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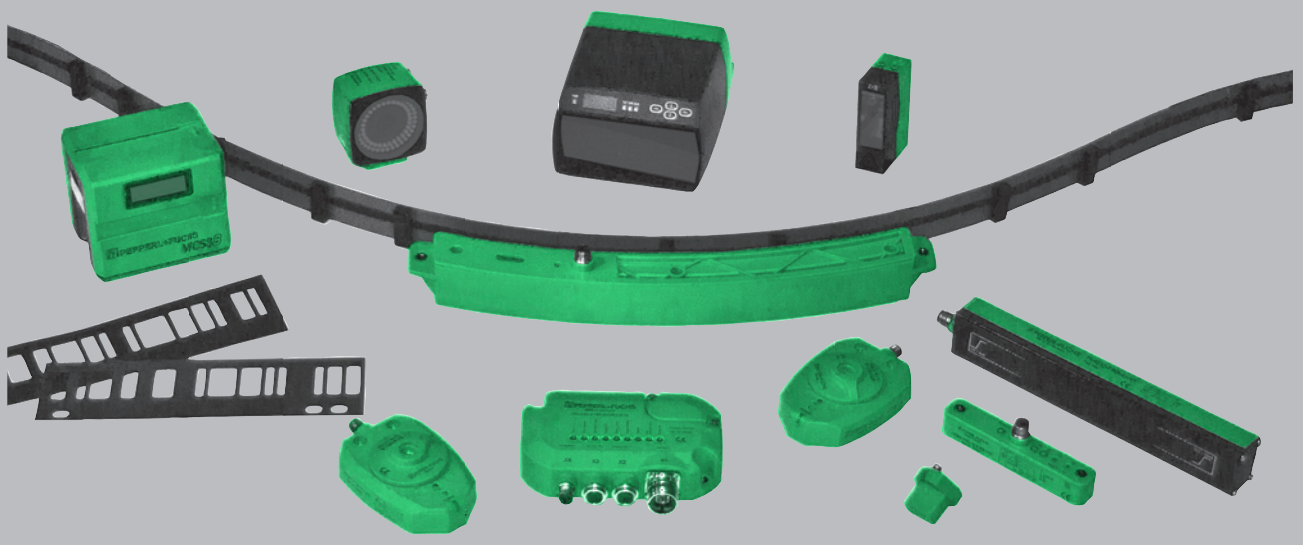
Position Feedback Systems



5. Position feedback systems

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PMI Inductive Analog Measuring Systems

From switch to positioning measuring technology

The PMI series of position measurement sensors are inductive based measurement devices that can be used to detect the position of a metal target relative to the device sensing surface. Combining inductive sensing techniques with microcontroller technology, these sensors can be used to provide analog feedback or switching point information to automation control or error proofing systems. In addition to the analog current signal (4 mA to 20 mA) or voltage signal (0 V to 10 V), PMI sensors also offer binary switching element functions. This enables limit switch positions to be implemented in addition to the measured path information.

The PMI series of sensing products comes in two configurations, one for linear measurement and one for 360 degree angular measurement.

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.

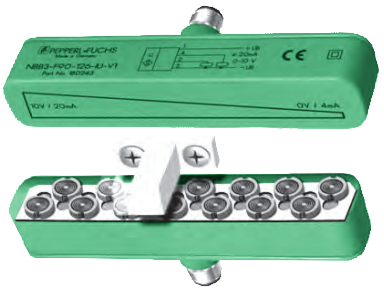
Simple steel actuator

PMI sensors react to a simple steel actuator. The actuating element can be designed as a part of the machine module.

Three-in-one – combined measuring and switching element functions

The combination of analog output and switching element functions can replace up to three standard sensors. For complete valve control, the actual position, both end stop positions, and valve OPEN and valve CLOSED can be fed back to the control system.

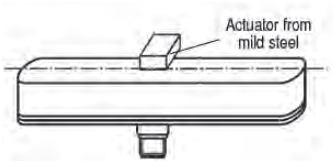
Functional description of inductive positioning sensors



PMI position measurement sensors have multiple coils positioned in two rows on a coil carrier. When an actuator passes over the coil arrangement, it creates 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 accessories, but they can be produced as part of a machine module. In order to meet the specified performance,certain mechanical dimensions and mounting conditions must be adhered to when reproducing the actuator.

Material and dimensions of the actuator



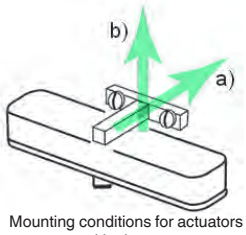
Actuators for PMI sensors are made out of mild steel. Construction steel 1.0037 (formerly ST37) is used as the reference material. When using other materials, you must take into account that the sensor will not provide the specified measurement accuracy. To provide protection against corrosion, the actuator's 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 detailed dimensions are included in the specific sensor data sheet.

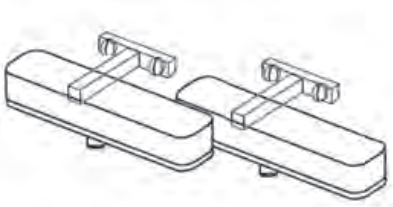
Mounting

The sensor and actuator together make up the positioning system. To ensure proper performance with the corresponding measurement accuracy, the actuator must not leave the detection range [a] of the sensor, nor exceed the specific distance [b]. The specific mounting conditions are included in the data sheets.

Inductive positioning systems can be built into, or flush-mounted on a machine element. They can be mounted side-by-side or end to end. To avoid cross-talk between the sensors, either two different actuators or one actuator with an insulation layer [B] are to be used between the sensors. See data sheet for details.



Mounting conditions for actuators on positioning sensors



Side-by-side arrangement, cascading of positioning sensors

Inductive positioning systems

PMI-F90

The PMI-F90 inductive positioning system is available in three different lengths: 80 mm, 104 mm, and 120 mm. In addition to versions with analog signal output designed solely for positioning, versions are also available with combined analog and binary functions.

PMI-F110

For longer measuring ranges, the PMI-F110 series is available in five different lengths from 210 mm to 960 mm. The F110 series provides an analog output signal that is either 0 V to 10 V or 4 mA to 20 mA. They can be mounted in the machine bed using adjustable t-slides.

PMI-F112

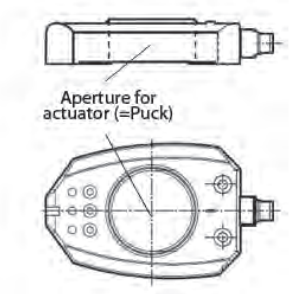
The PMI-F112 series offers a measuring length up to 14 mm and has a compact housing. The analog voltage signal (0 V to 10 V) is adjustable between 7 mm and 14 mm on the measuring range. In addition to the standard version with analog interface, a configurable version is available with an IO-Link interface.

Inductive angular position feedback system

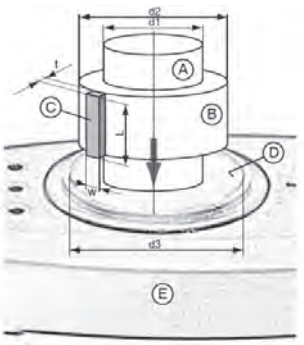
PMI-F130

The angle-measuring PMI-F130 sensors are similar to the linear positioning sensors. The metallic actuator is integrated into a round puck that can be mounted onto a rotating drive shaft. The air gap between the sensor and the puck enables wear-free evaluation 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 to 20 mA) or a voltage signal (0 V to 10 V). The desired rotation angle range can be scaled for the output range. Similar to the PMI-F90 positioning sensor, the F130 is also available as an angular sensor with two configurable switching window functions. An additional model is also available with three separately configurable switching window functions. This version can be used as a noncontact electronic cam position switch.



Outline of angular positioning system with central opening for the actuator



Dimensions and mounting conditions for reproducing the actuator

VDM Laser Distance Measurement Device

VDM laser sensors provide an analog output (4 to 20 mA) proportional to how close or far an object or reflector is from the sensor, which makes them an ideal solution for most types of measurement and inspection applications. VDM28 and VDM100 series sensors use Pulse Ranging Technology (PRT) and have long detection ranges, offering completely reliable measurement results. With the use of intense impulses of laser light, PRT offers a high level of reliability even in extreme ambient conditions with excessive ambient light and dust.

Equipped with analog outputs and/or a maximum of two discrete 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 triangulation for short distances

The VDM18 is based on the principle of the triangulation of laser light and has measuring ranges of 30 mm to 100 mm and 80 mm to 300 mm. The VDM18 not only offers a space-saving housing but also optimal measurement accuracy. Its analog output can be scaled to any distance in the measuring range. Furthermore, it is fully equipped with two configurable discrete 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.

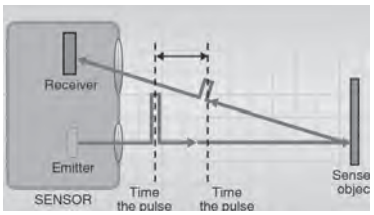
VDM100, Long distance, high accuracy measurement

The VDM100 works with outstanding precision 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 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 LS680 optical data coupler that is already popular. Together these form a strong duo to fulfill your requirements for a flexible automation solution.

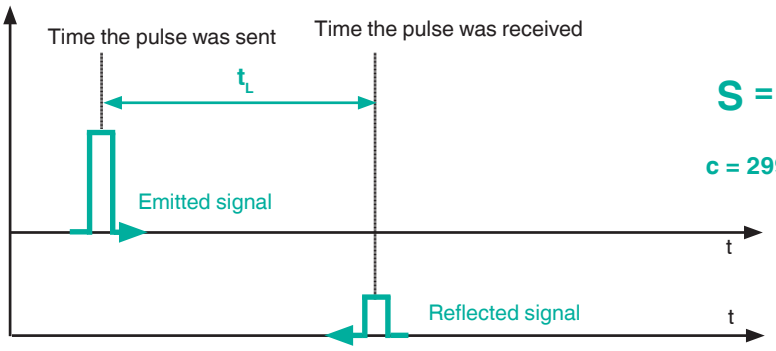
Distance Measurement using PRT (Pulse Ranging Technology)



Pulse ranging technology

PRT sensors are either diffuse, meaning they emit light that is reflected from the object to be sensed back to the sensor's receiver, or retroreflective, meaning they emit light that is reflected from a corner-cube reflector back to the sensor's receiver. But unlike background suppression and multipixel array technologies, PRT technology uses only one receiver element. A timer in the sensor determines how long it takes—after it emits a short burst of light—for the light to make it from the sensor to the object and then be reflected back to the sensor again.

Calculating this time duration and using the speed of light in air as a constant then determines the distance from the sensor to the object.



$$S = \frac{c \cdot t_L}{2}$$

c = 299.792.458 m/s

PRT is true "time of flight" (TOF) distance measurement. It is critical to note that the term "time of flight" is often misused in industry, as some manufacturers improperly use it to describe a different method of distance measurement that is more accurately called phase correlation or is chipbased technology. In phase correlation distance measurement, the reflected light is evaluated at the receiver, not based on the time it took to get from the sensor's emitter to the object and be reflected back, but rather by how much the phase angle of the light shifted as it traveled to and from the object. In other words, phase correlation geometrically calculates the distance rather than directly measuring it, as is the case with PRT.

Phase correlation distance measurement has significant disadvantages compared to PRT distance measurement. Phase correlation sensors have a weaker LED intensity since they are continuously on, resulting in shorter sensing distances and difficulty detecting dark objects. They are also limited to short sensing ranges because they detect shifts to the reflected light's phase angle, but anything greater than 360° can be misinterpreted by the sensor. This also means they are prone to detecting background objects, especially those that reflect light at the same phase angle as light in the sensing range. For example, whether reflected light is shifted in phase by 90° or by 450°, there is no way for a phase correlation sensor to differentiate the two. This results in the detection of "phantom objects" in the background. Other strengths of PRT include its ability to ignore environmental conditions such as ambient light, temperature, and target color, and measured values don't drift as they do in phase correlation, even after prolonged use.

PosiTrack™ WCS and PCV Position Feedback Systems

The PosiTrack WCS system from Pepperl+Fuchs brings fraction-of-a-millimeter position feedback to a wide range of industrial and commercial applications. Overhead monorails, gantry cranes, automated warehouses, even elevators and theater stage lighting systems can raise their performance to new levels with PosiTrack.

WCS position feedback system

Automating material handling systems requires information about the moving vehicle or forklift truck that is accurate to the millimeter. The WCS position feedback system provides the operator with a reliable and proven positioning system. It 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 optically scans a uniquely coded rail that 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 head's sophisticated intelligence provides rock-solid data in some of the toughest conditions. If the high-powered optics lose strength, the read head provides a maintenance control signal well before the system's output is influenced.

All read headscome with a snap-on mounting bracket and field-attachable connector.

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 EtherNet/IP.

The code rail

Available in stainless steel or fiber-laminate, the code rail is positioned parallel to the travel path and assigns a clear and exactly reproducible position at each point of the travel path. All rail types can be hirozontally curved with no affect on the read head's accuracy. Fiber-laminate rails can alco be flexed for vertical bends. Brackets are available for quickly mounting the code rail.

Precise, flexible, noncontact, absolute position feedback!

Outstanding benefits ...

- *Emulates a 512 turn, 1024 ppr absolute rotary encoder*
- *Non-contact, wear-free operation*
- *+/- 0.4 mm resolution*
- *Control interface options include SSI, DeviceNet ,and EtherNet/IP*
- *Follows straight or curved travel paths*
- *High burn-through power for dirty environments*
- *1ms response time*
- *Up to 27 mph travel speed*

... proven in many applications

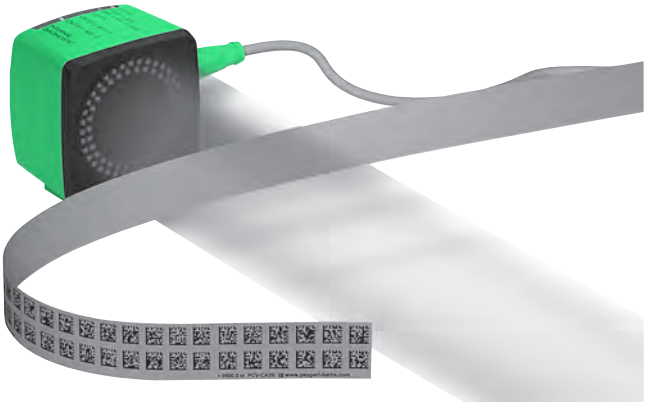
- *Automated warehousing*
- *Floor conveyors*
- *Vehicle ID*
- *Elevators and lifts*
- *Overhead monorails*
- *Stage lighting*
- *Rotating stages and turntables*
- *Gantry cranes*

PCV Data Matrix position feedback system

The PosiTrack PCV Data Matrix position feedback system scans a custom data matrix-marked tape using 2-D camera technology. Continuous feedback to distances of six miles is possible with accuracy to ±0.1 mm.

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 tape are suitable for a wide range of positioning tasks. The code tape is available in lengths up to 10 km. Several Data Matrix code sections can also be used to evaluate vertical position.



Always in focus: the read head unit with power illumination and two-row Data Matrix code reel

Benefits

- *Vertical and horizontal position feedback*
- *80 and 100 mm read distances*
- *Follows straight or curved travel paths*
- *12.5 m/s (41 ft/s) maximum speed*
- *+/- 0.1 mm resolution*
- *RS-485, SSI and PROFIBUS models*
  - *Interface modules for DeviceNet and EtherNet/IP*
- *Durable, self-adhesive polyester laminate code tape*
  - *Chemically resistant to fuels and oils*
  - *Vertical movement tolerances to +/- 45 mm*

Application examples

Monorail conveyor

The Data Matrix code tape 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 self-adhesive code tape together with its chemically resistant coating mean the PCV system is ideal for positioning skids.

High-bay warehouse

The PosiTrack PCV positioning system is always the best choice for moving and positioning in an X or Y-direction.

PosiTrack™

Technical Data

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

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	CCC approval / marking not required for sensors rated ≤36 V

Dimensions	
Length L [mm]	30.5
Width W [mm]	35
Height H [mm]	35
Connector length l_c [mm]	10.5

Properties

- F112 housing style
- 14 mm measuring length
- 33 µm resolution
- Analog output
- Pushbutton configurable

Benefits

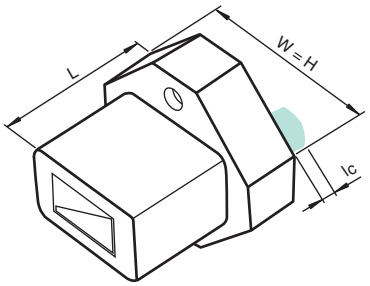
- Non-contact position measurement
- Output proportional to linear position
- Up to 2.5mm target distance
- No specialized targets or magnets needed

Accessories

These and more accessories can be found in chapter 5.6 from page xxx

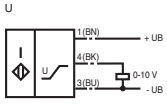
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

BT-F90-W	Damping element; lateral screw holes
V3-GM-2M-PUR	Female cordset, M8, 3-pin, 2 m PUR cable, straight
V3-WM-2M-PUR	Female cordset, M8, 3-pin, 2 m PUR cable, angled
V3-GM-5M-PUR-ABG	Female cordset, M8, 3-pin, 5 m PUR cable, straight, shielded



Electrical Connection

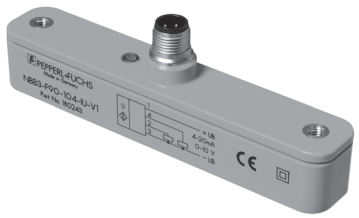
PMI14V-F112-U-V3



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)



Technical Data

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

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

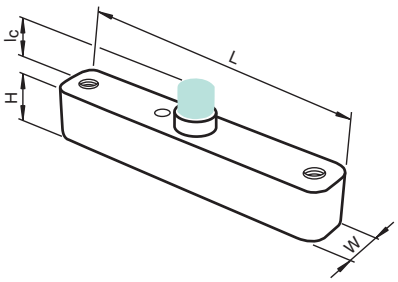
Model Number		PMI80-F90-IU-V1	PMI104-F90-IU-V1	PMI120-F90-IU-V1
Measurement range	0 ... 80 mm	●		
	0 ... 104 mm		●	
	0 ... 120 mm			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CCC approval	CCC approval / marking not required for sensors rated ≤36 V			
Dimensions				
Length L [mm]		102	126	142
Width W [mm]			23	
Height H [mm]			22	
Connector length l_c [mm]			19	

Properties

- F90 housing style
- Up to 120 mm measuring length
- 125 µm resolution
- Current or voltage analog output
- Fixed setting

Benefits

- Non-contact position measurement
- Output proportional to linear position
- Up to 3 mm target distance
- No specialized targets or magnets needed



Accessories

These and more accessories can be found in chapter 5.6 from page xxx

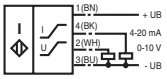
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

BT-F90-W	Damping element for F90 sensors; lateral screw holes
MH-F90	Mounting bracket for mounting of F90 sensors
V1-G-2M-PVC	Female cordset, M12, 4-pin, 2 m PVC cable, straight
V1-W-2M-PVC	Female cordset, M12, 4-pin, 2 m PVC cable, angled
V1-G-5M-PUR-ABG	Female cordset, M12, 4-pin, 5 m PUR cable, straight, shielded

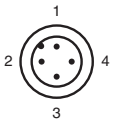
Electrical Connection

PMI104-F90-IU-V1
PMI120-F90-IU-V1
PMI80-F90-IU-V1

IU

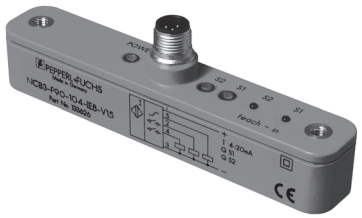


Core colours in accordance with EN 60947-5-2.



Wire colors in accordance with EN 60947-5-2

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



Technical Data

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

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

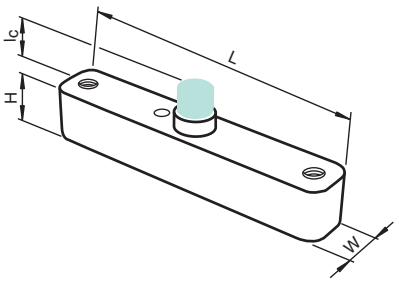
Model Number		PMI80-F90-IE8-V15	PMI104-F90-IE8-V15	PMI120-F90-IE8-V15
Measurement range	0 ... 80 mm	●		
	0 ... 104 mm		●	
	0 ... 120 mm			●
Approvals and Certificates				
UL approval	cULus Listed, General Purpose, Class 2 Power Source	●	●	●
CCC approval	CCC approval / marking not required for sensors rated ≤36 V			
Dimensions				
Length L [mm]		102	126	142
Width W [mm]			23	
Height H [mm]			22	
Connector length l_c [mm]			19	

Properties

- F90 housing style
- Up to 120 mm measuring length
- 125 µm resolution
- 1 Analog and 2 switching outputs
- Pushbutton configurable

Benefits

- 3 functions in a single sensor
- Non-contact position measurement
- 2 teachable limit switches
- Up to 3 mm target distance
- No specialized targets or magnets needed



Accessories

These and more accessories can be found in chapter 5.6 from page xxx

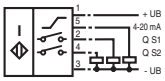
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

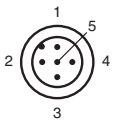
BT-F90-W	Damping element for F90 sensors; lateral screw holes
MH-F90	Mounting bracket for mounting of F90 sensors
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-W-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, angled
V15-G-5M-PUR-ABG	Female cordset, M12, 5-pin, 5 m PUR cable, straight, shielded

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)

Technical Data

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

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 (only one output can be used at a time)
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

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	CCC approval / marking not required for sensors rated ≤36 V				

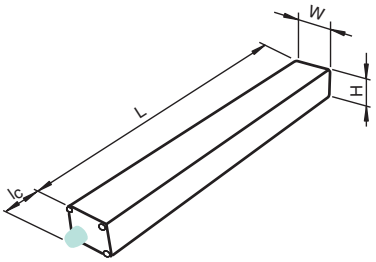
Dimensions					
Length L [mm]	250	400	550	850	
Width W [mm]	41				
Height H [mm]	30,5				
Connector length l_c [mm]	17				

Properties

- F110 housing style
- Up to 810 mm measuring length
- Current or voltage analog output
- Output mode auto selected based on connected load resistance - determined at power-up
- Fixed setting

Benefits

- Non-contact position measurement
- Position proportional analog value
- Up to 6 mm target distance
- No specialized targets or magnets needed



Accessories

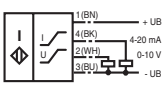
These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets **See pages xxxx ... for mounting accessories**

BT-F110-G	Damping element for F110 housing sensors; front screw holes
BT-F110-W	Damping element for F110 housing sensors; lateral screw holes
MH-F110	Mounting bracket for mounting F110 series sensors
V1-G-2M-PVC	Female cordset, M12, 4-pin, 2 m PVC cable, straight
V1-W-2M-PVC	Female cordset, M12, 4-pin, 2 m PVC cable, angled
V1-G-5M-PUR-ABG	Female cordset, M12, 4-pin, 5 m PUR cable, straight, shielded

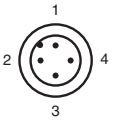
Electrical Connection

PMI210-F110-IU-V1
PMI360-F110-IU-V1
PMI510-F110-IU-V1
PMI810-F110-IU-V1

IU



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)

Technical Data

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

Model Number	PMI360D-F130-IE8-V15
Measurement range	360°
Operating voltage	18 ... 30 V
No-load supply current	≤ 45 mA
Reverse polarity protection	reverse polarity protected
Repeat accuracy	± 0.25 °
Resolution	0.4°
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
Linearity error	± 0.6 ° , (with original actuator)
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
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	CCC approval / marking not required for sensors rated ≤36 V

Dimensions	
Length L [mm]	110
Width W [mm]	76.5
Height H [mm]	26
Connector length l_c [mm]	20

Properties

- F130 housing style
- 360° measuring range
- 1 analog output and 2 switching outputs
- Pushbutton configurable

Benefits

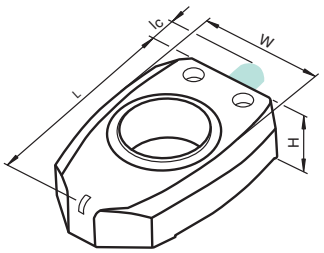
- 3 functions in a single sensor
- Non-contact position measurement
- Angle proportional analog value
- 2 teachable set points

Accessories

These and more accessories can be found in chapter 5.6 from page xxx

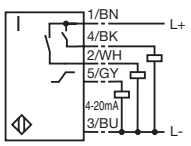
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

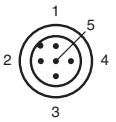
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-W-5M-PUR-ABG	Female cordset, M12, 5-pin, 5 m PUR cable, angled, shielded



Electrical Connection

PMI360D-F130-IE8-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)

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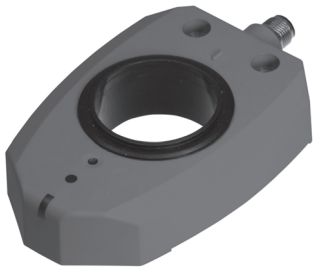


Technical Data

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

Model Number	PMI360DV-F130-IU-V15
Measurement range	max. 360° min. 45°
Adjustment range	45° ... 360° analog range
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 BT-F130-A)
Analog output	
Output type	current output or voltage output (depends on connected load resistance at power-up) 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	CCC approval / marking not required for sensors rated ≤36 V

Dimensions	
Length L [mm]	110
Width W [mm]	76.5
Height H [mm]	26
Connector length l_c [mm]	20

Properties

- F130 housing style
- Adjustable active range
- Analog output
- Pushbutton configurable

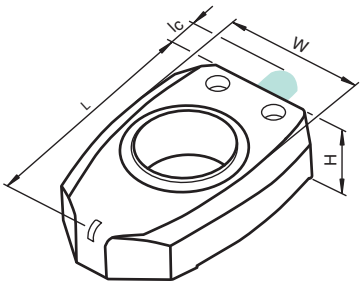
Benefits

- Non-contact position measurement
- Output proportional to angle position
- Teachable active rotation range
- Teachable output signal - rotation direction (CW/CCW)
- Zero position settable

Accessories

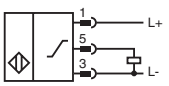
These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

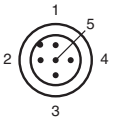
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-W-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, angled
V15-W-5M-PUR-ABG	Female cordset, M12, 5-pin, 5 m PUR cable, angled, shielded



Electrical Connection

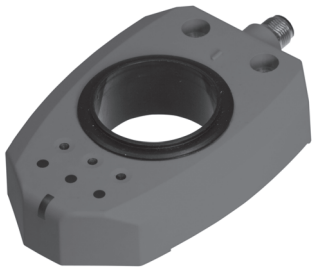
PMI360DV-F130-IU-V15





Wire colors in accordance with EN 60947-5-2

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



Technical Data

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

Model Number	PMI360DV-F130-3E2-V15
Adjustment range	3 configurable switchpoint windows , 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°
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	CCC approval / marking not required for sensors rated ≤36 V

Dimensions	
Length L [mm]	110
Width W [mm]	76,5
Height H [mm]	26
Connector length l_c [mm]	20

Properties

- F130 housing style
- 360° rotation range
- 3 switch point outputs
- Pushbutton configurable

Benefits

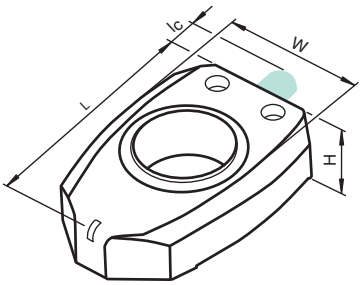
- Non-contact cam switch
- 3 teachable output points and pulse window widths

Accessories

These and more accessories can be found in chapter 5.6 from page xxx

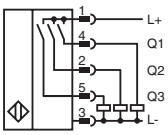
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

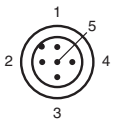
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-W-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, angled
V15-W-5M-PUR-ABG	Female cordset, M12, 5-pin, 5 m PUR cable, angled, shielded



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)

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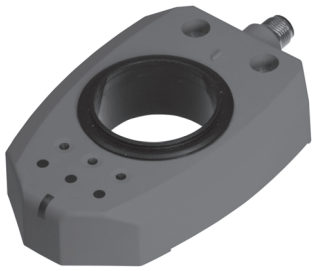
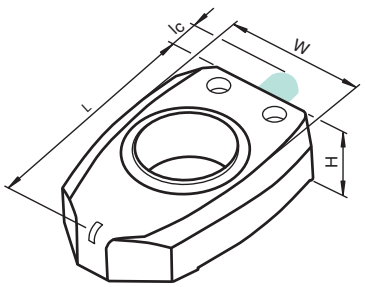


Properties

- F130 housing style
- Adjustable active range
- 1 analog output and 2 switching outputs
- Pushbutton configurable

Benefits

- 3 functions in a single sensor
- Non-contact position measurement
- Output proportional to position
- 2 teachable output points and pulse window widths
- Teachable active rotation range
- Teachable output signal - rotation direction (CW/CCW)
- Zero position settable



Technical Data

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

General Data	
Measurement range	max. 360° min. 45°
Adjustment range	45° ... 360° analog range, programmable 2 configurable switchpoint windows , 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 BT-F130-A)
Switching outputs	
Operating current	≤ 100 mA
Short-circuit protection	pulsing
Analog output	
Output type	current output or voltage output (depends on connected load resistance at power-up) 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	cULus Listed, General Purpose, Class 2 Power Source	●	●
CCC approval	CCC approval / marking not required for sensors rated ≤36 V		

Dimensions	
Length L [mm]	110
Width W [mm]	76,5
Height H [mm]	26
Connector length l_c [mm]	20

Accessories

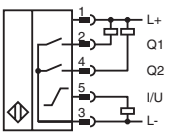
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

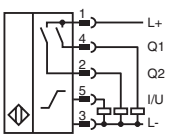
BT-F130-A	Actuator for F130 series
V15-G-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, straight
V15-W-2M-PVC	Female cordset, M12, 5-pin, 2 m PVC cable, angled
V15-W-5M-PUR-ABG	Female cordset, M12, 5-pin, 5 m PUR cable, angled, shielded

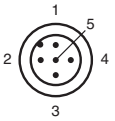
Electrical Connection

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)

Technical Data

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

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 maximum sensing 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		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]		50					
Connector length l_c [mm]		13.5					

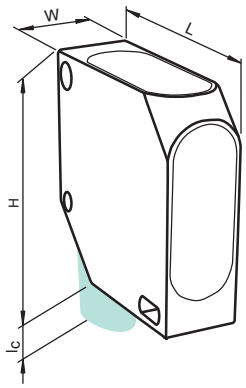
Properties

- Rectangular compact housing
- Diffuse distance measurement
- Triangulation method
- Short range
- Analog output
- Laser red light

LASER LIGHT
DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT

DIN EN 60825-1: 2008-05
lambda = 650 nm
pulsed-mode operation

Note: For detailed Laser specifications refer to the data sheet at www.pepperl-fuchs.us



Accessories

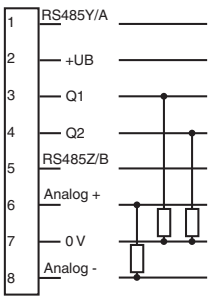
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

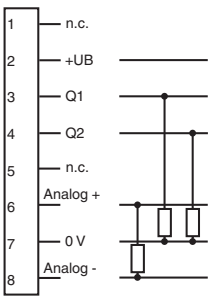
OMH-VDM18-01	Mounting accessory, distance measuring devices Series VDM18
OMH-VDM18-02	Mounting accessory, distance measuring devices Series VDM18

Electrical Connection

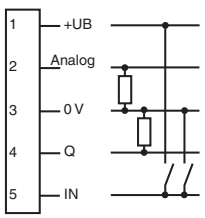
VDM18-100/20/88/122/151
VDM18-300/20/88/122/151

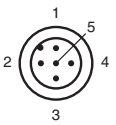


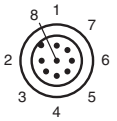
VDM18-100/20/122/151
VDM18-300/20/122/151



VDM18-100/32/105/122
VDM18-300/32/105/122







Wire colors in accordance with EN 60947-5-2

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

1	WH
2	BN
3	GN
4	YE
5	GY
6	PK
7	BU
8	RD

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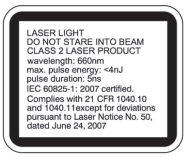


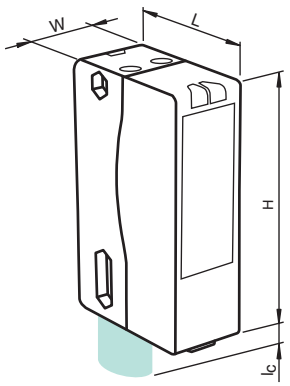
IO-Link

Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Benefits

- Parallel measuring paths without crosstalk.
- 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.us**

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
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
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		VDM28-8-L-IO/110/115b/122	VDM28-8-L-IO/115b/136	VDM28-8-L1-IO/73c/110/122	VDM28-8-L-IO/73c/136
Laser class	2	●	●		●
	1			●	
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 length l_c [mm]		5		14	

Accessories

These and more accessories can be found in chapter 5.6 from page xxx

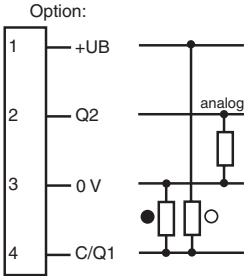
See pages from xxx ... for cordsets — See pages xxxx ... for mounting accessories

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

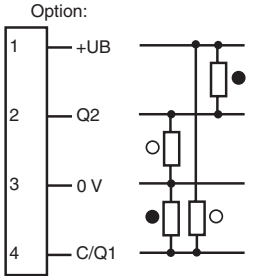
VDM28-8-L-IO/110/115b/122
VDM28-8-L1-IO/73c/110/122

Option:

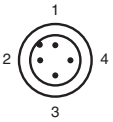


VDM28-8-L-IO/115b/136
VDM28-8-L-IO/73c/136

Option:



❍ = 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)

IO-Link

Technical Data

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

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
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.

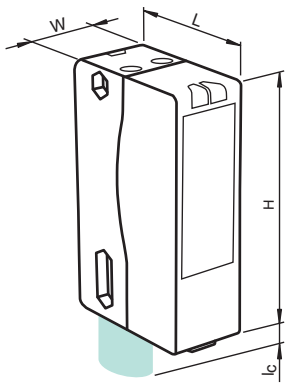
Dimensions	
Length L [mm]	54.3
Width W [mm]	25.8
Height H [mm]	88
Connector length l_c [mm]	14

Properties

- Rectangular full-size housing
- Diffuse distance measurement
- Pulse Ranging Technology (PRT)
- Medium range
- Discrete and analog outputs with IO-Link
- Laser red light

Benefits

- Parallel measuring paths without crosstalk.
- Secure measurement in difficult conditions, e.g. mist or dust
- High resistance to ambient light
- Measures distances consistently, regardless of surface color



Accessories

These and more accessories can be found in chapter 5.6 from page xxx

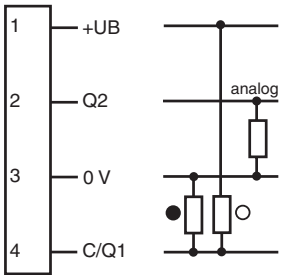
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

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 bracket for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-07	Mounting bracket for round steel ø 12 mm or sheet 1.5 mm ... 3 mm
OMH-21	Mounting bracket
OMH-22	Mounting bracket
OMH-MLV11-K	dove tail mounting clamp
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

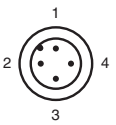
Electrical Connection

VDM28-15-L-IO/73c/110/122

Option:

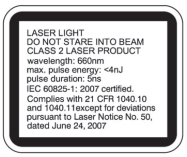


❍ = light on, ● = dark on



Wire colors in accordance with EN 60947-5-2

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



CE IO-Link

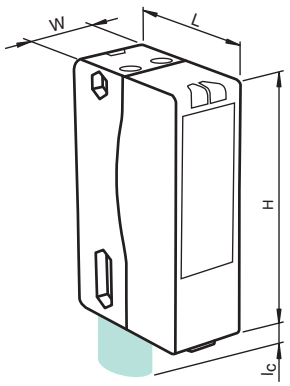
c UL us

Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Long range
- Discrete and analog outputs with IO-Link
- Laser red light

Benefits

- Parallel measuring paths without crosstalk.
- Secure measurement in difficult conditions, e.g. mist or dust
- High resistance to ambient light



Technical Data

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

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
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
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-R1-IO/73c/110/122	VDM28-50-R-IO/73c/136
Laser class	2		●
	1	●	
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 length l_c [mm]		14	

Accessories

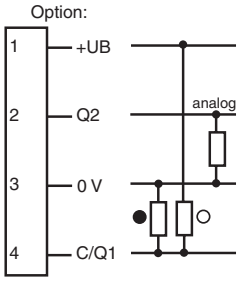
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets — See pages xxxx ... for mounting accessories

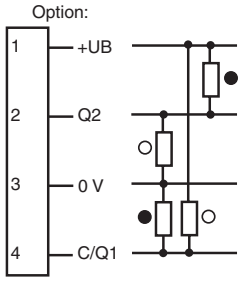
PACTware 4.X	Software
VDM28-IO-Link DTM	Device DTM for communication with VDM28-IO-Link sensors
IODD Interpreter	Software for the integration of IODDs in a frame application (e. g. PACTware)
IO-Link-Master01-USB	IO-Link Master
OMH-RL28-C	Protective cover
OMH-VDM28-01	Metal enclosure for inserting protective panes or apertures

Electrical Connection

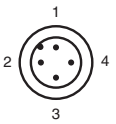
VDM28-50-R1-IO/73c/110/122



VDM28-50-R-IO/73c/136

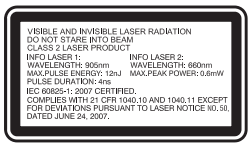


❍ = light on, ● = dark on



Wire colors in accordance with EN 60947-5-2

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

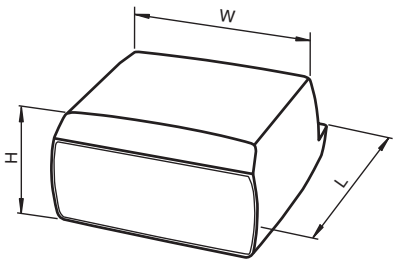


Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Extended range
- SSI interface
- Laser infrared light

Benefits

- Integral alignment aid LEDs simplify setup
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp tool-less mounting
- Ideal for highly dynamic control loops
- LED bar display indicates signal strength



Technical Data

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

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

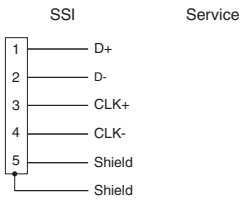
Model Number		VDM100-50-SSI	VDM100-150-SSI	VDM100-300-SSI
Measurement range	0.3 ... 50 m	●		
	0.3 ... 150 m		●	
	0.3 ... 300 m			●
Reference target	Foil reflector 500 mm x 500 mm	●	●	
	Reflector VDM01			●
Diameter of the light spot	< 15 cm at 50 m	●		
	< 35 cm at 150 m		●	
	< 70 cm at 300 m			●
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)	●	●	●
Approvals and Certificates				
UL approval	cULus Listed	●	●	●
Dimensions				
Length L [mm]			170	
Width W [mm]			140	
Height H [mm]			90	

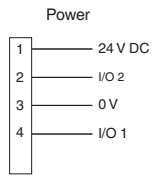
Accessories

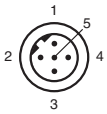
These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

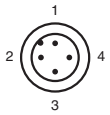
OMH-LS610-05	Mounting bracket for optical data coupler and distance measurement devices
V15-G-15M-LIHCH-TP	SSI bus cable, B-coded M12, 5-pin cable, straight
OMH-VDM100-01	Mounting bracket with deviation mirror for distance measurement devices
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-LS610-02	Direct mounting set consisting of 4 x M4 threaded inserts
OMH-LS610-05	Mounting bracket

Electrical Connection









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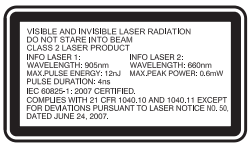
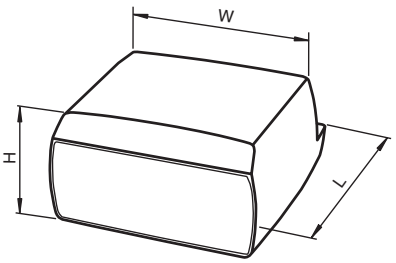


Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Extended range
- PROFIBUS interface
- Laser infrared light

Benefits

- Integral alignment aid LEDs simplify setup
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp tool-less mounting
- Ideal for highly dynamic control loops
- LED bar display indicates signal strength



Technical Data

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

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		VDM100-50-P	VDM100-150-P	VDM100-300-P
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)	●	●	●
Approvals and Certificates				
UL approval	cULus Listed	●	●	●
Dimensions				
Length L [mm]			170	
Width W [mm]			140	
Height H [mm]			90	

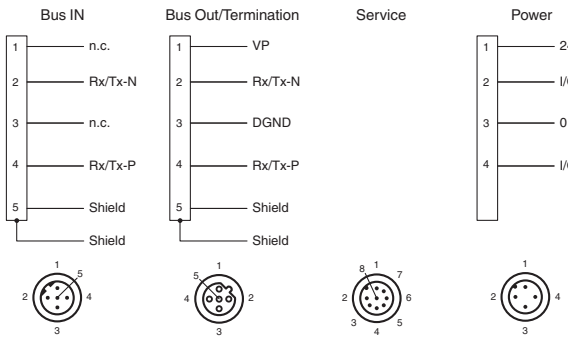
Accessories

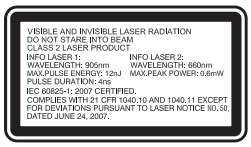
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

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
OMH-LS610-05	Mounting bracket

Electrical Connection





Technical Data

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

General Data	
Light source	laser diode
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
Alignment aid	Laserpointer Laser class 2
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	INTERBUS
Transfer rate	500 kBit/s
Input/output type	2 PNP inputs/outputs, independent configuration, short-circuit protected, reverse polarity protected
Switching current	200 mA per output
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
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		VDM100-50-IBS	VDM100-300-IBS	VDM100-150-IBS
Measurement range	0.3 ... 150 m			●
	0.3 ... 300 m		●	
	0.3 ... 50 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		●	
Approvals and Certificates				
UL approval	cULus Listed	●	●	●

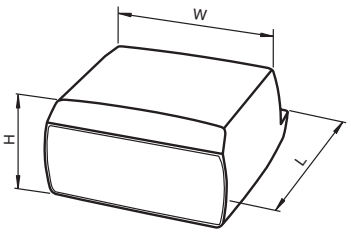
Dimensions	
Length L [mm]	170
Width W [mm]	140
Height H [mm]	90

Properties

- Rectangular full-size housing
- Retroreflective distance measurement
- Pulse Ranging Technology (PRT)
- Extended range
- INTERBUS interface
- Laser infrared light

Benefits

- Integral alignment aid LEDs simplify setup
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp tool-less mounting
- Ideal for highly dynamic control loops
- LED bar display indicates signal strength



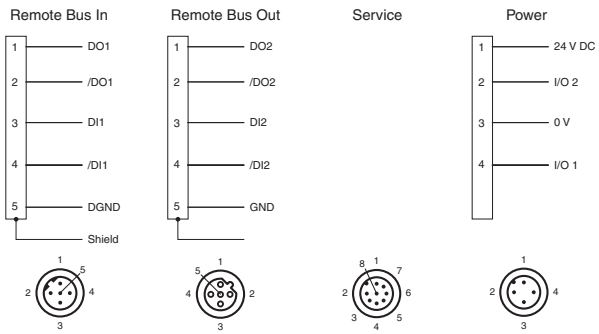
Accessories

These and more accessories can be found in chapter 10

See pages from 970 ... for cordsets See pages 1066 ... for mounting accessories

V15-W-PG9	5-pin, M12 female field-attachable connector, angled
V1-W	4-pin, M12 female field-attachable connector, angled
V15B-G-15M-LIHCH-TP	SSI bus cable, B-coded M12, 5-pin cable, straight
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
OMH-LS610-05	Mounting bracket

Electrical Connection



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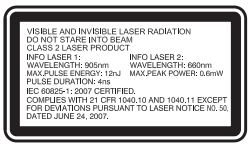


Technical Data

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

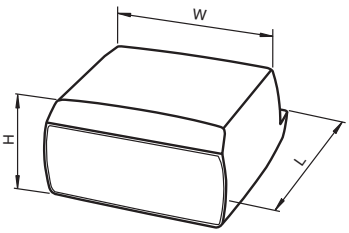
Model Number	VDM100-150-EIP/G2
Measurement range	0.3 ... 150 m
Reference target	Foil reflector 500 mm x 500 mm
Light source	laser diode
Laser class	Measurement laser: 1 Alignment laser: 2
Wave length	Measurement laser: 905 nm Alignment laser: 660 nm
Measuring method	Pulse Ranging Technology (PRT)
Max. Motion velocity	15 m/s
Alignment aid	Laserpointer
Diameter of the light spot	< 35 cm at 150 m
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	EtherNet/IP / Webserver
Input/output type	2 PNP inputs/outputs, independent configuration, short-circuit protected, reverse polarity protected
Switching current	200 mA per output
Ambient temperature	-10 ... 50 °C (14 ... 122 °F)
Housing	ABS / PC
Optical face	PMMA , hard coated
Protection degree	IP65
Connection	4-pin, M12x1 connector, standard (supply) , M12x1 socket, 4-pin, D-coded (LAN) , 8-pin M12x1 connector, service
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
- Ethernet/IP interface
- Laser infrared light

Benefits

- Integral alignment aid LEDs simplify setup
- Eyesafe, due to laser class 1 in measurement operation
- Easy installation due to quick clamp tool-less mounting
- Ideal for highly dynamic control loops
- LED bar display indicates signal strength



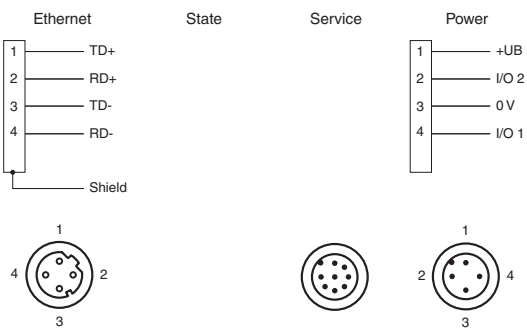
Accessories

These and more accessories can be found in chapter 10

See pages from 970 ... for cordsets See pages 1066 ... for mounting accessories

V15-G-PG9	5-pin, M12 female field-attachable connector, straight
V1SD-G-2M-PUR-ABG-V45-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e, straight
V1SD-G-5M-PUR-ABG-V45-G	Connection cable, M12 to RJ-45, PUR cable 4-pin, CAT5e, straight
V1SD-G-ABG-PG9	4-pin, M12 female field-attachable connector, D-coded, shielded, straight
V1SD-G-2M-PUR-ABG-V1SD-G	Ethernet bus cable, M12 to M12, PUR cable 4-pin, CAT5e, straight
OMH-LS610-01	Mounting bracket for optical data coupler
OMH-VDM100-01	Mounting bracket with deviation mirror for distance measurement devices
OMH-LS610-05	Mounting bracket

Electrical Connection



Properties

- Infrared LED technology
- Positioning feedback to 314.5 m
- RS 485 interface
- 12.5 m/s maximum speed
- +/- 0.4 mm resolution

Benefits

- Emulates a 512-turn, 1024 ppr absolute rotary encoder
- Non-contact, wear-free operation
- Alignment aids and health checks
- Scans straight or curved paths

Technical Data

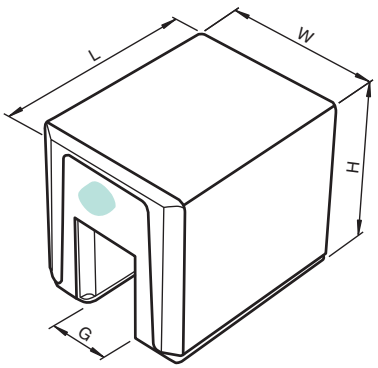
For detailed data and product description refer to the data sheets at www.pepperl-fuchs.us

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		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 sourcel
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31

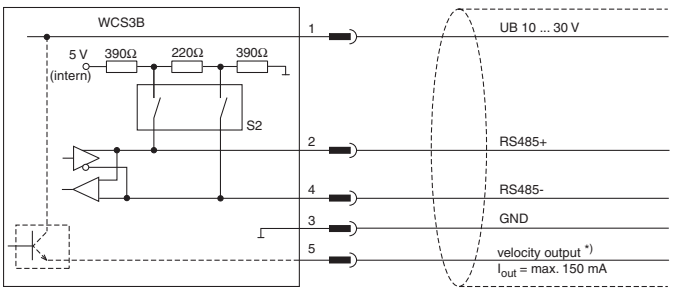


Accessories

These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets
See pages xxxx ... for mounting accessories

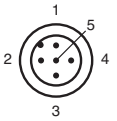
WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

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)

Technical Data

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

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		WCS3B-LS310	WCS3B-LS310D	WCS3B-LS311	WCS3B-LS311D
Display	Display module, 6-digit, adaptable to installation position		●		●
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			●	●

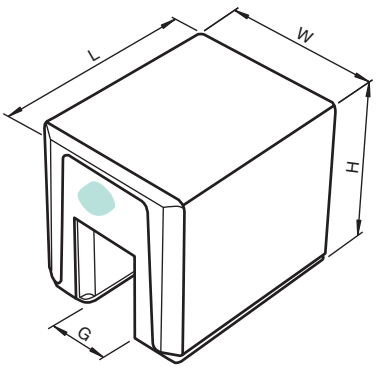
Approvals and Certificates	
CSA approval	cCSAus Certified, General Purpose Class 2 power source
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Properties

- Infrared LED technology
- Positioning feedback to 314.5 m
- SSI interface
- 1 ms response time
- +/- 0.4 mm resolution

Benefits

- Emulates a 512-turn, 1024 ppr absolute rotary encoder
- Non-contact, wear-free operation
- Alignment aids and health checks
- Scans straight or curved paths
- Plug-n-play drive communication



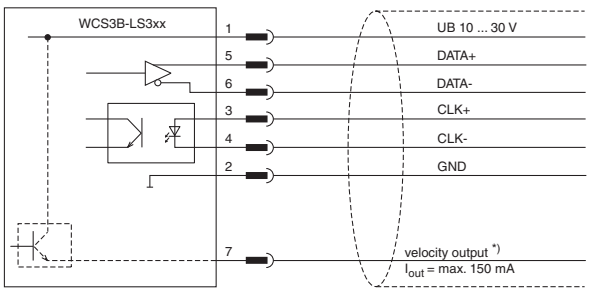
Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31

Accessories

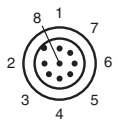
These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

WCS-MP1	Mounting plate for reading heads WCS2 and WCS3

Electrical Connection



*) only with option S, velocity output



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)

Technical Data

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

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
	

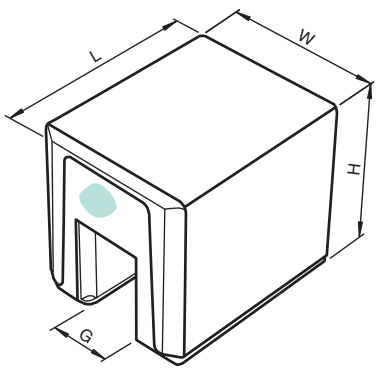
Approvals and Certificates	
CSA approval	cCSAus Certified, General Purpose Class 2 power source
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Properties

- Infrared LED technology
- Positioning feedback to 314.5 m
- CANopen interface
- +/- 0.4 mm resolution

Benefits

- Emulates a 512-turn, 1024 ppr absolute rotary encoder
- Non-contact, wear-free operation
- Alignment aids and health checks
- Scans straight or curved paths



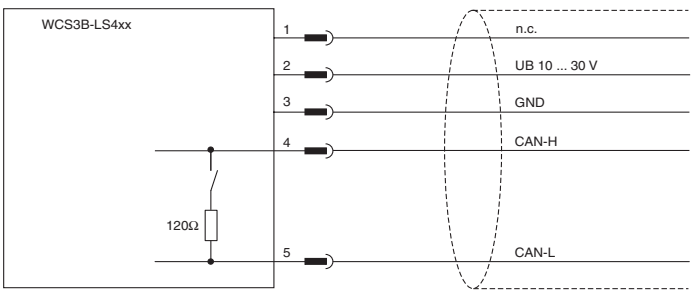
Dimensions	
Length L [mm]	115
Width W [mm]	90
Height H [mm]	99
Slot width G [mm]	31

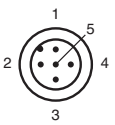
Accessories

These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets
See pages xxxx ... for mounting accessories

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)

Technical Data

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

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		WCS2B-LS1**	WCS2B-LS2**
Termination	with RS 485 termination		●
	without RS 485 termination	●	

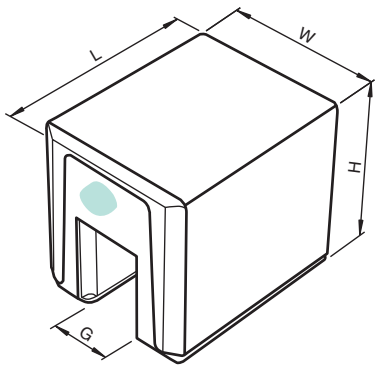
Approvals and Certificates	
CSA approval	cCSAus Certified, General Purpose Class 2 power source
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Properties

- Infrared LED technology
- Positioning feedback to 327 m
- RS 485 interface
- +/- 0.42 mm resolution

Benefits

- Maximum optical burn-thru power
- Used with trolley + track systems
- Emulates a 512-turn, 1024 ppr absolute rotary encoder
- Excellent for overhead cranes



Dimensions	
Length L [mm]	115
Width W [mm]	75
Height H [mm]	75
Slot width G [mm]	10

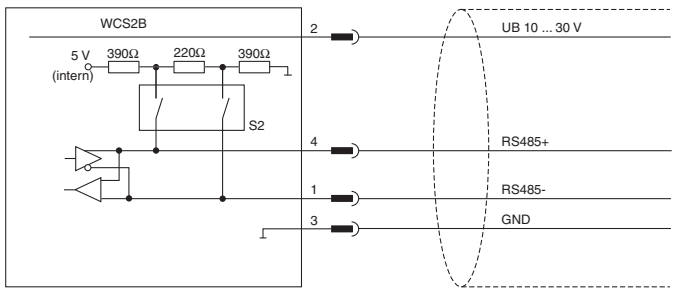
Accessories

These and more accessories can be found in chapter 5.6 from page xxx

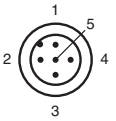
See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

WCS-MP1	Mounting plate for reading heads WCS2 and WCS3
WCS2-GT09-P1	WCS2 guiding trolley
WCS2-PS1-8FT	WCS2 profile rail
WCS2-MC1	Joint
WCS-MH	WCS2 profile rail bracket
WCS-MH1	WCS2 screw-on holder
WCS-MH2	WCS2 holder for C profile
WCS2-LB1	WCS2 locking bracket

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)

Technical Data

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

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	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	CCC approval / marking not required for sensors rated ≤36 V

Properties

- Infrared LED technology
- Positioning feedback to 327 m
- SSI interface
- 1 ms response time
- +/- 0.42 mm resolution

Benefits

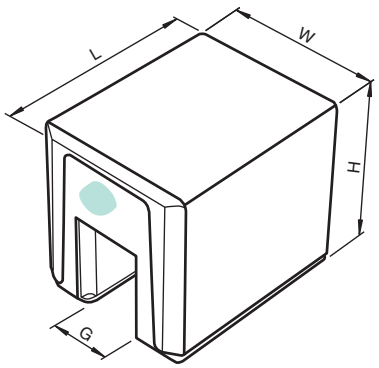
- Maximum optical burn-thru power
- Used with trolley + track systems
- Emulates a 512-turn, 1024 ppr absolute rotary encoder
- Excellent for overhead cranes

Further Products

In this series, we offer the following additional products:

WCS2B-LS311H

Technical data like WCS2B-LS311 but:
with Option H, heating, see General Data.



Dimensions	
Length L [mm]	115
Width W [mm]	75
Height H [mm]	75
Slot width G [mm]	10

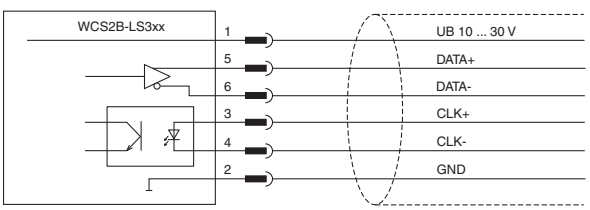
Accessories

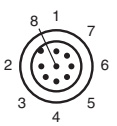
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets
See pages xxxx ... for mounting accessories

WCS-MP1	Mounting plate for reading heads WCS2 and WCS3
WCS2-GT09-P1	WCS2 guiding trolley
WCS2-PS1-8FT	WCS2 profile rail
WCS2-MC1	Joint
WCS-MH	WCS2 profile rail bracket
WCS-MH1	WCS2 screw-on holder
WCS-MH2	WCS2 holder for C profile
WCS2-LB1	WCS2 locking bracket

Electrical 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)

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CE

Properties

- RS 485 to PROFINET interface
- Connection of up to 2 WCS...B-LS221 read heads
- DIN rail mounting

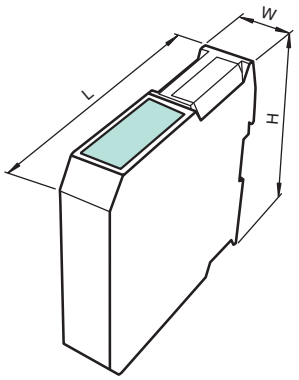
Technical Data

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

General Data	
Operating voltage	24 V DC ± 10 %
Power consumption	≤ 3.6 W (without read heads)
Interface 1	more information, see table below
Connection of	control system
Protocol	PROFINET
Data output format	binary code
Interface 2	
Connection of	Reading head
Connectable read heads	WCS...B-LS221 , WCS...B-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

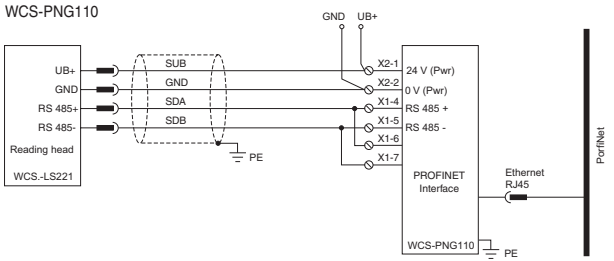
Model Number		WCS-PNG110	WCS-PNG210
Number of channels	1	●	
	2		●
Interface 1			
Interface type	Ethernet	●	
	Ethernet; 100 BASE-TX		●
Transfer rate	10 MBit/s or 100 MBit/s	●	
	100 MBit/s		●

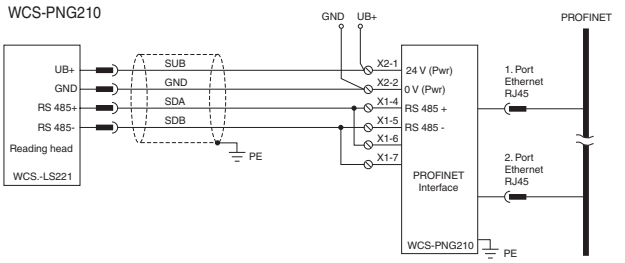
Approvals and Certificates	
CCC approval	CCC approval / marking not required for sensors rated ≤36 V



Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100

Electrical Connection





CE

Properties

- RS 485 to Ethernet/IP interface
- Connection of up to 2 WCS...B-LS221 read heads
- DIN rail mounting

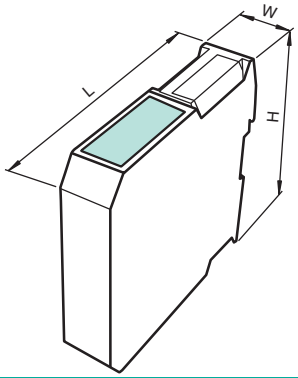
Technical Data

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

General Data	
Operating voltage	10 ... 30 V DC
Power consumption	≤ 3.6 W (without read heads)
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...B-LS221, WCS...B-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

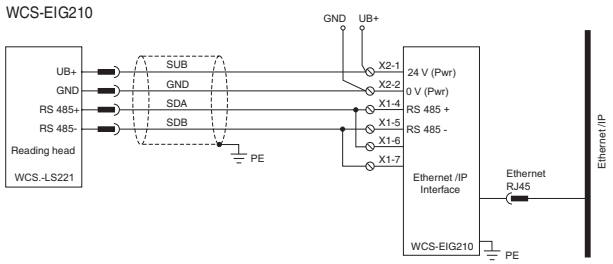
Model Number		WCS-EIG210	WCS-EIG310
Number of channels	1	●	
	2		●

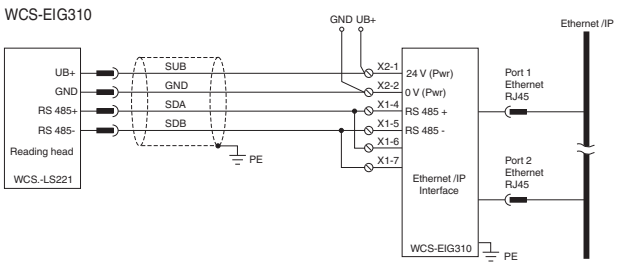
Approvals and Certificates	
CCC approval	CCC approval / marking not required for sensors rated ≤36 V



Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100

Electrical Connection





CE

Technical Data

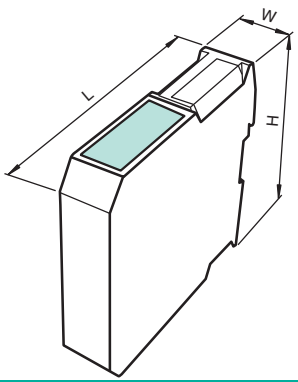
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.us***

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...B-LS221, WCS...B-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	CCC approval / marking not required for sensors rated ≤36 V

Properties

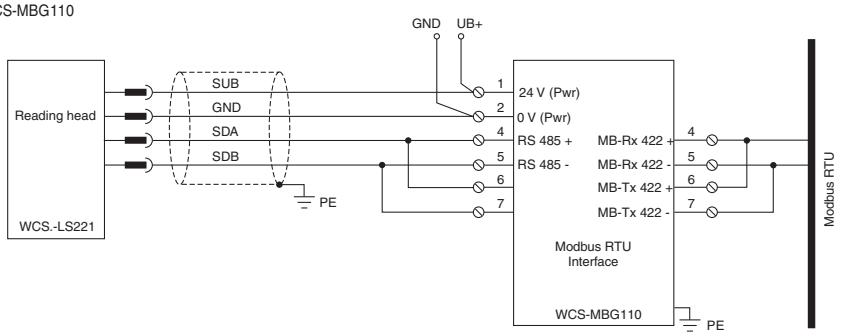
- **RS 485 to MODBUS-RTU interface**
- **Connection of up to 4 WCS...B-LS221 read heads**
- **DIN rail mounting**

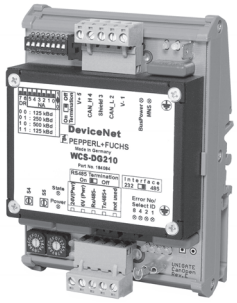


Dimensions	
Length L [mm]	117
Width W [mm]	23
Height H [mm]	100

Electrical Connection

WCS-MBG110





Technical Data

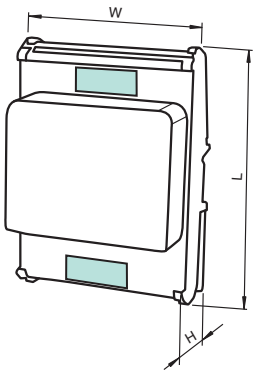
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.us***

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...B-LS221, WCS...B-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	CCC approval / marking not required for sensors rated ≤36 V

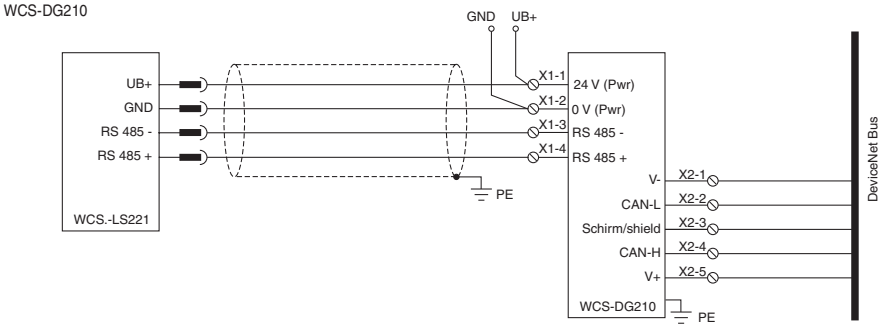
Properties

- **RS 485 to DeviceNet interface**
- **Connection of up to 4 WCS...B-LS221 read heads**
- **DIN rail mounting**



Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	63.5

Electrical Connection



Technical Data

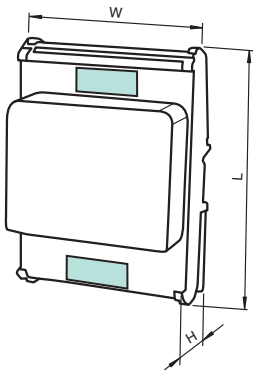
For detailed data and product description refer to the data sheets at ***www.pepperl-fuchs.us***

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...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 mm² , 5-pin

Approvals and Certificates	
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

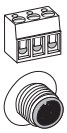
Properties

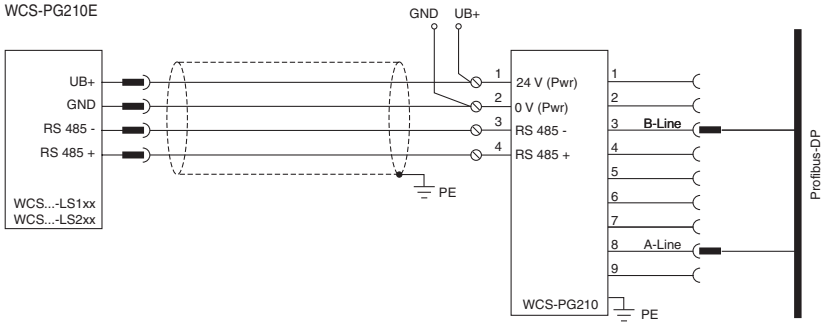
- **RS 485 to PROFIBUS DP interface**
- **Connection of up to 4 WCS...B-LS221 read heads**
- **DIN rail mounting**

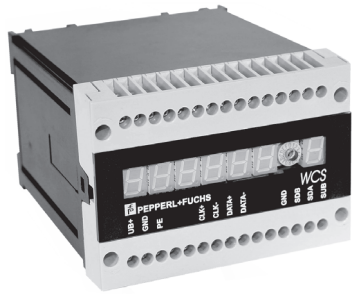


Dimensions	
Length L [mm]	127
Width W [mm]	90
Height H [mm]	64.5

Electrical Connection







Technical Data

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

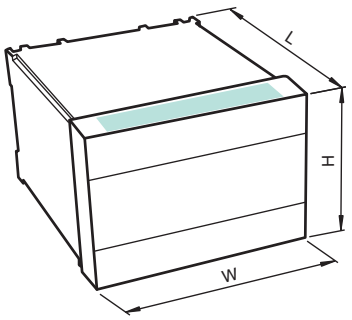
General Data	
Operating voltage	24 V DC ± 20 %
Power consumption	≤ 2 W (without read heads)
Interface 1	
Connection of	control system
Interface type	SSI
Bus termination resistor	integrated
Interface 2	
Connection of	Reading head
Interface type	RS 485
Transmission method	half duplex
RS485 termination 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...B-LS211	●	
	WCS...B-LS221		●
Transfer rate	max. 187.5 kBit/s	●	
	max. 62.5 kBit/s		●

Approvals and Certificates	
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

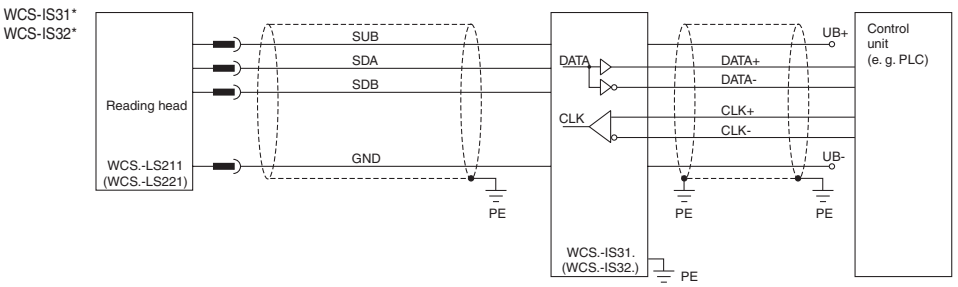
Properties

- RS 485 to SSI interface
- Connection to LS211 read heads
- Digital display shows position and diagnostics
- Excellent for electrically noisy areas



Dimensions	
Length L [mm]	121
Width W [mm]	100
Height H [mm]	74

Electrical Connection



CE

Properties

- RS 485 to parallel interface
- Connection of up to 4 LS211 read heads
- Digital display shows position and diagnostics

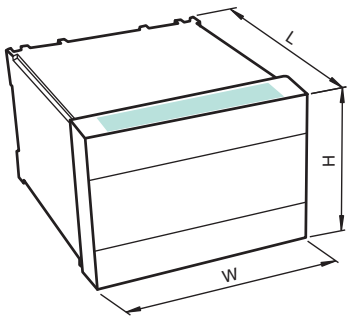
Technical Data

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

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...B-LS211, WCS...B-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			●	●

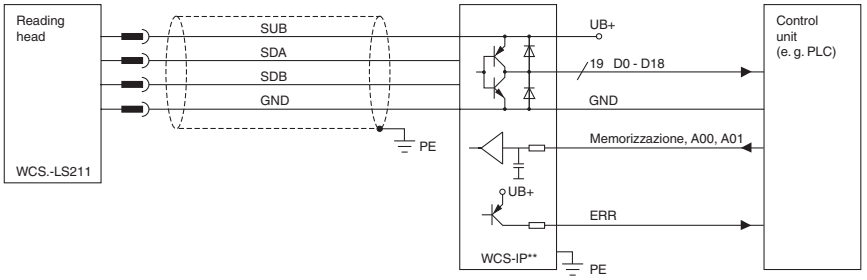
Approvals and Certificates	
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

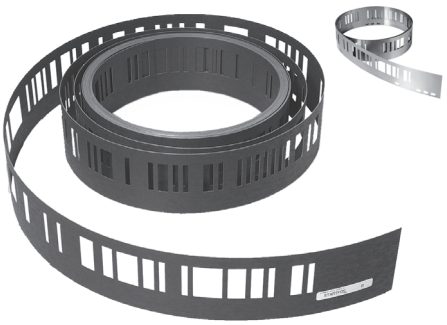


Dimensions	
Length L [mm]	121
Width W [mm]	100
Height H [mm]	74

Electrical Connection

WCS-IP110
WCS-IP111
WCS-IP120
WCS-IP121





Technical Data

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

General Data	
Length	0.1 ... 314.5 m
Bend radius	≥ 300 mm

Model Number		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	Type -L0: without mounting holes Type -L1 and -M1: with standard mounting holes Type -L2: with Vahle VKS mounting holes	●	●	●	●

Properties

- Code rail for WCS3 system
- Customized lengths to 314.5 m
- Polyester laminate and stainless steel versions

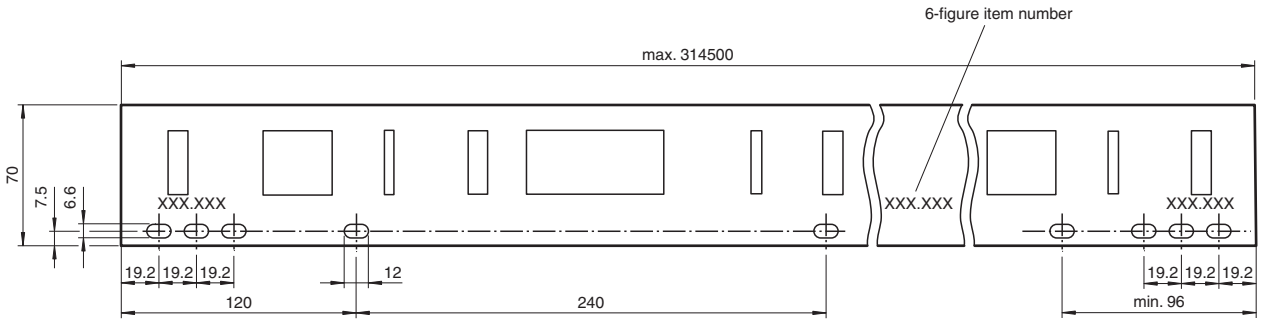
Accessories

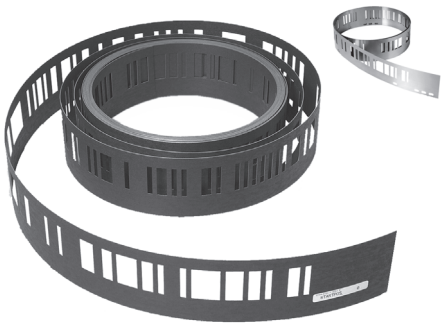
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

WCS-MT1	Tensioning device for stainless steel code rail
WCS-MB	Mounting bracket, straight
WCS-MB-B	Mounting bracket, curve
WCS-MB1	Mounting bracket for bolt connection, straight
WCS-MB1-B	Mounting bracket for bolt connection, curve
WCS-MB2	Mounting bracket for C profile, straight
WCS-MB2-B	Mounting bracket for C profile, curve
WCS-MB2-UNI	Mounting bracket for UNISTRUT™ profile, straight
WCS-MB2-B-UNI	Mounting bracket for UNISTRUT™ profile, curve
WCS-SP2	Stabilization profile

Dimensions





Technical Data

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

General Data	
Code rail height	a = 55 mm
Length	0.1 ... 327 m
Bend radius	≥ 500 mm

Model Number		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	●	

Properties

- Code rail for WCS2 system
- Customized lengths to 327 m
- Polyester laminate and stainless steel versions

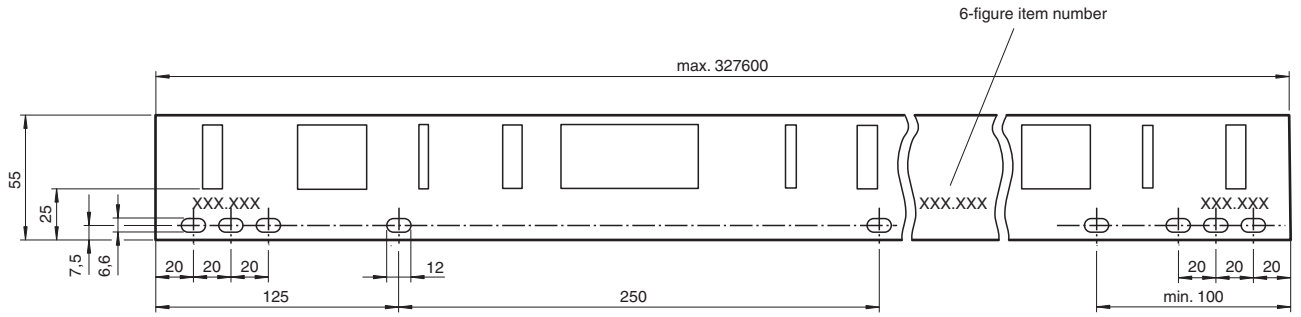
Accessories

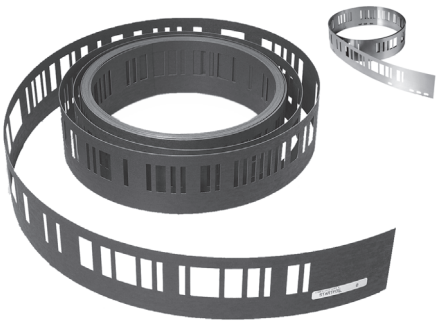
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

WCS-MT1	Tensioning device for stainless steel code rail
WCS2-PS1-8FT	WCS2 profile rail
WCS2-FT1	Mounting tool to install the 55 mm code strip in the aluminium profile
WCS-MF1	Wrist strap
WCS2-MC1	Joint
WCS2-LB1	WCS2 locking bracket
WCS2-MH2-UNI	WCS2 holder for UNISTRUT™ profile
WCS-GT09-P1	WCS2 guiding trolley

Dimensions





Technical Data

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

General Data	
Code rail height	a = 70 mm
Length	0.1 ... 327 m
Bend radius	≥ 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	●	

Properties

- Code rail for WCS2 system
- Customized lengths to 327 m
- Polyester laminate and stainless steel versions

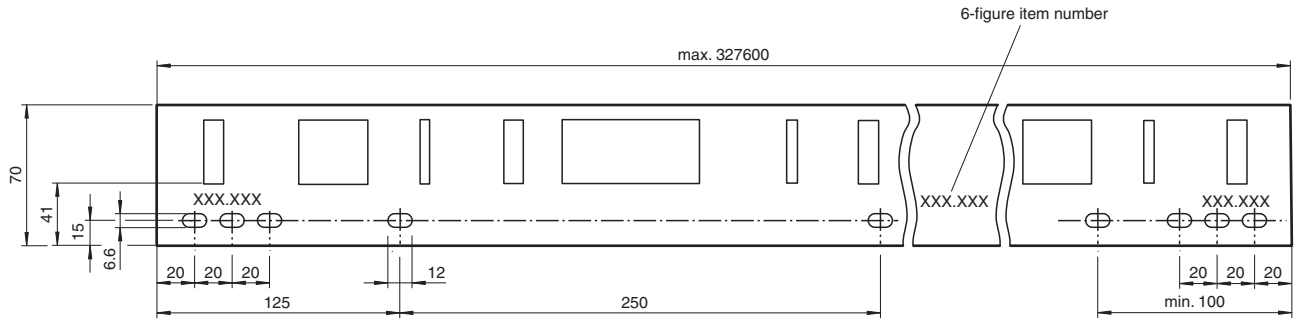
Accessories

These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

WCS-MT1	Tensioning device for stainless steel code rail
WCS-MB	Mounting bracket, straight
WCS-MB-B	Mounting bracket, curve
WCS-MB1	Mounting bracket for bolt connection, straight
WCS-MB1-B	Mounting bracket for bolt connection, curve
WCS-MB2	Mounting bracket for C profile, straight
WCS-MB2-B	Mounting bracket for C profile, curve
WCS-MB2-UNI	Mounting bracket for UNISTRUT™ profile, straight
WCS-MB2-B-UNI	Mounting bracket for UNISTRUT™ profile, curve
WCS-SP2	Stabilization profile

Dimensions



Technical Data

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

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		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	CCC approval / marking not required for sensors rated ≤36 V			

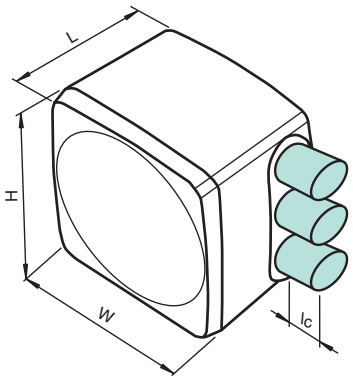
Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14,5

Properties

- 2-D data matrix read head
- Up to 10 km travel length
- SSI interface
- +/- 0.1 mm resolution
- 80 mm and 100 mm read distance
- High speed scanning - to 12.5 m/s

Benefits

- Absolute positional information
- Vertical and horizontal feedback
- Wear-free, contactless operation
- Follows straight or curved paths
- Secure, robust code technology



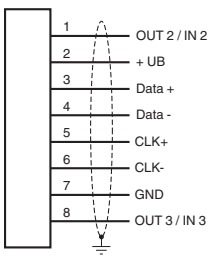
Accessories

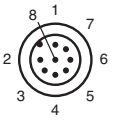
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets
See pages xxxx ... for mounting accessories

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, with ground
PCV-KBL-V19-STR-USB	USB cable unit with power supply
PCV-SC12	Grounding clip for PCV system
PCV-AB	Mounting bracket
PCV-FB	Mounting bracket

Electrical Connection





CE

Properties

- 2-D data matrix read head
- Up to 10 km travel length
- RS 485 interface
- +/- 0.1 mm resolution
- 80 mm and 100 mm read distance
- High speed scanning - to 12.5 m/s

Benefits

- Absolute positional information
- Vertical and horizontal feedback
- Wear-free, contactless operation
- Follows straight or curved paths
- Secure, robust code technology

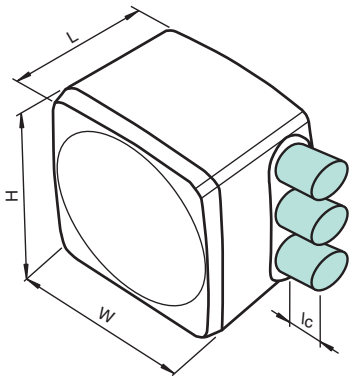
Technical Data

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

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		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	CCC approval / marking not required for sensors rated ≤36 V		

Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14,5



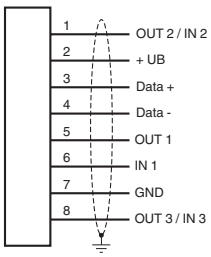
Accessories

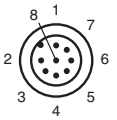
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets See pages xxxx ... for mounting accessories

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, with ground
PCV-SC12	Grounding clip for PCV system
PCV-AB	Mounting bracket
PCV-FB	Mounting bracket

Electrical Connection





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CE

Technical Data

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

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

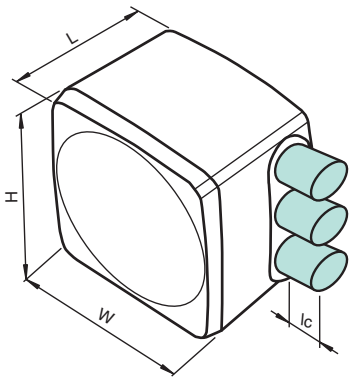
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Properties

- 2-D data matrix read head
- Up to 524 m travel length
- RS 485 interface
- For use with network interfaces
- 80 mm read distance
- High speed scanning - to 12.5 m/s

Benefits

- WCS-DG210 and WCS-EIG210 interfaces convert RS 485 to DeviceNet or EtherNet/IP
- Follows straight or curved paths
- Wear-free, contactless operation



Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14.5

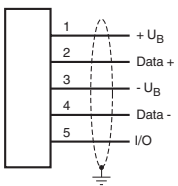
Accessories

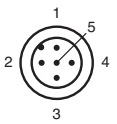
These and more accessories can be found in chapter 5.6 from page xxx

See pages from xxx ... for cordsets **See pages xxxx ... for mounting accessories**

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, with ground
PCV-SC12	Grounding clip for PCV system
WCS-DG210	WCS DeviceNet interface module
WCS-EIG210	WCS EtherNet/IP interface module
PCV-AB	Mounting bracket
PCV-FB	Mounting bracket

Electrical Connection





Technical Data

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

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)

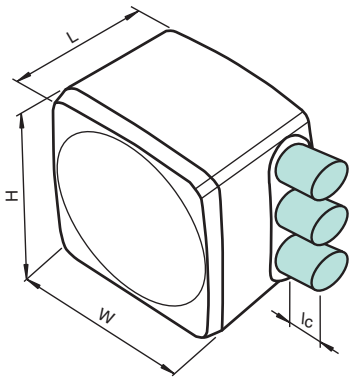
Approvals and Certificates	
UL approval	cULus Listed, General Purpose, Class 2 Power Source
CCC approval	CCC approval / marking not required for sensors rated ≤36 V

Properties

- 2-D data matrix read head
- Up to 10 km travel length
- Integral PROFIBUS protocol
- 80 mm read distance
- PLC configurable via fieldbus
- High speed scanning - to 12.5 m/s
- Compact housing

Benefits

- No extra control interface needed
- Absolute positional information
- Vertical and horizontal feedback
- Wear-free, contactless operation
- Follows straight or curved paths
- Secure, robust code technology



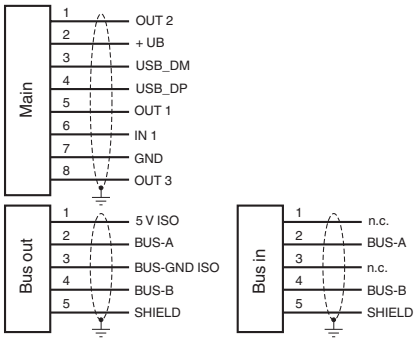
Dimensions	
Length L [mm]	51
Width W [mm]	70
Height H [mm]	70
Connector area l_c [mm]	14.5

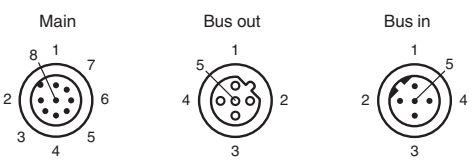
Accessories

These and more accessories can be found in chapter 5.6 from page xxx
See pages from xxx ... for cordsets
See pages xxxx ... for mounting accessories

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, 2 m length
V15B-G-5M-PUR ABG-V15B-G	Bus cable PROFIBUS, M12 to M12, PUR cable, 5 m length
PCV-SC12	Grounding clip for PCV system
PCV-AB	Mounting bracket
PCV-FB	Mounting bracket

Electrical Connection





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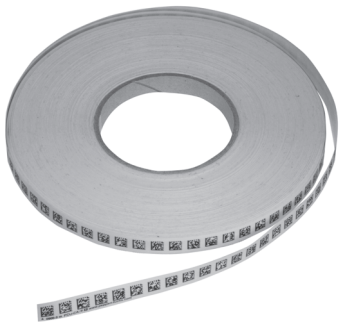


Technical Data

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

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 band
- Single-square, 1-row version
- 10 m, 20 m, 50 m and 100 m lengths
- Self adhesive

Benefits

- Thinnest possible width (15 mm)
- +/- 10 mm vertical scan tolerance
- Excellent chemical resistance
- Fast and simple installation
- Temporary replacement sections easily generated via web tool

Order Information

P	C	V				M	-	C	A	1	0	-						

Starting position
xxxxxx **0 ... 990000 cm**

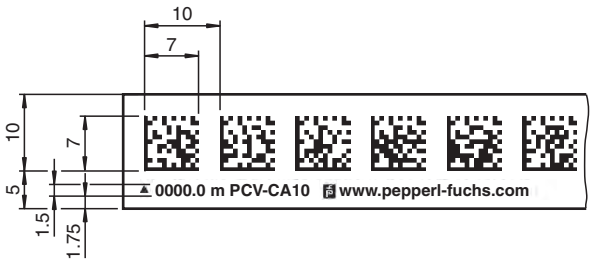
Absolute band width
10 15 mm (1 row version)

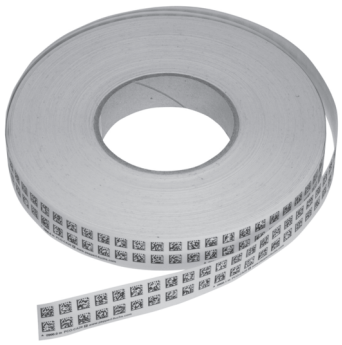
Absolute band
Code: Data Matrix ECC200; matrix size 12x12

Absolute band length
xxx 6 ... 100 meter

Position Coding System, Vision Technology

Dimensions





Technical Data

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

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 band
- Dual square, 2-row version
- 10 m, 20 m, 50 m and 100 m lengths
- Self-adhesive
- Stocked standard model

Benefits

- +/- 15 mm vertical scan tolerance
- Fast delivery time
- High chemical resistance
- Temporary replacement sections easily generated via web tool

Order Information

P	C	V				M	-	C	A	2	0	-						

Starting position
xxxxxx **0 ... 990000 cm**

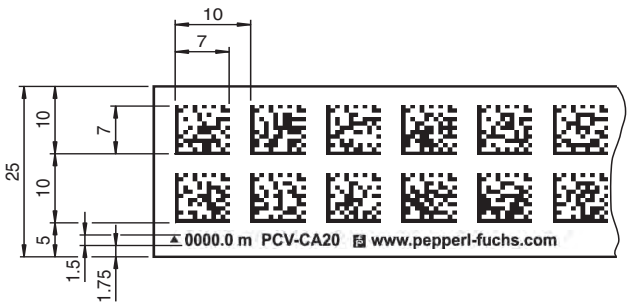
Absolute band width
20 25 mm (2 rows version)

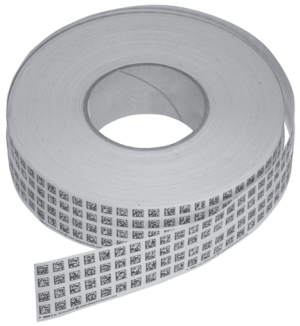
Absolute band
Code: Data Matrix ECC200; matrix size 12x12

Absolute band length
xxx 6 ... 100 meter

Position Coding System, Vision Technology

Dimensions





Technical Data

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

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 band**
- **Quad-square, 4-row version**
- **Non-stock, custom model**
- **Self adhesive**

Benefits

- **+/- 25 mm vertical scan tolerance**
- **Excellent chemical resistance**
- **Fast and simple installation**
- **Temporary replacement sections easily generated via web tool**

Order Information

P	C	V				M	-	C	A	4	0	-						

Starting position
xxxxxx **0 ... 990000 cm**

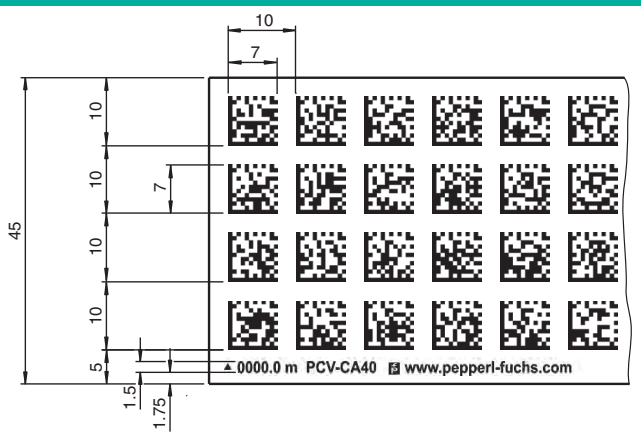
Absolute band width
40 45 mm (4 rows version)

Absolute band
Code: Data Matrix ECC200; matrix size 12x12

Absolute band length
xxx 6 ... 100 meter

Position Coding System, Vision Technology

Dimensions



Technical Data

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

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

- **Event marker strip (2-row)**
- **Self adhesive, installs over existing positional code tape**
- **Marker numbers 001 ... 998**

Benefits

- **Triggers read head switch outputs at critical points along the travel path**
- **Absolute positional data is uninterrupted**

Order Information

P	C	V	-	C	M			-			

Marker number
xxx 001 ... 998

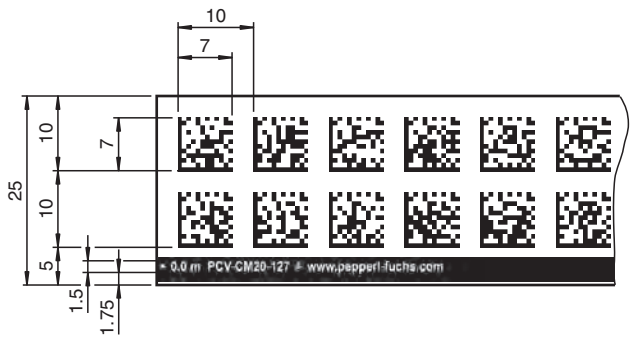
Marker band width
10 16 mm (single row version)
20 25 mm (2 rows version)

Marker band

Code

Position Coding System, Vision Technology

Dimensions



Technical Data

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

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

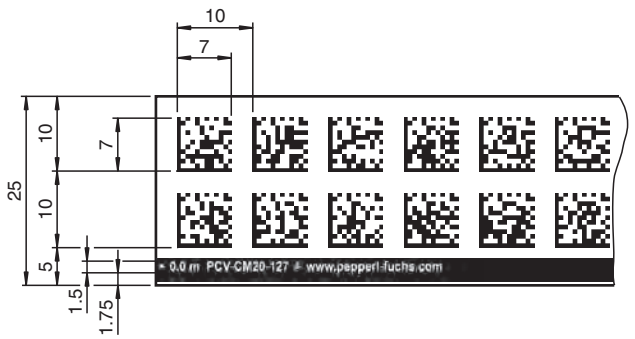
Properties

- **Data Matrix repair tape (2-row)**
- **Self adhesive, installs over existing positional code**
- **Incremental, 1 meter length**

Benefits

- **Easy repair of damaged sections**
- **Provides a high level of system availability**

Dimensions



Technical Data


BT-F90-G


BT-F110-G

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Common data	
Function	Actuator for inductive positioning system, front screw holes
Material	Steel ST37/1.0037

Model number		BT-F90-G	BT-F110-G
Inductive positioning system	F90	●	
	F110		●

Technical Data


BT-F90-W


BT-F110-W

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Common data	
Function	Actuator for inductive positioning system, lateral screw holes
Material	Steel ST37/1.0037

Model number		BT-F90-W	BT-F110-W
Inductive positioning system	F90	●	
	F110		●

Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Common data	
Function	Mounting bracket for the inductive positioning system
Material	Zinc-coated sheet steel
Pieces per package	2

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.us***

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.us***

Model number	OMH-LS610-01
Material	Black anodized aluminum Black zinc-coated steel
Description	Mounting bracket for VDM100 laser distance measurement devices

Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Model number	OMH-LS610-02
Material	Brass
Description	Direct mounting set comprising 4 M4 threaded inserts for VDM100 laser distance measurement devices

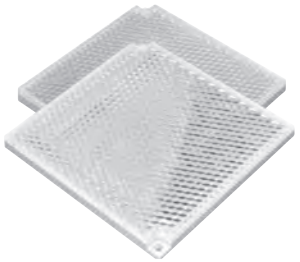
Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Model number	OFR-100/100
Description	100 mm x 100 mm reflective tape for 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.us***

Model number	REF-H100-2R
Material	PMMA
Description	100 mm x 100 mm reflector for 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.us***

Model number	REF-500MMx500MM
Description	500 mm x 500 mm reflective tape for VDM100 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.us***

Model number	Protective cap LS610
Description	For VDM100 laser distance measurement devices

Included with VDM 100 series

Technical Data

*For detailed data and product description, see the data sheet at **www.pepperl-fuchs.us***

Model number	Functional grounding LS610/VDM100
Description	For VDM100 laser distance measurement devices

Included with VDM 100 series