NO , reverse polarity protected , short-circuit protected , programmable	●	
2 switch outputs PNP, NO , reverse polarity protected , short-circuit protected , programmable		●
Approvals and Certificates		
UL approval	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	
Dimensions		
Length L [mm]	110	
Width W [mm]	76,5	
Height H [mm]	26	
Connector area l_c [mm]	20	

Accessories

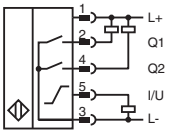
This and more accessories can be found in chapter 3.5 from page 673
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Cable socket, M12, 5-pin, PVC cable
V15-W-2M-PVC	Cable socket, M12, 5-pin, PVC cable

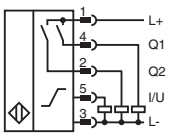
Electrical Connection

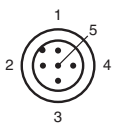


PMI360DV-F130-IU2E0-V15



PMI360DV-F130-IU2E2-V15





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum 08.04.2015



Technical Data

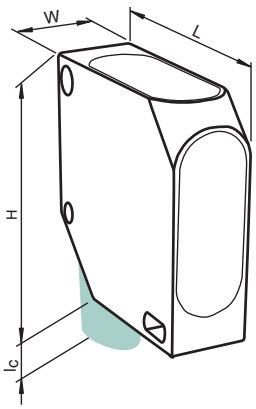
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light source	laser diode typ. service life 50,000 h at Ta = +40 °C
Light type	modulated visible red light
Laser class	2
Wave length	650 nm
Measuring method	Laser triangulation
Linearity error	0.25 % of the measuring range
Resolution	< 0.1 % of the measuring range
Operating voltage	18 ... 30 V DC
No-load supply current	≤ 40 mA at 24 V DC
Switching current	max. 100 mA
Switching frequency	≤ 1 kHz
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected , Rmax = 500 Ohm
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)
Material	
Housing	ABS , impact resistant
Optical face	PMMA
Protection degree	IP67

Model Number	green = preferred type	VDM18-100/20/122/151	VDM18-100/20/88/122/151	VDM18-100/32/105/122	VDM18-300/20/122/151	VDM18-300/20/88/122/151	VDM18-300/32/105/122
Measurement range	30 ... 100 mm	●	●	●			
	80 ... 300 mm				●	●	●
Light spot representation	approx. 1.5 mm x 3 mm at 100 mm	●	●				
	approx. 1.5 mm x 3.25 mm at 100 mm			●			
	approx. 2 mm x 4.5 mm at 300 mm				●	●	●
Interface type	RS 485		●			●	
Control input	Laser off (HIGH +UB) , Keypad lock (LOW 0 V)			●			●
Signal output	1 PNP output, short-circuit protected, reverse polarity protected, open collector			●			●
	2 PNP outputs, independent , short-circuit protected, reverse polarity protected	●	●		●	●	
Connection	5-pin, M12 x 1 plastic connector			●			●
	M12 connector, 8-pin	●	●		●	●	
Approvals and Certificates							
UL approval	cULus Listed	●	●	●	●	●	●
Dimensions							
Length L [mm]		50					
Width W [mm]		17					
Height H [mm]		46					
Connector area l_c [mm]		13,5 / 0					

Properties

- Rectangular compact housing
- Diffuse distance measurement
- Triangulation method
- Short range
- Analog output
- Laser red light



Accessories

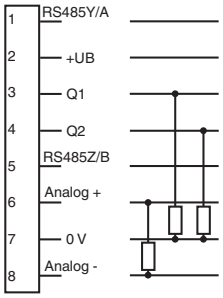
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-VDM18-01	Mounting accessory, distance measuring devices Series VDM18
OMH-VDM18-02	Mounting accessory, distance measuring devices Series VDM18

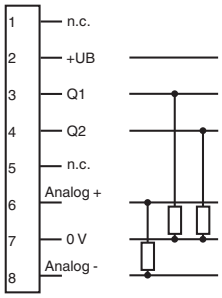
Electrical Connection



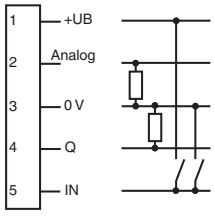
VDM18-100/20/88/122/151
VDM18-300/20/88/122/151

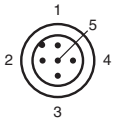


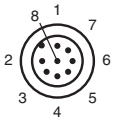
VDM18-100/20/122/151
VDM18-300/20/122/151



VDM18-100/32/105/122
VDM18-300/32/105/122







Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No mutual interference.
- Safe measurement under difficult conditions, e.g. mist or dust
- Immunity to extraneous light
- Surface independent measurement, practically no black-white difference

Further Products

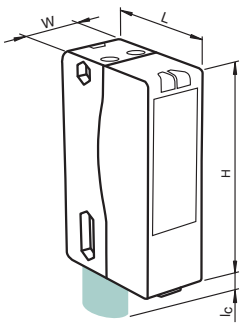
In this series, we offer additionally:

VDM28-8-L1-IO/73c/110/122

Tech. spec. like VDM28-8-L-IO/73c/110/122 but:
Laser class: 1

VDM28-8-L/73c/136

Tech. spec. like VDM28-8-L-IO/73c/136 but:
Interface: no IO-Link interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	0.2 ... 8 m
Reference target	Kodak white (90%)
Light source	laser diode typ. service life 85,000 h at Ta = +25 °C
Light type	modulated visible red light
Laser class	2
Wave length	660 nm
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 10 mm at a distance of 8 m at 20 °C
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Operating voltage	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Switching current	max. 100 mA
Switching frequency	50 Hz
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65

Model Number	green = preferred type	VDM28-8-L-IO/110/115b/122	VDM28-8-L-IO/115b/136	VDM28-8-L-IO/73c/110/122	VDM28-8-L-IO/73c/136
Signal output	Push-pull output, short-circuit protected, reverse polarity protected	●		●	
	2 Push-pull outputs, short-circuit protected, reverse polarity protection		●		●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected	●		●	
Connection	300 mm fixed cable with M12 x 1, 4-pin connector	●	●		
	connector M12 x 1, 4-pin			●	●
					
Approvals and Certificates					
Protection class	II	●	●	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●	●	●

Dimensions		
Length L [mm]	54,3	
Width W [mm]	25,8	
Height H [mm]	88	
Connector area l_c [mm]	5	14

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

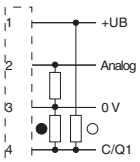
IO-Link-Master01-USB	IO-Link Master
PACTware 4.X	Software
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors

Electrical Connection



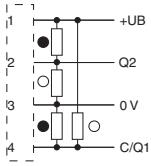
VDM28-8-L-IO/110/115b/122
VDM28-8-L-IO/73c/110/122
VDM28-8-L1-IO/73c/110/122

Option /110/122



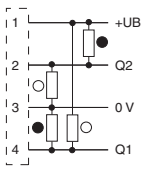
VDM28-8-L-IO/115b/136
VDM28-8-L-IO/73c/136

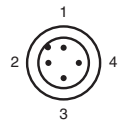
Option /136



VDM28-8-L/73c/136

Option /73c/136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VDM28-15-L-IO/73c/110/122
Measurement range	0.2 ... 15 m
Reference target	Kodak white (90%)
Light source	laser diode typ. service life 85,000 h at Ta = +25 °C
Light type	modulated visible red light
Laser class	2
Wave length	660 nm
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 15 mm at a distance of 15 m at 20 °C
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Operating voltage	10 ... 30 V DC when operating in IO-Link mode: 18 ... 30 V
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Signal output	Push-pull output, short-circuit protected, reverse polarity protected
Switching current	max. 100 mA
Switching frequency	50 Hz
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65
Connection	connector M12 x 1, 4-pin

Approvals and Certificates	
Protection class	II
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

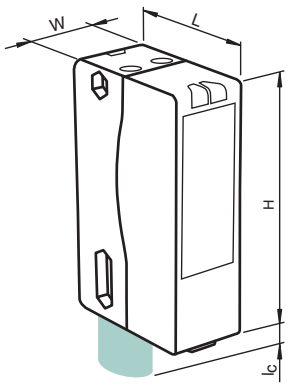
Dimensions	
Length L [mm]	54.3
Width W [mm]	25.8
Height H [mm]	88
Connector area l_c [mm]	14

Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No mutual interference.
- Safe measurement under difficult conditions, e.g. mist or dust
- Immunity to extraneous light
- Surface independent measurement, practically no black-white difference



Accessories

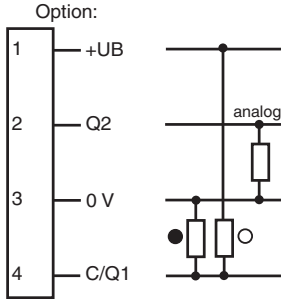
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

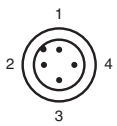
PACTware 4.X	Software
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
IO-Link-Master-USB DTM	Communication DTM for use of IO-Link-Master
OMH-05	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-RLK29	Mounting bracket
OMH-RLK29-HW	Mounting bracket for rear wall mounting
OMH-RL28-C	Protective cover
OMH-K01	dove tail mounting clamp
OMH-K03	dove tail mounting clamp
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

Electrical Connection



VDM28-15-L-IO/73c/110/122





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



IO-Link

Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Long range
- Discrete and analog outputs with IO-Link
- Laser red light

Your Benefit

- Parallel measuring paths possible. No mutual interference.
- Safe measurement under difficult conditions, e.g. mist or dust
- Immunity to extraneous light

Further Products

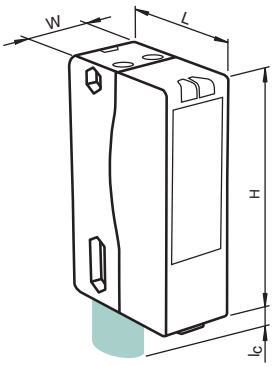
In this series, we offer additionally:

VDM28-50-R1-IO/73c/110/122

Tech. spec. like VDM28-50-R-IO/73c/110/122 but:
Laser class: 1

VDM28-50-R/73c/136

Tech. spec. like VDM28-50-R-IO/73c/136 but:
Interface: no IO-Link interface



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	0.2 ... 50 m
Reference target	OFR-100/100
Light source	laser diode typ. service life 85,000 h at Ta = +25 °C
Light type	modulated visible red light
Laser class	2
Wave length	660 nm
Measuring method	Pulse Ranging Technology (PRT)
Diameter of the light spot	< 50 mm at a distance of 50 m at 20 °C
Absolute accuracy	± 25 mm
Repeat accuracy	< 5 mm
Operating voltage	10 ... 30 V DC / when operating in IO-Link mode: 18 ... 30 V
No-load supply current	≤ 70 mA / 24 V DC
Interface	
Interface type	IO-Link
Switching current	max. 100 mA
Switching frequency	50 Hz
Ambient temperature	-30 ... 50 °C (-22 ... 122 °F)
Material	
Housing	Plastic ABS
Optical face	Plastic pane
Protection degree	IP65
Connection	connector M12 x 1, 4-pin



Model Number		VDM28-50-R-IO/73c/110/122	VDM28-50-R-IO/73c/136
	green = preferred type		
Signal output	Push-pull output, short-circuit protected, reverse polarity protected	●	
	2 Push-pull outputs, short-circuit protected, reverse polarity protection		●
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected	●	
Approvals and Certificates			
Protection class	II	●	●
UL approval	cULus Listed, Class 2 Power Source, Type 1 enclosure	●	●

Dimensions	
Length L [mm]	54,3
Width W [mm]	25,8
Height H [mm]	88
Connector area l_c [mm]	14

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

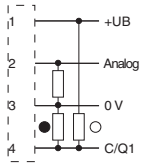
PACTware 4.X	Software
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

Electrical Connection



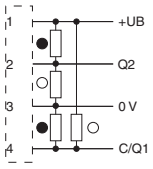
VDM28-50-R-IO/73c/110/122
VDM28-50-R1-IO/73c/110/122

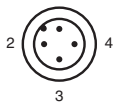
Option /110/122



VDM28-50-R-IO/73c/136
VDM28-50-R-IO/73c/136

Option /136





Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VDM70-10-L/87/122/160
Measurement range	0.5 ... 10 m by 90 % reflection (white)
Reference target	Kodak white (90%)
Light source	laser diode
Light type	modulated visible red light modulated infrared light
Laser class	Measurement laser: 1 Alignment laser: 2
Wave length	Measurement laser: 905 nm Alignment laser: 650 nm
Measuring method	Pulse Ranging Technology (PRT)
Linearity error	+/- 8 mm
Absolute accuracy	± 12 mm
Diameter of the light spot	3 mm x 10 mm at a distance of 4 m
Resolution	0.1 mm or 0.125 mm
Operating voltage	18 ... 30 V DC
No-load supply current	190 mA
Interface type	RS 422, SSI
Signal output	2 PNP, short-circuit protected, reverse polarity protected
Switching current	100 mA
Measurement output	1 analog output 4 ... 20 mA, short-circuit/overload protected
Other outputs	Service output, plausibility output, PNP, short-circuit protected 50 mA
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67
Connection	12-pin M16 connector

Dimensions	
Length L [mm]	95
Width W [mm]	42
Height H [mm]	93
Connector area l_c [mm]	9.5

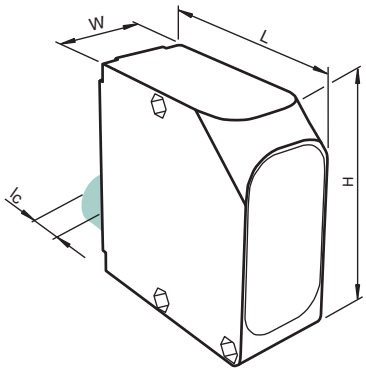
Properties

- **Rectangular full-size housing**
- **Diffuse distance measurement**
- **Pulse Ranging Technology (PRT)**
- **Medium range**
- **SSI interface with discrete and analog outputs**
- **Laser infrared light**

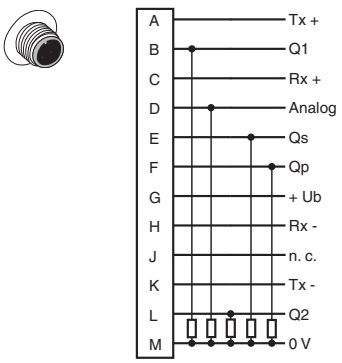
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-VDM35-01	Adjustment set series VDM35
VDM35-AR	Alignment aid for VDM35 and VDM70 series
OMH-VDM35	Mounting bracket



Electrical Connection



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VDM70-250-R/20/87/160
Measurement range	0.5 ... 250 m on reflector
Reference target	REF-VDM05
Light source	laser diode
Light type	modulated visible red light modulated infrared light
Laser class	Measurement laser: 1 Alignment laser: 2
Wave length	Measurement laser: 905 nm Alignment laser: 650 nm
Measuring method	Pulse Ranging Technology (PRT)
Linearity error	+/- 3 mm
Absolute accuracy	± 8 mm
Diameter of the light spot	20 mm x 20 mm at a distance of 10 m
Resolution	0.1 mm or 0.125 mm
Operating voltage	18 ... 30 V DC
No-load supply current	190 mA
Interface type	RS 422, SSI
Signal output	2 PNP, short-circuit protected, reverse polarity protected
Switching current	100 mA
Other outputs	Service output, plausibility output, PNP, short-circuit protected 50 mA
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Material	
Housing	ABS
Optical face	PMMA
Protection degree	IP67
Connection	12-pin M16 connector



Dimensions	
Length L [mm]	95
Width W [mm]	42
Height H [mm]	93
Connector area l_c [mm]	9.5

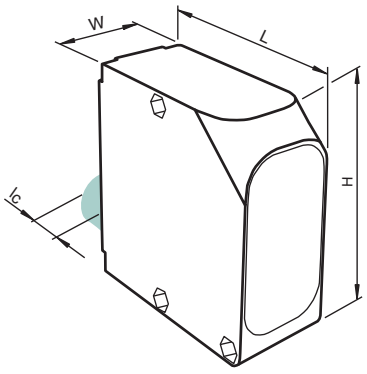
Properties

- **Rectangular full-size housing**
- **Retroreflective distance measurement**
- **Pulse Ranging Technology (PRT)**
- **Extended range**
- **SSI interface and discrete outputs**
- **Laser infrared light**

Accessories

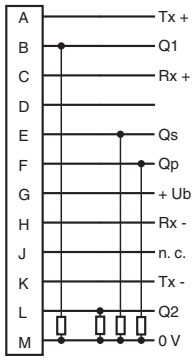
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

OMH-VDM35-01	Adjustment set series VDM35
VDM35-AR	Alignment aid for VDM35 and VDM70 series
OMH-VDM35	Mounting bracket



Electrical Connection





Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light source	laser diode
Alignment aid	Laserpointer
Laser class	Measurement laser: 1 Alignment laser: 2
Wave length	Measurement laser: 905 nm Alignment laser: 660 nm
Measuring method	Pulse Ranging Technology (PRT)
Max. Motion velocity	15 m/s
Resolution	0.1 mm , adjustable
Absolute accuracy	± 2.5 mm (> 3 m); ± 3.5 mm (0.3 m to 3 m)
Repeat accuracy	< 0.5 mm
Operating voltage	18 ... 30 V DC
No-load supply current	250 mA (18 V) ... 150 mA (30 V)
Interface type	SSI
Input/output type	2 PNP inputs/outputs, independent configuration, short-circuit protected, reverse polarity protection
Switching current	200 mA per output
Material	
Housing	ABS / PC
Optical face	PMMA , hard coated
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12 x 1 connector, B-coded (SSI) , 8-pin M12x1 connector, service



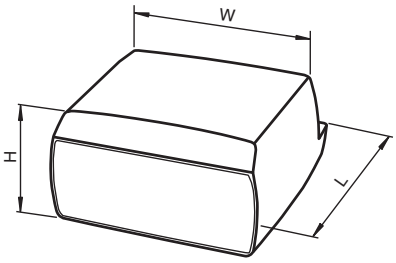
Model Number	green = preferred type	VDM100-50-SSI/G2	VDM100-50-SSI/G2/146	VDM100-150-SSI/G2	VDM100-150-SSI/G2/146	VDM100-300-SSI/G2
Measurement range	0.3 ... 50 m	●	●			
	0.3 ... 150 m			●	●	
	0.3 ... 300 m					●
Reference target	Foil reflector 500 mm x 500 mm	●	●	●	●	
	Reflector VDM01					●
Diameter of the light spot	< 15 cm at 50 m	●	●			
	< 35 cm at 150 m			●	●	
	< 70 cm at 300 m					●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●		●		●
	-30 ... 50 °C (-22 ... 122 °F) , For use in dry cold		●		●	
Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●	●
Dimensions						
Length L [mm]		170				
Width W [mm]		140				
Height H [mm]		90				

Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Extended range
- SSI interface
- Laser infrared light

Your Benefit

- Accurate positioning over the whole operating range
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp mounting
- Usable in highly dynamic control loops



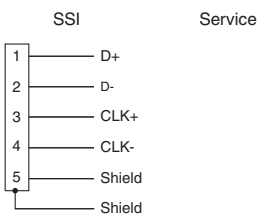
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

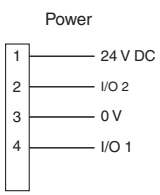
OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
V15-G-15M-LIHCH-TP	SSI bus cable, B-coded M12, 5-pin cable
OMH-VDM100-01	Mounting bracket with deviation mirror for distance measurement devices
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts

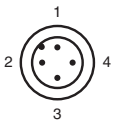
Electrical Connection











Date of issue: 2015-04-08

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PEPPERL+FUCHS SENSING YOUR NEEDS

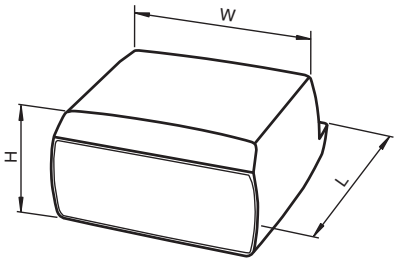


Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Extended range
- PROFIBUS interface
- Laser infrared light

Your Benefit

- Accurate positioning over the whole operating range
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp mounting
- Usable in highly dynamic control loops



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Light source	laser diode
Alignment aid	Laserpointer
Laser class	Measurement laser: 1 Alignment laser: 2
Wave length	Measurement laser: 905 nm Alignment laser: 660 nm
Measuring method	Pulse Ranging Technology (PRT)
Max. Motion velocity	15 m/s
Absolute accuracy	± 2.5 mm (> 3 m); ± 3.5 mm (0.3 m to 3 m)
Repeat accuracy	< 0.5 mm
Operating voltage	18 ... 30 V DC
No-load supply current	250 mA (18 V) ... 150 mA (30 V)
Interface type	PROFIBUS DP acc. to EN 50170
Transfer rate	9.6 kbit/s ... 12 Mbit/s , adjustable
Input/output type	2 PNP inputs/outputs, independent configuration, short-circuit protected, reverse polarity protection
Switching current	200 mA per output
Material	
Housing	ABS / PC
Optical face	PMMA , hard coated
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , 5-pin, M12x1 connector, B-coded (Bus In) , M12x1 socket, 5-pin, B-coded (Bus Out) , 8-pin M12x1 connector, service



Model Number	green = preferred type	VDM100-50-P/G2	VDM100-50-P/G2/146	VDM100-150-P/G2	VDM100-150-P/G2/146	VDM100-300-P/G2
Measurement range	0.3 ... 50 m	●	●			
	0.3 ... 150 m			●	●	
	0.3 ... 300 m					●
Reference target	Foil reflector 500 mm x 500 mm	●	●	●	●	
	Reflector VDM01					●
Diameter of the light spot	< 15 cm at 50 m	●	●			
	< 35 cm at 150 m			●	●	
	< 70 cm at 300 m					●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●		●		●
	-30 ... 50 °C (-22 ... 122 °F) , For use in dry cold		●		●	
Approvals and Certificates						
UL approval	cULus Listed	●	●	●	●	●
Dimensions						
Length L [mm]		170				
Width W [mm]		140				
Height H [mm]		90				

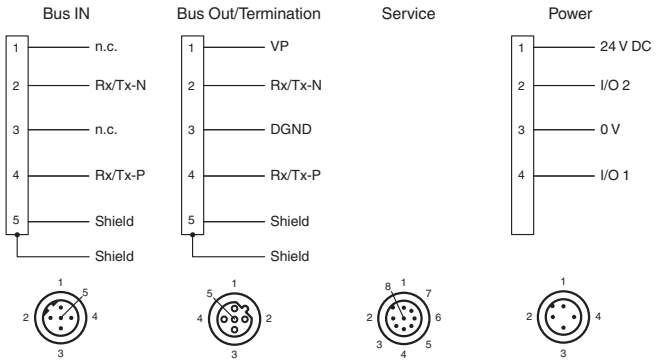
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
ICZ-TR-V15B	Terminal resistor for PROFIBUS
OMH-VDM100-01	Mounting bracket with deviation mirror for distance measurement devices
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts

Electrical Connection





Date of issue: 2015-04-08



Properties

- Barcode technology
- Positioning up to 314.5 m
- RS 485 interface
- U-shape rectangular plastic housing

Your Benefit

- Simple assembly
- Maintenance-free
- No wearing parts
- Long operating life
- Mechanically rugged

Technical Data

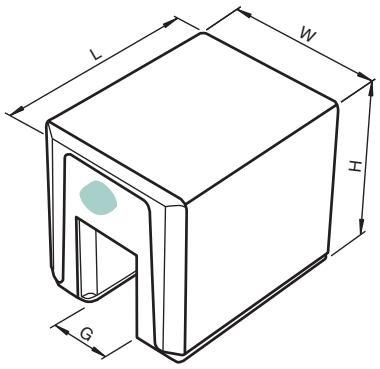
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 314.5 m
Resolution	± 0.4 mm (1,250 positions/m)
Passage speed	≤ 12.5 m/s
Free tolerances to code rail	horizontal: 31 mm (± 15.5 mm) vertical: 28 mm (± 14 mm)
Operating voltage	10 ... 30 V DC
Power consumption	2 VA with Option H, heating: 11 VA at 24 V DC
Operating display	LED green: power on
Data flow display	LED yellow: data communication active
Velocity indication	LED yellow (only with Option S, speed output) off, if speed limit is exceeded (instead of data flow display)
Error display	LED red flashing: read head outside of code rail solid on: internal diagnostic test failed
Display	Display module, 6-digit (only with option D, display) adaptable to installation position
Interface type	RS 485 interface
Data output code	binary code
Transfer rate	Baud rate 19.2 kBit/s ... 187.5 kBit/s (to be specified with order)
Output velocity	switch output , short-circuit protected (only with Option S, speed output)
Operating temperature	0 ... 60 °C (32 ... 140 °F) with Option H, heating: -40 ... 60 °C (-40 ... 140 °F)
Housing	ABS , PC (Polycarbonate)
Protection degree	IP54
Connection type	M12 x 1 connector, 5-pin



Model Number green = preferred type	WCS3B-LS1**	WCS3B-LS2**
Termination		
with RS 485 termination		●
without RS 485 termination	●	
Approvals and Certificates		
CSA approval cCSAus Certified, General Purpose Class 2 power source	●	●
CCC approval Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		●

Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31



Accessories

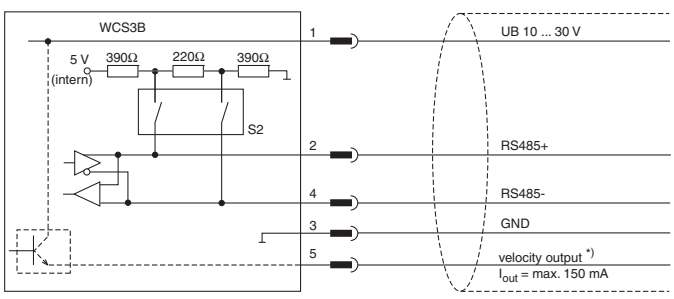
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

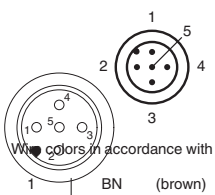
Electrical Connection





WCS3B-LS2... S2 = ON
WCS3B-LS1... S2 = OFF

*) only with option S, velocity output



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Properties

- Barcode technology
- Positioning up to 314.5 m
- SSI interface
- U-shape rectangular plastic housing

Your Benefit

- Simple assembly
- Maintenance-free
- No wearing parts
- Long operating life
- Mechanically rugged

Technical Data

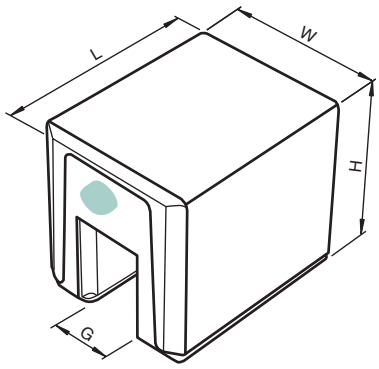
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 314.5 m
Resolution	± 0.4 mm (1,250 positions/m)
Passage speed	≤ 12.5 m/s
Free tolerances to code rail	horizontal: 31 mm (± 15.5 mm) vertical: 28 mm (± 14 mm)
Operating voltage	10 ... 30 V DC
Power consumption	2 VA
Operating display	LED green: power on
Data flow display	LED yellow: data communication active
Error display	LED red flashing: read head outside of code rail solid on: internal diagnostic test failed
Interface type	SSI interface
Clock frequency	100 ... 1000 kHz
Operating temperature	0 ... 60 °C (32 ... 140 °F)
Housing	ABS , PC (Polycarbonate)
Protection degree	IP54
Connection type	8-pin, M12 x 1 connector



Model Number	green = preferred type	WCS3B-LS310	WCS3B-LS311
Velocity indication	LED yellow (only with Option S, speed output) off, if speed limit is exceeded (instead of data flow display)	●	
Data output code	binary code , 25 bit	●	
	Gray code , 25 bit		●
Approvals and Certificates			
CSA approval	cCSAus Certified, General Purpose Class 2 power source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31



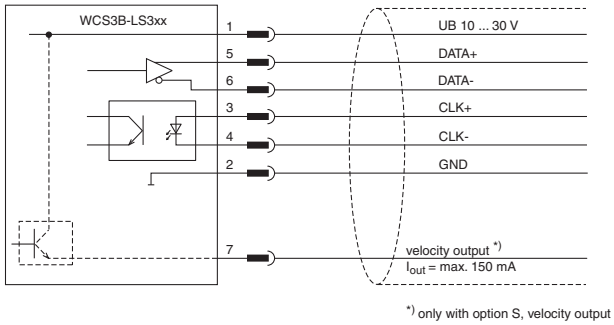
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

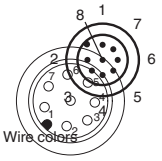
WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

Electrical Connection





*) only with option S, velocity output



1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS3B-LS410
Measuring range	max. 314.5 m
Resolution	± 0.4 mm (1,250 positions/m)
Passage speed	≤ 12.5 m/s
Free tolerances to code rail	horizontal: 31 mm (± 15.5 mm) vertical: 28 mm (± 14 mm)
Operating voltage	10 ... 30 V DC
Power consumption	2 VA
Operating display	LED green: power on
Data flow display	LED yellow: data communication active
Error display	LED red flashing: read head outside of code rail solid on: internal diagnostic test failed
Interface type	CANopen , galvanically isolated
Data output code	binary code
Transfer rate	max. 1 MBit/s
Termination	switchable
Operating temperature	0 ... 60 °C (32 ... 140 °F)
Housing	ABS , PC (Polycarbonate)
Protection degree	IP54
Connection type	M12 x 1 connector, 5-pin
	
Approvals and Certificates	
CSA approval	cCSAus Certified, General Purpose Class 2 power source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.
Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31

Properties

- Barcode technology
- Positioning up to 314.5 m
- CANopen interface
- U-shape rectangular plastic housing

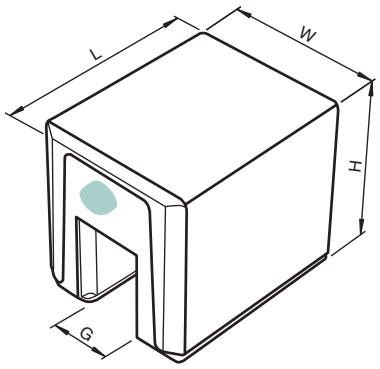
Your Benefit

- Simple assembly
- Maintenance-free
- No wearing parts
- Long operating life
- Mechanically rugged

Accessories

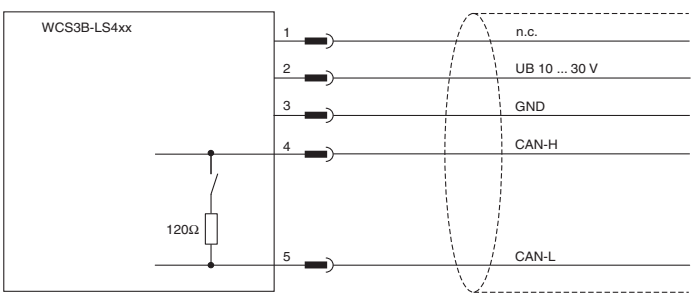
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

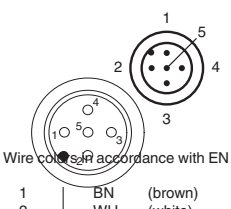
WCS-MP1	Mounting plate for reading heads WCS2 and WCS3



Electrical Connection







Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015

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Properties

- Barcode technology
- Positioning up to 327 m
- RS 485 interface
- U-shape rectangular plastic housing

Your Benefit

- Simple assembly
- Maintenance-free
- No wearing parts
- Long operating life
- Mechanically rugged

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 327 m
Resolution	± 0.42 mm (1,200 positions/m)
Passage speed	≤ 12.5 m/s
Free tolerances to code rail	horizontal: 10 mm (± 5 mm) vertical: 10 mm (± 5 mm)
Operating voltage	10 ... 30 V DC
Power consumption	2 VA with Option H, heating: 9 VA at 24 V DC
Interface type	RS 485 interface
Data output code	binary code
Transfer rate	Baud rate 19.2 kBit/s ... 187.5 kBit/s (to be specified with order)
Operating temperature	0 ... 60 °C (32 ... 140 °F) with Option H, heating: -40 ... 60 °C (-40 ... 140 °F)
Housing	ABS , Polycarbonate , Polyamide (PA)
Protection degree	IP54
Connection type	M12 x 1 connector, 5-pin



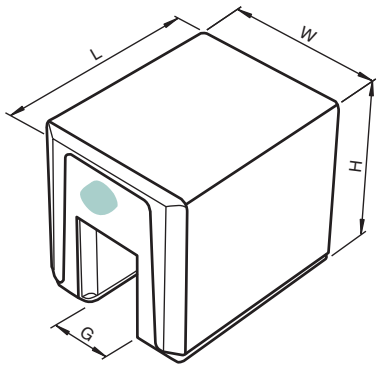
Model Number green = preferred type	WCS2B-LS1**	WCS2B-LS2**
Termination		
with RS 485 termination		●
without RS 485 termination	●	
Approvals and Certificates		
CSA approval: cCSAus Certified, General Purpose Class 2 power source	●	●
CCC approval: Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions	
Length L [mm]	115
Width W [mm]	75
Height H [mm]	75
Slot width G [mm]	10

Accessories

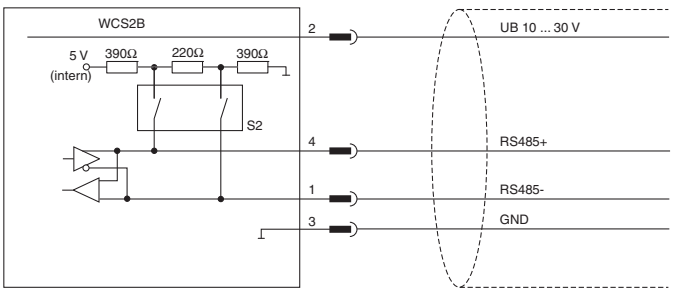
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

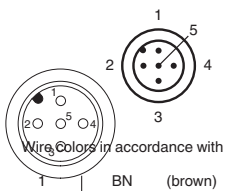


Electrical Connection





WCS2B-LS2... S2 = ON
WCS2B-LS1... S2 = OFF



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 327 m
Resolution	± 0.42 mm (1,200 positions/m)
Passage speed	≤ 12.5 m/s
Free tolerances to code rail	horizontal: 10 mm (± 5 mm) vertical: 10 mm (± 5 mm)
Operating voltage	10 ... 30 V DC
Power consumption	2 VA with Option H, heating: 9 VA at 24 V DC
Interface type	SSI interface
Clock frequency	100 ... 1000 kHz
Operating temperature	0 ... 60 °C (32 ... 140 °F) with Option H, heating: -40 ... 60 °C (-40 ... 140 °F)
Housing	ABS , Polycarbonate , Polyamide (PA)
Protection degree	IP54
Connection type	8-pin, M12 x 1 connector



Model Number green = preferred type	WCS2B-LS310	WCS2B-LS311
Data output code		
binary code , 25 bit	●	
Gray code , 25 bit		●
Approvals and Certificates		
CSA approval cCSAus Certified, General Purpose Class 2 power source	●	●
CCC approval Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions	
Length L [mm]	115
Width W [mm]	75
Height H [mm]	75
Slot width G [mm]	10

Properties

- Barcode technology
- Positioning up to 327 m
- SSI interface
- U-shape rectangular plastic housing

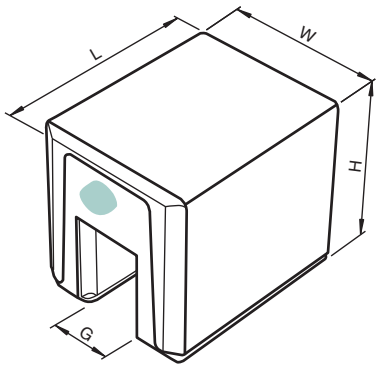
Your Benefit

- Simple assembly
- Maintenance-free
- No wearing parts
- Long operating life
- Mechanically rugged

Accessories

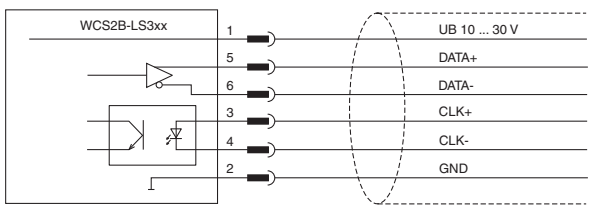
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

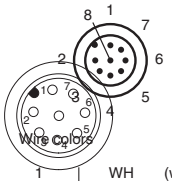
WCS-MP1	Mounting plate for reading heads WCS2 and WCS3



Electrical Connection



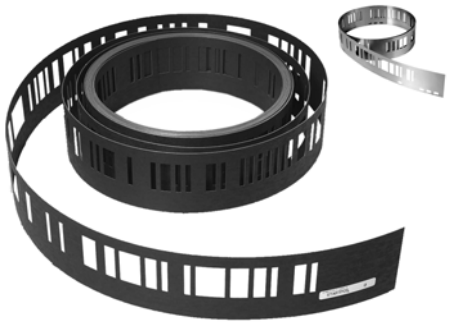




1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Date of issue: 04/08/2015

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Properties

- Code rail for WCS3 system
- Positioning length up to 314.5 m
- Polyester laminate and stainless steel versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Length	0.1 ... 314.5 m
Radius of bend	≥ 300 mm

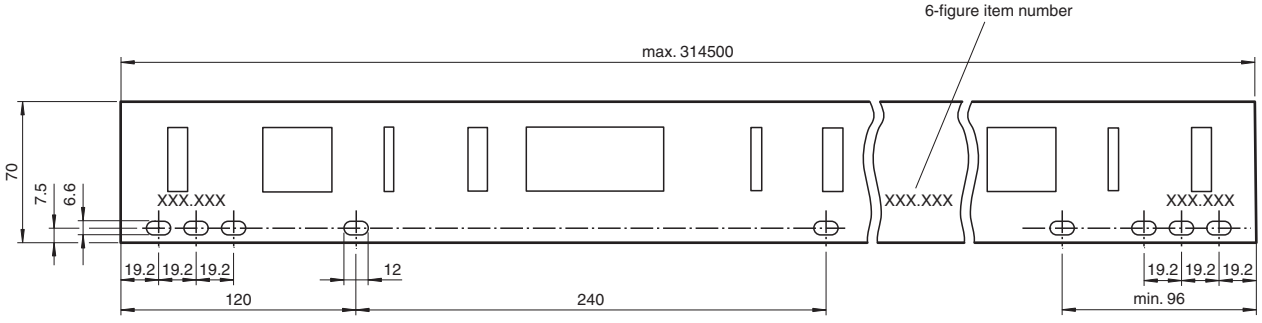
Model Number	green = preferred type	WCS3-CS70-L0	WCS3-CS70-L1	WCS3-CS70-L2	WCS3-CS70-M1
Operating temperature	-40 ... 100 °C (-40 ... 212 °F)				●
	-40 ... 60 °C (-40 ... 140 °F)	●	●	●	
Storage temperature	-40 ... 60 °C (-40 ... 140 °F)	●	●	●	
Installation temperature	10 ... 60 °C (50 ... 140 °F)	●	●	●	
Material thickness	0.5 mm				●
	0.7 mm	●	●	●	
Tension loading	≤ 260 N	●	●	●	
	≤ 5000 N				●
Material	stainless steel 1.4310 / AISI 301				●
	polyester laminate	●	●	●	
Thermal expansion coefficient	approx. 2.8 x 10^{-5} / K	●	●	●	
	1.6 x 10^{-5} / K				●
Mass	240 g / m				●
	40 g / m	●	●	●	
Ordering information	WCS3-CS70-L0: without mounting holes WCS3-CS70-L1: with standard mounting holes WCS3-CS70-L2: with Vahle VKS mounting holes	●	●	●	

Accessories

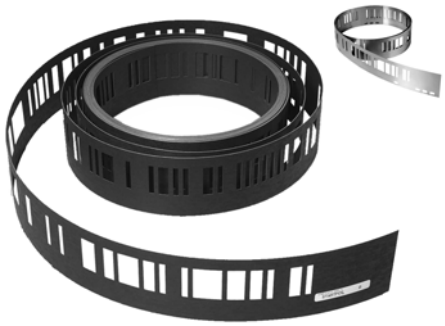
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

WCS-MT1	Tensioning device for stainless steel code rail

Dimensions



Date of issue: 2015-04-08



Properties

- Code rail for WCS2 system
- Positioning length up to 327 m
- Polyester laminate and stainless steel versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Code rail height	a = 55 mm
Length	0.1 ... 327 m
Radius of bend	≥ 500 mm

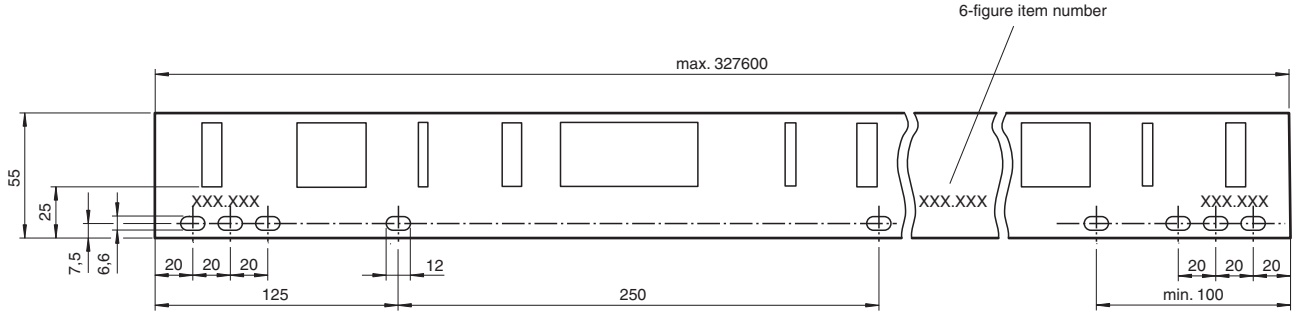
Model Number	green = preferred type	WCS2-CS55-L1	WCS2-CS55-M1
Operating temperature	-40 ... 100 °C (-40 ... 212 °F)		●
	-40 ... 60 °C (-40 ... 140 °F)	●	
Storage temperature	-40 ... 60 °C (-40 ... 140 °F)	●	
Installation temperature	10 ... 60 °C (50 ... 140 °F)	●	
Material thickness	0.5 mm		●
	0.7 mm	●	
Tension loading	≤ 230 N	●	
	≤ 4500 N		●
Material	stainless steel 1.4310 / AISI 301		●
	polyester laminate	●	
Thermal expansion coefficient	approx. 2.8 x 10^{-5} / K	●	
	1.6 x 10^{-5} / K		●
Mass	175 g / m		●
	30 g / m	●	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

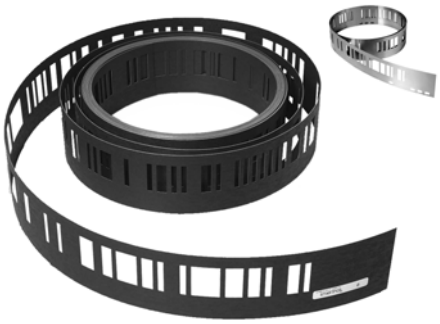
WCS-MT1	Tensioning device for stainless steel code rail

Dimensions



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Properties

- Code rail for WCS2 system
- Positioning length up to 327 m
- Polyester laminate and stainless steel versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Code rail height	a = 70 mm
Length	0.1 ... 327 m
Radius of bend	≥ 500 mm

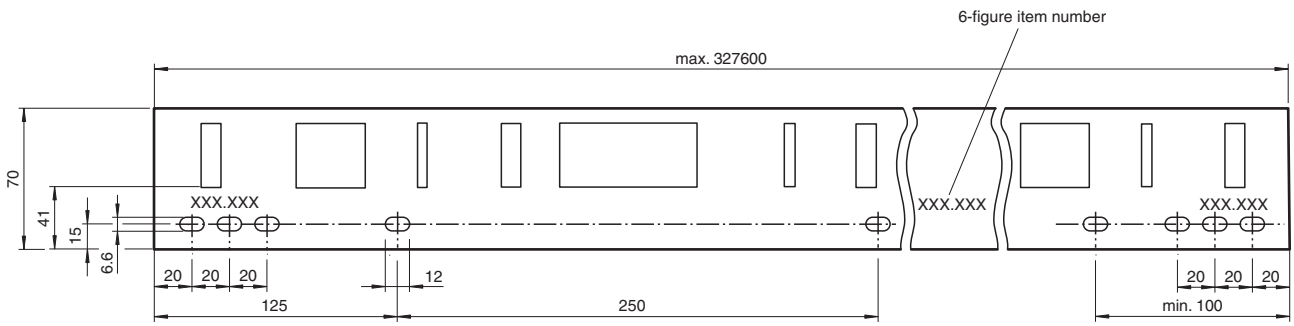
Model Number		WCS2-CS70-L1	WCS2-CS70-M1
Operating temperature	-40 ... 100 °C (-40 ... 212 °F)		●
	-40 ... 60 °C (-40 ... 140 °F)	●	
Storage temperature	-40 ... 60 °C (-40 ... 140 °F)	●	
Installation temperature	10 ... 60 °C (50 ... 140 °F)	●	
Material thickness	0.5 mm		●
	0.7 mm	●	
Tension loading	≤ 340 N	●	
	≤ 6500 N		●
Material	stainless steel 1.4310 / AISI 301		●
	polyester laminate	●	
Thermal expansion coefficient	approx. 2.8 x 10^{-5} / K	●	
	1.6 x 10^{-5} / K		●
Mass	240 g / m		●
	40 g / m	●	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

WCS-MT1	Tensioning device for stainless steel code rail

Dimensions



Date of issue: 2015-04-08



CE

Properties

- RS 485 to PROFINET interface
- Connection of up to 4 read heads
- DIN rail mounting

Technical Data

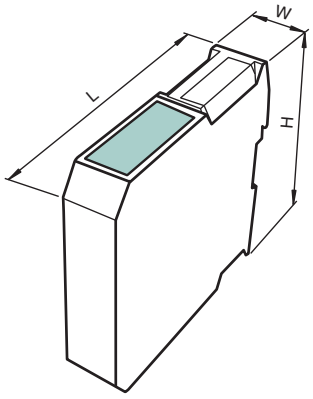
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-PNG210
Operating voltage	24 V DC ± 10 %
Power consumption	≤ 3.6 W (without read heads)
Number of channels	2
Interface 1	more information, see table below
Interface type	Ethernet; 100 BASE-TX
Connection of	control system
Protocol	PROFINET
Transfer rate	100 MBit/s
Data output format	binary code
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP20
Connection type	Interface 1: RJ-45 socket, 8-pin Interface 2: terminal connection ≤ 2.5 mm² , 5-pin



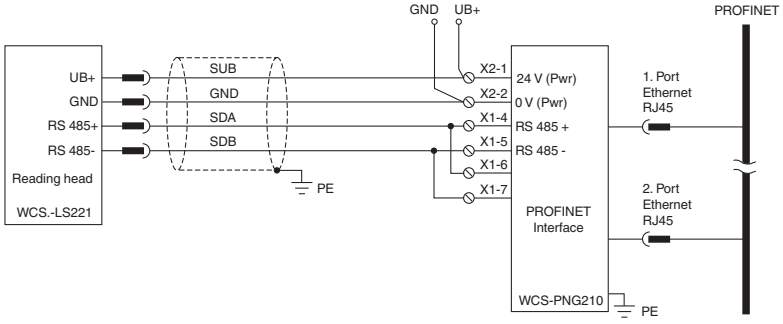
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100



Electrical Connection





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CE

Properties

- RS 485 to Ethernet/IP interface
- Connection of up to 4 read heads
- DIN rail mounting

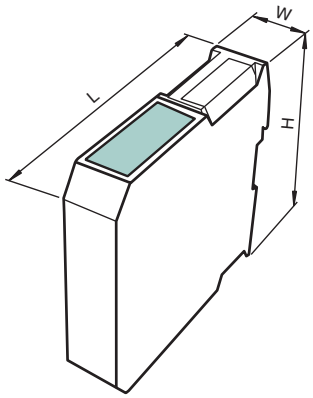
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-EIG310
Operating voltage	10 ... 30 V DC
Power consumption	≤ 3.6 W (without read heads)
Number of channels	2
Interface 1	
Connection of	control system
Interface type	Ethernet
Protocol	Ethernet/IP
Transfer rate	10 MBit/s or 100 MBit/s
Data output format	Ethernet 10/100 BASE-TX
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 55 °C (32 ... 131 °F) , no moisture condensation
Protection degree	IP20
Connection type	Interface 1: RJ-45 socket, 8-pin Interface 2: terminal connection ≤ 2.5 mm^2 , 5-pin

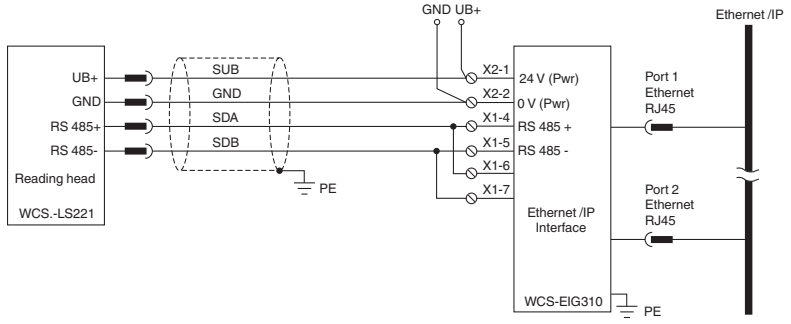
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100



Electrical Connection





Date of issue: 08.04.2015



CE

Properties

- RS 485 to MODBUS-RTU interface
- Connection of up to 4 read heads
- DIN rail mounting

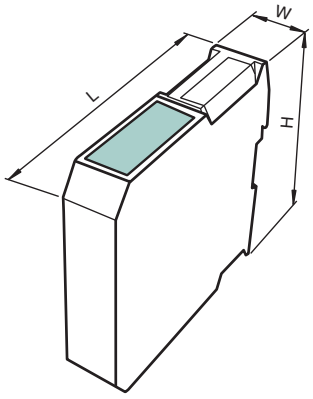
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-MBG110
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	RS 422
Protocol	MODBUS RTU (Remote Terminal Unit)
Transfer rate	19.2 kBit/s or 38.4 kBit/s
Data output format	binary code
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	2 ms
Operating temperature	-20 ... 55 °C (-4 ... 131 °F) , no moisture condensation
Protection degree	IP20
Connection type	Interface 1: terminal connection ≤ 2.5 mm^2 Interface 2: terminal connection ≤ 2.5 mm^2

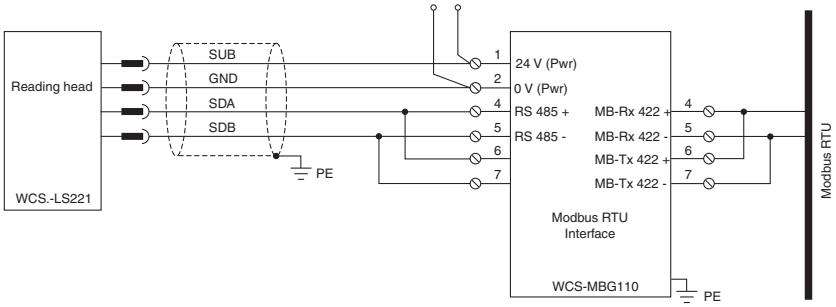
Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100



Electrical Connection

WCS-MBG110



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-IG110
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	INTERBUS-S
Transfer rate	500 kBit/s / 2 MBit/s , configurable
Data output format	binary code / Gray code , switchable
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP24
Connection type	Interface 1: 9-pin Sub-D connector and 9-pin Sub-D socket Interface 2: terminal connection ≤ 2.5 mm² , 5-pin

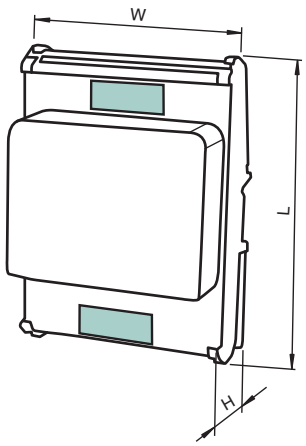


Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	64.5

Properties

- **RS 485 to INTERBUS-S interface**
- **Connection of up to 4 read heads**
- **DIN rail mounting**

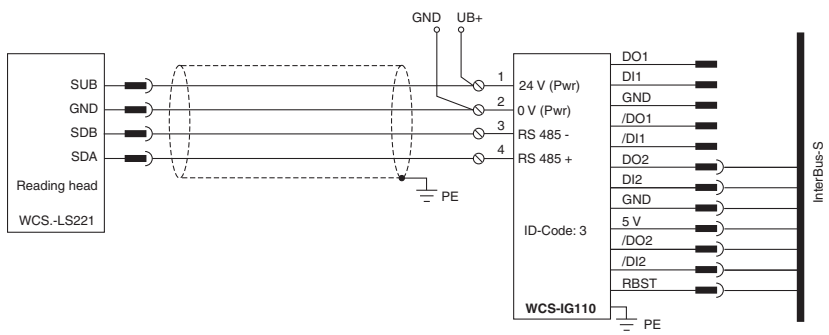


Electrical Connection



WCS-IG110





Date of issue: 08.04.2015



CE CANopen

Properties

- RS 485 to CANopen interface
- Connection of up to 4 read heads
- DIN rail mounting

Technical Data

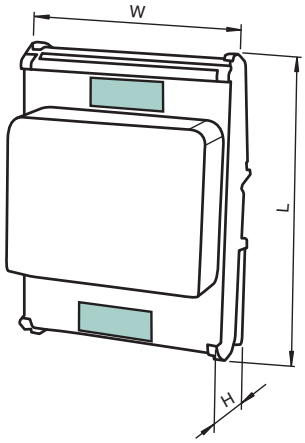
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-CG210
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	CANopen
Transfer rate	max. 1 MBit/s
Data output format	binary code
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP24
Connection type	Interface 1: 9-pin Sub-D connector Interface 2: terminal connection ≤ 2.5 mm² , 5-pin



Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	52.5

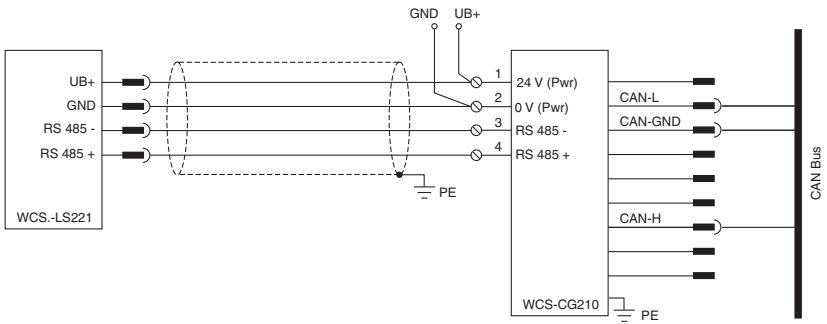


Electrical Connection



WCS-CG210





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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-DG210
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	DeviceNet
Transfer rate	max. 500 kBit/s
Data output format	binary code
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP24
Connection type	Interface 1: terminal connection ≤ 2.5 mm^2 , 5-pin Interface 2: terminal connection ≤ 2.5 mm^2 , 5-pin

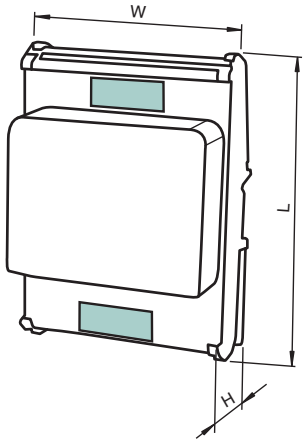


Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	63.5

Properties

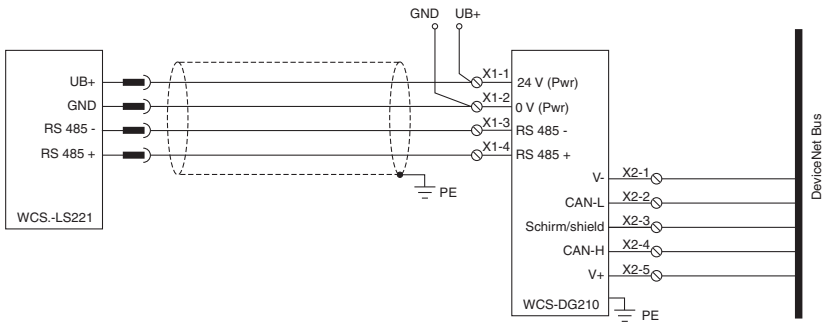
- **RS 485 to DeviceNet interface**
- **Connection of up to 4 read heads**
- **DIN rail mounting**



Electrical Connection



WCS-DG210



Date of issue: 08.04.2015



Properties

- RS 485 to Profibus interface
- Connection of up to 4 read heads
- DIN rail mounting

Technical Data

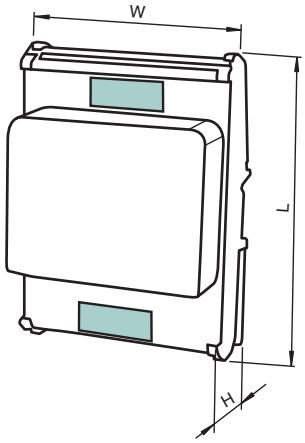
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	WCS-PG110
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	PROFIBUS DP
Transfer rate	max. 12 MBit/s , Automatic baud rate detection
Data output format	binary code
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS221 , WCS-LS121 , WCS-LS246 , WCS-LS146
Interface type	RS 485
Transmission method	half duplex
Transfer rate	19.2 kBit/s or 62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP24
Connection type	Interface 1: 9-pin Sub-D connector Interface 2: terminal connection ≤ 2.5 mm² , 5-pin



Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	64.5

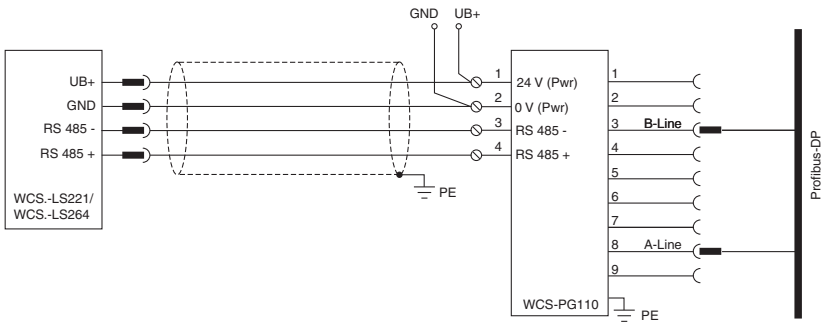


Electrical Connection



WCS-PG110





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Properties

- RS 485 to Profibus interface
- Connection of up to 4 read heads
- DIN rail mounting

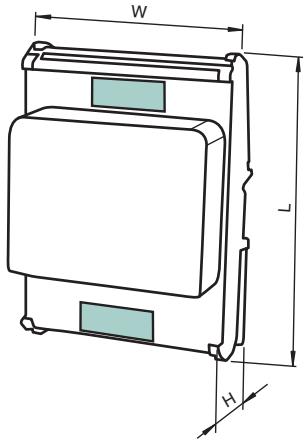
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

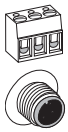
Model Number	WCS-PG210E
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	
Connection of	control system
Interface type	PROFIBUS DP V1
Transfer rate	max. 12 MBit/s , Automatic baud rate detection
Data output format	binary code
Bus termination resistor	switchable
Interface 2	
Connection of	Reading head
Connectable read heads	WCS...A-LS221 , WCS...A-LS121 , WCS...B-LS121 , WCS...B-LS221
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS485 termination resistor	switchable
Refresh cycle of read head	1 ms
Operating temperature	0 ... 45 °C (32 ... 113 °F) , no moisture condensation
Protection degree	IP24
Connection type	Interface 1: 9-pin Sub-D connector Interface 2: terminal connection ≤ 2.5 mm^2 , 5-pin
	

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

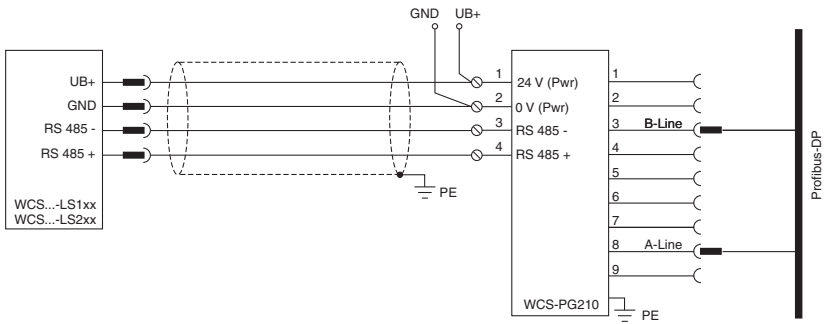
Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	64.5



Electrical Connection



WCS-PG210E



Date of issue: 08.04.2015



Properties

- RS 485 to SSI interface
- Connection of read heads LS211 or LS111
- DIN rail mounting

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

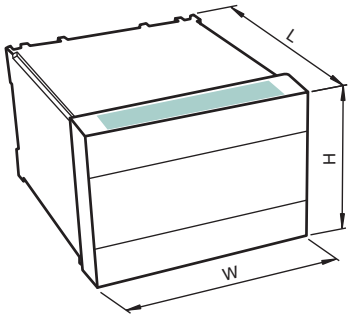
General Data	
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 2 W (without read heads)
Interface 1	
Connection of	control system
Interface type	SSI
Bus termination resistor	integrated
Interface 2	
Connection of	Reading head
Interface type	RS 485
Transmission method	half duplex
RS485 termination resistor	integrated
Refresh cycle of read head	1 ms
Operating temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Transfer rate	max. 500 kHz
Connection type	removable terminal block



Model Number		WCS-IS31*	WCS-IS32*
Data output format	WCS-IS310 : binary code WCS-IS311 : Gray code	●	
	WCS-IS320 : binary code WCS-IS321 : Gray code		●
Connectable read heads	WCS-LS211	●	
	WCS-LS221		●
Transfer rate	max. 187.5 kBit/s	●	
	max. 62.5 kBit/s		●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

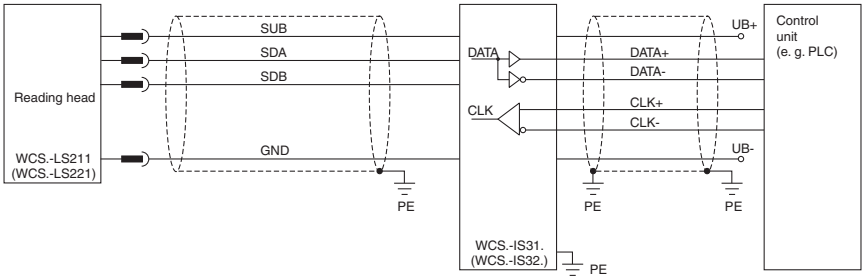
Dimensions	
Length L [mm]	121
Width W [mm]	100
Height H [mm]	74



Electrical Connection



WCS-IS31*
WCS-IS32*



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CE

Properties

- RS 485 to parallel interface
- Connection of up to 4 read heads LS211 or LS111
- DIN rail mounting

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

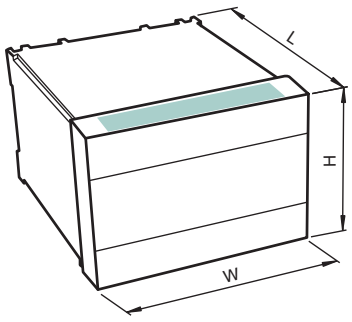
General Data	
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 2 W (without read heads)
Interface 1	
Connection of	control system
Interface type	Push-pull, parallel
Transfer rate	max. 500 Updates/s
Output stage	Push-pull output
Interface 2	
Connection of	Reading head
Connectable read heads	WCS-LS211 , WCS-LS111
Interface type	RS 485
Transmission method	half duplex
Transfer rate	max. 187.5 kBit/s
Refresh cycle of read head	1 ms
Control input	store input 2 inputs for reading head address
Output type	PNP
Signal output	error condition
Rated operational current	≤ 15 mA
Operating temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Load current	max. 5 mA
Connection type	removable terminal block



Model Number		WCS-IP110	WCS-IP111	WCS-IP120	WCS-IP121
Data output format	binary code	●		●	
	Gray code		●		●
RS485 termination resistor	integrated	●	●		
	without			●	●

Approvals and Certificates	
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

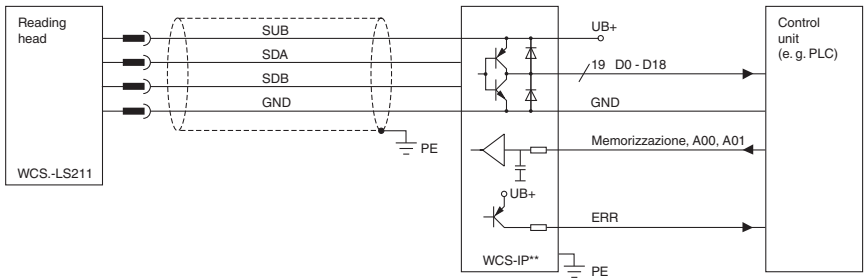
Dimensions	
Length L [mm]	121
Width W [mm]	100
Height H [mm]	74



Electrical Connection



WCS-IP110
WCS-IP111
WCS-IP120
WCS-IP121



Date of issue: 08.04.2015

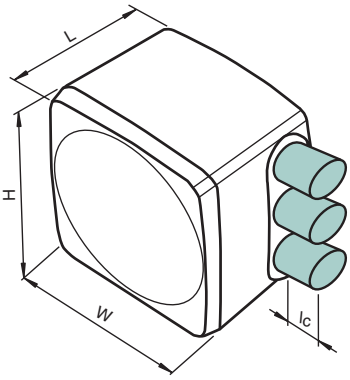


Properties

- Data Matrix, 2 axis
- 10.000 meters measurement length
- SSI interface
- DC, pnp outputs
- Configurable with PC and codecard
- Small rectangular plastic housing

Your Benefit

- Simple assembly
- Mechanically rugged
- No wearing parts
- Long operating life
- Maintenance-free



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 10000 m
Resolution	± 0.1 mm
Operating voltage	15 ... 30 V DC , PELV
No-load supply current	max. 200 mA
Interface 1	
Interface type	SSI interface
Data output code	Gray code, binary code , programmable
Clock frequency	100 ... 1000 kHz
Interface 2	
Interface type	USB (serial comport)
Protocol	8E1
Transfer rate	38.4 ... 460.8 kBit/s
Input	
Input type	1 to 2 functional inputs , programmable
Output	
Output type	1 to 2 switch outputs , PNP , programmable , short-circuit protected
Switching current	150 mA each output
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)
Housing	PC/ABS
Protection degree	IP67
Connection type	8-pin, M12 x 1 connector



Model Number	green = preferred type	PCV80-F200-SSI-V19	PCV80S-F200-SSI-V19	PCV100-F200-SSI-V19
Read distance	80 mm	●	●	
	100 mm			●
Depth of focus	± 15 mm	●	●	
	± 20 mm			●
Passage speed	≤ 12.5 m/s	●	●	
	≤ 8 m/s			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.			

Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_C [mm]	14,5

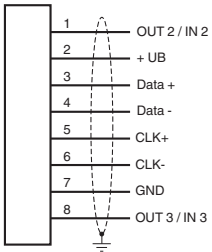
Accessories

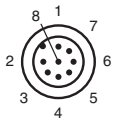
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V19-G-ABG-PG9	Cable socket, M12, 8-pin, shielded, non pre-wired
V19-G-ABG-PG9-FE	Cable socket, M12, 8-pin, shielded, non pre-wired
PCV-KBL-V19-STR-USB	USB cable unit with power supply
PCV-SC12	Grounding clip for PCV system

Electrical Connection







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CE

Properties

- Data Matrix, 2 axis
- 10.000 meters measurement length
- RS 485 interface
- DC, pnp outputs
- Configurable with PC and codecard
- Small rectangular plastic housing

Your Benefit

- Simple assembly
- Mechanically rugged
- No wearing parts
- Long operating life
- Maintenance-free

Technical Data

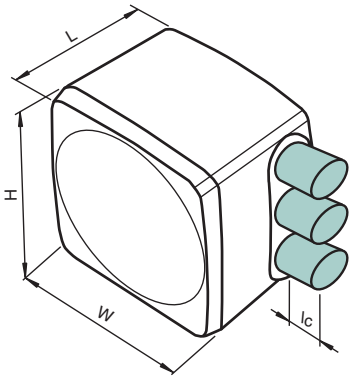
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measuring range	max. 10000 m
Resolution	± 0.1 mm
Operating voltage	15 ... 30 V DC , PELV
No-load supply current	max. 200 mA
Interface	
Interface type	RS 485 interface
Data output code	binary code
Transfer rate	38400 ... 230400 Bit/s
Termination	Switchable terminal resistor
Input	
Input type	1 to 3 functional inputs , programmable
Output	
Output type	1 to 3 switch outputs , PNP , programmable , short-circuit protected
Switching current	150 mA each output
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)
Housing	PC/ABS
Protection degree	IP67
Connection type	8-pin, M12 x 1 connector



Model Number	green = preferred type	PCV80-F200-R4-V19	PCV100-F200-R4-V19
Read distance	80 mm	●	
	100 mm		●
Depth of focus	± 15 mm	●	
	± 20 mm		●
Passage speed	≤ 12.5 m/s	●	
	≤ 8 m/s		●
Approvals and Certificates			
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		

Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14,5



Accessories

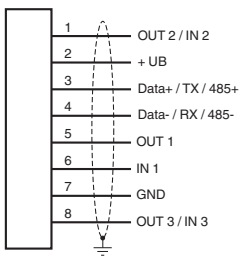
This and more accessories can be found in chapter 10

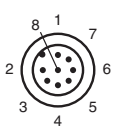
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

PCV-USB-RS485-Converter Set	USB to RS 485 interface converter
PCV-KBL-V19-STR-RS485	Cable unit with power supply for USB / RS 485 interface converter
V19-G-ABG-PG9	Cable socket, M12, 8-pin, shielded, non pre-wired
V19-G-ABG-PG9-FE	Cable socket, M12, 8-pin, shielded, non pre-wired
PCV-SC12	Grounding clip for PCV system

Electrical Connection







Ausgabedatum 08.04.2015



CE

Properties

- Data Matrix, 2 axis
- 524 meters measurement length
- RS 485 interface
- DC, pnp output
- Configurable with PC and codecard
- Small rectangular plastic housing

Your Benefit

- Simple assembly
- Mechanically rugged
- No wearing parts
- Long operating life
- Maintenance-free

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV80-F200-R4-V15-LS221
Read distance	80 mm
Measuring range	max. 524 m
Resolution	± 1 mm
Depth of focus	± 15 mm
Passage speed	≤ 12.5 m/s
Operating voltage	15 ... 30 V DC , PELV
No-load supply current	max. 200 mA
Interface	
Interface type	RS 485 interface
Data output code	binary code
Protocol	WCS...B-LS221
Transfer rate	62500 Bit/s
Termination	Switchable terminal resistor
Input	
Input type	1 funtion input 0-level: -$U_B$or unwired 1-level: +8 V ... +U_B , programmable
Output	
Output type	1 switch output PNP , programmable , short-circuit protected
Switching current	150 mA each output
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)
Housing	PC/ABS
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

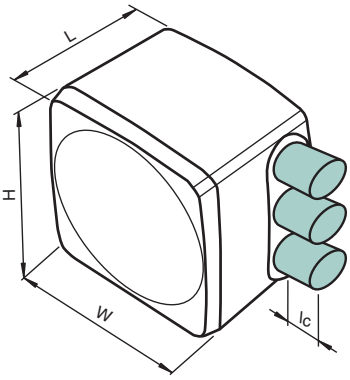
Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14.5

Accessories

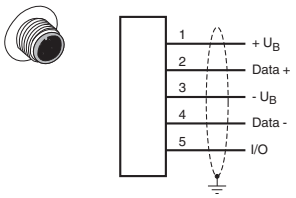
This and more accessories can be found in chapter 10

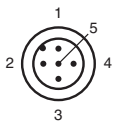
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-G-ABG-PG9	Cable socket, M12, 5-pin, shielded, non pre-wired
V15-G-ABG-PG9-FE	Cable socket, M12, 5-pin, shielded, non pre-wired
PCV-SC12	Grounding clip for PCV system



Electrical Connection





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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV80-F200-B6-V15B
Read distance	80 mm
Measuring range	max. 10000 m
Resolution	± 0.1 mm
Depth of focus	± 15 mm
Passage speed	≤ 12.5 m/s
Operating voltage	15 ... 30 V DC , PELV
No-load supply current	max. 400 mA
Interface 1	
Interface type	PROFIBUS DP V0
Protocol	PROFIBUS DP acc. to EN 50170
Transfer rate	9.6; 19.2; 93.75; 187.5; 500; 1500 kBit/s 3; 6; 12 Mbit/s self-synchronizing
Interface 2	
Interface type	USB (serial comport)
Protocol	8E1
Transfer rate	38.4 ... 460.8 kBit/s
Input	
Input type	1 to 3 functional inputs , programmable
Output	
Output type	1 to 3 switch outputs , PNP , programmable , short-circuit protected
Switching current	150 mA each output
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)
Housing	PC/ABS
Protection degree	IP67
Connection type	8-pin, M12x1 connector, standard (supply+IO) M12x1 socket, 5-pin, B-coded (Bus Out) 5-pin, M12x1 connector, B-coded (Bus In)



Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

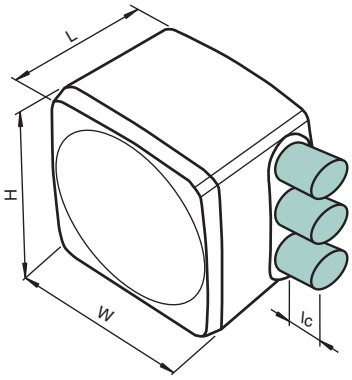
Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14.5

Properties

- Data Matrix, 2 axis
- 10.000 meters measurement length
- PROFIBUS interface
- DC, pnp outputs
- PLC configurable via fieldbus
- Configurable with PC and codecard
- Small rectangular plastic housing

Your Benefit

- Simple assembly
- Mechanically rugged
- No wearing parts
- Long operating life
- Maintenance-free



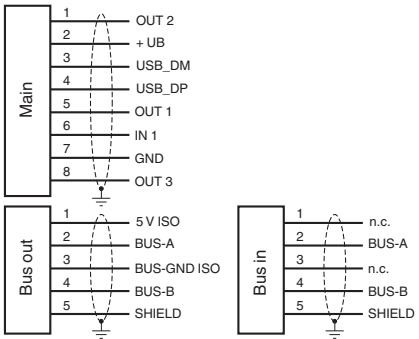
Accessories

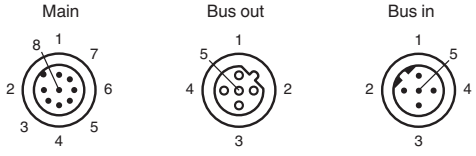
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

PCV-KBL-V19-STR-USB	USB cable unit with power supply
ICZ-TR-V15B	Terminal resistor for PROFIBUS
V15B-G-2M-PUR ABG-V15B-G	Bus cable PROFIBUS, M12 to M12, PUR cable
V15B-G-5M-PUR ABG-V15B-G	Bus cable PROFIBUS, M12 to M12, PUR cable
PCV-SC12	Grounding clip for PCV system

Electrical Connection







Ausgabedatum 08.04.2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV80-F200-B17-V1D
Read distance	80 mm
Measuring range	max. 10000 m
Resolution	± 0.1 mm
Depth of focus	± 15 mm
Passage speed	≤ 12.5 m/s
Operating voltage	15 ... 30 V DC , PELV
No-load supply current	max. 400 mA
Interface 1	
Interface type	100 BASE-TX
Protocol	PROFINET IO Real-Time (RT) Conformance class A
Transfer rate	100 MBit/s
Interface 2	
Interface type	USB Service
Input	
Input type	1 funtion input 0-level: -UBor unwired 1-level: +8 V ... +UB , programmable
Input impedance	≥ 27 kOhm
Output	
Output type	1 to 3 switch outputs , PNP , programmable , short-circuit protected
Switching current	150 mA each output
Operating temperature	0 ... 60 °C (32 ... 140 °F) , -20 ... 60 °C (-4 ... 140 °F) (noncondensing; prevent icing on the lens!)
Housing	PC/ABS
Protection degree	IP67
Connection type	8-pin, M12x1 connector, standard (supply+IO) M12x1 socket, 4-pin, D-coded (LAN) M12x1 socket, 4-pin, D-coded (LAN)



Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

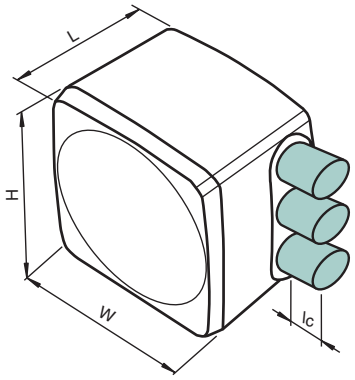
Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14.5

Properties

- Data Matrix, 2 axis
- 10.000 meters measurement length
- PROFINET interface
- DC, pnp outputs
- PLC configurable via fieldbus
- Configurable with PC and codecard
- Small rectangular plastic housing

Your Benefit

- Simple assembly
- Mechanically rugged
- No wearing parts
- Long operating life
- Maintenance-free



Accessories

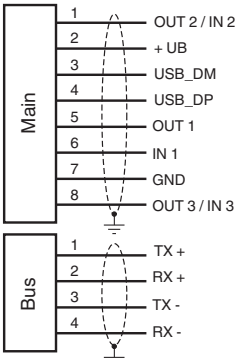
This and more accessories can be found in chapter 10

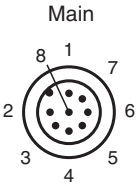
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

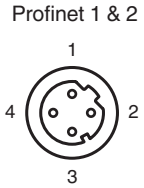
V19-G-2M-PUR-ABG	Female cordset, M12, 8-pin, shielded, PUR cable
PCV-AG80	Alignment guide for PCV80-* read head
V1SD-G-2M-PUR-ABG-V1SD-G	Ethernet bus cable, M12 to M12, PUR cable 4-pin, CAT5e
V1SD-G-5M-PUR-ABG-V1SD-G	Ethernet bus cable, M12 to M12, PUR cable 4-pin, CAT5e
PCV-SC12	Grounding clip for PCV system

Electrical Connection









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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV*-CA10-*
Length	6 ... 100 m (see Order Information)
Start position	0 … 9900 m (see Order Information)
Operating temperature	-40 ... 150 °C (-40 ... 302 °F)
Installation temperature	10 ... 40 °C (50 ... 104 °F)
Environmental resistance	UV radiation Humidity Salt spray (150 h / 5%)
Chemical resistance	Oils Grease Fuels Aliphatic solvents Weak acids
Material thickness	150 µm
Material	polyester laminate
Surface	polyester , matte
Tensile strength	≥ 60 N
Adhesive	Acrylate-based adhesive ; curing 72 h
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm PP : 18 N / 25 mm HD-PE : 12 N / 25 mm LD-PE : 12 N / 25 mm

Properties

- **Data Matrix code reel**
- **Self adhesive**
- **Versions of various lenth**
- **Versions of various starting positi-ons**

Your Benefit

- **High chemical resistance**
- **Low weight**
- **High temperature resistance**
- **High mechanical stability**

Order Information

P	C	V				M	-	C	A	1	0	-						

Position Coding System, Vision Technology

Absolute band length
xxx 6 ... 100 meter

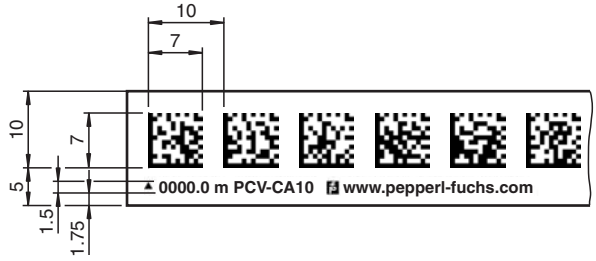
Code: Data Matrix ECC200; matrix size 12x12

Absolute band

Absolute band width
10 15 mm (1 row version)

Starting position
xxxxxx **0 ... 990000 cm**

Dimensions



Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV*-CA20-*
Length	6 ... 100 m (see Order Information)
Start position	0 … 9900 m (see Order Information)
Operating temperature	-40 ... 150 °C (-40 ... 302 °F)
Installation temperature	10 ... 40 °C (50 ... 104 °F)
Environmental resistance	UV radiation Humidity Salt spray (150 h / 5%)
Chemical resistance	Oils Grease Fuels Aliphatic solvents Weak acids
Material thickness	150 µm
Material	polyester laminate
Surface	polyester , matte
Tensile strength	≥ 150 N
Adhesive	Acrylate-based adhesive ; curing 72 h
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm PP : 18 N / 25 mm HD-PE : 12 N / 25 mm LD-PE : 12 N / 25 mm

Properties

- **Data Matrix code reel**
- **Self adhesive**
- **Versions of various lenth**
- **Versions of various starting positi-ons**

Your Benefit

- **High chemical resistance**
- **Low weight**
- **High temperature resistance**
- **High mechanical stability**

Order Information

P	C	V				M	-	C	A	2	0	-						

Starting position
xxxxxx **0 ... 990000 cm**

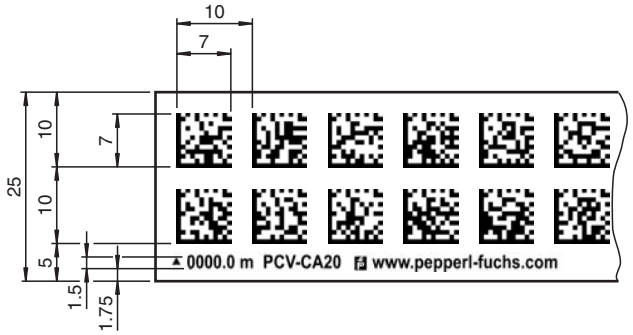
Absolute band width
20 25 mm (2 rows version)

Absolute band
Code: Data Matrix ECC200; matrix size 12x12

Absolute band length
xxx 6 ... 100 meter

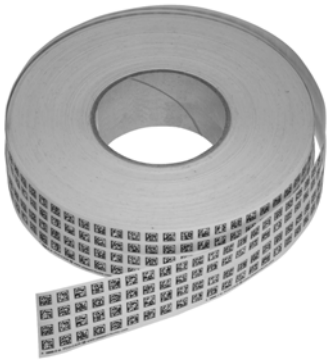
Position Coding System, Vision Technology

Dimensions



Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV*-CA40-*
Length	6 ... 100 m (see Order Information)
Start position	0 … 9900 m (see Order Information)
Operating temperature	-40 ... 150 °C (-40 ... 302 °F)
Installation temperature	10 ... 40 °C (50 ... 104 °F)
Environmental resistance	UV radiation Humidity Salt spray (150 h / 5%)
Chemical resistance	Oils Grease Fuels Aliphatic solvents Weak acids
Material thickness	150 µm
Material	polyester laminate
Surface	polyester , matte
Tensile strength	≥ 270 N
Adhesive	Acrylate-based adhesive ; curing 72 h
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm PP : 18 N / 25 mm HD-PE : 12 N / 25 mm LD-PE : 12 N / 25 mm

Properties

- **Data Matrix code reel**
- **Self adhesive**
- **Versions of various lenth**
- **Versions of various starting positions**

Your Benefit

- **High chemical resistance**
- **Low weight**
- **High temperature resistance**
- **High mechanical stability**

Order Information

P	C	V				M	-	C	A	4	0	-						

Starting position
xxxxxx **0 ... 990000 cm**

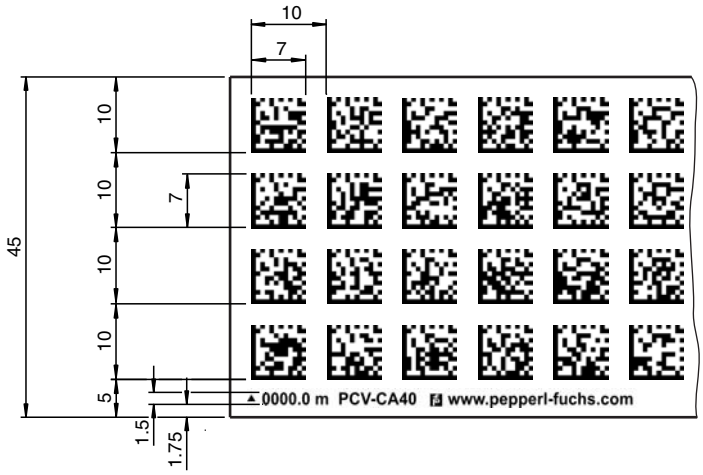
Absolute band width
40 45 mm (4 rows version)

Absolute band
Code: Data Matrix ECC200; matrix size 12x12

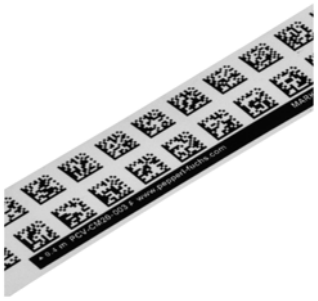
Absolute band length
xxx 6 ... 100 meter

Position Coding System, Vision Technology

Dimensions



Date of issue: 2015-04-08



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV-CM20-***
Number interval	1 ... 998 = marker number (see Order Information)
Length	1000 mm
Operating temperature	-40 ... 150 °C (-40 ... 302 °F)
Installation temperature	10 ... 40 °C (50 ... 104 °F)
Environmental resistance	UV radiation Humidity Salt spray (150 h / 5%)
Chemical resistance	Oils Grease Fuels Aliphatic solvents Weak acids
Material thickness	150 µm
Material	polyester laminate
Surface	polyester , matte
Tensile strength	≥ 150 N
Adhesive	Acrylate-based adhesive ; curing 72 h
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm PP : 18 N / 25 mm HD-PE : 12 N / 25 mm LD-PE : 12 N / 25 mm

Properties

- **Data Matrix event marker reel**
- **Self adhesive**
- **Marker number 001 ... 998**

Your Benefit

- **Easy creation of event triggers by simply pasting over the existing code reel**
- **Provides high plant flexibility**

Order Information

P	C	V	-	C	M			-			

Marker number
xxx 001 ... 998

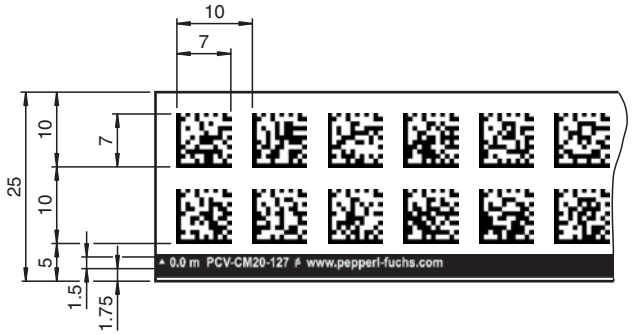
Marker band width
10 16 mm (single row version)
20 25 mm (2 rows version)

Marker band

Code

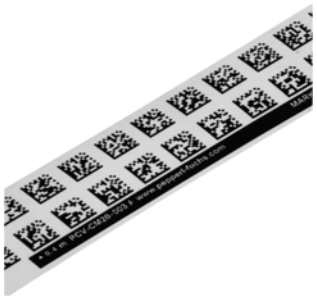
Position Coding System, Vision Technology

Dimensions



Date of issue: 2015-04-08

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PCV-CR20
Length	1000 mm
Operating temperature	-40 ... 150 °C (-40 ... 302 °F)
Installation temperature	10 ... 40 °C (50 ... 104 °F)
Environmental resistance	UV radiation Humidity Salt spray (150 h / 5%)
Chemical resistance	Oils Grease Fuels Aliphatic solvents Weak acids
Material thickness	150 µm
Material	polyester laminate
Surface	polyester , matte
Tensile strength	≥ 150 N
Adhesive	Acrylate-based adhesive ; curing 72 h
Adhesive strength	Average values (FTM2) aluminum : 24 N / 25 mm High grade stainless steel : 25 N / 25 mm ABS : 22 N / 25 mm PP : 18 N / 25 mm HD-PE : 12 N / 25 mm LD-PE : 12 N / 25 mm

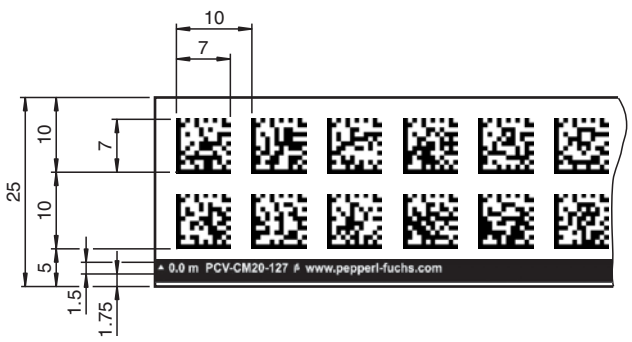
Properties

- **Data Matrix repair tape**
- **Self adhesive**
- **Incremental, 1 meter long**

Your Benefit

- **Easy repair by simply pasting over the damaged code reel**
- **Provides a high level of system availability**

Dimensions



Date of issue: 2015-04-08



CE

Properties

- 360° / up to 200 revolutions
- DC, 14 pnp switching and 6 analog outputs
- Up to 16 cams/output
- Configuration with PC
- Rectangular plastic housing

Your Benefit

- Easy installation and fast adaptation
- Intuitive operating and parameterizing software
- Wear–free and resistant to environmental influences
- Suitable for field use

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PAX001-F160-6I14E2-B14
Operating voltage	20 ... 30 V DC
No-load supply current	≤ 90 mA (without sensor)
Operating display	LED, green
Status indication	8 LEDs , red and yellow
Interface	
Interface type	USB 2.0 for parameterization tool
Input	
Input type	RS 232 interface for Ind. angular measuring system
Output	
Output type	12 switch outputs PNP, short circuit / overload protected 2 high power outputs PNP, short circuit / overload protected
Operating current	switch outputs: ≤ 250 mA , total ≤ 1.5 A high power outputs: ≤ 2.5 A , total ≤ 2.5 A
Short-circuit protection	pulsing
Analog output	
Output type	6 current outputs 4 ... 20 mA (current sinks)
Load resistor	≤ 600 Ω at 24 V DC
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	X1, M23 connector X2, M12 x 1 socket X3, M12 x 1 socket X4, M12 x 1 connector



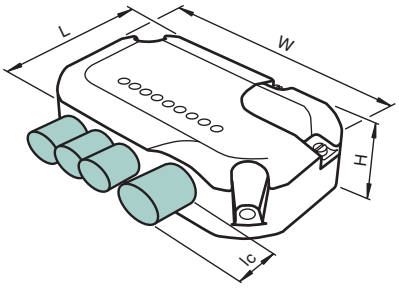
Dimensions	
Length L [mm]	150
Width W [mm]	90
Height H [mm]	33
Connector area I_c [mm]	23

Accessories

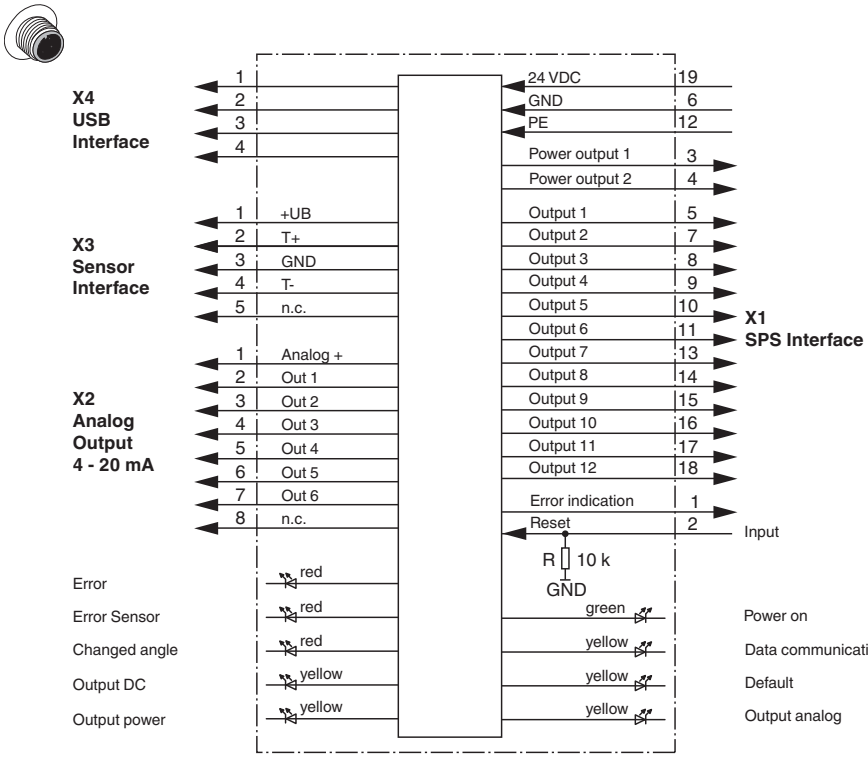
This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

PMI360D-F130-R2-V15	Position sensor for PAX001
V23-19-G-10M-PUR	Cable socket, M23, 19-pin, PUR cable
V15-G-2M-PUR-V15-G	Connecting cable, M12 to M12, PUR cable 5-pin
PAX001-F130-USD-CARD	Micro SD memory card
V23-19-G	Field attachable female cordset
V19S-G-ABG-PG9	Cable connector, M12, 8-pin, shielded, non pre-wired
V19S-G-BK5M-PUR-U/ABG	Cable connector, M12, 8-pin, PUR cable, shielded
V1-G-2M-PVC-USBA	adapter cable, M12 to USB, 4-pin PVC cable



Electrical Connection



Ausgabedatum: 08.04.2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	PMI360D-F130-R2-V15
Measurement range	0 ... 360 °
Rotational speed	≤ 100 min^{-1}
Operating voltage	supplied by evaluation unit (PAX001...)
No-load supply current	≤ 45 mA
Reverse polarity protected	reverse polarity protected
Repeat accuracy	0.5°
Resolution	0.2 °
LED yellow	RS 232
LED PWR/ERR	status display LED, green/red (Power on / missing actuator)
Interface	
Interface type	RS 232, for communication with interface box PAX...
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	PBT
Protection degree	IP67
Connection type	M12 x 1 connector, 5-pin
	

Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.

Dimensions	
Length L [mm]	110
Width W [mm]	76.5
Height H [mm]	26
Connector area l_c [mm]	20

Properties

- **Measuring range 0 ... 360°**
- **PAX001 communication interface**
- **Rectangular plastic housing**

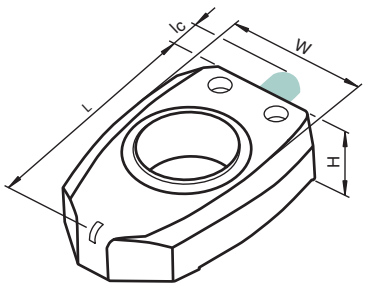
Your Benefit

- **Rugged and wearless angular measuring system**
- **Concentricity tolerant, even with self-made actuator**

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

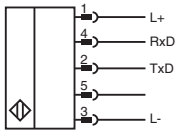
BT-F130-A	Actuator for F130 series
V15-G-2M-PUR-V15-G	Connecting cable, M12 to M12, PUR cable 5-pin

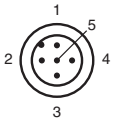


Electrical Connection



PMI360D-F130-R2-V15





Ausgabedatum 08.04.2015

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	BT-F90-G
Material	Steel ST37/1.0037
Description	Actuator for F90 inductive positioning system

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Common data	
Function	Mounting bracket for the inductive positioning system
Material	Zinc-coated sheet steel
Scope of delivery	2 units

Model number		MH-F90	MH-F110
Inductive positioning system	F90	●	
	F110		●

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	BT-F110-G
Material	Steel ST37/1.0037
Description	Actuator for F110 inductive positioning system

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	BT-F110-W
Material	Steel ST37/1.0037
Description	Actuator for F110 inductive positioning system

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	BT-F130-A
Material	Housing: PBT Spacer: PP Cap plugs: PBT Mounting screw: V2A
Description	Actuator for F130 inductive positioning system
Shaft diameter	< 27.5 mm
Shaft height	20 mm

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	OMH-LS610-01
Material	Black anodized aluminum Black zinc-coated steel
Description	Mounting bracket for VDM100 laser distance measurement devices

Issue date:26.08.2014

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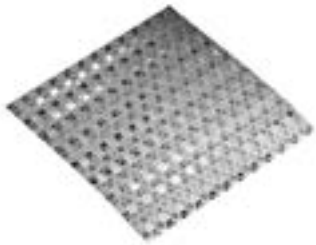
Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**OMH-LS610-02**
Material	Brass
Description	Direct mounting set comprising 4 M4 threaded inserts for VDM100 laser distance measurement devices

Technical Data

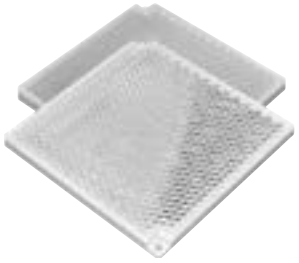


*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**OFR-100/100**
Description	100 mm x 100 mm reflective tape for VDM35 and VDM70 laser distance measurement devices
Ambient temperature	-20 °C ... 85 °C

Self-adhesive

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**REF-H100-2R**
Material	PMMA
Description	100 mm x 100 mm reflector for VDM54 laser distance measurement devices
Ambient temperature	-20 °C ... 85 °C

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**REF-500MMx500MM**
Description	500 mm x 500 mm reflective tape for VDM100 laser distance measurement devices
Ambient temperature	-20 °C ... 85 °C

Self-adhesive

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**Protective cap LS610**
Description	For VDM100 laser distance measurement devices

Technical Data



*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.com***

Model number	**Functional grounding LS610/VDM100**
Description	For VDM100 laser distance measurement devices

Issue date:26.08.2014

Contents

Inclination and Acceleration Sensors



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SENSING YOUR NEEDS

6. Inclination and Acceleration Sensors

Overview/Selection Table 818

Introduction 820

Data Section

6.1 Inclination Sensors 821

6.2 Acceleration Sensors 826

Inclination Sensors	

Series	INX	INY
	Page 821 ff	Page 821 ff
	• Measurement range 360° • Single axis • Programmable switching window • Programmable analog window	• Measurement range 360° • Dual axis • Programmable switching windows • Programmable analog windows
Specifications		
Measurement angle	up to 360°	up to 360° in both axes
Resolution	up to 0.01°	up to 0.01°
Absolute accuracy	0.5°	0.5°
Operating voltage	10 VDC ... 30 VDC	10 VDC ... 30 VDC
Connection type		
Cable	●	●
Plug	●	●
Interface		
Analog output	●	●
Switching output	●	●
CANopen	●	●

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Acceleration Sensors

ACX	ACY	Series
Page 826	Page 826	
• Single axis • Measuring range ± 2 *g* • Analog output	• Dual axis • Measuring range ± 2 *g* in both axes • Analog outputs	
		Specifications
-2 *g* to 2 *g*	-2 *g* to 2 *g* in both axes	**Measuring range**
5 m*g*	5 m*g*	**Resolution**
5 m*g*	5 m*g*	**Repeatability**
10 VDC ... 30 VDC	10 VDC ... 30 VDC	**Operating voltage**
		Connection type
		Cable
●	●	**Plug**
		Interface
●	●	**Analog output**
		Switching output
		CANopen

Introduction

Do you want to monitor the inclination angle of your machine components or the acceleration values of sensitive system components?

The F99 Series of inclination and acceleration sensors by Pepperl+Fuchs offers the ideal solution. Our precise and adjustable systems for inclination and acceleration monitoring are ideal for mobile equipment, renewable energy, and factory automation applications. They provide simple solutions for protecting your investment over the long-term.

Highlights

- *Customer-specific adjustment of measuring ranges and*
- *outputs*
- *Intelligent mounting concept with impact protection*
- *High IP68 and IP69K degree of protection*
- *Robust housing suitable for outdoor use*
- *Extended temperature range -40 °C ... +85 °C*
- *Highly resistant to mechanical shock 100 g*
- *Increased immunity 100 V/m*
- *e1 approval for use on public roads*
- *CSA approval for worldwide use*
- *Wear-free and without actuator*

Benefits

Mounting concept

- *The F99 Series incorporates a robust metal mounting bracket with four screw holes and a sensor module, for separate and flexible mounting*
- *Integrated hex socket screw that enables the sensor module to be used quickly and easily replaced without having to remove the mounting bracket*
- *A captive locking wedge in the bracket ensures optimum distribution of forces in the event of machine vibrations*



Simple mounting with a central screw

Adjustability

- *All F99 Series products can be adjusted by the customer*
-

Filters and angle ranges can be adapted to suit your application

Housing concept

- *Particularly suitable for applications under extreme conditions and for outdoor applications*
- *Water resistance and extreme shock resistance ensure a long service life*

Typical areas of application

F99 inclination sensor

- ***Commercial vehicle sector***
  for leveling cranes, liftgates, container-loading equipment, etc.
- ***Construction machinery,***
  e.g., for monitoring the inclined position of excavators
- ***Transport and loading units***
  for automatic horizontal alignment of inclined positions
- ***Solar power systems***
  for optimum solar tracking
- ***Automobile production plants***
  for monitoring rotation during assembly
- ***Rail and marine vessels***
  for ensuring equal loading
- ***Metal processing***
  e.g., for monitoring the movement sequences of stamping and pressing machines

F99 acceleration sensor

- ***Wind power plants or large machinery***
  for shutting down when defined vibration values are exceeded
- ***Elevators***
  to control acceleration
- ***Large plants***
  for status monitoring
- ***Machines***
  for measuring vibrations
- ***Robots and picker arms***
  to control acceleration

In short–what does your plant need?

Inclination…

Static value that is suitable for movement sequences that are not subject to extreme changes. The static value for the inclination is used for long-term monitoring of the machine to determine if readjustment is required.

… based on the example of a lifting platform

Continuous monitoring and leveling of the vehicle, working platform, or overall system.

Acceleration…

Dynamic value that needs to be monitored in order to quickly identify short-term dynamic influences on the machine.

… based on the example of a lifting platform

To prevent a dangerous situation when the lifting platform is extended and may be influenced by a sudden gust of high wind. This will permit early detection by the control system and readjustment before a permissible inclination angle is exceeded.

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

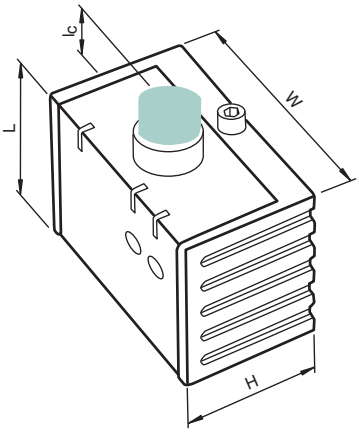
General Data	
No-load supply current	≤ 65 mA
Data output code	binary code
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K
Connection type	M12 x 1 connector, 5-pin



Model Number		INX360D-F99-B16-V15	INY360D-F99-B16-V15	INY030D-F99-B16-V15	INX360D-F99-B20-V15	INY360D-F99-B20-V15	INY030D-F99-B20-V15
	green = preferred type						
Type	Inclination sensor, 1-axis	●			●		
	Inclination sensor, 2-axis		●	●		●	●
Measurement range	0 ... 360 °	●	●		●	●	
	-15 ... 15 °			●			●
Absolute accuracy	≤ ± 0.5 °	●	●		●	●	
	≤ ± 0.2 °			●			●
Resolution	≤ 0.1 °	●	●		●	●	
	≤ 0.01 °			●			●
Operating voltage	10 ... 30 V DC	●	●	●			
	10 ... 60 V DC				●	●	●
Interface type	CANopen, profile CiA410, Ver. 1.2	●	●	●			
	J1939 protocol				●	●	●
Transfer rate	125 ... 1000 kBit/s , programmable	●	●	●			
	10 ... 1000 kBit/s , programmable				●	●	●
Node ID	1 ... 127 , programmable	●	●	●			
	0 ... 253 , programmable				●	●	●
Approvals and Certificates							
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●	●	●	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●	●	●	●	●
e1 Type approval	2006/28/EG	●	●	●	●	●	●
Dimensions							
Length L [mm]		44					
Width W [mm]		65					
Height H [mm]		37					
Connector area l_c [mm]		18.5					

Properties

- 1 and 2 axes measurement
- 30° and 360° measurement range versions
- CANopen and J1939 protocol versions
- Connector version



Accessories

This and more accessories can be found in chapter 10

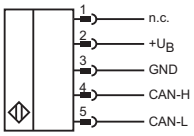
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

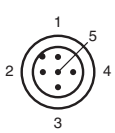
V15-G-2M-PUR-CAN-V15-G	DeviceNet/CANOpen bus cable, M12 to M12, PUR cable 5-pin
V15-G-5M-PUR-CAN-V15-G	DeviceNet/CANOpen bus cable, M12 to M12, PUR cable 5-pin
V15-G-10M-PUR-CAN-V15-G	DeviceNet/CANOpen bus cable, M12 to M12, PUR cable 5-pin
V15S-T-CAN/DN-V15	T distributor, M12 socket on M12 connector/socket
ICZ-TR-CAN/DN-V15	Terminal resistor for DeviceNet, CANopen

Electrical Connection



INX360D-F99-B16-V15
INY030D-F99-B16-V15
INY360D-F99-B16-V15
INX360D-F99-B20-V15
INY030D-F99-B20-V15
INY360D-F99-B20-V15

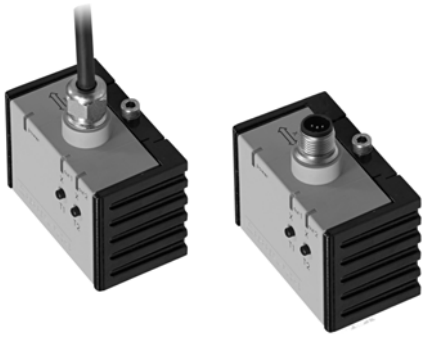




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum 08.04.2015



Properties

- 1 axis measurement
- 360° measurement range
- Analog and switching outputs
- Cable and connector versions

Technical Data

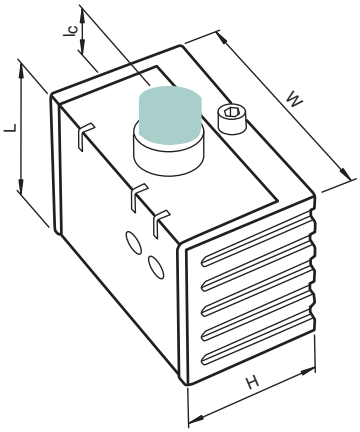
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type	Inclination sensor, 1-axis
Measurement range	0 ... 360 °
Absolute accuracy	≤ ± 0.5 °
Resolution	≤ 0.1 °
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Switch output	
Output type	2 switching outputs PNP, NO , reverse polarity and short-circuit protected
Operating current	≤ 100 mA
Analog output	
Output type	1 current output 4 ... 20 mA
Load resistor	0 ... 200 Ω at U_B = 10 ... 18 V 0 ... 500 Ω at U_B = 18 ... 30 V
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K

Model Number		INX360D-F99-I2E2-5M	INX360D-F99-I2E2-V15
	green = preferred type		
Connection type	M12 x 1 connector, 5-pin		●
	5 m, PUR cable 5 x 0.5 mm²	●	

Approvals and Certificates			
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
e1 Type approval	2006/28/EG	●	●

Dimensions		
Length L [mm]	44	
Width W [mm]	65	
Height H [mm]	37	
Connector area l_c [mm]	22	18.5



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

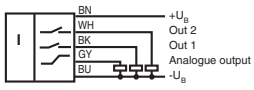
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



INX360D-F99-I2E2-5M

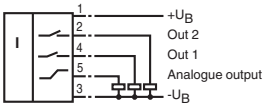
Standard symbol/Connection:

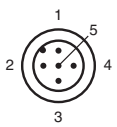




INX360D-F99-I2E2-V15

Standard symbol/Connection:





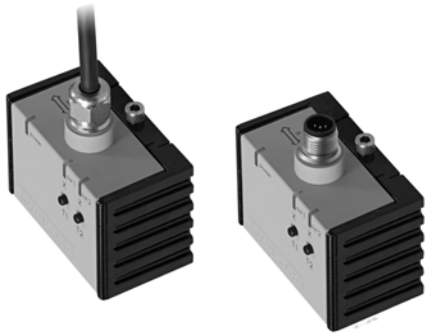
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum: 08.04.2015

Consider the General Notes on the Information in the Pepperl+Fuchs Product Catalogs
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PEPPERL+FUCHS SENSING YOUR NEEDS



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type	Inclination sensor, 1-axis
Measurement range	0 ... 360 °
Absolute accuracy	≤ ± 0.5 °
Resolution	≤ 0.1 °
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Switch output	
Output type	2 switching outputs PNP, NO , reverse polarity and short-circuit protected
Operating current	≤ 100 mA
Analog output	
Output type	1 voltage output 0 ... 5 V
Load resistor	≥ 1 kΩ
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K

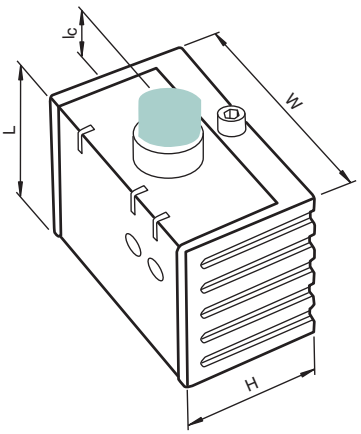
Model Number		INX360D-F99-U2E2-5M	INX360D-F99-U2E2-V15
Connection type	M12 x 1 connector, 5-pin		●
	5 m, PUR cable 5 x 0.5 mm²	●	

Approvals and Certificates			
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
e1 Type approval	2006/28/EG	●	●

Dimensions		
Length L [mm]	44	
Width W [mm]	65	
Height H [mm]	37	
Connector area l_c [mm]	22	18.5

Properties

- 1 axis measurement
- 360° measurement range
- Analog and switching outputs
- Cable and connector versions



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

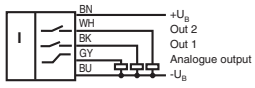
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable

Electrical Connection



INX360D-F99-U2E2-5M

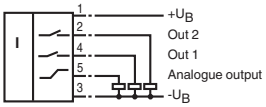
Standard symbol/Connection:

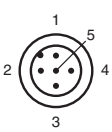




INX360D-F99-U2E2-V15

Standard symbol/Connection:

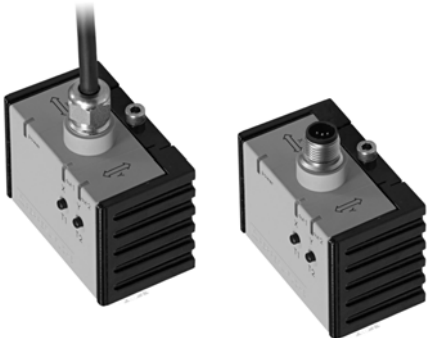




Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum 08.04.2015



Properties

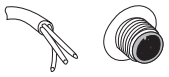
- 2 axes measurement
- 30° and 360° measurement range versions
- Analog and switching outputs
- Cable and connector versions

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

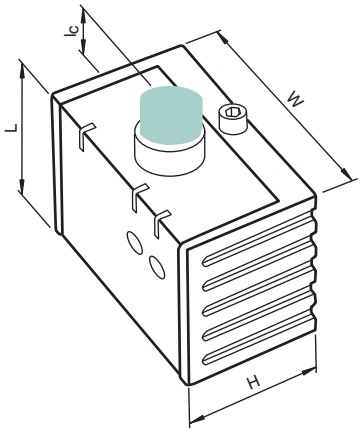
General Data	
Type	Inclination sensor, 2-axis
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Switch output	
Output type	2 switching outputs PNP, NO , reverse polarity and short-circuit protected
Operating current	≤ 100 mA
Analog output	
Output type	2 current outputs 4 ... 20 mA (one output for each axis)
Load resistor	0 ... 200 Ω at U_B = 10 ... 18 V 0 ... 500 Ω at U_B = 18 ... 30 V
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K

Model Number	green = preferred type	INY360D-F99-2I2E2-5M	INY030D-F99-2I2E2-5M	INY360D-F99-2I2E2-V17	INY030D-F99-2I2E2-V17
Measurement range	0 ... 360 °	●		●	
	-15 ... 15 °		●		●
Absolute accuracy	≤ ± 0.5 °	●		●	
	≤ ± 0.2 °		●		●
Resolution	≤ 0.1 °	●		●	
	≤ 0.01 °		●		●
Connection type	8-pin, M12 x 1 connector			●	●
	5 m, PUR cable 7 x 0.5 mm²	●	●		



Approvals and Certificates			
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
e1 Type approval	2006/28/EG	●	●

Dimensions		
Length L [mm]	44	
Width W [mm]	65	
Height H [mm]	37	
Connector area l_c [mm]	22	18.5



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

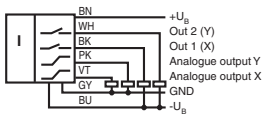
V17-G-2M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-5M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-10M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-10M-PVC ABG	Cable socket, M12, 8-pin, shielded, PVC cable

Electrical Connection



INY030D-F99-2I2E2-5M
INY360D-F99-2I2E2-5M

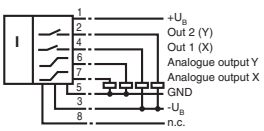
Standard symbol/Connection:

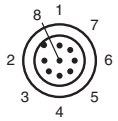




INY360D-F99-2I2E2-V17
INY030D-F99-2I2E2-V17

Standard symbol/Connection:





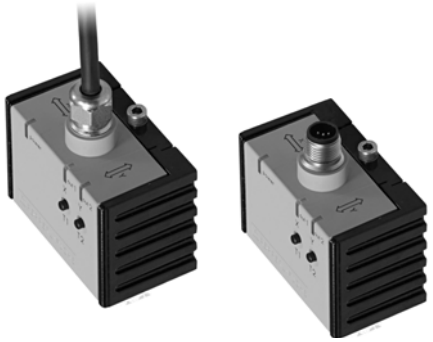
Wire colors

1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Ausgabedatum: 08.04.2015

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Technical Data

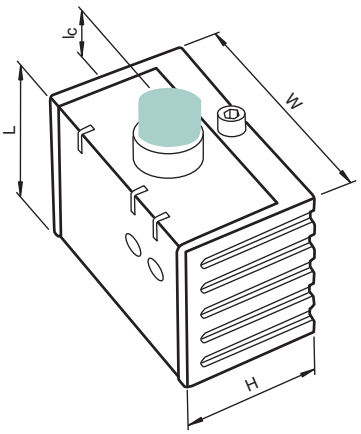
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type	Inclination sensor, 2-axis
Measurement range	0 ... 360 °
Absolute accuracy	≤ ± 0.5 °
Resolution	≤ 0.1 °
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Switch output	
Output type	2 switch outputs PNP, NO , reverse polarity protected , short-circuit protected
Operating current	≤ 100 mA
Analog output	
Output type	2 voltage outputs 0 ... 5 V (one output for each axis)
Load resistor	≥ 1 kΩ
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K

Properties

- 2 axes measurement
- 360° measurement range
- Analog and switching outputs
- Cable and connector versions

Model Number		INY360D-F99-2U2E2-5M	INY360D-F99-2U2E2-V17
Connection type	8-pin, M12 x 1 connector		●
	5 m, PUR cable 7 x 0.5 mm²	●	
Approvals and Certificates			
CSA approval	cCSAus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.	●	●
e1 Type approval	2006/28/EG	●	●
Dimensions			
Length L [mm]		44	
Width W [mm]		65	
Height H [mm]		37	
Connector area l_c [mm]		22	18.5



Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

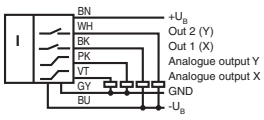
V17-G-2M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-5M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-10M-PUR	Cable socket, M12, 8-pin, shielded, PUR cable
V17-G-10M-PVC ABG	Cable socket, M12, 8-pin, shielded, PVC cable

Electrical Connection



INY360D-F99-2U2E2-5M

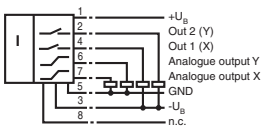
Standard symbol/Connection:

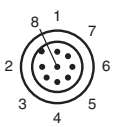




INY360D-F99-2U2E2-V17

Standard symbol/Connection:





Wire colors

1	WH	(white)
2	BN	(brown)
3	GN	(green)
4	YE	(yellow)
5	GY	(gray)
6	PK	(pink)
7	BU	(blue)
8	RD	(red)

Ausgabedatum 08.04.2015



Properties

- 1 and 2 axes measurement
- ±2*g* measurement range
- Analog output(s)
- Connector version

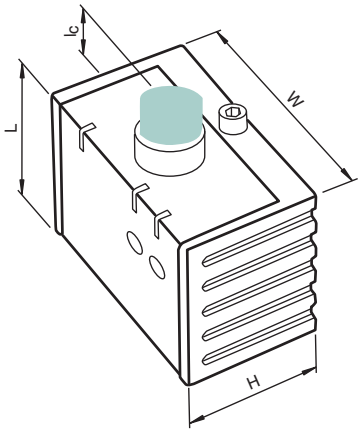
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Measurement range	-2 ... 2 *g*
Resolution	≤ 5 m*g*
Frequency range	0 ... 100 Hz
Operating voltage	10 ... 30 V DC
No-load supply current	≤ 25 mA
Operating display	LED, green
TEACH-IN indication	LED, yellow
Zero signal	12 mA
Slope of output characteristic	4 mA / *g*
Linearity error	± 1.2 %
Analog output	
Load resistor	0 ... 200 Ω at U_B = 10 ... 18 V 0 ... 500 Ω at U_B = 18 ... 30 V
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Housing material	PA
Protection degree	IP68 / IP69K
Connection type	M12 x 1 connector, 5-pin



Model Number		ACX04-F99-I-V15	ACY04-F99-2I-V15
	green = preferred type		
Type	1 axis acceleration sensor	●	
	2 axis acceleration sensor		●
Analog output			
Output type	1 current output 4 ... 20 mA	●	
	2 current outputs 4 ... 20 mA (one output for each axis)		●
Approvals and Certificates			
CSA approval	cCSAus Listed, General Purpose	●	●
CCC approval	Products with a maximum operating voltage of ≤36 V do not bear a CCC marking because they do not require approval.		
e1 Type approval	2006/28/EG	●	●
Dimensions			
Length L [mm]		44	
Width W [mm]		65	
Height H [mm]		37	
Connector area l_c [mm]		18,5	



Accessories

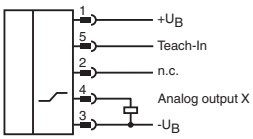
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V15-W-2M-PUR	Cable socket, M12, 5-pin, PUR cable
V15-G-2M-PUR	Cable socket, M12, 5-pin, PUR cable

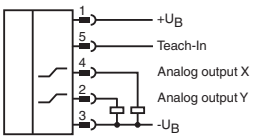
Electrical Connection

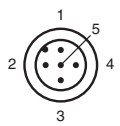


ACX04-F99-I-V15



ACY04-F99-2I-V15





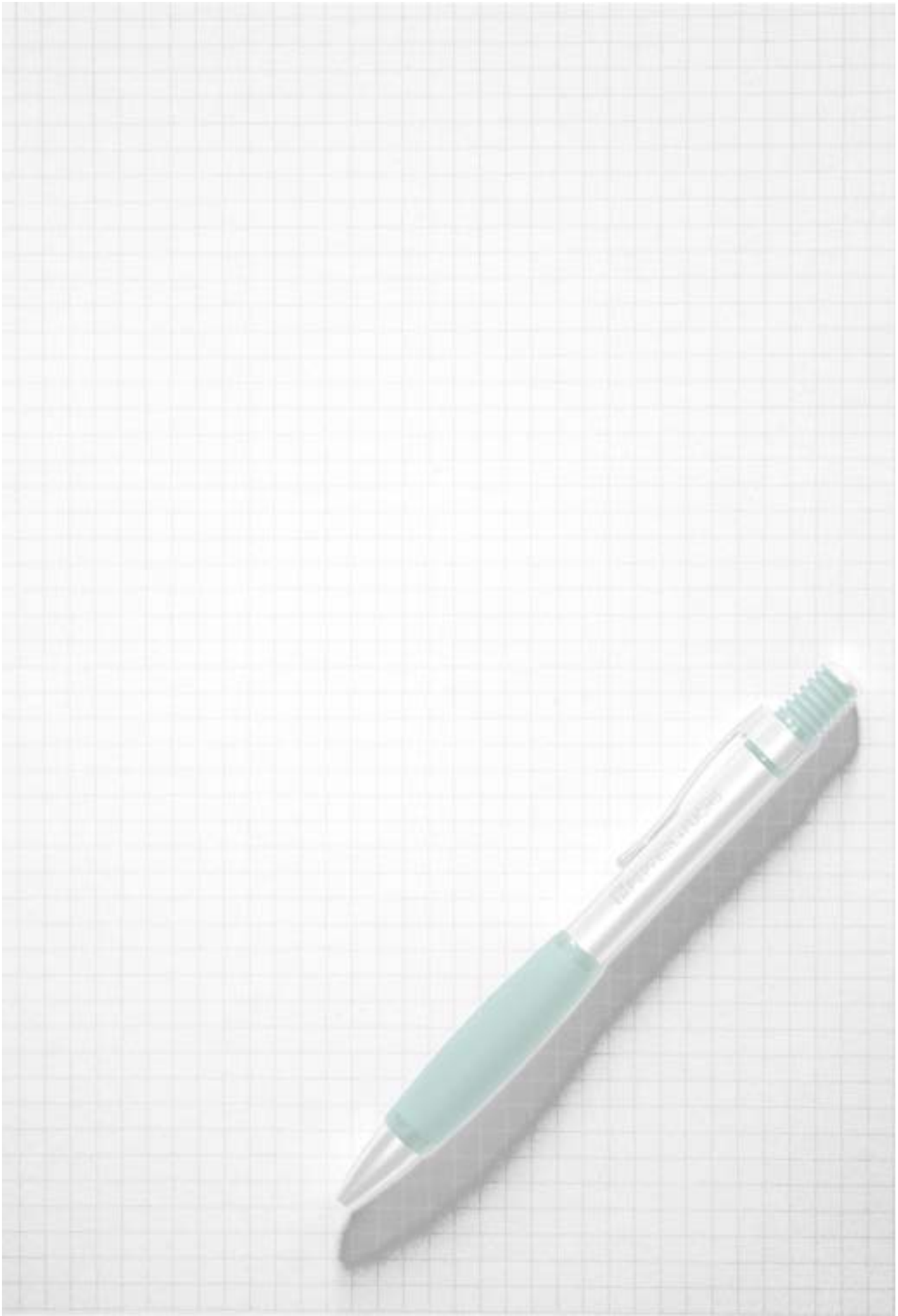
Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Ausgabedatum: 08.04.2015

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AS-Interface

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Gateways

Protocol					
					
	DeviceNet	DeviceNet	DeviceNet	Ethernet/IP MODBUS TCP	Ethernet/IP MODBUS TCP
Features					
Diagnostic interface	●	●		●	●
Duplicate address detection	●	●		●	●
Double master		●	●		●
Optional Control 3 programming				●	●
Model number					
	VBG-DN-K20-D	VBG-DN-K20-DMD	VBG-DN-K20-DMD-BV	VBG-ENX-K20-D	VBG-ENX-K20-DMD
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Gateways

Protocol				
				
	PROFIBUS	PROFIBUS	PROFIBUS	PROFIBUS
Features				
Diagnostic interface	●	●		
Duplicate address detection	●	●		
Double master		●	●	
Optional Control 3 programming				
Model number				
	VBG-PB-K20-D	VBG-PB-K20-DMD	VBG-PB-K20-DMD-BV	VBG-PB-K25
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					Protocol
	PROFINET	PROFINET	MODBUS	CC-Link	
					Features
	●	●	●	●	Diagnostic interface
	●	●	●		Duplicate address detection
		●			Double master
	●	●			Optional Control 3 programming
					Model number
	VBG-PN-K20-D	VBG-PN-K20-DMD	VBG-MOD-K20-D	VBG-CCL-K20-D-BV	
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Master

			Protocol	
ControlLogix PLC	CompactLogix / MicroLogix 1500 PLC	Serial		
			Features	
●	●		Diagnostic interface	
●	●	●	Duplicate address detection	
●			Double master	
			Model number	
VBM-CLX-DM	VBM-MLX/CPLX	VBM-CTR-K20-R2		
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Power supply

Output current				
	5 A	10 A	10 A	
Nominal voltage, primary side				
24 V_{DC}				
115/230 V_{AC}	●	●		
3 x 340 to 550 V_{AC}			●	
Features				
Integrated data decoupling				
Output voltage adjustable	●	●	●	
Model number				
	K17-STR-24..30VDC-5A	K24-STR-24..30VDC-10A	K34-STR-24..30VDC-3X500VAC-10A	
	Page 859	Page 859	Page 859	

Data Decouplers

Output current		
	4 A	2 x 4 A
Degree of protection		
IP20		●
IP67	●	
Model number		
	VAN-G4-PE-4A	VAN-KE2-2PE
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					Output current
	2.8 A	4 A	4 A	8 A	
					Nominal voltage, primary side
			●		24 V_{DC}
	●	●		●	115/230 V_{AC}
					3 x 340 to 550 V_{AC}
					Features
	●	●	●	●	Integrated data decoupling
					Output voltage adjustable
					Model number
	VAN-115/230AC-K19	VAN-115/230AC-K27	VAN-24DC-K28	VAN-115/230AC-K16	
	Page 858	Page 858	Page 858	Page 858	

Repeaters/Bus Termination

				Description
●	●			Repeater
	●	●		Terminator
				Tuner
			●	Analyzer
				Model number
VAR-G4F	VAR-KE3-TERM	VAZ-G10-TERM	VAZ-ANALYZER	
Page 860	Page 860	Page 860	Page 897	

Gateways/safety monitors

Interface					
	PROFIBUS	PROFIBUS	PROFIBUS	PROFINET	
Features/function					
Integrated master		●	●		
Integrated second master	●			●	
16 shutdown circuits	●	●	●	●	
Model number					
	VBG-PB-K30-DMD-S16	VBG-PB-K30-D-S	VBG-PB-K30-D-S16	VBG-PN-K30-DMD-S16	
	Page 861	Page 861	Page 861	Page 861	

Safety Monitors

Housing design		
	K31	K31
Features/function		
2 AS-Interface networks		●
2 shutdown circuits	●	
4 shutdown circuits		●
Logic output	●	●
Model number		
	VAS-2A1L-K31	VAS-4A16L-K31
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				Interface
	Ethernet	PROFIBUS/ PROFIsafe	PROFINET/ PROFIsafe	
				Features/function
				Integrated master
	●	●	●	Integrated second master
	●	●	●	16 shutdown circuits
				Model number
	VBG-ENX-K30-DMD-S16	VBG-PBS-K30-DMD	VBG-PNS-K30-DMD	
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Safe Speed Monitor

			Housing design
	Safety monitor compact	Safety module Rotational speed monitor	
			Features/function
		●	2 inputs for safe encoders
	●		2 shutdown circuits
	●		Logic output
			Model number
	VAS-2A8L-KE4-8SE	VBA-2E-KE4-ENC-S	
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Safety Modules

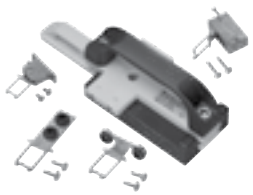
Type				
				
	Field module for OSSD inputs	**Control cabinet module**	**Control cabinet module**	**Control cabinet module**
Features/function				
Safe inputs	●	●	●	
Safe outputs				●
Standard outputs			●	
Model number				
	VAA-2E-G4-SE	**VAA-2E-KE1-S**	**VAA-2E2A-KE1-S/E2**	**VBA-4E1A-KE3-ZEJ/SR**
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Door monitoring

Type				
				
	Safety switch	**Safety switch**	**Safety switch**	**Safety switch**
Guard locking principle				
Operating current				●
Closed current			●	
No guard locking	●	●		
Power supply				
AS-Interface	●	●	●	●
AUX/AS-Interface				
Displays				
Fault/voltage		●	●	●
Model number				
	VAA-2E-IM1-J-S-V1	**VAA-2E2A-IM1-J-S-V1**	**VAA-2E3A-LIM1-PU-J-S-V1**	**VAA-2E3A-LIM1-PL-J-S-V1**
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				Type
	Field module	**Field module**	**Field module**	
				Features/function
	●	●	●	Safe inputs
				Safe outputs
	●	●	●	Standard outputs
				Model number
	VAA-2E2A-G12-SAJ/ EA2L	**VAA-2E1A-G10-SAJ/ EA2J-1M**	**VAA-2E1A-G10-SAJ/ EA2J-2X1M**	
	Page 866	Page 865	Page 865	

					Type
	Safety switch	**Safety switch**	**Enabling switches**	**Safety switch accessories**	
					Guard locking principle
		●			Operating current
	●				Closed current
					No guard locking
					Power supply
			●		AS-Interface
	●	●			AUX/AS-Interface
					Displays
	●	●			Fault/voltage
					Model number
	VAA-2E3A-LIM1-PU-L-S-V1	**VAA-2E3A-LIM1-PL-L-S-V1**	**VAA-3E-HH30-J-S-V1**	**VAZ-IM1-*-BOLT-S**	
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Door monitoring

Type					
	Control interface for noncontact safety switch	Read head for noncontact safety switch	Actuator for non-contact safety switch	Reed switch for noncontact safety switch	
Mode of operation					
RFID	●	●	●		
Reed				●	
Model number					
	VAA-4E-IEI1-CONTROL-J-S	VAZ-IEI1-READER1-S-V3	VAZ-IEI1-TAG1-S	VAA-2E1A-IER1-S-1M-V1	
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Emergency Stop Buttons

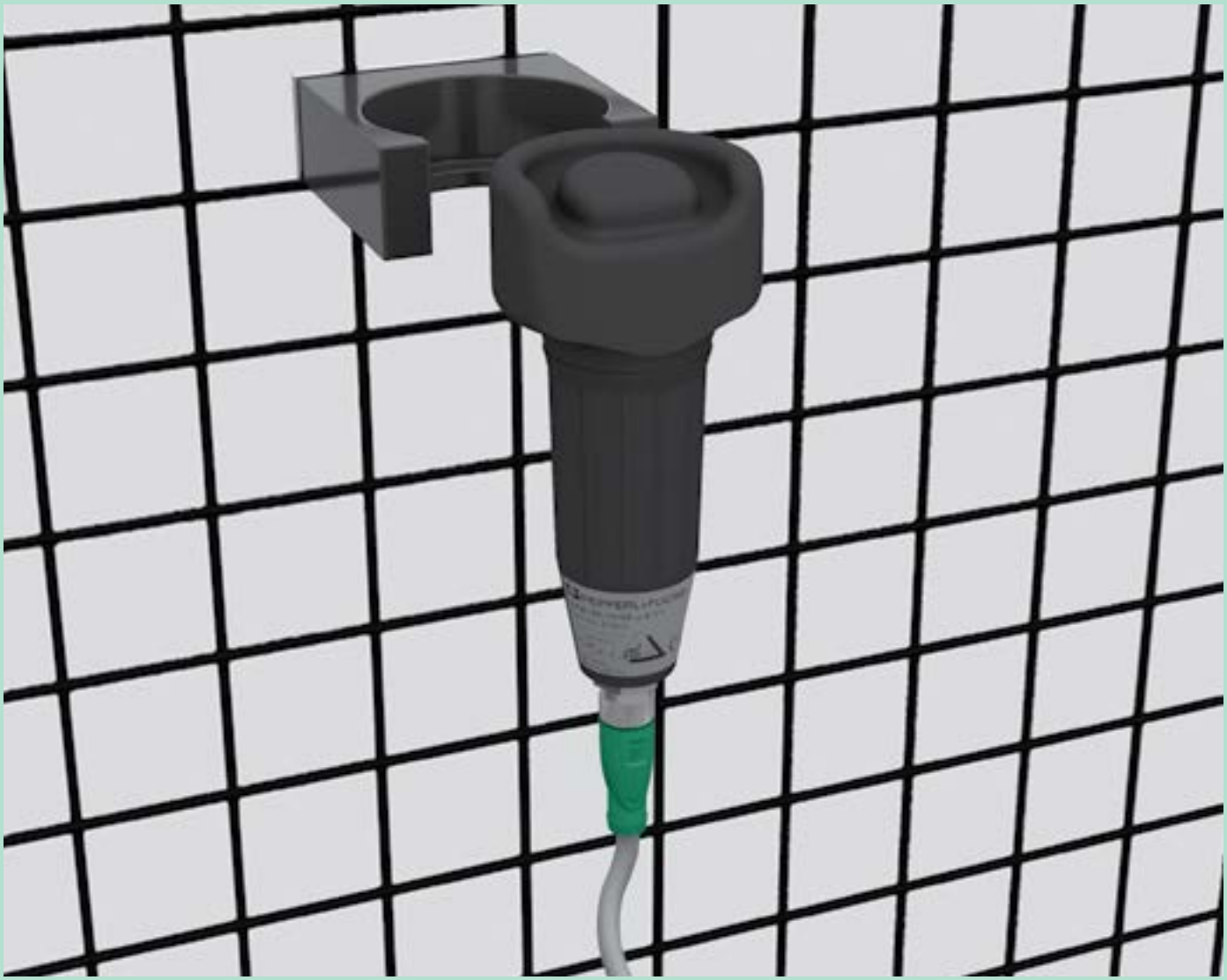
Type				
	Surface mountable	Surface mountable	Embeddable	Embeddable
Display				
Integrated red LED		●		●
Model number				
	VAA-2E-F85A-S-V1	VAA-2E1A-F85A-S-V1	VAA-2E-PM-S	VAA-2E1A-PM-S
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					Type
	Actuator for non-contact safety switch	Reed switch for noncontact safety switch	Reed switch for noncontact safety switch	Actuator for non-contact safety switch	
					Mode of operation
					RFID
	●	●	●	●	Reed
					Model number
	VAZ-IER1-ACTUATOR1-S	VAA-2E-IER2-S-1M-V1	VAA-2E-IER2-S-0,15M-V1	VAZ-IER2-ACTUATOR2-S	
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Sensor/actuator modules

Inputs/outputs						
	4/4 relay	4/4	4/-	4/3 relay	4/3	
Power supply						
Inputs from AS-Interface	●	●	●	●	●	
Inputs from AUX	●[1]	●[1]	●[1]	●[1]	●[1]	
Outputs from AS-Interface						
Outputs from AUX	●	●	●	●	●	
Slave type						
Extended addressing			●	●	●	
Model number						
	VAA-4E4A-KE-ZE/R	VAA-4E4A-KE-ZEJQ/E2L	VBA-4E-KE-ZEJQ	VBA-4E3A-KE-ZE/R	VBA-4E3A-KE-ZEJQ/E2L	
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[1] = not directed via module

Sensor/actuator modules

Inputs/outputs					
	1/3	4/2	4/-	4/4	
Power supply					
Inputs from AS-Interface		●	●	●	
Inputs from AUX	●				
Outputs from AS-Interface		●			
Outputs from AUX	●			●	
Slave type					
Extended addressing	●		●	●	
Model number					
	VBA-1E3A-M18-ZE/E2-V1	VAA-4E2A-G5-N/V2-Ex	VBA-4E-G16-ZEJ	VBA-4E4A-G16-ZEJ/E2L	
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						Inputs/outputs
	4/4 relay	4/4	4/-	4/2	4/4	
						Power supply
	●	●	●	●		Inputs from AS-Interface
	●[1]	●[1]			●	Inputs from AUX
						Outputs from AS-Interface
	●	●		●	●	Outputs from AUX
						Slave type
	●	●	●	●		Extended addressing
						Model number
	VBA-4E4A-KE-ZE/R	VBA-4E4A-KE-ZEJQ/E2L	VBA-4E-KE1-Z	VBA-4E2A-KE1-Z/E2	VAA-4E4A-KE1-Z/E2	
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				Inputs/outputs
	4/-	2/2	4/4	
				Power supply
	●	●	●	Inputs from AS-Interface
				Inputs from AUX
				Outputs from AS-Interface
		●	●	Outputs from AUX
				Slave type
	●	●	●	Extended addressing
				Model number
	VBA-4E-G4-ZE	VBA-2E2A-G4-ZE/E2	VBA-4E4A-G4-ZE/E2	
	Page 877	Page 877	Page 877	

Sensor/actuator modules

Inputs/outputs				
	2/-	2/-	2/1	
Power supply				
Inputs from AS-Interface	●	●		
Inputs from AUX			●	
Outputs from AS-Interface				
Outputs from AUX			●	
Slave type				
Extended addressing	●	●	●	
AS-Interface/AUX connection				
Flat cable	●	●	●	
M12 round plug connector				
Model number				
	VBA-2E-G10-ZAJ-1M-V1-W	VBA-2E-G10-ZEJ-1M-2V1-W	VBA-2E1A-G10-ZAL/E2L-1M-2V1-W	
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Sensor/actuator modules

Inputs/outputs						
	-/4	4/4	4/4	4/-	4/-	
Power supply						
Inputs from AS-Interface		●		●		
Inputs from AUX			●		●	
Outputs from AS-Interface						
Outputs from AUX	●	●	●			
Slave type						
Extended addressing				●	●	
Model number						
	VAA-4A-G12-EA2L	VAA-4E4A-G12-ZAJ/EA2L	VAA-4E4A-G12-ZAL/EA2L	VBA-4E-G12-ZAJ	VBA-4E-G12-ZAL	
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					Inputs/outputs
	4/-	4/-	4/4	4/4	
					Power supply
	●	●	●	●	Inputs from AS-Interface
					Inputs from AUX
					Outputs from AS-Interface
			●	●	Outputs from AUX
					Slave type
	●	●	●	●	Extended addressing
					AS-Interface/AUX connection
	●		●		Flat cable
		●		●	M12 round plug connector
					Model number
	VBA-4E-G11-ZAJ-F	VBA-4E-G11-ZAJ-V1	VBA-4E4A-G11-ZAJ/EA2L-F	VBA-4E4A-G11-ZAJ/EA2L-V1	
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						Inputs/outputs
	2/2	4/4	8/-	4/4	4/4	
						Power supply
	●		●	●		Inputs from AS-Interface
		●			●	Inputs from AUX
						Outputs from AS-Interface
	●	●		●	●	Outputs from AUX
						Slave type
	●	●	●	●	●	Extended addressing
						Model number
	VBA-2E2A-G12-ZAJ/EA2L	VBA-4E4A-G12-XEL	VBA-4E4E-G12-ZAJ	VBA-4E4A-G12-ZAJ/EA2L	VBA-4E4A-G12-ZAL/EA2L	
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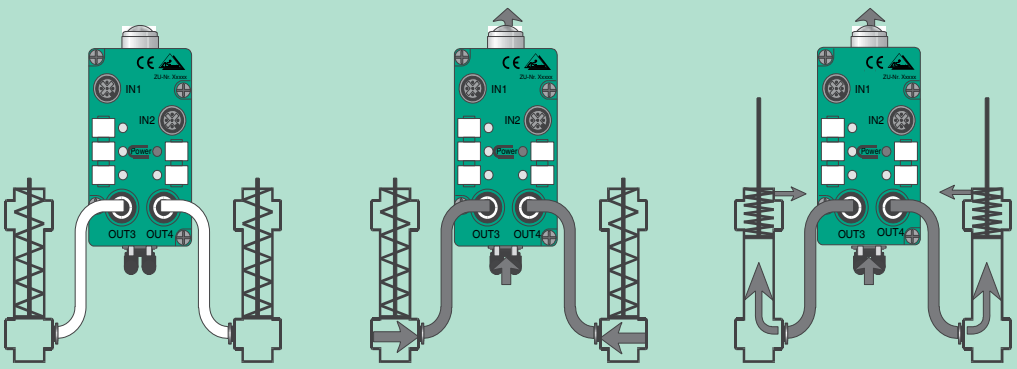
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PCB Modules

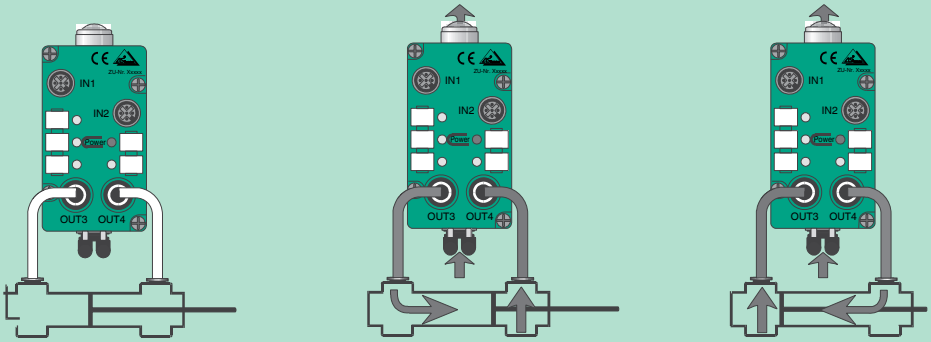
Inputs/outputs			
	4/4	4/4	4/4
Power supply			
Inputs from AS-Interface	●		●
Inputs from AUX		●	
Outputs from AS-Interface	●		●
Outputs from AUX		●	
Slave type			
Extended addressing	●	●	●
Model number			
	VBA-4E4A-CB1-ZEJ/E2J	VBA-4E4A-CB2-ZEL/E2L	VBA-4E4A-CB1-ZEJ/E2J-FL
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Examples of pneumatic module functions

as 3/2-way valve



as 4/2-way valve



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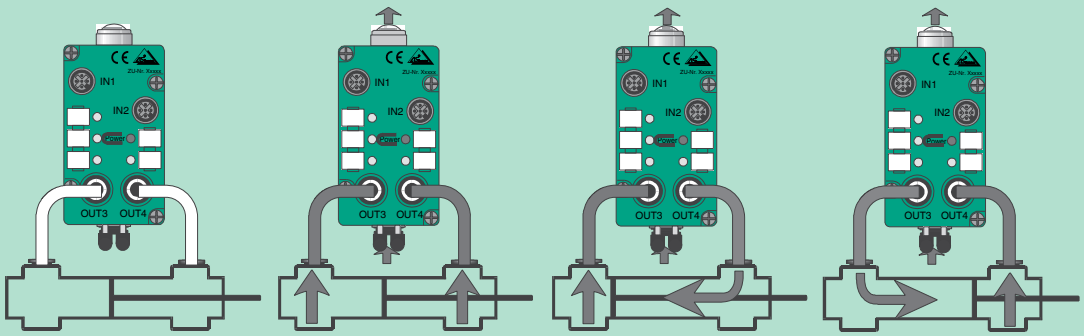
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Pneumatic Modules

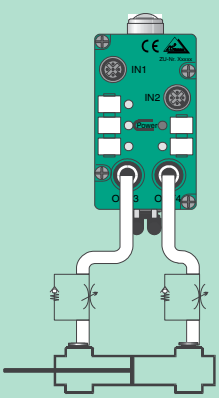
		**Inputs/outputs**
4/2 x pneum.	**4/2 x pneum.**	
Power supply		
●	●	**Inputs from AS-Interface**
		Inputs from AUX
●		**Outputs from AS-Interface**
	●	**Outputs from AUX**
Slave type		
●	●	**Extended addressing**
Model number		
VBA-4E2A-G1-ZE/P-S	**VBA-4E2A-G1-ZE/PEXT-S**	
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as 5/2-way valvel

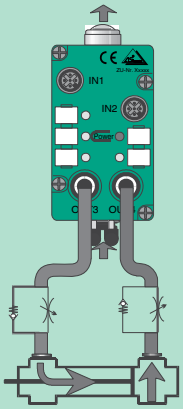


as 5/2-way valve

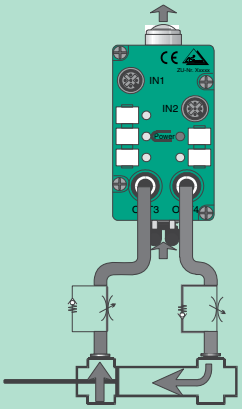
Unpressurized



Pressurized



Switched



Analog Modules

Inputs/outputs			
	-/2 x analog	-/2 x analog	-/4 x analog
Type			
Current	●	●	●
Voltage			●
Temperature (Pt100)			
Power supply from			
AS-Interface	●	●	●
AUX			
AS-Interface/AUX connection			
Flat cable	●		●
M12 round plug connector		●	
Model number			
	VBA-2A-G11-I-F	VBA-2A-G11-I-V1	VBA-4A-G11-I/U-F
	Page 880	Page 880	Page 880

Analog Modules

Inputs/outputs			
	-/2 x analog	2/- x analog	2/- x analog
Type			
Current	●	●	●
Voltage	●	●	●
Temperature (Pt100)			
Power supply from			
AS-Interface	●	●	●
AUX	●	●	●
AS-Interface/AUX connection			
Removable screw terminal	●	●	●
Model number			
	VBA-2A-KE2-I/U	VBA-2E-KE2-I/U-V3.0	VBA-2E-KE2-I/U
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				Inputs/outputs
4/- x analog	2/- x analog	2/- x analog		
				Type
●	●	●		Current
	●	●		Voltage
	●	●		Temperature (Pt100)
				Power supply from
	●	●		AS-Interface
●	●	●		AUX
				AS-Interface/AUX connection
●	●			Flat cable
		●		M12 round plug connector
				Model number
VBA-4E-G11-I-F	VBA-2E-G11-I/U/PT100-F	VBA-2E-G11-I/U/PT100-V1		
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Display/Operating Modules

				Inputs/outputs
-/4	2/2	4/4	1/2	
				Power supply from
●	●	●	●	AS-Interface
●				AUX
				Slave type
	●		●	Extended addressing
				Model number
VAA-4A-70MM & accessories	VBA-LT2-G1	VAA-LT3-F86-V1	VBA-1E2A-BUZZER/LT-RD	
Page 885 ff	Page 889	Page 889	Page 890	

Passive Splitters

Function				
	AS-Interface on 1 x M12 socket	AS-Interface & auxiliary power on 1 x M12 socket	AS-Interface & auxiliary power flat cable on 8 x M12 socket	AS-Interface & auxiliary power M12 plug on 8 x M12 socket
Display				
Overload AS-Interface	●	●		
Operating Display AS-Interface	●	●	●	●
Overload AUX		●	●	●
Operating Display AUX		●	●	●
Model number				
	VAZ-T1-FK-G10-PTC-1M-PUR-V1-G	VAZ-2T1-FK-G10-PTC-1M-PUR-V1-G	VAZ-2T8-G11-F	VAZ-2T8-G11-V1
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Passive Splitters

Function					
	AS-Interface on 1 x M12 socket	AS-Interface on 1 x M12 socket	AS-Interface & auxiliary power on 1 x M12 socket	AS-Interface & auxiliary power on 1 x M12 socket	AS-Interface on 1 x M12 socket
Connection					
Straight M12 socket with cable	●		●		
Angled M12 socket with cable		●		●	
Straight M12 socket					●
Model number					
	VAZ-T1-FK-G10-*M-PUR-V1-G	VAZ-T1-FK-G10-*M-PUR-V1-W	VAZ-2T1-FK-G10-*M-PUR-V1-G	VAZ-2T1-FK-G10-*M-PUR-V1-W	VAZ-T1-FK-G10-V1
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AS-Interface handheld programmer

					Operating mode
230 V charger	120 V charger	230 V charger	120 V charger	230 V charger	
					Features/function
		●	●		Incl. accessories
				●	Power supplied externally
VBP-HH1-V3.0	VBP-HH1-V3.0-110V	VBP-HH1-V3.0-KIT	VBP-HH1-V3.0-KIT-110V	VBP-HH1-V3.0-V1	
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					Function
AS-Interface & auxiliary power on 1 x M12 socket	AS-Interface & auxiliary power on 2 x M12 socket	2 x AS-Interface on 2 x double terminal	AS-Interface & auxiliary power on double terminals	Flat cable on flat cable	
					Connection
					Straight M12 socket with cable
					Angled M12 socket with cable
●	●				Straight M12 socket
					Model number
VAZ-2T1-FK-G10-V1	VAZ-2T2-FK-G10-V1	VAZ-T1-FK-G10-CLAMP1	VAZ-2T1-FK-G10-CLAMP1	VAZ-2FK-G10-BRIDGE	
Page 895	Page 895	Page 895	Page 895	Page 895	

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7.7 Introduction

What is AS-Interface?

The actuator-sensor interface (AS-Interface) replaces conventional wiring technology at the sensor-actuator level. The AS-Interface minimizes installation effort, has a comprehensive diagnostic function, and enables flexible system enhancements. AS-Interface is an open installation system that is recognized and accepted around the world. Many manufacturers offer a wide range of compatible products.

The main benefits of AS-Interface

AS-Interface transfers digital and analog I/O signals and safe I/O signals over a two-core cable that also supplies the nodes and their peripherals with power. Installation via the profiled flat cable is performed using insulation piercing technology. This is easy and failsafe thanks to the polarity-protected geometry of the flat cable.

AS-Interface is fast and can achieve response times of less than 3 ms. The installation of an AS-Interface is completely flexible and topology-free. The use of passive splitters means it is very quick to install. If required, modules can be supplied with power via a second black flat cable. The slaves are assigned with addresses locally within seconds using a handheld device. If you replace a product at a later point for maintenance purposes, the addresses are assigned automatically by the master. Program routines for decentralized processes can also be managed in the master in order to replace small control units. AS-Interface is transparent to the higher-level control unit and behaves like an I/O plug-in card. In doing so, AS-Interface has a considerably higher functional density because 1000 I/Os can be realized on a construction width of less than 100 mm. The diagnostic function enables detection of duplicate addresses or a short circuit to ground, the evaluation of sporadic faults, and the separate detection of overloads on the bus and peripheral side through to the port-related LED display on the module.

Compared with conventional wiring technology, this removes the need for parallel wiring, as well as a number of plug and terminal connections. Control cabinets and cable trays can be designed much smaller and the documentation is also simpler.

This additional functionality and the reduced wiring result in considerable cost savings over the service life in the application.

Manchester coding (alternating pulse modulation) and potential-free differential signal transfer enable AS-Interface to achieve extremely high data security and immunity, despite the use of an unsheathed two-wire cable.

The choice of AS-Interface topology is flexible and can be based on line, star, or tree structures. Even larger networks can be created cost-effectively using bus terminations and repeaters with an overall network length of 1 km. A maximum of two repeaters can be switched consecutively. Higher-level systems are connected with the gateway integrated into the master. All common international gateway functions are available, meaning that AS-Interface is always upward compatible with all control unit types when installed in the field.

8.8 AS-Interface System Components

AS-Interface products from Pepperl+Fuchs are certified by the independent AS-Interface testing body to ensure interoperability between products. This is indicated by the AS-Interface shadow logo on our products.

Masters, gateways, and power supplies

A master with gateway function controls the AS-Interface system and makes the process data available to all higher-level control unit types in a defined configuration. Typically, this involves more than 32 bytes of digital I/O data and additional diagnostic data. AS-Interface operates like a conventional I/O card in the control unit, making it possible to convert a system to AS-Interface without changing the control unit software.

The master is usually installed in the control cabinet and stores the configuration used. Individual communication errors do not result in a fault, although they are listed in the statistical error memory for diagnostic purposes.

Masters with an integrated monitor function enable the connection of the safe slaves to the same AS-Interface cable.

AS-Interface power supplies are used to supply power.

AS-Interface slaves

Sensors/actuators with AS-Interface

These devices can be connected directly to the flat cable via passive splitters, and offer the advantage of transferring additional information such as prefault diagnostics and parameterization options.

Modules

Standard sensors and actuators can be connected to modules for control cabinet installation or field mounting up to IP68/69K degree of protection. Analog modules that automatically detect the connected sensor (I, U, PT100) are also available.

The color-coded terminals in our control cabinet modules at installation depths of 50 mm and 100 mm facilitate reliable assignment during installation. We offer various PCB solutions for installation in the terminal box and integration into the housing.

Field modules with a direct cable output for connecting up to two sensors, and modules for connecting via M8 and M12 connectors are available in different housing designs.

AS-Interface Safety at Work for safety-related applications

A single AS-Interface cable can be used to connect components such as emergency stop buttons, safety light grids, or safety door locks in mixed operation while using the same protocol. You only need to integrate a safety monitor and safe slaves into the segment. The monitor evaluates data communication on the AS-Interface cable using dynamic code sequences that are taught in to the monitor during commissioning. AS-Interface guarantees a safe shutdown time of a maximum 40 ms. A safety monitor integrated into the master can control up to 16 safe shutdown circuits with multiple safe inputs and outputs. Safe outputs can be grouped together and controlled simultaneously via a shutdown circuit without jitter.

Field and control cabinet modules, emergency stop buttons, door locks, and locking door guards with integrated AS-Interface chip are available as slaves with safe inputs. The bus communication and the deployed technology have been assessed by BGIA as safe and certified by TÜV. AS-Interface can be used even for the highest safety level PLe specified in the new machine safety guideline ISO 13849-1. Machines can be controlled in accordance with stop category 0 (immediate energy shutdown) and 1 (controlled shutdown). Several AS-Interface segments can also be coupled together safely. In accordance with IEC 61508 approval, it is possible to achieve up to SIL3.

Addressing device, diagnostics and parameterization tools

AS-Interface slaves can be easily assigned an address locally during installation using the AS-Interface handheld programmer. Addresses that have already been assigned can also be displayed. The handheld device can also be used to read input data and control outputs, e.g. during a commissioning test.

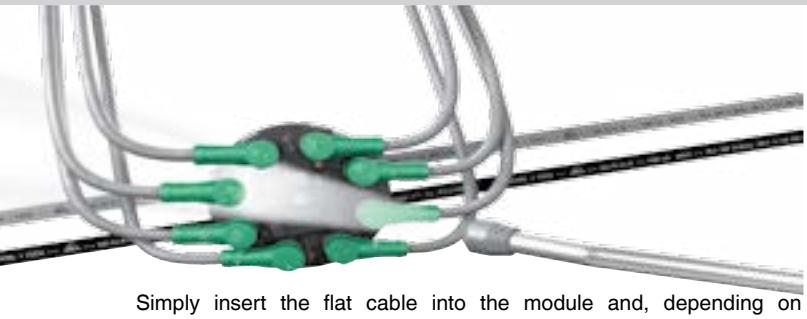
The AS-i Control Tools software provides a clear diagnosis that can be displayed visually. The ASIMON+ software is used to define all safety-related functions and import them into the monitor. The use of Drag & Drop makes this action simple, clear, and very functional.

7.3 The AS-Interface Installation

Flat cable

The flat cable is one of the biggest benefits of AS-Interface. The flat shape of the cable prevents reverse polarity and the slaves are connected within seconds thanks to the insulation piercing technology.

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Simply insert the flat cable into the module and, depending on the housing design, close the module or attach the top part. Most modules can be mounted without tools or by using just one screw. The connection to AS-Interface is established using the penetrating, gold-plated, twisted contact pins.

A black flat cable is used for a 24 V power supply to provide high power to outputs.

Installation

The AS-Interface cable is symmetrical, i.e., you must not connect either of the strands to the system ground. You can place a branch at any point (any topology layout) where the cable end does not require a terminator. If you use a bus termination at the far "cable end," the segment length is extended to 200 m. Using a maximum of two further repeaters in a row and three bus terminations in each segment, you can achieve a maximum distance of 600 m from the master. You can also use repeaters in a star-shaped topology to achieve a possible 1 km total network length.

Power from the AS-Interface power supply is supplied at any point within the AS-Interface segment. In the event of high current slaves, position the power supply close to the slaves in order to keep the voltage drop



low. A 24 V additional power supply may be required when connecting powerful actuators, in order to operate them via the electronic outputs. The 24 V power supply can be connected several times locally. AS-Interface masters/gateways are supplied with 24 V directly or from the AS-Interface.

Commissioning of the AS-Interface segment can take place directly at the master/gateway without a PC.

Pepperl+Fuchs offers an extensive range of connectors for connecting sensors and actuators.

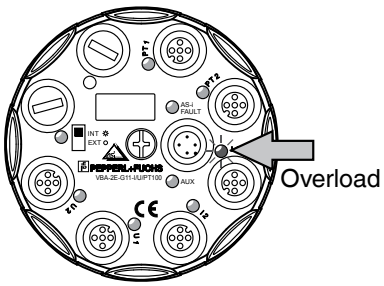
7.4 AS-Interface Technical Characteristics

Number of slaves on the AS-Interface segment and functionalities

AS-Interface is backward compatible, meaning that even the very first generation of slaves will still function with the current master. You can connect up to 62 slaves to one AS-Interface segment. These can have up to four inputs and four outputs enabling 248 input signals and 248 output signals to be connected per network. These addresses are counted sequentially from 1A to 31A and 1B to 31B for historical reasons. As safe slaves require both an A and a B address, you can connect a maximum of 31 safe nodes to one segment. Slaves are also referred to as A/B slaves if they only require either an A or B address and standard slaves if they require a full address.

Several outputs can be switched simultaneously within 1 µs via the "synchronous mode" parameter bit.

Diagnostic function with peripheral errors



In addition to communication errors (such as faulty telegrams), the master also detects hardware errors at the slave. These peripheral error messages can be transferred to the control unit and used to perform shutdowns in the event of an error.

A peripheral error is indicated by a red LED on the module itself. Some slaves also offer the option to display the inputs/outputs affected.

Analog value transfer

Analog values are transferred in several cycles and are then sent as a complete analog value, typically 16-bit, from the master to the control unit. Seven cycles are required for each channel for the transfer time and approximately 10 ms conversion time.

Transfer rate and cycle time



The maximum cycle time is 10 ms. If the segment is not fully occupied, the cycle time reduces by 0.15 ms per slave. If a module has four inputs and four outputs, the maximum cycle time for the outputs only is a maximum of 20 ms. If the corresponding B address is released, the cycle time for the respective slave with the A address is halved. Standard slaves with a full address always have a maximum 5 ms cycle time.

This enables both time-critical applications and applications with multiple inputs and outputs to be set up on the same segment.

9.9 Programming and Installation

Plant size

By specifying the sensors and actuators you wish to connect, you can determine the required number of modules and addresses. Note that analog modules and safety modules occupy a full address (A and B).

Estimate the required length for the segment. Incorporate a bus termination for lengths over 100 m. Incorporate repeaters with downstream AS-Interface power supply for distances over 200 m.

As AS-Interface is not restricted by topology, you can route the cables freely.

Power supply dimensioning

You can determine the required power supply from the power consumption of the individual devices. The relevant data is included in the data sheets. Then, select the AS-Interface power supply and specify, if necessary, the required 24 V_{DC} power supply through the output load.

Assigning an address to the slaves and wiring

Prior to mounting, you have the option of assigning an address to all the slaves, labeling them, and installing them at the planned mounting location, or you can use the VBP-HH1-V3.0-KIT handheld device to assign addresses once installation is complete. It is common to assign addresses locally following installation. The default address for all slaves on delivery is 0. The slaves are connected and assigned an address via a programming plug, the M12 plug on the device, or the socket on the addressing device.

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Configuration of the master/gateway and monitor

You must then specify which nodes are connected to the AS-Interface segment in the master/gateway.

Fieldbus master simulation is available for PROFIBUS, DeviceNet and MODBUS. You can use AS-i Control Tools to simulate Ethernet and MODBUS gateways and test them in conjunction with the higher-level fieldbus connection.

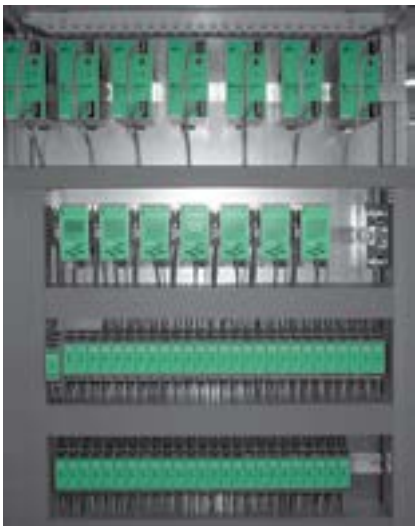
Most K20/K30 masters have a separate serial diagnostic interface for connecting to a PC. You can use AS-i Control Tools to perform diagnostics on the AS-Interface segment.

To execute safety-related functions, the logic must be stored in the monitor using the ASIMON+ software. Function blocks are used to define and store the logic. This configuration is loaded to the monitor from the PC. The safe code sequences are then taught in.

10.10 Masters and Gateways

The AS-Interface master/gateways control communication and are also available with an integrated safety monitor with various different gateway interfaces. You can enter the parameters easily via the graphical display on the master or call up diagnostic information in plain text. All the diagnostic data can be transferred to the control unit. The standard menu structure and universal operating concept make this system easy to use despite the wide variety of different devices.

Many masters/gateways are also available with a control function and, similarly to a small PLC, can directly control the inputs and outputs on the AS-Interface segment. This reduces the upward data volume, reduces response times, and renders a small control unit superfluous.



7.7 Power Supplies

With AS-Interface, the data and power supply are transferred on the same two strands. Data communication is modulated to 30.5 V_{DC} voltage. A special AS-Interface power supply with data decoupling is therefore required to supply the AS-Interface segment. All power supplies comply with the PELV (protective extra low voltage) requirements of EN 50178 and EN 60204. Therefore no earth ground (PE) is required for the AS-Interface current circuit. Since AS-Interface is constructed symmetrically, the shield terminal on the power supply must have ground potential.

A ground connection monitoring function is integrated into some power supplies to increase plant safety. This reliably indicates a non-compliant contact on the AS-Interface cable to the ground potential, which can result in communication errors.

Depending on the size of the plant you can use power units from 2 A to 8 A at any point within the AS-Interface segment. If there are particularly heavy consumers, you should position the power units close to them.

The total input current for all the AS-Interface nodes must be lower than the maximum output current of the power supply. Current consumption is made up of the following for the modules:

- Operating current
- Current consumption of the sensors supplied from AS-Interface
- Required current for operating the outputs, provided these are not supplied externally.

11.11 Repeaters, Bus Termination, and Analyzers

If the segment length is longer than 100 m, you need bus termination in order to extend the segment to 200 m. The bus termination reduces the reflections at the cable ends. It must be positioned as far away as possible from the master. As each AS-Interface network functions differently, the bus termination has two impedances that cover the entire required range depending on the application.

For segment lengths over 200 m, you can use repeaters that reprocess the signal and transmit it to the next galvanically isolated decoupled segment. A separate AS-Interface power supply is therefore also required for this segment. In principle, you can use as many repeaters as you wish in parallel for star topology, although there must be a maximum of just two repeaters between the master and the last node.

The analyzer is used to test AS-Interface networks. In applications with many powerful noise sources or with very long cable lengths, it is advisable to check the signal quality on the AS-Interface segment. You can transfer the measured data to the PC and use the diagnostic software to perform a more accurate analysis. The device can detect sources of interference and makes it easier to implement a suitable fix. You can also set up test protocols for plant transfer.

12.12 AS-Interface Safety at Work



AS-Interface Safety at Work describes the safe communication on the AS-Interface network in accordance with the latest machine guidelines. This globally implemented safety system enables you to achieve the highest safety class. You can connect all known safety devices to the AS-Interface segment via modules or directly as an integrated solution. Parallel wiring is avoided entirely. Especially when several machines are linked together using safety-related components, the easily configured AS-Interface Safety at Work solution quickly proves its worth even with a small number of slaves.

The safety principle

Neither special cabling nor special control units are required to make the most of these benefits. You can retrofit each existing AS-Interface line with safety-related devices by integrating one or more safety monitors into the AS-Interface segment. The monitor observes the responses from the "safe" nodes to the master. The higher-level standard master continues to operate all components in a network. The AS-Interface transfer protocol is so noise-immune and failsafe that safety-related telegrams may be transmitted. Additional monitoring of the "safe" nodes is carried out by the safety monitor that continuously monitors the communication between the standard master and the "safe" slaves. This functional principle is extremely reliable and can therefore be used up to Performance Level e (PLe) in accordance with ISO 13849-1 "Safety of machinery - Safety-related parts of control systems" and up to SIL3 in accordance with IEC 61508. TÜV has certified the devices and the BGIA (German Institute for Occupational Safety) has also classified the communication as "safe." The system offers the following functions:

- Safe coupling of up to 32 AS-Interface segments
- Safe local outputs with the option of creating groups
- Replacement of a failsafe PLC

08.04.15

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- Safety at Work is compatible with existing AS-Interface systems
- Flexible expansion options
- Safe and standard signals are possible on one segment
- Active safety replaces the passive solution for power shutdown

Safety monitor

The safety monitor monitors the proper functioning of the safe slaves and, in the event of a fault, restores them to a safe state using a positive-action relay. The safety monitor "listens" to the AS-Interface communication. The master talks to all the slaves for every cycle. The signal response of the safe slaves includes the input states of the connected sensors and contacts as well as a 4-bit safety code that varies for each query in accordance with a fixed algorithm. If this 4-bit code is modified in an unexpected way, a malfunction can be detected and the system is safely switched off. In the event of an alarm, code "0000" is transferred. This code results in a shutdown after a maximum of 40 ms (max. cycle time incl. repetition and processing time).

The safety monitor does not require an address, but assigning an address enables communication with the master and provides the master with access to diagnostic information. To safely control outputs, the monitor generates and sends further code sequences that are checked by the safe output slave. A group of safe output slaves can be controlled using a single AS-Interface address.

Masters/gateways are also available with an integrated monitor function. Direct communication between the monitor and master enables more detailed diagnostic information to be transmitted to the control unit.

Configuration software ASIMON+ is used to configure release circuits for the K30 and K31 safety monitors. This software is used to define logical links and up to 16 shutdown circuits. The stop categories 0 and 1 can be stored in the monitor.

A Windows-based Drag&Drop function enables configurations to be created easily as a flow chart on the PC and saved to a chip card. This chip card then transfers the configuration to the device, making a change in function relatively easy. The chip card also enables a safety monitor to be replaced easily.

Safe slaves

In order to cover the necessary functions in the systems, safe slaves are available that connect directly to the AS-Interface. These include emergency stop buttons with an integrated AS-Interface, safe slaves with two safe outputs, and safe slaves with two safe inputs and two standard outputs, e.g., for connecting contacts.

Safety category 3 is achieved by assigning the inputs on the module separately. For safety category 4, you must use the dual-channel input on the module. The safe output slaves provide a further four standard inputs. A standard input is used as a feedback circuit. You can use the remaining standard inputs for diagnostics. The safe modules with standard outputs can be used for direct on-site signaling. You can easily link the input and output logically in the module using one data bit, and control a warning light or the LED in the emergency stop button. Due to the logic function integrated in the module, you must only run the module output to the light. Previously this required a detour via the master, a software routine in the PLC, a relay output in the control cabinet, and wiring from the control cabinet to the warning light.

We also offer integrated solutions for safe mechanical contacts, noncontact contacts, emergency stop buttons, locks with guard locking, tamper-proof RFID door monitoring, and enabling switches.

7.10 ASIMON+ Configuration Software



ASIMON+ software is used to configure and commission the safety monitor using a PC with an RS232 interface. The simple user interface is used to assign the safe inputs to the shutdown circuits or monitoring blocks, define the emergency stop functions, make assignments to the start blocks, and select the output modules (stop category 0 or 1). There are many different options, meaning that the settings are suitable for almost all applications. System documentation for the safe components is supported as you can save and print out the configuration. It is also possible to create a copy of the configuration for other safety monitors. To create a configuration you must perform the following steps:

- Start the program and "Setup Wizard,"
- Select the diagnostic function,
- Define the configuration: enter the title, dependencies, slave addresses, assignment of slaves to a module, supplement the AND/OR logic block, define the stop category, define delay time.
- Assign the AS-Interface address for the safety monitor (optional).

If a configuration already exists, you can load this and change it. You can assign the blocks from a symbol library to both release circuits interactively using Drag&Drop.



When you have created and checked a configuration, you can transfer it to the safety monitor and teach in the code sequences of the safe slaves that are to be monitored. You must then check and release the configuration protocol. Finally, you must switch the safety monitor from configuration mode to protection mode.

The functions for reconfiguration, code sequence teach-in, release, stop command, and password modification are password protected. The ASIMON+ software offers extensive support for troubleshooting and fault clearance. The ASIMON+ manual also includes a few application examples to help you familiarize yourself with the system quickly.

7.11 Modules

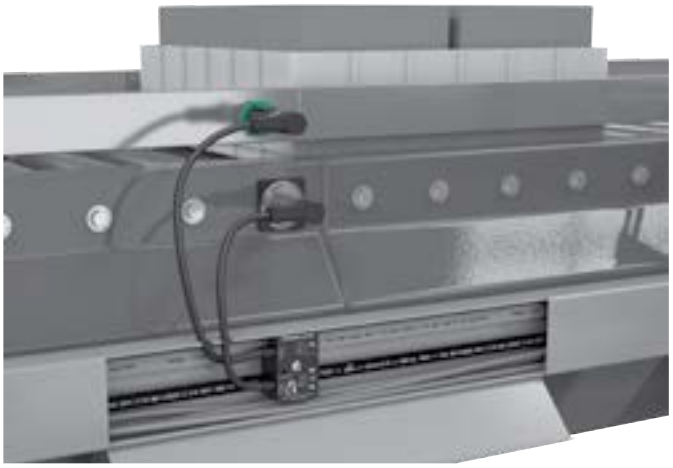
Field modules

Pepperl+Fuchs offers field modules to suit almost every application:

- Ultra compact modules with cable outlet and M12-plug (housing design G10)
- Modules in round housing design with IP68/69K degree of protection (housing design G11)
- Flat modules for mounting without tools (housing design G12)
- Compact modules with M8 plug-in connection and width of just 30 mm (housing design G16)
- Field modules with cable gland (housing design G4)

All modules have round, rotated, and gold-plated pins for establishing contact with the flat cable, which guarantee a permanent and stable contact. The modules are available in different I/O versions:

- 4 inputs
- 2 inputs/2 outputs
- 4 inputs/4 outputs
- 8 inputs or
- 4 outputs



All the modules are easy to mount. Housing design G10 is especially

08.04.15

quick to mount due to its single section housing concept with direct sensor connection that already has an integrated connection line for the sensor.

The G11 module design is robust, round, and has the higher IP68/69K degree of protection. It especially suitable for use in harsh ambient conditions.

You can directly connect double sensors or four-wire sensors to the modules with two signal inputs on an M12-plug. Inside most G11 and G12 modules, the inputs for pins 2 and 4 are bridged by two adjacent slots. If you want to use just a single signal input, however, you must use a three-strand connection cable.

The flat modules in the G12 series enable quick mounting without tools. You can mount the flat module to the DIN mounting rail using the stainless steel quick action lock. The inputs and outputs have M12-quick disconnects. The M12-quick disconnects enable safe connection and removal of the connector using a half turn. The LEDs on the connectors of the respective port allow for quick diagnostics. An output overload is displayed directly on the affected port. The stainless steel half shell and encapsulated housing provide impact resistance and a high degree of protection.-

The G16 series is available in two housing designs (4 or 8 ports) and is ideal for confined spaces (e.g., robotics, handling technology). The flat cable is connected via an M12- plug and an AS-Interface passive splitter.

The modules offer communication monitoring as well as a function display for bus, external auxiliary power, and inputs and outputs. An output overload is displayed for the port on the affected plug connection. This enables peripheral errors to be detected accurately at the affected port.

Control cabinet modules

Our KE series control cabinet modules require an overall width of only 22.5 mm for four inputs and four outputs. They are connected using removable, color-coded terminal blocks that guarantee a quick and fault-free exchange. You can plug the terminals even when energized. The permissible core cross-section is a maximum of 2.5 mm^2.

The KE1 housing is suitable for installation in flat connector boxes since it has a height of just 50 mm.

Analog modules

We offer analog input and output modules in the G11 housing design with M12 plug-in connections. The modules can be used universally for several signal sources and, in part, automatically detect the connected sensor (I, U, PT100), meaning that no wiring programming or parameterization is required. We also offer analog modules for the control cabinet.

The analog values are galvanically isolated from the AS-Interface. The analog modules can be supplied externally or via the AS-Interface (adjustable via switch).

Modules for hazardous areas

We offer a module in housing design G5 that is suitable for hazardous area Zone 1. You can connect four NAMUR sensors and two outputs to this module. You must either position the master and power supply outside of Zone 1 or mount it in a housing that is approved for hazardous areas. The cabling in Zone 1 must meet increased safety requirements (EEx e). The AS-Interface is connected via the flat cable (in this case the seal VAZ-PG11-FKD is also required) or a round cable. The module is encapsulated (EEx m). The field circuits are designed with EEx ia IIC type of protection. The inputs are monitored for lead breakages and short circuits (can be switched off for connecting mechanical contacts).

Pneumatic modules

You can use our AS-Interface pneumatic modules to control the air pressure locally, e.g., to actuate valves or flaps pneumatically. Shorter pneumatic lines result in energy savings and faster response times. In the case of decentralized actuators, this solution is superior to valve islands.

Display and control modules

You can use illuminated button modules for locally controlling and displaying states. Traditionally, illuminated button modules are often used with two illuminated buttons for the start and stop functions. However, we also offer a system solution for the installation of up to six illuminated buttons with a diameter of 22 mm.

7.12 Stack Lights

You can freely combine this modular series of signal lights, which are available in five colors and with three signal horns. You can connect up to four sensors to the AS-Interface module. The stack lights can also be connected without the AS-Interface module.



7.13 PCB Modules

Pepperl+Fuchs also offers PCB solutions (type designation CB*) for integrating AS-Interface into existing devices. We offer standard PCBs with up to four inputs and four outputs as well as special encapsulated solutions or installation modules in a plastic shell. Customer-specific solutions are also easy and quick to implement. You can choose between pins, single conductors, or terminals as standard connection technology.

7.14 Accessories

Pepperl+Fuchs offer all the accessories required for seamless installation and commissioning of an AS-Interface system.

AS-Interface handheld programmer

The AS-Interface system is very easy to operate. The AS-Interface handheld programmer VBP-HH1-V3.0-KIT is used to assign addresses and for the initial commissioning tests. You can connect the slaves directly via the plug-in cap, a programming cable, or an M12 connection line. Single-hand operation of the handheld programmer makes it extremely easy to assign addresses to individual modules or even an entire segment. You can also use the handheld programmer to control the AS-Interface outputs directly for testing purposes. The handheld programmer is powered by battery or the provided power supply.



AS-Interface flat cable

The profiled flat cable is used in most AS-Interface installations. The flat cable is available with rubber sheathing or in an oil-resistant TPE design in yellow and black. If you need to implement safety-related applications via AS-Interface, you can also use our flat cable marked with "+++SAFETY+++" in red lettering.

Converters

Converters are used to connect different AS-Interface gateways to the RS232 interface on a PC. You can then configure and parameterize these gateways using the commissioning software AS-i Control Tools.

Mounting bases

Mounting bases for AS-Interface modules in the G1 series make it easy to lay the AS-Interface flat cable. The mechanical coding prevents incorrect mounting. Pepperl+Fuchs offers different mounting bases with and without an addressing socket, for flat and round cables, and for different housing sizes.

Adapters and passive splitters

Adapters and passive splitters are available to suit every application: screw-in adapters in housings, outlets on round cables, adapters for M12 sockets, freely configurable solutions, outlets from yellow/black lines to 4-pin M12 plugs, splitters for a second flat cable spur, or mounting clips for mounting flat cables.

Plugs and female cordsets

As your AS-Interface service provider, Pepperl+Fuchs also offers all the necessary plug components, manufactured in our own factories.

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Properties

- High grade steel housing with push-in clamp connection
- CC-Link, DeviceNet, Ethernet/IP and MODBUS versions
- Versions for 1 or 2 AS-Interface networks

Your Benefit

- Color coded removable terminals simplify maintenance
- Advanced integrated diagnostics options increases system uptime
- Integrated button/display user interface simplifies trouble shooting

VBG-ENX-K20-D*

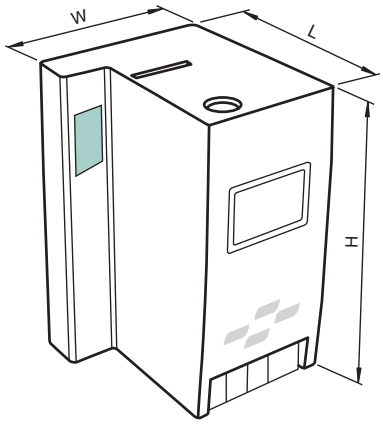
- Memory card makes device replacement fast and easy

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
PLC-Functionality	activateable
UL File Number	E223772
Display	Illuminated graphical LC display for addressing and error messages
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Construction type	Low profile housing , Stainless steel

Model Number	green = preferred type	VBG-CCL-K20-D-BV	VBG-DN-K20-D	VBG-DN-K20-DMD	VBG-DN-K20-DMD-BV	VBG-ENX-K20-D	VBG-ENX-K20-DMD	VBG-MOD-K20-D
AS-Interface networks	1	●	●			●		●
	2			●	●		●	
Duplicate address detection	from AS-Interface slaves		●	●		●	●	●
Upper level network								
Interface type	CombiCon	●	●	●	●			
	RJ-45					●	●	
	Sub-D							●
Protocol	CC-Link	●						
	DeviceNet		●	●	●			
	Ethernet/IP + MODBUS TCP/IP according to IEEE 802.3 , integrated switch					●	●	
	MODBUS RTU (Remote Terminal Unit)							●
Transfer rate	10 MBit/s / 100 MBit/s, Automatic baud rate detection					●	●	
Diagnostic interface								
Interface type	RS 232, serial		●			●	●	●
Transfer rate	19,2 kBit/s		●			●	●	●
Chip card								
Interface type	Chip card slot					●	●	



Dimensions				
Length L [mm]	83	76		
Width W [mm]		85		75
Height H [mm]		120		

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-SW-ACT32	Full version of the AS-I Control Tools including connection cable
VAZ-DN-SIM-USB	DeviceNet master simulator
USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232

Date of issue: 04/08/2015



Properties

- High grade steel housing with push-in clamp connection
- PROFIBUS or PROFINET versions
- Versions for 1 or 2 AS-Interface networks

Your Benefit

- Color coded removable terminals simplify maintenance
- Advanced integrated diagnostics options increases system uptime
- Integrated button/display user interface simplifies trouble shooting

VBG-PN-K20-D*

- Memory card makes device replacement fast and easy

VBG-PB-K25

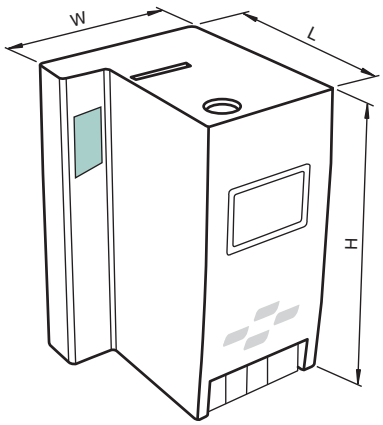
- Low-cost AS-Interface/Profibus gateway ideal for cost critical installations with basic diagnostics

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
UL File Number	E223772
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Construction type	Low profile housing , Stainless steel

Model Number	green = preferred type	VBG-PB-K25	VBG-PB-K20-D	VBG-PB-K20-DMD	VBG-PB-K20-DMD-BV	VBG-PN-K20-D	VBG-PN-K20-DMD
PLC-Functionality	activateable	●	●	●	●		
AS-Interface networks	1	●	●			●	
	2			●	●		●
Duplicate address detection	from AS-Interface slaves		●	●		●	●
Display	address display, error message LED display, 3 digits, for addressing and error messages	●					
	Illuminated graphical LC display for addressing and error messages		●	●	●	●	●
Upper level network							
Interface type	RJ-45					●	●
	RS 485	●	●	●	●		
Protocol	PROFIBUS DP V0 and V1	●					
	PROFIBUS DP V1		●	●	●		
	PROFINET according to IEEE 802.3					●	●
Transfer rate	9.6 kBit/s ... 12 MBit/s, Automatic baud rate detection	●	●	●	●		
	10 MBit/s / 100 MBit/s, Automatic baud rate detection					●	●
Diagnostic interface							
Interface type	RS 232, serial Diagnostic Interface		●	●		●	●
Transfer rate	19,2 kBit/s		●	●		●	●
Chip card							
Interface type	Chip card slot					●	●



Dimensions				
Length L [mm]	45	76		
Width W [mm]	45	75	85	
Height H [mm]	120			

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-SW-ACT32	Full version of the AS-I Control Tools including connection cable
USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232
VAZ-PB-SIM	PROFIBUS master simulator
VAZ-PB-DB9-W	PROFIBUS Sub-D Connector with switchable terminal resistance

Date of issue: 04/08/2015

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
PLC-Functionality	none
Display	LC display
Interface type	RS 232
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20

Model Number		VBM-CLX-DM	VBM-MLX/CPLX
AS-Interface networks	1		●
	2	●	
Protocol	ControlLogix, backplane	●	
	MicroLogix 1500 or CompactLogix backplane		●
Construction type	Mounting into backplane of ControlLogix PLC rack	●	
	Mounting into the backplane of a MicroLogix 1500 or CompactLogix PLC		●

Properties

- RS 232 serial interface
- Versions for 1 or 2 AS-Interface networks

Your Benefit

- AS-Interface scanner cards for Allen-Bradley PLC simplify I/O and safety integration

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VAZ-SW-ACT32	Full version of the AS-I Control Tools including connection cable
K-ADP2 RPI	Adapter for Gateways with RS 232 interface
USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232



Technical Data

*Detailed data and product description refer to data sheet on **www.pepperl-fuchs.com***

Model Number	VBM-CTR-K20-R2
AS-Interface specification	V3.0
PLC-Functionality	integrated
UL File Number	E223772
Display	Illuminated graphical LC display for addressing and error messages
Interface type	Sub-D
Transfer rate	1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600 or 11500 Bit/s , Automatic baud rate detection
Cable length	max. 30 m
Construction type	Low profile housing , Stainless steel
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VAZ-SW-ACT32	Full version of the AS-I Control Tools including connection cable
USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232

Properties

- RS 232 serial interface
- Supports 1 AS-Interface network

Your Benefit

- Color coded removable terminals simplify maintenance
- Integrated button/display user interface simplifies trouble shooting
- Advanced integrated diagnostics options increases system uptime

Date of issue: 04/08/2015



Properties

- AS-Interface power supply with data decoupling
- 2.8 A, 4 A and 8 A output current versions
- 24 V_{DC} and 115/230 V_{AC} input voltage versions
- 124 x 102 mm (h x l)
- Overload indication

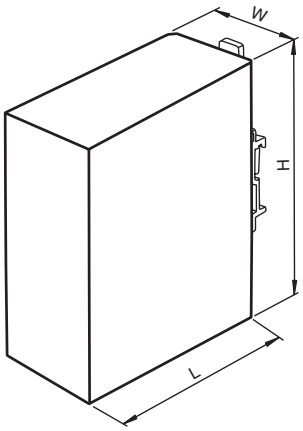
Your Benefit

- The integrated ground fault detection enhances network reliability
- Auto-resetting short circuit protection simplifies maintenance

Further Products

In this series, we offer additionally:

VAN-230/500AC-K24	8 A



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E223176
Voltage	30.55 V_{DC} ± 3 % fixed
Residual ripple	< 50 mV_{SS} (500 kHz bandwidth, 50 Ω measurement, with resistive load)
Protection degree	IP20
Protection class	I, Protective conductor connection necessary
Electrical isolation	SELV/PELV
Mounting	DIN rail

Model Number	green = preferred type	VAN-115/230AC-K16	VAN-115/230AC-K19	VAN-115/230AC-K27	VAN-24DC-K28
Current	2.8 A		●		
	4 A			●	●
	8 A	●			
Fusing	T10A HBC (not accessible)				●
	T3A 15/250 V HBC (not accessible)			●	
	T8A/250 V AC HBC (not accessible)	●			
	2.5 AT (not replacable)		●		
Capacity factor	> 0.5	●	●		
Rated operational voltage	100 ... 120 V_{AC}/220 ... 240 V_{AC}	●	●		
	24 V_{DC}				●
	85 … 132 V_{AC} 184 … 264 V_{AC} 240 … 300 V_{DC}			●	
Rated operational current	2.0 A at 115 V_{AC} 0.9 A at 230 V_{AC}		●		
	2.7 A at 115 V_{AC} 1.3 A at 230 V_{AC}			●	
	5.6 A at 24 V_{DC}				●
	6,0 A (Switch position 115 V) 2.8 A (Switch position 230 V)	●			
Supply frequency	47 ... 63 Hz	●	●	●	
Efficiency	typ. 90 % (230 V_{AC}, 4 A)			●	
	typ. 90.5 % (24 V_{DC}, 4 A)				●
	typ. 92 % (at 230 V AC/8 A)	●			
	90.5 % (230 V_{AC}, 2.8 A)		●		
Overvoltage protected	limited to max. 55 V	●	●	●	
	limited to max. 36 V				●
Short-circuit protection/overload	> 4,2 A < 6.5 A			●	
	> 5 A < 9 A				●
	FUSE Mode (2 ... 5 s current, then trips)	●			
Short-circuit current	min. 3.2 A, max. 4.6 A		●		
	12 ... 25 A (max. 5 s)	●			
Ambient temperature	-10 ... 70 °C (14 ... 158 °F) Note derating	●	●	●	
	-25 ... 70 °C (-13 ... 158 °F) Note derating				●

Dimensions					
Length L [mm]	102				
Width W [mm]	91	49	73	40	
Height H [mm]	124				

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

AS-Interface Power Calculator	AS-Interface Power supply and network checking utility

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E223176
Supply frequency	47 ... 63 Hz
Voltage	30 V ± 1 % Adjustment range 23 ... 30 V AC
Efficiency	89 %
Protection degree	IP20
Protection class	I, Protective conductor connection necessary
Mounting	DIN rail

Model Number	green = preferred type	K17-STR-24..30VDC-5A	K24-STR-24..30VDC-10A	K34-STR-24..30V-3X500VAC-10A
Current	0 ... 4 A	●		
	0 ... 8 A		●	●
Fusing	3.15 AT	●		
	6.3 AT		●	
Capacity factor	approx. 0.5 (Depending on input voltage)	●		
	approx. 0.6 (Depending on input voltage)		●	
	0.55 capacitive			●
Rated operational voltage	115/230 V_{AC}	●	●	
	3 x 340 ... 550 V_{AC}			●
Rated operational current	2.2 A (115 V) 0.9 A (230 V)	●		
	3 x 700 mA At 400 V_{AC}			●
	4.0 A (115 V) 1.9 A (230 V)		●	
Nominal voltage	3 x 380 ... 500 V_{AC}			●
Current limit	approx. 12 A		●	
	approx. 6 A	●		
	12.5 A			●
Ambient temperature	-10 ... 60 °C (14 ... 140 °F) with free convection, noncondensing			●
	-10 ... 70 °C (14 ... 158 °F) with free convection	●	●	

Dimensions		
Length L [mm]	140	160
Width W [mm]	70	81
Height H [mm]	132,5	153

Properties

- **Standard power supply**
- **4 A and 8 A output current versions, adjustable voltage**
- **115/230 V_{AC} and 3 x 340 ... 500 V_{AC} input voltage versions**
- **Overload protected**
- **132.5 x 70 x 140 mm and 153 x 81 x 160 mm versions (h x w x l)**

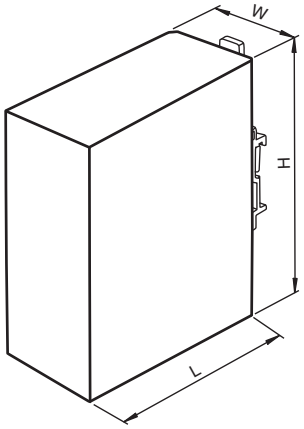
Your Benefit

- **LED overload indication simplifies troubleshooting**

Further Products

In this series, we offer additionally:

K26-STR-24VDC-2A



Date of issue: 04/08/2015





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	green = preferred type	VAR-G4F	VAR-KE3-TERM	VAZ-G10-TERM
UL File Number	E223772	●	●	
Insulation voltage	≥ 500 V		●	
Rated operational voltage	18.5 ... 31.6 V			●
	26.5 ... 31.6 V from AS-Interface	●	●	
Rated operational current	approx. 70 mA			
	≤ 15 mA per connection			●
	60 mA (per strand element), 120 mA (total)	●	●	
Protection class	III			●
Ambient temperature	0 ... 55 °C (32 ... 131 °F)		●	
	-10 ... 55 °C (14 ... 131 °F)	●		
	-25 ... 70 °C (-13 ... 158 °F)			●
Protection degree	IP20 according to EN 60529		●	
	IP67	●		
	IP67 IP67 / IP68 / IP69K with flat cable VAZ-FK-S-*			●
Mounting	DIN rail		●	
	screw mounting	●		

Properties

- **Repeater and Terminator versions**
- **IP20 and IP67 versions**

Your Benefit

VAZ-G10-TERM

- **200 m segment networks without repeater simplifies installation**
- **Two integrated termination profiles allow operation with virtually any network topology**

Further Products

In this series, we offer additionally:

VAA-4E4A-KE2-DK Data coupler-I/O module

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

VAZ-G4-B1	Blind plug M12





Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E223772
Insulation voltage	≥ 500 V
Short-circuit protection/over-load	6 A self resetting fuse
Rated operational voltage	30 V DC PELV
Voltage	29.5 ... 31.6 V DC
Rated operational current	4 A at 30 V

Model Number		VAN-G4-PE-4A	VAN-KE2-2PE
Number/Type	2 AS-Interface circuits 1+2		●
Ambient temperature	0 ... 55 °C (32 ... 131 °F)		●
	0 ... 70 °C (32 ... 158 °F)	●	
Protection degree	IP20		●
	IP67	●	
Mounting	DIN rail		●

Your Benefit

- **Power conditioner allows the easy use of a standard 30 VDC power supply**

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

VAR-KE3-TERM	AS-Interface advanced repeater with terminator
VAZ-G4-B	Blind plug PG7
K17-STR-24..30VDC-5A	Power supply, 24 to 30 V DC, 5 A
VAR-G4F	AS-Interface Advanced Repeater
K24-STR-24..30VDC-10A	Power supply, 24 to 30 V DC, 10 A
VAZ-G4-B1	Blind plug M12
AS-Interface Power Calculator	AS-Interface Power supply and network checking utility

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Properties

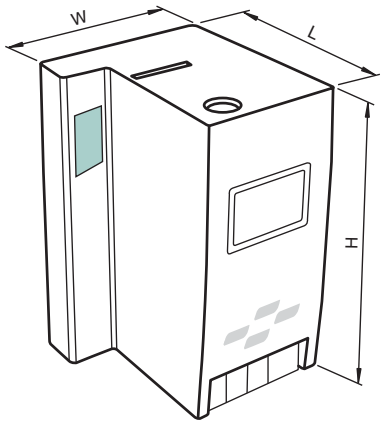
- PROFIBUS, PROFINET and Ethernet/IP versions
- Versions for 1 and 2 supported networks
- Versions with 2 and 4 safe OSSD
- SIL 3 / PIe

Your Benefit

- A single safety configuration processes safe data from two AS-Interface networks
- Memory card makes device replacement fast and easy
- Sharing of safe data between several gateway/safety controllers enables safety systems with nearly 1000 safe devices

VBG-PB-K30-DMD-S16-EV, VBG-PBS-K30-DMD & VBG-PNS-K30-DMD

- PROFISAFE gateway brings AS-Interface simplicity to PROFISAFE enabled PLC



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
Duplicate address detection	from AS-Interface slaves
Switch-on delay	< 10 s
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL e
$MTTF_d$	200 a
B_{10d}	2 E+7
Display	Illuminated graphical LC display for addressing and error messages
Interface type	Chip card slot
	RS 232, serial Diagnostic Interface
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20

Model Number	green = preferred type	VBG-PB-K30-DMD-S16	VBG-PB-K30-DMD-S16-EV	VBG-PB-K30-D-S	VBG-PB-K30-D-S16	VBG-PBS-K30-DMD	VBG-PN-K30-DMD-S16	VBG-PNS-K30-DMD	VBG-ENX-K30-DMD-S16
AS-Interface networks	1			●	●				
	2	●	●			●	●	●	●
PLC-Functionality	activateable	●	●	●	●		●		●
Response delay	< 40 ms	●	●	●	●		●		●
UL File Number	E223772	●	●	●	●		●		●
Upper level network									
Interface type	RJ-45						●	●	●
	RS 485	●	●	●	●	●			
Protocol	Ethernet/IP + MODBUS TCP/IP								●
	PROFIBUS DP V1	●	●	●	●	●			
	PROFINET according to IEEE 802.3						●	●	
	PROFISAFE		●			●		●	
Inputs									
Number/Type	2 EDM inputs: Inputs for external device monitoring circuits 1 and 2 2 Start inputs: Output circuits 1 and 2			●					
	4 EDM/Start inputs: EDM: Inputs for the external device monitoring circuits Start: start inputs: Static switching current 4 mA at 24 V, dynamic 30 mA at 24 V (T=100 µs)	●	●		●	●	●	●	●
Outputs									
Safety output	Outlet circuits 1 and 2: 2 potential-free contacts, Outlet circuits 3 and 4: 2 PNP transistor outlets	●	●		●	●	●	●	●
	2 x 2 output switch elements: Output circuits 1 and 2			●					

Dimensions									
Length L [mm]	89								
Width W [mm]	100								110
Height H [mm]	120								

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232
VAZ-SW-SIMON+	Software for configuration of K30 Master Monitors/K31 Safety Monitors
VAZ-PB-DB9-W	PROFIBUS Sub-D Connector with switchable terminal resistance

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Spec. 3.0

Properties

- **2 supported networks**
- **4 safe OSSD**
- **4 integrated safe outputs**
- **SIL 3 / PIe**

Your Benefit

- **16 channel Safety Monitor with four on-board safe outputs (two relays, two electronic safe outputs)**
- **Memory card makes device replacement fast and easy**

Further Products

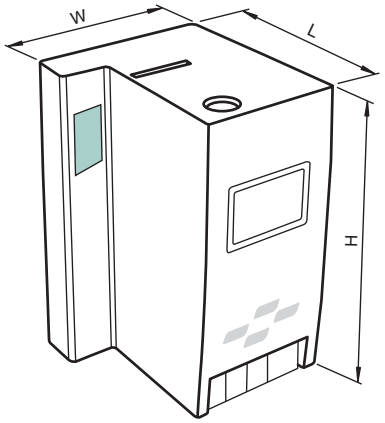
In this series, we offer additionally:

VAS-1A-K12-S1	Response delay < 50 ms
VAS-1A-K12-U	1 De-energizing circuit
VAS-1A-K12-U-S1	Response delay < 50 ms
VAS-2A-K12	Response delay < 40 ms
VAS-2A-K12-S1	Response delay < 50 ms
VAS-2A-K12-U	2 De-energizing circuits
VAS-2A-K12-U-S1	Response delay < 50 ms

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**VAS-4A16L-K31** **VAS-2A1L-K31**
Slave type	Standard slave
AS-Interface specification	V3.0
Required master specification	V3.0
Duplicate address detection	from AS-Interface slaves
Switch-on delay	< 10 s
Response delay	< 40 ms
UL File Number	E223772
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL e
$MTTF_d$	200 a
B_{10d}	2 E+7
Display	Illuminated graphical LC display for addressing and error messages
Rated operational current	≤ 200 mA from 24 V_{DC} ≤ 45 mA from AS-Interface
Inputs	
	4 EDM/Start inputs: EDM: Inputs for the external device monitoring circuits Start: start inputs: Static switching current 4 mA at 24 V, dynamic 30 mA at 24 V (T=100 µs)
Outputs	
Safety output	Outlet circuits 1 and 2: 2 potential-free contacts, Outlet circuits 3 and 4: 2 PNP transistor outlets
Interface type	Chip card slot
	RS 232, serial Diagnostic Interface
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20



Dimensions	
Length L [mm]	89
Width W [mm]	85
Height H [mm]	120

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

USB-0,8M-PVC ABG-SUBD9	Interface converter USB/RS 232
VAZ-SW-SIMON+	Software for configuration of K30 Master Monitors/K31 Safety Monitors

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62
Spec 2.1

Properties

- Versions with 2 safety-related inputs for mechanical contacts, 8 / 4 safe inputs Cat. 4, 2 inputs for incremental rotary encoders and 1 safety relay output
- SIL 3 / PIe
- IP20

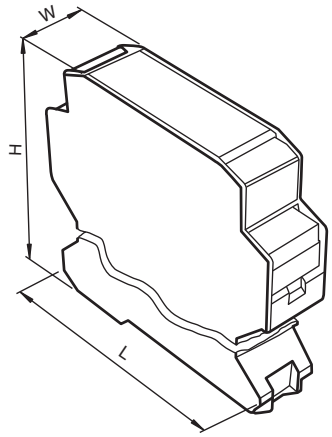
Your Benefit

VAS-2A8L-KE4-8SE

- Safety monitor with two integrated safe electronic outputs offers decentralized safety control
- Memory card makes device replacement fast and easy
- Integrated mini-safety PLC functionality make this the ideal solution for small to medium size stand-alone applications

VBA-2E-KE4-ENC-S

- Safe, fully configurable 2-channel zero-speed monitor makes zero-speed detection over AS-Interface flexible and convenient



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
Performance level (PL)	PL e
Safety Integrity Level (SIL)	SIL 3
Mission Time (T_M)	20 a
Inputs	
Input current	Static switching current 4 mA at 24 V, dynamic 30 mA at 24 V (T=100 µs)
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Protection degree	IP20
Mounting	DIN rail

Model Number	green = preferred type	VAS-2A8L-KE4-8SE	VBA-2E-KE4-ENC-S	VAS/M-2A8L-KE4-8SE-C1
Type	Safety monitor	●		●
	Safety module		●	
Required master specification	≥ V2.1	●		
	≥ V3.0		●	●
PFH_d	2.77 E-9		●	
	5.08 E-9	●		●
Rated operational current	≤ 150 mA from AS-Interface; ≤ 200 mA off AUX		●	
	≤ 200 mA from AS-Interface; ≤ 4 A off AUX	●		●
Inputs				
Number/Type	8 / 4 safe inputs cat. 4 or 8 standard inputs	●		
	8 / 4 safe inputs cat. 4 or 8 standard inputs and outputs			●
	2 inputs for incremental rotary encoders AMP mini-IO connector		●	
Supply	24 V U_{AUX}	●		●
Voltage	U_b = 5 V DC		●	
Current loading capacity	10 mA per signal output 1.4 A OSSD supply output	●		●
Outputs				
Number/Type	Output circuits 1 and 2	●		
Supply	from external auxiliary voltage U_{AUX}	●		
Profile	S-0.B.E	●		
	Safe input slaves: S-0.B.E Diagnosis slaves: S-7.A.5.		●	

Dimensions	
Length L [mm]	113
Width W [mm]	22,5
Height H [mm]	99

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-SIMON-USB	Connection cable module/hand-held programming device
VAZ-ENC-1,5M-PVC	Connection cable for connecting encoders to a speed monitor
RVS58S-*****Z**	Incremental rotary encoder
RVS58S-282YYR4ZN-01024	Safety incremental encoder
Safe Speed Monitor	Speed monitor

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TÜV approved up to cat.4 / SIL3

Properties

- 2 inputs for 2-channel active optoelectronic protective devices
- SIL 3 / PIe
- IP67

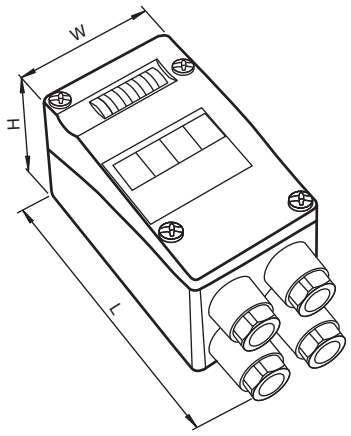
Your Benefit

- Modular solution to connect all semiconductor safety devices
- PG gland connection allows cut-to-length cable

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VAA-2E-G4-SE
Slave type	Safety-Slave
AS-Interface specification	V2.1
Required master specification	≥ V2.0
Response delay	≤ 10 ms
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL e
Category	Cat. 4
$MTTF_d$	1500 a
Mission Time (T_M)	10 a
PFH_d	1.54 E-9
PFD	2.5 E-5
Diagnostic Coverage (DC)	99.4 %
Rated operational current	≤ 30 mA
Number/Type	2 inputs for a 2-channel active optoelectronic protective devices (AOPD) for safeguarding positions and areas of danger up to Type 4 in accordance with EN 61496-1.
Supply	from external auxiliary voltage U_{AUX}
Current loading capacity	≤ 2 A overload and short-circuit resistant
Input current	≤ 45 mA
Profile	S-0.B
Functional safety	EN 61496-1:2004/A1:2008 (by type 4), EN ISO 13849-1:2008 (up to PL e), EN 61508:2001 and IEC 62061:2005 (up to SIL3)
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)
Protection degree	IP67
Mounting	DIN rail or screw mounting



Dimensions	
Length L [mm]	102
Width W [mm]	45
Height H [mm]	51

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-G4-B	Blind plug PG7
SLPCM8-2	Safety light grid with integrated control unit
VAZ-G4-B1	Blind plug M12

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Properties

- 2 safety-related inputs for mechanical contacts
- SIL 3 / PIe
- IP67

Your Benefit

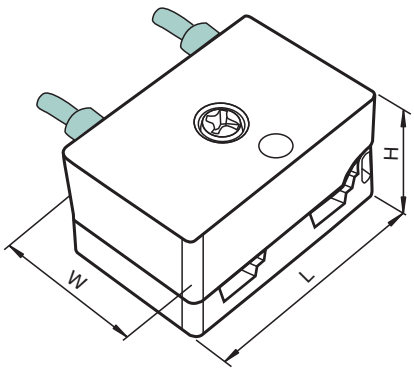
- Reduces installation complexity and cost by interfacing with any dry-contact safety device
- Integrated non-safe output drives announciation (horns/visual indicators)

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slave type	Safety-Slave
AS-Interface specification	V3.0
Required master specification	≥ V2.1
Performance level (PL)	PL e
Category	Cat. 4
Safety Integrity Level (SIL)	SIL 3
Supply	from AS-Interface
Voltage	20 ... 30 V DC pulsed
Rated operational current	≤ 90 mA
Current loading capacity	input current limited ≤ 15 mA, overload and short-circuit resistant
Inputs	
Number/Type	2 safety-related inputs for mechanical contacts, crossed-circuit monitored: 2 single-channel contacts: up to category 2/PL c to ISO 13849-1 or 1 2-channel contact: up to category 4/PL e to ISO 13849-1 Cable length must not exceed 30 m per input.
Outputs	
Number/Type	1 conventional electronic output, PNP
Supply	from AS-Interface
Current	50 mA, short-circuit/overload protected
Profile	S-7.B
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Protection degree	IP67
Functional safety	EN ISO 13849-1:2008, IEC 62061:2005
Cable length	1 m

Model Number		VAA-2E1A-G10-SAJ/EA2J-1M	VAA-2E1A-G10-SAJ/EA2J-2X1M
Electrical connection	2 open cable ends: 1 open cable end for inputs 1 open cable end for output		●
	1 open cable end for inputs and output	●	



Dimensions	
Length L [mm]	40,5
Width W [mm]	27,7
Height H [mm]	21,5

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-FK-0.2-V1-W	Connection cable G10 module/hand-held programming device
VAZ-2E1A-F85A-S	Emergency stop button

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	VAA-2E2A-G12-SAJ/EA2L
Slave type	Safety-Slave
AS-Interface specification	V2.1
Required master specification	≥ V2.1
Safety Integrity Level (SIL)	SIL 3
UL File Number	E87056
Rated operational current	≤ 50 mA
Supply	from AS-Interface
Voltage	20 ... 30 V DC pulsed
Current loading capacity	input current limited ≤ 15 mA, overload and short-circuit resistant
Inputs	
Number/Type	2 safety-related inputs for mechanical contacts, crossed-circuit monitored: 2 single-channel contacts: up to category 2/PL c to ISO 13849-1 or 1 2-channel contact: up to category 4/PL e to ISO 13849-1 nicht uebersetzt!
Outputs	
Number/Type	2 conventional electronic outputs, PNP
Supply	from external auxiliary voltage U_{AUX}
Current	1.5 A per output, short-circuit protected
Functional safety	ISO 13849-1 (up to category 4/PL e), IEC 61508/IEC 62061 (up to SIL3)
Mounting	Mounting base
Profile	S-7.B
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Protection degree	IP67

TÜV approved up to cat.4 / SIL3

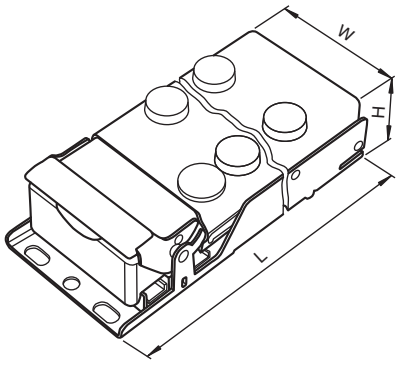
ECOLAB

Properties

- **2 safety-related inputs for mechanical contacts**
- **SIL 3 / PIe**
- **IP67**

Your Benefit

- **Safety module with all the benefits of the G12 line**
- **Flexible solution with inputs for any dry-contact safety device and non-safe output for machine control or annunciation**



Dimensions	
Length L [mm]	118
Width W [mm]	57,4
Height H [mm]	35

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-V1-B2	Blind plug for M12 sockets
VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VAZ-G12-MARK1-YE	Lettering set for AS-Interface module, design G12 "Safety, short", yellow
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VAZ-V1-B	Blind plug for M12 sockets
VAZ-CLIP-G12	lock for G12 module

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TÜV approved up to cat.4 / SIL3

Properties

- Versions with 2 safety-related inputs for mechanical contacts and 1 safety relay output
- SIL 3 / PIe (some versions)
- IP20

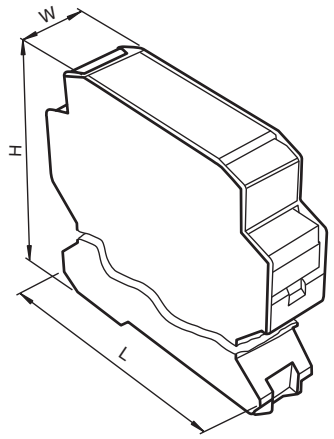
Your Benefit

VAA-2E*-KE1-S*

- Reduced mounting height is ideal for junction box applications
- Color-coded removable terminals simplify maintenance

VBA-4E1A-KE3-ZEJ/SR

- Remote safe output increases the control capabilities of AS-Interface Safety at Work
- On-board non-safe input simplify EDM feedback from motor control relays



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V2.1
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL e
Protection degree	IP20
Inputs	
Supply	from AS-Interface
Mounting	DIN rail

Model Number		VAA-2E-KE1-S	VAA-2E2A-KE1-S/E2	VBA-4E1A-KE3-ZEJ/SR
	green = preferred type			
Slave type	A/B slave			●
	Safety-Slave	●	●	
Required master specification	≥ V2.0	●		
	≥ V2.1		●	●
$MTTF_d$	200 a	●	●	
Rated operational current	≤ 30 mA (without sensors) / max. 200 mA			●
	≤ 70 mA	●	●	
Inputs				
Number/Type	2 safe inputs for mechanical contacts	●	●	
	4 inputs for 2- or 3-wire sensors			●
Voltage	20 ... 30 V DC pulsed	●	●	
	21 ... 31 V DC			●
Current loading capacity	input current limited ≤ 15 mA,	●	●	
	≤ 90 mA (INT)			●
Input current	≤ 8 mA (limited internally)			●
Outputs				
Number/Type	1 safety relay output			●
	2 conventional electronic outputs, PNP		●	
Supply	from AS-Interface			●
	from external auxiliary voltage U_{AUX}		●	
Profile	S-0.B	●		
	S-7.A.E			●
	S-7.B		●	
Ambient temperature	0 ... 55 °C (32 ... 131 °F)			●
	-25 ... 50 °C (-13 ... 122 °F)	●	●	

Dimensions		
Length L [mm]	48,5	107
Width W [mm]	22,5	
Height H [mm]	99,6	99

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device

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Properties

- Emergency stop
- Release of emergency stop by pull or turn
- IP65

Your Benefit

- AS-Interface intelligent E-stop with M12 quick disconnect results in fast error-free installation
- Pull and twist release satisfies customers preferences
- Pre-tensioned mechanical design results in secure deactivation of contacts upon mechanical failure

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slave type	Safety-Slave
AS-Interface specification	V2.1
Required master specification	≥ V2.0
UL File Number	E198304
$MTTF_d$	200 a
B_{10d}	1 E+5
Inputs	
Number/Type	2 NC Safety function with positive opening operation in accordance with IEC/EN 60947-5-1 Reset by pulling/turning
Supply	from AS-Interface
Functional safety	EN 954-1:1996, EN 62061:2005, EN 61508 Parts 1-7:1998-2000, NFPA 79:2002, EN 60204-1:2006

Model Number	green = preferred type	VAA-2E-F85A-S-V1	VAA-2E1A-F85A-S-V1	VAA-2E-PM-S	VAA-2E1A-PM-S
Rated operational current	≤ 25 mA	●		●	
	≤ 40 mA		●		●
Outputs					
Number/Type	LED red		●		●
Supply	from AS-Interface		●		●
Profile	S-0.B.E	●		●	
	S-7.B.E		●		●
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F) (no freezing)		●		
	-25 ... 55 °C (-13 ... 131 °F) (no freezing)	●		●	●
Protection degree	IP65			●	●
	IP65 Module: IP20	●	●		
Mechanical data	Panel mount			●	●
	Surface mount	●	●		

Further Products

In this series, we offer additionally:

VAZ-2E1A-F85A-S Emergency Stop Button
VAA-2E1A-G10-SAJ/EA2J-1M
Safety module
VAA-2E1A-G10-SAJ/EA2J-2X1M
Safety module

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Properties

- Magnetic door switch and RFID safety interlock switch versions
- SIL 3 / PIe
- IP67

Your Benefit

VA*-IEI*

- 4-Channel RFID safety door switch ideal for high-vibration applications
- Unique RFID target cannot be bypassed and provides superior operator protection

VA*-IER*

- AS-Interface intelligent design with M12 connector ensures proper network connection

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number		VAA-4E-IEI1-CONTROL-J-S	VAZ-IEI1-READER1-S-V3	VAZ-IEI1-TAG1-S	VAA-2E1A-IER1-S-1M-V1	VAZ-IER1-ACTUATOR1-S	VAA-2E-IER2-S-1M-V1	VAA-2E-IER2-S-0,15M-V1	VAZ-IER2-ACTUATOR2-S
	green = preferred type								
Detection type	inductive		●	●					
	magnetic				●	●	●	●	●
Slave type	Safety-Slave	●			●		●	●	
AS-Interface specification	V2.1	●			●		●	●	
Required master specification	≥ V2.0	●			●		●	●	
Response delay	< 5 ms				●		●	●	
UL File Number	E155795				●	●	●	●	●
	E179102	●	●	●					
Safety Integrity Level (SIL)	SIL 3	●	●	●	●		●	●	
Performance level (PL)	PL e	●	●	●	●		●	●	
$MTTF_d$	330 a	●							
Mission Time (T_M)	20 a				●		●	●	
PFH_d	4.29 E-8				●		●	●	
Rated operational current	≤ 130 mA	●							
	≤ 30 mA				●		●	●	
Number/Type	4 safety-related inputs up to 4 read heads, Cable length must not exceed 25 m per input.	●							
Supply	from AS-Interface	●			●				
Profile	S-0.B	●					●	●	
	S-7.B				●				
Functional safety	DIN EN 954-1, EN ISO 13849-1 (up to PL_d)		●	●					
	DIN EN 954-1 (Cat. 4), EN ISO 13849-1 (to PL_e), EN 62061 (SIL 3)	●							
	ISO 13849-1:2008 (up to category 3/PL e) EN ISO 12100-1, -2:2003 EN 1088:1995+A2:2008				●	●	●	●	●
Ambient temperature	0 ... 50 °C (32 ... 122 °F)	●							
	-20 ... 60 °C (-4 ... 140 °F)				●	●	●	●	●
	-25 ... 70 °C (-13 ... 158 °F)		●	●					
Protection degree	IP67	●			●	●	●	●	●
	IP67 / IP69K		●	●					
Mounting	Mounting base	●							

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V3-GM-5M-PUR-ABG43-V1-G	Connection cable, M8 to M12, PUR cable, 3-pin
V3-GM-2M-PUR-ABG43-V1-G	Connection cable, M8 to M12, PUR cable, 3-pin
VAZ-T1-FK-V1	Splitter box AS-Interface to 1x M12 round connector

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Properties

- Mechanical safety interlock switch and enabling switch versions
- PI_d
- IP67

Your Benefit

VAA-2E*-IM1-J-S-V1

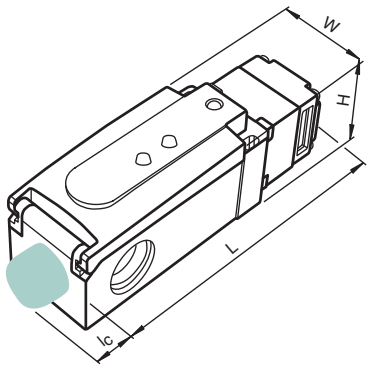
- AS-Interface intelligent safety door switch with M12 quick disconnect results in fast error-free installation

VAA-2E3A-LIM1-P*

- AS-Interface intelligent latching safety door switch with M12 quick disconnect results in fast error-free installation
- Two integrated user-controlled, high-visibility LEDs can be used to indicate door open/close status

VAA-3E-HH30-J-S-V1

- AS-Interface intelligent enabling switch with M12 quick disconnect results in fast error-free installation



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slave type	Safety-Slave
AS-Interface specification	V2.1
Required master specification	≥ V2.0
Rated operational current	≤ 45 mA
Supply	from AS-Interface
Profile	S-7.B
Functional safety	DIN EN 954-1, EN ISO 13849-1 (up to PL_d)
Protection degree	IP67

Model Number		VAA-2E-IM1-J-S-V1	VAA-2E2A-IM1-J-S-V1	VAA-2E3A-LIM1-PU-J-S-V1	VAA-2E3A-LIM1-PL-J-S-V1	VAA-2E3A-LIM1-PU-L-S-V1	VAA-2E3A-LIM1-PL-L-S-V1	VAA-3E-HH30-J-S-V1
guard-locking mode	power to lock				●		●	
	power to unlock			●		●		
Switching principle	slow-acting contact element, 3-stage							●
UL File Number	E179102	●	●			●	●	●
Performance level (PL)	PL d			●	●	●	●	●
B_{10d}	1 E+5							●
	5 E+6			●	●	●	●	
Inputs:								
Number/Type	2 safety-related inputs: NO E1 NO E2							●
	2 safety-related inputs: normally-closed contact 1 normally-closed contact 2	●	●					
	2 safety-related inputs: 1 door-monitoring contact SK 1 Magnet-monitoring contact MC			●	●	●	●	
Outputs:								
Number/Type	1 guard locking magnet, 1 LED red, 1 LED green			●	●	●	●	
Supply	from AS-Interface			●	●			
	from external auxiliary voltage					●	●	
Current	300 mA			●	●	●	●	
Ambient temperature	-20 ... 55 °C (-4 ... 131 °F)	●	●	●	●	●	●	
	-5 ... 50 °C (23 ... 122 °F)							●

Dimensions				
Length L [mm]	123	190		-
Width W [mm]	40			-
Height H [mm]	42			-
Connector area l_c [mm]	13			-

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-HH30-BRACKET	Bracket for VAA-3E-HH30-J-S-V1
VAZ-IM1-90°-BOLT-S	Right-angled actuator for AS-Interface safety switches
VAZ-T1-FK-V1	Splitter box AS-Interface to 1x M12 round connector
VAZ-IM1-BOLT-S	Straight actuator for AS-Interface safety switches
V1-G-0,6M-PUR-V1-G	Connection cable, M12 to M12, PUR cable, 4-pin
VAZ-IM1-LR-RADIUS-BOLT-S	Hinged actuator for right/left mounted doors, for safety switches
V1-G-1M-PUR-V1-G	Connection cable, M12 to M12, PUR cable, 4-pin
VAZ-IM1-TD-RADIUS-BOLT-S	Hinged actuator for top/bottom mounted doors, for safety switches
V1-G-10M-PUR-V1-G	Connection cable, M12 to M12, PUR cable, 4-pin
VAZ-IM1-BASE-BOLT-S	Latches for mechanical security switches (LIM1 and IM1)
VAZ-IM1-BASE-S	Switch mount for mechanical safety switches (LIM1 and IM1)
VAZ-2T1-FK-1M-PUR-V1-G	Splitter box AS-Interface and auxiliary voltage to 1 x M12 round connector
VAZ-T1-FK-1M-PUR-V1-G	Splitter box AS-Interface to 1x M12 round connector

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Model number



VAZ-IM1-BOLT-S

Straight actuator for AS-Interface safety switches

Mechanical specifications	
Tension force	≤ 2500 N
door radius r	≥ 300 mm
caster	5 mm
General information	
Scope of delivery	1 straight actuator, with rubber grommet; 2 safety screws, stainless steel M4 x 14

Model number

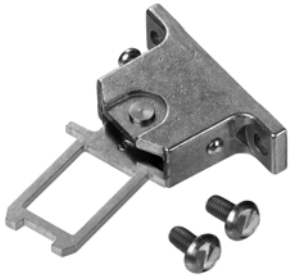


VAZ-IM1-90°-BOLT-S

Right-angled actuator for AS-Interface safety switches

Mechanical specifications	
Tension force	≤ 1500 N
door radius r	≥ 300 mm
caster	5 mm
General information	
Scope of delivery	1 right-angled actuator, with rubber grommet; 2 safety screws, stainless steel M4 x 14

Model number

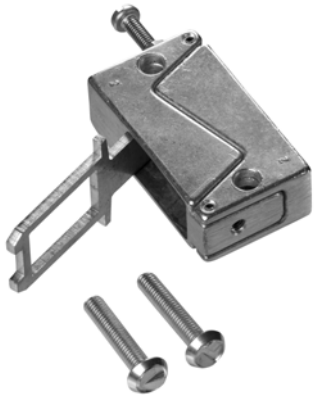


VAZ-IM1-LR-RADIUS-BOLT-S

Hinged actuator for right/left mounted doors, for AS-Interface safety switches

Mechanical specifications	
door radius r	100 ... 1000 mm
door stop	left/right
caster	5 mm
General information	
Scope of delivery	1 hinged actuator, for right- and left-mounted doors 2 safety screws, stainless steel M5 x 10

Model number



VAZ-IM1-TD-RADIUS-BOLT-S

Hinged actuator for top/bottom mounted doors, for AS-Interface safety switches

Mechanical specifications	
door radius r	200 ... 1000 mm
door stop	top/bottom
caster	5 mm
General information	
Scope of delivery	1 hinged actuator, For top and bottom mounted doors 2 safety screws, stainless steel M5 x 25

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Model number



VAZ-IM1-BASE-BOLT-S

Latches for mechanical security switches (LIM1 and IM1)

General information

Scope of delivery	1 latch 1 actuator included

Model number



VAZ-IM1-BASE-S

Switch mount for mechanical safety switches (LIM1 and IM1)

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Model number



VAZ-SW-SIMON+

Software for configuration of K12 Basic Monitors/K30 Master Monitors/K31 Safety Monitors via a PC

General specifications	
Description	Software on CD-ROM

The easy-to-operate user interface enables you to configure the AS-Interface safety monitor in conjunction with safe AS-Interface slaves such as EMERGENCY STOP buttons, safety switches for doors, or safety thru-beam sensors within an AS-Interface bus system for virtually all applications relating to the protection of danger areas on industrial power-driven machines.
This software also assists you in commissioning and documenting your safety-relevant applications and has powerful diagnostic features.

Model number



VAZ-SIMON-R2

USB Type A to Micro-USB connector

Mechanical specifications	
Connection	USB Type A to Micro-USB connector
Cable	
Length L	2 m

Model number



VAZ-SIMON-RJ45

Interface cable for connecting two K12-Safety Monitors

Mechanical specifications	
Connection	2 x RJ-45
Cable	
Length L	0.1 m

Model number



VAZ-SIMON+-R2-1,8M-PS/2

Interface cable for connecting the K20/K30/K31 Safety Monitor to a PC

Mechanical specifications	
Connection	Serial interface RS 232: 9-pin Sub-D socket On the monitor: PS/2
Cable	
Length L	1.8 m

Date of issue: 0408/2015



Properties

- Versions with 2, 4 and 2 x 4 PNP inputs
- Versions with 2 and 4 electronic outputs
- Versions with standard, A/B and double A/B slave
- IP67

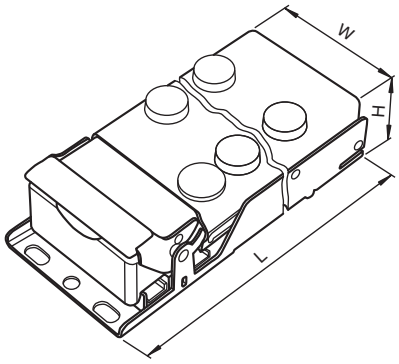
Your Benefit

- Toolless installation and one-part construction speeds-up installation
- Output overload indication on affected M12 port takes guessing out of troubleshooting
- SPEEDCON M12 metal inserts reduce I/O installation time

Further Products

In this series, we offer additionally:

VAA-4E4A-G12-ZAJ/EA2L sensor/actuator module
VAA-4E4A-G12-ZAL/EA2L sensor/actuator module



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E87056
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Mounting	Mounting base
AS-Interface specification	V3.0

Model Number	green = preferred type	VAA-4A-G12-EA2L	VBA-4E-G12-ZAJ	VBA-4E-G12-ZAL	VBA-2E2A-G12-ZAJ/EA2L	VBA-4E4A-G12-XEL	VBA-4E4E-G12-ZAJ	VBA-4E4A-G12-ZAJ/EA2L	VBA-4E4A-G12-ZAL/EA2L
Slave type	A/B slave		●	●	●	●		●	●
	Double A/B slave						●		
	Standard slave	●							
Required master specification	≥ V2.1	●	●	●	●		●		
	≥ V3.0					●		●	●
Auxiliary voltage	24 V DC ± 15 % PELV					●			
Rated operational current	≤ 40 mA	●		●		●			●
	≤ 40 mA (without sensors) / max. 240 mA		●		●			●	
	≤ 80 mA (without sensors) / max. 280 mA						●		
Inputs									
Number/Type	2 inputs for 2- or 3-wire sensors option 1 input for 4-wire sensor				●				
	2x 4 inputs for 2- or 3-wire sensors alternative 2 x 2 inputs for 4-wire sensors						●		
	4 inputs for 2- or 3-wire sensors					●			
	4 inputs for 2- or 3-wire sensors option 2 inputs for 4-wire sensors		●	●				●	●
Supply	from AS-Interface		●		●		●	●	
	from auxiliary voltage U_{AUX}			●		●			●
Voltage	21 ... 31 V		●	●	●		●	●	
Current loading capacity	≤ 200 mA		●		●		●	●	
	≤ 500 mA					●			
	≤ 600 mA			●					●
Input current	≤ 8 mA (limited internally)		●	●	●	●	●	●	●
Outputs									
Number/Type	2 electronic outputs				●				
	4 electronic outputs	●				●		●	●
Supply	from external auxiliary voltage U_{AUX}	●			●	●		●	●
Current	1 A per output					●			
	2 A per output 4 A total (TB ≤ 40 °C) 3 A total (TB ≤ 70 °C)				●				
	2 A per output 6 A total (TB ≤ 40 °C) 4 A total (TB ≤ 70 °C)	●						●	●
Voltage	≥ (U_{AUX} - 0.5 V)	●			●	●		●	●
Profile	S-B.A.2				●				
	S-0.A.2		●	●			●		
	S-7.A.7					●		●	●
	S-8.1	●							

Dimensions									
Length L [mm]			118				151,6		
Width W [mm]					57,4				
Height H [mm]					35				

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-V1-B3	Blind plug for M12 sockets
VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VAZ-G12-MARK2-GN	Lettering set for AS-Interface module, design G12 "long", green
VAZ-G12-MARK1-GN	Lettering set for AS-Interface module, design G12 "short", green
VAZ-CLIP-G12	lock for G12 module

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Properties

- 4 PNP inputs / versions with 4 electronic outputs
- A/B slave
- IP69 / IP69k

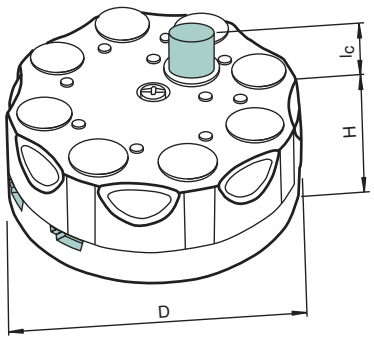
Your Benefit

- High IP rating makes this an excellent solution for washdown applications
- Compact, round design fits into tight spaces
- Sturdy mounting base (included) make this one of the toughest housings on the market

Further Products

In this series, we offer additionally:

VAA-4E4A-G11-ZAJ/EA2L-F Sensor-/actutor modul
VAA-4E4A-G11-ZAJ/EA2L-V1 Sensor-/actuator modul



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
Slave type	A/B slave
UL File Number	E87056
Rated operational current	≤ 40 mA (without sensors) / max. 240 mA
Inputs	
Number/Type	4 inputs for 2- or 3-wire sensors (PNP), DC option 2 inputs for 4-wire sensors (PNP), DC
Supply	from AS-Interface
Voltage	12 ... 31 V
Current loading capacity	≤ 200 mA
Input current	≤ 9 mA (limited internally)
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP68 / IP69K
Mounting	Mounting base

Model Number	green = preferred type	VBA-4E-G11-ZAJ-F	VBA-4E-G11-ZAJ-V1	VBA-4E4A-G11-ZAJ/EA2L-F	VBA-4E4A-G11-ZAJ/EA2L-V1
Required master specification	≥ V2.1	●	●		
	≥ V3.0			●	●
Outputs					
Number/Type	4 electronic outputs, PNP			●	●
Supply	from external auxiliary voltage U_{AUX}			●	●
Current	2 A per output TB ≤ 40 °C: 6 A total TB ≤ 70 Â°C: sum O1 + O2 max. 2 A, sum O3 + O4 max. 2 A			●	●
Voltage	≥ (U_{AUX} - 0.5 V)			●	●
Connection	AS-Interface: AS-Interface flat cable Inputs: M12 round connector	●			
	AS-Interface: M12 round connector Inputs: M12 round connector		●		
	AS-Interface/U_{AUX}: AS-Interface flat cable Inputs/outputs: M12 round connector			●	
	AS-Interface/U_{AUX}: M12 round connector Inputs/outputs: M12 round connector				●
Profile	S-0.A.2	●	●		
	S-7.A.7			●	●

Dimensions				
Height H [mm]	35			
Diameter D [mm]	85			
Connector area l_c [mm]	-	11	-	11

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VAZ-V1-B3	Blind plug for M12 sockets
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VAZ-FK-S-BK-SEAL	AS-Interface flat cable seal

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Properties

- 2 PNP inputs / versions with 1 electronic output
- A/B slave
- Up to IP67/68/69k possible

Your Benefit

- Ultra-compact dimensions allow direct installation in cable trays and ducts
- Integrated sensor pigtails reduce installation time and cost

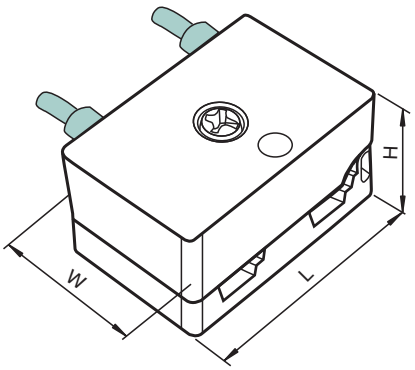
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slave type	A/B slave
AS-Interface specification	V3.0
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67 IP67 / IP68 / IP69K with flat cable VAZ-FK-S-*

Model Number	green = preferred type	VBA-2E-G10-ZAJ-1M-V1-W	VBA-2E-G10-ZEJ-1M-2V1-W	VBA-2E1A-G10-ZAL/E2L-1M-2V1-W
Required master specification	≥ V2.0	●	●	
	≥ V2.1			●
Auxiliary voltage	20 ... 30 V DC PELV			●
Rated operational current	≤ 40 mA / max. 60 mA			●
	≤ 40 mA (without sensors) / max. 120 mA	●	●	
Inputs				
Number/Type	2 inputs for 2- or 3-wire sensors		●	
	2 inputs for 2- or 3-wire sensors option 1 input for 4-wire sensor	●		●
Supply	from AS-Interface	●	●	
	from external auxiliary voltage U_{AUX}			●
Voltage	20 ... 30 V			●
	21 ... 31 V	●	●	
Current loading capacity	≤ 1000 mA			●
	75 mA at TB ≤ 40 °C (104 °F) 60 mA at TB ≤ 75 °C (167 °F)	●	●	
Outputs				
Number/Type	1 electronic output, PNP,			●
Supply	from external auxiliary voltage U_{AUX}			●
Voltage	≥ (U_{AUX} - 0.5 V)			●
Current loading capacity	≤ 1000 mA			●
Profile	S-0.A.2	●	●	
	S-7.A.E			●

Dimensions	
Length L [mm]	40,5
Width W [mm]	27,7
Height H [mm]	21,5



Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-PK-FK-0,2M-V1-W	Connection cable G10 module/hand-held programming device

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Properties

- **Versions with 2, 2 x 2 and 4 PNP inputs / versions with 2 pneumatic outputs, 2 and 4 electronic outputs**
- **A/B slave**
- **Versions with IP65 and IP67**

Your Benefit

VBA-4E2A-G1-ZE/P*

- **AS-Interface pneumatic modules with electronic inputs simplify valve control**

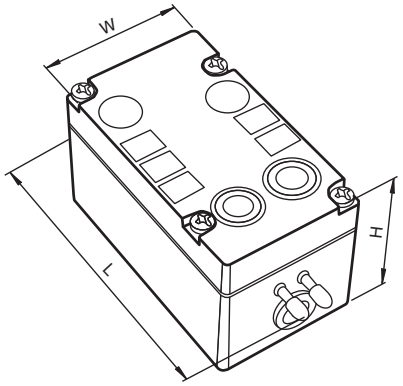
VBA-*-G4-ZE*

- **PG gland connection allows cut-to-length cable**

Further Products

In this series, we offer additionally:

VAA-4E4A-G4-ZE/E2	sensor/actuator module
VAA-4E-G4-ZE	sensor/actuator module
VBA-4E3A-G4-ZE/E2	sensor/actuator module



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data						
Slave type	A/B slave					
Inputs						
Supply	from AS-Interface					
Mounting	DIN rail or screw mounting					

Model Number	green = preferred type	VBA-4E2A-G1-ZE/P-S	VBA-4E2A-G1-ZE/PEXT-S	VBA-4E-G4-ZE	VBA-2E2A-G4-ZE/E2	VBA-4E4A-G4-ZE/E2
Required master specification	≥ V2.0			●		
	≥ V2.1	●	●		●	
	≥ V3.0					●
UL File Number	E87056			●	●	●
Rated operational current	≤ 30 mA (without sensors) / max. 140 mA				●	
	≤ 30 mA (without sensors) / max. 230 mA					●
	≤ 40 mA (without sensors) / max. 190 mA			●		
	≤ 45 mA (without sensors) / max. 200 mA	●	●			
Inputs						
Number/Type	2 inputs for 2- or 3-wire sensors				●	
	2x 2 inputs for 2- or 3-wire sensors	●	●			
	4 inputs for 2- or 3-wire sensors			●		●
Voltage	21 ... 31 V			●	●	●
Input current	≤ 8 mA (limited internally)			●	●	
	≤ 9 mA (limited internally)					●
Outputs						
Number/Type	2 electronic outputs,				●	
	2 pneumatic outputs with separated 3/2-way valves	●	●			
	4 electronic outputs					●
Supply	from external auxiliary voltage U_{AUX}		●		●	●
Current	1 A per output				●	
	1 A per output, 4 A total					●
Voltage	≥ (U_{AUX} - 0.5 V)				●	●
	20 ... 30 V DC, PELV		●			
Venting guide	Sinter filter	●	●			
Compressed air	2 ... 8 bar, filtered (5 µm), oiled or unoiled compressed air	●	●			
Air throughput	550 Nl/min at 6/0 bar 350 Nl/min at 6/5 bar	●	●			
Valve cross-section	5 mm	●	●			
Profile	S-B.A.0				●	
	S-0.A.0			●		
	S-7.A.E	●	●			
	S-7.A.7					●
Ambient temperature	0 ... 55 °C (32 ... 131 °F)	●	●			
	-25 ... 60 °C (-13 ... 140 °F)			●	●	●
Protection degree	IP65	●	●			●
	IP67			●	●	

Dimensions				
Length L [mm]	102			
Width W [mm]	45			90
Height H [mm]	60		51	71

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-G4-B	Blind plug PG7
VAZ-G4-B1	Blind plug M12

Date of issue: 0408/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Protection degree	IP67 according to EN 60529 (only in connection with module or cover)
Mounting	DIN rail or screw mounting

Model Number	green = preferred type	U-G1F	U-G1FA	U-G1FF	U-G1FFA	U-G1PP
UL File Number	E198304					●
	E223772	●	●	●	●	
Addressing	via addressing jack		●		●	
Connection	2 AS-Interface flat cables	●	●			
	Flat cable for AS-Interface and external power supply			●	●	
	round cable PG11 for AS-Interface and external power supply core cross-section . 2.5 mm					●
Dimensions	about 80, 45, 20 mm (L, W, H)	●	●	●	●	
	about 80, 45, 34 mm (L, W, H)					●

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-DK-G1	cover for bases -G1F- and -G1P-
PG11-1/2NPT	Conduit adapter

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Properties

- Versions with 1 and 4 inputs / versions with 2 outputs for safe valves, 3 and 4 electronic outputs
- Standard and A/B slave versions
- Versions with IP54, IP67 and IP67/68/69k

Your Benefit

VBA-1E3A-M18-ZE/E2-V1

- Motor starter module designed to simplify MOVIMOT control

VAA-4E2A-G5-N/V2-Ex

- Approved for hazardous environments up to Zone 1, extends AS-Interface advantages to critical process control applications

VBA-4E*-G16-ZEJ*

- M8 input/output connections are advantageous when mounting space is limited
- M12 AS-Interface/AUX power connection and lightweight construction is ideal for robotics applications
- Output overload indication on affected M12 port takes guessing out of troubleshooting

Further Products

In this series, we offer additionally:

VAA-4E4A-G16-ZEJ/E2L Sensor-/actuator module

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number		VBA-1E3A-M18-ZE/E2-V1	VAA-4E2A-G5-N/V2-Ex	VBA-4E-G16-ZEJ	VBA-4E4A-G16-ZEJ/E2L
	green = preferred type				
Slave type	A/B slave	●		●	●
	Standard slave		●		
Required master specification	≥ V2.0	●			
	≥ V2.1			●	
	≥ V3.0				●
UL File Number	E87056			●	●
Rated operational current	≤ 30 mA	●			
	≤ 40 mA (without sensors) / max. 240 mA			●	●
	≤ 90 mA		●		
Inputs					
Number/Type	1 Input for 2-wire sensor	●			
	4 inputs for 2- or 3-wire sensors (PNP), DC			●	●
	4 inputs according to IEC 60947-5-6 (NAMUR, DIN 19234)		●		
Supply	from AS-Interface			●	●
	from external auxiliary voltage U_{AUX}	●			
Voltage	21 ... 31 V			●	●
Current loading capacity	≤ 200 mA (T_B ≤ 40 °C), ≤ 150 mA (T_B ≤ 70 °C), overload-proof and short-circuit protected			●	●
Input current	≤ 9 mA (limited internally)			●	●
Outputs					
Number/Type	2 outputs for control of intrinsically safe valves		●		
	3 electronic outputs, PNP	●			
	4 electronic outputs, PNP				●
Supply	from external auxiliary voltage U_{AUX}	●			●
Current	1 A per output				●
	20 mA per output	●			
Voltage	≥ (U_{AUX} - 0.5 V)				●
Profile	S-0.A.0			●	
	S-7.A.7				●
	S-7.F		●		
	S-9.A.E	●			
Ambient temperature	0 ... 70 °C (32 ... 158 °F)	●			
	-20 ... 60 °C (-4 ... 140 °F)		●		
	-25 ... 70 °C (-13 ... 158 °F)			●	●
Protection degree	IP54 according to EN 60529		●		
	IP67 / IP68 / IP69k			●	●
	IP67	●			
Mounting	screw mounting		●	●	●

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VAZ-2T5-G2	Splitter box AS-Interface and auxiliary voltage to 5 x M12 round connector
VAZ-RK-PUR 2x1,5-YE 100M	AS-Interface round cable
VAZ-T1-FK-0,3M-PUR-V1-G	Splitter box AS-Interface to 1x M12 round connector
VAZ-2T1-FK-0,3M-PUR-V1-W	Splitter box AS-Interface and auxiliary voltage to 1 x M12 round connector
V1-G-BK	4-pin, M12 female field-attachable connector
VAZ-2T1-FK-1M-PUR-V1-W	Splitter box AS-Interface and auxiliary voltage to 1 x M12 round connector
VAZ-V3-B	Blind plug for M8 sockets
VBP-HH1-V3.0	AS-Interface Handheld

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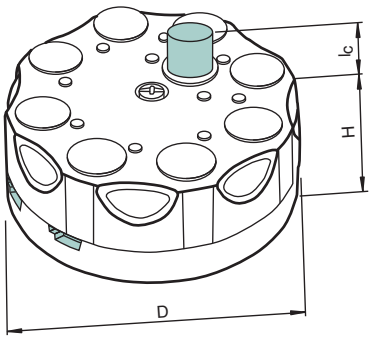


Properties

- Versions with 2 analog inputs (I, U, Pt100) / versions with 2 and 4 analog outputs
- Standard slave
- ECOLAB approved
- IP69 / IP69k

Your Benefit

- High IP rating make this an excellent solution for wash-down applications
- Constructed for highest precision analog date transmission
- Sturdy mounting base (included) make this one of the toughest housings on the market
- Large operating temperate span increases application security



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Slave type	Standard slave
AS-Interface specification	V3.0
Required master specification	≥ V2.1
UL File Number	E87056
Protection degree	IP68 / IP69K
Mounting	Mounting base

Model Number	green = preferred type	VBA-2A-G11-I-F	VBA-2A-G11-I-V1	VBA-4A-G11-I/U-F	VBA-4E-G11-I-F	VBA-2E-G11-I/U/PT100-F	VBA-2E-G11-I/U/PT100-V1
Rated operational current	≤ 100 mA	●	●				
	≤ 110 mA				●		
	≤ 60 mA (without sensors) / max. 200 mA					●	●
	≤ 75 mA (without outputs) / max. 200 mA			●			
Inputs							
Number/Type	2 analog inputs Current: 0 ... 20 mA/4 ... 20 mA voltage: 0 ... 10 V Pt100: -200 ... 850 °C					●	●
Supply	from AS-Interface or auxiliary voltage U_{EXT}					●	●
Current loading capacity	≤ 140 mA from AS-Interface ≤ 600 mA from auxiliary voltage U_{AUX}					●	●
Outputs							
Number/Type	2 analog outputs (current), 0 ... 20 mA	●	●		●		
	4 analog outputs Current: 0 ... 20 mA Voltage: 0 ... 10 V			●			
Supply	from AS-Interface	●	●		●		
	from AS-Interface or auxiliary voltage U_{EXT}			●			
Current loading capacity	≤ 120 mA from AS-Interface ≤ 700 mA from auxiliary voltage U_{AUX}			●			
Connection	AS-Interface: AS-Interface flat cable Outputs: M12 round connector	●					
	AS-Interface: M12 round connector Outputs: M12 round connector		●				
	AS-Interface/U_{AUX}: AS-Interface flat cable Outputs: M12 round connector			●			
	AS-Interface/U_{AUX}: AS-Interface flat cable Inputs: M12 round connector				●	●	
	AS-Interface/U_{AUX}: M12 round connector Inputs: M12 round connector						●
Profile	S-7.3.D					●	●
	S-7.3.5	●	●		●		
	S-7.3.6			●			
Ambient temperature	0 ... 60 °C (32 ... 140 °F)				●		
	-25 ... 60 °C (-13 ... 140 °F)			●			
	-25 ... 70 °C (-13 ... 158 °F)	●	●			●	●
Dimensions							
Height H [mm]		35					
Diameter D [mm]		85					
Connector area l_c [mm]		-	11	-	-	-	11

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

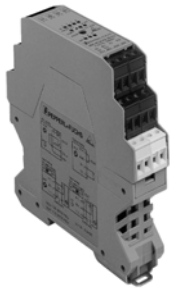
VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VAZ-V1-B3	Blind plug for M12 sockets
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VAZ-FK-S-BK-SEAL	AS-Interface flat cable seal

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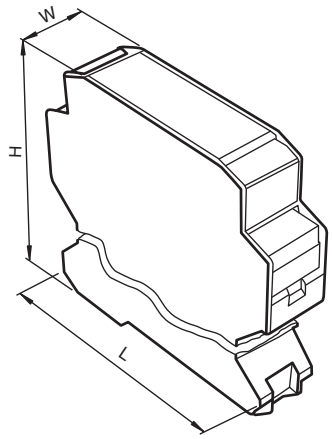


Properties

- 4 PNP inputs / versions with 3 and 4 electronic or relay outputs
- Standard and A/B slave versions
- IP20

Your Benefit

- Color coded, removable terminals speed up installation and replacement
- Relay version allows switching of 115/230VAC sources
- Increased application flexibility as connected sensors are powered from AS-Interface or external power source (DIP switch selectable)



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data								
Inputs								
Number/Type	4 inputs for 2- or 3-wire sensors (PNP), DC							
Supply	from AS-Interface (switch position INT, basic setting) or external U_{EXT} (switch position EXT)							
Voltage	21 ... 31 V DC (INT)							
Current loading capacity	≤ 150 mA, overload- and short-circuit protected (INT)							
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)							
Protection degree	IP20							
Mounting	DIN rail							

	green = preferred type	VAA-4E4A-KE-ZE/R	VAA-4E4A-KE-ZEJQ/E2L	VBA-4E3A-KE-ZE/R	VBA-4E3A-KE-ZEJQ/E2L	VBA-4E4A-KE-ZE/R	VBA-4E4A-KE-ZEJQ/E2L	VBA-4E-KE-ZEJQ
Slave type	A/B slave			●	●	●	●	●
	Standard slave	●	●					
Required master specification	≥ V2.0	●	●					
	≥ V2.1			●	●			●
	≥ V3.0					●	●	
UL File Number	E106378	●		●		●		
	E87056		●		●		●	●
Rated operational current	≤ 30 mA (without sensors) / max. 180 mA							●
	≤ 35 mA (without sensors) / max. 190 mA		●		●		●	
	≤ 35 mA (without sensors)/max. 210 mA	●				●		
	≤ 35 mA (without sensors) / max. 235 mA			●				
Inputs								
Input current	≤ 8 mA (limited internally)	●		●		●		
	≤ 9 mA (limited internally)		●		●		●	●
Outputs								
Number/Type	3 electronic outputs, PNP, overload and short-circuit proof				●			
	3 relay outputs, normally open			●				
	4 electronic outputs, PNP, overload and short-circuit proof		●				●	
	4 relay outputs, normally open	●				●		
Supply	from external auxiliary voltage U_{AUX}		●		●		●	
	none	●		●		●		
Current	O1 max. 3 A, O2/O3 max. 1.5 A, total 6 A (T_B ≤ 40 °C) O1 max. 2 A, O2/O3 max. 1 A, total 4 A (T_B ≤ 60 °C)				●			
	2 A per output, sum 4A (T_B ≤ 40 °C) 0.5 A per output, total 2A (T_B ≤ 60 °C, arranged in series without gaps) 2 A per output, total 4A (T_B ≤ 60 °C, arranged in series with 5 mm gap)		●				●	
Voltage	≥ (U_{AUX} - 0.5 V)		●		●		●	
Profile	S-0.A.0							●
	S-7.A.0			●	●			
	S-7.A.7					●	●	
	S-7.0	●	●					

Dimensions	
Length L [mm]	102
Width W [mm]	22,5
Height H [mm]	99

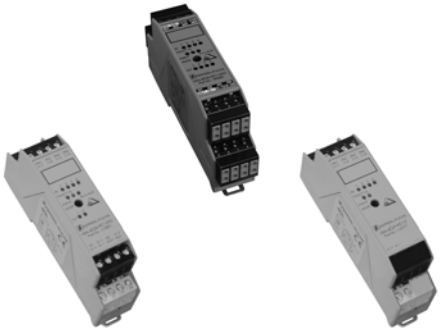
Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VBP-HH1-V3.0-V1	AS-Interface Handheld

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Properties

- Versions with 4 PNP inputs and 2 analog inputs / versions with 2 and 4 electronic outputs
- Standard and A/B slave versions
- IP20

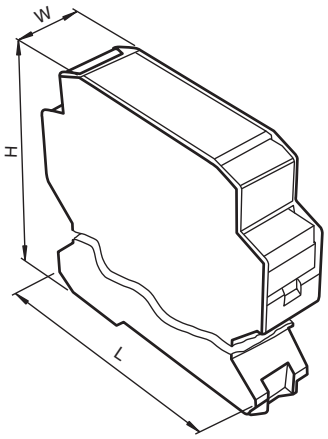
Your Benefit

- Reduced mounting height is ideal for junction box applicationsColor coded push-in clamps for easy installation
- Color-coded removable terminals simplify maintenance

Further Products

In this series, we offer additionally:

VAA-4E4A-KE1-Z/E2-TL
Sensor-/actuator module
VAA-4E4A-KE-ZEJQ/E2L
Sensor-/actuator module
VBA-4E4A-KE-ZE/R
Sensor-/actuator module



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data		
UL File Number	E87056	
Inputs		
Number/Type	4 inputs for 2-wire sensors (PNP), DC or for mechanical contacts	
Input current	≤ 8 mA (limited internally)	
Protection degree	IP20	
Mounting	DIN rail	

Model Number	green = preferred type	VBA-4E-KE1-Z	VBA-4E2A-KE1-Z/E2	VAA-4E4A-KE1-Z/E2
Slave type	A/B slave	●	●	
	Standard slave			●
Required master specification	≥ V2.0	●		●
	≥ V2.1		●	
Rated operational current	≤ 25 mA (without sensors)	●	●	
	≤ 40 mA (without sensors)			●
Inputs				
Supply	from AS-Interface	●	●	
	from external auxiliary voltage as required U_{AUX}			●
Outputs				
Number/Type	2 electronic outputs, PNP, overload and short-circuit proof		●	
	4 electronic outputs, PNP, overload and short-circuit proof			●
Supply	from external auxiliary voltage U_{AUX}		●	●
Current	O1/O2 max. 1.5 A, total 3 A (T_B ≤ 40 °C) O1/O2 max. 1 A, total 2 A (T_B ≤ 70 °C)		●	
	0.5 A per output , 2 A per module			●
Voltage	≥ (U_{AUX} - 0.5 V)		●	●
Profile	S-0.A.0	●		
	S-7.A.0		●	
	S-7.0			●
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)			●
	-25 ... 70 °C (-13 ... 158 °F)	●	●	

Dimensions	
Length L [mm]	99,6
Width W [mm]	22,5
Height H [mm]	48,5

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VBP-HH1-V3.0-V1	AS-Interface Handheld

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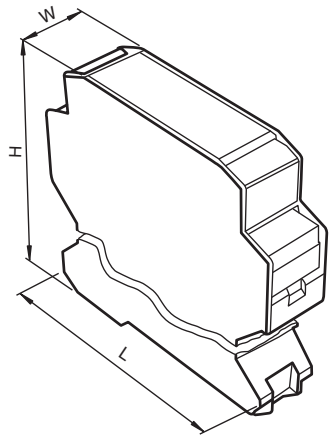


Properties

- Versions with 4 PNP inputs and 2 analog inputs / versions with 2 and 4 electronic outputs
- Standard and A/B slave versions
- IP20

Your Benefit

- Selectable current or voltage analog inputs or outputs increase usability/flexibility
- Color-coded removable terminals simplify maintenance



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E223772
Protection degree	IP20
Mounting	DIN rail

Model Number		VBA-2A-KE2-I/U	VBA-2E-KE2-I/U	VBA-2E-KE2-I/U-V3.0
Slave type	A/B slave			●
	Standard slave	●	●	
Required master specification	≥ V2.1	●	●	
	≥ V3.0			●
Rated operational current	≤ 80 mA		●	●
	Supply via AS-Interface: ≤ 100 mA supply via AS-Interface and U_{AUX}: ≤ 120 mA	●		
Inputs				
Input voltage	For voltage module: ≤ 25 V per input			●
Number/Type	2 analog inputs Current: 4 ... 20 mA voltage: 0 ... 10 V		●	●
Supply	from AS-Interface or from external auxiliary voltage as required U_{AUX}		●	●
Current loading capacity	≤ 40 mA per input		●	
Input current	For current module: ≤ 40 mA per input			●
Outputs				
Number/Type	2 analog outputs Current: 4 ... 20 mA ± 0.5 % voltage: 0 ... 10 V ± 0.5 %	●		
Open loop voltage	current output: max. 21 V (dependent on the supply voltage)	●		
Supply	from AS-Interface or from external auxiliary voltage as required U_{AUX}	●		
Profile	S-7.A.9			●
	S-7.3.D		●	
	S-7.3.5	●		
Ambient temperature	0 ... 55 °C (32 ... 131 °F)	●		
	0 ... 70 °C (32 ... 158 °F)		●	●

Dimensions	
Length L [mm]	99,6
Width W [mm]	22,5
Height H [mm]	85

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VBP-HH1-V3.0-KIT	AS-Interface Handheld with accessory
VBP-HH1-V3.0	AS-Interface Handheld
VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
VBP-HH1-V3.0-V1	AS-Interface Handheld

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Properties

- 4 PNP inputs / 4 electronic outputs
- Standard and A/B slave versions

Your Benefit

- AS-Interface powered outputs are ideal to power LED indicators and pushbuttons
- Fully potted design protects electronics in moist/humid environments
- Easily create custom pushbutton/ annunciation boxes

Further Products

In this series, we offer additionally:

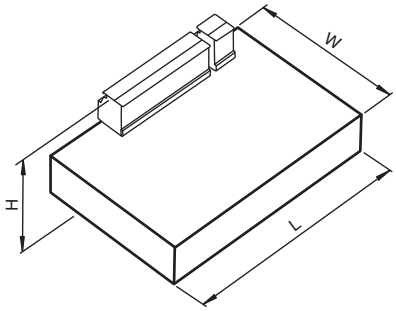
VAA-4E4A-CB1-Z/E2 Printed circuit board module
VAA-4E4A-CB2-Z/E2 Printed circuit board module

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
AS-Interface specification	V3.0
Required master specification	≥ V3.0
Profile	S-7.A.7
Inputs	
Number/Type	4 inputs for 2- or 3-wire sensors (PNP), DC
Input current	5 mA (typically)
Outputs	
Number/Type	4 electronic outputs, PNP
Current	≤ 100 mA per output, ≤ 140 mA total
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)

Model Number	green = preferred type	VBA-4E4A-CB1-ZEJ/E2J	VBA-4E4A-CB1-ZEJ/E2J-FL	VBA-4E4A-CB2-ZEL/E2L
Slave type	A/B slave	●	●	
	Standard slave			●
UL File Number	E87056	●	●	
Rated operational current	≤ 30 mA			●
	≤ 30 mA (without sensors) / max. 180 mA	●	●	
Inputs				
Supply	from AS-Interface	●	●	
	from external auxiliary voltage U_{AUX}			●
Voltage	20 ... 30 V DC PELV			●
	21 ... 31 V	●	●	
Outputs				
Supply	from AS-Interface	●	●	
	from external auxiliary voltage U_{AUX}			●
Voltage	20 ... 30 V DC PELV			●
	21 ... 31 V	●	●	
Connection	screw terminals, removable	●		●
	190 mm, PVC - flexible lead		●	
Mounting	Self-adhesive velcro for mounting enclosed			●



Dimensions			
Length L [mm]	76		
Width W [mm]	51		
Height H [mm]	29	15	29

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Properties

- 4 outputs
- Standard slave
- IP65

Your Benefit

- This modular set of stack light components makes it easy to build up the desired variant

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E223176
Protection degree	IP65

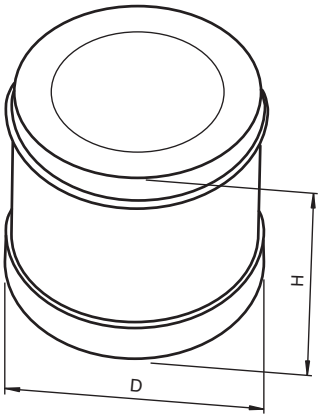
Model Number	green = preferred type	VAA-4A-70MM	VAZ-LAMP-70MM-BU	VAZ-LAMP-70MM-CL	VAZ-LAMP-70MM-GN	VAZ-LAMP-70MM-RD	VAZ-LAMP-70MM-YE
Slave type	Standard slave	●					
AS-Interface specification	V3.0	●					
Required master specification	≥ V2.0	●					
Color	blue		●				
	yellow						●
	green				●		
	clear			●			
	red					●	
Rated operational current	≤ 210 mA	●					
	illuminant dependend		●	●	●	●	●
Illuminant	24 V / ≤ 7 W holder BA15D		●	●	●	●	●
Number/Type	4 semiconductor outputs	●					
Supply	from AS-Interface or from external auxiliary voltage as required U_{AUX}	●					
Current	AS-interface: ≤ 200 mA for the signal tower U_{AUX}: ≤ 300 mA per light element	●					
Voltage	21 ... 31 V	●					
Profile	S-8.F	●					
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)	●					
	-20 ... 60 °C (-4 ... 140 °F)		●	●	●	●	●
Life span	illuminant dependend		●	●	●	●	●
Illumination	Bulbs are not included		●	●	●	●	●

Dimensions							
Height H [mm]	70	65					
Diameter D [mm]	70						

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-MH 100-70MM	Stack light assembly mounting, straight
VAZ-LAMP-70MM-BULB-5W/24V	Bulb for solid light element stack light
VAZ-CLAMP-70MM	Stack light terminal base with cover plate
VAZ-MH 90°-70MM	Stack light assembly mounting, angled
VAZ-CLAMP-70MM-90°	Stack light terminal base with cover plate
VAZ-LED-70MM-YE	Stack light LED permanent light element, yellow
VAZ-LED-70MM-RD	Stack light LED solid light element, red
VAZ-LED-70MM-GN	Stack light LED solid light element, green
VAZ-LED-70MM-CL	Stack light LED permanent light element, clear
VAZ-LED-70MM-BU	Stack light LED permanent light element, blue



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Your Benefit

- **This modular set of stack light components makes it easy to build up the desired variant**

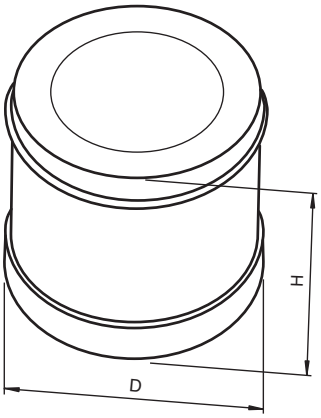
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)

Model Number	green = preferred type	VAZ-LED-70MM-BU	VAZ-LED-70MM-CL	VAZ-LED-70MM-GN	VAZ-LED-70MM-RD	VAZ-LED-70MM-YE	VAZ-FLASH-70MM-RD	VAZ-FLASH-70MM-YE	VAZ-HORN-70MM-85DBA	VAZ-HORN-70MM-105DBA	VAZ-HORN-70MM-0..100DBA-8TONE
UL File Number	E223176	●	●	●	●	●	●	●	●		
Color	blue	●									
	yellow					●		●			
	green			●							
	clear		●								
	red				●		●				
	black								●	●	●
Frequency	approx. 1 Hz						●	●			
	approx. 1,6/3,4 kHz										●
	approx. 2.5/3.5 kHz Alternating									●	
	1.75 kHz Duration/pulse								●		
Rated operational current	≤ 25 mA	●	●	●					●		
	≤ 30 mA				●	●					
	≤ 35 mA						●	●			
	≤ 80 mA										●
	≤ 150 mA									●	
Protection degree	IP40									●	
	IP65	●	●	●	●	●	●	●	●		●
Life span	Max. 100,000 hours = 11.4 years (continuous operation)	●	●	●	●	●					
	Max. 50000 hours = 5.7 years (continuous operation)						●	●			
	min. 5000 hours								●		●

Dimensions									
Height H [mm]				70			65	72	79	72
Diameter D [mm]						70				



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Model number



VAZ-CLAMP-70MM

Stack light terminal base with cover plate

General specifications	
UL File Number	E223176
Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Mechanical specifications	
Protection degree	IP65
Connection	Bayonet system

Model number



VAZ-MH 100-70MM

Stack light assembly mounting, straight

General specifications	
UL File Number	E223176
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)

Model number



VAZ-CLAMP-70MM-90°

Stack light terminal base with cover plate for angled mounting

General specifications	
UL File Number	E223176
Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Mechanical specifications	
Protection degree	IP65
Connection	Bayonet system

Model number



VAZ-MH 90°-70MM

Stack light assembly mounting, angled

General specifications	
UL File Number	E223176
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)

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Model number



VAZ-TUBE400-70MM

Stack light upright, straight

Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)

Model number



VAZ-TUBE-BASE-70MM

Stack light mounting base

Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)

Model number



VAZ-MH-1/2"Conduit-70MM

Stack light adapter for pipe assembly 25 mm - 1/2"

Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)

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Model number



VBA-LT2-G1

Illuminated pushbutton (1 red, 1 green) module

General specifications	
Slave type	A/B slave
AS-Interface specification	V2.1
Electrical specifications	
Rated operational current I_e	≤ 50 mA (LEDs on)
Ambient conditions	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Mechanical specifications	
Protection degree	IP67 according to EN 60529
Connection	Via module mounting base **U-G1*** cable piercing method or terminal compartment flat cable or standard round cable

Model number



VAZ-LT2-BK

Pressure cover for illuminated pushbutton module

Also available:
VAZ-LT2-BK - black
VAZ-LT2-BU - transparent blue
VAZ-LT2-CL - transparent
VAZ-LT2-GN - transparent green
VAZ-LT2-RD - transparent red
VAZ-LT2-YE - transparent yellow

Model number



VAZ-LT2-REMOVER

Mounting aid for pressure covers

Model number



VAA-LT3-F86-V1

Luminous push-button housing for 22 mm pushbuttons with 4 input/4output module

General specifications	
Slave type	Standard slave
AS-Interface specification	V2.0
Electrical specifications	
Rated operational current I_e	≤ 30 mA (without sensors) / max. 180 mA
Ambient conditions	
Ambient temperature	-25 ... 40 °C (-13 ... 104 °F)
Mechanical specifications	
Protection degree	IP65 in accordance with EN 60529 (with corresponding displays and controls)
Connection	M12 round connector

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Model number



VBA-1E2A-BUZZER/LT-RD

AS-Interface buzzer element with red LED and acknowledgment

General specifications	
Slave type	A/B slave
AS-Interface specification	V3.0
UL File Number	E223176
Electrical specifications	
Rated operational current I_e	≤ 80 mA
Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Mechanical specifications	
Protection degree	IP65
Connection	plug-in screw terminals Wire cross section: ≤1.5 mm^2 fine-strand

Model number



VAZ-BUZZER/LT-RD

buzzer element with red LED and acknowledgment

General specifications	
UL File Number	E223176
Electrical specifications	
Rated operational current I_e	≤ 80 mA
Ambient conditions	
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Mechanical specifications	
Protection degree	IP65
Connection	plug-in screw terminals Wire cross section: ≤1.5 mm^2 fine-strand

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Interface type	AS-Interface, short-circuit and overload protected
Open loop voltage	28 V
Load current	100 mA at 25 V
Ambient temperature	0 ... 40 °C (32 ... 104 °F)
Protection degree	IP20
AS-Interface specification	V3.0

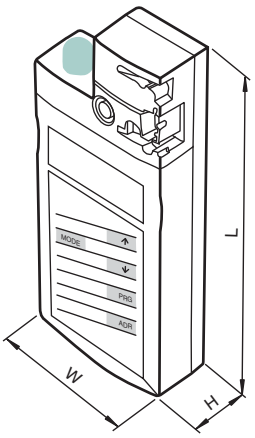
Model Number	green = preferred type	VBP-HH1-V3.0	VBP-HH1-V3.0-110V	VBP-HH1-V3.0-KIT	VBP-HH1-V3.0-KIT-110V	VBP-HH1-V3.0-V1
Interface type	M12 connector for external power supply					●
Physical	AUX: 24 V PELV, 2 A (not short-circuit proof) AS-Interface: 31,6 V PELV (DC or AS-Interface), 200 mA (short-circuit proof)					●
Supplied with	case			●	●	
	connecting cable module / handheld			●	●	●
	connecting cable for external auxiliary voltage					●

Properties

- **Versions with 115 V and 230 V supply voltage**

Your Benefit

- **Simple address assignment speeds up installation**
- **Works with any AS-Interface module on the market**
- **Reading inputs and setting outputs support manual system tests**
- **Long lasting rechargeable battery allows addressing of hundreds of modules**



Dimensions	
Length L [mm]	214
Width W [mm]	80
Height H [mm]	34

Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-PK-1,5M-V1-G	Connection cable module/hand-held programming device
V1S-TEE-V1/V1S	T-Distributor, M12 connector to M12 socket/connector
V1-W-2M-PVC	Cable socket, M12, 4-pin, PVC cable
VAZ-PK-FK-0,2M-V1-W	Connection cable G10 module/hand-held programming device
VAZ-9VDC-CHRG-115VAC	Power Supply
VAZ-9VDC-CHRG-230VAC	Power Supply

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Technical Data

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General Data	
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F) fixed mounting, -25 ... 85 °C (-13 ... 185 °F) flexible mounting

Model Number	green = preferred type	VAZ-FK-R-BK	VAZ-FK-R-BK 1000M	VAZ-FK-R-YE	VAZ-FK-R-YE 1000M	VAZ-FK-S-BK	VAZ-FK-S-BK-2,5MM	VAZ-FK-S-YE	VAZ-FK-S-YE-SAFETY	VAZ-FK-PURBK-500M	VAZ-FK-PUR-YE-500M
UL File Number	E130266	●	●	●	●						
Cable											
Cable	UL-Style 2103	●	●	●	●						
Cable length	100 m	●		●		●	●	●	●		
	500 m									●	●
	1000 m		●		●						
Material	TPE	●	●	●	●						
	EPDM (rubber)					●	●	●	●		
	PUR									●	●
Halogen-free						●	●	●	●	●	●

Properties

- **PUR, TPE and rubber compound versions in yellow and black**

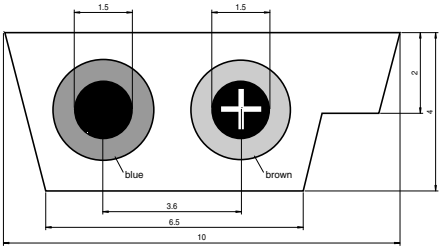
Your Benefit

- **Rubber jacket offers highest IP protection and simplest handling**
- **TPE jacket is suitable for harsh chemical environment**
- **TPE jacketed cable is suitable for flex-applications**
- **Oil-resistant TPE jacketed cable is suitable for automotive installations**

Further Products

In this series, we offer additionally:

VAZ-RK-PUR 2x1,5-YE 100M AS-Interface round cable



Accessories

This and more accessories can be found in chapter 7.6 from page 891
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

VAZ-FK-S-BK-SEAL	Flat cable seal
VAZ-FK-GLAND-12NPT	Flat cable sleeve
VAZ-2FK-GLAND-12NPT	Flat cable sleeve
VAZ-FK-GLAND-M20	Flat cable sleeve
VAZ-2FK-GLAND-M20	Flat cable sleeve
VAZ-FK-S-STRIPPER	Cable stripper for standard AS-Interface flat cable
VAZ-FK-R-STRIPPER	Stripping Pliers for AS-Interface flat cable
VAZ-FK-R-STRIPPER-BLADES	Replacement blades

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ECOLAB

Properties

- Flat cable to M12
- Up to IP67/68/69k
- ECOLAB approved

Your Benefit

- AS-Interface passive splitters promote correct installation
- Simple and intuitive handling enables installation in seconds

VAZ-T1-FK-G10-PTC-1M-PUR-V1-G

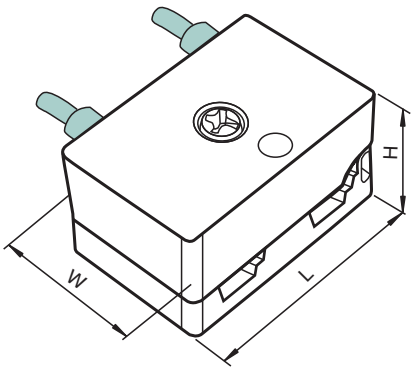
- Passive splitter with integrated current limiting protects end devices

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operational current	≤ 4 A
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)
Protection degree	IP67 IP67 / IP68 / IP69K with flat cable VAZ-FK-S-*
Connection	Flat cable AS-Interface: cable piercing method Plug connection: M12 x 1 socket (V1)

Model Number	green = preferred type	VAZ-T1-FK-G10-0,3M-PUR-V1-G	VAZ-T1-FK-G10-1M-PUR-V1-G	VAZ-T1-FK-G10-2M-PUR-V1-G	VAZ-T1-FK-G10-5M-PUR-V1-G	VAZ-T1-FK-G10-1M-PUR-V1-W	VAZ-T1-FK-G10-2M-PUR-V1-W	VAZ-T1-FK-G10-5M-PUR-V1-W	VAZ-T1-FK-G10-PTC-1M-PUR-V1-G
Length	30 cm	●							
	1 m		●			●			●
	2 m			●			●		
	5 m				●			●	
LED Overload	Overload display output LED red Red: overload output								●
LED PWR	Operating voltage LED green Green: voltage OK								●
Construction type	right-angled socket connector					●	●	●	
	straight socket connector	●	●	●	●				●



Dimensions	
Length L [mm]	40,5
Width W [mm]	27,7
Height H [mm]	22

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ECOLAB

Properties

- 2 x flat cable to M12
- Up to IP67/68/69k
- ECOLAB approved

Your Benefit

- AS-Interface passive splitters promote correct installation
- Simple and intuitive handling enables installation in seconds

VAZ-2T1-FK-G10-PTC-1M-PUR-V1-G

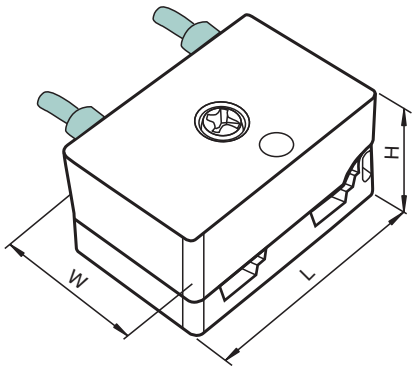
- Passive splitter with integrated current limiting protects end devices

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operational current	≤ 4 A AS-Interface, ≤ 4 A AUX
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)
Protection degree	IP67 IP67 / IP68 / IP69K with flat cable VAZ-FK-S-*
Connection	Flat cable AS-Interface: cable piercing method Flat cable ext. auxiliary voltage U_{AUX}: Insulation penetration technology Plug connection: M12 x 1 socket (V1)

Model Number	green = preferred type	VAZ-2T1-FK-G10-1M-PUR-V1-G	VAZ-2T1-FK-G10-2M-PUR-V1-G	VAZ-2T1-FK-G10-5M-PUR-V1-G	VAZ-2T1-FK-G10-1M-PUR-V1-W	VAZ-2T1-FK-G10-2M-PUR-V1-W	VAZ-2T1-FK-G10-5M-PUR-V1-W	VAZ-2T1-FK-G10-PTC-1M-PUR-V1-G
Length	1 m	●			●			●
	2 m		●			●		
	5 m			●			●	
LED Overload	Overload display output LED red Red: overload output							●
LED PWR	Operating voltage LED green Green: voltage OK							●
Construction type	right-angled socket connector				●	●	●	
	straight socket connector	●	●	●				●



Dimensions	
Length L [mm]	40,5
Width W [mm]	27,7
Height H [mm]	22

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PEPPERL+FUCHS SENSING YOUR NEEDS



ECOLAB

Properties

- Versions with flat cable to M12, flat cable to spring terminal and flat cable to flat cable
- Versions with IP20 and up to IP67/68/69k
- ECOLAB approved

Your Benefit

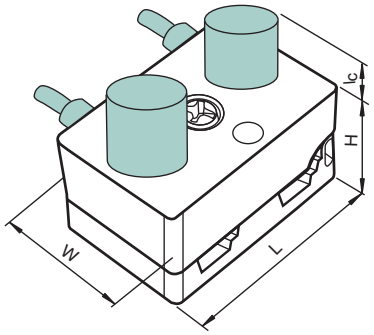
- AS-Interface passive splitters promote correct installation
- Simple and intuitive handling enables installation in seconds

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient temperature	-25 ... 75 °C (-13 ... 167 °F)

Model Number	green = preferred type	VAZ-T1-FK-G10-V1	VAZ-2T1-FK-G10-V1	VAZ-2T2-FK-G10-V1	VAZ-T1-FK-G10-CLAMP1	VAZ-2T1-FK-G10-CLAMP1	VAZ-2FK-G10-BRIDGE
Rated operational current	≤ 4 A	●	●	●			
	≤ 8 A				●	●	●
Protection degree	IP20				●	●	
	IP67 IP67/IP68/IP69K with flat cable VAZ-FK-S-*	●	●	●			●
Connection	Flat cable: cable piercing method Spring terminal				●	●	
	Flat cable: cable piercing method Plug connection: M12 x 1 socket (V1)	●	●	●			
	Flat cable: cable piercing method						●
Function	AS-Interface to M12	●					
	AS-Interface and auxiliary voltage to M12		●				
	AS-Interface and auxiliary voltage to 2 x M12			●			
	2 x AS-Interface to 2 double terminals				●		
	AS-Interface and auxiliary voltage each to double terminals					●	
	flat cable to flat cable						●



Dimensions				
Length L [mm]	40,5			
Width W [mm]	27,7			
Height H [mm]	22	21,5	22	
Connector area l_c [mm]	13,3		9,5	

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Rated operational current	≤ 4 A
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67 according to EN 60529
Mounting	Mounting base

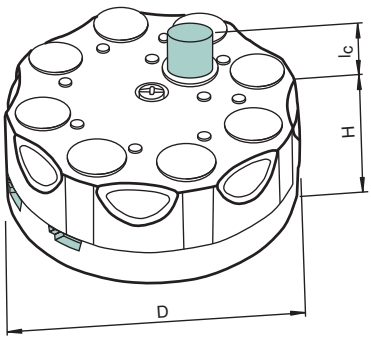
Model Number		VAZ-2T8-G11-F	VAZ-2T8-G11-V1
	green = preferred type		
Connection	Flat cable AS-Interface: cable piercing method Flat cable ext. auxiliary voltage U_{AUX}: cable piercing method Plug connection: M12 x 1 socket (V1)	●	
	Plug connection: M12 x 1 socket (V1) Connector: M12 x 1 connector (V1)		●

Properties

- Versions wit flat cable to M12 and M12 to M12
- IP67
- ECOLAB approved

Your Benefit

- High IP protection, 8-port passive splitter is suitable for harsh environments including wash down



Dimensions		
Height H [mm]	35	
Diameter D [mm]	85	
Connector area l_c [mm]	-	11

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Model number

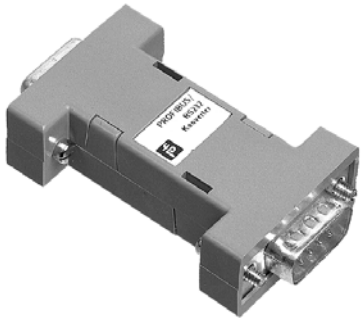


VAZ-ANALYZER

If errors occur in an AS-Interface network, practically all the errors in the network can be identified with this AS-Interface Analyzer.

General specifications	
AS-Interface specification	V3.0
Electrical specifications	
Rated operational current I_e	approx. 70 mA
Power supply	from AS-Interface
Interface	
Interface type	AS-Interface: Screw terminal Trigger: Screw terminal (Input: 24 V; Output: TTL) PC: RS 232 with 9-pin Sub-D Socket
Ambient conditions	
Ambient temperature	0 ... 55 °C (32 ... 131 °F)

Model number



VAZ-PB-SIM

PROFIBUS master simulator

Electrical specifications	
Rated operational current I_e	≤ 60 mA
Power supply	draws its 5 V power supply from the RS 485 interface of the PROFIBUS slave
Interface	
Interface type	Standard PC RS 232 interface with 9-pin D-SUB connector (female) RS 485 interface with 9-pin D-SUB connector (male)
Protocol	PROFIBUS DP V0
Ambient conditions	
Ambient temperature	0 ... 55 °C (32 ... 131 °F)
Mechanical specifications	
Dimensions	63, 34, 17 mm (L, W, H)

Model number



VAZ-DN-SIM-USB

DeviceNet master simulator

Electrical specifications	
Rated operational current I_e	≤ 60 mA
Power supply	draws its 5 V power from USB of the PC
Interface	
Interface type	USB-PC-interface (USB-connector Serie A) DeviceNet-interface with 9-pin sub-D connector (male)
Transfer rate	125, 250 und 500 kBit/s
Cable length	max. 2 m
Ambient conditions	
Ambient temperature	0 ... 55 °C (32 ... 131 °F)

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Model number



VAZ-2FK-CL2

Fixing clip for one or two AS-Interface flat cables

Mechanical specifications	
Installation	Mounting on smooth, grease-free, clean, dry surfaces.
Mounting	Adhesive or screw mounting Attached with cheese-head screws and optional spring washer.

Model number



VAZ-DK-G1

cover for bases -G1F- and -G1P-

Mechanical specifications	
Dimensions	about 80, 45, 8 mm (L, W, H)

Model number



VAZ-PG11-FKD

Seal for AS-Interface-flat cable in PG11 screwed connection

Mechanical specifications	
Protection degree	IP67 according to EN 60529

Model number



VAZ-FK-ED2

AS-Interface end seal for flat cable

Mechanical specifications	
Protection degree	IP67

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Model number



VAZ-PK-1,5M-V1-G

Connection cable module/hand-held programming device

Mechanical specifications	
Connection	M12 plug connection for handheld programming device connector for addressing jack to module

Model number



VAZ-PK-FK-0,2M-V1-W

Connection cable G10 module/hand-held programming device

Ambient conditions	
Ambient temperature	-25 ... 85 °C (-13 ... 185 °F)
Mechanical specifications	
Protection degree	IP20
Connection	AS-Interface flat cable: cable piercing method Connector: M12 x 1 (V1)
Cable	

Model number



VAZ-V1-B3

Blind plug for M12 sockets

Mechanical specifications	
Connection	M12 x 1
Installation	Philips screwdriver H3, size 3 Flat-head screwdriver 1.2 x 8 or 1.6 x 10 Knurling tool MH V1-BIT M12

Model number



VAZ-V3-B

Blind plug for M8 sockets

Mechanical specifications	
Connection	M8 x 1

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Model number



VAZ-FK-GLAND-M20

flat cable sleeve

Ambient conditions	
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)
Mechanical specifications	
Protection degree	IP65
Connection	1 Flat cable
Installation	M20 cable gland No O-Ring necessary to obtain IP65 seal. Crush ribs on underside of HEX will provide the seal

Model number



VAZ-FK-GLAND-12NPT

flat cable sleeve

Ambient conditions	
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)
Mechanical specifications	
Protection degree	IP65
Connection	1 Flat cable
Installation	1/2" NPT cable gland No O-Ring necessary to obtain IP65 seal. Crush ribs on underside of HEX will provide the seal

Model number



VAZ-2FK-GLAND-M20

flat cable sleeve

Ambient conditions	
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)
Mechanical specifications	
Protection degree	IP65
Connection	2 Flat cable
Installation	M20 cable gland No O-Ring necessary to obtain IP65 seal. Crush ribs on underside of HEX will provide the seal

Model number



VAZ-2FK-GLAND-12NPT

flat cable sleeve

Ambient conditions	
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)
Mechanical specifications	
Protection degree	IP65
Connection	2 Flat cable
Installation	1/2" NPT cable gland No O-Ring necessary to obtain IP65 seal. Crush ribs on underside of HEX will provide the seal

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Model number



VAZ-T1-FK-PG11

Screw adapter PG11

Ambient conditions	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Mechanical specifications	
Protection degree	IP67 according to EN 60529
Connection	AS-Interface flat cable
Cable	
Length L	Lead length approx. 200 mm

Model number



VAZ-T1-FK-M20

Screw adapter M20 x 1.5 with metal housing

Ambient conditions	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Mechanical specifications	
Protection degree	IP65 according to EN 60529
Connection	AS-Interface flat cable
Cable	
Length L	Lead length approx. 200 mm

Model number



VAZ-T1-FK-PG9

Screw adapter PG9

Ambient conditions	
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Mechanical specifications	
Protection degree	IP67 according to EN 60529
Connection	AS-Interface flat cable
Cable	
Length L	Lead length approx. 200 mm

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RFID Identification Systems

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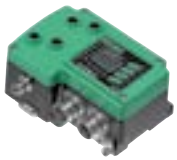
IDENT*Control*

Interface				
	PROFIBUS	PROFIBUS	PROFIBUS	
Connection interface				
M23 cylindrical connector; Plug: incoming Socket: outgoing				
9-pin sub-D connector	●			
1 x M12 plug B-coded		●		
2 x M12 plug B-coded			●	
1 x M12 plug A-coded				
7/8SDSq (mini style)				
RJ-45 AIDA				
Model number				
	IC-KP-B6-SUBD	IC-KP-B6-V15B	IC-KP-B6-2V15B	
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IDENT*Control* Compact

Interface					
	PROFIBUS	PROFIBUS	CC-Link	EtherCAT	
Protocol					
ASCII					
CC-Link			●		
PROFIBUS	●	●			
EtherCAT				●	
SMTP HTTP TCP/IP MODBUS/TCP EtherNet/IP PROFINET IO					
Read/Write Heads					
max. 1	●				
max. 2		●	●	●	
Model number					
	IC-KP2-1HB6-V15B	IC-KP2-2HB6-V15B	IC-KP2-2HB18-2V1	IC-KP2-2HB21-2V1D	
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					Interface
	INTERBUS	**DeviceNet**	**Ethernet**	**Serial RS232/485**	
					Connection interface
	●				M23 cylindrical connector; Plug: incoming Socket: outgoing
					9-pin sub-D connector
					1 x M12 plug B-coded
					2 x M12 plug B-coded
				●	1 x M12 plug A-coded
		●			7/8" (mini style)
			●		RJ-45 AIDA
					Model number
	IC-KP-B5-V23	**IC-KP-B7-V95**	**IC-KP-B17-AIDA1**	**IC-KP-R2-V1**	
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					Interface
	Ethernet	**Ethernet**	**Serial**	**Serial**	
					Protocol
			●	●	ASCII
					CC-Link
					PROFIBUS
					EtherCAT
	●	●			SMTP HTTP TCP/IP MODBUS/TCP EtherNet/IP PROFINET IO
					Read/Write Heads
	●		●		max. 1
		●		●	max. 2
					Model number
	IC-KP2-1HB17-2V1D	**IC-KP2-2HB17-2V1D**	**IC-KP2-1HRX-2V1**	**IC-KP2-2HRX-2V1**	
	Page 917	Page 917	Page 917	Page 917	

Read/write heads LF (125 kHz)

Detection range					
Read distance	1 to 50 mm	1 to 65 mm	2 to 45 mm	1 to 97 mm	2 to 155 mm
Write distance	0 to 40 mm	1 to 55 mm	2 to 35 mm	1 to 80 mm	2 to 140 mm
Width	max. 40 mm	max. 55 mm	max. 65 mm	max. 140 mm	145 mm
Model number					
	IPH-18GM-V1	**IPH-30GM-V1**	**IPH-F61-V1**	**IPH-F90A-V1**	**IPH-F15-V1**
	Page 918	Page 918	Page 920	Page 920	Page 920

Read/write heads HF (13.56 MHz)

Detection range					
Read distance	1 to 55 mm	0 to 50 mm	0 to 130 mm	0 to 160 mm	0 to 10 mm
Write distance	0 to 55 mm	0 to 50 mm	0 to 130 mm	0 to 160 mm	0 to 10 mm
Width	max. 45 mm	max. 45 mm	max. 100 mm	160 mm	max. 20 mm
Conforms to					
ISO/IEC 15693	**IQH1-18GM-V1** Page 918	**IQH1-F61-V1** Page 921	**IQH1-FP-V1** Page 921	**IQH1-F15-V1** Page 921	**IQH1-30GM105-EXD** Page 919
ISO/IEC 14443	**IQH2-18GM-V1** Page 918	**IQH2-F61-V1** Page 921	**IQH2-FP-V1** Page 921		



IPT1-FP R/W system and LF mounting bases (125 kHz)

Interface					
	Serial	**Serial**	**Serial**	**Serial**	**Serial**
Connection interface					
Screw terminals	●	●	●		●
M12 x 1				●	
M23 cylindrical connector; Plug: incoming Socket: outgoing					
Housing material					
Die-cast aluminum	●		●	●	
Stainless steel		●			●
Model number					
	U-P3-RX	**U-P3V4A-RX**	**U-P3-R4**	**U-P3-R4-V15**	**U-P7V4A-R4**
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						Detection range
1 to 75 mm	0 to 100 mm	0 to 100 mm	1 to 75 mm	0 to 10 mm		Read distance
1 to 58 mm	0 to 80 mm	0 to 80 mm	2 to 65 mm	0 to 10 mm		Write distance
max. 500 mm	max. 100 mm	max. 100 mm	max. 60 mm	max. 20 mm		Width
						Model number
IPH-F97-V1	**IPH-FP-V1**	**IPH-FP7V4A**	**IPH-L2-V1**	**IPH-30GM 105-EXD**		
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Read/write heads UHF (868 MHz)

			Detection range
max. 6 m	max. 6 m	max. 6 m	Operating distance
865.1 to 867.9 MHz	902 to 928 MHz	920.5 to 924.5 MHz	Operating frequency
			Model number
IUH-F117-V1-EU	**IUH-F117-V1-US**	**IUH-F117-V1-CN**	
Page 922	Page 922	Page 922	

					Interface
PROFIBUS	**PROFIBUS**	**PROFIBUS**	**INTERBUS**	**INTERBUS**	
					Connection interface
●	●		●		Screw terminals
		●			M12, B-coded
				●	M23 cylindrical connector Plug: incoming Socket: outgoing
					Housing material
●		●	●	●	Die-cast aluminum
	●				Stainless steel
					Model number
U-P6-B6	**U-P6V4A-B6**	**U-P6-B6-V15B**	**U-P6-B5**	**U-P6-B5-V**	
Page 933	Page 933	Page 933	Page 933	Page 933	

LF tag (125 kHz)

Housing design						
	Ø 12 mm	**Ø 16 mm**	**Ø 20 mm**	**Ø 26 mm**	**Ø 30 mm**	
Special features	• Wide temperature range	• Wide temperature range	• Flat disk shape	• Mounting hole • Wide temperature range	• Mounting hole • Flat disk shape	
Storage type						
Read-only tag	**IPC02-12** Page 923	**IPC02-16** Page 923	**IPC02-20P** Page 923	**IPC02-26-T6** Page 923	**IPC02-30P** Page 923	
Programmable read-only tag	**IPC11-12** Page 925				**IPC11-30** Page 925	
Read/write tag			**IPC03-20P** Page 924		**IPC03-30P** Page 924	

LF tag (125 kHz)

Housing design					
	Ø 58 mm	**85.6 x 54 mm**	**46.4 x 35 mm**	**Ø 3.15 x 13 mm**	
Special features	• Can be mounted on metal • Mounting hole	• ISO credit card format	• Key ring • Different colors	• Mounting in metal • Protection degree IP68	
Storage type					
Read-only tag		**IPC02-C1** Page 930		**IPC02-3GL** Page 930	
Programmable read-only tag					
Read/write tag	**IPC03-58** Page 924	**IPC03-C1** Page 930	**IPC03-20K*** Page 931		

HF tag (13.56 MHz) ISO/IEC 15693

Housing design						
	Ø 16 mm	**Ø 30 mm**	**Ø 50 mm**	**Ø 58 mm**	**Ø 85 mm**	
Special features	• Writable and readable on both sides	• Mounting hole	• Mounting hole	• Can be mounted on metal • Mounting hole	• Wide temperature range • Mounting hole	
Storage type						
112 byte EEPROM	●	●	●	●	●	
256 byte EEPROM						
2 kilobyte FRAM						
Model number						
	IQC21-16	**IQC21-30P**	**IQC21-50P**	**IQC21-58**	**IQC21-85-T13**	
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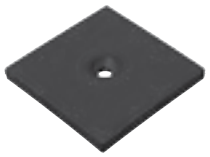
						**Housing design**
	Ø 50 mm	**Ø 12.4 mm**	**Ø 16 mm**	**Ø 24 mm**	**Ø 30 mm**	
	• Mounting hole • Flat disk shape	• Can be flush mounted in metal • For press fitting	• Can be flush mounted in metal • External thread for screwing	• Can be flush mounted in metal • For press fitting	• Can be flush mounted in metal • External thread for screwing	**Special features**
						Storage type
	IPC02-50P Page 923					**Read-only tag**
	IPC11-50 Page 925					**Programmable read-only tag**
	IPC03-50P Page 924	**IPC03-12.4** Page 924	**IPC03-16GK** Page 924	**IPC03-24** Page 924	**IPC03-30GK** Page 924	**Read/write tag**

HF tag (13.56 MHz) ISO/IEC 14443

				**Housing design**
Ø 30 mm	**Ø 50 mm**	**85.6 x 54 mm**		
		• ISO credit card format		**Special features**
				Storage type
●	●			**4 kilobyte EEPROM**
		●		**1 kilobyte EEPROM**
				Model number
IQC43-30	**IQC43-50**	**IQC42-C1**		
Page 929	Page 929	Page 930		

					**Housing design**
Ø 22 mm	**Ø 39 mm**	**Ø 10 mm**	**Ø 16 mm**	**Ø 20 mm**	
• Wide temperature range	• Wide temperature range				**Special features**
					Storage type
	●				**112 byte EEPROM**
●					**256 byte EEPROM**
		●	●	●	**2 kilobyte FRAM**
					Model number
IQC22-22-T9	**IQC21-39-T1**	**IQC33-10**	**IQC33-16**	**IQC33-20**	
Page 926	Page 926	Page 928	Page 928	Page 928	

HF tag (13.56 MHz) ISO/IEC 15693

Housing design					
	Ø 30 mm	Ø 50 mm	Ø 10 mm	51 x 51 mm	
Special features	• Mounting hole	• Mounting hole	• High resistance to petrol, chemicals, transformer oil and fuel oil	• Mounting hole • Wide temperature range	
Storage type					
112 byte EEPROM				●	
256 byte EEPROM			●		
2 kilobyte FRAM	●	●			
Model number					
	IQC33-30	**IQC33-50**	**IQC35-10**	**IQC21-50F-T10**	
	Page 928	Page 928	Page 928	Page 927	

UHF tag (868 MHz)

Housing design			
	Ø 50 mm	48 x 52 mm	
Special features	• Mounting holes • Must be mounted on metal	• Mounting holes • Must be mounted on metal	
Storage type			
240 bits EPC + 64 bytes user memory		●	
96 bits EPC + 64 bytes user memory	●		
Model number			
	IUC76-50-M	**IUC72-F151-M**	
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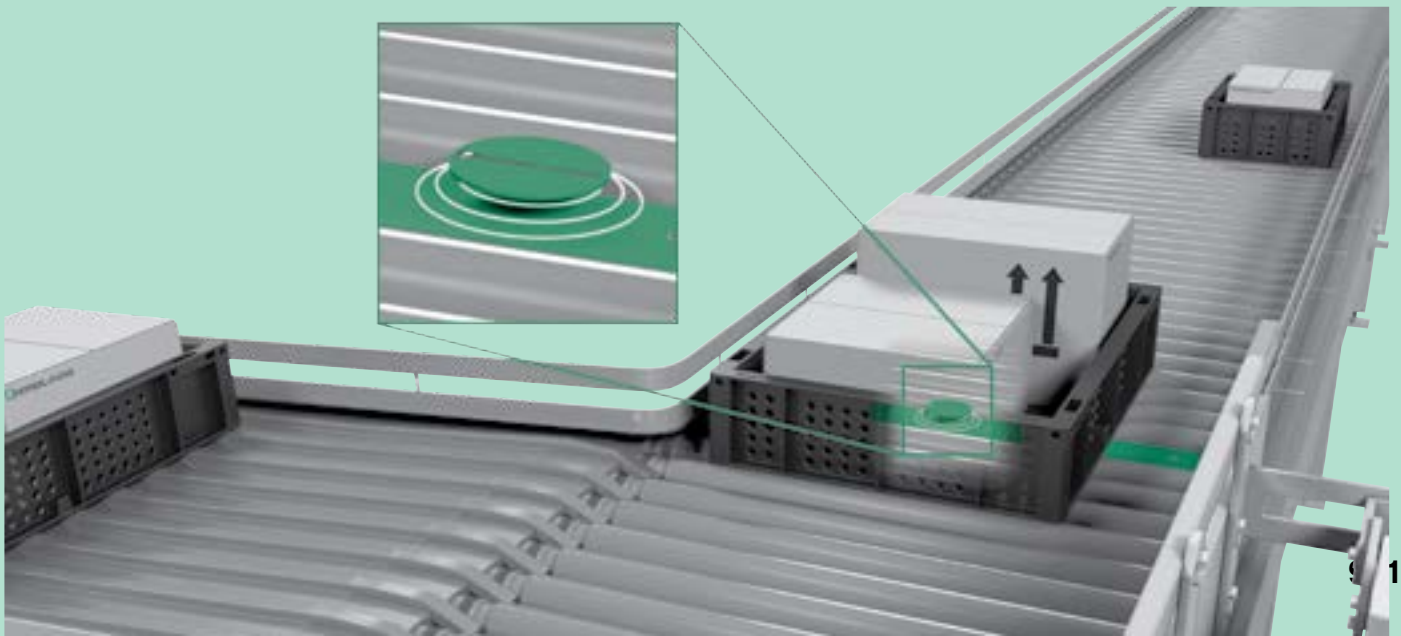
Handheld Devices

Operating frequency			
LF (125 kHz)	●		
HF (13.56 MHz)		●	
Depending on the connected read/write head			●
Model number			
	IPT-HH20	**IQT1-HH20**	**IC-HH20-V1**
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					**Housing design**
	65 x 25 mm	**85.6 x 54 mm**	**85.6 x 54 mm**	**116 x 64.5 mm**	
	• Self-adhesive mounting • Can be mounted on metal	• ISO credit card format	• ISO credit card format	• Mounting flange	**Special features**
					Storage type
	●				**112 byte EEPROM**
		●	●	●	**256 byte EEPROM**
					2 kilobyte FRAM
					Model number
	IQC21-F125	**IQC22-C1**	**IQC24-C1**	**IQC22-C4**	
	Page 926	Page 930	Page 930	Page 930	

				**Housing design**
	36.3 x 51 mm	**150 x 40 mm**	**60 x 14 mm**	
	• Must be mounted on metal	• Transparent film • Only 0.3 mm thick	• Must be mounted on metal	**Special features**
				Storage type
		●	●	**240 bits EPC + 64 bytes user memory**
	●			**96 bits EPC + 64 bytes user memory**
				Model number
	IUC76-F157-M	**IUC72-C8-T14**	**IUC72-F152-M**	
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8.1 Introduction

Automatic object identification has become an integral part of industrial manufacturing. RFID (Radio Frequency Identification) links together the data and material flow during manufacturing processes, including inventory control, warehouse management, theft protection systems, or product piracy protection systems. It is also for management supply chain. As a system provider, Pepperl+Fuchs has over 20 years of experience and offers a wide range of products as well as excellent programming and commissioning support.

The IDENTControl system by Pepperl+Fuchs can control read heads in the frequency ranges



- Low Frequency (LF) 125 kHz
- High Frequency (HF) 13.56 MHz
- Ultra High Frequency (UHF) 868 MHz

using just one control interface.

Systems operating in the 125 kHz (LF) frequency range are used in metallic surroundings and for installation in metal.

Systems operating in the 13.56 MHz (HF) frequency range are used for Smart Label tags. Systems in the LF and HF frequency ranges work at close range using inductive coupling and provide operating distances of less than half a meter.

UHF systems in the 868 MHz frequency range cover larger operating distances.

RFID is essential for many types of production processes since manufacturers are increasingly demanding the level of traceability that can be achieved with RFID.

RFID offers excellent data security, data hold times, and read rates. Encapsulated tags can withstand dirt, water, or mechanical effects. An EEPROM chip or an FRAM memory bank is used as a storage medium in the tag.

The IDENT*Control* interface is compatible with all common interfaces (PROFIBUS, Ethernet, INTERBUS, DeviceNet, CC-Link and serial). The user concept and set of commands are almost identical.

Our devices are approved in accordance with R&TTE.

8.2 Programming an RFID System

Components of an identification system

Identification systems usually consist of a control interface, read/write heads, and tags. The tags are divided into:

- Read-only tags contain a globally unique read only code (UID), usually 40, 64, or 96 bits that cannot be changed.
- Read/write tags with an additional memory area that can be freely used and overwritten many times. The size of the writable memory bank is between 1 kBit and 64 kBit.

Read/write heads, controlled by system commands, read released data and write data areas. The functionality of the evaluation unit with an interface to the higher-level fieldbus is defined by a software program in the control unit. The evaluation unit enables internal communication and provides the power for the read/write heads. The read/write heads are connected to the evaluation unit by a shielded M12 connecting cable. Systems with several hundred read/write points (ID points) can be set up using the fieldbus and the corresponding number of evaluation units, and they can be connected to a control unit.

System selection criteria

Number of read/write cycles

Passive read-only and read/write tags can be read as often as required and have an almost unlimited service life. Read/write tags on an EEPROM basis, however, can be written to only a limited number of times (usually 100,000 times). In contrast, FRAM read/write tags can be read and written to an unlimited number of times.

Data processing

During programming it should be ensured that the data being read can also be collected by the higher-level system. The number of read points, quantity of data, and repeat rate must be taken into consideration and reconciled with the performance of the fieldbus system.

Read/write distances and tolerances

The read/write distances are specified in the data sheets. Communication should typically take place within 30% and 80% of the maximum read area.

Housing designs for read/write heads and tags

The most suitable housing design can be selected from a wide range of products, depending on the application. Generally speaking, a larger housing design usually also provides larger read ranges but should still be a similar size to the tag.

Maximum passing speed

Specific minimum times are required to detect the tag and read the data. The amount of time that the tag spends in the read area is longer with large read/write heads, which enables faster passing speeds. The recommended range (30 to 80% of the maximum read distance) indicates the read range that can be used reliably.

Cable routing and grounding

Signal lines are shielded because they are especially sensitive to external electromagnetic fields. Lines to heavy consumers and high-frequency system lines must not be positioned parallel to the data line and there must be a sufficient safety distance.

8.3 RFID Handheld Devices

Product description

Our handheld devices represent a mobile extension of the IDENT*Control* system. RFID handheld devices are available for LF and HF tags. The read data can be stored in the device and assigned a prefix, suffix, timestamp, and checksum, enabling the devices to be safely integrated into logistics and production processes.



LC display and keyboard

The design is similar to that of a cell phone and is intuitive to use. The handheld device has a keyboard and a multiline display.

Application-specific functions

The JavaScript programming language is used to control the display, execute all the commands in a routine, and assign soft keys. If you wish to configure your own interface for the device, please contact

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Interfaces

The handheld device has different interfaces through which it can communicate with a computer. In addition to the wireless Bluetooth interface, the handheld device also has RS232, PS/2, and USB wired interfaces. You set the parameters of the individual interfaces directly via the user interface on the handheld device. Compatible interface accessories are available from Pepperl+Fuchs.

Power supply

A lithium-ion battery provides power to the handheld device. Batteries and battery chargers are available from Pepperl+Fuchs.

8.4 LF R/W System IPT1-FP

The IPT1-FP system can be used if the IDENT read points are distributed over long distances in the plant. These R/W systems have a maximum detection range of 100 mm and, in addition to the actual



read/write head, also incorporate the control interface and fieldbus interface in one device. These devices are designed for use in harsh industrial applications. They fulfill the IP67 degree of protection and can be directly connected to the higher-level control unit. Serial interfaces are available for simple point-to-point connection, addressable RS485 interfaces for creating a simple bus system, and fieldbus interfaces for PROFIBUS and INTERBUS. We offer special stainless steel designs for use in the food industry.

8.5 2.45 GHz R/W System (MT System)

The MT system comprises a read/write device and the read-only or read/write tags. The tags contain a code that cannot be changed, along with a memory bank for modifiable data. The read/write device transfers the data to the read-only and read/write tags and can be connected directly to a higher-level computer, e.g., PC or PLC, via Ethernet or a serial interface. The read/write device can also be used in stand-alone mode.

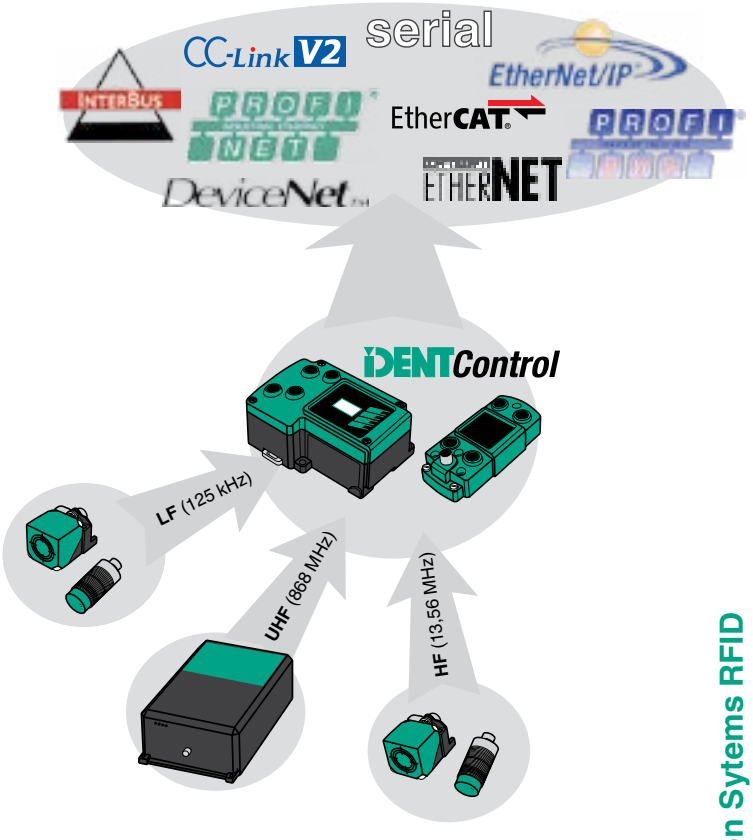
This reader with integrated antenna provides a reading range up to 6 m.



8.6 System IDENTControl

System description

The IDENT*Control* brand represents an innovative identification system. It enables RFID read/write heads with different operating frequencies to be connected using an almost identical set of commands, which facilitates easy integration into the PLC program. Up to four read/write heads can be connected to IDENT*Control*. Depending on the type, one or two read heads can be connected to IDENT*Control* Compact.

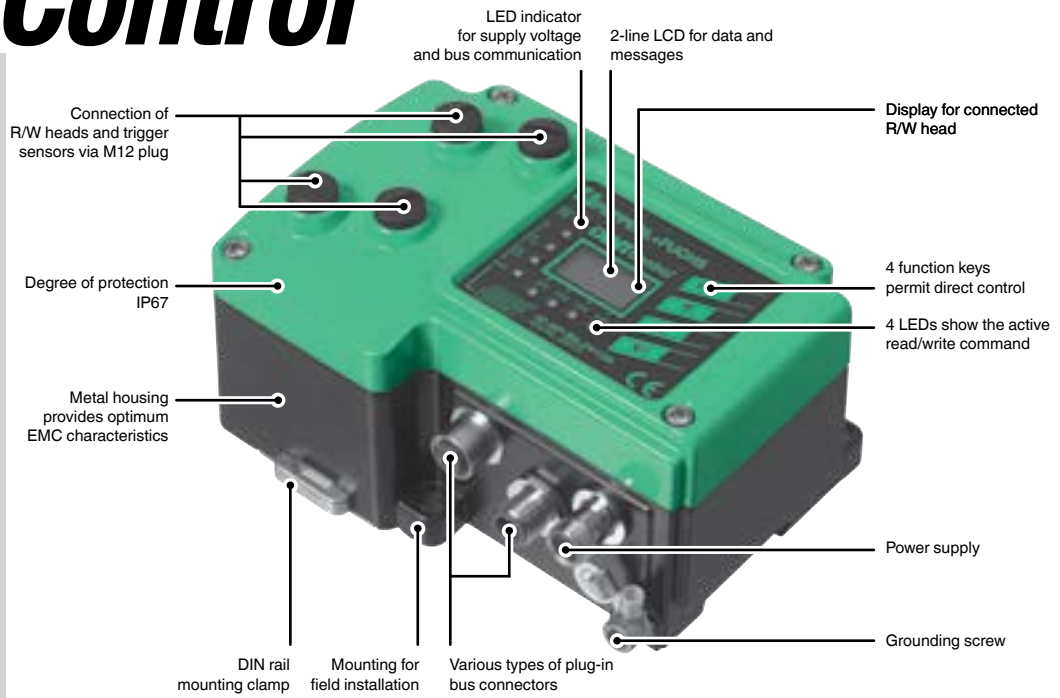


Advantages of the IDENT*Control* system

- The system is completely shielded and can be easily connected with a ground potential. The read head cables are also shielded to provide the highest level of EMC safety.
- Up to four read/write heads can be connected and a mixed mode of different frequency ranges is possible.
- Trigger sensors can be connected to start read/write commands.
- The quick disconnect design means that all components can be connected easily and swapped over quickly
- The 24 V_{DC} power supply is obtained through a separate M12 plug; a red LED indicates polarity.
- The robust aluminum housing can be mounted to the DIN mounting rail in the control cabinet using the integrated snap-on hook (IDENTControl) or suitable mounting aids (IDENTControl Compact). A simple three-point screw fixing makes it suitable for field mounting in IP67 applications.

08.04.15

IDENTControl



PROFI BUS
PROFI NET
EtherNet/IP
INDUSTRIAL ETHERNET
DeviceNet
INTERBUS
Serial

IDENT*Control*

IDENT*Control* has a graphic LC display and can display the data that has been read. It also uses icons to display other information such as the device status. The plain text display and function keys enable function tests to be carried out directly after installation, even without the need for a PLC program.

IDENT*Control* Compact

Suitable for local installation, IDENT*Control* Compact offers high optical resolution and is ideal for field mounting. As many applications require up to two RFID read points, this device is ideal for many applications. The modular construction and command syntax are identical.

IDENT*Control* Compact has separate LEDs for displaying the connected read/write heads, the status of the read/write heads, and bus communication and diagnostics.

LF, HF, and UHF read/write heads can be connected to the IDENT*Control* interface even in mixed mode.

Tags

Tags are available in a wide range of housing designs. The application and mounting/installation of the tag often determine which type to use. Special solutions are available for high temperatures, chemically aggressive ambient conditions, high protection requirements, price-critical applications, and for mounting on or in metal. Pepperl+Fuchs offers housing designs for installation in metallic objects (e.g. workpiece carriers) for the 125 kHz frequency range, in which the coil is embedded in a shielded ferrite core that enables the bundled inductive field to emerge from the front.

Fieldbus connection

The IDENT*Control* interface offers integrated interfaces to common fieldbus systems such as PROFIBUS, EtherNet (supported protocols: TCP/IP, EtherNet/IP, PROFINET, MODBUS/TCP), DeviceNet, INTERBUS, CC-Link, and serial connections (RS232 and RS485). The shared control interface means that the command structure and command philosophy are very similar.

EtherNet/IP maps the data similarly to a standard IO card, so special configuration software is not required.

Connection to port 10,000 is used as the standard socket with TCP/IP protocol in order to exchange data. The integrated web server function facilitates configuration and testing. The integrated SMTP server even enables alarms to be issued via email in the case of an error.

The MODBUS/TCP protocol is easy to use and offers powerful features. It enables several control units to communicate simultaneously with the IDENTControl interface.

PROFINET and PROFIBUS are very similar in terms of operation but use different hardware. GSD files or GSDML files in XML format provide the device characteristics.

PROFINET and PROFIBUS support automatic parameterization via the host and diagnostic messages can be easily forwarded to the host.

DeviceNet connections allow cable lengths of over 100 m with over 50 read/write points due to their low power requirement. DeviceNet offers automatic parameterization in the event of a replacement.



The serial interface is used to enable local PC solutions and to adapt software to changed conditions in a highly flexible manner. This also enables larger quantities of data to be read/written to the tag at once.

LF read/write heads and tags

Identification systems with an operating frequency of 125 kHz are the most versatile systems and are most often used in automation technology.

This is partly due to the large selection of tags available in different designs and sizes, which are suitable for high temperatures, are available in chemically resistant housings for installation in and on metal, and feature a degree of protection up to IP68/IP69K.

High temperature

Tags are exposed to high temperatures in many industrial applications. Tags with a higher temperature class are identified with -T* in the model number.

High detection range at low frequency

Maximum detection ranges in the 125 kHz range are achieved through combinations of a large tag and a large read/write head (e.g., IPH-F15-V1 with Ø 140 mm). Detection ranges greater than 10 cm can be achieved in nonmetallic surroundings or using spacers.

Memory bank segmentation

All read/write tags (rewritable tags) have a 32-bit memory block. Most of these read/write tags are based on EEPROM technology and enable at least 100,000 write cycles. Memory segmentation in 32-bit memory bank blocks enables you to simply change to the next memory bank block on the same read/write tag after 100,000 write cycles. Each memory bank

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of read/write heads	max. 4 alternative 2 read/write heads and 2 trigger sensors
UL File Number	E87056
LC display	two-line multi-function display with 12 characters per line
Button	4 keys: ESC, up, down and return
Rated operational voltage	20 ... 30 V DC , PELV
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Housing material	Powder coated zinc
Installation	snap-on to 35 mm standard rail or screw fixing

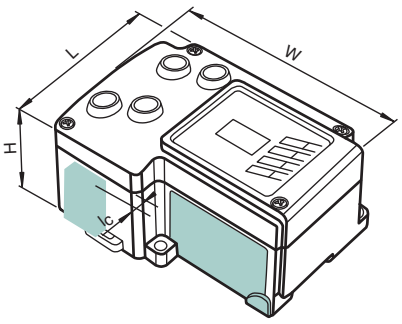
Model Number	green = preferred type	IC-KP-B17-AIDA1	IC-KP-B5-V23	IC-KP-B6-2V15B	IC-KP-B6-SUBD	IC-KP-B6-V15B	IC-KP-B7-V95	IC-KP-R2-V1
Current consumption	≤ 2 A incl. read/write heads		●	●	●	●	●	●
	≤ 8 A incl. read/write heads	●						
Interface:								
Physical	DeviceNet						●	
	Ethernet	●						
	RS 232							●
	RS 485		●	●	●	●		
Protocol	ASCII							●
	INTERBUS remote bus		●					
	PROFIBUS DP acc. to EN 50170			●	●	●		
	TCP/IP (Port 10000) MODBUS/TCP EtherNet/IP PROFINET IO	●						
Protection degree	IP40				●			
	IP65		●					
	IP67	●		●		●	●	●

Properties

- DeviceNet, Ethernet, PROFIBUS, PROFINET, InterBus, RS 232 and RS485 interface versions
- Max. 4 R/W heads connectable

Your Benefit

- All IDENT*Control* interfaces support all IPH and IQH R/W heads The IC-KP-B17-AIDA1 supports also our IUH R/W heads
- Metal housing and continuous shielding concept result in exceptional noise resistance
- Common user interface makes application development for different PLCs simpler and faster
- Quick disconnect design speeds up installation and eliminates wiring errors
- LCD and function keys allow faster on-site setup and testing



Dimensions		
Length L [mm]		107
Width W [mm]		148
Height H [mm]		73
Connector area l_c [mm]	10	

Accessories

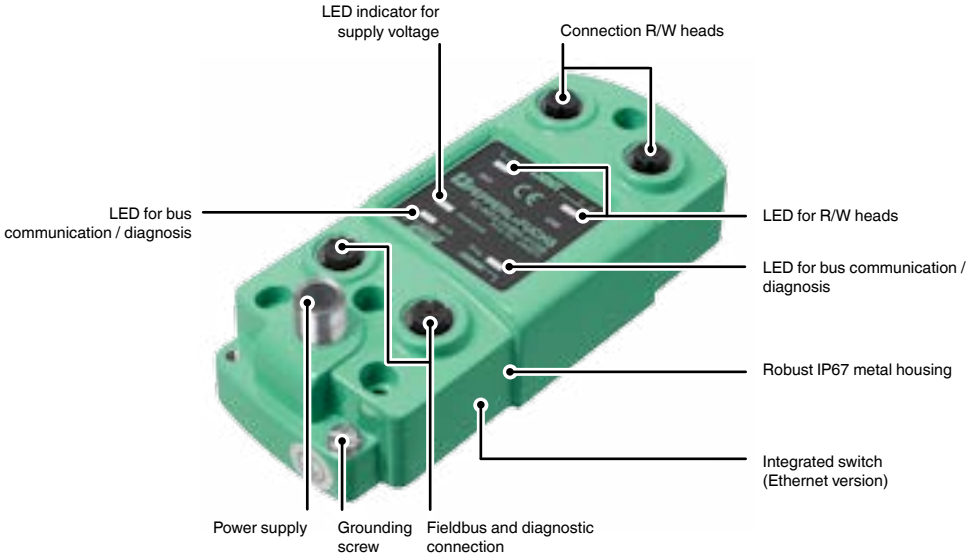
This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1S-G-0,15M-PUR-ABG-SUBD	Adapter M12 on Sub-D for PC connection with null modem cable
ICZ-AIDA1-MSTB-0,2M-PUR-V1-G	Double-ended connector MSTB to M12 connector
V1-G-5M-PUR-ABG-V1-W	Double-ended connector, M12 to M12, PUR cable 4-pin, shielded
ICZ-AIDA1-B	Blind plug for IC-KP-B17-AIDA1
ICZ-AIDA1-MSTB	Field connector MSTB
V1-G-5M-PUR	Single-ended cordset, M12, 4-pin, PUR cable
V15B-G-5M-PUR-ABG-V15B-G	Data connector PROFIBUS, M12 to M12, PUR cable
ICZ-3T-0,2M-PUR ABG-V15B-G	Y-splitter connector for PROFIBUS
ICZ-TR-V15B	Terminal resistor for PROFIBUS
ICZ-2T/TR-0,2M-PUR ABG-V15B-G	Terminal cable for PROFIBUS with terminal resistor
VAZ-PB-DB9-W	PROFIBUS Sub-D Data connector with switchable terminal resistance
IVZ-K-R2	Null modem cable
ICZ-AIDA1-V45	Field connector for RJ-45
V15B-G	Field connector, M12, for PROFIBUS, adjustable
CBL-PUR-PN-GN-04x034-100M	Data connector, PROFINET, PUR/PE, 4-pin, shielded
V15SB-G	Data connector, M12, for PROFIBUS, adjustable

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IDENTControl Compact



block then offers another 100,000 write cycles. With this procedure, type IPC03 read/write tags allow at least 2,900,000 write cycles if all the memory bank blocks are used sequentially.

The IPC12-58-64K ferrite magnetic FRAM tag offers an almost unlimited number of write cycles (10^{12}).



IPC02 read-only tag

The IPC02-type read-only tags have an internationally unique code that is 40 bits long. They are one of the most cost-effective RFID solutions on the market and come preprogrammed with a read only code that cannot be changed.

Read/write tags with "make read-only code" function

Special IPC11-type read/write tags (one-time writable tags) can emulate a read-only tag through the programming of a separate read-only code. The freely programmable read-only code can be protected against change and as a result the tag achieves read speeds that are just as quick as a "real" read-only tag. In this way, the evaluation or assignment of the read-only code can be made considerably easier in the PLC program.

HF read/write heads and tags

Read/write heads at 13.56 MHz are well defined worldwide in accordance with ISO and IEC standards. However, only the UID code can be securely read by all standardized systems due to the manufacturer-specific variations for chips and a certain level of freedom in the standards.

Due to the higher tag frequency, a lower number of receiver/transmitter coil windings is required for tuning. The coil geometry can be stamped out in a "meandering" pattern and can easily and cost-effectively be incorporated with the silicon chip in a smart label. It can, for example, be laminated in a credit card format. However, if requirements include a high degree of protection, mechanically robust industrial design, or high temperature applications, the price does not differ greatly from that of other systems. Installation or mounting on metal is only possible if the relevant spacers are fitted. It is not possible to align the field using ferrite cores due to the low number of windings. A distance from the metal of at least 15 mm should be used as a benchmark. This spacer is already integrated in the housing design of some types. These considerations must always be taken into account when programming 13.56 MHz systems.

13.56 MHz tags typically have a 64-bit UID code as well as a data range of variable size.

UHF read/write heads and tags

Read/write heads in the 865 to 928 MHz frequency range work with electromagnetic waves in the far field. The tags can be either passive or active (i.e., with battery) and have a specially shaped rod antenna as the resonance element. The passive tags can be manufactured very cost-effectively and reach detection ranges of up to a few meters. However, UHF systems are very sensitive to humidity and metal in the read range. Conductive objects in the direct surroundings can reflect waves and interference can lead to reading gaps. It therefore makes sense to read UHF tags during movement or at a tested location.

Due to the lower tag costs in particular, this system offers a cost-effective alternative to microwave systems for material handling and the automotive sector with required detection ranges of 1 to 5 meters. The high tag frequency supports large data volumes and extremely short read times.



Application Examples

8.7 RFID in several applications

For several applications using RFID go to **www.pepperl-fuchs.com**.

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E87056
LED PWR/ERR	Power on
Rated operational voltage	20 ... 30 V DC , PELV
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Housing material	Powder coated zinc
Installation	screw fixing

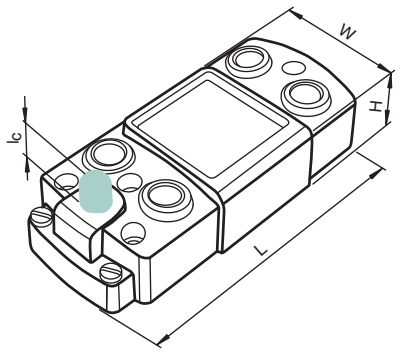
Model Number	green = preferred type	IC-KP2-1HB17-2V1D	IC-KP2-1HB6-V15B	IC-KP2-1HRX-2V1	IC-KP2-2HB17-2V1D	IC-KP2-2HB18-2V1	IC-KP2-2HB6-V15B	IC-KP2-2HRX-2V1	IC-KP2-2HB21-2V1D
Number of read/write heads	max. 1	●	●	●					
	max. 2 alternatively 1 read/write head and 1 trigger sensor				●	●	●	●	●
LEDs 1, 2	Status indicator for read/write heads				●	●	●	●	●
LED 1	Status indicator for read/write head	●	●	●					
LEDs CH1, CH2	Read head detected				●	●	●	●	●
LED CH1	Read head detected	●	●	●					
LED BUS	Data exchange		●				●		
LED Diag	Receiving data		●				●		
LED Link/Traffic	Network connection	●			●				
LED L RUN	Data communication active					●			
LED L ERR	Invalid rotary switch setting or data transfer failure					●			
LED TxD	Transmitting data			●				●	
LED RxD	Receiving data			●				●	
Rotary switch	Address setting	●	●		●	●	●		
Current consumption	≤ 2 A incl. read/write head	●	●	●			●	●	
	≤ 4 A incl. read/write heads				●	●			●
Interface:									
Interface type	serial			●				●	
Protocol	ASCII			●				●	
	CC-Link					●			
	PROFIBUS DP acc. to EN 50170		●				●		
	SMTP, HTTP, TCP/IP (Port 10000) MODBUS/TCP EtherNet/IP PROFINET IO	●			●				
	EtherCAT								●
Diagnostic interface:									
Protocol	ASCII		●			●	●		●

Properties

- **CC-Link, PROFIBUS, EtherCAT, various Ethernet protocols and serial interface versions**
- **Versions with max. 1 and max. 2 connectable R/W heads**

Your Benefit

- **All IDENT*Control* interfaces support all IPH, IQH and IUH R/W heads**
- **Metal housing and continuous shielding concept result in exceptional noise resistance**
- **Common user interface makes application development for different PLCs simpler and faster**
- **Quick disconnect design speeds up installation and eliminates wiring errors**
- **Second port, if present, can be used as a trigger sensor input**



Dimensions					
Length L [mm]	136.6	141.6	136.6	141.6
Width W [mm]	61.4			
Height H [mm]	33			
Connector area l_c [mm]	9			

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1S-G-0,15M-PUR-ABG-SUBD	Adapter M12 on Sub-D for PC connection with null modem cable
V1-G-5M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-10M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
ICZ-MH05-SACB-8	Mounting aid for DIN rail
V1SD-G-5M-PUR-ABG-V45-G	Double-ended cordset, M12 to RJ-45, PUR cable 4-pin, CAT5e
ICZ-3T-0,3M-PUR ABG-V15B-G	Y-splitter cordset for PROFIBUS
ICZ-2T/TR-0,2M-PUR ABG-V15B-G	Terminal cable for PROFIBUS with terminal resistor
V15B-G-5M-PUR-ABG-V15B-G	Data connector PROFIBUS, M12 to M12, PUR cable
V15B-G-10M-PUR-ABG-V15B-G	Data connector PROFIBUS, M12 to M12, PUR cable
V15B-G	Field connector, M12, for PROFIBUS, adjustable
V15SB-G	Field connector, M12, for PROFIBUS, adjustable
V1-G-ABG-PG9	Field connector, M12, 4-pin, screened, ready to make up
V1S-G-ABG-PG9	4-pin, M12, screened field connector
ICZ-3T-0,2M-PVC-CCL-V1-G	Y-splitter cordset for CC-Link
V3S-GM-0,15M-PUR-ABG-SUBD	Adapter M8 on Sub-D for PC connection with null modem cable
ICZ-TR-V1-130R	Terminal resistor for CC-Link
ICZ-TR-V1-110R	Terminal resistor for CC-Link

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E87056
LED green/yellow	Multihole-LED: green: power on green flashing: read/write attempt performed yellow: data carrier detected
Power consumption	≤ 1.2 W
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67
Connection	M12 x 1 connector
Installation	non-flush

Model Number	green = preferred type	IPH-18GM-V1	IQH1-18GM-V1	IQH2-18GM-V1	IPH-30GM-V1
Operating frequency	125 kHz	●			●
	13.56 MHz		●	●	
Read distance	0 ... 22 mm			●	
	0 ... 55 mm		●		
	1 ... 50 mm	●			
	1 ... 65 mm				●
Write distance	0 ... 22 mm			●	
	0 ... 40 mm	●			
	0 ... 55 mm		●		
	1 ... 55 mm				●

Properties

- **Up to 65 mm range**
- **LF and HF System**
- **ø 18 and 30 mm versions, cylindrical**

Your Benefit

IPH-*

- **LF solutions for high metallic environments**
- **Compatibility with any IDENT*Control* interface simplifies parts selection and reduces complexity**

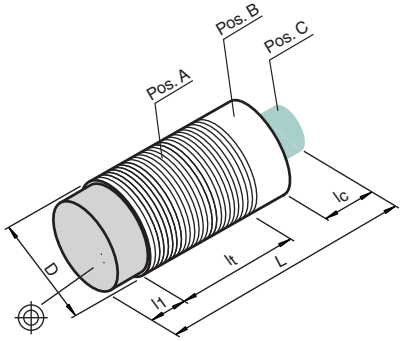
IQH1-*

- **HF solution enables fast data exchange**
- **Conforms to ISO/IEC 15693**
- **Use with IQC tag**

IQH2-*

- **Conforms to ISO/IEC 14443 Mode A**
- **Exceptionally fast tag access, ideal for high-speed applications**

Dimensions		
Length L [mm]	66	
Diameter D [mm]	18	30
Thread length l_t [mm]	34	32
Cap length l_1 [mm]	16	18
Connector area l_c [mm]	16	



Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

V1-G-5M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-10M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
IQC21-50P	Data carrier
IQC21-58	Data carrier
IQC33-20	Data carrier
IQC33-30	Data carrier
IQC33-50	Data carrier
IQC24-27-T12	Data carrier
IQC22-22-T9	Data carrier

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Properties

- LF and HF System versions
- ø 30 mm, cylindrical
- Suitable for hazardous areas

Your Benefit

- RFID head for hazardous area applications
- Compatibility with any IDENT*Control* interface simplifies parts selection and reduces complexity

IQH*-*

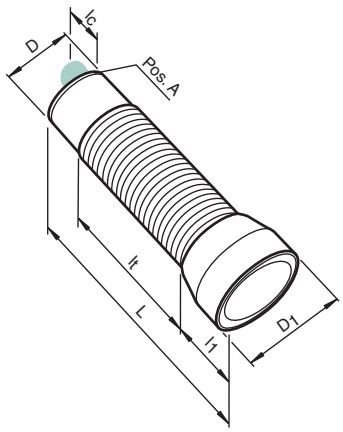
- HF solution enables fast data exchange
- Conforms to ISO/IEC 15693
- Use with IQC tag

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E87056
Power consumption	≤ 1.8 W
Type of protection	II 2G EEx d IIC T6/T5 II 2D EEx tD A21 IP68 T80°C/95°C
ATEX Directive 94/9/EC	EN 60079-0:2006, EN 60079-1:2004, EN 61241-0:2006, EN 61241-1:2004
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Protection degree	IP68
Installation	flush

Model Number		IQH1-30GM105-EXD dS64M-1038	IPH-30GM105-EXD dS64M-1038
Operating frequency	125 kHz		●
	13.56 MHz	●	
Operating distance	0 ... 9 mm	●	
	0 ... 10 mm		●



Dimensions	
Length L [mm]	105
Diameter D [mm]	30
Cap diameter D_1 [mm]	38
Cap length l_1 [mm]	38

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Properties

- Up to 155 mm range
- LF System
- Various housing styles

Your Benefit

- LF solutions for high metallic environments
- Compatibility with any IDENT*Control* interface simplifies parts selection and reduces complexity

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating frequency	125 kHz
UL File Number	E87056
Power consumption	≤ 1.2 W

Model Number	green = preferred type	IPH-F15-V1	IPH-F61-V1	IPH-F90A-V1	IPH-F97-V1	IPH-FP7V4A	IPH-FP-V1	IPH-L2-V1
Read distance	0 ... 100 mm					●	●	
	1 ... 70 mm (with transponder IPC03-50P)				●			
	1 ... 75 mm							●
	2 ... 155 mm	●						
	2 ... 45 mm		●					
	3 ... 90 mm (with transponder IPC03-50P)			●				
Write distance	0 ... 80 mm					●	●	
	1 ... 58 mm (with transponder IPC03-50P)				●			
	2 ... 140 mm	●						
	2 ... 35 mm		●					
	2 ... 65 mm							●
	3 ... 80 mm (with transponder IPC03-50P)			●				
Ambient temperature	-25 ... 55 °C (-13 ... 131 °F)			●	●			
	-25 ... 70 °C (-13 ... 158 °F)	●	●			●	●	●
Protection degree	IP67	●	●	●	●		●	●
	IP69K					●		
Installation	non-flush in metal							●

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-2M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-5M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-10M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded

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Properties

- Up to 160 mm range
- HF System
- Various housing styles

Your Benefit

IQH1-*

- HF solution enables fast data exchange
- Conforms to ISO/IEC 15693
- Use with IQC tag

IQH2-*

- Conforms to ISO/IEC 14443 Mode A
- Exceptionally fast tag access, ideal for high-speed applications

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating frequency	13.56 MHz
UL File Number	E87056
Protection degree	IP67

Model Number	green = preferred type	IQH1-FP-V1	IQH2-FP-V1	IQH1-F15-V1	IQH1-F61-V1	IQH2-F61-V1	IQH2-L2-V1
Read distance	0 ... 35 mm (with transponder IQC42-C1)					●	
	0 ... 40 mm (with transponder IQC42-C1)						●
	0 ... 50 mm		●		●		
	0 ... 130 mm	●					
	0 ... 160 mm (with transponder IQC22-C4)			●			
Write distance	0 ... 35 mm (with transponder IQC42-C1)					●	
	0 ... 40 mm (with transponder IQC42-C1)						●
	0 ... 50 mm		●		●		
	0 ... 130 mm	●					
	0 ... 160 mm (with transponder IQC22-C4)			●			
Power consumption	≤ 1.3 W	●	●		●	●	●
	≤ 3.5 W			●			
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)	●	●		●	●	●
	-5 ... 70 °C (23 ... 158 °F)			●			

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

V1-G-5M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-10M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
IQC21-50P	Data carrier
IQC21-58	Data carrier
IQC33-20	Data carrier
IQC22-C1	Data carrier
IQC33-30	Data carrier
IQC22-C4	Data carrier
IQC33-50	Data carrier
IQC22-22-T9	Data carrier
IQC24-27-T12	Data carrier
IQC42-C1	Data carrier
IQC43-30	Data carrier
IQC43-50	Data carrier

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CE

Properties

- Up to 1 m range
- UHF System

Your Benefit

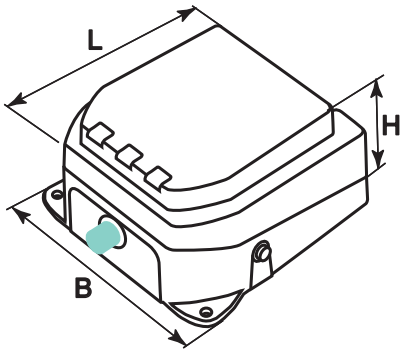
- UHF mid-range R/W antenna
- Conforms to ISO/IEC 18000-63
- Chinese/Asian, European and North American approvals respectively

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating distance	typ. 1 m
LED green	Power on
LED yellow	Read/write operation successful
LED blue	Transmission mode
Power consumption	≤ 7 W
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F) (Operation with nontransmission periods, adjustable) -25 ... 50 °C (-13 ... 122 °F) (Continuous transmission mode)
Protection degree	IP67
Connection	M12 x 1 connector
Material	
Housing	Aluminium / PA 6

Model Number		IUH-F190-V1-EU	IUH-F190-V1-FR2	IUH-F190-V1-FR2-02
Operating frequency	865 ... 868 MHz	●		
	902 ... 928 MHz possible		●	
	902 ... 928 MHz			●



Dimensions		
Length L [mm]	114	114
Width W [mm]	112	112
Height H [mm]	50	63

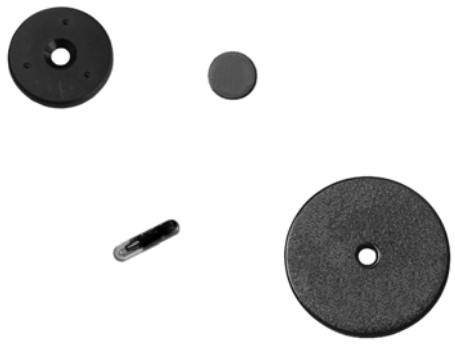
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

V1-G-5M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
V1-G-10M-PUR-ABG-V1-W	Double-ended cordset, M12 to M12, PUR cable 4-pin, shielded
IUZ-MH12	Mounting accessories
IUC72-F152-M-FR*	Data carrier
IUC76-F157-M-FR*	Data carrier
IUC76-50-M-FR*	Data carrier
IUC76-50-FR*	Data carrier
IUC76-F203-M-FR* 10pcs	Data carrier

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Properties

- Diameter 12.4 - 50mm
  Height 2.2 - 3 mm
- LF System
- Read only tags

Your Benefit

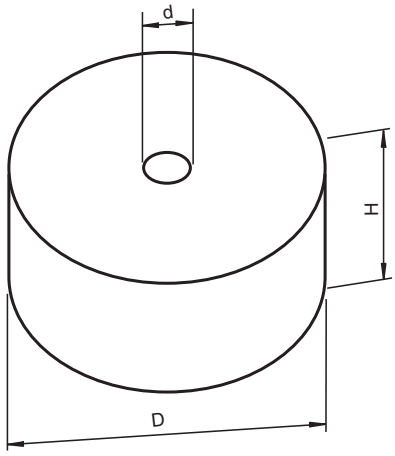
- Battery-free construction results in unlimited lifetime
- Chemically resilient encapsulation housing for harsh environments
- Extended temperature range for paint and curing applications

Technical Data

Detailed data, read/write distances and product description refer to data sheet on ***www.pepperl-fuchs.com***

General Data	
Operating frequency	125 kHz
Transfer rate	2 kBit/s
Memory	
Chip type	EM4102 Unique (EM Microelectronic)
Type/Size	ROM 64 Bit (40 Bit code, 24 bit data security)
Read cycles	unlimited

Model Number	green = preferred type	IPC02-12	IPC02-16	IPC02-20P	IPC02-26-T6	IPC02-30P	IPC02-50P	IPC02-3GL
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)					●		
	-20 ... 85 °C (-4 ... 185 °F)			●			●	
	-25 ... 85 °C (-13 ... 185 °F)	●	●					
	-25 ... 85 °C (-13 ... 185 °F) 20 ... 160 °C (68 ... 320 °F) for 100 x 5 minutes with transposition every 30 seconds				●			
	-40 ... 85 °C (-40 ... 185 °F)							●
Protection degree	IP68	●	●			●	●	●
	IP68 / IP69K			●				
	IP68 (24 hours in water 1 m deep)				●			
Material								
Housing	Epoxy (black)	●	●					
	PC (Polycarbonate)			●		●	●	
	PA				●			
	glass							●



Dimensions								
Height H [mm]	2.2	3		4	3			13
Diameter D [mm]	12.4	16	20	26	30	50	3.15	
Middle hole d [mm]	-			4.5	3	5	-	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

IPZ-MH50	Spacer

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CE

Properties

- Diameter 12.4 - 58mm
  Height 3 - 20.1 mm
- LF System
- Programmable tags

Your Benefit

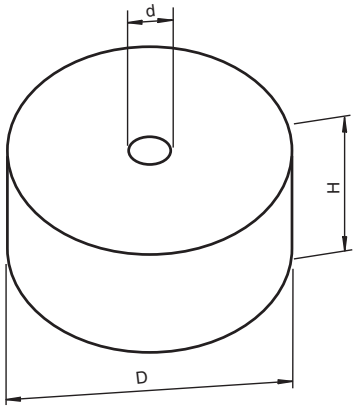
- Battery-free for an unlimited lifetime
- Chemically resilient encapsulation housing for harsh environments
- Flush mounting in metal for increased mechanical protection (for some versions)

Technical Data

*Detailed data, read/write distances and product description refer to data sheet on **www.pepperl-fuchs.com***

General Data	
Operating frequency	125 kHz
Transfer rate	2 kBit/s
Memory	
Chip type	EM4450 Titan (EM Microelectronic)
Type/Size	EEPROM 928 Bit ROM 32 Bit
Read cycles	unlimited
Write cycles	> 100 000

	green = preferred type	IPC03-12.4	IPC03-16GK	IPC03-20P	IPC03-24	IPC03-30P	IPC03-30GK	IPC03-50P	IPC03-58
Ambient temperature	-20 ... 100 °C (-4 ... 212 °F)					●			
	-20 ... 85 °C (-4 ... 185 °F)			●					
	-25 ... 70 °C (-13 ... 158 °F)	●	●		●		●	●	
	-25 ... 85 °C (-13 ... 185 °F)								●
Protection degree	IP67	●	●		●		●		●
	IP68					●		●	
	IP68 / IP69K			●					
Material									
Housing	PBT	●	●		●				
	PC (Polycarbonate)			●		●		●	
	PP						●		
	PA 6 (Polyamid)								●



Dimensions								
Height H [mm]	6		3	11	3	20	5	20.1
Diameter D [mm]	12.3	16	20	24	30		50	58
Middle hole d [mm]	-				3	-	5	6:5

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

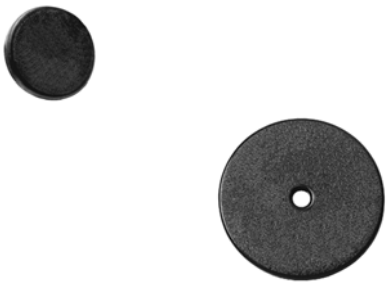
IVZ-16G-EW	Screw-in tool
IVZ-30G-EW	Screw-in tool
IPZ-MH50	Spacer

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Properties

- Diameter 12.4 - 50 mm
  Height 2 mm
- LF System
- Programmable tags

Your Benefit

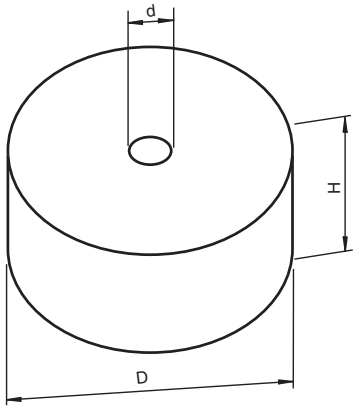
- Battery-free for an unlimited lifetime
- Chemically resilient encapsulation housing for harsh environments
- Flush mounting in metal for increased mechanical protection (for some versions)
- Write-once-read-many tag allows unchangeable custom codes

Technical Data

Detailed data, read/write distances and product description refer to data sheet on ***www.pepperl-fuchs.com***

General Data	
Operating frequency	125 kHz
Transfer rate	2 kBit/s
Memory	
Chip type	Q5
Type/Size	EEPROM Bit 40 bit fixcode free programmable
Read cycles	unlimited

Model Number		IPC11-12	IPC11-30	IPC11-50
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)		●	●
	-25 ... 85 °C (-13 ... 185 °F)	●		
Protection degree	IP67		●	●
	IP68	●		
Material				
Housing	PPS and epoxy (black)	●		
	PC (Polycarbonate)		●	●



Dimensions			
Height H [mm]	2		
Diameter D [mm]	12.4	30	50
Middle hole d [mm]	-	3	5

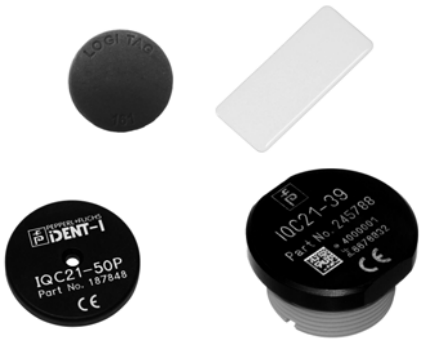
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

IPZ-MH50	Spacer

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CE

Properties

- Rectangular version: 65 x 25 x 3 mm
  Cylindrical versions:
  Diameter 12.4 - 50mm
  Height 2 mm
- HF System
- Programmable tags

Your Benefit

- Battery-free for an unlimited lifetime

IQC21-85-T13 & IQC22-22-T9

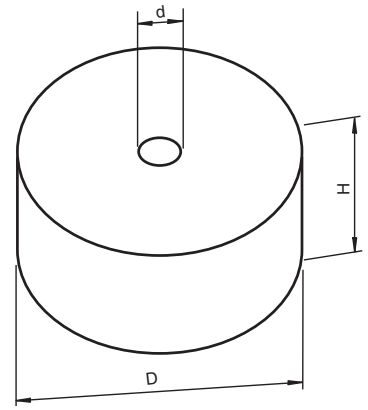
- High-temperature design for paint and curing applications

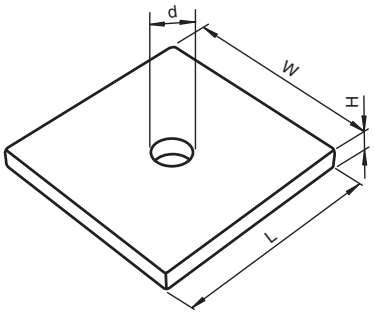
Technical Data

*Detailed data, read/write distances and product description refer to data sheet on **www.pepperl-fuchs.com***

General Data	
Operating frequency	13.56 MHz
Transfer rate	26 kBit/s
Read cycles	unlimited

Model Number	green = preferred type	IQC21-50P	IQC21-58	IQC21-85-T13	IQC21-F125	IQC22-22-T9	IQC21-39-T1
Memory							
Chip type	I-CODE SLI (NXP)	●	●		●		●
	Tag-it HF-I Plus (Texas Instruments)					●	
Type/Size	EEPROM 112 Byte			●			
	EEPROM 896 Bit ROM 64 Bit	●	●		●		●
	EEPROM 2 kBit ROM 64 Bit					●	
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)				●		
	-25 ... 70 °C (-13 ... 158 °F)	●					●
	-25 ... 100 °C (-13 ... 212 °F) 140 °C (413 K) for 20% reduction in limit of exposure zone 200 °C (473 K) for 4000 hours or 1500 cycles 220 °C (493 K) for 2000 hours or 500 cycles			●			
	-25 ... 85 °C (-13 ... 185 °F)		●				
	-25 ... 90 °C (-13 ... 194 °F)					●	
Protection degree	IP65				●		
	IP67	●	●				●
	IP68			●		●	
Material							
Housing	PPS			●		●	
	PC (Polycarbonate)	●					
	ABS		●		●		
	PP/POM						●





Dimensions							
Length L [mm]					65		
Width W [mm]					25		
Height H [mm]	5	20.1	21.5	3	3	21.5
Diameter D [mm]	50	58	39		22	39
Middle hole d [mm]	5	6.5	-		-	-

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

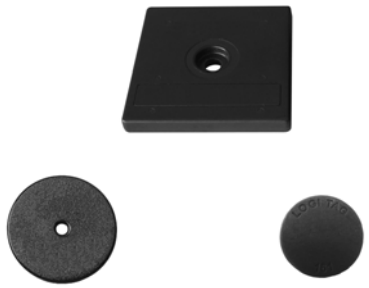
IPZ-MH50	Spacer

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Technical Data

Detailed data, read/write distances and product description refer to data sheet on ***www.pepperl-fuchs.com***

General Data	
Operating frequency	13.56 MHz
Memory	
Type/Size	EEPROM 896 Bit ROM 64 Bit
Transfer rate	26 kBit/s
Memory	
Chip type	I-CODE SLI (NXP)
Read cycles	unlimited

Model Number	green = preferred type	IQC21-8	IQC21-10	IQC21-12.4	IQC21-16	IQC21-30P	IQC21-50F-T10
Ambient temperature	-40 ... 93 °C (-40 ... 199.4 °F)						●
	-20 ... 100 °C (-4 ... 212 °F)					●	
	-25 ... 70 °C (-13 ... 158 °F)	●	●	●			
	-25 ... 70 °C (-13 ... 158 °F) 120 °C for 100 h 220 °C for 30 s				●		
Protection degree	IP67	●	●	●	●		
	IP68					●	●
Material							
Housing	PPS						●
	PC (Polycarbonate)				●	●	

Properties

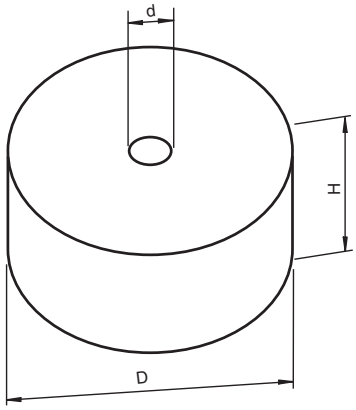
- **Square versions: 51 x 51 x 6.5 mm**
  Cylindrical versions:
  Diameter 8, 10, 12.4, 16 and 30mm
  Height 2.9 - 6 mm
- **HF System**
- **Programmable tags**

Your Benefit

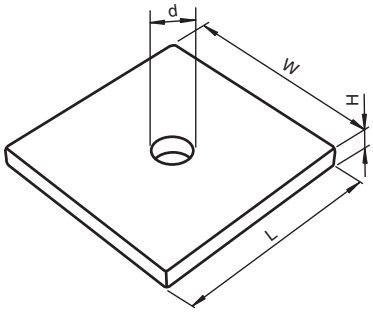
- **HF tags enables fast data exchange**
- **Conforms to ISO 15693**
- **Use with any IQH1 R/W head**

IQC21-50F-T10

- **High-temperature design for paint and curing applications**



Dimensions						
Length L [mm]						51
Width W [mm]						51
Height H [mm]	5	4.5	6	2.9	3	6.5
Diameter D [mm]	8	10	12.4	16	30	
Middle hole d [mm]					3	5.5



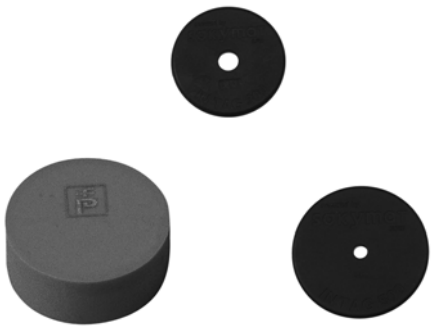
Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

ICZ-MH30-25-T10	Spacers for code/data carrier
IQZ-MH-85	Spacers for code/data carrier

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Properties

- Diameter 10 - 50mm
  Height 2 - 4.5 mm
- HF System
- Programmable tags

Your Benefit

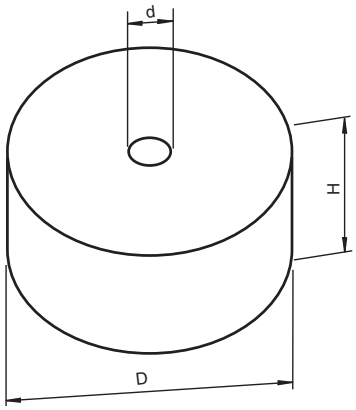
- Conforms to ISO/IEC 15693
- FRAM technology allows unlimited number of R/W operations
- Large data capacity holds specific data

Technical Data

*Detailed data, read/write distances and product description refer to data sheet on **www.pepperl-fuchs.com***

General Data	
Operating frequency	13.56 MHz
Transfer rate	26 kBit/s
Memory	
Chip type	FRAM MB89R118 (Fujitsu)
Type/Size	EEPROM 2048 Bit , fixcode 64 Bit
Read cycles	unlimited
Write cycles	unlimited

Model Number	green = preferred type	IQC33-10	IQC33-16	IQC33-20	IQC33-30	IQC33-50	IQC35-10
Type/Size	EEPROM 2048 Bit , fixcode 64 Bit						●
	FRAM 16 kBit , fixcode 64 Bit	●	●	●	●	●	
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)		●	●	●	●	
	-25 ... 85 °C (-13 ... 185 °F)						●
	-40 ... 85 °C (-40 ... 185 °F)	●					
Protection degree	IP67	●	●				
	IP68			●	●	●	●
Material							
Housing	PBT	●					
	Polycarbonate		●				
	PA 6 modified			●	●	●	
	PPS						●



Dimensions							
Height H [mm]	4.5	3	2.8	2.8	3.3	2	
Diameter D [mm]	10	16	20	30	50	10	
Middle hole d [mm]	-	-	-	5.2		-	

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CE

Technical Data

Detailed data, read/write distances and product description refer to data sheet on ***www.pepperl-fuchs.com***

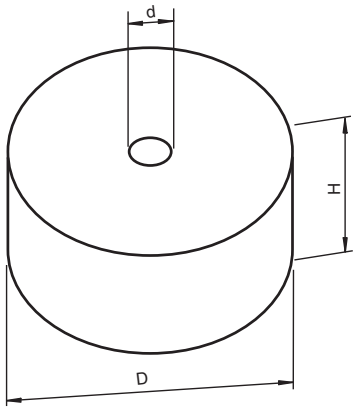
General Data	
Operating frequency	13.56 MHz
Transfer rate	106 kBit/s
Memory	
Chip type	NXP MF1 S7009
Type/Size	EEPROM 4096 Byte 3440 Byte Nutzerdaten
Read cycles	unlimited
Write cycles	> 100 000
Ambient temperature	-40 ... 85 °C (-40 ... 185 °F)
Protection degree	IP68
Material	
Housing	Thermoplastic polyester

Properties

- **Diameter 30 - 50mm**
  Height 3 mm
- **HF System**
- **Programmable tags**

Your Benefit

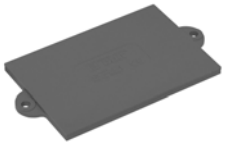
- **Conforms to ISO/IEC 14443**
- **Large data capacity holds specific data**



Dimensions	IQC43-30	IQC43-50
Height H [mm]	3	3
Diameter D [mm]	30	50
Middle hole d [mm]	3	5

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Properties

- Length 85.6 and 116 mm
  Width 54 and 64.5 mm
  Height 0.8 and 5 mm
- LF and HF System
- Programmable and read only tags

Your Benefit

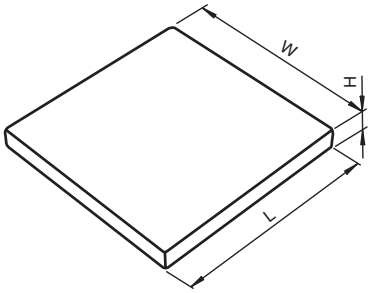
- Battery-free for an unlimited lifetime

Technical Data

*Detailed data, read/write distances and product description refer to data sheet on **www.pepperl-fuchs.com***

General Data		
Memory		
Read cycles	unlimited	

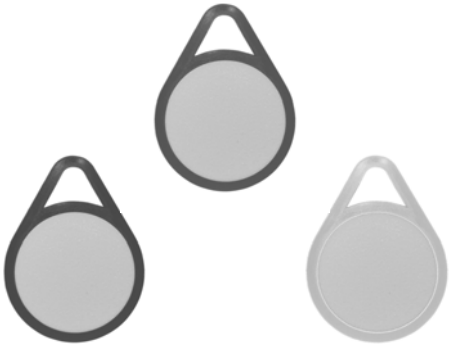
Model Number	green = preferred type	IPC02-C1	IPC03-C1	IQC22-C1	IQC24-C1	IQC42-C1	IQC22-C4
Operating frequency	125 kHz	●	●				
	13.56 MHz (according to ISO/IEC 15693)			●	●		●
	13.56 MHz (according to ISO/IEC 14443)					●	
Transfer rate	2 kBit/s	●⑨	●				
	26 kBit/s			●	●		●
	106 kBit/s					●	
Memory							
Chip type	EM4102 Unique (EM Microelectronic)	●					
	EM4450 Titan (EM Microelectronic)		●				
	Tag-it HF-I Plus (Texas Instruments)			●			●
	NXP MF1 S5009					●	
Type/Size	EEPROM 2 kBit ROM 64 Bit			●			●
	EEPROM 1024 Byte ROM 56 Bit 752 Byte User data					●	
	EEPROM 928 Bit ROM 32 Bit		●				
	EEPROM 992 Byte ROM 64 Bit				●		
	ROM 64 Bit (40 Bit code, 24 bit data security)	●					
Ambient temperature	0 ... 50 °C (32 ... 122 °F)	●	●				
	0 ... 55 °C (32 ... 131 °F)					●	
	-20 ... 50 °C (-4 ... 122 °F)			●	●		
	-25 ... 70 °C (-13 ... 158 °F)						●
Protection degree	IP20						●
	IP67	●	●	●	●	●	
Material							
Housing	PVC	●	●	●	●	●	
	ABS						●



Dimensions				
Length L [mm]	116	85.6		116
Width W [mm]	54	54		64.5
Height H [mm]	0.8	0.8		5

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Properties

- Keyrings 40 x 31 mm and 46.5 x 35 mm
- LF System
- Programmable tags

Your Benefit

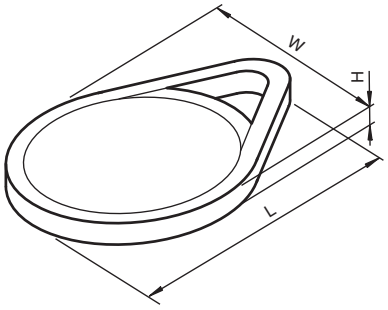
- Battery-free for an unlimited lifetime
- Chemically resilient encapsulation housing for harsh environments
- Keyring design is ideal for machine and building access control systems

Technical Data

Detailed data, read/write distances and product description refer to data sheet on ***www.pepperl-fuchs.com***

General Data	
Operating frequency	125 kHz
Transfer rate	2 kBit/s
Memory	
Chip type	EM4450 Titan (EM Microelectronic)
Type/Size	EEPROM 928 Bit ROM 32 Bit
Read cycles	unlimited
Protection degree	IP67
Material	
Housing	PC (Polycarbonat)

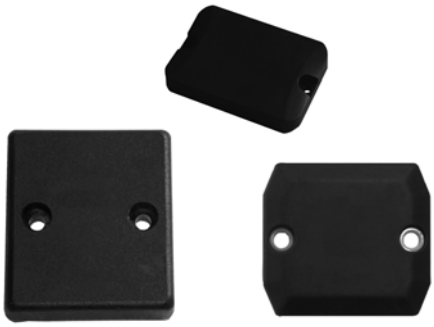
Model Number		IPC03-20K1	IPC03-20K2	IPC03-20K3	IPC03-20K4	IPC03-20K5	IPC03-20K6
Color	black	●				●	
	red		●				
	white			●			
	blue				●		
	green						●
Ambient temperature	-20 ... 80 °C (-4 ... 176 °F)		●	●	●	●	●
	-25 ... 70 °C (-13 ... 158 °F)	●					



Dimensions			
Length L [mm]	40	40	46.5
Width W [mm]	31	31	35
Height H [mm]	4.5	4.5	5

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Properties

- Various sizes
- UHF System
- Programmable tags

Your Benefit

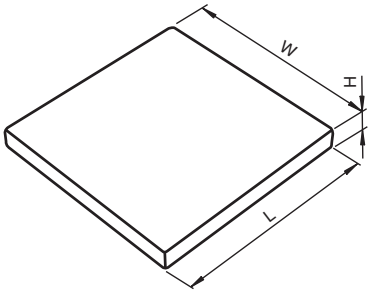
- Conforms to ISO/IEC 18000-63
- Battery-free for an unlimited lifetime
- R/W ranges of several meters, depending on selected UHF antenna

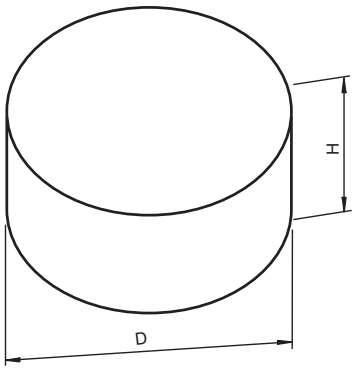
Technical Data

*Detailed data, read/write distances and product description refer to data sheet on **www.pepperl-fuchs.com***

General Data	
Operating frequency	865 - 928 MHz
Polarization	linear

Model Number		IUC72-F151-M	IUC72-F152-M	IUC76-F157-M	IUC72-C8-T14	IUC76-50-M
Memory						
Chip type	NXP UCode-EPC-G2XM	●	●		●	
	Higgs-3 (Alien)			●		●
Capacity	240 Bit EPC, 512 Bit expanded memory unique 64 bit fixcode (TID) available	●	●		●	
	96 Bit EPC, 512 Bit expanded memory unique 64 bit fixcode (TID) available			●		●
Ambient temperature	-30 ... 85 °C (-22 ... 185 °F)			●		●
	-35 ... 85 °C (-31 ... 185 °F)		●			
	-40 ... 85 °C (-40 ... 185 °F)	●			●	
Protection degree	IP67		●		●	●
	IP68	●		●		
Material						
Housing	Impact-resistant plastic material	●				
	ABS / PC		●			
	PP			●		
	Transparent tape				●	
	PA 6					●
Installation	preferably mountable on plastic, wood or paper					
	preferably mountable on metal	●	●			
	preferably free hanging				●	





Dimensions						
Length L [mm]	47.5	60	58	51	150	-
Width W [mm]	51.5	14	50	36.3	40	-
Height H [mm]	10	12	12	7.5	0.1	8
Diameter D [mm]			-			50

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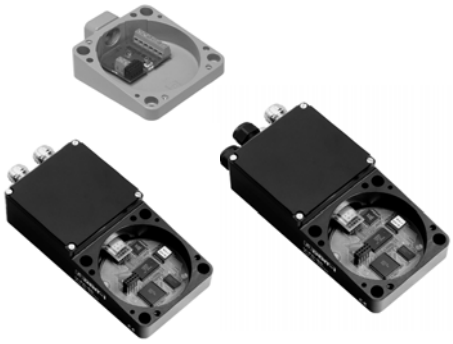
Technical Data Read/Write Head

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	IPT1-FP
Operating frequency	125 kHz
UL File Number	E87056
Power consumption	max. 5 W , in connection with the base
Physical	Interface type depends on base used
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67 according to EN 60529, with base

Your Benefit

- **Single R/W station with direct field-bus connection by combining this head unit with the preferred U-P* base unit**



Technical Data Base

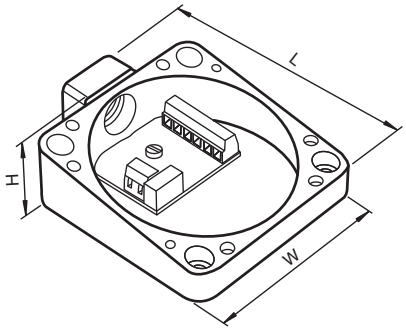
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Protection degree	IP67 according to EN 60529 with IPT*-FP

Model Number		U-P3-R4	U-P3-R4-V15	U-P3-RX	U-P3V4A-RX	U-P6-B5	U-P6-B5-V	U-P6-B6	U-P6-B6-V15B	U-P6V4A-B6	U-P7V4A-R4
Power consumption	max. 4 W with read/write head IPT*-FP	●	●	●	●						●
	max. 5 W with read/write head IPT*-FP					●	●	●	●	●	
Physical	RS 232/RS 485			●	●						
	RS 485					●	●	●	●	●	
	RS 485, addressable , up to 30 bases , address 1 ... 30	●	●								●
Protocol	ASCII	●	●	●	●						●
	INTERBUS remote bus					●	●				
	PROFIBUS DP acc. to EN 50170							●	●	●	

Properties

- **PROFIBUS, INTERBUS and serial versions**
- **LF and HF System**
- **Flat packed housing**



Dimensions											
Length L [mm]	91	114	91	92	161						103
Width W [mm]	80										
Height H [mm]	30	29	30	29	50	50	50	50	50	29	

Accessories

This and more accessories can be found in chapter 10

See pages from 972 ... for cordsets **See pages 1068 ... for mounting aids**

RFIDControl	Software for RFID identification systems
ICZ-3T-0,2M-PUR ABG-V15B-G	Y connection cable for PROFIBUS
ICZ-TR-V15B	Terminal resistor for PROFIBUS
V15B-G	Cable socket, M12, for PROFIBUS, adjustable
V15SB-G	Cable connector, M12, for PROFIBUS, adjustable
V15B-G-0,6M-PUR ABG-V15B-G	M12 connection cable for PROFIBUS

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
UL File Number	E87056
Display	128 x 128 pixel monochrome LC Display
Keyboard	Keypad for entering alphanumerical characters
Key	Programmable function keys
Supply	from interface or Li-Ion battery
Physical	Bluetooth , USB 2.0 , RS 232 or PS/2
Protocol	ASCII
Ambient temperature	0 ... 40 °C (32 ... 104 °F)
Protection degree	IP20

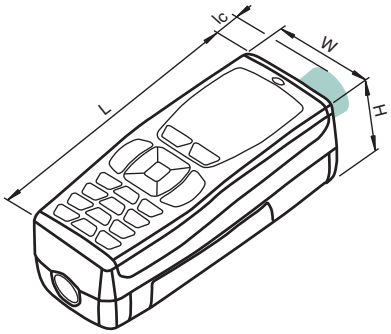
Model Number	green = preferred type	IC-HH20-V1	IPT-HH20	IQT1-HH20
Operating frequency	125 kHz		●	
	13.56 MHz			●
	acc. to connected read/write head	●		

Properties

- LF and HF System

Your Benefit

- Flexible handheld solution for any R/W head
- Battery powered Bluetooth handheld for true mobile RFID applications
- Display and keypad allows even complex user interaction
- Users can develop in-house applications using JavaScript



Dimensions		
Length L [mm]		111
Width W [mm]		46
Height H [mm]		41
Connector area l_c [mm]	11	

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets See pages 1068 ... for mounting aids

ODZ-MAH-CHARGER-5310	Charging tray for ODZ-MAH-GRIP2/GRIP3
V1-G-0,5/2,5M-PUR-V1-G	Double-ended cordset, Helix cable
ODZ-MAH-SUPPLY	Power supply
ODZ-MAH-BLANK	Battery blank
ODZ-MAH-GRIP1	Handle with trigger button
ODZ-MAH-GRIP2	Handle with trigger button and 1950 mAh battery
ODZ-MAH-GRIP3	Handle with trigger button and 3900 mAh battery
ODZ-MAH200-SUPPLY	Power supply
ODZ-MAH-CAB-CHARGE	Cable for power supply unit
ODZ-MAH200-CHARGER	Charger for ODT-HH-MAH200/ODZ-MAH-BAT
ODZ-MAH-CHARGER	Charging tray for ODZ-MAH-GRIP2/GRIP3
ODZ-MAH-CAB-B14	Double-ended cordset with USB Interface
ODZ-MAH-CAB-R6	Double-ended cordset PS/2 interface
ODZ-MAH-CAB-R2	Double-ended cordset RS 232 interface
ODZ-MAH200-B15-B14	Bluetooth Dongle USB for PC
ODZ-MAH300-COVER	Protective sleeve for handheld reader without handle
ODZ-MAH-CHARGER-SINGLE	Charger for ODT-HH-MAH200/300/I*T-HH20
ODZ-MAH-B15-M3	Bluetooth modem, configured for USB
ODZ-MAH-5V-110V	Power supply
ODZ-MAH-CHARGER-UM-110V	Charging tray for ODZ-MAH-GRIP2/GRIP3

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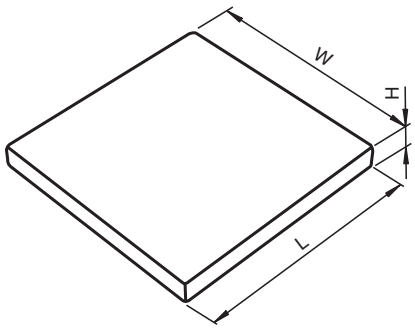
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Operating frequency	2.402 ... 2.482 GHz Channel separation 300 kHz

Model Number of Reader	
MTT6000-F120-B12-V45	
Interface	Ethernet / RS 232/RS 485
Reading range	0 ... 6 m
Writing range	0 ... 0.25 m
Transfer rate	read: 4 kBit/s , 16 kBit/s write: 4 kBit/s
Memory	
Type/Size	Flash 16 MByte RAM 32 MByte
Power consumption	typical 4.5 W max. 15 W
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Protection degree	IP65
Material	
Housing	Plastic

Model Numbers of Tags		MTO-C1	MTO-C2	MTM-C1	MTM-C2
Memory					
Capacity	an 8-digit decimal number as fixcode and 32-bit checksum	●	●		
	606 Bit R/W (584 bits available for user data) 8-digit decimal number as fixcode			●	●
Battery life	typically 6 years	●	●	●	●
Ambient temperature	-20 ... 85 °C (-4 ... 185 °F)	●		●	
	-40 ... 85 °C (-40 ... 185 °F)		●		●
Protection degree	IP67 according to EN 60529	●	●	●	●
Material					
Housing	Polymer	●	●	●	●



Dimensions				
Length L [mm]	86	90	86	90
Width W [mm]	54	58	54	58
Height H [mm]	3	8	3	8

Accessories

This and more accessories can be found in chapter 10
See pages from 972 ... for cordsets
See pages 1068 ... for mounting aids

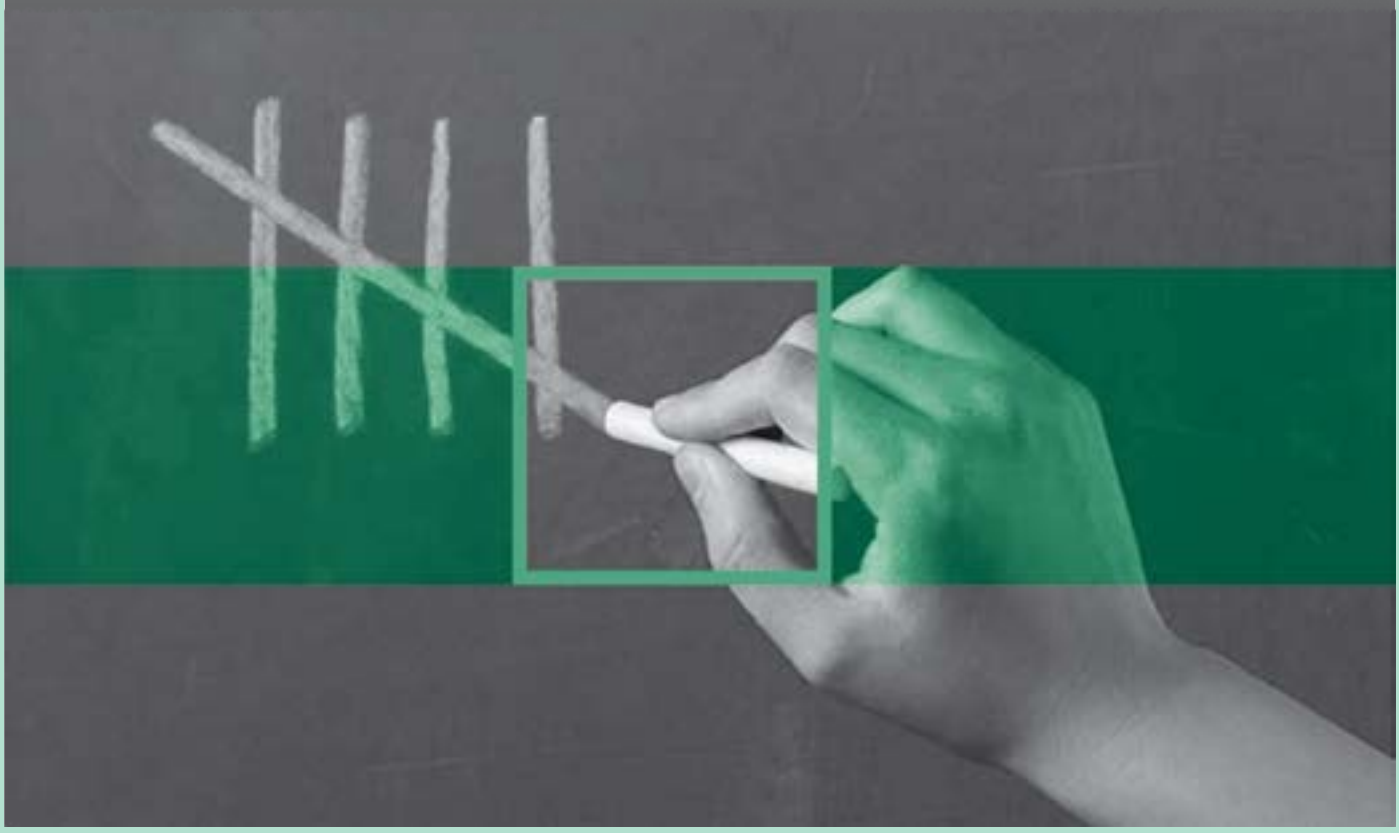
MTA-C1V1	Card holder with fixing clip
MTA-C1V2	Card holder for window mounting in vehicles
MTA-MH09	Mounting bracket for pole and wall mounting

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Contents

Logic Control Units



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Logic Control Units

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Displays and Counters

Dimensions						
	48 x 48 mm	48 x 48 mm	48 x 48 mm	48 x 48 mm	48 x 48 mm	
Type of display						
Numeric display						
LED display						
LCD display	●	●	●	●	●	
Multicolor			●	●	●	
Backlit		●	●	●	●	
Number of decades	6	6	2 x 6	2 x 6	2 x 6	
Power supply						
24 V_{DC}	●	●	●	●	●	
240 V_{AC}						
Type						
Counters						
Batch controller	●	●	●	●	●	
Counter/tachometer/timer	●	●	●	●	●	
Process displays						
Functionality						
Relay output	1	2		2		
Transistor output			2		6	
Reset button	●	●	●	●	●	
External reset	●	●	●	●	●	
Model number						
	KC-LCD-48-1R-24VDC	KC-LCDL-48-2R-24VDC	KC-LCDC-48-2T-24VDC	KC-LCDC-48-2R-24VDC	KC-LCDC-48-6T-24VDC	
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						Dimensions
	48 x 48 mm	48 x 48 mm	48 x 48 mm	48 x 48 mm	48 x 48 mm	
						Type of display
						Numeric display
						LED display
	●	●	●	●	●	LCD display
			●	●	●	Multicolor
		●	●	●	●	Backlit
	6	6	2 x 6	2 x 6	2 x 6	Number of decades
						Power supply
						24 V_{DC}
	●	●	●	●	●	240 V_{AC}
						Type
						Counters
	●	●	●	●	●	Batch controller
	●	●	●	●	●	Counter/tachometer/timer
						Process displays
						Functionality
	1	2		2		Relay output
			2		6	Transistor output
	●	●	●	●	●	Reset button
	●	●	●	●	●	External reset
						Model number
	KC-LCD-48-1R-230VAC	KC-LCDL-48-2R-230VAC	KC-LCDC-48-2T-230VAC	KC-LCDC-48-2R-230VAC	KC-LCDC-48-6T-230VAC	
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Displays and Counters

Dimensions						
	48 x 48 mm	48 x 48 mm	48 x 48 mm	48 x 24 mm	48 x 24 mm	
Type of display						
Numeric display						
LED display	●	●	●	●	●	
LCD display						
Multicolor						
Backlit						
Number of decades	6	6	6	6	6	
Power supply						
24 V_{DC}	●			●	●	
240 V_{AC}		●	●			
Type						
Counters						
Batch controller	●	●		●	●	
Counter/tachometer/timer			●			
Process displays						
Functionality						
Relay output	1	1	1			
Transistor output					1	
Analog output						
Reset button	●	●	●	●	●	
External reset	●	●	●	●	●	
Model number						
	KCT1-6SR-C	KCT1-6SR-V	KCT1-6WR/ RS232-V	KCT-6S-C	KCT-6ST-C	
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						Dimensions
	48 x 48 mm	96 x 48 mm	96 x 48 mm	48 x 48 mm	96 x 48 mm	
						Type of display
						Numeric display
	●	●	●		●	LED display
				●		LCD display
						Multicolor
						Backlit
	6	6	6	7	6	Number of decades
						Power supply
				●	●	24 V_{DC}
	●	●	●			240 V_{AC}
						Type
					●	Counters
	●					Batch controller
		●	●			Counter/tachometer/timer
						Process displays
						Functionality
						Relay output
	1	1			1	Transistor output
			1			Analog output
	●	●	●	●	●	Reset button
	●	●	●	●	●	External reset
						Model number
	KCT1-6ST-V	KCT2-6ST-V	TC-6A-V	KC-LCD-24-24VDC	KC-LED-96-1T-24VDC	
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Displays and Counters

Dimensions					
	48 x 48 mm	48 x 24 mm	48 x 24 mm	48 x 24 mm	
Type of display					
Numeric display			●	●	
LED display					
LCD display	●	●			
Multicolor					
Backlit					
Number of decades	6	7	5	5	
Power supply					
2 x 3.6 V battery	●				
24 V_{DC}		●	●		
240 V_{AC}				●	
Type					
Counters			●	●	
Batch controller	●				
Operating hours counter		●			
Process displays					
Functionality					
Relay output	1				
Transistor output					
Reset button	●	●	●	●	
External reset	●	●			
Model number					
	KCY1-6SR-B	KH-LCD-24-24VCD	KCM-51-C	KCM-51-V	
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					Dimensions
	32 x 15 mm	32 x 15 mm	48 x 24 mm	48 x 24 mm	
					Type of display
	●	●	●	●	Numeric display
					LED display
					LCD display
					Multicolor
					Backlit
	7	7	7	7	Number of decades
					Power supply
					2 x 3.6 V battery
	●		●		24 V_{DC}
		●		●	240 V_{AC}
					Type
	●	●	●	●	Counters
					Batch controller
					Operating hours counter
					Process displays
					Functionality
					Relay output
					Transistor output
					Reset button
					External reset
					Model number
	KCM-70A-C	**KCM-70A-V**	**KCM-70-C**	**KCM-70-V**	
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Displays and Counters

Dimensions					
	48 x 24 mm	48 x 24 mm	96 x 48 mm	96 x 48 mm	
Type of display					
Numeric display					
LED display	●	●	●	●	
LCD display					
Multicolor					
Backlit					
Number of decades	5	5	5	5	
Power supply					
10 .. 30 V_{DC}	●	●	●		
90 ... 260 V_{AC}				●	
Type					
Digital display					
Temperature display	Pt100/Ni100	Thermocouples J, K, N	Pt100/Pt1000 thermocouples B, E, J, K, N, R, S, T	Pt100/Pt1000 thermocouples B, E, J, K, N, R, S, T	
Process display					
Controller			●	●	
Functionality					
Relay output					
Transistor output					
Reset button	●	●	●	●	
External reset	●	●	●	●	
Model number					
	KT-LED-24-PT100-24VDC	KT-LED-24-TC-24VDC	KT-LED-96-2R-24VDC	KT-LED-96-2R-230VAC	
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				Dimensions
	48 x 24 mm	96 x 48 mm	96 x 48 mm	
				Type of display
				Numeric display
	●	●	●	LED display
				LCD display
				Multicolor
				Backlit
	5	6	6	Number of decades
				Power supply
	●	●		10 ... 30 V_{DC}
			●	90 ... 260 V_{AC}
				Type
	●			Digital display
				Temperature display
		●	●	Process display
		●	●	Controller
				Functionality
		2 x SPDT	2 x SPDT	Relay output
				Transistor output
	●	●	●	Reset button
		●	●	External reset
				Model number
	DA5-IU-C	DA6-IU-2K-C	DA6-IU-2K-V	
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Functional Description

Sensor signals often need to be displayed clearly on site or further processed and used to control processes directly.

Therefore, in addition to the sensors featured in the previous sections, Pepperl+Fuchs also offers a wide range of products for signal evaluation.

9.1 Displays and Counters

Visibility

Depending on the type, you can choose from four standard sizes with front measurements of 48 mm x 24 mm, 48 mm x 48 mm, 96mm x 48 mm, and 32 mm x 15 mm depending on the space available for your application.

The 96 mm x 48 mm housing design with very bright LED-display is ideal for situations where good readability is required for process visualization or if the viewer is several meters away.

Type of Display

With the exception of electromechanical counters (cost-effective numeric displays) and pure digital display units (extremely bright LED-display), you can choose between a high-contrast liquid crystal display (LCD) and a light-emitting diode display (LED).

The LCD-display is usually more cost effective and requires less power, although it has restricted readability in low-light conditions. Therefore, you should use a large LED display wherever good readability is required.

Electromechanical Counters

Electromechanical counters are used in situations without electric output signals that call for cost-effective counting with or without a reset function. The KCM series is particularly well suited to this scenario



Electronic Batch Controllers

Electronic batch controllers are used to control transactions through switching outputs and display scaled values. Electronic counters with LED displays offer excellent readability even without the batch control function. The KC-L Series is best suited to this purpose.

Time Measurement

The multifunction devices from the KC-L and KCT Series are ideal for short- and long-term measurements as well as the measurement of operating hours. These devices can accurately measure times to the nearest millisecond. The measuring intervals can be started and stopped automatically through the two inputs. For long-term measurements, the devices can display times up to a maximum of 999,999 hours.

Measuring Speed/Frequency

Pulse intervals are measured in order to calculate rotational speed or frequency. The display on the KC-L and KCT Series can easily be scaled. The data is displayed directly in Hertz or rpm.



Multifunction Devices

The KC-L and KCT Series incorporating a time/counter/tachometer function can be used in all situations where a device is used to detect several signals and programming needs to be quickly customizable to the specific application. These devices are also ideally equipped to deal with future changes in your plant while helping you to reduce your inventory.

Displaying Analog Values

Display units from the DA5 Series can display measured analog values such as pressure, temperature, or distance. These devices provide excellent readability and feature a scalable numeric display of the measured values. You can choose between a purely digital display in 48 mm x 24 mm format and a process display in 96 mm x 48 mm format with two relay outputs and linearization for sequential control. Thanks to the power supply provided, you can supply the sensors used in the application directly using these displays and without an auxiliary power supply.

Operation

The requirements for an optimal operational philosophy differ depending on the application. These requirements are as follows:

09.04.15

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- *No setting function or just a reset function to prevent adjustments from being made*
- *Very easy and clear operation with limited functionality*
- *Menu-driven operation with a high level of flexibility for the application.*
- *These requirements are fulfilled in this order by the series:*
- *KCM (no adjustment option)*
- *KCY (simple adjustment of preset values using one button per digit)*
- *KC-L and KCT (menu-driven operation and connection via RS232-interface, keylock can be activated).*

9.2 Tachometers

Tachometers are pulse-controlled time measurement devices. In contrast to standard tachometers (KCT Series) that count the incoming pulses within a gate time, TC-type tachometers evaluate the duration of a period between two subsequent input pulses (cycle method).

The period duration is allocated an adjustable multiplication factor and is converted into a rotational speed or speed depending on the operating mode.

Benefit:

The cycle method requires only one pulse per revolution and a maximum of two revolutions to detect the rotational speed with high accuracy.

Rotational speed = 1/T x 60 min^{-1}

T = time between two pulses

min-1 = revolutions/minute



9.3 Sensor End Stages

Sensor end stages form the interface between the sensor and the system controller or actuator if the output signal of the sensor cannot be further processed directly. This is the case, for example, where a two-wire sensor with NAMUR interface must directly switch a load. The sensor obtains its power supply from the sensor end stage, which also monitors the line if necessary. The sensor end stage evaluates the sensor circuit and switches its output accordingly. Sensor end stages are also useful for connecting three-wire sensors. For example, if the current load for the sensor-specific end stage is insufficient for the connected load, or if a semiconductor output needs to be converted to a potential-free relay output.

9.4 Rotation Speed Monitors

Rotation speed monitors are devices for displaying and monitoring periodic signals, i.e., frequencies in general and rotation speeds in particular. Periodic signals occur in almost all areas of automation and process technology.

The input signals are evaluated depending on the cycle method, i.e., through period duration measurement, and are converted into frequency or rotational speed by a very quick microcontroller.

Particular attention was paid to rotation speed monitoring during the development of these devices. Displays and data can be provided in either Hz or 1/min. It is also possible to automatically apply the actual rotation speed of the drive for applications with slow processes. For this, several pulses per sensor revolution can be converted into the rotational speed using an appropriate setting.

The monitoring function operates using a trip value for which the upper and lower hysteresis value can be freely selected within the respective measurement and display range. The output signal is generated when the predefined limits are exceeded or not met.



In addition to the ON delay and OFF delay, pulse function, and OFF delay timer, it is possible to select the direction of operation for the output, i.e., for underspeed or overspeed monitoring. A built-in start-up override prevents false signals during start-up of the monitored system.

All common two-, three-, or four-wire proximity switches and incremental rotary encoders can be used as signal sources. Terminals are also available for connecting proximity switches in accordance with DIN 19 234 (NAMUR).

9.5 Frequency Voltage Current Converters

Frequency voltage current converters function in the same way as rotation speed monitors. The difference is that a voltage or current value that is proportional to the input frequency is emitted as the output signal:

- *0 V ... 10 V*
- *2 V ... 10 V*
- *0 mA ... 20 mA*
- *4 mA ... 20 mA*

The pulse output provides the input frequency divided by an adjustable factor (1 to 1200) for further processing.

09.04.15



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Function	Electromechanical summator
Type	digital display
Display value	digit height 4 mm
Pulse length/pulse interval	50 ms / 50 ms
Counting frequency	10 Hz
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-40 ... 90 °C (-40 ... 194 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	flexible leads AWG 22 150 mm long
Mounting	latch fastener

Model Number		KCM-51-C	KCM-51-V	KCM-70-C	KCM-70-V
Number of digits	5	●	●		
	7			●	●
Reset	manually	●	●		
Operating voltage	230 V_{AC}		●		●
	24 V_{DC}	●		●	
Power consumption	0.6 W	●		●	
	1.3 VA		●		●
Dimensions	48 mm x 24 mm x 54 mm			●	●
	48 mm x 24 mm x 59 mm	●	●		
Mass		62 g	48 g	60 g	50 g

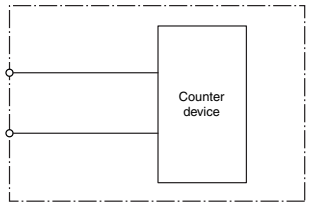
Properties

- **Electromechanical summators**
- **24 V_{DC} and 230 V_{AC} supply voltage versions**
- **5 and 7 digit versions**

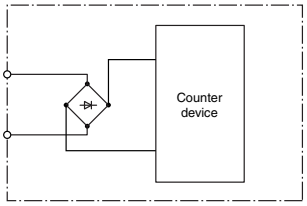
Electrical Connection



DC Supply



AC Supply



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CE

Properties

- Electromechanical summators
- 24 V_{DC} and 230 V_{AC} supply voltage version
- 7 digits

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

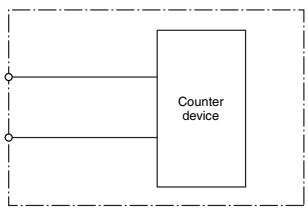
General Data	
Function	Electromechanical summators
Type	digital display
Number of digits	7
Display value	digit height 4 mm
Ambient temperature	-10 ... 60 °C (14 ... 140 °F)
Storage temperature	-40 ... 90 °C (-40 ... 194 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	flexible leads AWG 22 150 mm long
Mass	18 g
Dimensions	32 mm x 15 mm x 36 mm
Mounting	Locating springs

Model Number		KCM-70A-C	KCM-70A-V
Operating voltage	230 V_{AC}		●
	24 V_{DC}	●	
Power consumption	0.3 W	●	
	0.9 VA		●
Pulse length/interval	20 ms / 20 ms	●	
	50 ms / 50 ms		●
Counting frequency	10 Hz		●
	25 Hz	●	

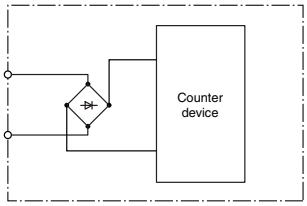
Electrical Connection



DC Supply



AC Supply



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Type	7-segment LED display, red
Number of digits	6
Reset	manually or external
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 80 % (noncondensing)
Mounting	latch fastener

Model Number		KCT-6S-C	KCT-6ST-C	KCT1-6ST-V	KCT2-6ST-V
Function	Counter	●	●	●	●
	Timer				●
	Tachometer				●
Display value	digit height 14 mm				●
	digit height 8 mm	●	●	●	
Operating voltage	10 ... 30 V_{DC}	●	●		
	90 ... 250 V_{AC}			●	●
Power consumption	max. 6 VA				●
	max. 7 VA			●	
	1.5 W	●	●		
Counting frequency	20 kHz			●	
	30 Hz / 20 kHz	●	●		
	30 Hz / 20 kHz (max. 11 kHz when counting with phase discriminator)				●
Output type	Transistor switching output		●	●	●
Sensor supply	✔			●	●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●	●	●	
	-20 ... 65 °C (-4 ... 149 °F)				●
Connection	7-pin screw terminal , max. core cross-section 0.34 ... 1.5 mm^2		●		
	2 plug-in 7-pin screw terminals max. core cross-section 0.34 ... 1.5 mm^2			●	
	2-pin and 7-pin plug-in connection terminals, core cross-section ≤ 1.5 mm^2				●
	5-pin screw terminal , max. core cross-section 0.34 ... 1.5 mm^2	●			
Mass	approx. 150 g				●
	approx. 200 g			●	
	48 g	●	●		
Dimensions	48 mm x 24 mm x 65 mm	●	●		
	48 mm x 48 mm x 106 mm			●	
	96 mm x 48 mm x 90 mm				●

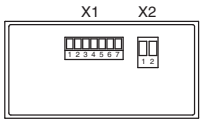
Properties

- **LED Counter and LED Counter/Timer/Tachometer versions**
- **10 - 30 V_{DC} and 90 - 250 V_{AC} supply voltage versions**
- **6 digits**

Electrical Connection

KCT2-6ST-V





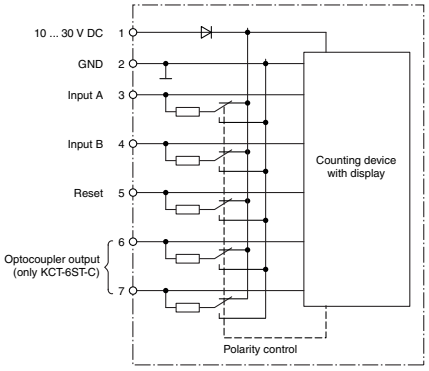
Connection assignment X2

Terminal No.	AC version
1	Power supply 90 ... 260 V AC
2	Power supply 90 ... 260 V AC

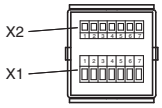
Connection assignment X1

Terminal No.	AC version
1	Optocoupler collector output
2	Optocoupler emitter output
3	SET
4	INP B
5	INP A
6	GND
7	+24 V out

KCT-6S-C
KCT-6ST-C



KCT1-6ST-V



Connector assignment X1
supply voltage and outputs

Terminal No.	AC version	10 ... 30 V DC version
1	Optocoupler output 1 collector	
2	Optocoupler output 1 emitter	
3	Optocoupler output 2 emitter	
4	n.c.	
5	Optocoupler output 2 collector	
6	supply voltage 90 ... 250 V AC	operating voltage 10 ... 30 V DC
7	supply voltage 90 ... 250 V AC	0 V DC (GND)

Connector assignment X2
inputs

Terminal No.	Name	AC version	10 ... 30 V DC version
1	+24 VDC	Sensor Supply voltage	n.c.
2	0 VDC (GND)	Reference voltage	n.c.
3	INP A	Counter input A	
4	INP B	Counter input B	
5	RESET	Reset input	
6	GATE	Gate circuit	
7	KEY	Input for key locking	

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CE

Properties

- **LCD counter**
- **10 - 30 V_{DC} supply voltage**

Technical Data

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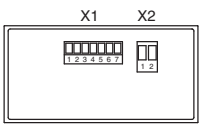
General Data	
Function	Counter
Reset	manually or external
Operating voltage	10 ... 30 V DC
Ambient temperature	-20 ... 65 °C (-4 ... 149 °F)

Model Number		KC-LCD-24-24VDC	KC-LED-96-1T-24VDC
Type	6-digit 7-segment LED display, red		●
	7-digit 7-segment LC display	●	
Display value	digit height 14 mm		●
	digit height 8 mm	●	
Counting frequency	30 Hz / 60 kHz with position display max. 25 kHz		●
	8 kHz, pnp input max. 48 Hz, npn input	●	
Output type	1 transistor switching output		●
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)		●
	-25 ... 75 °C (-13 ... 167 °F)	●	
Dimensions	48 mm x 24 mm x 53.5 mm	●	
	96 mm x 48 mm x 89.4 mm		●
Mass	approx. 140 g	40 g	140 g

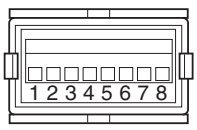
Electrical Connection

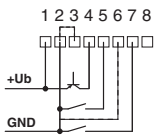


KC-LED-96-1T-24VDC



KC-LCD-24-24VDC





Connection assignment X2

Terminal No.	DC version
1	Power supply 0 V DC (GND)
2	Power supply 10 ... 30 V DC

Connection assignment X1

Terminal No.	DC version
1	Optocoupler collector output
2	Optocoupler emitter output
3	SET
4	INP B
5	INP A
6	n.c
7	n.c.

Function and terminal assignment

Terminal	Text on device	Function
1	10 - 30 V DC	Supply voltage +Ub
2	GND	0 V DC
3	GND	0 V DC
4	INP PNP	fast counting input
5	INP NPN	slow counting input
6	RESET ENABLE	Reset key enable input
7	RESET	Reset input
8	n.c.	not used

Date of issue: 04/08/2015



CE

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KCY1-6SR-B
Function	Addition/Subtraction pre-select counter
Type	2-line, 7-segment LC display with signs
Number of digits	6
Display value	digit height 7 mm
Reset	manually or external
Operating voltage	2 x 3.6 V batteries
Counting frequency	25 Hz
Output type	Relay output
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-20 ... 60 °C (-4 ... 140 °F)
Relative humidity	≤ 80 % (noncondensing)
Mass	80 g
Dimensions	48 mm x 48 mm x 85 mm
Mounting	latch fastener (dimension 50.5 mm x 54.5 mm)

Properties

- **LCD batch controller**
- **Battery operated**
- **6 digits**

Electrical Connection





Terminal No.	
1	+3 V DC for terminal 2
2	Input of push-button lock
3	Relay contact
4	Relay contact
5	AC/DC optocoupler count input
6	AC/DC optocoupler reset input
7	Common AC/DC input for terminals 5 and 6

Date of issue: 04/08/2015

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CE

Properties

- LED batch controller
- 10 - 30 V_{DC} and 90 - 250 V_{AC} supply voltage version
- 7 digits

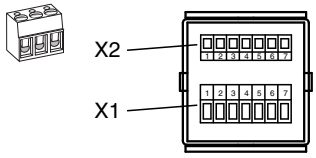
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Function	Counter Timer Tachometer
Type	7-segment LED display, red
Number of digits	6
Display value	digit height 8 mm
Reset	manually or external
Counting frequency	20 kHz
Output type	Relay output
Sensor supply	✔
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	2 plug-in 7-pin screw terminals max. core cross-section 0.34 ... 1.5 mm^2
Mass	approx. 200 g
Dimensions	48 mm x 48 mm x 106 mm
Mounting	latch fastener (dimension 50.5 mm x 54.5 mm)

Model Number		KCT1-6SR-C	KCT1-6SR-V
Operating voltage	10 ... 30 V DC	●	
	90 ... 250 V AC		●
Power consumption	max. 1.2 VA	●	
	max. 7 VA		●

Electrical Connection



Connector assignment X1

supply voltage and outputs

Terminal No.	AC version	10 ... 30 V DC version
1	n.c.	
2	n.c.	
3	output relay common contact (C)	
4	output relay normally open contact (NO)	
5	output relay normally closed contact (NC)	
6	supply voltage 90 ... 250 V AC	operating voltage 10 ... 30 V DC
7	supply voltage 90 ... 250 V AC	0 V DC (GND)

Connector assignment X2

inputs

Terminal No.	Name	AC version	10 ... 30 V DC version
1	+24 VDC	Sensor Supply voltage	not connected
2	0 VDC (GND)	Reference voltage	not connected
3	INP A	Counter input A	
4	INP B	Counter input B	
5	RESET	Reset input	
6	GATE	Gate circuit	
7	KEY	Input for key locking	



Properties

- LCD batch controller
- 10 - 30 V_{DC} supply voltage
- 2 x 6 digits

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

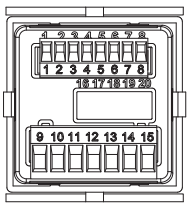
General Data	
Function	Counter
	Timer
	Tachometer
Display value	digit height 9 mm
Reset	manually or external
Sensor supply	✔
Storage temperature	-25 ... 75 °C (-13 ... 167 °F)
Relative humidity	≤ 93 % at 40 °C (noncondensing)
Dimensions	48 mm x 48 mm x 109.8 mm

	green = preferred type	KC-LCD-48-1R-24VDC	KC-LCDL-48-2R-24VDC	KC-LCDC-48-2T-24VDC	KC-LCDC-48-2R-24VDC	KC-LCDC-48-6T-24VDC
Type	2-line, 2 x 6-digit LC display with leading sign	●				
	2-line, 2 x 6-digit LC display with leading sign backlighted		●			
	2-line, 2 x 6-digit LC display with leading sign Multicolor, backlit			●	●	●
Operating voltage	10 ... 30 V_{DC}		●	●	●	●
	11 ... 30 V_{DC}	●				
Power consumption	max. 1.5 W		●	●	●	●
	max. 4 W	●				
Counting frequency	max. 50 kHz					●
	30 Hz / 5 kHz	●				
	30 Hz / 55 kHz		●	●	●	
Output type	1 relay output	●				
	2 relay outputs		●		●	
	2 transistor switching outputs			●		
	6 transistor switching outputs					●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●				
	-20 ... 65 °C (-4 ... 149 °F)		●	●	●	●
Mass	approx.	117 g	138 g	130 g	138 g	147 g

Electrical Connection

KC-LCDL-48-2R-24VDC
KC-LCDC-48-2R-24VDC





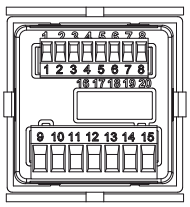
Signal and control inputs

1	Sensor supply voltage
2	GND (0V)
3	INP A (Signal input A)
4	INP B (Signal input B)
5	RESET (Reset input)
6	LOCK (Input Keypad lock)
7	GATE (Gate input)
8	MPI (User input)

Supply voltage and outputs

9	Relay contact C.	Output 1
10	Relay contact N.O.	
11	Relay contact C.	Output 2
12	Relay contact N.O.	
13	Relay contact N.C.	
14	10 ... 30 V DC	Supply voltage
15	GND (0V)	

KC-LCDC-48-2T-24VDC



Signal and control inputs

1	Sensor supply voltage
2	GND (0V)
3	INP A (Signal input A)
4	INP B (Signal input B)
5	RESET (Reset input)
6	LOCK (Input Keypad lock)
7	GATE (Gate input)
8	MPI (User input)

Supply voltage and outputs

9	Collector	Output 1
10	Emitter	
11	Collector	Output 2
12	not connected	
13	Emitter	
14	10 ... 30 V DC	Supply voltage
15	GND (0V)	

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CE

Properties

- LCD batch controller
- 230 V_{AC} supply voltage
- 2 x 6 digits

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

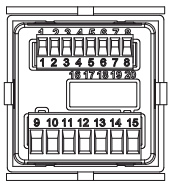
General Data	
Display value	digit height 9 mm
Reset	manually or external
Sensor supply	✔
Storage temperature	-25 ... 75 °C (-13 ... 167 °F)
Relative humidity	≤ 93 % at 40 °C (noncondensing)
Dimensions	48 mm x 48 mm x 109.8 mm

Model Number	green = preferred type	KC-LCD-48-1R-230VAC	KC-LCDL-48-2R-230VAC	KC-LCDC-48-2T-230VAC	KC-LCDC-48-2R-230VAC	KC-LCDC-48-6T-230VAC
Type	2-line, 2 x 6-digit LC display with leading sign	●				
	2-line, 2 x 6-digit LC display with leading sign backlighted		●			
	2-line, 2 x 6-digit LC display with leading sign Multicolor, backlit			●	●	●
Operating voltage	230 V_{AC}	●				
	90 ... 260 V_{AC}		●	●	●	●
Power consumption	max. 6.5 VA	●				
	max. 8 VA		●	●	●	●
Counting frequency	max. 50 kHz					●
	30 Hz / 5 kHz	●				
	30 Hz / 55 kHz		●	●	●	
Output type	1 relay output	●				
	2 relay outputs		●		●	
	2 transistor switching outputs			●		
	6 transistor switching outputs					●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●				
	-20 ... 65 °C (-4 ... 149 °F)		●	●	●	●
Mass	approx.	230 g	143 g	134 g	142 g	151 g

Electrical Connection

KC-LCD-48-1R-230VAC





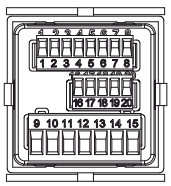
Signal and control inputs

1	Sensor supply voltage
2	GND (0V)
3	INP A (Signal input A)
4	INP B (Signal input B)
5	RESET (Reset input)
6	LOCK (Input Keypad lock)
7	not connected
8	not connected

Supply voltage and outputs

9	not connected	
10	not connected	
11	Relay contact C.	Output
12	Relay contact N.O.	
13	Relay contact N.C.	
14	230 V AC N~	Supply voltage
15	230 V AC L~	

KC-LCDC-48-6T-230VAC



Signal and control inputs

1	Sensor supply voltage
2	GND (0V)
3	INP A (Signal input A)
4	INP B (Signal input B)
5	RESET (Reset input)
6	LOCK (Input Keypad lock)
7	GATE (Gate input)
8	MPI (User input)

Supply voltage and outputs

9	Collector	Output 1
10	Emitter	
11	Collector	Output 2
12	not connected	
13	Emitter	
14	10 ... 30 V DC	Supply voltage
15	GND (0V)	
16	Common Emitter	Output 3 - 6
17	Collector 6	Output 6
18	Collector 5	Output 5
19	Collector 4	Output 4
20	Collector 3	Output 3

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CE

Properties

- LED Counter/Timer/Tachometer
- 90 - 250 V_{AC} supply voltage
- 6 digits

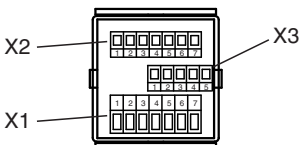
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KCT1-6WR/RS232-V
Function	Counter
	Timer
	Tachometer
Type	7-segment LED display, red
Number of digits	6
Display value	digit height 8 mm
Reset	manually or external
Operating voltage	90 ... 250 V_{AC}
Power consumption	max. 7 VA
Counting frequency	20 kHz
Output type	Relay output
Sensor supply	✔
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	2 plug-in 7-pin screw terminals
Mass	approx. 200 g
Dimensions	48 mm x 48 mm x 106 mm
Mounting	latch fastener (dimension 50.5 mm x 54.5 mm)

Electrical Connection





Connection assignment X1

Supply voltage and outputs

Terminal No.	AC version
1	Output 1 relay contact
2	Output 1 relay contact
3	Output 2 relay common contact (C)
4	Output 2 relay normally open contact (NO)
5	Output 2 relay normally closed contact (NC)
6	Power supply 90 ... 250 V AC
7	Power supply 90 ... 250 V AC

signment X2

AC version
Power supply
Sensor supply voltage
Reference voltage

C

Connection assignment X2

Inputs

Terminal No.	Name	AC version
1	+24 V DC	Sensor supply voltage
2	0 VDC (GND)	Reference voltage
3	INP A	Counter input A
4	INP B	Counter input B
5	RESET	Reset input
6	GATE	Gate input
7	KEY	Input of push-button lock

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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

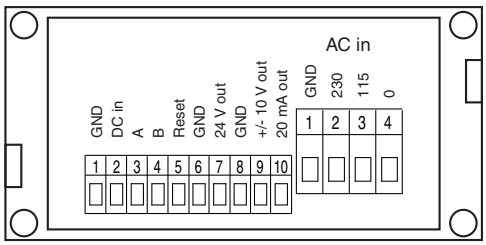
Model Number	TC-6A-V
Function	Counter
	Timer
	Tachometer
Type	7-segment LED display, red
Number of digits	6
Display value	digit height 15 mm
Reset	manually/external/automatically
Operating voltage	115 ... 230 V_{AC} 16 ... 35 V_{DC}
Power consumption	7.5 VA
Counting frequency	25 kHz (Timer function 1 kHz)
Output type	1 Analog output, configurable voltage output: -10 V ... 10 V current output: 0/4 ... 20 mA
Sensor supply	✔
Ambient temperature	0 ... 45 °C (32 ... 113 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	45 ... 90 % (noncondensing)
Connection	screw terminals, removable max. core cross-section 0.34 ... 1.5 mm^2 (AC max. 2.5 mm^2)
Mass	approx. 450 g
Dimensions	96 x 48 x 140 mm

Properties

- **LED Counter/Timer/Tachometer with analog voltage and current output**
- **16 - 35 V_{DC} and 115 - 230 V_{AC} supply voltage**
- **6 digits**

Electrical Connection





Date of issue: 04/08/2015



Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	KH-LCD-24-24VDC
Function	Operating hours counter
Type	7-digit 7-segment LC display Hourglass as operating indicator
Display value	digit height 8 mm
Reset	manually or external
Operating voltage	10 ... 30 V DC
Ambient temperature	-20 ... 65 °C (-4 ... 149 °F)
Storage temperature	-25 ... 75 °C (-13 ... 167 °F)
Mass	approx. 40 g
Dimensions	48 mm x 24 mm x 53.5 mm

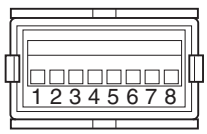
CE

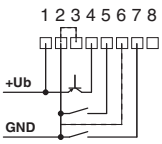
Properties

- **LCD operating hours counter**
- **10 - 30 V_{DC} supply voltage**
- **7 digits**

Electrical Connection







Function and terminal assignment

Terminal	Text on device	Function
1	10 - 30 V DC	Supply voltage +Ub
2	GND	0 V DC
3	GND	0 V DC
4	INP PNP	static counting input ≥ 3,5 V
5	INP NPN	static counting input ≤ 2 V
6	RESET MANUEL ENABLE	Reset key enable input
7	RESET	Reset input
8	n.c.	not used

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CE

Properties

- **LED display**
- **Digital display unit**
- **10 - 30 V_{DC} supply voltage**
- **5 digits**

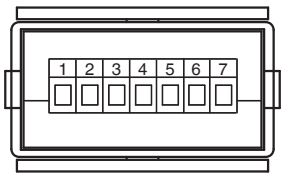
Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	**DA5-IU-C**
Pre-selection	none
Data storage	10^6 storage cycles or 10 years, EEPROM
Programming	keypad-driven menu
Type	7-segment LED display, red
Number of digits	5
Display value	digit height 8 mm
Display interval	-19999 ... 99999
Operating voltage	10 ... 30 V_{DC}
Power consumption	1.5 VA
Impedance	1 MOhm
Voltage	max. 30 V_{DC}
Analog voltage input	0 ... 10 V / 2 ... 10 V_{DC}
Analog current input	0 ... 20 mA / 4 ... 20 mA
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	7-pin screw terminal max. core cross-section 0.34 ... 1.5 mm^2
Dimensions	48 mm x 24 mm x 65 mm
Mounting	latch fastener/mounting frame
Protection degree	IP65 (front)

Electrical Connection





Terminal No.	
1	10 ... 30 V DC
2	0 V (GND)
3	0 V LATCH
4	LATCH
5	Current input
6	0 V input signal
7	Voltage input

Date of issue: 04/08/2015



Properties

- LED display
- Process control and indication unit
- 10 - 30 V_{DC} and 90 - 260 V_{AC} supply voltage version
- 6 digits

Technical Data

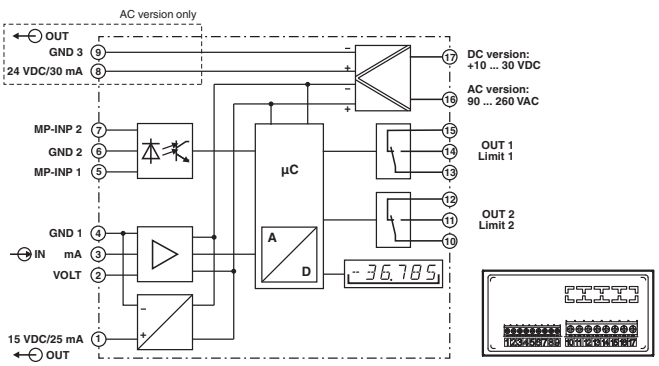
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Pre-selection	2-fold
Data storage	> 10 years, EEPROM
Programming	keypad-driven menu
Type	14-segment LED display, red
Number of digits	6
Display value	digit height 14 mm
Display interval	-199999 ... 999999 with suppression of leading zeros
Impedance	> 1 MΩ for voltage measurement 22 Ω + PTC 25 Ω for current measurement
Analog voltage input	0 ... 10 V / 2 ... 10 V DC, -10 ... 10 V DC
Analog current input	0 ... 20 mA / 4 ... 20 mA
Relay output	2 x 250 V AC/ 125 V DC, 5 A, changeover contact
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Storage temperature	-20 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 80 % (noncondensing)
Connection	8-pin and 9-pin connectors with plug-in screw terminals
Dimensions	96 mm x 48 mm x 102 mm
Mounting	mounting frame with latch fastener

Model Number	green = preferred type	DA6-IU-2K-C	DA6-IU-2K-V
Operating voltage	10 ... 30 V_{DC}	●	
	90 ... 260 V_{AC}		●
Power consumption	3.8 W	●	
	9 VA		●
Sensor supply	15 V DC , 25 mA	●	●
	24 V DC , 30 mA		●

Electrical Connection





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CE

Properties

- LED temperature display
- 10 - 30 V_{DC} supply voltage
- 5 digits

Technical Data

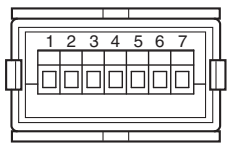
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Data storage	EEPROM
Programming	keypad-driven menu
Type	5-digit 7-segment LED display, red
Display value	digit height 8 mm
Operating voltage	10 ... 30 V_{DC} galvanically isolated
Ambient temperature	-20 ... 65 °C (-4 ... 149 °F)
Storage temperature	-25 ... 70 °C (-13 ... 158 °F)
Relative humidity	≤ 85 % (noncondensing)
Dimensions	48 mm x 24 mm x 68.3 mm
Protection degree	IP65 (front)

		KT-LED-24-PT100-24VDC	KT-LED-24-TC-24VDC
Display interval	-1999.9 ... 9999.9	●	
	-999.9 ... 1999.9		●

Electrical Connection



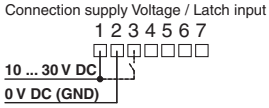


Connections

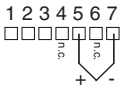
Pin	Function
1	10 - 30 V DC Supply voltage
2	0 V DC (GND)
3	Latch input
4	not connected
5	Thermocouple "+"
6	not connected
7	Thermocouple "-"

Electrical connection

Connection supply Voltage / Latch input



Thermocouple Sensor



Date of issue: 04/08/2015



CE

Properties

- LED display
- Temperature control unit
- 10 - 30 V_{DC} and 90 - 260 V_{AC} supply voltage version
- 5 digits

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Data storage	10^6 storage cycles or 10 years, EEPROM
Programming	keypad-driven menu
Type	5-digit 7-segment LED display, red
Display value	digit height 14.2 mm
Display interval	-19999 ... 99999 with suppression of leading zeros
Output type	2 Relay changeover outputs
Sensor supply	✔
Ambient temperature	-20 ... 65 °C (-4 ... 149 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 75 % (noncondensing)
Dimensions	96 mm x 48 mm x 90.7 mm
Protection degree	IP65 (front)

		KT-LED-96-2R-24VDC	KT-LED-96-2R-230VAC
Operating voltage	10 ... 30 V_{DC} galvanically isolated	●	
	90 ... 260 V_{AC}		●
Power consumption	max. 2 W	●	
	max. 6 VA		●

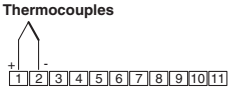
Electrical Connection



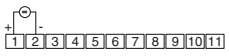
KT-LED-96-2R-230VAC
KT-LED-96-2R-24VDC

Electrical connection X2

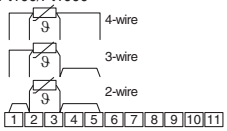
Thermocouples



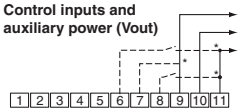
Voltage measurement



Resistance thermometer
Pt100/Pt1000



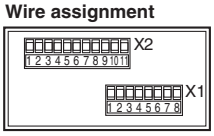
Control inputs and auxiliary power (Vout)



* Alternatively connect directly to DC power supply (galvanic isolation of control and measurement inputs

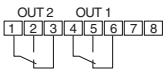
KT-LED-96-2R-24VDC

Wire assignment



X1: Pin Function

Power supply and alarm outputs



7 + 10 ... 30 V DC
8 GND4 (0 V DC)

X2: Pin Function

Thermocouples
1 Positive sensing arm
2 Negative sensing arm

Resistance thermometer
1 Pt100 or 0 ... 400 Ω
2 Pt1000 or 0 ... 4000 Ω

Voltage measurement
1 Voltage input (V)
2 GND 1 (analog)

Control inputs and auxiliary power (Vout)
6 Keypad lock-out "Key"
7 GND2 Key/MPI
8 MP-input "Reset-alarm-latch/ Display-Hold"
9 GND3 (for Vout)
10 Vout + 10 V/30 mA
11 n.c.

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Properties

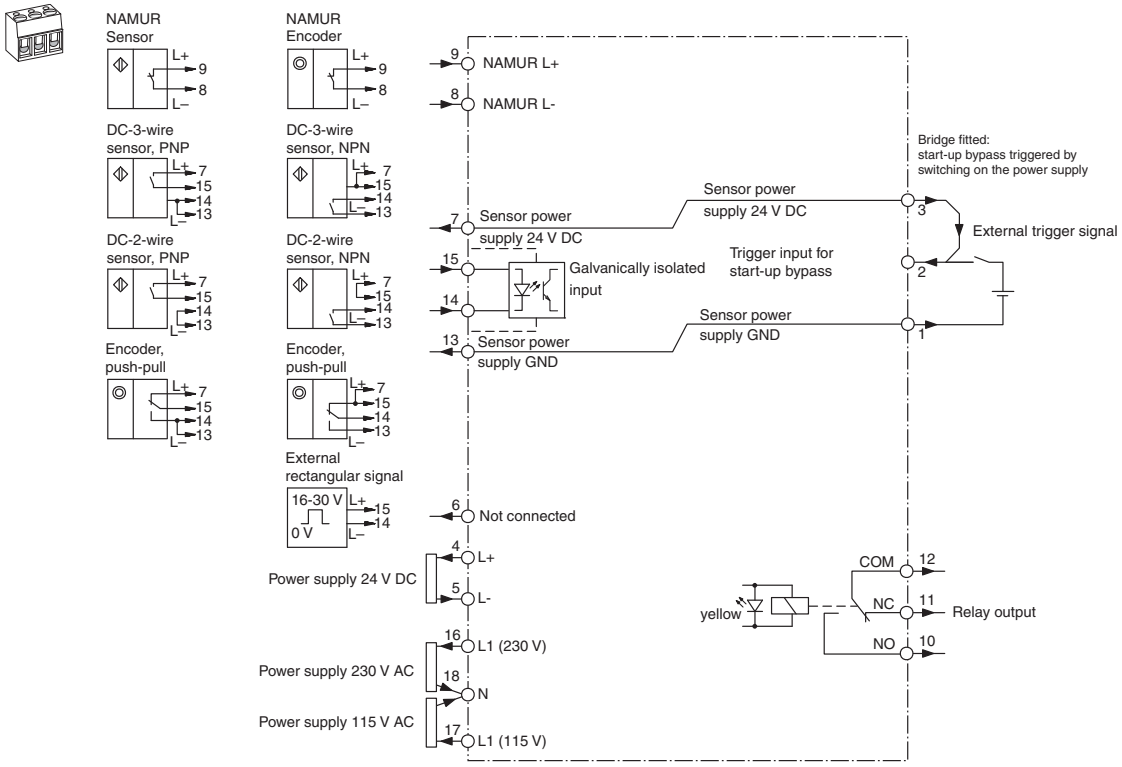
- **Overspeed / underspeed monitor**
- **DC and AC supply voltage**
- **4 digits display**

Technical Data

For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.com***

Model Number	**KFU8-DW-1.D**
Rated voltage	196 ... 250 V AC ; 98 ... 127 V AC; 47 ... 63 Hz 20.4 ... 28 V DC
Power consumption	AC: < 5 VA DC: < 5 W
Type	4-digit, 7-segment red display, 7 mm digit height
Display interval	0.002 ... 9999 Hz or 0.01 ... 9999 min^{-1}
Parameter assignment	keypad-driven menu
Switching state	LED yellow, 3 mm
Input 1	
Connection	terminals 8-, 9+
Connectable sensor types	NAMUR sensors according to DIN EN 60947-5-6
Input frequency	0.002 ... 40000 Hz, pulse length/duration: ≥ 12µs
Input 2	
Connection	terminals 7+, 13- sensor supply terminals 14, 15 NPN/PNP input (galvanically isolated)
Connectable sensor types	Two, three, or four-wire proximity switch, incremental rotary encoder, or externally generated pulses 16 ... 30 V
Start-up override	Triggering by external signal 16 ... 30 V or Place jumper between terminals 2/3 or by switching on supply voltage (terminal 2 and terminal 3 permanently bridged)
Jumpering time	0.1 ... 999.9 s (External trigger signal)
Relay	1 changeover contact NO, NC, COM
Sensor supply	24 V DC ± 10 %, 30 mA , short-circuit protected
Delay	≤ 20 ms (incl. calculation time)
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Protection degree	IP20
Connection	coded, removable terminals , max. core cross-section 0.34 ... 2.5 mm^2
Mounting	Snap onto 35 mm standard rail compliant with DIN EN 50022 or Screw fastening using slide-on straps in a 90 mm net

Electrical Connection



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

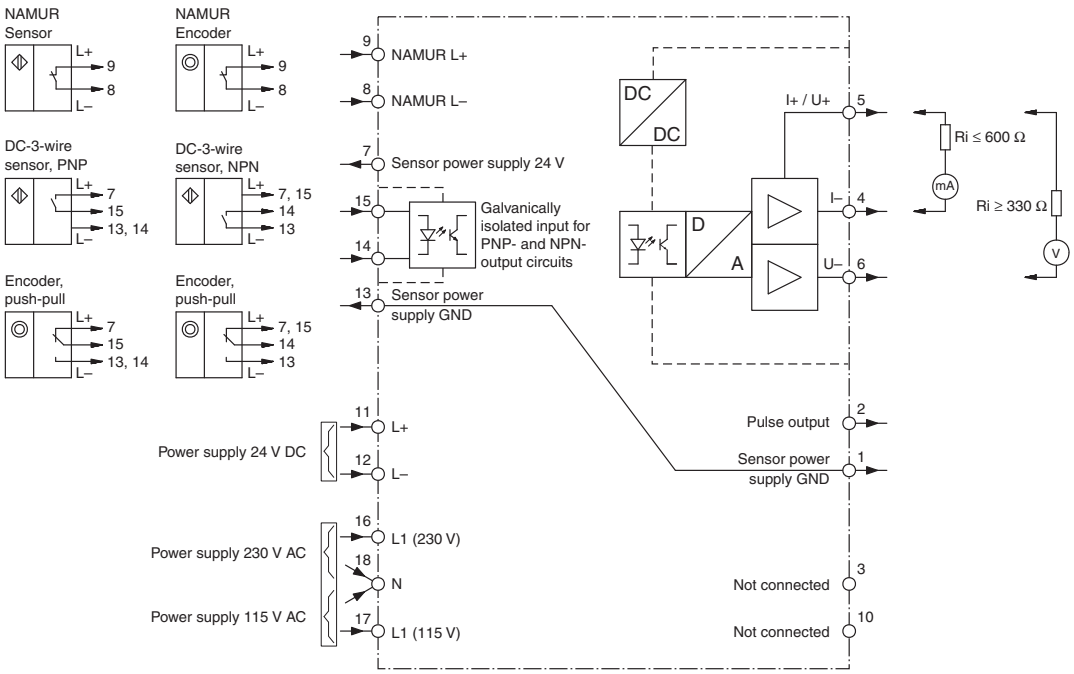
Model Number	KFU8-FSSP-1.D
Rated voltage	196 ... 250 V AC ; 98 ... 127 V AC; 47 ... 63 Hz 20.4 ... 27.6 V DC
Power consumption	AC: < 5 VA DC: < 5 W
Type	4-digit, 7-segment red display, 7 mm digit height
Display interval	0.002 ... 9999 Hz or 0.01 ... 9999 min^{-1}
Input 1	
Connection	terminals 8-, 9+
Connectable sensor types	NAMUR sensors according to DIN EN 60947-5-6
Switching point	high: 16 ... 30 V DC; max.10 mA; $R_i \cong 3$ kOhm low: 0 ... 6 V DC
Input 2	
Connection	terminals 7+, 13- sensor supply terminals 14, 15 NPN/PNP input (galvanically isolated)
Connectable sensor types	2-, 3-, or 4-wire proximity switches and incremental rotary encoder
Ambient temperature	-25 ... 50 °C (-13 ... 122 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Protection degree	IP20
Connection	coded, removable terminals , max. core cross-section 0.34 ... 2.5 mm^2
Mounting	snap-on to 35 mm standard rail or screw fixing

Properties

- **Frequency voltage current converter**
- **DC and AC supply voltage**
- **4 digits display**

Electrical Connection





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Technical Data

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	K23-SSI/R2/IU-C
Rated operational voltage	18 ... 30 V DC
Rated operational current	≤ 170 mA at 18 V DC (5.5 V not connected) ≤ 120 mA at 30 V DC
Supply	Encoder: 5.5 V ±5 %, max. load 150 mA
Input 1	
Input type	SSI
Input format	Gray code, binary code
Resolution	13, 21, or 25 bit
Input 2	
Input type	Set
Output	
Number/Type	analog
Output rated operating current	0/4 ... 20 mA (< 150Ω) at ±10 V DC (> 5 kΩ)
Ambient temperature	0 ... 45 °C (32 ... 113 °F)
Connection	screw terminals , max. core cross-section 0.34 ... 2.5 mm^2

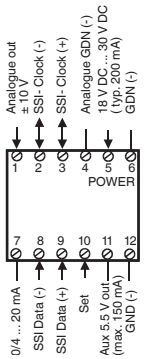
Properties

- **Signal converter**
- **DC supply voltage**

Electrical Connection

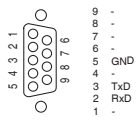


Terminals

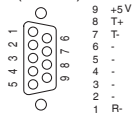


Sub-D 9-pin
(RS 232)

Only connect PINS 2, 3 and 5.
The connection of other PINs leads to interference with the RS 485 signal.



(RS 485)



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Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model Number	K23-SSI/R2/25B-C
Rated operational voltage	18 ... 30 V DC
Rated operational current	≤ 200 mA
Input 1	
Input type	SSI
Input format	Gray code, binary code
Resolution	13, 21, or 25 bit
Input 2	
Input type	HTL (Hold)
Output	
Number/Type	Parallel
Output rated operating current	Gray-Code, Binary-Code, BCD-Code
Ambient temperature	0 ... 45 °C (32 ... 113 °F)
Connection	screw terminals , max. core cross-section 0.34 ... 2.5 mm^2

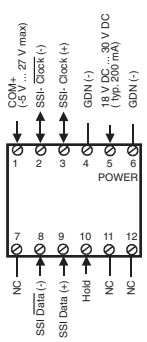
Properties

- **Signal converter**
- **DC supply voltage**

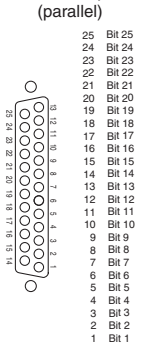
Electrical Connection



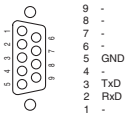
Terminals



Sub-D 25-pin (parallel)



Sub-D 9-pin (RS 232)



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Properties

- **Sensor output interface terminal**
- **DC supply voltage**

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

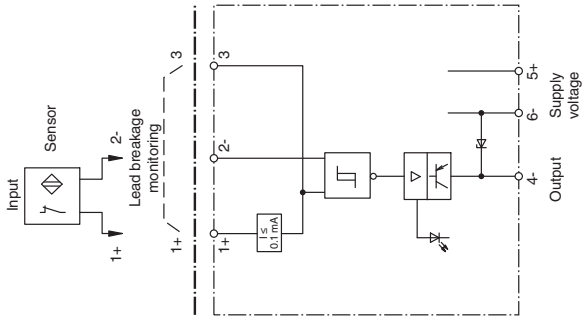
General Data	
LED yellow	switch output lead breakage: LED off, output locked
Operating voltage	10 ... 30 V DC
Operating current	approx. 22 mA
Sensor supply	8 V DC
Input	
Connection	terminals 1+, 2-
Connectable sensor types	NAMUR
Trip value	1 kHz
Output	
Current	200 mA short-circuit protected
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Storage temperature	-25 ... 85 °C (-13 ... 185 °F)
Connection	self-opening apparatus connection terminals, max. core cross-section 0.34 ... 2.5 mm^2
Dimensions	20x60x40 (in mm)

Model Number	green = preferred type	KCD2-EL	KCD2-E2L
Output			
Output type	1 NPN, NO	●	
	1 PNP, NO		●
Connection	terminal 4+		●
	terminal 4-	●	
Signal level	U_B - 1.1V		●
	U_B - 1.8V	●	

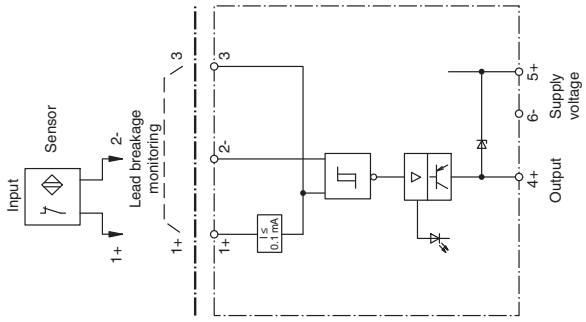
Electrical Connection



KCD2-EL



KCD2-E2L



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Technical Data

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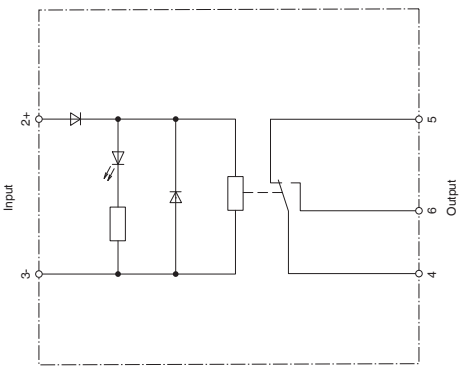
	KCD2-R
LED yellow	switch output
Operating voltage	24 V DC ± 15 %
Operating current	16 mA
Input	
Connection	terminals 2+, 3-
Connectable sensor types	PNP or NPN 3-wire sensors
Output	
Relay	1 changeover contact
Contact load	30 VDC / 2 A
Switching frequency	≤ 10 Hz
Ambient temperature	-25 ... 60 °C (-13 ... 140 °F)
Storage temperature	-25 ... 85 °C (-13 ... 185 °F)
Connection	self-opening apparatus connection terminals, max. core cross-section 0.34 ... 2.5 mm^2
Dimensions	20 mm x 60 mm x 40 mm

Properties

- **Sensor output interface terminal**
- **DC supply voltage**

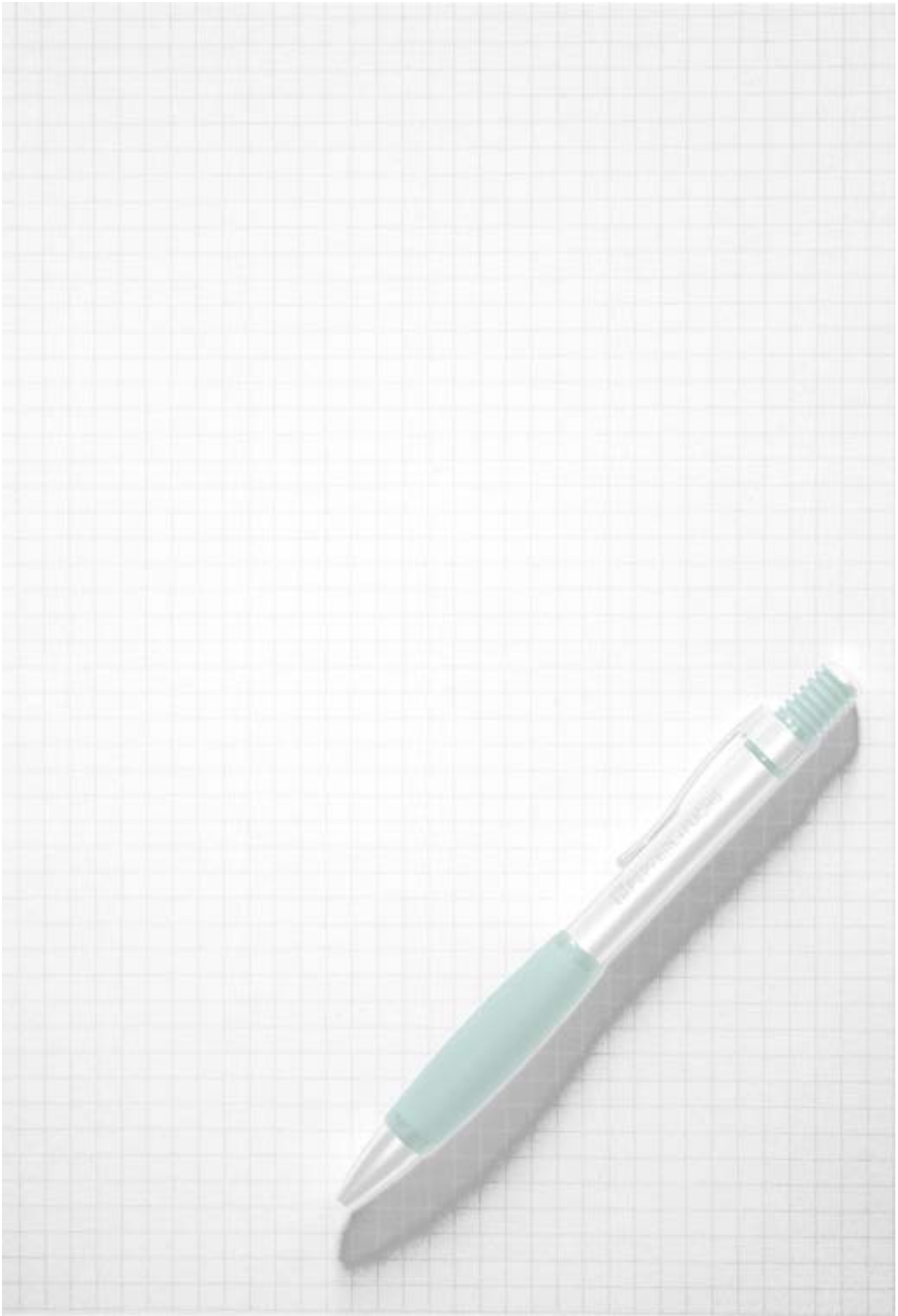
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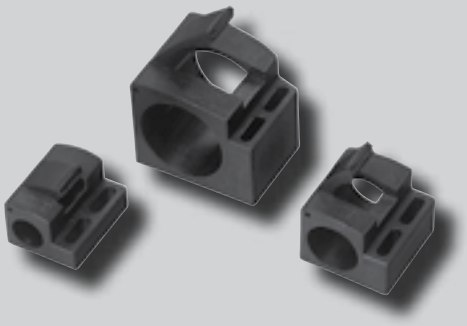


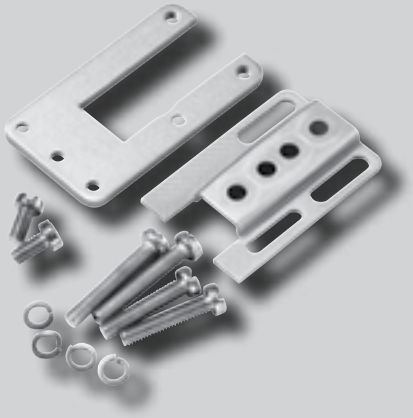
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Contents

Accessories









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SENSING YOUR NEEDS

Accessories

10.1 Connectors, Cordsets, Splitters

Sensor-actuator cable M12 980
Sensor-actuator cable M8 998
Sensor-actuator cable 1/2“ 1012
Sensor-actuator cable 7/8“ 1014
Valve Connector Cordsets Form A, B, C 1016
Field Connectors M12 1018
Field Connectors M8 1024
Field Connectors 1/2“ 1030
Field Connectors 7/8“ 1032
Field Connectors M18 1034
Field Connectors Rd24 1036
Valve Field Connector 1038
Sensor-actuator receptacles M12 1040
Sensor-actuator receptacles M8 1042
Sensor-actuator receptacles 7/8“ 1044
Sensor-actuator receptacles 1/2“ 1046
Junction blocks M12 1048
Junction blocks M8 1050
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Y-Splitter M12 / M8 1054
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Data connectors DeviceNet / CANopen 1059
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Sensor tester and Tools 1067

10.3 Mounting accessories

Mounting Adapters for cylindrical sensors 1068
Mounting Adapters for the VariKont, VariKont M and VariKont L series 1070
Cable Protectors 1070

10.4 Wireless Inductive System WIS

Noncontact Energy and Data Transfer 1084



Product Diversity – Always the Right Connection

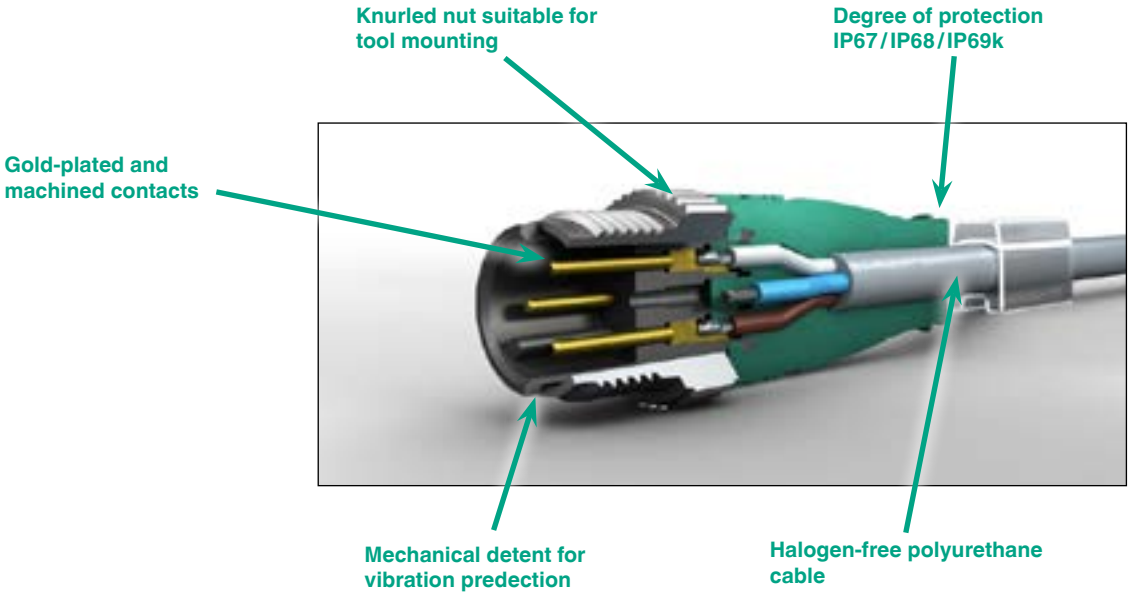
Pepperl+Fuchs offers a comprehensive range of sensor-actuator cables for machine and plant installations. In addition to the common M8, M12, and valve connector designs, ready-made 1/2″ and 7/8″ connectors are also available in stock as standard. Our recently introduced "LEAN Production" philosophy will enable us to manufacture and deliver customized versions with short delivery times.

Our range includes:

- Shielded versions
- Versions with stainless-steel coupling nut
- Versions with indicators for operation and function.

In conjunction with our wide range of cable types, these options mean that we can provide the optimum solution for virtually any application.

The New Generation – Connectors with Impressive Properties

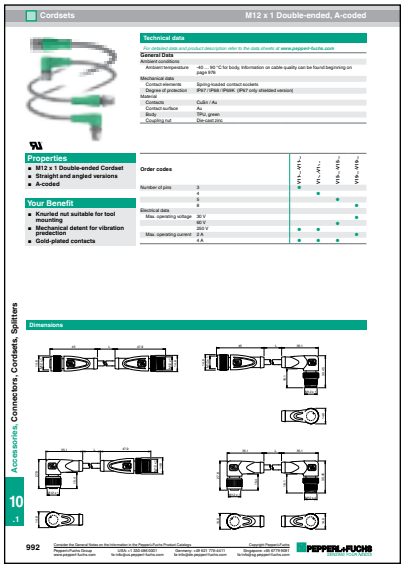


- Optimized size and a rounded body designed for a secure grip enable the connector to be used in the tightest of spaces
- Gold-plated, machined contacts ensure contact resistances < 5 mΩ
- Halogen-free PUR cables prevent toxic vapors being released in the event of a fire
- The knurled nut enables a torque wrench to be used to securely tighten our connectors
- Highly effective integrated vibration predection

Your Benefits at a Glance

- **Flexibility – we are happy to customize our products to your specifications**
- **Shortest delivery times – even for customized products**
- **Quality – exhaustive functional testing of all connectors**
- **Products are approved for the American market –**
- **Reliably sealed to IP67 or higher**

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PEPPERL+FUCHS SENSING YOUR NEEDS



Our Type Code – Your Order Code

Simply use our type code to order the product you desire with a minimum of fuss. We'll show you how!

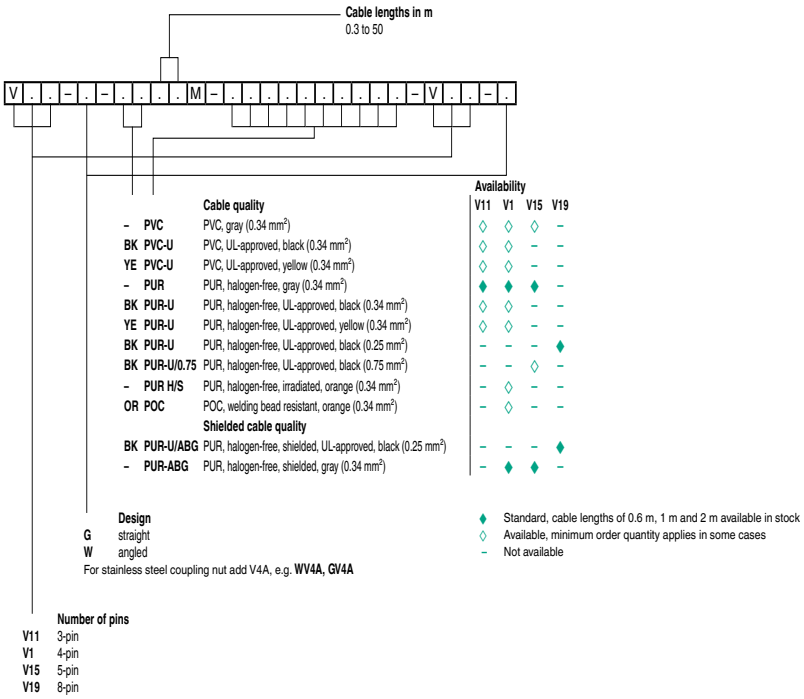
For example, just select the desired cable material and cable length and enter this into the empty space on the type code – your order code is complete.

Example

You wish to order the following M12 double-ended cordset:

- M12 socket, straight to M12 plug, straight, 4-pin
- Halogen-free polyurethane cable, gray
- 1 m cable length

Order codes



As you can see from the image above, the correct order code is:
V1-G-1M-PUR-V1-G.

The Correct Cable for Every Application

Choosing the right cable is crucial in terms of the service life you can expect from a sensor-actuator cable. This is why it pays to familiarize yourself with our extensive range of cables. It will save you time as well as money!



PVC – for straightforward applications

Application areas:

For use in areas subject to morate mechanical strain, e.g., packaging machines, assembly and production lines.

- **Affordable cable quality**
- **Effective resistance to chemicals**
- **Suitable for the food industry**

Features:

- Easily strippable
- Excellent flame retardance
- Suitable for flexible installation to some extent
- Liwithed resistance to oil and lubricant

Temperature range

fixed installed	–25 °C … 70 °C
	–25 °C … 105 °C for indicated cable types
flexible installed	–5 °C … 70 °C
Minimum bending radius	10 x D

PVC

Cable type	Structure	Diameter	Use
PVC, gray, 70 °C	3/4/5 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M12
PVC, gray, 70 °C	3/4 x 0.25 mm² (14 x 0.15 mm)	Ø = 4.3 mm	M8
PVC, black, 80 °C	2+1 x 0.5 mm² (16 x 0.2 mm)	Ø = 4.8 mm	Valve connectors
PVC, black, 80 °C	3+1/4+1 x 0.5 mm² (28 x 0.15 mm)	Ø = 4.9 mm / 5.3 mm	Valve connectors
PVC-U, black, 70 °C	3/4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.3 mm	M8 / M12
PVC-U, yellow, 70 °C	3/4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.3 mm	M8 / M12
PVC, blue (NAMUR), 70 °C	2/4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M8 / M12
PVC-U, yellow, 105 °C	3/4/5 x 0.34 mm² (42 x 0.1 mm)	Ø = 5.2 mm / 5.5 mm / 5.9 mm	1/2″

For available Raw cable rings, see page 1064.

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PUR – for complex applications

Application areas:

Suitable for long-term flexible use in the most challenging of environments such as with machine tools, redary tables and swivel tables. Shielded versions available to meet additional EMC requirements.

- **Halogen-free**
- **Capable of withstanding a high level of mechanical stress**
- **Effective resistance to chemicals**
- **Effective resistance to oil**
- **UL cable types are extremely flame-retardant**

Features:

- Free from silicone and substances that inhibit lacquer adhesion
- Resistant to microbes and hydrolysis
- UV-resistant

Temperature range

fixed installed	–40 °C … 80 °C
flexible installed	–20 °C … 80 °C
Minimum bending radius	10 x D

Additional data for UL-approved cable types (unshielded):

Min. no. of bending cycles	5 million
Distance	5 m
Acceleration	5 m/s²
Speed	3.33 m/s
Torsion	±180°/m tested at 20 °C ... 25 °C

PUR

Cable type		Structure	Diameter	Use
PUR, gray, 80 °C		3/4/5 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M12
PUR, gray, 80 °C		3/4 x 0.25 mm² (14 x 0.15 mm)	Ø = 4.3 mm	M8
PUR-U, black, 80 °C	UL	8 x 0.25 mm² (14 x 0.15 mm)	Ø = 6.0 mm	M12
PUR-U, black, 80 °C	UL	3/4 x 0.34 mm² (42 x 0.1 mm)	Ø = 4.3 mm	M8 / M12
PUR-U, yellow, 80 °C	UL	4 x 0.34 mm² (42 x 0.1 mm)	Ø = 4.3 mm	M8 / M12
PUR, blue (NAMUR), 80 °C		2/4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M8 / M12
PUR-ABG, gray, shielded, 80 °C		4/5 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M8 / M12
PUR-U/ABG, black, shielded, 80 °C	UL	8 x 0.25 mm² (14 x 0.15 mm)	Ø = 6.0 mm	M12
PUR-U/0.75, black, 80 °C	UL	5 x 0.75 mm² (42 x 0.15 mm)	Ø = 6.0 mm	M12
PUR, black, 80 °C	UL	2+1/3+1/4+1 x 0.5 mm² (28 x 0.15 mm)	Ø = 4.5 mm / 4.9 mm / 5.3 mm	Valve connectors

For available Raw cable rings, see page 1064.



Irradiated PUR – for extreme applications

Application areas:

This cable boasts properties that are better than those of conventional PUR cables, making this highly-flexible control cable also suitable for use in robot applications and particularly with welding robots.

- **Welding bead resistant**
- **Resistant to high temperatures**
- **Capable of withstanding mechanical stress**
- **Robot-compatible**
- **Halogen-free**
- **Excellent flame retardance**

Features:

- Effective resistance to oil
- Effective resistance to chemicals
- UV-resistant
- Free from silicone and substances that inhibit lacquer adhesion
- Resistant to microbes and hydrolysis

Temperature range

fixed installed	–50 °C ... 105 °C	
	–50 °C ... 80 °C	for UL cable types
flexible installed	–40 °C ... 105 °C	
	–40 °C ... 80 °C	for UL cable types
Minimum bending radius	10 x D	
Min. no. of bend cycles	5 million	
Distance	10 m	
Acceleration	10 m/s²	
Speed	3 m/s	
Torsion	±360°/m tested at 20 °C ... 25 °C	

Irradiated PUR

Cable type	Structure	Diameter	Use
PUR-H/S, orange, irradiated, 80 °C	4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M8 / M12
PUR-H/S, yellow, irradiated, 80 °C	3/4/5 x 0.75 mm² (42 x 0.15 mm)	Ø = 5.8 mm	1/2″

For available Raw cable rings, see page 1064.

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POC welding bead resistant – for the most challenging scenarios

Application areas:

This special cable comes into its own for applications in the welding sector that cannot be solved with irradiated PUR cables.

- **Welding bead resistant**
- **Resistant to high temperatures**
- **Capable of withstanding mechanical stress**
- **Robot-compatible**
- **Excellent flame retardance**

Features:

- Effective resistance to oil
- Effective resistance to chemicals
- UV-resistant
- Free from silicone and substances that inhibit lacquer adhesion
- Resistant to microbes and hydrolysis

Temperature range

fixed installed	–40 °C … 150 °C
flexible installed	–15 °C … 150 °C
Minimum bending radius	10 x D
Torsion	±360°/m tested at 20 … 25 °C

POC

Cable type	Structure	Diameter	Use
POC, orange, 105 °C	4 x 0.34 mm² (19 x 0.15 mm)	Ø = 4.8 mm	M8 / M12

For available Raw cable rings, see page 1064.



STOOW – THE cable for the American market

Application areas:

This type of cable uses an extremely resilient PVC mixture that is used predominantly in the American market.

- **Extremely resilient PVC mixture acc. to STOOW-A**
- **Tried and tested for outdoor use**
- **Approved up to 600 V**
- **Excellent flame retardance**

Features:

- Effective resistance to oil
- Effective resistance to chemicals

Temperature range

fixed installed	–25 °C … 105 °C
flexible installed	–5 °C … 105 °C
Minimum bending radius	10 x D

STOOW

Cable type	Structure	Diameter	Use
STOOW, yellow, 105 °C	3/4/5 x AWG16 (~1.25 mm², 19 x 0.29 mm)	Ø = 9.9 mm / 10.7 mm / 12.9 mm	7/8″

Instructions on Connecting and Routing Cables

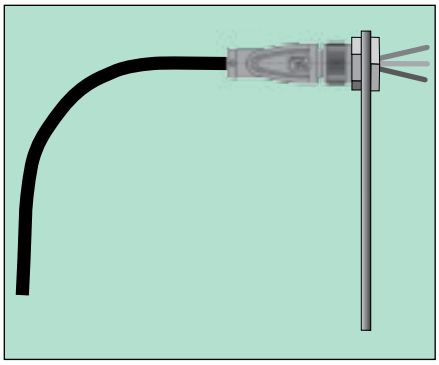
Avoid common mistakes when connecting and routing cables

Properly connecting, routing, and maintaining cable systems is the best way to ensure their reliability and long service life.

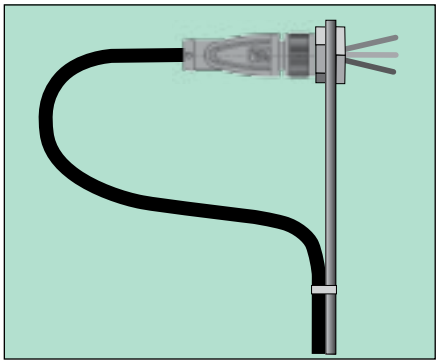
Bending radius

By using an appropriate bending radius you can reduce the tensions that arise from bending, and extend the cable's service life.

Recommended flexible installation



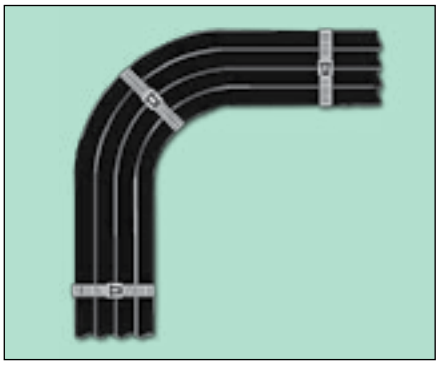
Recommended fixed installation



Bundling

When individual cables are connected to a device and when securing cables together, take care to avoid deforming the cables with the cable ties. When cables are secured correctly it should be possible to move them easily and without using much force; this will extend their service life.

Correct bundling



Incorrect bundling

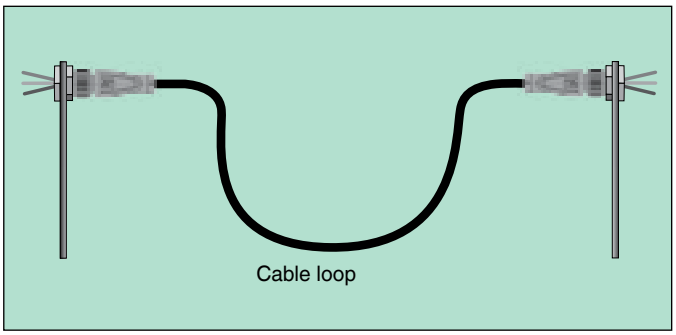
Cable ties that are too tight should be loosened, and those that are too slack should be tightened

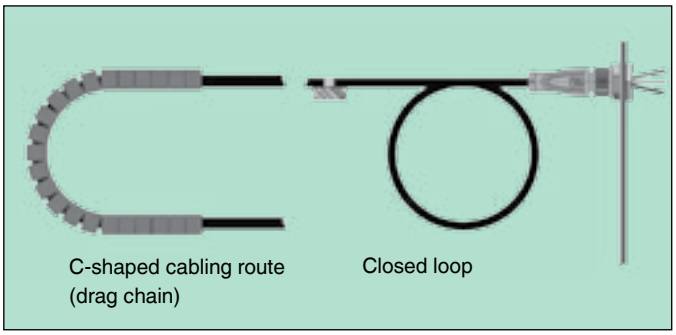


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Connecting cables to portable devices

Connecting cables that are subject to movement between two points must be long enough to avoid excessive strain on the cables and connectors.
In this situation it is advisable to form loops in the cable and route sections in the shape of the letter C.

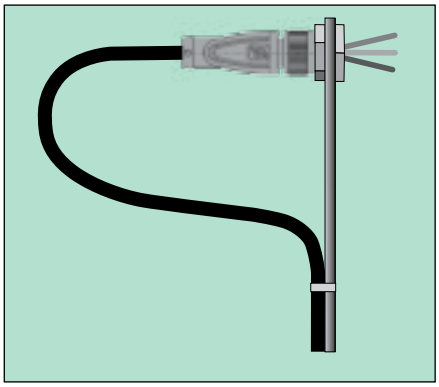




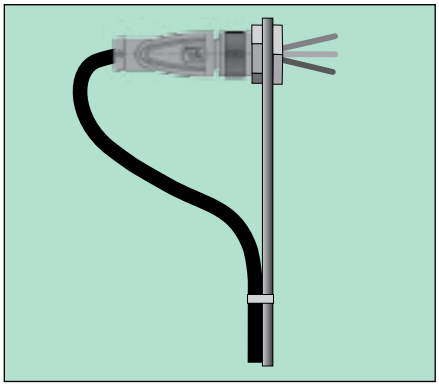
Strains

If a sufficiently large loop is formed at connection points, then excessive wear and common problems due to the strains illustrated below can be avoided. Pepperl+Fuchs connecting cables feature rugged, pre-fitted easy-grip body. If these are combined with correctly formed loops, the result is that both connector and cable are relieved very effectively of strain.

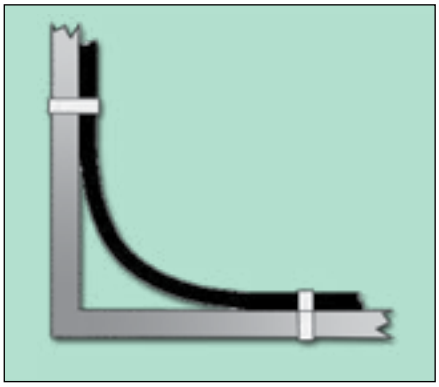
Correct strain relief loop



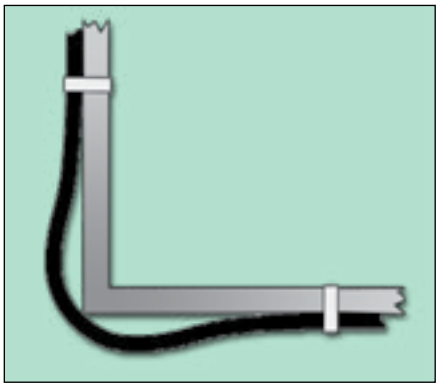
Incorrect strain relief loop



Recommended: Routing inside corner



Routing the cable round the outside of a corner is not recommended





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K (IP67 only shielded version)
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

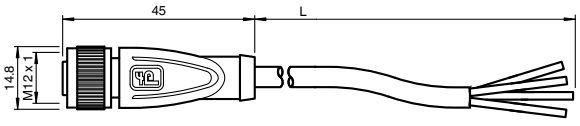
- **M12 x 1 Single-ended Cordset**
- **Female straight and angled versions**
- **A-coded**

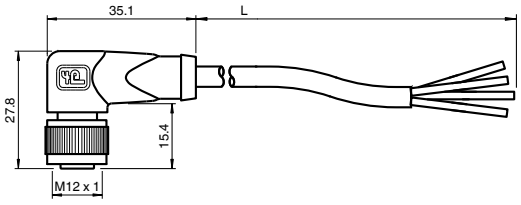
Your Benefit

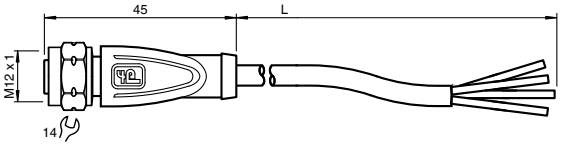
- **Knurled nut suitable for tool mounting**
- **Mechanical detent for vibration predection**
- **Gold-plated contacts**

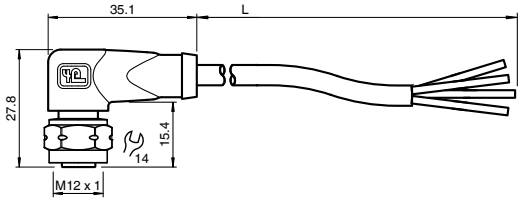
Order codes		V11-...	V1-...	V15-...	V17-...	V19-...
Number of pins	3	●				
	4		●			
	5			●		
	7 + Shield				●	
	8					●
Electrical data						
Max. operating voltage	30 V				●	●
	60 V			●		
	250 V	●	●			
Max. operating current	2 A				●	●
	4 A	●	●	●		

Dimensions



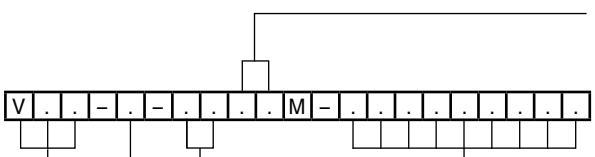






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Order codes



Cable lengths in m
0.3 to 50

Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.25 mm²)
BK	PUR-U/0.75	PUR, halogen-free, UL-approved, black (0.75 mm²)
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)
OR	POC	POC, welding bead resistant, orange (0.34 mm²)

Shielded cable quality

–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)
BK	PUR-U/ABG	PUR, halogen-free, shielded, UL-approved, black (0.25mm²)

Availability

V11	V1	V15	V17	V19
◇	◇	◇	–	–
◇	◇	–	–	–
◇	◇	–	–	–
♦	♦	♦	–	–
◇	◇	–	–	–
◇	◇	–	–	–
–	–	–	–	♦
–	–	◇	–	–
–	◇	–	–	–
–	◇	–	–	–
–	♦	♦	–	–
–	–	–	♦	♦

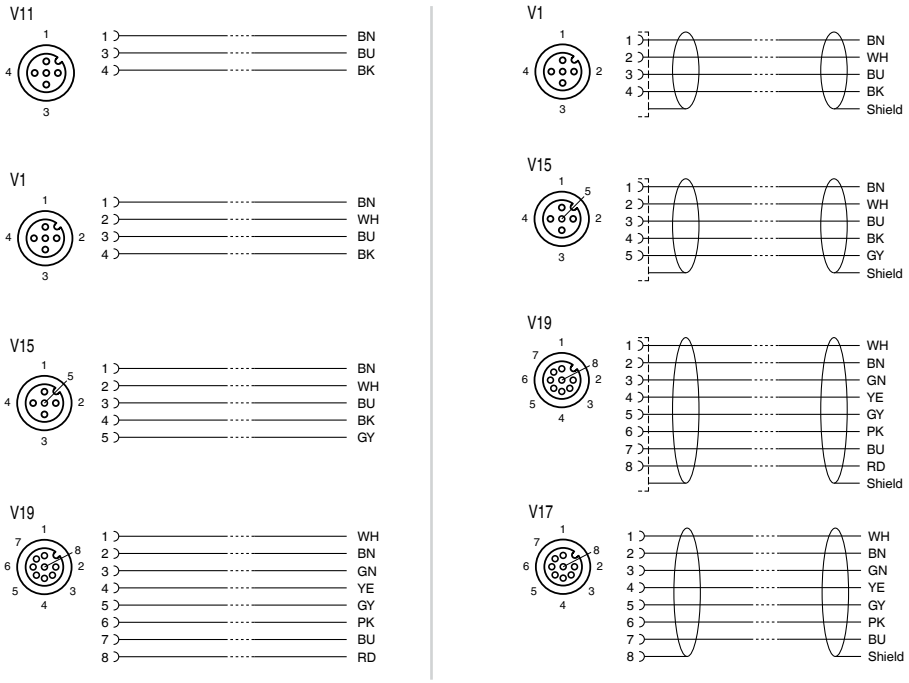
♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Design
G straight
W angled
For stainless steel coupling nut add V4A, e.g. **WV4A, GV4A**

Number of pins
V11 3-pin
V1 4-pin
V15 5-pin
V17 7-pin + shield
V19 8-pin

Electrical connection

Shielded





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Pin diameter	1 mm
Degree of protection	IP67 / IP68 / IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

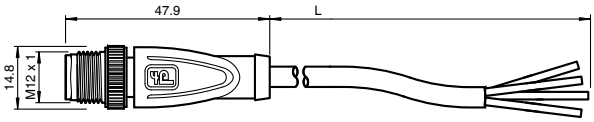
- M12 x 1 Single-ended Cordset
- Male straight and angled versions
- A-coded

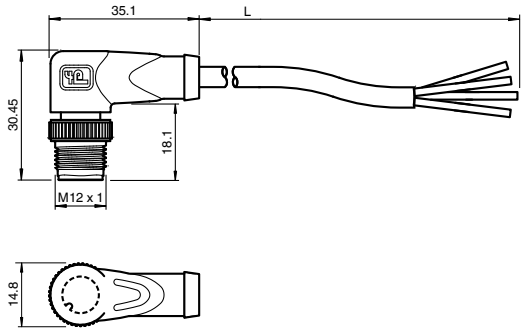
Your Benefit

- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

Order codes		V11S-...	V1S-...	V15S-...	V19S-...
Number of pins	3	●			
	4		●		
	5			●	
	8				●
Electrical data					
Max. operating voltage	30 V				●
	60 V			●	
	250 V	●	●		
Max. operating current	2 A				●
	4 A	●	●	●	

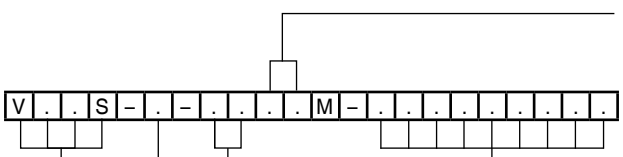
Dimensions





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Order codes



Cable lengths in m
0.3 to 50

Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.25 mm²)
BK	PUR-U/0.75	PUR, halogen-free, UL-approved, black (0.75 mm²)
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)
OR	POC	POC, welding bead resistant, orange (0.34 mm²)
		Shielded cable quality
–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)
BK	PUR-U/ABG	PUR, halogen-free, shielded, UL-approved, black (0.25mm²)

Availability

V11S	V1S	V15S	V19S
◇	◇	◇	–
◇	◇	–	–
◇	◇	–	–
♦	♦	♦	–
◇	◇	–	–
◇	◇	–	–
–	–	–	♦
–	–	◇	–
–	◇	–	–
–	◇	–	–
–	◇	◇	–
–	–	–	◇

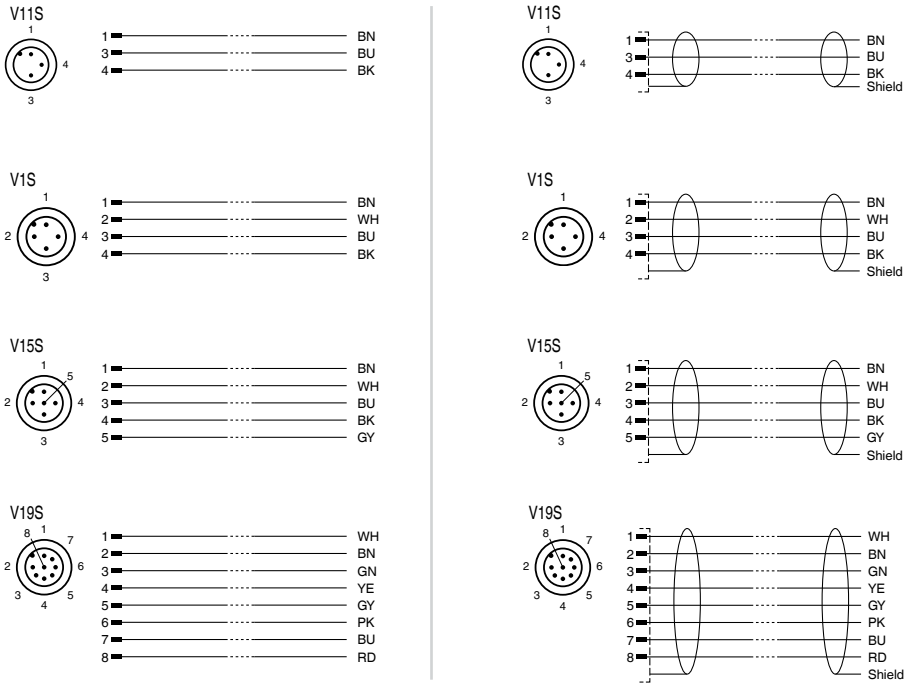
Design
G straight
W angled
For stainless steel coupling nut add V4A, e.g. **WV4A, GV4A**

Number of pins
V11S 3-pin
V1S 4-pin
V15S 5-pin
V19S 8-pin

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

Shielded





Properties

- M12 x 1 Single-ended Cordset
- Female straight and angled versions
- A-coded
- LED

Your Benefit

- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

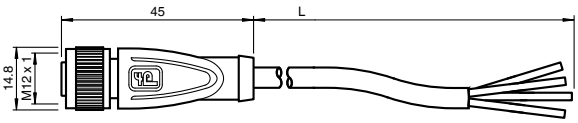
Technical data

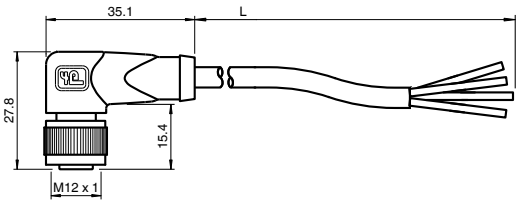
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

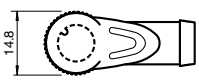
General Data	
Display/controls	
LED green	Operating display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent
Coupling nut	Die-cast zinc

Order codes			V1-...-E2-...	V1-...-E0-...	V1-...-E2/E3-...	V1-...-A2-...	V1-...-E8-...	V1-...-E8W-...
Number of pins	3 (E2)		●					
	3 (E0) NPN			●				
	4 (E2. E3)				●			
	4 (A2)					●		
	4 (E8)						●	
	4 (E8W)							●
Display/controls								
LED yellow	NO contact function display	Pin 4	●	●		●	●	●
	NO/NC contact function display				●			
LED red	NO contact function display	Pin 2					●	
LED white	NO contact function display	Pin 2						●

Dimensions

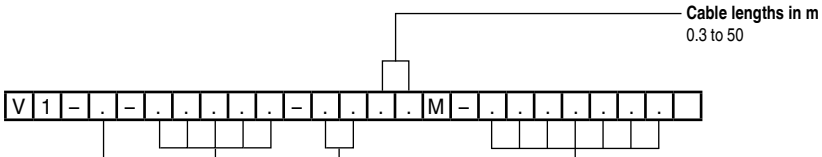






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PEPPERL+FUCHS SENSING YOUR NEEDS

Order codes



Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)
OR	POC	POC, welding bead resistant, orange (0.34 mm²)

Availability

E2	E2/E3	A2	E0	E8	E8W
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇
◇	◇	◇	♦	◇	◇
♦	♦	♦	◇	♦	♦
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇
–	◇	◇	◇	◇	◇
–	◇	◇	◇	◇	◇

Number of pins

E2	3-pin
E2/E3	4-pin (2+4 bridged)
A2	4-pin
E0	3-pin (NPN)
E8	4-pin
E8W	4-pin

Design

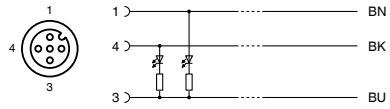
G	straight
W	angled

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

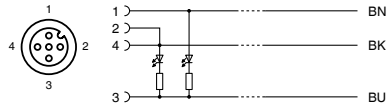
Electrical connection

PNP

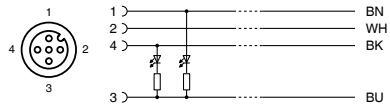
E2



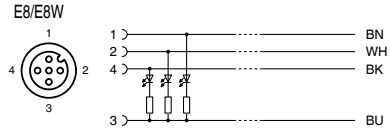
E2/E3



A2

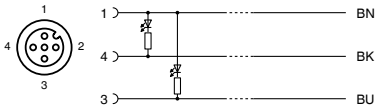


E8/E8W



NPN

E0





Properties

- M12 x 1 Single-ended Cordset
- Male straight and angled versions
- A-coded
- LED

Your Benefit

- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

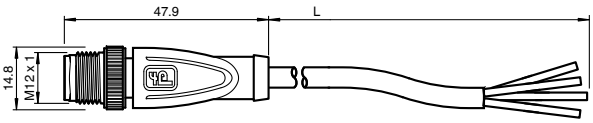
Technical data

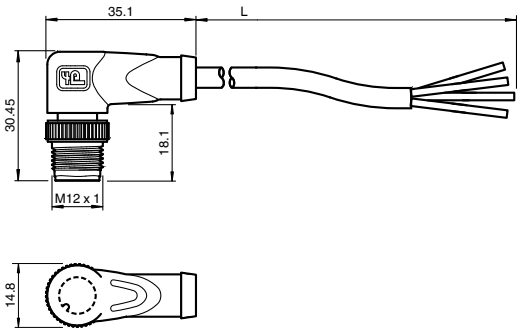
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Display/controls	
LED green	Operating display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Pin diameter	1 mm
Degree of protection	IP67 / IP68 / IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent
Coupling nut	Die-cast zinc

Order codes		V1S-...-E2-...	V1S-...-E0-...
Number of pins	3 (E2)	●	
	3 (E0) NPN		●
Display/controls			
LED yellow	NO contact function display	●	
	NO/NC contact function display		●

Dimensions





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Order codes

Cable lengths in m
0.3 to 50

V 1 S – . – . . . – . . . . M – . . . . . .

Design

G	straight
W	angled

Number of pins

E2	3-pin
E0	3-pin (NPN)

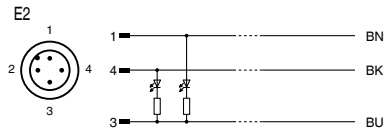
Cable quality

			Availability E0	E8
–	PVC	PVC, gray (0.34 mm²)	◊	◊
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)	◊	◊
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)	◊	◊
–	PUR	PUR, halogen-free, gray (0.34 mm²)	◊	◊
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)	◊	◊
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◊	◊
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)	◊	◊
OR	POC	POC, welding bead resistant, orange (0.34 mm²)	◊	◊

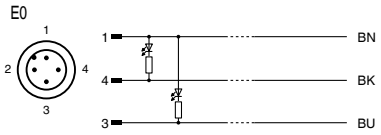
♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

PNP



NPN





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	250 V
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU
Coupling nut	Die-cast zinc

Properties

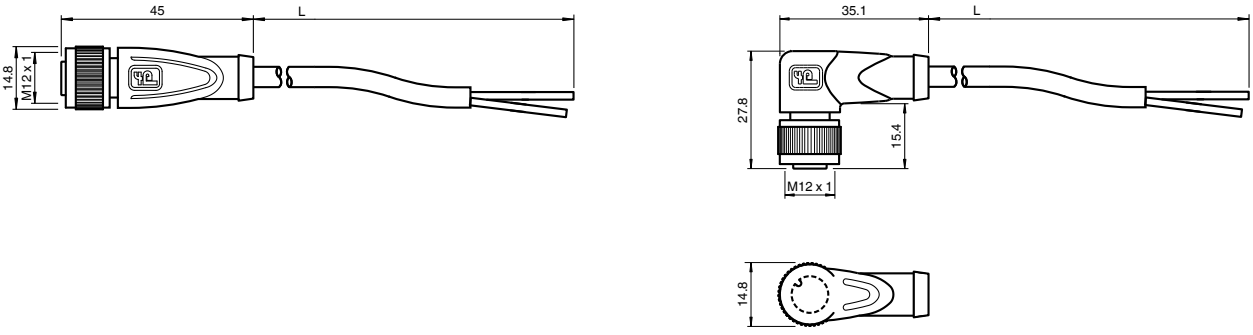
- M12 x 1 Single-ended Cordset
- Female straight and angled versions
- A-coded
- NAMUR

Your Benefit

- Suitable for NAMUR technology
- Blue cable jacket
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

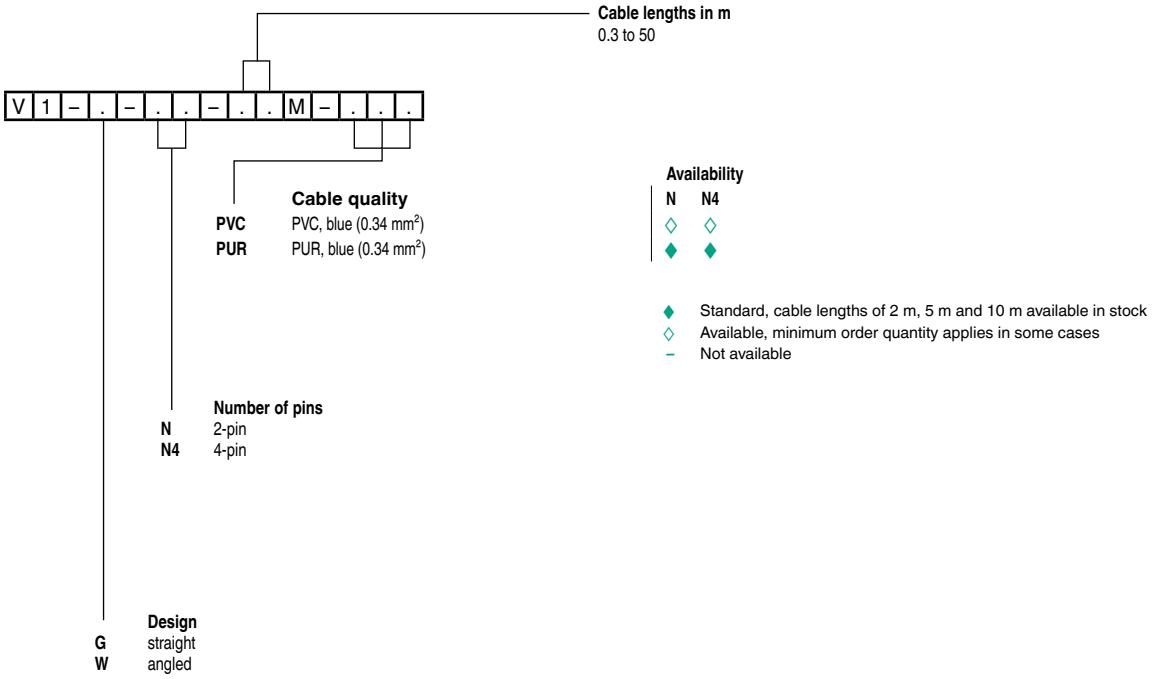
Order codes		V1-...-N-...	V1-...-N4-...
Number of pins	2	●	
	4		●

Dimensions

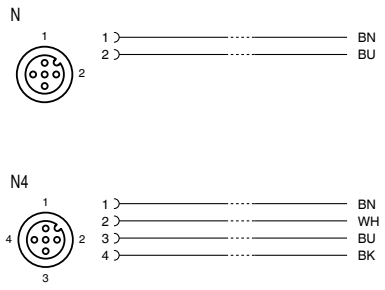


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Order codes



Electrical connection





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K (IP67 only shielded version)
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

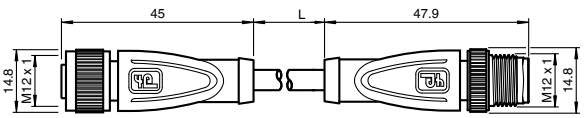
- M12 x 1 Double-ended Cordset
- Straight and angled versions
- A-coded

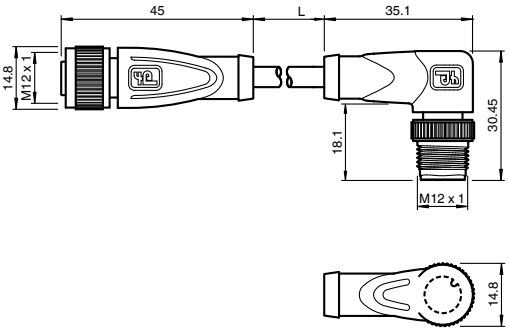
Your Benefit

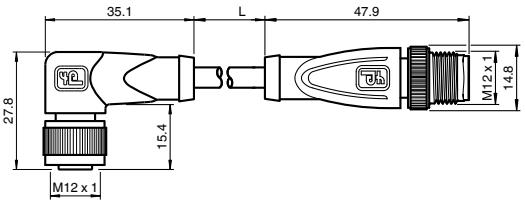
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

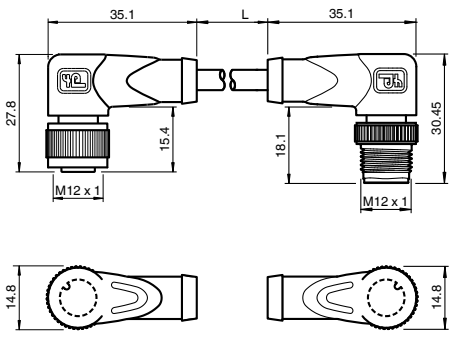
Order codes		V11-...-V11-...	V1-...-V1-...	V15-...-V15-...	V19-...-V19-...
Number of pins	3	●			
	4		●		
	5			●	
	8				●
Electrical data					
Max. operating voltage	30 V				●
	60 V			●	
	250 V	●	●		
Max. operating current	2 A				●
	4 A	●	●	●	

Dimensions



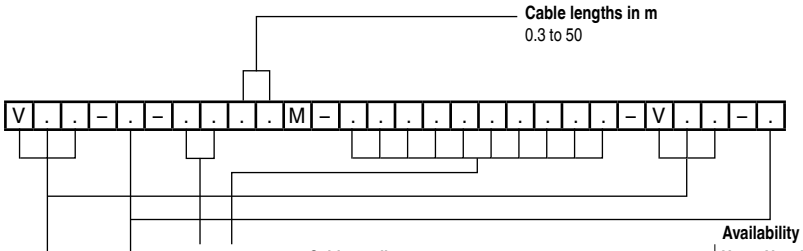






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Order codes



		Cable quality	Availability V11	V1	V15	V19
–	PVC	PVC, gray (0.34 mm²)	◇	◇	◇	–
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)	◇	◇	–	–
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)	◇	◇	–	–
–	PUR	PUR, halogen-free, gray (0.34 mm²)	♦	♦	♦	–
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)	◇	◇	–	–
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇	◇	–	–
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.25 mm²)	–	–	–	♦
BK	PUR-U/0.75	PUR, halogen-free, UL-approved, black (0.75 mm²)	–	–	◇	–
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)	–	◇	–	–
OR	POC	POC, welding bead resistant, orange (0.34 mm²)	–	◇	–	–
		Shielded cable quality				
BK	PUR-U/ABG	PUR, halogen-free, shielded, UL-approved, black (0.25 mm²)	–	–	–	♦
–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)	–	♦	♦	–

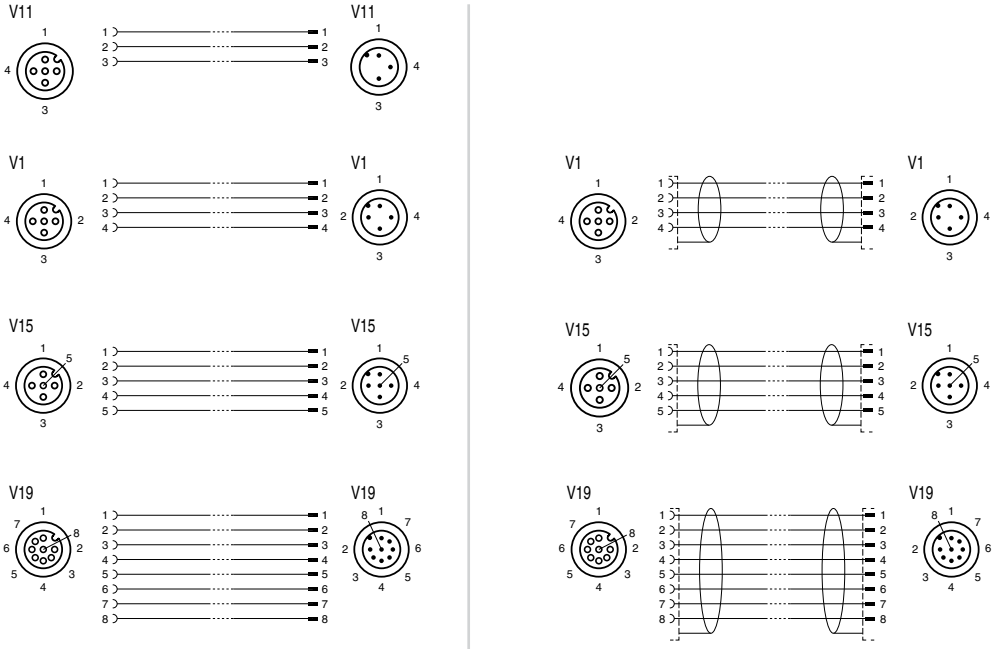
Design
G straight
W angled
For stainless steel coupling nut add V4A, e.g. **WV4A, GV4A**

Number of pins
V11 3-pin
V1 4-pin
V15 5-pin
V19 8-pin

♦ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

Shielded





Properties

- M12 x 1 Double-ended Cordset
- Straight and angled versions
- A-coded
- LED

Your Benefit

- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

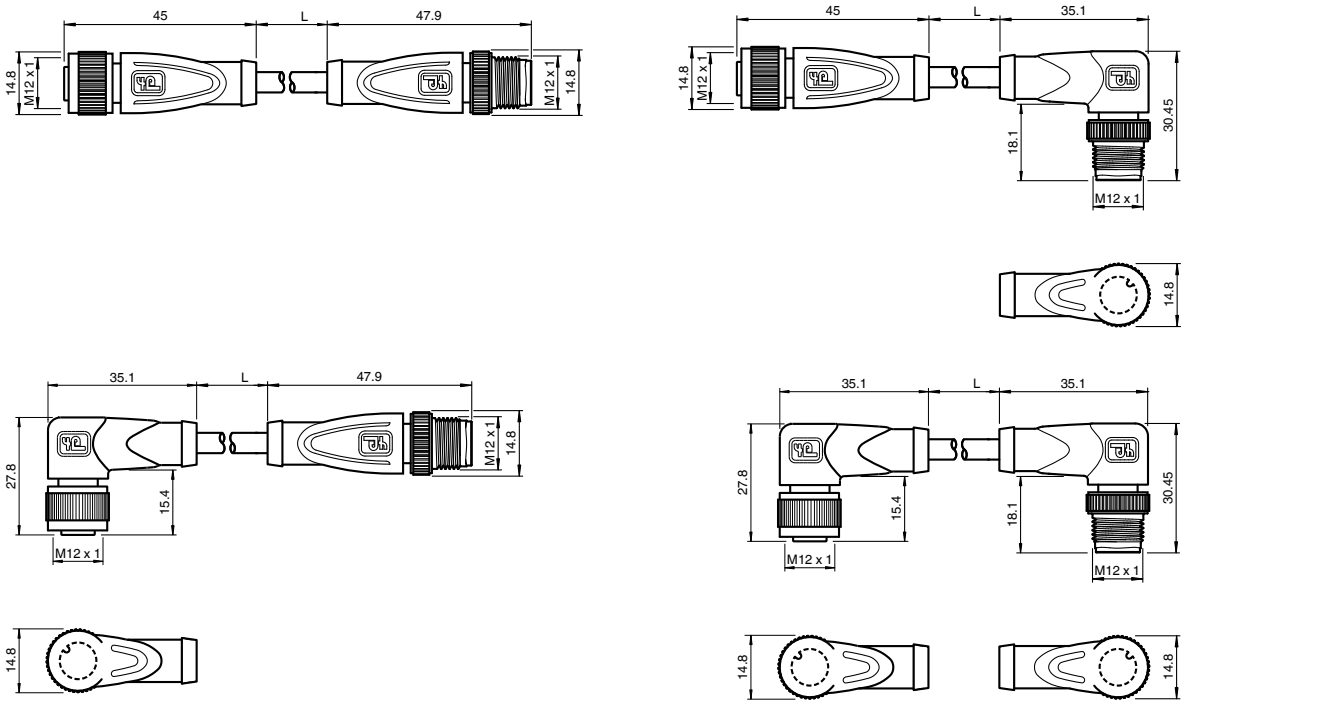
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Display/controls	
LED green	Operating display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67 / IP68 / IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent/green
Coupling nut	Die-cast zinc

Order codes			V1-...-E2-...-V1-...	V1-...-E0-...-V1-...	V1-...-E2/E3-...-V1-...	V1-...-A2-...-V1-...	V1-...-E8-...-V1-...	V1-...-E8W-...-V1-...
Number of pins	3 (E2)		●					
	3 (E0) NPN			●				
	4 (E2. E3)				●			
	4 (A2)					●		
	4 (E8)						●	
	4 (E8W)							●
Display/controls								
LED yellow	NO contact function display	Pin 4	●	●		●	●	●
	NO/NC contact function display				●			
LED red	NO contact function display	Pin 2					●	
LED white	NO contact function display	Pin 2						●

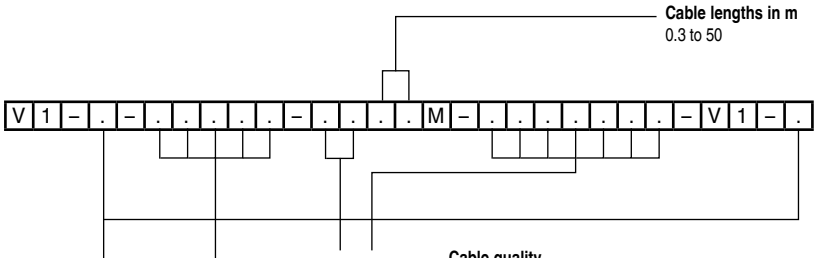
Dimensions



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Order codes



Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)
–	PUR H/S	PUR, halogen-free, irradiated, orange (0.34 mm²)
OR	POC	POC, welding bead resistant, orange (0.34 mm²)

Availability

E2	E2/E3	A2	E0	E8	E8W
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇
◇	◇	◇	◆	◇	◇
◆	◆	◆	◇	◇	◇
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇
◇	◇	◇	◇	◇	◇

◆ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Number of pins

E2	3-pin
E2/E3	4-pin (2+4 bridged)
A2	4-pin
E0	3-pin (NPN)
E8	4-pin
E8W	4-pin

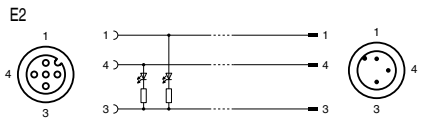
Design

G	straight
W	angled

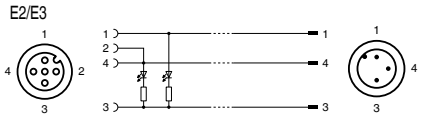
Electrical connection

PNP

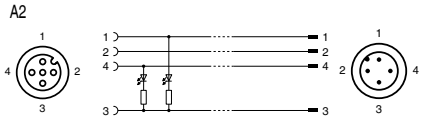
E2



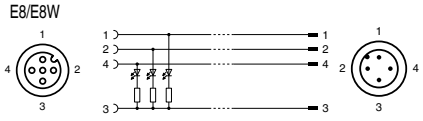
E2/E3



A2

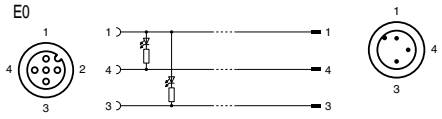


E8/E8W



NPN

E0





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Pin diameter	1 mm
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

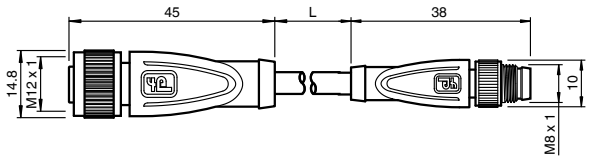
- **M12-M8 Adapter Cordset**
- **M12 x 1 Female straight and angled versions M8 x 1 Male straight**
- **A-coded**

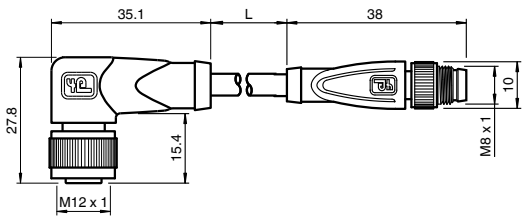
Your Benefit

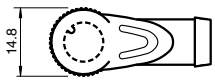
- **Knurled nut suitable for tool mounting**
- **Mechanical detent for vibration predection**
- **Gold-plated contacts**

Order codes		V11-...-...-V3-GM	V1-...-...-V31-GM
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

Dimensions

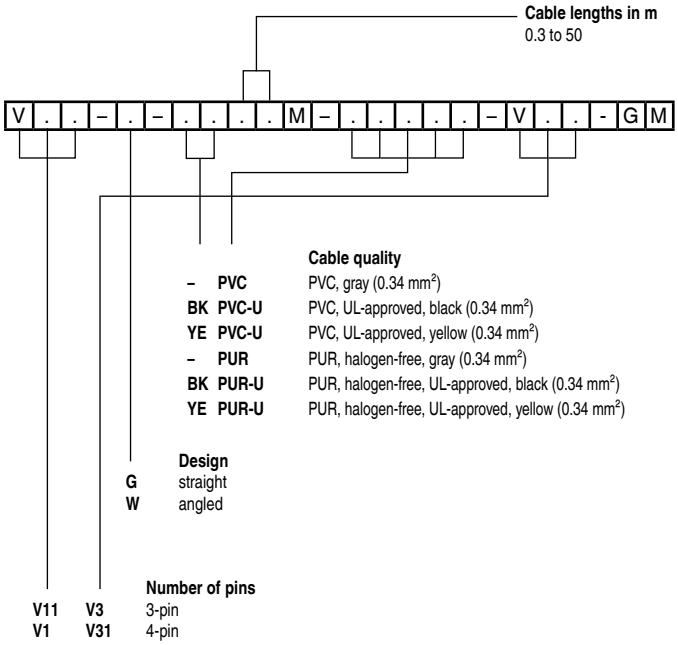




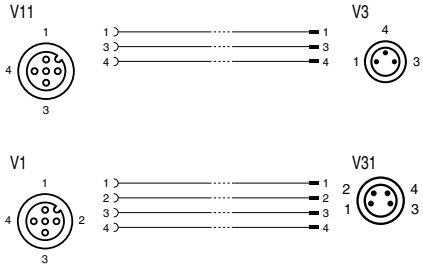


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Order codes



Electrical connection





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Pin diameter	1 mm
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

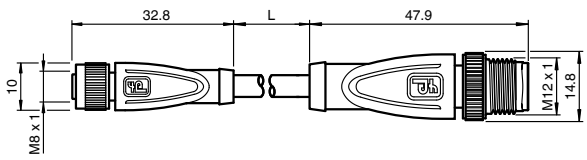
- **M8-M12 Adapter Cordset**
- **M8 x 1 Female straight and angled versions**
  M12 x 1 Male straight
- **A-coded**

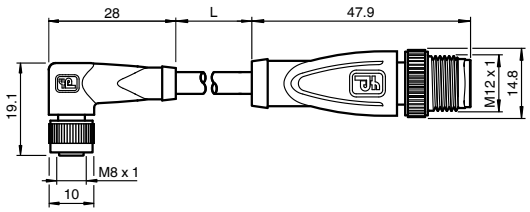
Your Benefit

- **Knurled nut suitable for tool mounting**
- **Mechanical detent for vibration predection**
- **Gold-plated contacts**

Order codes		V3-...-...-V11-G	V31-...-...-V1-G
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

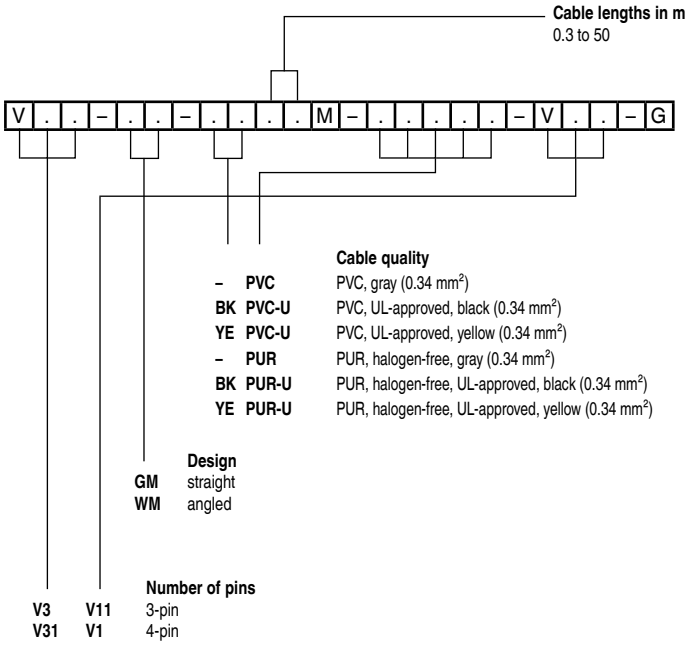
Dimensions





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Order codes



Cable quality

–	PVC	PVC, gray (0.34 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
–	PUR	PUR, halogen-free, gray (0.34 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)

Availability

V3-V11	V31-V1
◇	◇
◇	◇
◇	◇
♦	♦
◇	◇
◇	◇

♦ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

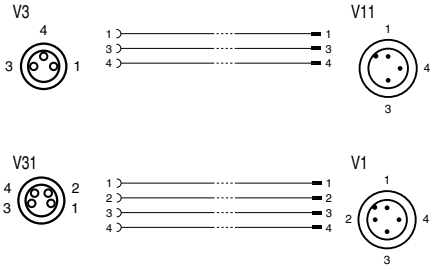
Design

GM	straight
WM	angled

Number of pins

V3	V11	3-pin
V31	V1	4-pin

Electrical connection



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Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

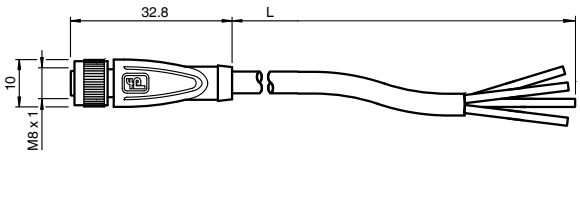
- M8 x 1 Single-ended Cordset
- Female straight and angled versions

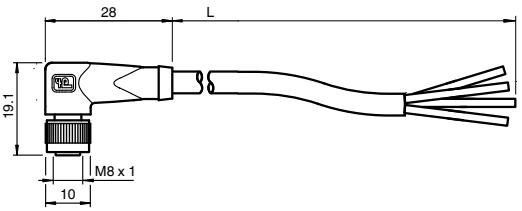
Your Benefit

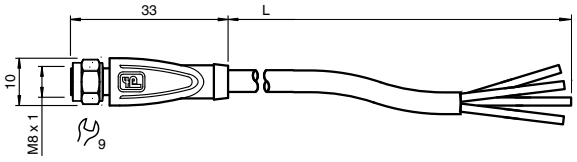
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

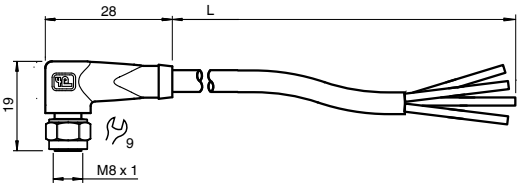
Order codes		V3-...	V31-...
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

Dimensions



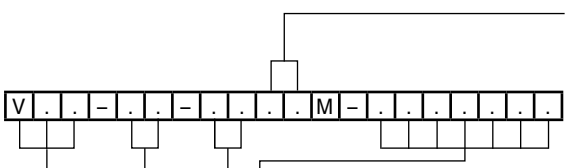






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Order codes



Cable lengths in m
0.3 to 50

Cable quality

-	PVC	PVC, gray (0.25 mm²)
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)
-	PUR	PUR, halogen-free, gray (0.25 mm²)
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)

Shielded cable quality

–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)

Availability

Cable quality	V3	V31
PVC, gray (0.25 mm²)	◇	◇
PVC, UL-approved, black (0.34 mm²)	◇	◇
PVC, UL-approved, yellow (0.34 mm²)	◇	◇
PUR, halogen-free, gray (0.25 mm²)	◆	◆
PUR, halogen-free, UL-approved, black (0.34 mm²)	◇	◇
PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇	◇
Shielded cable quality		
PUR, halogen-free, shielded, gray (0.34 mm²)	◇	◇

Design

GM	straight
WM	angled

For stainless steel coupling nut add V4A, e.g. **WMV4A, GMV4A**

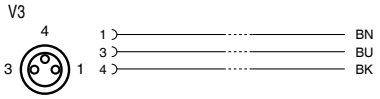
Number of pins

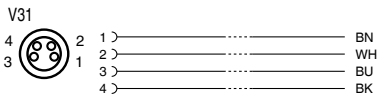
V3	3-pin
V31	4-pin

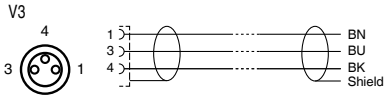
◆ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

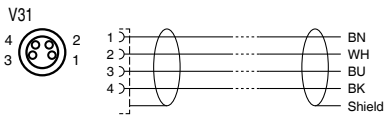
Electrical connection

Shielded











Properties

- M8 x 1 Single-ended Cordset
- Male straight and angled versions

Your Benefit

- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

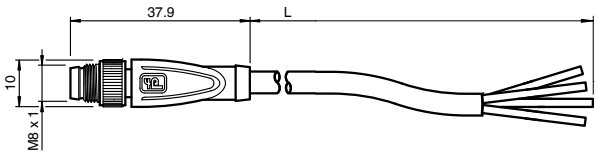
Technical data

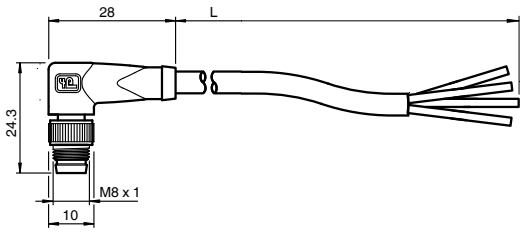
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Pin diameter	1 mm
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Order codes		V3S-...	V31S-...
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

Dimensions





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Order codes

Cable lengths in m
0.3 to 50

V . . S – . . – . . . . M – . . . . . .

Number of pins
V3S 3-pin
V31S 4-pin

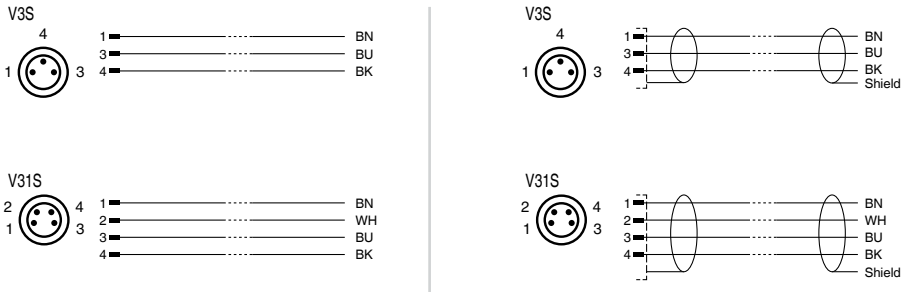
Design
GM straight
WM angled
For stainless steel coupling nut add V4A, e.g. **WMV4A, GMV4A**

		Cable quality	Availability V3S	V31S
-	PVC	PVC, gray (0.25 mm²)	◇	◇
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)	◇	◇
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)	◇	◇
-	PUR	PUR, halogen-free, gray (0.25 mm²)	♦	♦
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)	◇	◇
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇	◇
		Shielded cable quality		
–	PUR-ABG	PUR, halogen-free, shielded, gray (0.34 mm²)	◇	◇

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

Shielded





Properties

- M8 x 1 Single-ended Cordset
- Female straight and angled versions
- LED

Your Benefit

- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

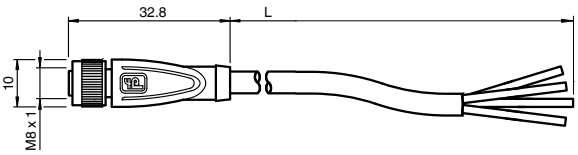
Technical data

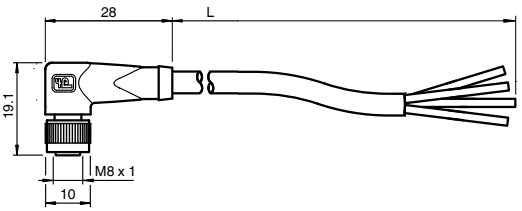
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Display/controls	
LED green	Operating display
LED yellow	NO contact function display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent
Coupling nut	Die-cast zinc

Order codes		V3-E2-...	V31-A2-...
Number of pins	3 (E2)	●	
	4 (A2)		●

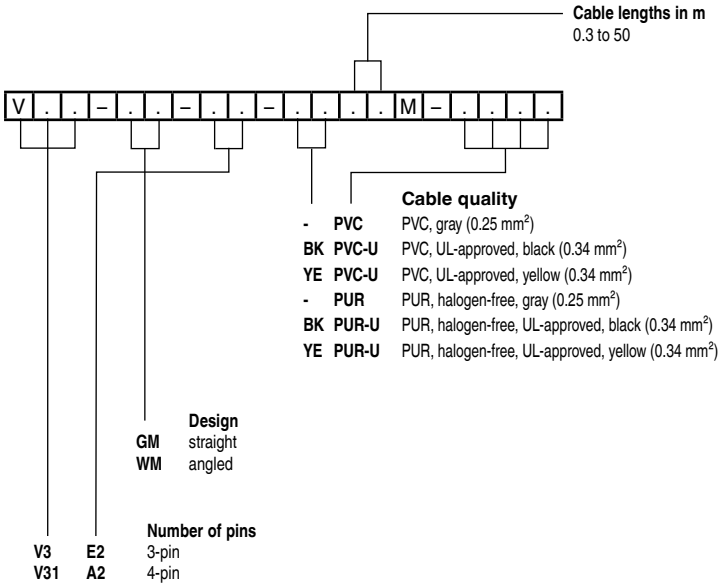
Dimensions





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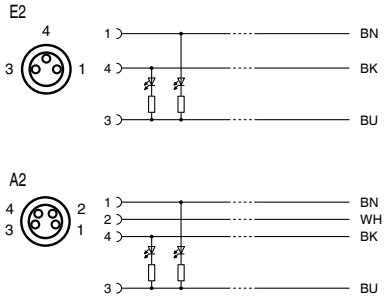
Order codes



Availability	V3	V31
PVC, gray (0.25 mm²)	◇	◇
PVC, UL-approved, black (0.34 mm²)	◇	◇
PVC, UL-approved, yellow (0.34 mm²)	◇	◇
PUR, halogen-free, gray (0.25 mm²)	♦	♦
PUR, halogen-free, UL-approved, black (0.34 mm²)	◇	◇
PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇	◇

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection



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Properties

- M8 x 1 Single-ended Cordset
- Male straight and angled versions
- LED

Your Benefit

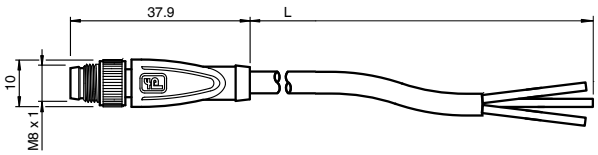
- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

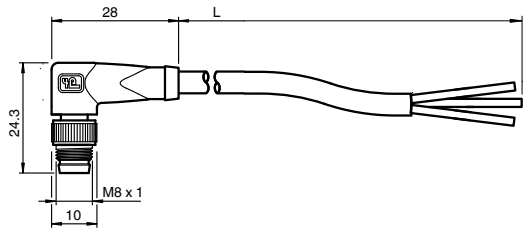
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	3 (E2)
Display/controls	
LED green	Operating display
LED yellow	NO contact function display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Pin diameter	1 mm
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent
Coupling nut	Die-cast zinc

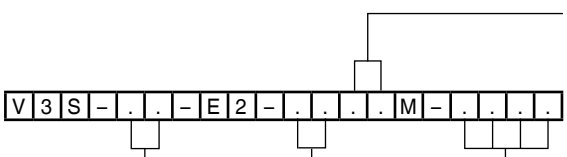
Dimensions





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Order codes



Cable lengths in m
0.3 to 50

Cable quality

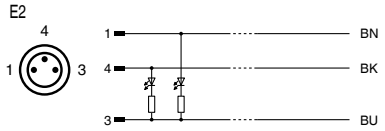
			Availability V3S
-	PVC	PVC, gray (0.25 mm²)	◇
BK	PVC-U	PVC, UL-approved, black (0.34 mm²)	◇
YE	PVC-U	PVC, UL-approved, yellow (0.34 mm²)	◇
-	PUR	PUR, halogen-free, gray (0.25 mm²)	◇
BK	PUR-U	PUR, halogen-free, UL-approved, black (0.34 mm²)	◇
YE	PUR-U	PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇

Design

GM	straight
WM	angled

◆ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection





Properties

- M8 x 1 Single-ended Cordset
- Male straight and angled versions
- Snap-on

Your Benefit

- Snap locking

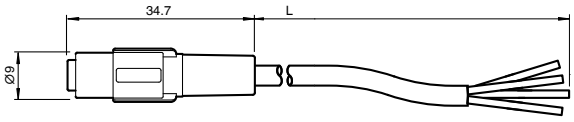
Technical data

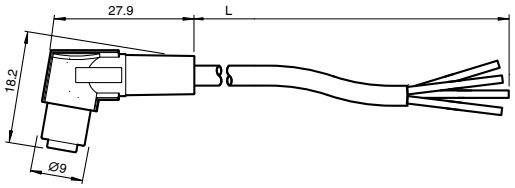
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-25 … 70 °C for body, Information on cable quality can be found on the data sheet.
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP65
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	PUR, black

Order codes		V3-...R-...	V31-...R-...
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

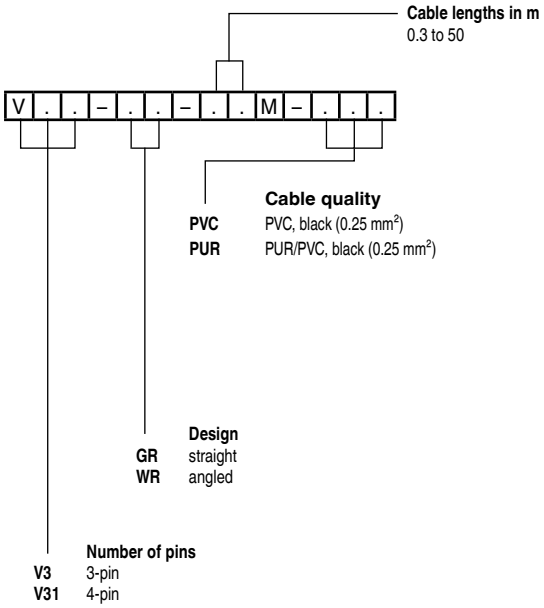
Dimensions





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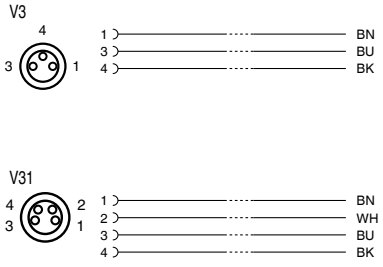
Order codes



Availability	
V3	V31
◇	◇
♦	♦

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, green
Coupling nut	Die-cast zinc

Properties

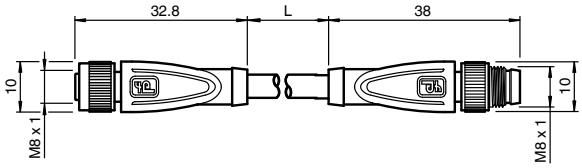
- M8 x 1 Double-ended Cordset
- Straight and angled versions

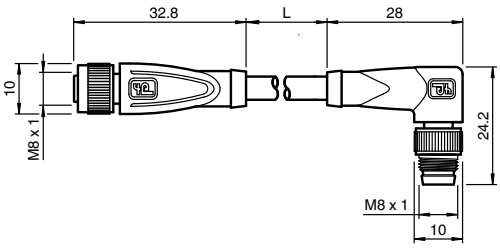
Your Benefit

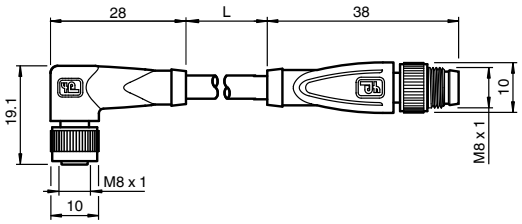
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

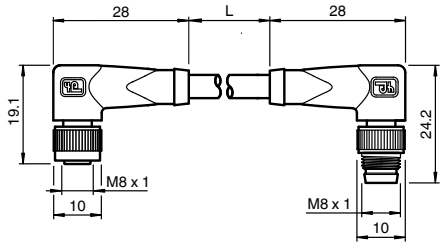
Order codes		V3-...-V3-...	V31-...-V31-...
Number of pins	3	●	
	4		●
Electrical data			
Max. operating voltage	30 V		●
	60 V	●	

Dimensions



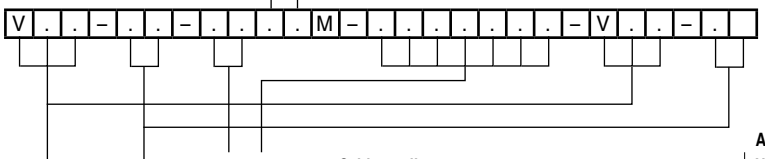






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Order codes



Cable lengths in m
0.3 to 50

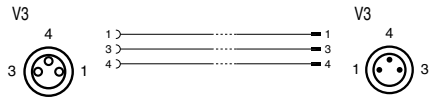
		Cable quality	Availability V3	Availability V31
–	**PVC**	PVC, gray (0.25 mm²)	◇	◇
BK	**PVC-U**	PVC, UL-approved, black (0.34 mm²)	◇	◇
YE	**PVC-U**	PVC, UL-approved, yellow (0.34 mm²)	◇	◇
–	**PUR**	PUR, halogen-free, gray (0.25 mm²)	♦	♦
BK	**PUR-U**	PUR, halogen-free, UL-approved, black (0.34 mm²)	◇	◇
YE	**PUR-U**	PUR, halogen-free, UL-approved, yellow (0.34 mm²)	◇	◇
		Shielded cable quality		
–	**PUR-ABG**	PUR, halogen-free, shielded, gray (0.34 mm²)	◇	◇

♦ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

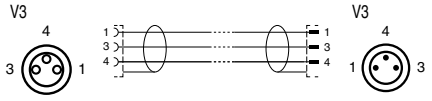
Design
GM straight
WM angled
For stainless steel coupling nut add V4A, e.g. **WMV4A, GMV4A**

Number of pins
V3 3-pin
V31 4-pin

Electrical connection



Shielded





Properties

- M8 x 1 Double-ended Cordset
- Straight and angled versions
- LED

Your Benefit

- Built-in LED, as operating and function indicator
- Knurled nut suitable for tool mounting
- Mechanical detent for vibration predection
- Gold-plated contacts

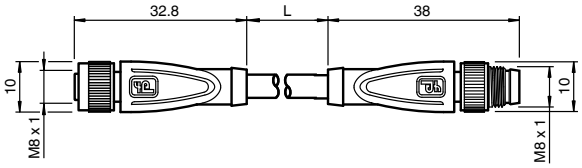
Technical data

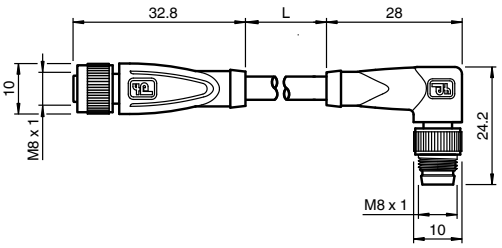
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

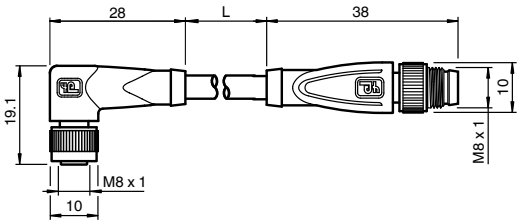
Gemeimsame Daten	
Display/controls	
LED green	Operating display
LED yellow	NO contact function display
Electrical data	
Max. operating voltage	24 V DC ± 15%
Max. operating current	3 A
Ambient conditions	
Ambient temperature	-40 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, transparent/green
Coupling nut	Die-cast zinc

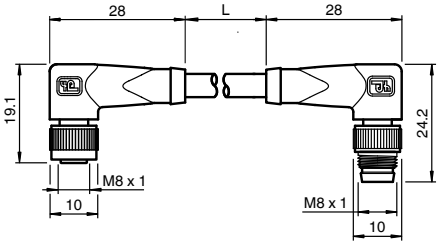
Order codes		V3-E2-...-V3-...	V31-A2-...-V31-...
Number of pins	3 (E2)	●	
	4 (A2)		●

Dimensions



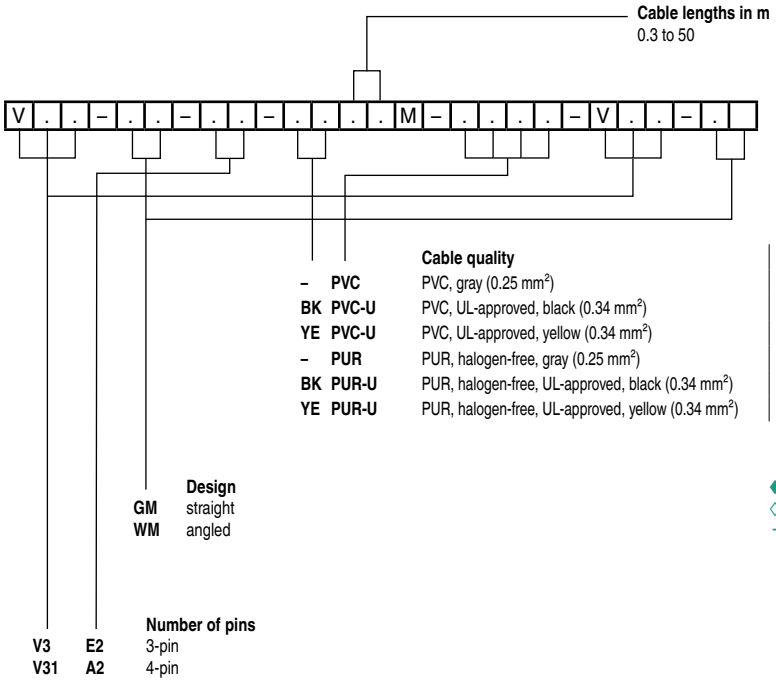






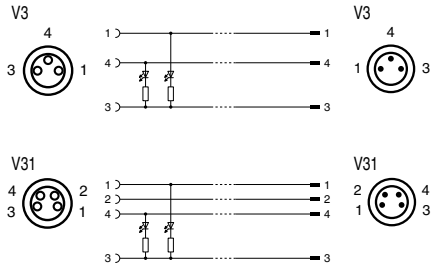
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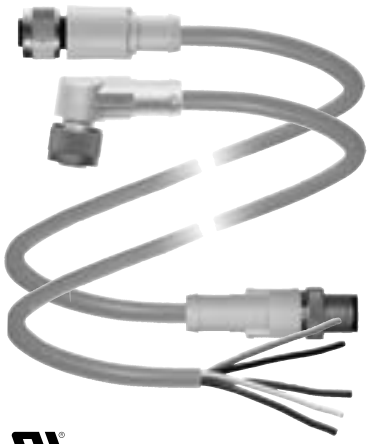
Order codes



♦ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 90 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67/IP69K
Material	
Contacts	CuSn / Au
Contact surface	Au
Body	TPU, yellow
Coupling nut	Brass, nickel-plated

Properties

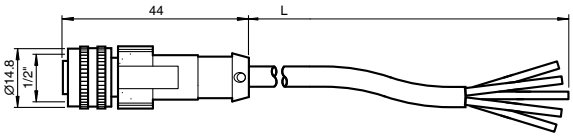
- 1/2" Single-ended and Double-ended Cordset versions
- Straight and angled versions

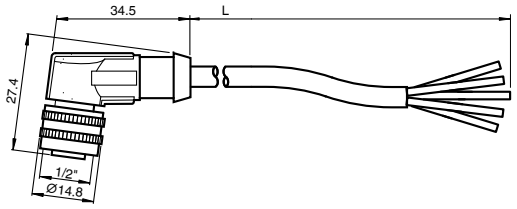
Your Benefit

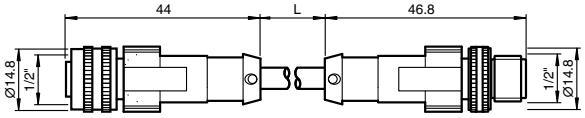
- Knurled nut suitable for tool mounting
- Micro AC dual key
- Yellow body and cable jacket
- Gold-plated contacts

Order codes		V12-...	V124-...	V125-...
Number of pins	3	●		
	4		●	
	5			●
Electrical data				
Max. operating voltage	60 V AC/DC			●
	250 V AC/DC	●	●	

Dimensions







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Order codes

Female cordset

Cable lengths in m
0.3 to 50

V . . . – . – Y E . . M – . . . . . .

Cable quality

PVC	PVC, yellow (AWG22)
PUR H/S	PUR, halogen-free, irradiated, yellow (AWG18)

Design

G	straight
W	angled

Number of pins

V12	3-pin
V124	4-pin
V125	5-pin

Availability

V12	V124	V125
♦	♦	♦
◇	◇	◇

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Connecting cable

Cable lengths in m
0.3 to 50

V . . . – G – Y E . . M – . . . . . . – V . . . – G

Cable quality

PVC	PVC, yellow (AWG22)
PUR H/S	PUR, halogen-free, irradiated, yellow (AWG18)

Number of pins

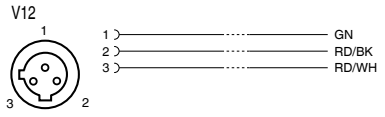
V12	3-pin
V124	4-pin
V125	5-pin

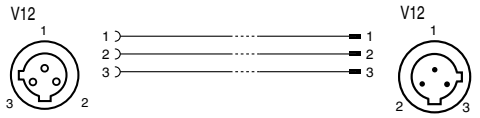
Availability

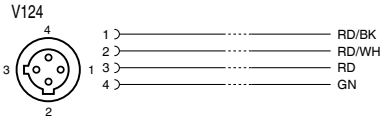
V12	V124	V125
◇	◇	◇
◇	◇	◇

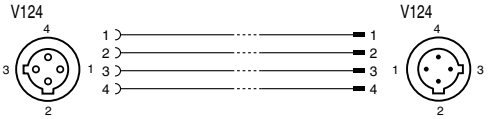
♦ Standard, cable lengths of 0.6 m, 1 m and 2 m available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

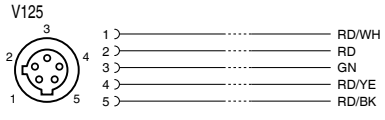
Electrical connection

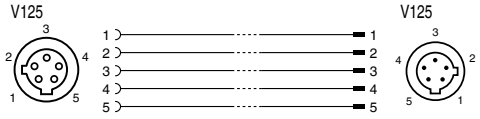


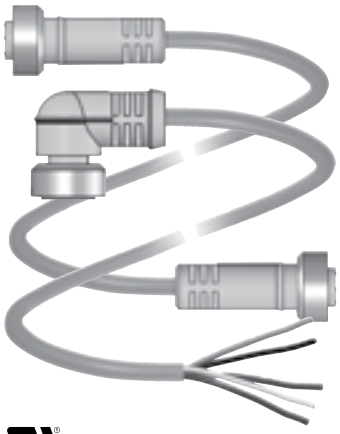












Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	600 V AC/DC
Ambient conditions	
Ambient temperature	-40 … 105 °C for body, Information on cable quality can be found beginning on page 974
Mechanical data	
Contact elements	Spring-loaded contact sockets
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PVC, yellow
Coupling nut	Aluminum, anodized

Properties

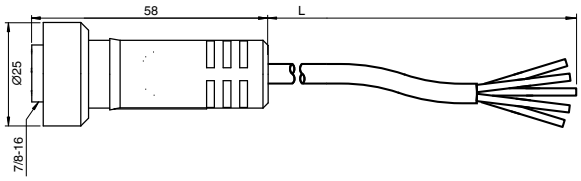
- 7/8" Single-ended and Double-ended Cordset versions
- Straight and angled versions

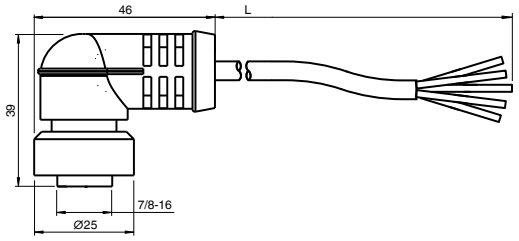
Your Benefit

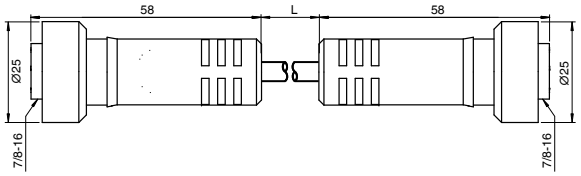
- Mini connector
- Immunity to vibration
- Gold-plated contacts
- Heavy-gauge wire

Order codes		V93-...	V94-...	V95-...
Number of pins	3	●		
	4		●	
	5			●
Electrical data				
Max. operating current	8 A			●
	10 A		●	
	13 A	●		

Dimensions



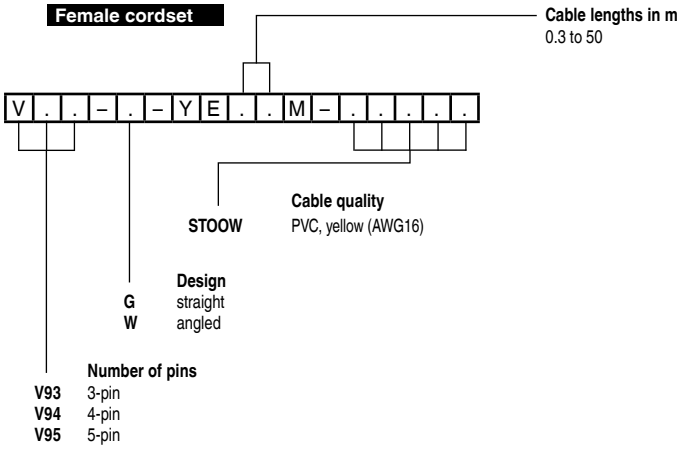




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Order codes

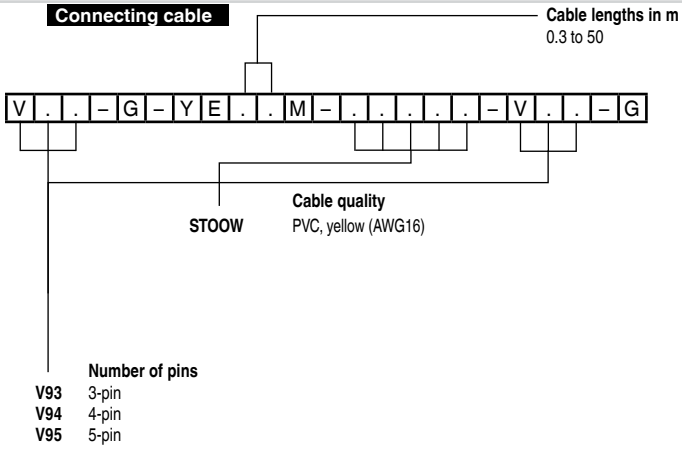
Female cordset



Availability		
V93	V94	V95
♦	♦	♦

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

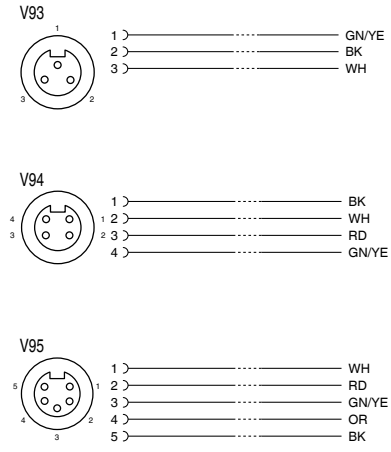
Connecting cable

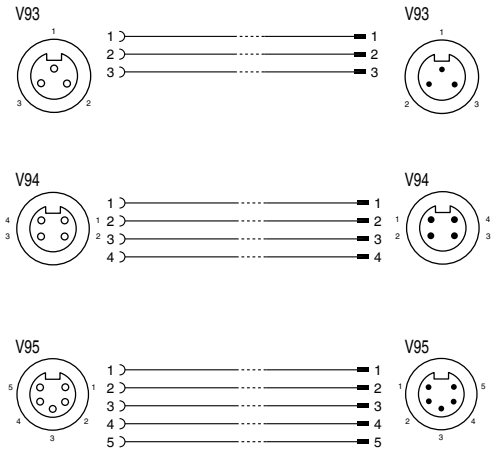


Availability		
V93	V94	V95
♦	♦	♦

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Electrical connection







Properties

- **Valve connector cordsets acc. EN 175301-803 A/ISO 4400**
- **Form A, B and C versions, DIN and Industrial versions**
- **Unwired, Z diode, Varistor and Pressure switch versions**
- **PUR and PVC cable versions**

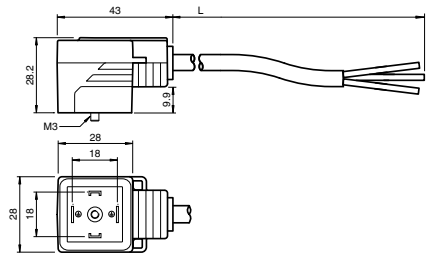
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

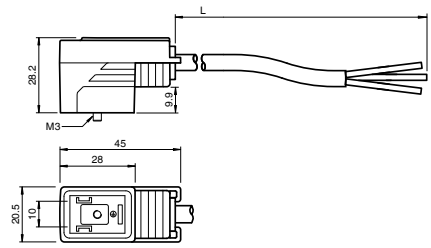
Application	**Valve**			**Pressure switch**	
Circuitry	**unwired**	**Z diode**	**Varistor**	**unwired**	**LED**
Number of pins	**2+P**	**2+P/Z2**	**2+P/V2**	**3+P**	**3+P/L1**
Display/controls					
LED	-	Function display		-	Function display
Electrical data					
Max. operating voltage	230 V AC/DC	24 V AC/DC		230 V AC/DC	24 V AC/DC
Max. operating current open end cable	6 A	4 A		6 A	4 A
Max. operating current M12 body	4 A				
Volume resistance	≤ 5 mΩ				
Ambient conditions					
Ambient temperature	-20 … 85 °C for valve plug, Information on cable quality can be found beginning on page 1020				
Mechanical data					
Degree of protection	IP65/IP67				
Material					
Contacts	CuSn				
Contact surface	Sn				
Body	TPU, black-transparent				

Dimensions

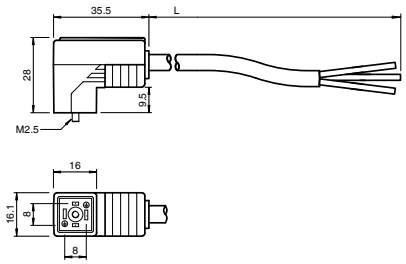
Form A



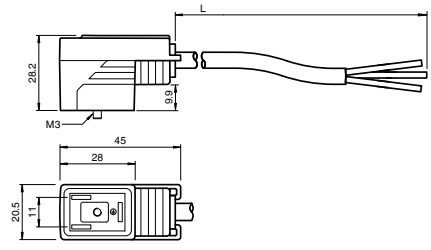
Form B



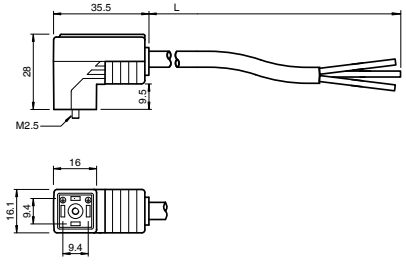
Form C



Form B (Industrial)



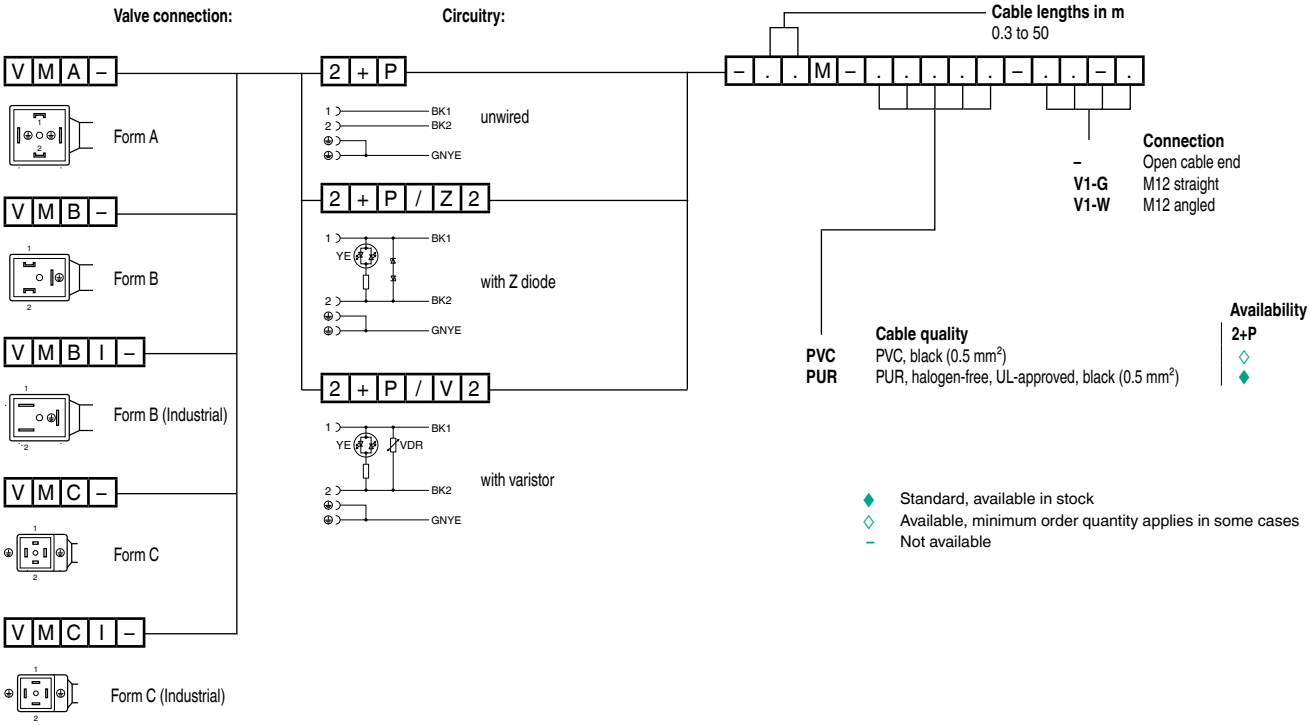
Form C (Industrial)



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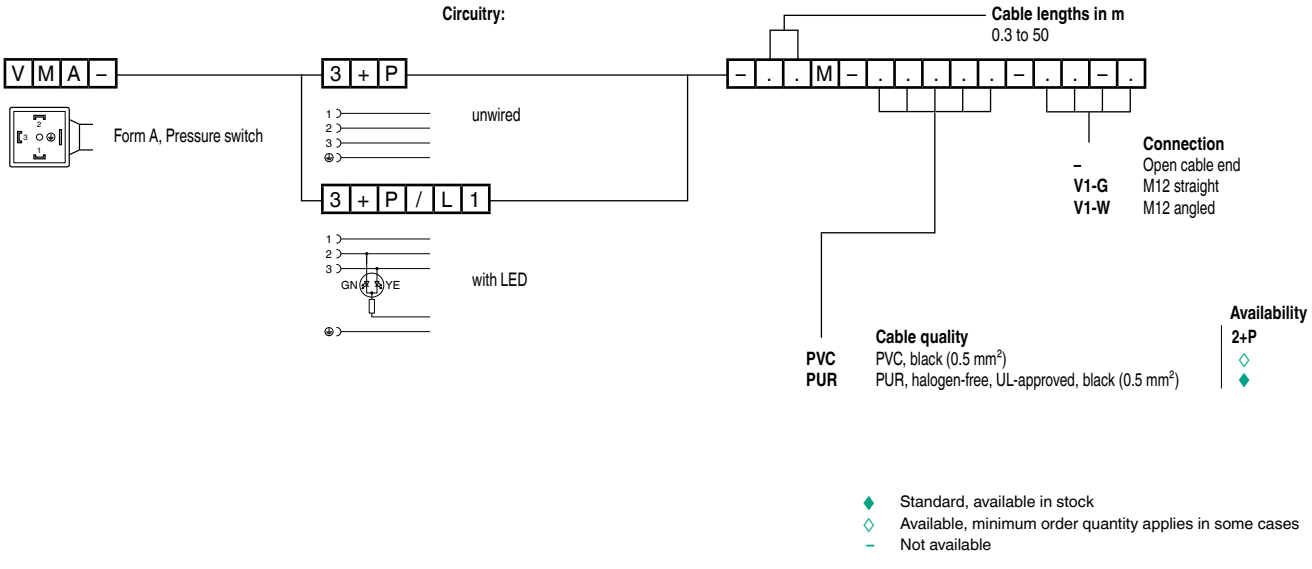
Order codes

Valve connector



♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Pressure switch connector



♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Not available



Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PA
Coupling nut	CuZn, nickel-plated

Properties

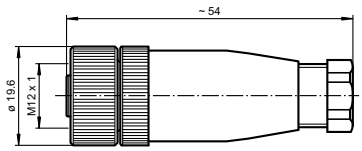
- **M12 x 1 Field Connector**
- **Female and male, straight and angled versions**
- **A-coded**

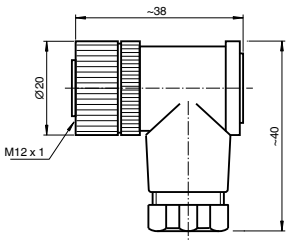
Your Benefit

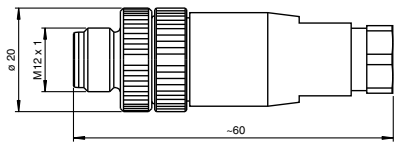
- **Screw terminal connection**
- **Gold-plated contacts**

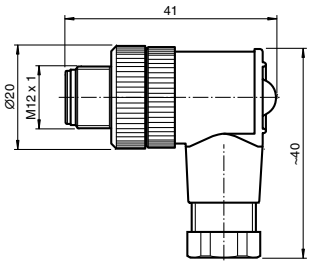
Order codes		V1-...	V15-...	V17-...	V1S-...	V15S-...	V17S-...
Number of pins	4	●			●		
	5		●			●	
	8			●			●
Electrical data							
Max. operating voltage	30 V AC/DC			●			●
	60 V AC/DC		●			●	
	250 V AC/DC	●			●		
Max. operating current	2 A			●			●
	4 A	●	●		●	●	
Mechanical data							
Connection	Screw terminals for max. 0.5 mm²			●			●
	Screw terminals for max. 0.75 mm²	●	●		●	●	
	1 x M12 socket	●	●	●			
	1 x M12 plug				●	●	●

Dimensions









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Order codes

V . . . – . – . . .

Number of pins

V1	4-pin socket
V15	5-pin socket
V17	8-pin socket
V1S	4-pin plug
V15S	5-pin plug
V17S	8-pin plug

Design

G	straight
W	angled

Cable diameter

–	4 ... 6 mm
PG9	6 ... 8 mm

Availability

V1	V15	V17	V1S	V15S	V17S
♦	♦	–	♦	♦	–
◇	◇	♦	◇	◇	♦

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

V1



V15



V17



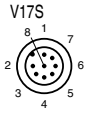
V1S



V15S



V17S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	Die-cast zinc, nickel-plated
Coupling nut	CuZn, nickel-plated
Cable	
Cable diameter	5 … 8 mm

Properties

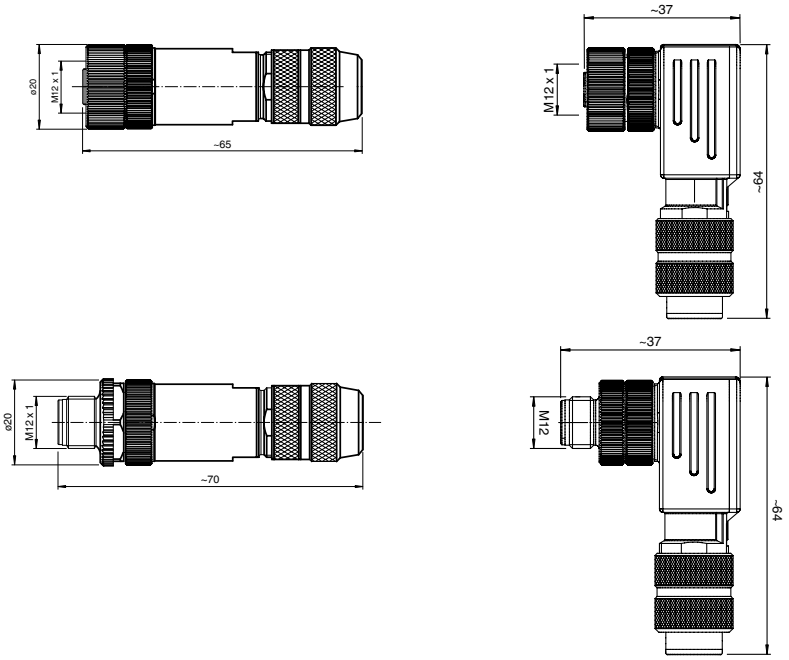
- **M12 x 1 Field Connector**
- **Shielded**
- **Female and male, straight and angled versions**
- **A-coded**

Your Benefit

- **Screw terminal connection**
- **Iris spring provides easy shield bonding**
- **Gold-plated contacts**

Order codes		V1-...	V15-...	V19-...	V1S-...	V15S-...	V19S-...
Number of pins	4	●			●		
	5		●			●	
	8			●			●
Electrical data							
Max. operating voltage	30 V AC/DC			●			●
	60 V AC/DC		●			●	
	250 V AC/DC	●			●		
Max. operating current	2 A			●			●
	4 A	●	●		●	●	
Mechanical data							
Connection	Screw terminals for max. 0.5 mm²			●			●
	Screw terminals for max. 0.75 mm²	●	●		●	●	
	1 x M12 socket	●	●	●			
	1 x M12 plug				●	●	●

Dimensions



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Order codes

V	.	.	.	–	.	–	A	B	G	–	P	G	9

Design

G	straight
W	angled

Availability

V1	V15	V19	V1S	V15S	V19S
♦	♦	♦	♦	♦	♦
♦	♦	♦	♦	♦	♦

♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Number of pins

V1	4-pin socket
V15	5-pin socket
V19	8-pin socket
V1S	4-pin plug
V15S	5-pin plug
V19S	8-pin plug

Electrical connection

V1



V15



V19



V1S



V15S



V19S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	4
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Degree of protection	IP65 / IP67
Material	
Contacts	CuSn
Contact surface	Ni/Au
Body	PA66, black
Coupling nut	Die-cast zinc

Properties

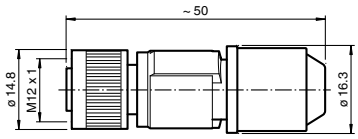
- M12 x 1 Field Connector
- QuickOn
- Female and male, straight and angled versions
- A-coded

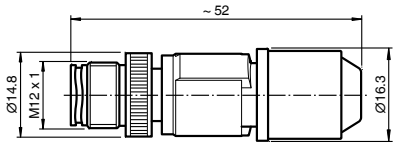
Your Benefit

- Time-saving insulation displacement connection technology
- No screwdriver required
- Gold-plated contacts

Order codes		V1-G-Q2	V1S-G-Q2	V1-G-Q3	V1S-G-Q3
Electrical data					
Max. operating voltage	125 V AC/DC			●	●
	250 V AC/DC	●	●		
Mechanical data					
Connection	Insulation displacement for 0.14 … 0.34 mm²			●	●
	Insulation displacement for 0.34 … 0.75 mm²	●	●		
	1 x M12 socket	●		●	
	1 x M12 plug		●		●
Cable					
Cable diameter	3.5 … 6 mm			●	●
	4 … 8 mm	●	●		

Dimensions





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Order codes

V . . – G – . .

Number of pins
V1 4-pin socket
V1S 4-pin plug

Core cross-section
Q2 0.34 ... 0.75 mm²
Q3 0.14 ... 0.34 mm²

Availability	
V1	V1S
♦	♦
♦	♦

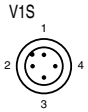
♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection

V1



V1S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Connection	Straight design: screw terminals < 0.5 mm²
	Angled design: solder connection 0.25 mm²
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PA
Coupling nut	CuZn, nickel-plated
Cable	
Cable diameter	3.5 … 5 mm

Properties

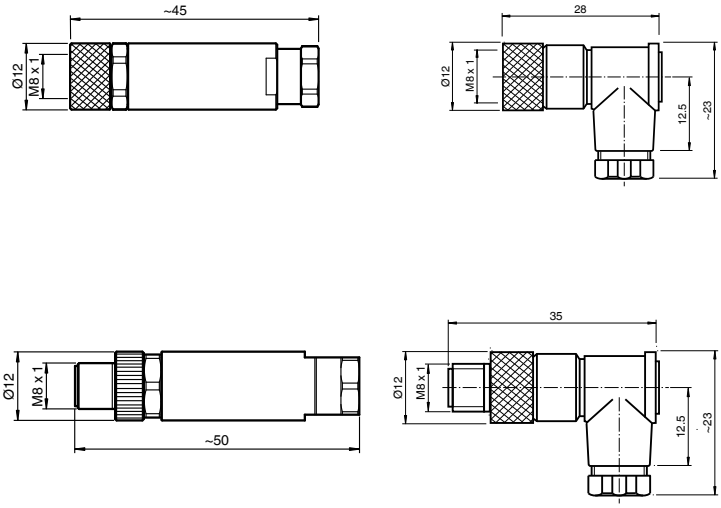
- **M8 x 1 Field Connector**
- **Female and male, straight and angled versions**
- **Screw terminal and solder connection versions**

Your Benefit

- **Gold-plated contacts**

Order codes		V3-...	V31-...	V3S-...	V31S-...
Number of pins	3	●		●	
	4		●		●
Electrical data					
Max. operating voltage	30 V AC/DC		●		●
	60 V AC/DC	●		●	
Mechanical data					
Connection	1 x M8 plug			●	●
	1 x M8 socket	●	●		

Dimensions



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Order codes

V . . . – . M

Design
G straight
W angled

Connectiontype
Screw terminals
Solder connection

Availability

V3	V31	V3S	V31S
♦	♦	♦	♦
♦	♦	♦	♦

♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Combination not available

Number of pins
V3 3-pin socket
V31 4-pin socket
V3S 3-pin plug
V31S 4-pin plug

Electrical connection

V3



V31



V3S



V31S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Connection	Straight design: screw terminals < 0.5 mm²
	Angled design: solder connection 0.25 mm²
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PA
Coupling nut	CuZn, nickel-plated
Cable	
Cable diameter	3.5 … 5 mm

Properties

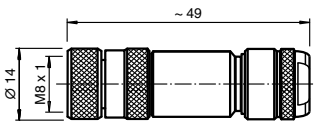
- M8 x 1 Field Connector
- Shielded
- Female and male, straight and angled versions
- Screw terminal and solder connection versions

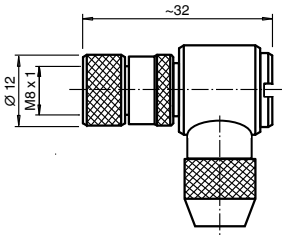
Your Benefit

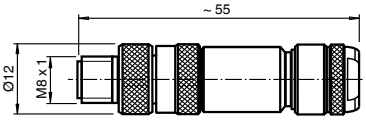
- Gold-plated contacts

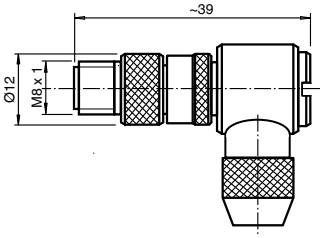
Order codes		V3-...	V31-...	V3S-...	V31S-...
Number of pins	3	●		●	
	4		●		●
Electrical data					
Max. operating voltage	30 V AC/DC		●		●
	60 V AC/DC	●		●	
Mechanical data					
Connection	1 x M8 plug			●	●
	1 x M8 socket	●	●		

Dimensions









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Order codes

V . . . – . M – A B G

Number of pins
V3 3-pin socket
V31 4-pin socket
V3S 3-pin plug
V31S 4-pin plug

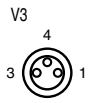
Design
G straight
W angled

Connectiontype
Screw terminals
Solder connection

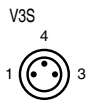
Availability			
V3	V31	V3S	V31S
◇	◇	◇	◇
◇	◇	◇	◇

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection











Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Contact elements	Insulation piercing technology 0.14 … 0.34 mm²
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PA
Coupling nut	ZnAl / Ni
Cable	
Cable diameter	4 … 5 mm

Properties

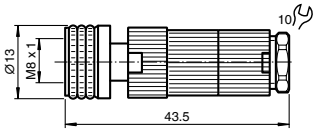
- M8 x 1 Field Connector
- Female and male, straight and angled versions
- MiniQuick technology

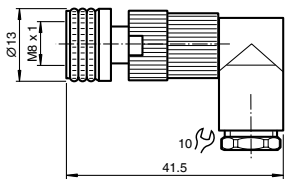
Your Benefit

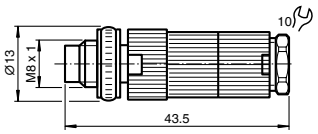
- Time-saving axial wire contact technology
- Gold-plated contacts

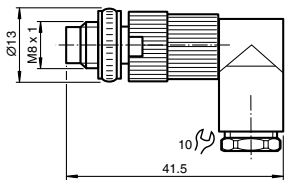
Order codes		V3-...	V31-...	V3S-...	V31S-...
Number of pins	3	●		●	
	4		●		●
Electrical data					
Max. operating voltage	30 V AC/DC		●		●
	60 V AC/DC	●		●	
Mechanical data					
Connection	1 x M8 plug			●	●
	1 x M8 socket	●	●		

Dimensions









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Order codes

V . . . – . . – M Q

Number of pins
V3 3-pin socket
V31 4-pin socket
V3S 3-pin plug
V31S 4-pin plug

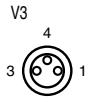
Design
GM straight
WM angled

Availability

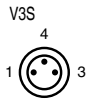
V3	V31	V3S	V31S
♦	♦	♦	♦
♦	♦	♦	♦

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection











Properties

- 1/2" Field Connector
- Female and male, straight and angled versions

Your Benefit

- Gold-plated contacts

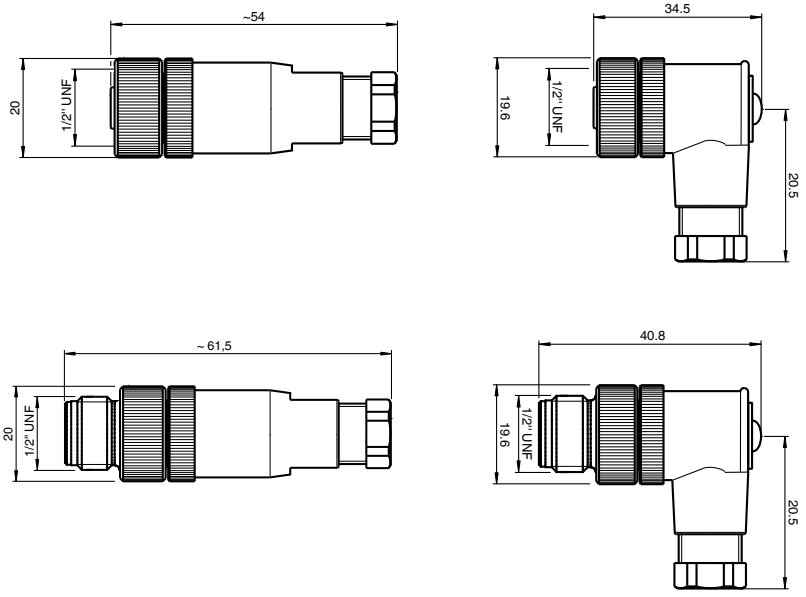
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	3
Electrical data	
Max. operating voltage	250 V AC/DC
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 85 °C
Mechanical data	
Connection	Screw terminals for max. 0.75 mm²
	PG7 cable gland
Degree of protection	IP67
Material	
Contacts	CuSn
Contact surface	Au
Body	PA
Coupling nut	CuSn, nickel-plated
Cable	
Cable diameter	4 … 6 mm

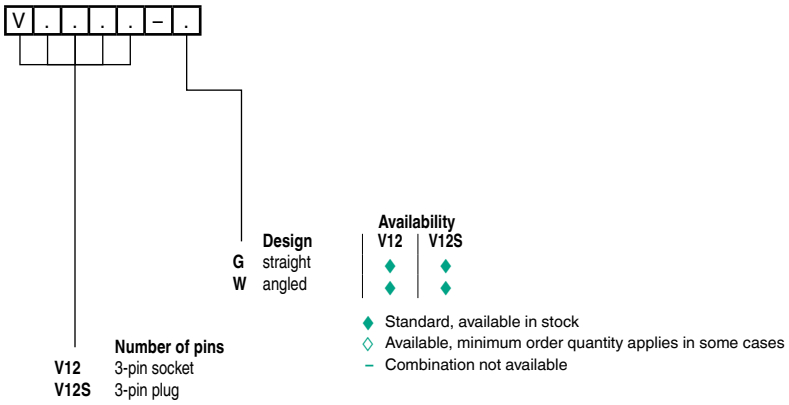
Order codes		V12-...	V12S-...
Mechanical data			
Connection	1 x M12 socket	●	
	1 x M12 plug		●

Dimensions

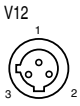


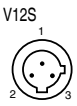
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Order codes



Electrical connection







Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	600 V AC/DC
Ambient conditions	
Ambient temperature	-40 … 90 °C
Mechanical data	
Connection	1 x 7/8" socket, screw terminals < 2.0 mm²
	1 x 7/8" plug, internal or external thread, screw terminals < 2.0 mm², PG9 cable gland
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Body	PA
Coupling nut	Al, anodized
Cable	
Cable diameter	5 … 13 mm

Properties

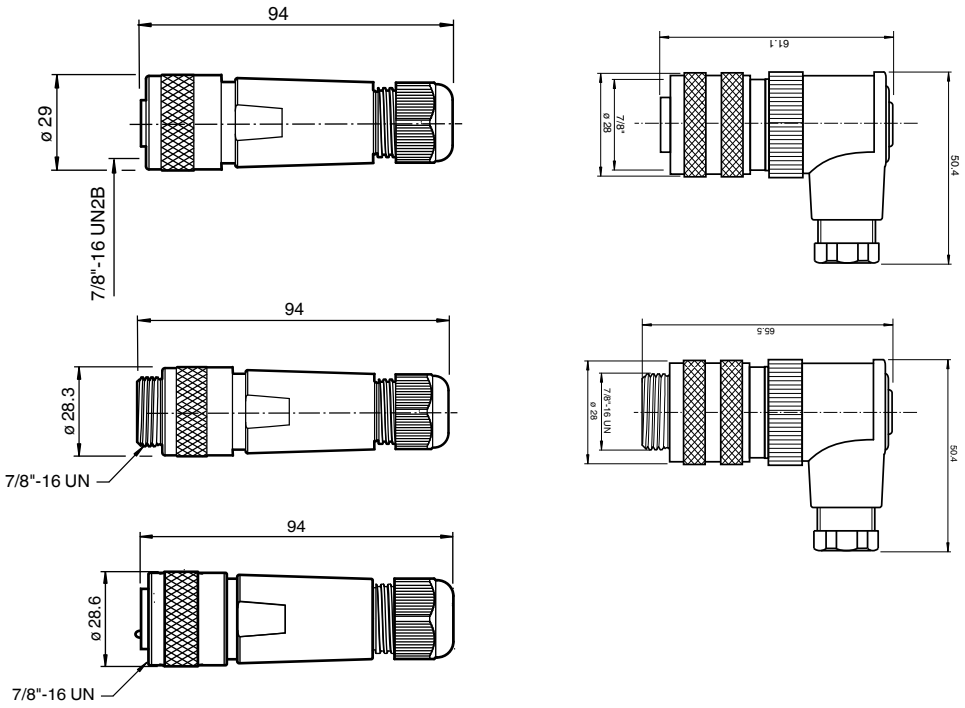
- 7/8" Field Connector
- Female and male, straight and angled versions

Your Benefit

- Gold-plated contacts
- Suitable for heavy-gauge wires

Order codes		V93-...	V94-...	V95-...
Number of pins	3	●		
	4		●	
	5			●
Electrical data				
Max. operating voltage	12 A			●
	15 A		●	
	18 A	●		

Dimensions



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Order codes

Socket

V . . – .

Design
- **G** straight
- **W** angled

Number of pins
- **V93** 3-pin
- **V94** 4-pin
- **V95** 5-pin

Availability

V93	V94	V95
♦	♦	♦
◇	◇	◇

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Plug

V . . – . – S .

Type of thread
- **I** internal
- **E** external

Design
- **G** straight
- **W** angled

Number of pins
- **V93** 3-pin
- **V94** 4-pin
- **V95** 5-pin

Availability

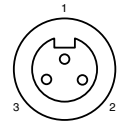
V93	V94	V95
♦	♦	♦
◇	◇	◇

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

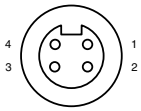
Electrical connection

Socket

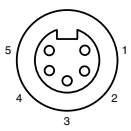
V93



V94

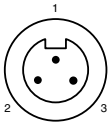


V95



Plug

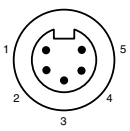
V93



V94



V95





Properties

- M18 x 1 Field Connector
- Female, straight and angled versions

Your Benefit

- Gold-plated contacts

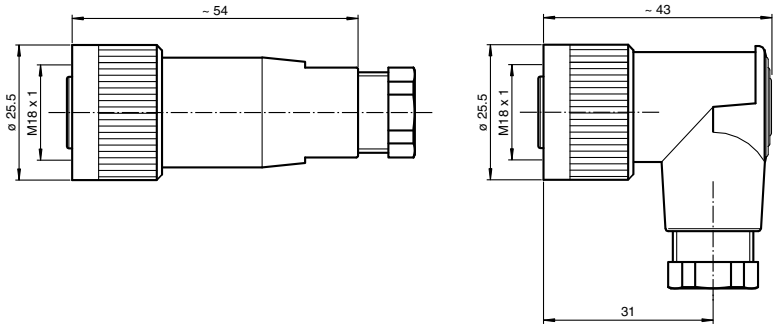
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	4
Electrical data	
Max. operating voltage	250 V AC/DC
Max. operating current	16 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Connection	1 x M18-socket Screw terminals for max. 1.5 mm² PG9 cable gland
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	CuSnZn
Body	PA
Coupling nut	PA
Cable	
Cable diameter	6 … 8 mm

Order codes		V18-G	V18-W
Design	straight	●	
	angled		●

Dimensions



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Order codes

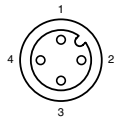
V 1 8 – .

	Design	Availability V18
G	straight	♦
W	angled	♦

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection

V18





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	6 + PE
Electrical data	
Max. operating voltage	250 V AC/DC
Max. operating current	10 A
Ambient conditions	
Ambient temperature	-40 … 100 °C
Mechanical data	
Connection	Screw terminals < 1.5 mm²
	PG9 cable gland
Degree of protection	IP65 / IP67
Material	
Contacts	CuZn
Contact surface	Ag
Body	PBT
Cable	
Cable diameter	6 … 8 mm

Properties

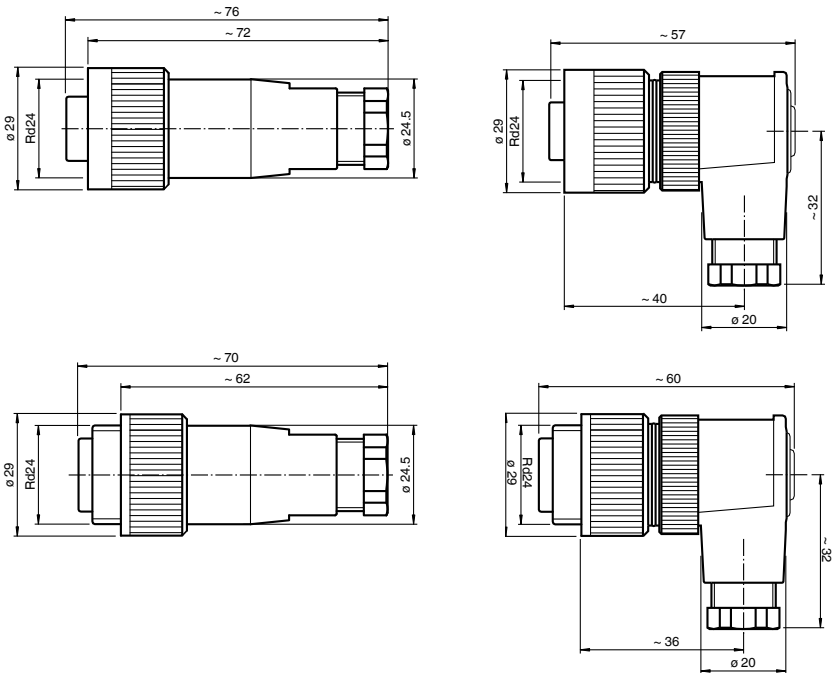
- **Rd24 Field Connector**
- **Female and male, straight and angled versions**

Your Benefit

- **Silver-plated contacts**

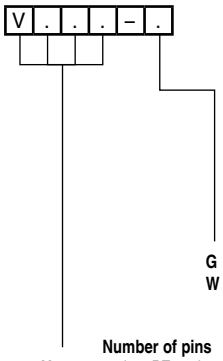
Order codes		V16-...	V16S-...
Mechanical data			
Connection	1 x Socket, Rd24 x 1/8"	●	
	1 x Plug, Rd24 x 1/8"		●

Dimensions



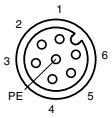
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Order codes

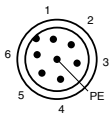


Electrical connection

V16



V16S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Application	Valve		Pressure switch
Circuitry	**unwired**	**Varistor**	**unwired**
Number of pins	**2+P**	**2+P/V2**	**3+P**
Display/controls			
LED	-	Function display	-
Electrical data			
Max. operating voltage	250 V AC/300 V DC	24 V AC/DC	250 V AC/300 V DC
Max. operating current			
Form A	16 A		
Form B	16 A		
Form C	10 A		
Ambient conditions			
Ambient temperature	-25 … 90 °C		
Storage temperature	-40 … 125 °C		
Mechanical data			
Degree of protection	IP67		
Material			
Contact surface	Ag		
Seal	NBR		
Body	PA6, black	PA6, transparent	PA6, black
Cable diameter			
Form A+B	4 … 9 mm		
Form C	3 … 5.5 mm		

Properties

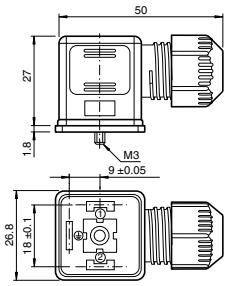
- **Valve Field Connector acc. EN 175301-803**
- **Form A, B and C versions, DIN and Industrial versions**
- **Unwired, and Varistor versions**

Your Benefit

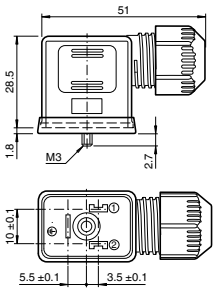
- **Selectable PE position (Form A and Form BI)**
- **Integrated seal**

Dimensions

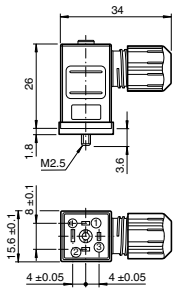
Form A



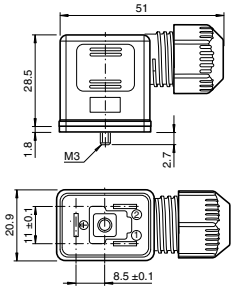
Form B



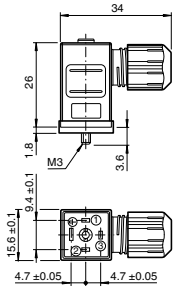
Form C



Form B (Industrial)



Form C (Industrial)



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Order codes

V M . . – . + P . . .

Circuitry

-	none
/V2	Varistor

Availability

	VMA	VMB	VMBI	VMC	VMCI
-	♦	♦	♦	♦	♦
/V2	–	–	–	♦	–

♦ Standard, cable lengths of 2 m, 5 m and 10 m available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Number of poles

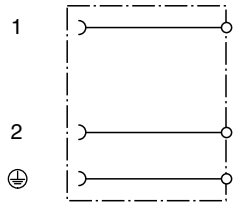
2	2 + PE
3	3 + PE (Form A and Form C only)

Valve connection

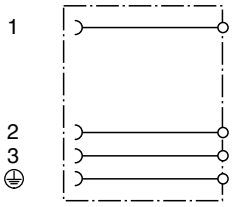
VMA	Form A
VMB	Form B
VMBI	Form B (Industrial)
VMC	Form C
VMCI	Form C (Industrial)

Electrical connection

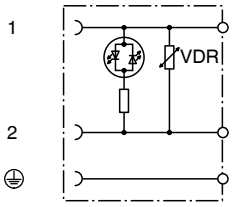
2+P



3+P



2+P/V2





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-25 … 80 °C
Mechanical data	
Connection	Single strand leads
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Housing	Brass, nickel-plated
Cable	
Insolation type	TPE stranded wire
Length L	500 mm

Properties

- **M12 x 1 Receptacles, A-coded**
- **Female and male versions**
- **Front and Rear panel mounting**
- **Thread M16 or PG9 mounting**

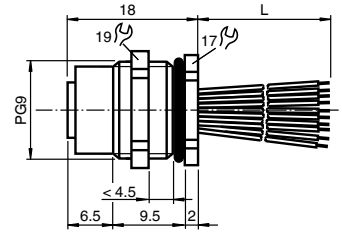
Your Benefit

- **Halogen-free**
- **Degree of protection IP67**

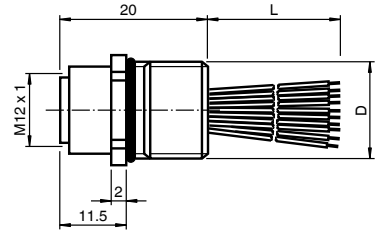
Order codes		V1-...	V15-...	V19-...	V1S-...	V15S-...	V19S-...
Number of pins	4	●			●		
	5		●			●	
	8			●			●
Electrical data							
Max. operating voltage	30 V AC/DC			●			●
	60 V AC/DC		●			●	
	250 V AC/DC	●			●		
Max. operating current	2 A			●			●
	4 A	●	●		●	●	
Mechanical data							
Connection	1 x M12 socket	●	●	●			
	1 x M12 plug				●	●	●
Cable							
Leads	4 x 0.34 mm²	●			●		
	5 x 0.34 mm²		●			●	
	8 x 0.25 mm²			●			●

Dimensions

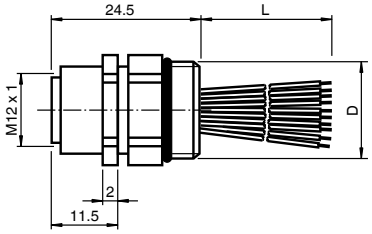
Rear panel mounting



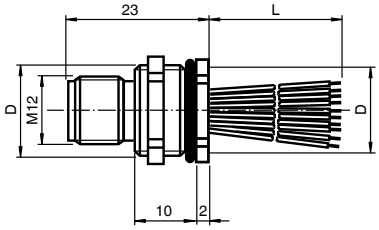
Front panel mounting



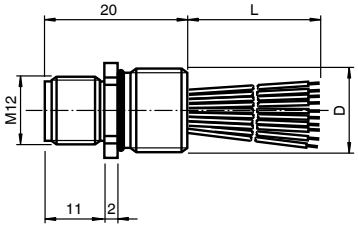
Front panel mounting, adjustable position



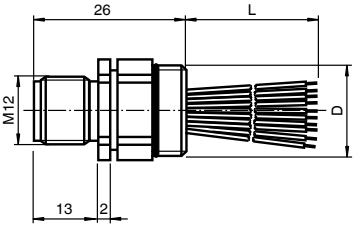
Rear panel mounting



Front panel mounting



Front panel mounting, adjustable position



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Order codes

V . . . – . . . . – 5 0 0

Mounting type
– Front panel mounting
H Rear panel mounting
P Front panel mounting, adjustable position

Availability

	M16	PG9
–	♦	♦
H	◇	◇
P	◇	◇

Thread
PG9 Secured with armored pipe thread 9
M16 Secured with M16 thread

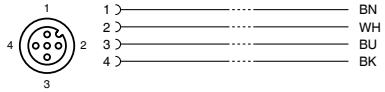
♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Number of pins
V1 4-pin socket
V15 5-pin socket
V19 8-pin socket
V1S 4-pin plug
V15S 5-pin plug
V19S 8-pin plug

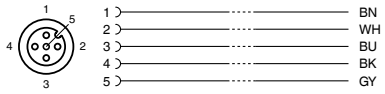
See also 1/2" NPT series on page 1046

Electrical connection

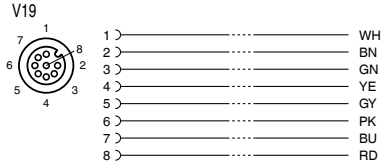
V1



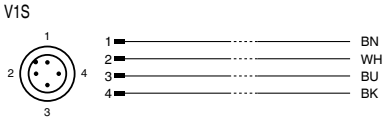
V15



V19



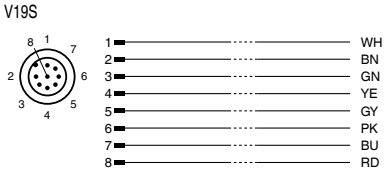
V1S



V15S



V19S





Properties

- M8 x 0.5 Receptacles
- Female and male versions
- Front panel mounting
- Thread M8 mounting

Your Benefit

- Halogen-free
- Degree of protection IP67

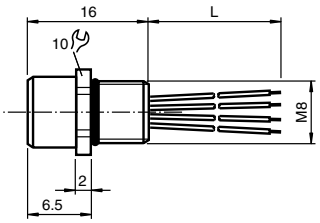
Technical data

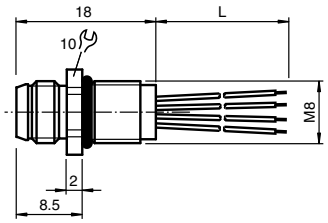
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 80 °C
Mechanical data	
Connection	M8 x 0.5 mounting thread, single strand leads
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Housing	Brass, nickel-plated
Cable	
Insulation type	TPE stranded wire
Length L	500 mm

Order codes		V3-...	V31-...	V3S-...	V31S-...
Number of pins	3	●		●	
	4		●		●
Electrical data					
Max. operating voltage	30 V AC/DC		●		●
	60 V AC/DC	●		●	
Mechanical data					
Connection	1 x M8 socket	●	●		
	1 x M8 plug			●	●
Cable					
Leads	3 x 0.25 mm²	●		●	
	4 x 0.25 mm²		●		●

Dimensions





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Order codes

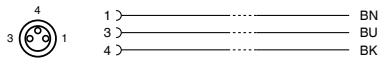
V . . . – M 8 – 5 0 0

Number of pins		Availability
V3	3-pin socket	♦
V31	4-pin socket	♦
V3S	3-pin plug	♦
V31S	4-pin plug	♦

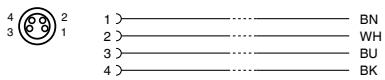
♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection

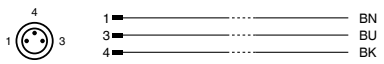
V3



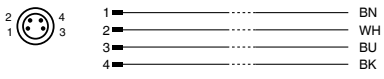
V31



V3S



V31S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	600 V AC/DC
Ambient conditions	
Ambient temperature	-40 … 105 °C
Mechanical data	
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Housing	Al, anodized
Cable	
Length L	300 mm

Properties

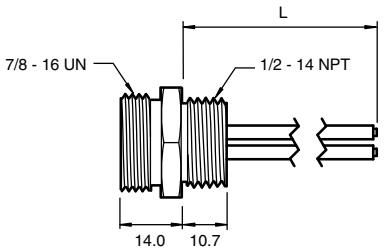
- 7/8"-16 UN Receptacles
- Female and male versions
- Front panel mounting
- Thread 1/2" NPT mounting

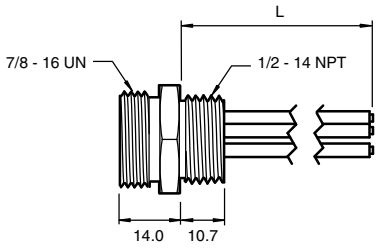
Your Benefit

- Gold-plated contacts

Order codes		1/2" NPT-V93-G-.3M	1/2" NPT-V94-G-.3M	1/2" NPT-V95-G-.3M	1/2" NPT-V93-G-S-.3M	1/2" NPT-V94-G-S-.3M	1/2" NPT-V95-G-S-.3M
Number of pins	3	●			●		
	4		●			●	
	5			●			●
Electrical data							
Max. operating current	8 A			●			●
	10 A		●			●	
	13 A	●			●		
Mechanical data							
Connection	7/8"-16 UN socket	●	●	●			
	7/8"-16 UN plug				●	●	●
Cable							
Leads	3 x 1.5 mm²	●			●		
	4 x 1.5 mm²		●			●	
	5 x 1.5 mm²			●			●

Dimensions





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Order codes

1 / 2 " N P T – V . . – G – . – . 3 M

Number of pins
V93 3-pin
V94 4-pin
V95 5-pin

Type
– Socket
S Plug

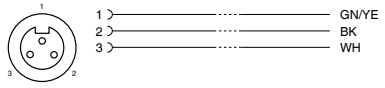
Availability

V93	V94	V95
♦	♦	♦
♦	♦	♦

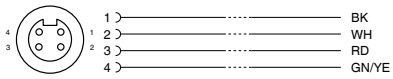
♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection

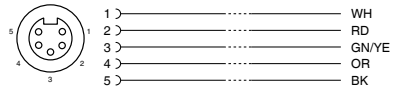
V93



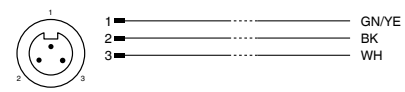
V94



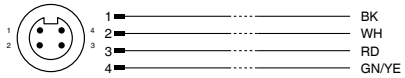
V95



V93S



V94S



V95S





Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	300 V AC/DC
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-40 … 105 °C (-40 ... 221 °F)
Mechanical data	
Degree of protection	IP67
Material	
Contacts	CuZn
Contact surface	Au
Housing	Al, anodized
Cable	
Core cross-section	0.34 mm² (22 AWG)
Length L	300 mm

Properties

- **M12 x 1 and 1/2" - 20 UNF Receptacles**
- **Female and male versions**
- **Front panel mounting**
- **Thread 1/2" NPT mounting**

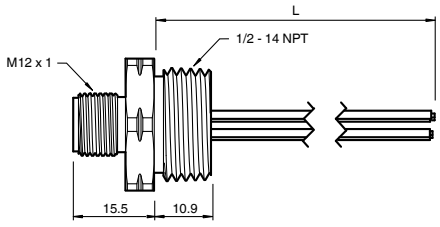
Your Benefit

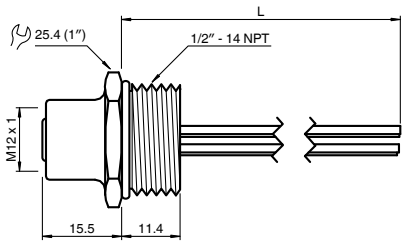
- **Gold-plated contacts**

Order codes		1/2" NPT-V1-G-.3M	1/2" NPT-V15-G-.3M	1/2" NPT-V12-G-.3M	1/2" NPT-V1-G-S-.3M	1/2" NPT-V15-G-S-.3M	1/2" NPT-V12-G-S-.3M
Number of pins	4	●			●		
	5		●			●	
	3			●			●
Mechanical data							
Connection	M12 x 1 socket	●	●				
	M12 x 1 plug				●	●	
	1/2" - 20 UNF socket			●			
	1/2" - 20 UNF plug						●

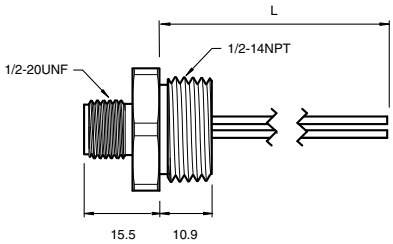
Dimensions

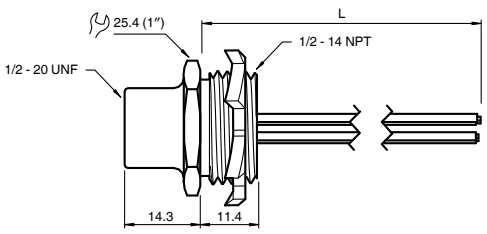
M12 x 1





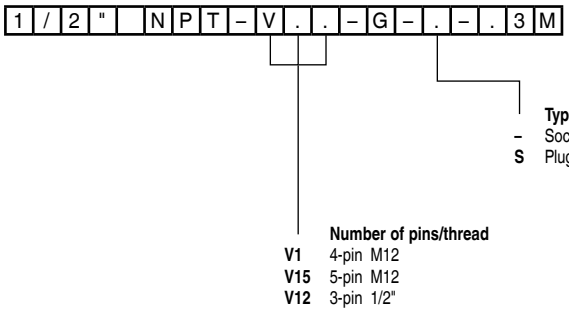
1/2" - 20 UNF





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Order codes

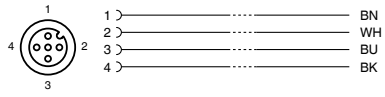


Availability	V1	V15	V12
	◇	◇	◇
	◇	◇	◇

◆ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Combination not available

Electrical connection

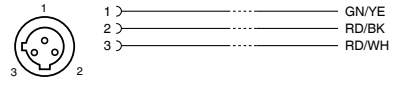
V1



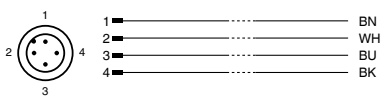
V15



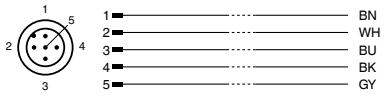
V12



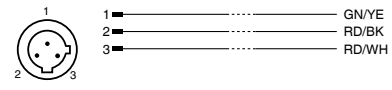
V1S



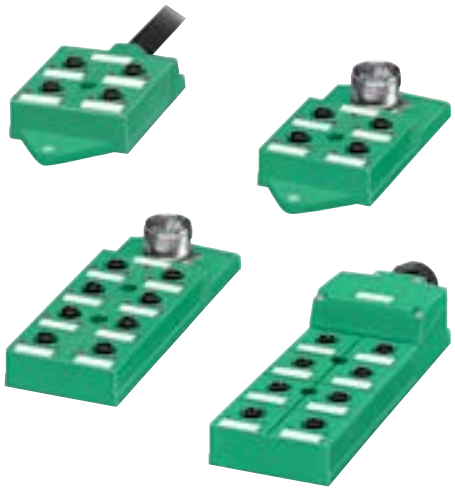
V15S



V12S



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Properties

- M12 Junction Blocks
- 4, 6 and 8 port versions, single and dual PNP input
- Master cable, M23 connector and Cage terminal versions

Your Benefit

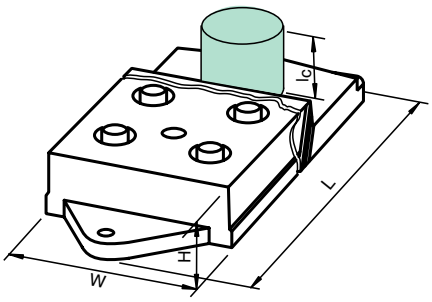
- Flat design
- LED indication for module supply and I/O status

Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	4, 5
Display/controls	
LED green	Supply voltage per module
LED yellow	I/O status indication
Electrical data	
Operating voltage	24 V DC, max. 30 V DC
Max. operating current	5 mA per channel display element
Max. current loading	2 A per channel, 4 A per port, 12 A total current per block
Ambient conditions	
Ambient temperature	-25 … 75 °C
Mechanical data	
Sockets	M12 x 1
Degree of protection	IP65 / IP67
Material	
Contacts	CuSn
Contact surface	Ni/Au
Housing	PA, green

Order codes		V1-...A-E2-...M-PUR	V1-...A-E2	V1-...A-E2-M23
Connection	Master cable	●		
	Cage terminal		●	
	M23 plug			●
Mechanical data				
Connection	Cable: stranded wire	●		
	Cage terminal		●	
	M23 plug			●
Cable				
Material	PUR black	●		
Leads	Signal line: 0.34 mm²	●		
	Supply line: 0.75 mm²			



Dimensions		Master cable						Spring terminal			M23 plug		
	Slots	4	6	8	4/8	6/12	8/16	4	6	8	4	6	8
Length L [mm]		82	100	126.5	116.5	128.5	155	116.5	128.5	155	116.5	128.5	155
Width W [mm]		54	54	54	54	54	54	54	54	54	54	54	54
Heigth H [mm]		18.5	18.5	18.5	18.5	18.5	18.5	32	32	32	18.5	18.5	18.5
Connection area l_c [mm]		-	-	-	-	-	-	-	-	-	7.5	7.5	7.5

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Order codes

Master cable

V 1 – . . . . A – E 2 – . . M – P U R

Spring terminal

V 1 – . . . . A – E 2

M23 plug

V 1 – . . . . A – E 2 – M 2 3

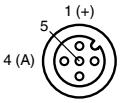
Cable lengths in m
5 or 10

	Ports/Signal inputs	Availability V1
4	4 ports/4 signal inputs	♦
6	6 ports/6 signal inputs	◇
8	8 ports/8 signal inputs	♦
4/8	4 ports/8 signal inputs (dual inputs)	♦
6/12	6 ports/12 signal inputs (dual inputs)	◇
8/16	8 ports/16 signal inputs (dual inputs)	♦

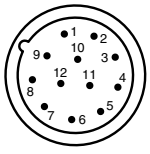
♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

Single input:

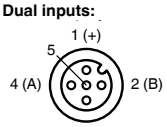


M12-socket

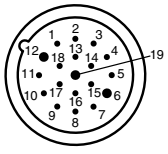


M23-connector
12-pin

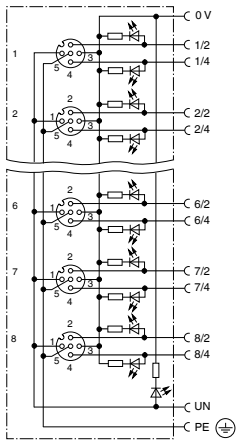
Dual inputs:



M12-socket



M23 connector
19-pin



Master cable

Slot/ Signal input	color
1 / 4 (A)	WH
1 / 2 (B)	GY/PK
2 / 4 (A)	GN
2 / 2 (B)	RD/BU
3 / 4 (A)	YE
3 / 2 (B)	WH/GN
4 / 4 (A)	GY
4 / 2 (B)	BN/GN
5 / 4 (A)	PK
5 / 2 (B)	WH/YE
6 / 4 (A)	RD
6 / 2 (B)	YE/BN
7 / 4 (A)	BK
7 / 2 (B)	WH/GY
8 / 4 (A)	VT
8 / 2 (B)	GY/BN
1-8 / 1 (UN)	BN
1-8 / 3 (0 V)	BU
1-8 / 5 (PE)	GN/YE

(B) with double layout ports

Spring terminal

Slot/ Signal input	Terminal
1 / 4 (A)	1/4
1 / 2 (B)	1/2
2 / 4 (A)	2/4
2 / 2 (B)	2/2
3 / 4 (A)	3/4
3 / 2 (B)	3/2
4 / 4 (A)	4/4
4 / 2 (B)	4/2
5 / 4 (A)	5/4
5 / 2 (B)	5/2
6 / 4 (A)	6/4
6 / 2 (B)	6/2
7 / 4 (A)	7/4
7 / 2 (B)	7/2
8 / 4 (A)	8/4
8 / 2 (B)	8/2
1-8 / 1 (UN)	UN
1-8 / 3 (0 V)	0 V
1-8 / 5 (PE)	PE

(B) with double layout ports

M23 plug

Slot/ Signal input	Pin 12-pin	Pin 19-pin
1 / 4 (A)	1	15
1 / 2 (B)		7
2 / 4 (A)	2	5
2 / 2 (B)		4
3 / 4 (A)	3	16
3 / 2 (B)		8
4 / 4 (A)	4	3
4 / 2 (B)		14
5 / 4 (A)	5	17
5 / 2 (B)		9
6 / 4 (A)	6	2
6 / 2 (B)		13
7 / 4 (A)	7	11
7 / 2 (B)		10
8 / 4 (A)	8	1
8 / 2 (B)		18
1-n / 1 (UN)	11	19
1-n / 3 (0 V)	9+10	6
1-n / 5 (PE)	12	12

12-pin with single layout ports,
19-pin with dual input ports



Properties

- M8 Junction Blocks
- 4, 6 and 8 port versions, single PNP input
- Master cable and M12 connector versions

Your Benefit

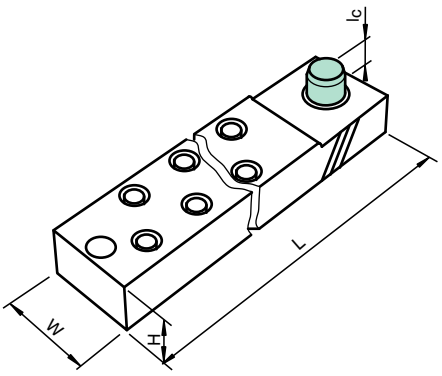
- LED indication for module supply and I/O status

Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Number of pins	3
Display/controls	
LED green	Supply voltage per module
LED yellow	I/O status indication
Electrical data	
Operating voltage	24 V DC, max. 30 V DC
Max. operating current	5 mA per channel display element
Ambient conditions	
Ambient temperature	-30 … 80 °C
Mechanical data	
Sockets	M8. 3-pin
Degree of protection	IP65 / IP67
Material	
Contacts	CuSn
Contact surface	Ni/Au
Housing	PBT

Order codes		V3-...A-E2-...M-PUR	V3-...A-E2-V19
Connection	Master cable	●	
	M12 plug		●
Electrical data			
Max. current loading	2 A per channel, 2 A per port, 4 A total current per block		●
	2 A per channel, 2 A per port, 6 A total current per block	●	
Mechanical data			
Connection	Cable: stranded wire	●	
	Plug M12 x 1, 8-pin		●
Cable			
Material	PUR black	●	
Leads	Signal line: 0.34 mm² Supply line: 0.75 mm²	●	



Dimensions	Master cable			M12 plug	
Slots	4	6	8	4	6
Length L mm]	102	122	141	92.2	111.8
Width W [mm]	30	30	30	30	30
Heigth H [mm]	22	22	22	20	20
Connection area l_c [mm]	-	-	-	7	7

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Order codes

Master cable

V 3 – . A – E 2 – . . M – P U R

Cable lengths in m
5 or 10

	Slots/Signal inputs	Availability V3
4	4 ports/4 signal inputs	♦
6	6 ports/6 signal inputs	♦
8	8 ports/8 signal inputs	♦

♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

M12 plug

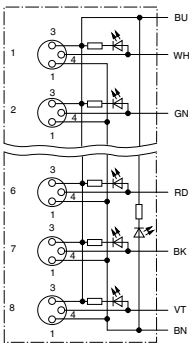
V 3 – . A – E 2 – V 1 9

	Slots/Signal inputs	Availability V3
4	4 ports/4 signal inputs	♦
6	6 ports/6 signal inputs	♦

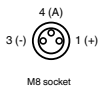
♦ Standard, available in stock
◊ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

Master cable

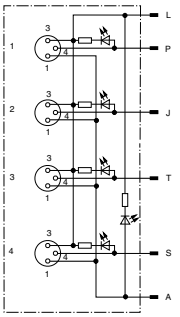


Core colour	M8-socket/pole
WH	1/4 (A)
GN	2/4 (A)
YE	3/4 (A)
GY	4/4 (A)
PK	5/4 (A)
RD	6/4 (A)
BK	7/4 (A)
VT	8/4 (A)
BN	1 ... 8/1 (+24 V)
BU	1 ... 8/3 (0 V)



M8 socket

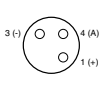
M12 plug



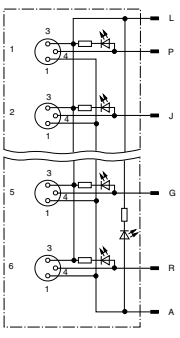
M12-connector -V19	M8-socket/pole
P	1/4 (A)
J	2/4 (A)
T	3/4 (A)
S	4/4 (A)
A	1 ... 4/1 (+24 V)
L	1 ... 4/3 (0 V)

Displays


M12-connector -V19



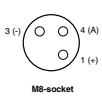
M8-socket



M12-connector -V19	M8-socket/pole
P	1/4 (A)
J	2/4 (A)
T	3/4 (A)
S	4/4 (A)
G	5/4 (A)
R	6/4 (A)
A	1 ... 6/1 (+24 V)
L	1 ... 6/3 (0 V)

Displays


M12-connector -V19



M8-socket



Properties

- Parallel splitter
- M12, 4-pin and 5-pin versions

Your Benefit

- Immunity to vibration
- 5-pin: compatible with DeviceNet and CANopen

Technical data

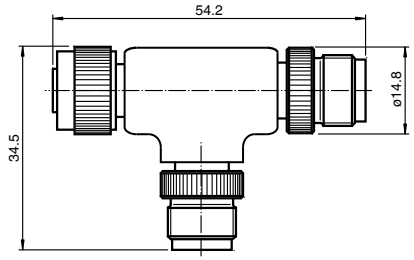
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Electrical data	
Max. operating voltage	60 V AC/DC
Max. operating current	4 A
Ambient conditions	
Ambient temperature	-25 … 85 °C
Mechanical data	
Degree of protection	IP67

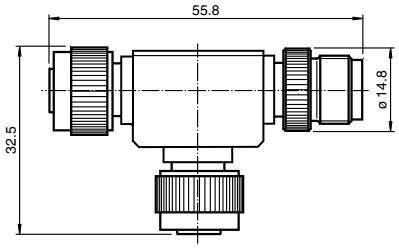
Order codes		V1S-TEE-V...	V15S-TEE-V....
Number of pins	4	●	
	5		●
Mechanical data			
Connection	1 x M12 plug 1 x M12 plug / 1 x M12 socket	●	
	1 x M12 socket 1 x M12 plug / 1 x M12 socket		●

Dimensions

4-pin



5-pin



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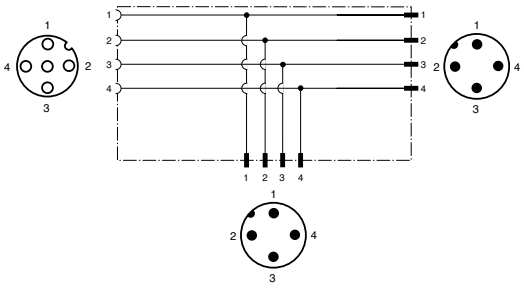
Order codes

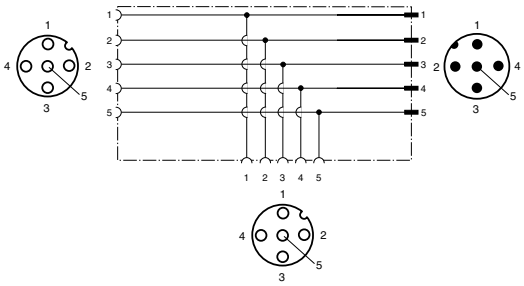
V . . . – T E E – V . . . .

		Number of pins	Availability V1S/V15S
V1S	V1/V1S	4-pin	♦
V15S	V15	5-pin	♦

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection







Properties

- Parallel splitter
- M12 to M12 and M8 to M8 versions
- 3-pin, 4-pin and 5-pin versions

Your Benefit

- Efficiently combines two signals onto one slot
- Immunity to vibration

Technical data

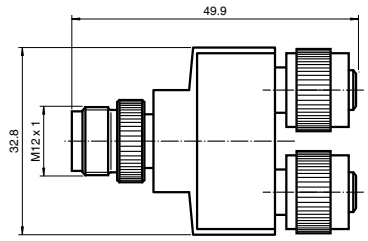
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Ambient conditions	
Ambient temperature	-25 … 90 °C
Mechanical data	
Degree of protection	IP65/IP67

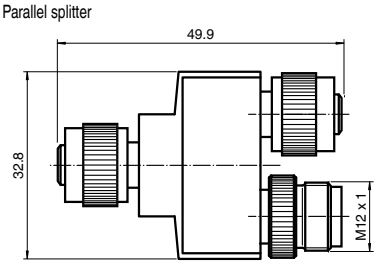
Order codes		V1S-T-V1	V11S-T-V11.	V15S-T-V15	V15S-YEE-V15	V31S-T-V3	V3S-YEE-V3	V31S-YEE-V31
Connectionsize	M8					●	●	●
	M12	●	●	●	●			
Number of pins	3		●			●		
	3 + PE	●						
	4 + PE			●				
	3 (parallel)						●	
	4 (parallel)							●
	5 (parallel)				●			
Electrical data								
Max. operating voltage	30 V AC/DC					●	●	●
	60 V AC/DC	●	●	●	●			
Max. operating current	3 A					●	●	●
	4 A	●	●	●	●			
Mechanical data								
Connection	1 x M12 plug 1 x M12 socket / 1 x M12 socket	●	●	●				
	1 x M12 socket 1 x M12 plug / 1 x M12 socket				●			
	1 x M8 plug 2 x M8 socket					●	●	●

Dimensions

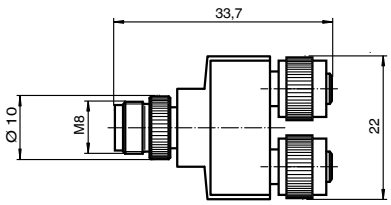
M12



Parallel splitter



M8



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Order codes

M12

V . . . – T – V . .

Number of pins

V11S	V11	3-pin
V1S	V1	3-pin + PE
V15S	V15	4-pin + PE (Pins 2+4 bridged)

Availability

♦
♦
♦

V . . . – Y E E – V . .

Number of pins

V15S	V15	5-pin

Availability

♦

M8

V . . . – T – V .

Number of pins

V31S	V3	3-pin

Availability

♦

V . . . – Y E E – V . .

Number of pins

V3S	V3	3-pin
V31S	V31	4-pin

Availability

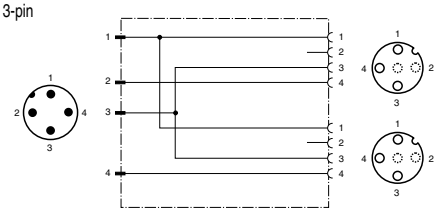
◇
♦

♦ Standard, available in stock
◇ Available, minimum order quantity applies in some cases
– Not available

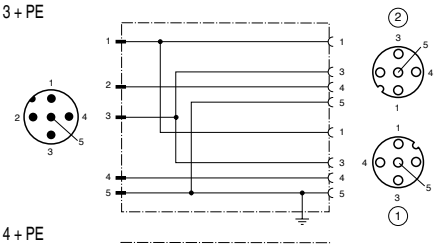
Electrical connection

M12

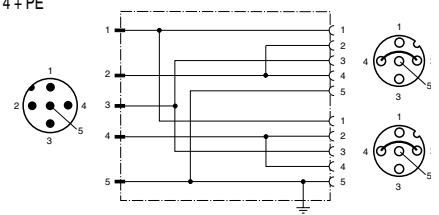
3-pin



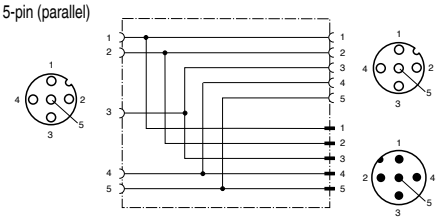
3 + PE



4 + PE

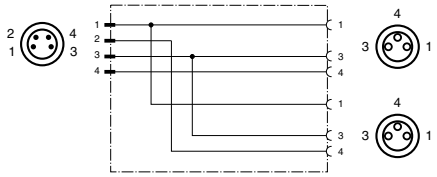


5-pin (parallel)

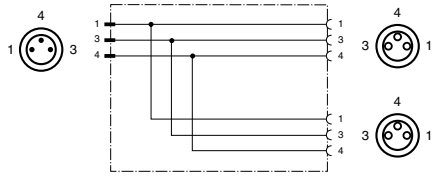


M8

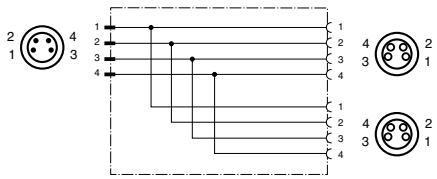
3-pin



3-pin (parallel)



4-pin (parallel)





Properties

- Y-Splitter
- M12 and M12 to M8 versions
- 3-pin, 4-pin and 5-pin versions

Your Benefit

- Efficiently combines two signals onto one M12 slot
- Immunity to vibration

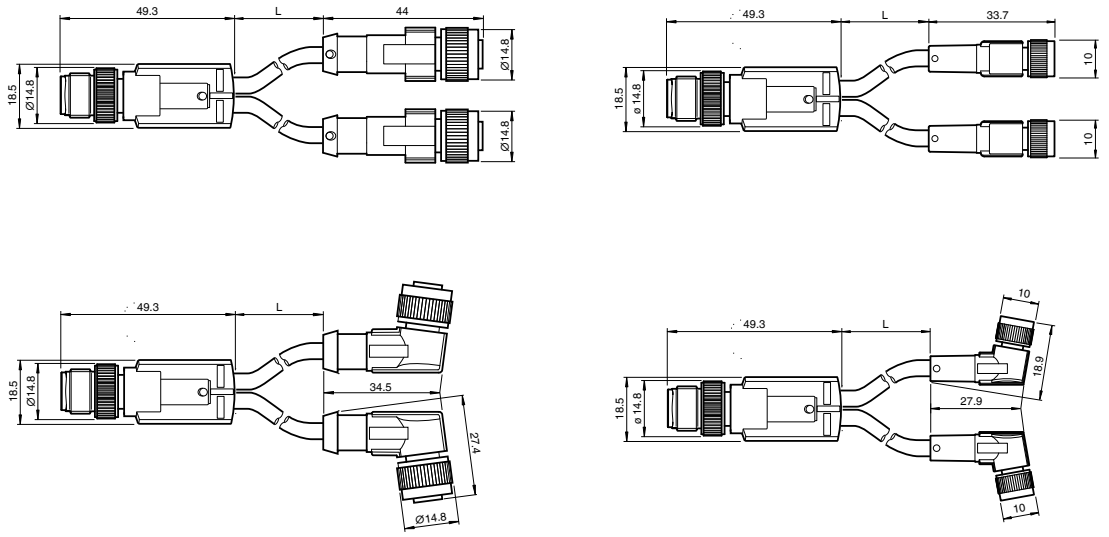
Technical data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Ambient conditions	
Ambient temperature	-40 … 80 °C fixed -5 … 80 °C non-fixed
Mechanical data	
Degree of protection	IP67/IP68/IP69K

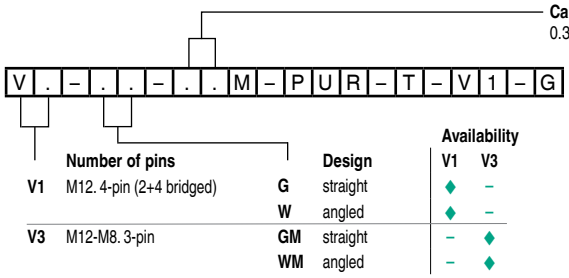
Order codes		V1-...-...M-PUR-T-V1-G	V3-...-...M-PUR-T-V1-G
Type	M12-M12	●	
	M12-M8		●
Number of pins	3		●
	4 (2+4 bridged)	●	
Electrical data			
Max. operating voltage	60 V AC/DC		●
	250 V AC/DC	●	
Max. operating current	3 A		●
	4 A	●	
Mechanical data			
Connection	1 x M12 plug 2 x M12 socket	●	
	1 x M12 plug 2 x M8 socket		●

Dimensions



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Order codes

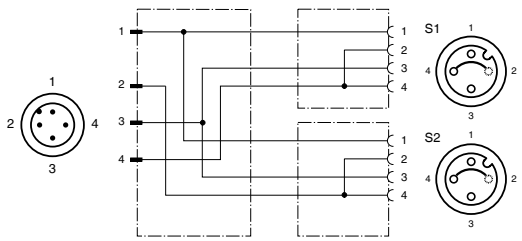


	Number of pins		Design	Availability V1	Availability V3
V1	M12. 4-pin (2+4 bridged)	G	straight	♦	–
		W	angled	♦	–
V3	M12-M8. 3-pin	GM	straight	–	♦
		WM	angled	–	♦

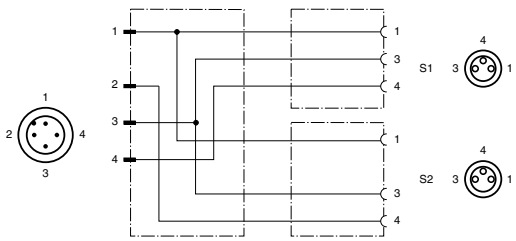
♦ Standard, In den Cable lengthn 0.3 m, 0.6 m, 1 m ab Lager verfügbar
◇ Available, minimum order quantity applies in some cases
– Not available

Electrical connection

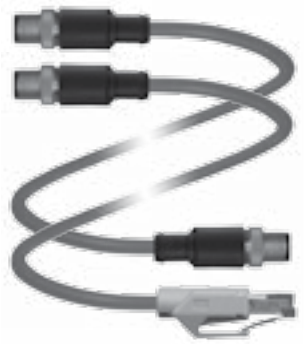
M12



M12-M8



Ethernet



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Double-ended Cordsets

Type	Order codes	Cable length available
Ethernet cable, M12-M12	V1SD-G-..M-PUR-ABG-V1SD-G	0.5 ... 60 m [1]
Ethernet cable, M12-RJ45	V1SD-G-..M-PUR-ABG-V45-G, V1SD-G-..M-PUR-ABG-V45X G (crossed)	0.5 ... 60 m [1]
Ethernet cable, RJ45-RJ45	V45-G-..M-V45-G	0.5 ... 30 m [1]

[1] = cable lengths of 2m, 5m and 10m available in stock



Field Connectors

Type	Order codes
RJ45 Field connector - male	V45-G V45-GP (Push-Pull)
M12 x 1 Field connector - male, D-coded	V1SD-G-ABG-PG9. V1SD-W-ABG-PG9

PROFIBUS



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Double-ended Cordsets

Type	Order codes	Cable length available
PROFIBUS bus cable, M12-M12	V15B-G-..M-PUR-ABG-V15B-G	0.2 ... 40 m [1]

[1] = cable lengths of 2m, 5m and 10m available in stock



Field Connectors

Type	Order codes
M12 Field connector - male/female, B-coded	V15B-G-ABG-PG9. V15SB-G-ABG-PG9. V15B-W-ABG-PG9. V15SB-W-ABG-PG9
Sub-D Field connector - male, D-coded switchable terminal resistor	VAZ-PB-DB9-W



Splitter

Type	Order codes
Y-Splitter cordset	ICZ-3T-0.2M-PUR ABG-V15B-G
Y-Splitter	ICZ-3T-V15B



Terminal resistor

Type	Order codes	Cable length available
Terminal resistor	ICZ-TR-V15B	–
Terminal resistor cordset	ICZ-2T/TR-0.2M-PUR ABG-V15B-G	0.2 m

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DeviceNet / CANopen

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***



Double-ended Cordsets

Type	Order codes	Cable length available
DeviceNet/CANopen bus cable, M12-M12	V15-G-..M-PUR-CAN-V15-G	0.2 ... 40 m [1]

[1] = cable lengths of 2m, 5m and 10m available in stock



Field Connectors

Type	Order codes
M12 Field connector male/female, A-coded	V15-G-ABG-PG9. V15S-G-ABG-PG9. V15-W-ABG-PG9. V15S-W-ABG-PG9



Splitter

Type	Order codes
T-Splitter	V15S-T-CAN/DN-V15



Terminal resistor

Type	Order codes
Terminal resistor	ICZ-TR-CAN/DN-V15

DeviceNet™
CANopen

Mounting tools



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data	
Length	Blade: 100 mm
Drive	4 mm hexagonal

Order codes		MH V1-SCREWDRIVER	MH V3-SCREWDRIVER
Preset torque	0.2 Nm		●
	0.4 Nm	●	
Weight	approx. 93 g	●	
	approx. 95 g		●
Matching nut	**MH V1-BIT M12**	●	
	MH V3-BIT M8		●

Properties

- **Tightening tool for round plug connectors with knurled coupling nuts**
- **Acoustic signal on reaching the preset torque**

Blind plug



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Order codes		V1-B	V1S-B	V3-B	V3S-B
Thread					
Size	M8 x 1			●	●
	M12 x 1	●	●		
Type	Internal thread		●		●
	External thread	●		●	

Suitable for M8 and M12 connectors and splitter boxes

Identification



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Order codes		V1/V3-LABELHOLDER	V1/V3-LABEL	V1-BOX LABEL	V3-BOX LABEL
Color	Transparent	●			
	White		●	●	●
Cable diameter	4.0 - 6.0 mm	●			
Length	23 mm	●			
Material	TPE	●			
	PC		●	●	●
Suitable for	M8/M12 connectors	●	●		
	Splitter boxes M8				●
	Splitter boxes M12			●	

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Lock nut



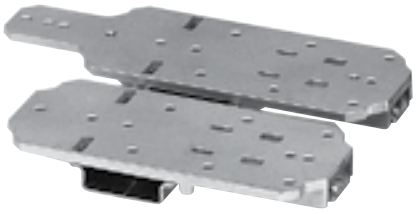
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data

Material	Brass, nickel-plated

Order codes		LOCKNUT M8 NICKEL BRASS	LOCKNUT PG9 NICKEL BRASS	LOCKNUT M16 NICKEL BRASS
Thread	M8 x 0.5	●		
	PG9		●	
	M16 x 1.5			●
Width across the flats	10	●		
	18		●	
	19			●
Thickness	2.2 mm	●		
	2.8 mm		●	●

Mounting base



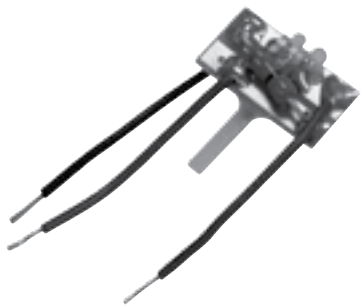
*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

General Data

Material	Die-cast zinc

Order codes		MH 05-SACB-4	MH 05-SACB-8
Weight	approx. 130 g	●	
	approx. 150 g		●
Dimensions	107 x 52 x 3 mm	●	
	136 x 52 x 3 mm		●
Suitable for splitter boxes	V1-4A-...	●	
	V1-8A-...		●

Indication element



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Order codes	**V1-E/E2-LED**
LED green	Operating display
LED yellow	NO contact function display
Max. operating voltage	24 V DC ± 15%
Max. operating current	4 A

Fits in M12 connectors with screw terminal connections



Order codes

C B L – . . . . . – . . – . . x . . . – 1 0 0 M

Cable lengths

Core cross-section

025	0.25 mm²
034	0.34 mm²
050	0.5 mm²
075	0.75 mm²

Number of leads

03	3
04	4
05	5
08	8

		Cable quality and color
PVC	–	PVC, gray
PVC-U	**BK**	PVC, UL-approved, black
PVC-U	**YE**	PVC, UL-approved, yellow
PUR	–	PUR, halogen-free, gray
PUR-U	**BK**	PUR, halogen-free, UL-approved, black
PUR-U	**YE**	PUR, halogen-free, UL-approved, yellow
PUR-U/0.75	**BK**	PUR, halogen-free, UL-approved, black
PUR H/S	–	PUR, halogen-free, irradiated, orange
POC	**OR**	POC, welding bead resistant, orange
		Shielded cable quality
PUR-ABG	–	PUR, halogen-free, shielded, gray
PUR-U/ABG	**BK**	PUR, halogen-free, shielded, UL-approved, black

All combinations of lengths, number of leads and cable qualities available only on request

Availability
Number of leads → Core cross-section

3	4	5	8
0.25 mm² / 0.34 mm²	0.25 mm² / 0.34 mm²	0.34 mm²	–
0.34 mm²	0.34 mm²	–	–
0.34 mm²	0.34 mm²	–	–
0.25 mm² / 0.34 mm²	0.25 mm² / 0.34 mm²	0.34 mm²	–
0.34 mm²	0.34 mm²	–	0.25 mm²
–	0.34 mm²	–	–
–	–	0.75 mm²	–
–	0.34 mm²	–	–
–	0.34 mm²	–	–
–	0.34 mm²	0.34 mm²	0.25 mm²
–	–	–	0.25 mm²

Examples for order codes	
CBL-PVC-GY-04x025-100M	PVC cable coil, 100 m, 4 x 0.25 mm²
CBL-PVC-GY-04x034-100M	PVC cable coil, 100 m, 4 x 0.34 mm²
CBL-PVC-U-BK-04x034-100M	PVC cable coil with UL, 100 m, 4 x 0.34 mm²
CBL-PUR-GY-04x025-100M	PUR cable coil, 100 m, 4 x 0.25 mm²
CBL-PUR-GY-04x034-100M	PUR cable coil, 100 m, 4 x 0.34 mm²
CBL-PUR-U-BK-04x034-100M	PUR cable coil with UL, 100 m, 4 x 0.34 mm²
CBL-PUR-OR-04x034-100M	PUR cable coil welding bead resistant, 100 m, 4 x 0.34 mm²
CBL-PUR-ABG-GY-04x034-100M	PUR cable coil shielded, 100 m, 4 x 0.34 mm²

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

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Technical Information

The user must follow the appropriate equipment instructions when using connectors. We reserve the right to alter designs for quality improvement, product enhancement and technology improvements. The technical information listed in the catalog is based on connectors that are not allowed to be connected in energized condition.

The distance to conductive parts should not be minimized by stripping the insulation. Take care when soldering cables to ensure that no individual strands are loose or exposed, making possible the risk of short-circuits. Listed below are the key standards and regulations to which our products are produced and tested.

Product-Specific Standards

DIN IEC 61076-2-101 / DIN EC 61076-2-104

Connectors for electronic equipment

Part 2-101: Circular connectors – design specification for screw-locking M12 connectors for low-voltage applications

Part 2-104: Circular connectors – design specification for screw or snap-locking M8 connectors for low-voltage applications

These standards specify the design guidelines for M12 and M8 connectors. They also serve as the basis for the test specifications.

DIN EN 175301-803

Design specification:

Rectangular connectors – 0.8 mm-thick flat contacts, captive-locking screws

This standard specifies the design guidelines for valve connectors. It also serves as the basis for the test specification.

DIN EN 60664-1

Coordination of the insulation of electronic equipment in low-voltage systems – Part 1:

Principles, requirements and tests

This standard replaces DIN VDE 0110-1, which was valid until the end of the transitional period in May 2006. These standards define the air and creepage distances depending on area of application, material and degree of pollution.

DIN EN 61984

Connectors – Safety requirements and tests

This standard replaces DIN VDE 0627, which was valid until the end of the transitional period in October 2004.

In addition to the product-specific standards for connectors, this standard specifies further design requirements and calls for individual testing.

DIN EN 60512

Connectors for electronic equipment – Tests and measurements

This standard specifies the test requirements for connectors. The test program includes: climate/mechanical tests, test description of the mechanical characteristics of connectors such as max. current and insulation resistance.

DIN EN 60068

Environmental tests

In this series of tests the possible influences on the environment are defined. Among other things, this includes climatic influences such as dry heat, coldness, moist heat and temperature cycles as well as mechanical influences such as vibration and shock. With these tests, the influences from the location to be used are checked in the laboratory.

DIN EN 60529

Degree of protectionen due to housing (IP code)

In this standard the IP code is defined. The test setup and the test conditions necessary to comply with the IP coding are prescribed.

Calculating American Wire Gauge (AWG) in mm²

Certain branches of industry also use the American Wire Gauge (AWG) for lines and wires.

The table below demonstrates how to convert AWG to mm².

AWG	Cable Structure [mm]	Cable diameter [mm]	Conductor Cross-Section [mm²]
30	1 x 0.25	0.25	0.05
	7 x 0.10	0.36	0.06
28	1 x 0.32	0.32	0.08
	7 x 0.13	0.38	0.09
26	1 x 0.4	0.40	0.13
	7 x 0.16	0.48	0.14
24	1 x 0.51	0.51	0.21
	17 x 0.20	0.61	0.22
	19 x 0.13	0.64	0.25
22	1 x 0.64	0.64	0.33
	7 x 0.25	0.76	0.34
	19 x 0.16	0.81	0.38
20	1 x 0.81	0.81	0.52
	7 x 0.32	0.97	0.56
	19 x 0.20	1.02	0.60
18	1 x 1.02	1.02	0.82
	19 x 0.25	1.27	0.93
16	19 x 029	1.44	1.25
14	19 x 0.36	1.80	1.93
12	19 x 0.46	2.29	3.16
10	37 x 0.40	3.10	4.65

Please note that cables with the same AWG number may have different cross-sections due to their differing structures.

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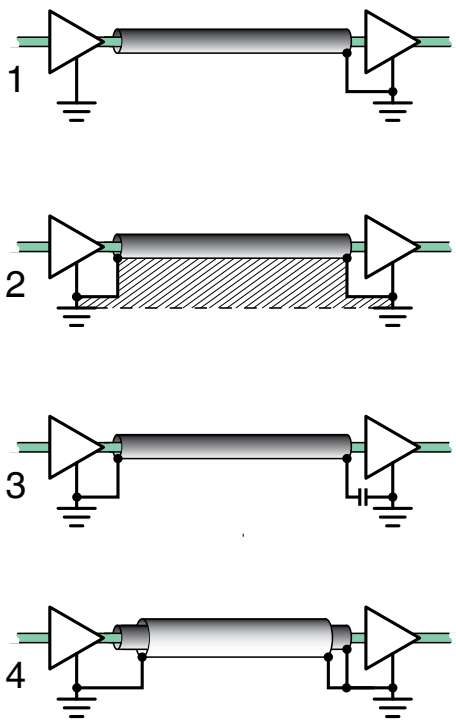
Cable Structure Data

VDE standard 0295 specifies that only the maximum single wire diameter and the corresponding highest-permissible electrical resistance have to be determined for each cable cross-section.

Cables made of Uninsulated or Tin-Plated Copper Wires Number of Wires x Wire Diameter [mm] VDE 0295							
Conductor Cross-Section [mm²]	**Single wire** Class 1	**Stranded** Class 2	**Finely-Stranded*** Class 5	**Extra Finely-Stranded*** Class 6			
0.10			14 x0.10			26 x 0.07	50 x 0.05
0.14			18 x 0.10			36 x 0.07	72 x 0.05
0.25			14 x 0.15		32 x 01.0	65 x 0.07	128 x 0.05
0.34		7 x 0.25	19 x 0.15		43 x 0.10	88 x 0.07	180 x 0.05
0.50	1 x 0.80	7 x 0.30	16x 0.20	28 x 0.15	63 x 0.10	129 x 0.07	258 x 0.05
0.75	1 x 1.00	7 x 0.37	24 x 0.20	42 x 0.15	95 x 0.10	196 x 0.07	384 x 0.05
1.00	1 x 1.13	7 x 0.43	32 x 0.20	56 x 0.15	127 x 0.10	258 x 0.07	512 x 0.05
1.50	1 x 1.38	7 x 0.52	30 x 0.25	84 x 0.15	191 x 0.10	385 x 0.07	768 x 0.05
2.50	1 x 1.78	7 x 0.67	50 x 0.25	140 x 015	320 x 0.10	651 x 0.07	1281 x 0.05
4.00	1 x 2.26	7 x 0.85	56 x 0.30	224 x 0.15	512 x 0.10	1036 x 0.07	
6.00	1 x 2.77	7 x 1.05	84 x 0.30	192 x 0.20	765 x 0.10	1561 x 0.07	
10.00	1 x 3.57	7 x 1.35	80 x 0.40	320 x 0.20	1275 x 0.10		

* The number of wires in finely and extra finely-stranded cable structures are preferred values.

Shield Connection



The type of shield connection is primarily decided by the nature of the expected interference.

To suppress electrical fields, the shield must be grounded (1) at one end.

However, interference caused by a magnetic alternating field can only be suppressed if the shield is connected at both ends (2).

A ground loop, including all its known disadvantages, is created when a shield is connected at both ends. The useful signal is particularly susceptible to noise on the reference voltage. Triaxial cables (4) combat this effect. The internal shield is connected at one end, whereas the external shield is connected at both ends.

Interference of this nature when a cable shield is connected at both ends is often reduced by also connecting one end of the shield to the reference potential via a capacitor (3). This breaks the ground loop, at least for direct currents and low-frequency currents.

Chemical resistance

The chemical resistance of the plastics, elastomers and outer sheath are shown in the table below:

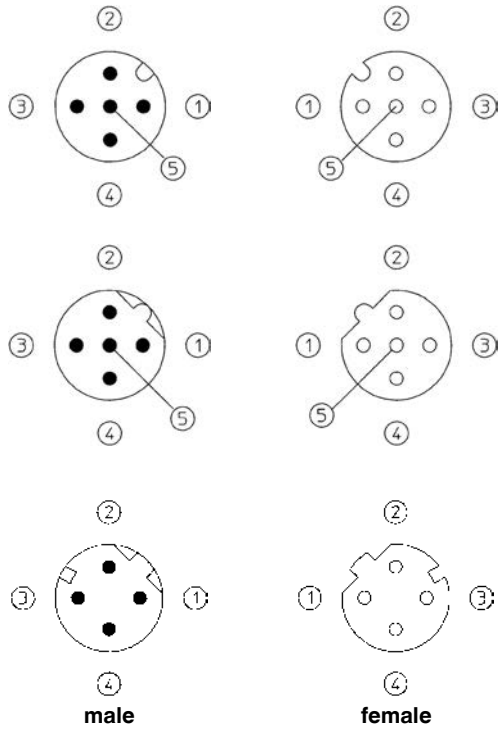
Outer Sheath / Chemical	PVC	PUR	TPU	Polyamide	NBR	Fluorinated rubber (FPM)
10% acetic acid	♦	♦	♦♦	◇	♦♦	♦♦
10% potassium hydroxide	♦♦	♦♦				
ATE brake fluid	♦	▬				
Cleaning agents			♦♦	♦♦	♦♦	
Citric acid		♦♦	♦♦	♦♦	♦♦	
Detergent			♦♦	♦♦	♦♦	
Diesel oil/heating oil	▬	♦	♦♦	♦♦	♦♦	♦♦
Ethanol	▬	♦	▬	◇	♦♦	♦♦
Gasoline, normal		♦♦	♦♦	♦♦	♦♦	
Hydraulic oils		♦♦	♦♦			
Isopropanol	▬	◇	◇	◇	♦♦	♦♦
Mineral oils		♦♦	♦♦	♦♦	◇	
Ozone	♦♦	♦♦				
Seawater		♦♦	♦♦	♦♦	♦♦	

♦♦ = resistant ♦ = largely resistant ◇ = offers limited resistance ▬ = not resistant

The research was carried out, unless otherwise indicated, at room temperature. Resistances may change when different mediums converge, hence we can assume no liability with regard to this information

Coding M12 Connectors

Coding M12 connectors with a pin or groove on the contact body prevents similar M12-style connectors from being mixed up and erroneously connected. Distinctions are made between “A” standard coding, “B” coding (Reverse Key) for fieldbus applications such as Profibus, “C” coding (Double Key; also known as “U” coding) and “D” coding for Ethernet applications.



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Testing Devices for Sensors

Our battery-operated sensor tester can be used to verify the functionality of a variety of sensors without the need for an externalal power supply.
The testing device indicates the switching state of the sensor both visually and audibly.
This enables you to test sensors quickly and easily, even if the sensors are mounted in difficult-to-see locations. This allows the user to easily locate faults and replace the corresponding devices.
You can also adjust sensors before the electrical installation is fully completed.

Sensor tester



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	ST 03
Operating voltage	18 V, two 9 V block batteries included with delivery
Current loading	Output current max. 100 mA
Connection	Three terminals for 0 V, 18 V, and signal input

Properties

- Usable for 2-, 3- an 4-wire sensors in NPN- and PNP-technique as well as for NAMUR sensors
- Suitable for ultrasonic sensors due to output current of 100 mA
- Two LEDs (NPN/PNP) for displaying the switching state

Your Benefit

- Visual and audible signaling
- Battery-operated portable testing device, includes two 9 V block batteries
- Sensor adjustment prior to completion of the electrical installation
- Detection of wiring faults
- Test function control/battery test

Tools

Screwdriver



Model number	Screwdriver 0.5 mm x 3.0 mm
Length	Blade: Ø 3 mm x 80 mm
Weight	approx. 28 g

Properties

- Slot screwdriver
- Easy handle grip

Mounting Adapters for cylindrical sensors with adjustment feature

The mounting flanges for directly mounting cylindrical sensors on even surfaces allow easy sensor adjustment using just two screws.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Common data	
Ambient temperature	-25 °C ... 85 °C (-13 °F ... 185 °F)
Material	Mounting base: PBTB (green) Top: PC (transparent)

Model number		BF 4	BF 4.5	BF 5	BF 6.5	BF 8	BF 11	BF 12	BF 18	BF 30	BF 40
Diameter Ø	4 mm	●									
	4.5 mm		●								
	5 mm			●							
	6.5 mm				●						
	8 mm					●					
	11 mm						●				
	12 mm							●			
	18 mm								●		
	30 mm									●	
	40 mm										●

The universal mounting set BF 5-30 includes inserts suitable for use with cylindrical sensors with a diameter of 5. 8. 12. 18. and 30 mm. The sensors can be adjusted by redating 360° in two planes using the mounting set.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	BF 5-30
Ambient temperature	-25 °C ... 85 °C (-13 °F ... 185 °F)
Scope of delivery	2 mounting heads (ø 18 mm, ø 30 mm) 4 adapter sockets (ø 5 mm, ø 8 mm, ø 12 mm, ø 14 mm)

Also suitable for threaded photoelectric sensors from the KT10. GLV12. VL18. 18GM60. CP18. and GLV30 series.

Mounting flanges for cylindrical sensors with snap lever bracket

The snap lever bracket allows for easy sensor replacement, because the adjustment made during the initial installation using two lateral slots is retained. The adjustment range is max. 8 mm.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Common data	
Ambient temperature	-25 °C ... 85 °C (-13 °F ... 185 °F)
Material	PC (Polycarbonat)

Model number		BF 8-F	BF 12-F	BF 18-F	BF 30-F
Diameter Ø	8 mm	●			
	12 mm		●		
	18 mm			●	
	30 mm				●

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Mounting Adapters for cylindrical sensors with adjustment feature

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH01-M18
Material	Clamping cylinder: die-cast zinc Mounting bracket: steel
Description	For mounting M18 sensors to round steel with 12 mm diameter, two-axis adjustment of sensor.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	OMH04
Material	Nickel-plated sheet steel Aluminum
Description	For mounting M18 sensors to round steel with 12 mm diameter, adjustable in all directions, can be clamped to sheet.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	OMH-VL18
Material	Sheet steel/stainless steel
Description	Mounting adapter with swivel adjustment for mounting M18 sensors

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	CPZ18B03
Material	Plastic
Description	Mounting adapter with swivel adjustment for mounting M18 sensors

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	M105
Material	PTFE
Description	Universal mounting adapter for cylindrical sensors with ø 30 mm with thread that extends to the front end of the sensor. The externalal thread on the mounting adapter is 1-1/2 " NPT.

Your Benefit

- **Secure mounting**
- **Easy installation**
- **Robust design**
- **Resistant to chemicals**

Cable Protectors

Hose connections can be used to fit a predective hose to predect the connecting cable from mechanical damage and corrosion.
Hose connections are available for sensors with M8. M12. M18. and M30 thread.

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Common data	
Material	Housing: stainless steel 1.4305 / AISI 303 (V2A) Seal: NBR

Model number		SM8	SM12	SM18	SM30
for sensor diameter	8 mm	●			
	12 mm		●		
	18 mm			●	
	30 mm				●

Mounting Adapters for the VariKont, VariKont M and VariKont L series

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH 04-2681F
Material	Chrome-plated die-cast zinc
Description	Mounting adapter for all VariKont series sensors that use the C-profile rail, in accordance with EN 50024 and DIN 43662.

Your Benefit

- 20 mm adjustment range
- 360° redation range
- The wired sensor can be adjusted

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH 04-3742A
Material	Aluminum
Description	Mounting adapter for all sensors in the VariKont M series.

Your Benefit

- 12 mm adjustment range
- The wired sensor can be adjusted

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH 04-2057B
Material	Aluminum
Description	Mounting adapter for all sensors in the VariKont series.

Your Benefit

- 30 mm adjustment range
- The wired sensor can be adjusted

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Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH 02-L
Material	Profile rail: aluminum Base: die-cast zinc
Description	Mounting adapter for all sensors in the VariKont L series. Suitable for C-profile rails in accordance with EN 50024 and DIN 43662.

Your Benefit

- 60 mm adjustment range
- The wired sensor can be adjusted

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MH 03-U1/L
Material	Aluminum
Description	Mounting rail for all sensors in the VariKont and VariKont L series

Mounting set MHZ 03-U1/L (screws and t-slides) required to mount the VariKont and VariKont L sensors

Your Benefit

- 1-meter profile rail
- Easy to move the sensors along the profile groove
- Can be connected in any configuration

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	MHW 01
Material	Aluminum
Description	Modular mounting adapter for all VariKont and VariKont L series sensors that use profile rails for material handling

Your Benefit

- Easy to mount on the profile rails
- Flexible mounting and simple adjustment in all three axis directions
- Height: 107 mm, arm: 155 mm
- Other dimensions upon request

Model Number



BF-L2

Mounting flange

Mechanical specifications	
Material	PA 6 Grivory GVN-35H
Mass	19 g

Model Number



BF-L2K

Mounting flange

Mechanical specifications	
Material	
Mass	19 g

Model Number



BF-L2M

Mounting flange

Mechanical specifications	
Material	Diecast zinc , Xylan powder coated
Mass	74 g

Model Number



BF-L3M

Mounting flange

Mechanical specifications	
Material	Diecast zinc , Xylan powder coated
Mass	74 g

Date of issue:: 2015-04-08

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Model Number



OMH-01

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 50 g
Suitable series	
Series	MLV11 MLV12

Model Number



OMH-02

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 50 g
Suitable series	
Series	VariKont M

Model Number



OMH-03

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 85 g
Suitable series	
Series	RL36 RL39 EDM3,5 EDM5 EDM20

Model Number



Bracket SU

Mounting bracket for DIN rail

Mechanical specifications	
Material	stainless steel 1.4301 / AISI 304
Mass	approx. 5 g
Suitable series	
Series	SU18 ; SU18/35 ; SU19

Date of issue: 2015-04-08

Model Number



OMH-05

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 50 g
Suitable series	
Series	RL23 RL28 RL29 RL30 RL32
Reflector series	H75 reflector

Model Number



OMH-06

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 50 g
Mounting	Mounting accessories included
Suitable series	
Series	MLV12

Model Number



OMH-07

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated aluminum
Mass	approx. 120 g
Suitable series	
Series	RL23 RL28 RL29 RL30 RL32
Reflector series	reflector C110-2 VR10 reflector

Model Number



OMH-21

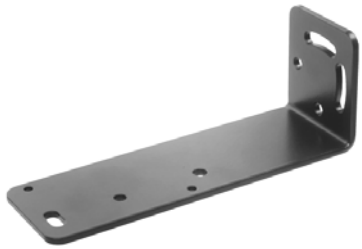
Mounting bracket

Mechanical specifications	
Material	Powder coated steel
Mass	approx. 175 g
Mounting	Mounting accessories included
Suitable series	
Series	RL23 RL28 RL29

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Model Number



OMH-22
Mounting bracket

Mechanical specifications	
Material	black anodized aluminium
Mass	approx. 180 g
Suitable series	
Series	RL23 RL28 RL29 RL32
Reflector series	reflector C110-2 H60 reflector

Model Number



OMH-4.1
Mounting Clamp

Mechanical specifications	
Material	plastic
Mass	approx. 2 g
Dimensions	14 mm x 18 mm x 6 mm
Suitable series	
Series	ML4.1 ML4.2 ML6

Model Number



OMH-40
Mounting bracket

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 30 g
Dimensions	136 mm x 52 mm x 3 mm
Mounting	Mounting accessories included
Suitable series	
Series	MLV40

Model Number



OMH-91
Mounting bracket

Mechanical specifications	
Material	Metal sheet (steel), black-coated
Mass	approx. 70 g
Mounting	Mounting accessories included
Suitable series	
Series	RL91

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Model Number

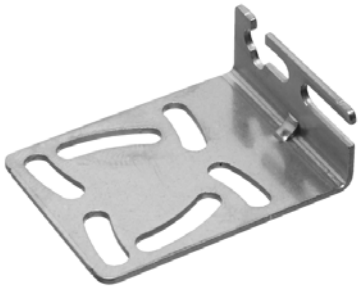


OMH-ML5

Mounting bracket for series ML5 sensors

Mechanical specifications	
Material	Stainless steel
Mass	approx. 10 g
Suitable series	
Series	ML5

Model Number



OMH-ML5

Mounting bracket for series ML5 sensors

Mechanical specifications	
Material	Stainless steel
Mass	approx. 10 g
Mounting	Mounting accessories included
Suitable series	
Series	ML5

Model Number



OMH-ML6

Mounting bracket

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 10 g
Suitable series	
Series	ML6 ML4.1 ML4.2

Model Number



OMH-ML6-U

Mounting bracket

Mechanical specifications	
Material	nickel-plated steel
Suitable series	
Series	ML6 ML4.1 ML4.2

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Model Number



OMH-ML7-01
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 15 g
Mounting	Mounting accessories included
Suitable series	
Series	ML7 ML8

Model Number



OMH-ML7-02
Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 8 g
Mounting	Mounting accessories included
Suitable series	
Series	ML71 ML8

Model Number



OMH-ML7-03
Fixing plate

Mechanical specifications	
Material	Stainless steel
Mass	approx. 5 g
Suitable series	
Series	ML7 ML71 ML8

Model Number



OMH-ML6-Z
Mounting bracket

Mechanical specifications	
Material	nickel-plated steel
Suitable series	
Series	ML6 ML4.1 ML4.2

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Model Number



OMH-MLV11

Mounting bracket for series MLV11 sensors

Mechanical specifications	
Material	Stainless steel
Mass	approx. 40 g
Mounting	Mounting accessories included
Suitable series	
Series	MLV11

Model Number



OMH-MLV12-HWG

Mounting bracket for series MLV12 sensors

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 15 g
Suitable series	
Series	MLV12

Model Number



OMH-MLV12-HWK

Mounting bracket for series MLV12 sensors

Mechanical specifications	
Material	nickel-plated steel
Mass	approx. 10 g
Suitable series	
Series	MLV12

Model Number



MH 04-3505

Mounting bracket for inductive /capacitive -FP series and ultrasonic sensors -F42 series

Suitable series	
Series	Ultrasonic sensors F42 series Inductive sensors / capacitive sensors FP series

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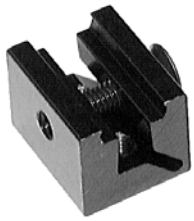
Model Number



OMH-GL
Mounting bracket for glass fiber optics

Mechanical specifications	
Material	aluminum
Mass	approx. 20 g
Suitable series	
Series	Glass fiber optic

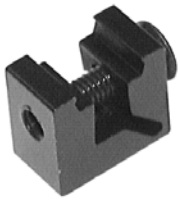
Model Number



OMH-K01
dove tail mounting clamp

Mechanical specifications	
Material	anodized aluminium
Mass	approx. 10 g
Suitable series	
Series	MLV12

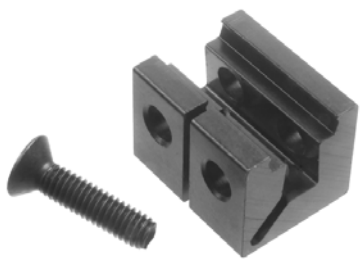
Model Number



OMH-K02
dove tail mounting clamp

Mechanical specifications	
Material	anodized aluminium
Mass	approx. 5 g
Suitable series	
Series	MLV12

Model Number



OMH-K03
dove tail mounting clamp

Mechanical specifications	
Material	anodized aluminium
Mass	approx. 6 g
Suitable series	
Series	MLV12

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Model Number



OMH-RL36

Mounting bracket

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	approx. 95 g
Mounting	Mounting accessories included
Suitable series	
Series	RL36 EDM3,5 EDM5 EDM20

Model Number



OMH-RL39

Mounting bracket for RL39 series Sensors

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	approx. 85 g
Mounting	Mounting accessories included
Suitable series	
Series	RL39

Model Number



OMH-RLK29

Mounting bracket

Mechanical specifications	
Material	Stainless steel
Mass	approx. 85 g
Suitable series	
Series	RLK28 RLK29

Model Number



OMH-RLK29-HW

Mounting bracket for rear wall mounting

Mechanical specifications	
Material	Stainless steel
Mass	approx. 150 g
Dimensions	136 mm x 52 mm x 3 mm
Suitable series	
Series	RL23 RL28 RL29 RL32
Reflector series	C110-2

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Model Number



OMH-RL28-C
Weld slag cover model

General specifications	
Accessories provided	glass M4 x 8 mm thumb screw
Mechanical specifications	
Material	
Housing	Metal sheet (steel), black-coated
Optical face	glass
Suitable series	
Series	RL28 RL29

Model Number



OMH-RL31-01
Mounting bracket

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Suitable series	
Series	Series 31

Model Number



OMH-RL31-02
Mounting bracket narrow

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Suitable series	
Series	Series 31

Model Number



OMH-RL31-03
Mounting bracket narrow

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Suitable series	
Series	Series 31

Date of issue: 2015-04-08

Model Number



OMH-DAD10

Mounting bracket

Mechanical specifications	
Material	aluminum
Mass	approx. 50 g
Suitable series	
Series	DAD10 DAD15

Model Number



OMH-LS610-01

Mounting bracket for optical data coupler

Mechanical specifications	
Material	black coated aluminum zinc-plated black steel
Mass	approx. 1500 g
Suitable series	
Series	LS610 LS611 VDM100

Model Number



OMH-LS610-02

Direct mounting set consisting of 4 x M4 threaded inserts

Mechanical specifications	
Material	brass
Suitable series	
Series	LS610 LS611 VDM100

Model Number



OMH-LS610-03

Mounting bracket with deviation mirror for optical data coupler

Mechanical specifications	
Material	Stainless steel
Mass	approx. 1580 g
Suitable series	
Series	LS610 LS611

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Model Number

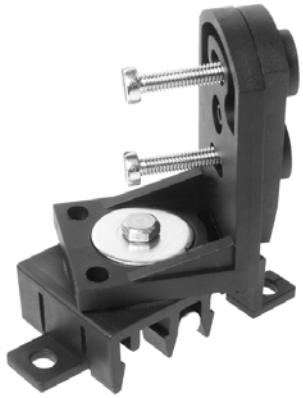


OMH-VDM100-01

Mounting bracket with deviation mirror for distance measurement devices

Mechanical specifications	
Material	Stainless steel, Deviation mirror: glass
Mass	approx. 1580 g
Suitable series	
Series	VDM100

Model Number



OMH 4-4950

Retainer

Mechanical specifications	
Material	plastic
Mass	approx. 50 g
Mounting	Mounting accessories included
Suitable series	
Series	VariKont M

Model Number



OMH-SBL-01

Mounting bracket for sensors of SBL series

Mechanical specifications	
Material	Metal sheet (steel), zinc-plated
Mass	approx. 70 g
Suitable series	
Series	SBL

Date of issue: 2015-04-08

Noncontact Energy and Data Transfer

The coupling of sensors on moving machine ptypes is a ptypeicular challenge in automation technology. Due to their mechanical nature, conventional solutions with drag chains or slip rings have the disadvantage of a considerable reduction in service life, resulting in regular maintenance and replacement costs. The WIS module primary from Pepperl+Fuchs GmbH operates in a more intelligent and efficient way.

Greater freedom in plant design

The system consists of four components and enables noncontact power supply and simultaneous communication with sensors on moving machine ptypes. Up to 1.5 W can be transferred with a maximum operating distance of 5 mm (NDP5-30GM-5M) and of 20 mm (NDP20-FP-V1). Inductive, capacitive, photoelectric, or ultrasonic sensors can be operated wirelessly and their signal states evaluated.

WIS offers a wear-free solution for the operation of up to eight sensors on

- interchangeable tools for redary tables and pressing machines
- Object detection on workpiece carriers
- Component manufacture
- Redation tools
- Robotic gripper arms



Primary side

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***



Model number	NDP-KE2-8E2	NDP-KE2-8E2-FP
Operating voltage	24 VDC ± 10%	
Current consumption	max. 1000 mA	
Number of signal channels	8	
Signal transfer direction	From the secondary side to the primary side	
For transmitter	NDP5-30GM-5M	NDP20-FP-V1

Properties

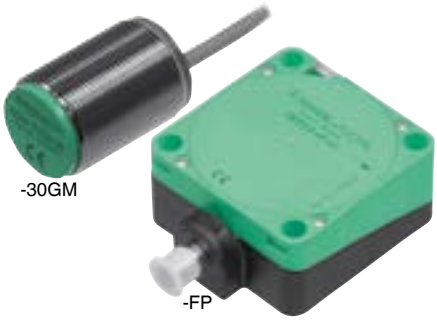
- **8 channels**
- **9 outputs**
- **LEDs for display of the output states and communication**

Your Benefit

- **Deactivation option**
- **Housing with removable clamps**
- **1 connectable transwithter head**

Technical Data

*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***



Model number	NDP5-30GM-5M	NDP20-FP-V1
Transfer distance	0 mm to 5 mm	0 mm to 20 mm
Housing design	M30	FP
Installation	Non-flush	Screw mounting
Connection	5 m cable	M12 x 1 plug
Degree of protection	IP67	IP67

Properties

- **Transfer range up to 20 mm**

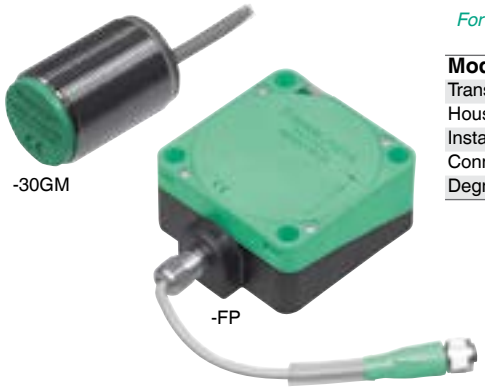
Your Benefit

- **Compact housing design**

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Secondary side

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

Model number	NDS5-30GM-1M-V1	NDS20-FP-V1
Transfer distance	0 mm to 5 mm	0 mm to 20 mm
Housing design	M30	FP
Installation	Non-flush	Screw mounting
Connection	Cable 1 m with 1 x M12 plug, 4-pin	Cable with M12 x 1 plug
Degree of protection	IP67	IP67

Properties

- Transfer range up to 20 mm

Your Benefit

- Connection via M12 x 1 plug

Technical Data



*For detailed data and product description refer to the data sheets at **www.pepperl-fuchs.com***

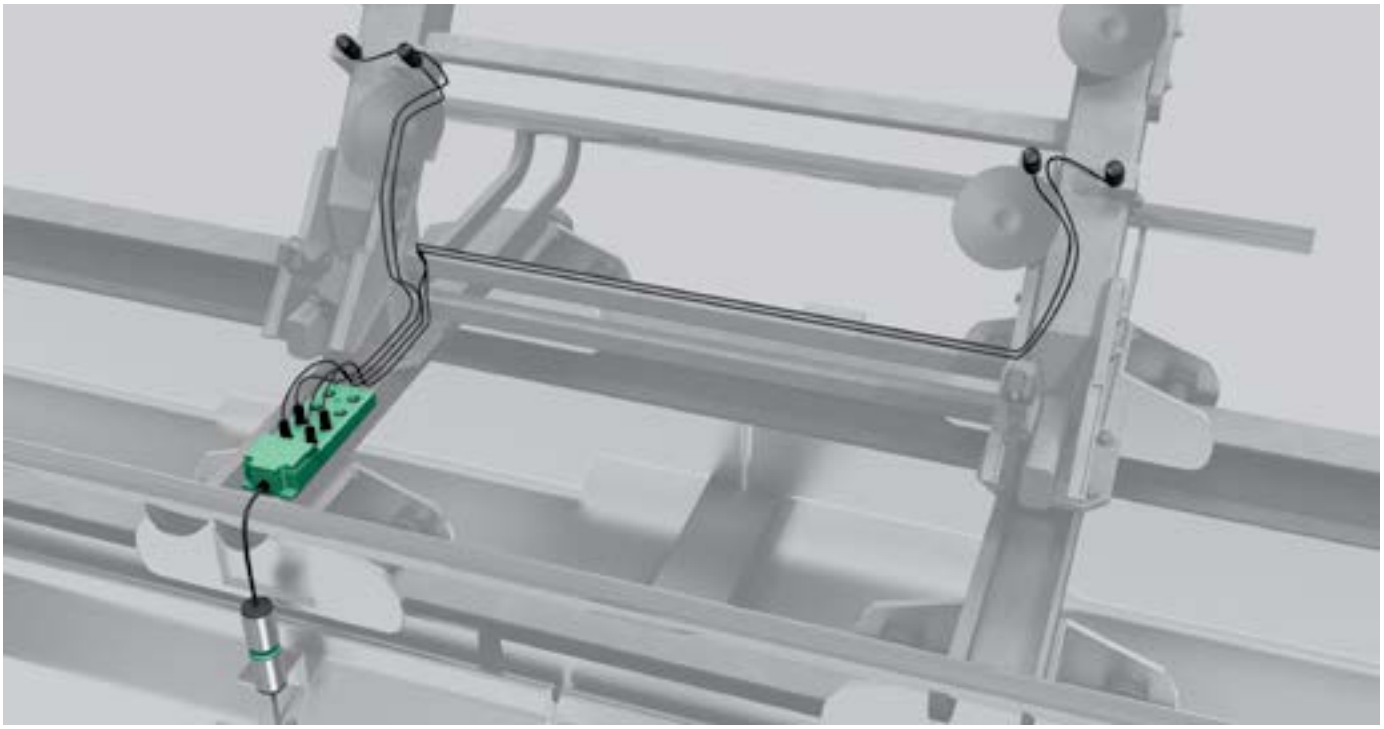
Model number	NDS-F146-8E2-V1
Sensor supply voltage	12 VDC ± 10%, overload and short-circuit proof
Transferred power	max. 2.5 W (1.5 W with 5 mm)
Number of signal channels	8
Signal transfer direction	From the secondary side to the primary side

Properties

- 8 channels
- 8 sensor inputs

Your Benefit

- Fast, flexible installation/ separation



Standards

Proximity switches by Pepperl+Fuchs GmbH are developed and produced in accordance with current standards. Draft standards are also taken into account for new developments and during the reworking and modification of our existing products

German standards

DIN VDE 0660 Part 208	Low-voltage switchgear and controlgear, additional requirements for inductive proximity switches
DIN VDE 0660 Part 209	Switchgear, low-voltage switchgear, additional requirements for noncontact operating position switches used in safety applications
DIN VDE 0660 Part 212 (replaces DIN 19234)	Measuring, regulating, and controlling - electric travel sensors - DC interfaces for travel sensors and switch amplifiers

European standards

EN 60947-5-2	Low-voltage switchgear
	Part 5: control circuit devices and switching elements, main section 2: proximity switches
EN 60947-5-6	Control circuit devices and switching elements, proximity sensors – DC interface for proximity sensors and switching amplifiers (NAMUR)

International standards

IEC 60947-5-2	Low-voltage switchgear and controlgear
	Part 5 Control circuit devices and switching elements - Section 2, proximity switches
Draft IEC 61934	Control circuit devices and switching elements DC interface for proximity sensors and switching amplifiers (NAMUR)

Standards for electromagnetic compatibility

EN 50081	Generic emission standard for electromagnetic interference
	Part 1, residential
	Part 2, industrial
EN 50082	Generic emission standard for immunity
	Part 1, residential
	Part 2, industrial
EN 61000-4	EMC, testing and measuring types
	Parts 2, 3, 4, 5 and 6

Standards for explosion protection

DIN EN 50014	Electrical apparatus for hazardous areas
	General conditions
DIN EN 50020	Electrical apparatus for potentially explosive atmospheres
	Intrinsic safety "i"
EN 60079-10	Electrical apparatus for potentially explosive gas atmospheres
	Classification of potentially explosive atmospheres
EN 60079-14	Electrical apparatus for potentially explosive gas atmospheres
	Electric installations in potentially explosive atmospheres (other than mines)

Quality assurance standards

DIN ISO 9000-9004 (EN 29000-29 004)	Quality assurance (QA) for products and services
DIN ISO 9001	QA from development to production, installation, and customer service

Pepperl+Fuchs GmbH is certified according to DIN ISO 9001.

The CE quality mark

The CE quality mark is a declaration by the manufacturer that the labeled product complies with the worldwide standards and guidelines that are applicable to the product. The following guidelines apply to products offered by Pepperl+Fuchs GmbH:

89/336/EEC	EMC Directive (EN 60 947-5-2)
73/23/EEC	Low Voltage Directive (see also VDE 0160, product standard EN 60947-5-2)
Directive 94/9/EC	Equipment and protective systems intended for use in potentially explosive atmospheres

The Pepperl+Fuchs GmbH manufacturer declaration confirms that the company's products have been certified for conformity with the respective applicable guidelines.

ALPHA

Pepperl+Fuchs GmbH is a member of ALPHA, an organization for testing and certifying low-voltage devices. This organization promotes the direct responsibility of the manufacturers of such devices through standard test instructions in accordance with applicable standards, and supports the assurance of high product quality. As ALPHA is a member of LOVAG (Low Voltage Agreement Group), the state-recognized product certificates issued by ALPHA are also recognized in other European states, under certain conditions.

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Chemical Resistance of Housing Materials

The following table summarizes the chemical resistance of our housing materials and provides information for using our sensors in harsh ambient conditions.

Chemical Resistance

Chemically resistant against	V2A	ABS	Epoxy	PBT	PC	POM	PP	PPS	PS	PVC	Brass, nickel-plated
Acetone	●	-	-	●	-	●	●	●	-	-	●
Formic acid	20 °C	40%	●	10 %	-	-	85 %	○	40%	50 %	●
Ammonia	●	25 %	○	10 %	-	●	●	●	●	○	○
Benzine	●	25 %	●	●	○	●	-	●	-	●	●
Benzene	●	-	●	●	-	●	-	●	-	-	●
Brake fluid		○			-	●	●				
Butane		●	●		●	●	●	●	-	●	●
Butanol			-			●	●			40 °C	●
Calcium chloride		●		10 %	●	●	●	●	●	60 °C	●
Chlorobenzene	20 °C	-	●		-	●	-		-	-	
Diesel oil		●	●	●	○	●	60 °C	●	-		
Acetic acid	20 °C	25 %	○	●	10 %	10 %	70 %	●	50 %	40 °C	○
Formaldehyde	●	30 %	50 %	30 %		●	40%	37 %	40%	●	●
Freon 113		-			●		-	●		●	
Fruit juice	●		●		●	●	●		-	●	●
Glycerin	●	●	●	●	○	●	●	●	●	60 °C	●
Heating oil		○	●	●	○	●	60 °C	●	-		●
Hydraulic oil					●	●	60 °C			●	
Caustic potash		50 %	○	3 %	-	●	50 %		50 %	60 °C	
Potassium chloride	●				●	●	●		●	60 °C	●
Potassium hydroxide	●						●				●
Linseed oil	●	●			●	●	●		●	●	●
Methanol	●		●	●	-	●	●	●		●	●
Methylene chloride	●	-	-		-	○	○	●	-	-	-
Lactic acid	20 °C	80 %	●		●	●	●		80 %	○	-
Mineral oil	●		●	●		●	●	●		●	●
Engine oil	●	●		●		●	●	●	○		
Sodium carbonate	●	●			●	●	●		●		●
Sodium chloride	●	●			●	●	●		●	●	●
Sodium hydroxide	20 °C	●					●				●
Caustic soda lye	20 °C	50 %		3 %	-	●	●		50 %	●	
Nitric acid	66 %	-	-		10 %	-	25 %		10 %	●	-
Hydrochloric acid	-	○	-	10 %	20 %	-	●	-	10 %	○	-
Lubricating oil	●		●		●	○/●	●				
Carbon disulfide	●	-	-		-	●	●		-	○	
Sulfuric acid	-	50 %	-	28 %	50 %	-	80 %	50 %	50 %	70 %	-
Sea water (cold)	●		●	●		●	●	●		●	●
Soap suds	●		●		○	●	●			●	●
Detergent	●						●				
Turpentine oil	●		●		○		●		-	●	●
Carbon tetrachloride	●	-			○		-		-	○	●
Toluene	●	-	●	●	-	●	-	●	-	-	●
Trichloroethylene	●	-	-	●	-	-	-	○	-	-	●
Water	●	●	68 °C	68 °C	●	●	●	●	●	60 °C	●
Tartaric acid	20 °C	●	●		●	10 %	●		●	60 °C	●
Xylene	●	-		●	-	●	-	●	-	-	
Zinc sulfate		●			●		●		-		
Citric acid	20 °C	●	●		10 %	●	●		●		●

Legend:

●: resistant/○: limited resistance/-: not resistant/: no information resistant from ..°C: to ..°C/..%: resistant up to ...% solution

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Accreditation Offices for Electric Apparatus

This table contains a selection of accreditation offices that have certified the products of Pepperl+Fuchs GmbH.

		Other potentially explosive areas	Firedamp hazardous mining areas	Safety-related control components
PTB	Physikalisch-Technische Bundesanstalt	●		
DMT	DMT Deutsche Montan Technologie GmbH	●	●	
ZELM Ex	ZELM Ex Testing and Certification Body	●		
BIA	German Institute for Occupational Safety			●
TÜV	Technical Inspection Association of Bavaria and South West Germany	●		●
TÜV	Technical Inspection Association of Hanover/Saxony-Anhalt	●		
GL	Germanischer Lloyd (application area: maritime and inland vessels)	●		
TÜV	Technical Inspection Association of Vienna	●		●
SEV	Swiss Association for Electrical Engineering, Power and Information Technologies	●		
SUVA	Swiss Accident Insurance Fund			●
BASEEFA	British Approvals Service for Electrical Equipment in Flammable Atmospheres	●		
SMRE	Safety in Miners Research Establishment (GB)		●	
FM	Factory Mutual Research (USA)	●		
UL	Underwriters Laboratories Association (USA)	●		
CSA	Canadian Standards Association	●		
KBI	Központi Banyaszati Fejlesztesi Intezet Budapest (Hungary)	●		
FTZU	Fyzikalne Technicky Zkusebni Ustav Ostrava (Czech Republic)	●		
VNIIVE	Explosion Protection Test Center Donezk (Ukraine)	●	●	

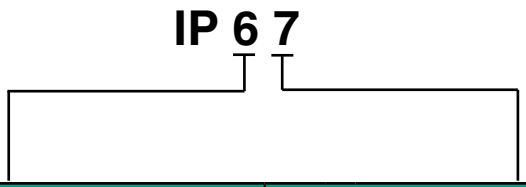
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General Explosion Protection Requirements

	European Union	North America
Classification of dangers	Explosive mixture in Group I: Firedamp hazardous mining areas Group II: Other areas except mining areas	Explosive mixture of air with CLASS I: Gases and vapors CLASS II: Dust CLASS III: Fibers
Ignition hazard due to sparks	Subclassification for types of protection intrinsic safety/ flameproof enclosure based on minimum ignition current/maximum permitted gap, under assignment of minimum ignition energy of representative gases: Group I: Methane Group IIA: Propane IIB: Ethylene IIC: Hydrogen, acetylene The subclassification also partially applies to the type of protection "n" (zone 2 apparatus)	Subclassification of the CLASS by ignition energy: CLASS I Group A: Acetylene B: Hydrogen C: Ethylene D: Methane CLASS II Group E: Metal dusts F: Coal dusts G: Grain dusts CLASS III: No classification
Ignition hazard due to hot surfaces	Classification into temperature classes in accordance with IEC 79-8 for maximum surface temperatures at an ambient temperature of 40 °C under fault conditions: T1 ≤ 450 °C T2 ≤ 300 °C T3 ≤ 200 °C T4 ≤ 135 °C T5 ≤ 100 °C T6 ≤ 85 °C	
Classification of hazardous areas	Areas classified according to the probability of a potentially explosive atmosphere: For gases, vapors, mist: (EN 60079-10) Zone 0: Continuous or long term 1: Occasionally 2: Rarely and short term For dusts: (EN 1127-1) Zone 20: Continuous or long term or often 21: Occasionally 22: Short term or build-up or layers of dust Note (see IEC 79-10): Continuous or long term equivalent to > 1000 hr/year Occasionally equivalent to 10 to 1000 hr/year Rarely or short term equivalent to < 10 hr/year	For gases and dusts: Division 1 Division 2
Safety-related data	For data on combustible gases and vapors as a basis for grouping according to ignition energy and temperature as well as flash-point temperature, see: Redeker, Nabert, Schön/Safety characteristics of combustible gases and vapors	NFPA 497 M CSA No. C22-1
Accreditation offices	PTB: Physikalisch-Technische Bundesanstalt DMT: Deutsche Montan Technologie GmbH BASEEFA: British Approvals Service for Electrical Equipment in Flammable Atmospheres and others	UL: Underwriters Laboratories, USA FM: Factory Mutual Research, USA CSA: Canadian Standards Association
Installation conditions	DIN EN 60079-14 (VDE 0165 Part 1) for potentially explosive gas atmospheres DIN EN 50281-1-2 (VDE 0165 Part 2) for areas with combustible dust	NFPA 70: National Electrical Code Art. 500 NFPA 493: Standard for intrinsically safe operations ...

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Degrees of Protection through Housing



Degree of protection against contact and ingress of objects		Degree of protection against water	
0	- Not protected	0	- Not protected
1	- Protected against hand access to hazardous parts - Protected against solid foreign objects with a diameter greater than 50 mm	1	- Protected against vertically falling drops of water
2	- Protected against finger access to hazardous parts - Protected against solid foreign objects with a diameter greater than 12.5 mm	2	- Protected against drops of water when the housing is inclined up to 15°
3	- Protected against tool access to hazardous parts - Protected against solid foreign objects with a diameter greater than 2.5 mm	3	- Protected against water falling as a spray when the housing is inclined up to 60°
4	- Protected against wire access to hazardous parts - Protected against solid foreign objects with a diameter greater than 1.0 mm	4	- Protected against splash water
5(K)	- Protected against wire access to hazardous parts - Protected against dust	4k	- Protected against water splashing from any direction under increased pressure
6(K)	- Protected against wire access to hazardous parts - Dust-tight	5	- Protected against water projected by a nozzle from any angle
		6	- Protected against water projected from powerful jets (flooding)
		6k	- Protected against water projected from powerful jets under increased pressure (flooding)
		7	- Protected against the effect of temporary immersion in water
		8	- Protected against the effect of permanent immersion in water
		9k	- Protected against water during high-pressure/steam jet cleaning

Notes:

If a digit does not need to be specified, it must be replaced by the letter X.

Devices where the second digit is 7 or 8 do not need to fulfill the requirements for the second digits 5 or 6 as they are given a dual designation (e.g., IPX6/IPX7).

The letter K is used in conjunction with some of the main digits for the identification of road vehicle equipment.

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Glossary

ABS
Acrylonitrile butadiene styrene

Absolute rotary encoder
Issues a unique encrypted numerical value for each shaft position. The internal coded disk enables an absolute measured value to be read out after application of the supply voltage. A reference run is not required.

Actuating direction
Objects can enter the sound beam from all directions. All information included in the catalog relating to trip points applies to the axial approach of objects.

Adjuster
Operating element, usually a potentiometer or rotary switch, used to adjust the response sensitivity, operating distance, direction of operation for the output, timer functions, etc.

Adjustment aid
The prefault diagnostics tool can be used to help make adjustments. Sensors that use visible red light can be adjusted visually. The mounting aids included in the catalog enable optimal adjustments to be made.
⇒ also Mounting aids

Adjustment insensitivity
Retroreflectors can be mounted and adjusted by +25° from the reference axis.

Adjustment range
Range within which the trip point for a sensor can be set.

Air humidity
The speed of sound increases by 2% from dry to saturated air. As a result, the operating distances reduces by a maximum of 2%. This can usually be disregarded.

Air pressure
Under common atmospheric deviations (±5%), the speed of sound deviates by around ±0.6% at a fixed location.
The resulting change in operating distance can usually be disregarded.

Air temperature
The speed of sound is extremely dependent upon air temperature. This can result in the output values of an ultrasonic sensor changing if the sensor is not temperature-compensated.
⇒ Temperature compensation

Alarm
⇒ Fault indication
⇒ Prefault diagnostics

Ambient conditions
Pepperl+Fuchs ultrasonic sensors are unaffected by dust, mist, rain, snow, or audible noise. Deposits on the sensor surface are usually avoided due to the self-cleaning effect of the oscillating decoupling layer.

Ambient temperature
According to the standard, photoelectric sensors must be capable of operating at temperatures of -5 °C to +55 °C.
The standard temperature range for Pepperl+Fuchs sensors is -25 °C to +70 °C. The values applicable in each case are included in the data sheets.

Background/foreground suppression
Measuring method that determines the distance from the object using angle geometry.

Binary code
A code based upon two digits that is also used with absolute rotary encoders.

Blind zone
Zone in front of an ultrasonic sensor where an object or reflector is not detected.
⇒ Section Detection range
⇒ Adjustment range

Cable length
This can be up to 300 m for sensors with internal evaluation. If the cable is used to communicate via the RS232 interface, the maximum cable length is reduced to 100 m. The cable must be shielded in case of high interference levels.
The cable length for sensors without evaluation (H1/2/3 sensors) must not exceed 50 m.

Cams 1, 2
(A**58 parameterizable)

The AVE/AVM58 absolute rotary encoders incorporate a switching mechanism with two cams. The cam signals are emitted via the outputs or the SSI special bit

CE mark
The CE mark is a declaration by the manufacturer that the labeled product conforms to the applicable international and European standards and guidelines.

Channel
Signal track of the incremental rotary encoder.

Characteristic deviation
⇒ Measurement accuracy

Characteristic displacement
Adjustable offset by which the output characteristic of a measuring sensor can be displaced.

Close range
(blind zone)
Area in which e.g., a diffuse mode sensor can no longer detect an object.
⇒ Section Detection range

Code construction
It is possible to choose between open and closed code construction for multiturn absolute rotary encoders with a singleturn resolution that is unequal to a power of two, and when the Tannenbaum format is used, provided that the measuring range has not been moved. Open code construction means that the position within a revolution and the number of detected revolutions are arranged separately. In all other instances, only closed code construction is possible, i.e., the resulting position value is already calculated in the rotary encoder.

Code course
⇒ Counting direction.

Code rate
Maximum number of measuring step changes per second.

Constant light
Light with largely constant radiant flux (e.g., daylight).

Dark ON
The photoelectric sensor switches through when there is no light falling on the receiver optics. In a diffuse mode sensor, this occurs when no object is close and in light barriers, when an object breaks the beam.

Degree of protection
The standard EN 40050 classifies the protection of electrical apparatus against contact, the ingress of objects or water through the housing, covers, etc. The IP abbreviation is made up of the letters IP (International Protection) and two numbers:
1st Number:
Degree of protection against contact and the ingress of objects
2nd Number:
Degree of protection against the ingress of water
⇒ Table Degrees of protection through housing

Detectable object
⇒ Standard measuring plate

Detection difference
Difference in the detection range depending on the reflectivity of the objects to be detected. In particular, this specification characterizes diffuse mode sensors with background suppression and ultrasonic sensors in detection mode.

Detection range
Range within which an object or reflector can be reliably detected or within which the operating distance can be set. In accordance with EN 60947-5-2, the terms scanning range and sensing range are replaced with the term detection range.
This range is determined when applying the rated operational voltage Ue at an ambient temperature of 20 °C and relative humidity of 50%. In the case of ultrasonic thru-beam sensors, the receiver (or the measuring plate in the case of diffuse mode sensors) is moved in an axial direction towards the sensor.
The switching element function must switch reliably in detection area sd.

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Detection range

Photoelectric sensors:
Usable distance between the light source and receiver (thru-beam sensor) or emitter/receiver and reflector (retroreflective sensor).
Ultrasonic sensors:
Usable distance between the ultrasonic sensor emitter and receiver (thru-beam sensor), sensor and reflector (retroreflective sensor), or sensor and object (diffuse mode sensor).
⇒ Detection range

Detection range

Maximum usable distance between the diffuse mode sensor and the object. The detection range depends on the intensity of the emitted signal, the ratios in the measurement path and, above, all the reflectivity of the object.
⇒ Detection range

Diffuse mode sensor

Consists of an active device with an integrated light source and receiver. The light is reflected diffusely by the object (target).
⇒ Section Mounting and functional principle of optical sensors

Diffuse mode sensor (type D)

Consists of an active device with an integrated ultrasonic emitter and receiver. The sound waves are reflected diffusely by the object (target).
⇒ Section Sensor principle

Diffuse reflection

⇒ Reflection

Diffuse sensor

⇒ Diffuse mode sensor

Distance hysteresis

Indicates the distance of the trip points between the approach and withdrawal of the measuring plate. The hysteresis is specified as a percentage of the operating distance.

EMC classification

Electromagnetic compatibility is the ability of an electric device to function properly in an electromagnetic environment, without improperly interfering with other devices or interfering with itself. The EMC classification is based upon tests for emission and immunity for different severity levels for testing. Severity level 3, for example, applies to a common industrial environment.
(see also EN 60947-5-2 Appendix X).

Explosion protection

Measures that prevent the formation (primary) or the ignition (secondary) of a potentially explosive atmosphere.

Extraneous light

Extraneous light is the optical radiation that is received by a photoelectric sensor's receiver but was not emitted by its emitter.
This can include elements of constant light (sun, incandescent lamps) and/or modulated light (fluorescent lighting, other sensors).

Extraneous light limit

Specifies the level of extraneous light intensity above which an optical sensor will no longer function.
⇒ Lux

Fault indication (alarm)

Many ultrasonic sensors by Pepperl+Fuchs are fitted with a red LED display for signalizing faults. A fault primarily occurs through misalignment of the sensor or if the noise level is too high. This is signalized by a blinking red LED.
In the event of a fault, the last applicable output states are frozen. The output states remain unchanged until the fault has been rectified and the sensor re-enters normal operation.

Fiber optic cable

(also: fiber optics)
Glass fiber optic cables consist of several glass fibers combined into one bundle. Each of these glass fibers has an optically thicker glass core and an optically thinner glass sheathing. As a result of total reflection, the light follows the longitudinal axis of the fiber optic cable, even if this is bent. Plastic fiber optic cables operate along the same basic principle, although they consist of one single fiber.
⇒ Section Mounting and functional principle of optical sensors

Focus

The sound beam has an opening angle of approximately 5° with -6dB sound pressure. It is not possible to further focus the ultrasound, e.g., through a pipe that is positioned ahead of the converter.

Gray code

Enhanced data security through a single step and cyclical code. Each time, only one bit changes from step to step. This code must be converted into the binary code for data processing.

Gray excess code

This is an extract of the gray code. It is used to create angular steps.
Example: 360 steps
In this instance, 9 bits are required. This is equivalent to 512 steps. The extract of the code is symmetrical. It begins with 76 and ends at 436. The 360 steps between the start and end represent the difference.

Hysteresis

⇒ Distance hysteresis
⇒ Scanning width hysteresis

Incremental rotary encoder

Provides a frequency that is proportional to the rotational speed or a number of electric pulses that is proportional to the rotational angle. A reference run should be carried out after the loss of power.

Infrared light (IR or IRED)

The beaming of larger wavelengths as visible light (l = 780 nm to 1 mm). IR transmitter diodes beam with wavelengths of 880, 940, or 950 nm, for example.

Interface

Electrical or mechanical interface.

Interference, mutual

Simultaneously operating ultrasonic sensors with overlapping detection ranges can interfere with each other. Therefore the minimum distances between the sensors must be adhered to:
If the sensors emit sound in the same direction, the lateral safety distance equates to around half a detection range.
However, if sensors are positioned opposite each other, the safety distance equates to more than both detection ranges together.
If it is not possible to adhere to these safety distances, we recommend the use of synchronizable sensors.

Inverse-polarity protection

Protection against the incorrect application of the operating voltage.

Laser

(Light Amplification by Stimulated Emission of Radiation)
Lasers have properties that make them quite different from traditional types of light. When using lasers in photoelectric sensors, being able to focus well is extremely important. Laser photoelectric sensors/light scanners by Pepperl+Fuchs have a narrow beam profile for detecting small parts or edges. They pose no danger to eyesight due to their technical design.
Lasers in photoelectric sensors operate in the red or infrared spectral range.

LATCH

Memory function: when the absolute rotary encoder input is activated, the current measured value is frozen. The rotary encoder drive shaft continues to rotate, although no measured value exchange takes place at the interface.
If the input is deactivated, each new measuring step is transferred to the interface (transparent latch).

Leakage current

Current that flows into the load circuit of the sensor when in a locked state.

LED

(Light Emitting Diode)
The light emitting diode is a semiconductor light source that can be modulated and has a long service life. LEDs in photoelectric sensors operate primarily in the red and infrared spectral range.

Light Emitting Diodes

The majority of sensors by Pepperl+Fuchs are fitted with LEDs to indicate different states: The respective data sheets include information on the importance of the individual LEDs.

Light exit

A transparent window in the housing within the wavelength range determined by the type of light, behind which the transmitting and/or receiving elements are located.

Light ON

The sensor output is switched through when light falls on the receiver optics. For retroreflective sensors, this is the case with a free light path for diffuse mode sensors, when an object moves close enough.

Linearity

⇒ Measurement accuracy

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Load current

Specifies the permissible current load for an output.

LSB

Least Significant Bit.

Lux

Lux is the unit of measurement for light intensity, i.e., a measurement for the light beam falling on each receiver area. Sunlight during the summer can generate up to 100,000 Lux, an overcast winter sky 1000 to 2000 Lux, and in normal rooms the light intensity is around 50 Lux to 100 Lux.

Measurement accuracy

The maximum value of the deviation from the ideal characteristic. This is specified for measuring sensors and relates to the maximum measurement range.
Measuring output
Absolute: the measuring output specifies the distance of the object from the sound converter area in millimeters. The output is either analog (4 mA to 20 mA or 0 V to 10 V) or digital (parallel 8-bit or serial RS232).
Relative: the measuring output specifies the position of the object within the window area (A1/A2 or upper limit/lower limit).

Measuring photoelectric sensor

Measuring photoelectric sensors combine the advantages of background/foreground suppression with the measuring functionality of a distance sensor. An integrated measuring core, otherwise found only in distance sensors, enables different switching functions in one device and provides outstanding performance data.

Measuring range

Evaluation range for measuring sensors. The start value of the measuring range is determined by the lower limit, the end value of the measuring range by the upper limit.

Modulated light

Light with a periodically changing radiant power (e.g., fluorescent lighting).

Mounting aids

Brackets and mutually adjustable mounting panels for sensors are included in the catalog. These make adjusting easier.

MSB

Most Significant Bit.

Multiturn

In addition to singleturn, the number of revolutions is also detected.

NAMUR

Standardization commission for measuring and control technology in the chemical industry. Tasks include the definition of guidelines for devices that are operated in hazardous areas.

NC contact

If the sensor does not detect an object, the output is live. If an object is detected it is de-energized (normally closed, NC).

NO contact

The output is de-energized if the sensor does not detect an object. If it detects an object, the output is live (normally open, NO).

No-load current

Specifies the individual power consumption of the sensor and is measured without load.

Objects

(for ultrasonic sensors)
A 100 x 100 mm level standard measuring plate, aligned perpendicular to the sensor axis, is usually used as the basis for the detection range. The detection range of sensors for very small distances involves using smaller measuring plates to some extent (see data sheets for further information).
Fixed or powdered objects can be detected, as well as fluids.
We recommend that ultrasonic sensors are used for poorly reflective materials (felt, absorbent cotton, foam rubber, rough textiles).
Heated materials (>100 °C) are poor reflectors.
⇒Section Notes on mounting and operating

OFF delay

(previously: turn-off time)
The time required by the sensor from when the object disappears from the detection range until the switching process. (The same applies for the ON delay.)

Off-delay time

The time it takes for an electric signal to change from high to low.

Offset

Value that is permanently added to a measured value.

Open Collector (OC)

Divided into OC-PNP and OC-NPN end stages. The latter inverts the output signals. OC end stages are superseded by the push-pull output for incremental rotary encoders and absolute rotary encoders.
The inverting behavior of the OC-NPN end stage should be taken into account for absolute rotary encoders.

Operating temperature

The temperature range in which the values and tolerances specified in the data sheet are adhered to. However, if these are marginally and temporarily undershot or exceeded, the rotary encoder is not destroyed.
Once the operating temperature is reached again, the specifications are once more fulfilled.

Operating voltage

The operating voltage is specified with maximum and minimum values for supply voltage,
e.g., UB = 10 to 60 VDC.
Safe operation of the sensor is guaranteed within this range. The rated voltage is specified for NAMUR sensors.

Output frequency

The maximum signal frequency of the rotary encoder. It is made up of the pulse count and the speed.

Parity

Control bit for fault detection in the data transfer.

PBT

Polybutylene terephthalate

PC

Polycarbonate

Phase correlation

Measurement method that determines the distance from the object via an indirect runtime measurement. The phase displacement between the intensity-modulated emitted solid light and the reflected signals is the measurement for the distance.

Phasing

Offset of the edges of channels A and B for an incremental rotary encoder.

PMMA

Polymethylmethacrylate

Polarization filter

Filter for generating polarized light.

Polarized light

In polarized light the electric field vector oscillates only in one preferred plane and not in all planes as is the case for natural light.

Power consumption

Specifies the no-load power consumption of the sensor.

Pre-fault diagnostics (alarm)

Optical sensors are very sensitive to soiling. The pre-fault diagnostics tool therefore issues warnings in good time prior to failure. The red blinking LED signalizes soiling, misalignment, or an incorrectly selected detection range. The switching element function of the sensor is still guaranteed. A prefault output allows the prefault indication to be detected remotely. The prefault diagnostics tool can also be used as an alignment aid.

PRESET 1

Control input for resetting the measured value to zero. This is used for electrically adjusting the absolute rotary encoder.
A value other than zero can be set for parameterizable absolute rotary encoders.

PRESET 2

Control input for setting the measured value to a quarter of the singleturn resolution. This is used for electrically adjusting the absolute rotary encoder.
A value other than one quarter of the singleturn resolution can be set for parameterizable absolute rotary encoders.

Pulse count

Resolution of the incremental rotary encoder. It specifies the number of pulses per revolution.

Pulse frequency

Sensors that use LEDs are not operated using solid light but rather pulsed light (the pulse frequency is in the range of 10 kHz). If two sensors are positioned directly adjacent to each other, it is possible to set a second pulse frequency for some sensors in order to prevent mutual interference.

Pulse function

Timer function for switching outputs that generates an output pulse with a defined length, which is independent of the duration of the switching event.
⇒ Timer function

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Pulse stretching

Timer function that is used to delay the switching time, provided it is shorter than the pulse stretching value.
⇒ Timer function

Push-pull output

The maximum high signal is calculated from the supply voltage minus the voltage drop specified in the data sheet.
The low signal corresponds with the reference potential.

Quality assurance

The standards DIN ISO 9000-9004 (EN 29000-29004) regulate the quality assurance (QA) of products and services.
Pepperl+Fuchs GmbH is certified according to DIN ISO 9001.

Rated operational current

This value specifies the maximum load current during continuous operation.

Rated operational voltage

The rated operational voltage is specified with maximum and minimum values for supply voltage,
e.g., Ue = 10 VDC to 30 VDC.
Safe operation of the sensor is guaranteed within this range.

Red light

Visible light with wavelengths between 630 and 780 nm. Red light end diodes operate, e.g., with l = 660 nm.

Reference axis

Ideal line on which the emitter and receiver (thru-beam sensor) or emitter and object/reflector (diffuse mode sensor or retroreflective sensor) face each other.
Photoelectric sensors:
In the case of a thru-beam sensor, the reference axis is the same as the optical axis of the lens
in the case of a diffuse mode sensor or retroreflective sensor it is the center line between the optical axes of the transmitter and receiver lens.
Ultrasonic sensors:
The reference axis on single-head systems is the same as the line of symmetry for the sound beam
on dual-head systems it is the center line between the sound beam axes of the emitter and receiver.

Reflection

In general, a reflection is a throwback of waves on the boundary between two media.
There are three types of reflection:
Mirroring: reflection where virtually the entire incident radiant power is reflected and for which the angle of incidence = angle of reflection.
Largely directed reflection: mirroring with diffuse portion, e.g., for rough object surfaces.
Diffuse reflection: reflection where the incident radiant power is reflected equally in all directions.
The way in which an ultrasonic wave is reflected depends on the ratio between the sound wavelength and the roughness of the object's surface.
⇒ Section Notes on mounting and operating

Reflectivity

Depending on an object's surface structure and texture, it will reflect ultrasonic waves well or poorly, directly or diffusely. The unreflected portion is absorbed or emitted. Reflection tables for common materials can be used to estimate the achievable detection range for diffuse mode sensors.

Reflector

A reflector is a level plate with good reflective characteristics, which is positioned perpendicular to the propagation direction of the sound waves within the detection range. The reflector is used as a reference object for ultrasonic diffuse mode sensors that are used in retroreflective mode.
⇒ Sensor principle

Reflector range

Ultrasonic sensors:
Range within which the ultrasonic sensor's reflector must be installed in retroreflective mode in order to be safely detected. The reflector range spans from the end of the reflector blind zone to the end of the detection range.
Photoelectric sensors:
Range within which the retroreflector of a retroreflective sensor must be installed in order to be safely detected. The reflector range spans from the end of the retroreflector blind zone to the end of the detection range.

Repeat accuracy

⇒ Repeatability

Repeatability

(also: repeat accuracy)
This is determined during an eight-hour test at 23 +5 °C and under rated operational voltage. The difference between two operating distances must not exceed 10% of the actual operating distance.

Residual ripple

The AC voltage (peak to peak) that is superimposed over the operating DC voltage is specified as a percentage of the arithmetic average value. Pepperl+Fuchs GmbH sensors feature max. 10% residual ripple and comply with standard EN 50008.

Resolution

Smallest change in the measured quantity that can be detected and shown by a measuring sensor.

Response time

The shortest possible time between two switch outputs. The response time corresponds with half the reciprocal value of the switching frequency.

Retroreflective area sensor

A retroreflective area sensor contains several transmitters and receivers in one enclosure with a reflector positioned opposite, forming a continuous wide or high detection area over the relevant detection range.
When the light beams in the detection area are interrupted by an object, the switching element function is triggered.
These sensors are suitable for reliable and complete object detection irrespective of the object's shape, surface, and position without incorrect switching. If the object's shape or position changes, you do not need to realign the sensors.

Retroreflective sensor

Consists of an active device with an integrated light source and receiver as well as a passive reflector from which the light is reflected.
⇒ Section Mounting and functional principle of optical sensors

Retroreflective sensor (type R)

Ultrasonic sensor in retroreflective mode.
A highly reflective object within the detection range is used as a reference. Poorly reflective objects that appear in the detection range can be safely detected in this operating mode.
⇒ Section Sensor principle

Retroreflector

Retroreflectors (also referred to as triple mirrors) reflect the incoming light parallel to the direction of incidence. They can be rotated up to a certain angle in relation to the reference axis without restricting the function of a retroreflective sensor.

Retroreflector blind zone

Zone in front of a retroreflective sensor where the retroreflector is not detected.

Reverse polarity tolerant

A reverse polarity tolerant sensor is guaranteed to operate irrespective of the polarity of the supply voltage.

Ring register, standard 0 mode

The same single position value is often required multiple times by the evaluation electronics. For this, a 51-bit long start sequence is sent to the multiturn absolute rotary encoder instead of a 25-bit start sequence, for example. If the absolute rotary encoder is in ring register mode, the same position value is transferred twice in succession. The control unit can then check for consistency in order to filter out transfer errors, e.g., caused by EMC faults.
In standard 0 mode, zeros are provided as of the 26th cycle.

Ripple

The AC voltage (peak to peak) that is superimposed over the operating DC voltage is specified as a percentage of the arithmetic average value. Pepperl+Fuchs GmbH sensors feature max. 10% ripple and comply with standard EN 50008.

Rise time

The time it takes for an electric signal to change from low to high.

Rotational speed

Specifies the mechanical load limit for the rotary encoder. If this limit is exceeded it can have a negative effect upon the service life of the ball bearings. It can also result in signal generation faults.

Rotational speed monitoring

The absolute rotary encoder monitors the speed of the shaft. If the maximum permissible speed of 6000 min-1 is exceeded, the rotary encoder generates an alarm signal. It is also possible to specify an application-specific rotational speed trip value that is monitored and reported upon in the case of under or overshooting.

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RS232

Unsymmetrical, serial, unidirectional interface between the PC and parameterizable absolute rotary encoder.

RS422

Unsymmetrical, serial, unidirectional interface. Used with incremental rotary encoders for transferring complementary pulse channels: AA, BB, 00.
For absolute rotary encoders with SSI interface for transferring cycles and data: cycle+ cycle-, data+, data-.
Each signal pair is carried via a set of pair-stranded cables.

RS485

Symmetrical, serial, bidirectional interface. The basis for many fieldbus systems.

Scaling

It is possible to define the number of steps per revolution. The number of multiturn revolutions to be detected can be selected between 1 and 4096 depending on the type of rotary encoder.

Scan range

Evaluable angle range that the scanner‘s light beam moves through.

Scanning width hysteresis

Depicts the offset of the trip points between the lateral approach and removal of the measuring plate,
i.e. between the approach and removal at a right angle to the reference axis.

Selection of counting direction

This control input is used to define whether the absolute rotary encoder generates increasing measured values when the drive shaft rotates either in a clockwise direction (CW) or counterclockwise direction (CCW). The line of sight is always from the front facing the shaft.

Sense-

Used along with Sense+ to measure the effective rotary encoder supply voltage. Enables automatic compensation of the voltage drop that occurs via the rotary encoder cable.

Sense+

Used along with Sense- to measure the effective rotary encoder supply voltage. Enables automatic compensation of the voltage drop that occurs via the rotary encoder cable.

Sensor

⇒ Diffuse mode sensor
⇒ Diffuse mode sensor

Sensor principle

Physical layer upon which a sensor‘s functionality is based.

Service life

The service life of an LED is defined as the period during which the light output drops to 50% of the original value. This period of time is specified for an operating temperature of +25 °C.

Shaft load

Specifies the maximum permissible axial and radial force on the rotary encoder shaft. The point of application of force is the center of the drive shaft journal. If these levels of force are exceeded, this can have a negative impact upon the service life of the mount. This may also result in irreparable damage to the rotary encoder.

Short circuit current limitation

Many sensors by Pepperl+Fuchs GmbH are equipped with a cyclic short-circuit current limitation. If the current trip value is exceeded, the output is periodically locked and re-released until the short circuit has been rectified.

Singleturn

Absolute rotary encoder that issues a defined number of measuring steps within one revolution. Once the revolution is completed, the measured value jumps from the maximum to the minimum value.

Spur

⇒ Channel.

SSI

Synchronous Serial Interface. Used with absolute rotary encoders.

Standard identification of switching element functions

Six-part code consisting of a maximum of eight letters or numbers that identifies the sensor type, mechanical installation conditions, housing design and size, switching element function, switching output, and type of sensor connection (⇒EN 60947-5-2).

Standard measuring plate

Standard measuring plates enable comparison measurements of the operating distances and detection ranges for different proximity switches. The following is defined for photoelectric sensors:
Retroreflective sensor:
Reflector defined by manufacturer (specified in the data sheets)
Thru-beam sensor:
Receiver defined by manufacturer (corresponds with the receiver of the two-part sensor set)
Diffuse mode sensor:
White test card, size 100 x 100 mm (for detection ranges up to 400 mm), size 200 x 200 mm (for detection ranges over 400 mm). The white test cards must have 90% diffuse reflectivity, resulting in
e.g., a fourfold detection range for polished stainless steel because it mainly reflects directly.

Starting torque

Torque that is required to start the rotary encoder shaft from a standstill.

Storage temperature

Permissible temperature limits for a sensor that is neither electrically nor mechanically stressed.

Switching current

This value specifies the maximum load current during continuous operation.
⇒ Rated operational current

Switching frequency f

The switching frequency is the maximum number of relevant events per time interval that are detected by the sensor. It applies for a duty cycle of 50% and is specified in Hertz (Hz).

Switching hysteresis

The hysteresis is the path differential between the switch-on point and the switch-off point when an object moves towards or away from a trip point on the sensor in an axial direction. This prevents permanent switching at the range limit.

Switch-on delay

(previously: response time)
The time required by the sensor from when the object appears in the detection range until the switching process. (The same applies to the OFF delay.)

Switch-on pulse suppression

All sensors are equipped with this feature, which suppresses a fault signal at the output when the operating voltage is switched on during the time delay before availability.

Synchronization

Many types of sensor have a synchronization output to avoid mutual interference from adjacent sensors. If the input is blank or is at zero potential, the sensor functions in free-range operation with its internal cycle generator.
A positive synchronization pulse triggers a measuring cycle. It is started with the incoming pulse edge.
Pepperl+Fuchs provides UC sensors with synchronization inputs/outputs that can be linked together for self-synchronization.

Temperature compensation

To minimize the effect of air temperature upon the output values, many ultrasonic sensors by Pepperl+Fuchs incorporate a temperature compensation function.
⇒ Air temperature

Temperature effect

Temperature-dependent effect upon the output sizes and trip points of a sensor. Specified in mm/K.

Thru-beam sensor

Thru-beam sensors consist of two separate active devices: a light source and light receiver.
⇒ Section Mounting and functional principle of optical sensors

Tightening torque

The recommended tightening torque of 15 Nm must not be exceeded when mounting cylindrical sensors with a threaded housing.

Time delay before availability

The time delay before availability is the time it takes until a proximity switch is ready for operation once the operating voltage has been switched on.

Timer function

Parameterizable timer functions for sensor switching outputs.
⇒ Off delay timer
⇒ Pulse function

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Total reflection

A material-specific critical angle exists for total reflection at the transition from an optically thick to an optically thin medium. Beams that strike the boundary surface at a larger angle are not interrupted but are reflected back to the optically thicker medium.

Total resolution

Summarization of the single-turn and multiturn resolution. Usually specified in bits.

Transfer rate

Data transfer speed for absolute rotary encoders.

Type D

The term for a diffuse mode sensor in accordance with EN 60947-5-2.

Type of light

Indicates the emission wavelength of the light source used in the sensor.

Type R

The term for a retroreflective sensor in accordance with EN 60947-5-2.

Type T

The term for a thru-beam sensor in accordance with EN 60947-5-2.

Ultrasonic thru-beam sensor (type T)

Ultrasonic thru-beam sensors consist of two separate active devices: an ultrasonic emitter and receiver.
⇒ Section Functional principle

V/R input

⇒ Selection of counting direction.

Voltage drop

The voltage drop is measured via the active sensor output.

Warning field output

Signalizes a fault, short circuit of an output, LED failure, undershooting of supply voltage.

Watchdog function

In the event of operational voltage faults or EMC influences, the Watchdog function resets the internal micro controller of the sensor to a defined initial state, i.e., the program within the sensor restarts.

Window area

The switching output is active if the object is located in the area delimited by both trip points A1 and A2.

Zero setting

⇒ Preset 1.

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