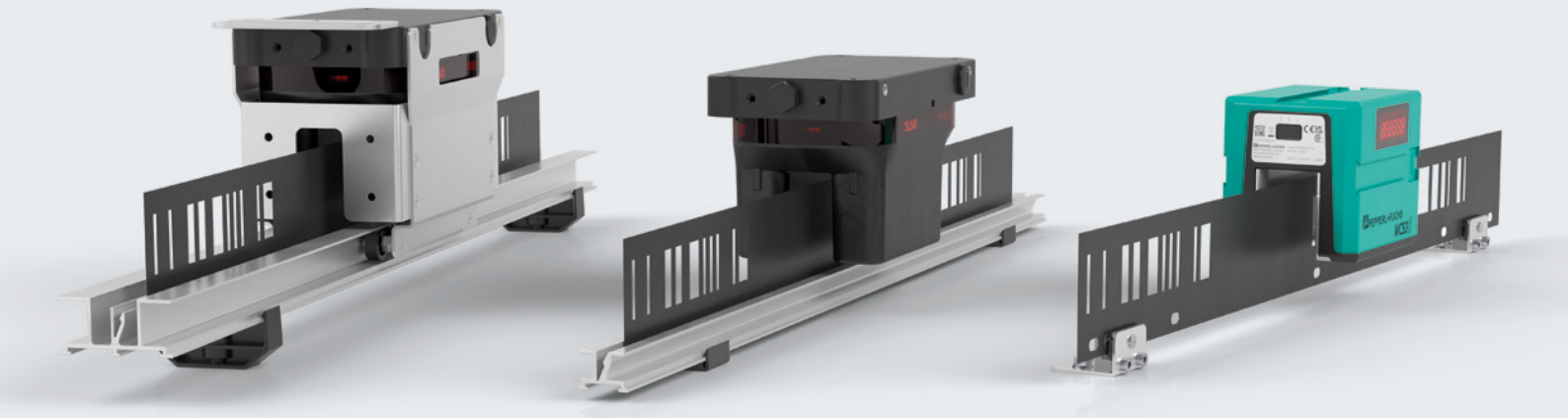
Setting up the WCS in Five Steps

WCS Absolute Positioning System



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WCS Absolute Positioning System

Building a WCS System

Successful WCS setup begins with defining the following five criteria.

1

Type of read head:
- WCS2B
- WCS3B

2

Data communication format:
- Direct read head communication
- Communication via control interface

3

Code rail material:
- Polyester laminate
- Stainless steel

4

Code rail mounting method:
- Thru-hole
- Angle bracket
- Track-based

5

Read head mating connection
- M12 cable, plug, or field-attachable with necessary interface

For more information, visit
pepperl-fuchs.com/pf-wcs

1 Selecting the Right Read Head: WCS2B or WCS3B?

From an electrical standpoint, the WCS2B and WCS3B read heads are virtually identical, offering similar accuracy, response times, communication protocols, and more. The main differences between the two series are the "burn-through" power and the guidance method. Each WCS read head is supplied with a snap-lock mounting bracket. To quickly determine whether a WCS2B or WCS3B reader is required, simply follow the guidelines below.

WCS Read Head	 WCS2B Series	 WCS3B Series	 WCS Outdoor
Description	Ideal when the environment is very dirty (galvanizing, foundries, etc.) or when trolley-based guidance is preferred.	The slot width of 31 mm and the visible display of the WCS3B make it the preferred solution for all general purpose positioning applications.	The WCS outdoor option is a read head with a rugged housing (IP69), resistant to dust, moisture, shocks, and vibration.

WCS2B

ideal for positioning dip tracks in anodizing and galvanizing processes

WCS3B

a standard in the automotive industry for the position feedback of monorails and transfer conveyors

2 Selecting the Data Communication Format

Position and diagnostic information can be retrieved either directly from the read head or via a control interface. The following options are available for direct communication with the reader.

Read Head	WCS3B-LS810*	WCS2B-LS2** WCS3B-LS2**	WCS3B-LS410*	WCS2B-LS31** WCS3B-LS31**	WCS3B-LS710*	WCS3B-LS510*	WCS3B-LS610*
Protocol	IO-Link	RS-485	CANopen	SSI	EtherCAT	EtherNet/IP	PROFINET
Technical Data	**-LS810** 230.4 kBit/s transfer rate	**-LS111, -LS211** 187.5 kBit/s, Data Protocol 1 and 2 **-LS116** 187.5 kBit/s, Data Protocol 3 **-LS121, -LS221** 62.5 kBit/s, Data Protocol 1 and 2 **-LS146, -LS147, -LS246, -LS247** 19.2 kBit/s, Data Protocol 3 **-LS256, -LS257** 9.6 kBit/s, Data Protocol 3 **-LS166, -LS266, -LS267** 38.4 kBit/s, Data Protocol 3	**-LS410** Binary output, 1 Mbit/s transfer rate with switchable termination	**-LS310, -LS311** 25-bit binary code, 100 ... 1000 kHz clock frequency	**-LS710** Binary output, 100 Mbit/s	**-LS510** Binary output, 100 Mbit/s	**-LS610** Binary output, 100 Mbit/s

Read Head Options

WCS read heads are also available with the following optional features:

Digital Display
An on-board 7-segment display aids in system setup and troubleshooting. Add a “D” suffix to any WCS3B reader model number to specify the display option.

Integral Heater Element
Permits application in low-temperature environments (down to –40 °F). Also helpful if moisture ingress is a concern. Add an “H” suffix to any reader model number to specify the heater option.

Overspeed Output
A transistor output can be preconfigured to indicate a maximum travel speed has been exceeded. Add an “S” suffix to any reader model number to specify the overspeed limit in m/s (factory default is 0.7 m/s).

Extended
The special WCS Extended version makes it possible to cover a distance of up to 629 m. An “E” suffix on a serial read head will specify the extended range. A code rail extension bracket (WCS3-CS70-E) is also required for this version.

Control Interface Communication Formats

If the data formats directly accessible from the read heads do not match your system requirements, a variety of control interfaces are available. These convert RS-485 communication to additional standard communication protocols. Additionally, controllers with digital displays are available that convert RS-485 data to parallel binary, Gray code, or SSI (SSI controllers extend permissible cable runs from 50 feet to over 4,000 feet).

Network Interface Options

These modules, excluding safety versions, can accommodate up to four RS-485 read heads and simplify plant expansion.

Model Number	WCS-CG310	WCS-DG310	WCS-ECG*
			
Interface	CANopen	DeviceNet	EtherCAT

Model Number	WCS-EIG*	WCS-PG*	WCS-PNG*
			
Interface	EtherNet/IP	PROFIBUS DP	PROFINET

3 Selecting the Code Rail Material

The WCS2B and WCS3B read heads use custom, non-interchangeable code rails. The WCS2B code rail is 55 mm high, while the WCS3B version is 70 mm high. Both are available in polyester laminate or stainless steel. Positioning with code rails ensures absolute accuracy to 0.8 mm and an extended application length of up to 629 m. Short code rail segments, known as ID pads, are also available. These are attached to the mobile unit and detected by a statically mounted read head as it passes.

Polyester Laminate

- Tear-resistant
- Unaffected by oils, fats, and solvents
- Chemically resistant to acids, alkalis, and aggressive gases

V2A Stainless Steel

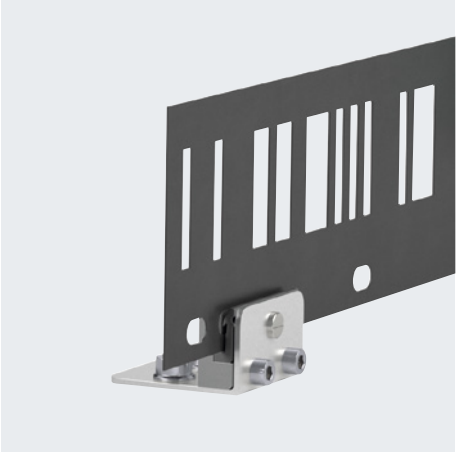
- Corrosion-resistant
- Temperature range from –40 °C to +80 °C
- Withstands flying sparks and severe contamination

ID Pad

- Attachment to the moving object
- Read head identifies chassis when passing
- Fine positioning
- Especially rugged for extreme environments

4 Selecting the Code Rail Mounting Options

For straight layouts or navigating around horizontal/vertical curves, code rails can be easily mounted using a mounting bracket. Since the code rail is flexible, the mounting brackets and stabilization profiles can be used to easily create horizontal and vertical curves, lane changes, and circular movements.

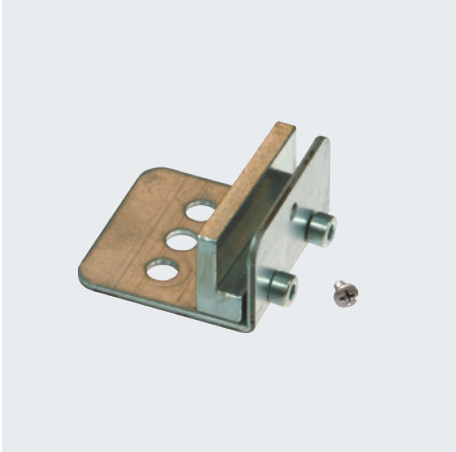


Thru-hole: No Brackets

Both polyester laminate and stainless-steel code rails feature integral mounting holes. Securing the code rail through these holes helps reduce hardware costs.

Angle Brackets

WCS2B and WCS3B code rails can also be mounted using several “clamp-type”, right-angle mounting brackets. For straight code rail installations, one bracket is required every four feet. Curved sections require a support bracket every two feet.



WCS2 Aluminum Profile System with Guide Trolley

When using a WCS2B series reader and a trolley system (the most popular WCS2B configuration), the following components are required:

- Code rail: polyester laminate (WCS2-CS55-L1) or stainless steel (WCS2-CS55-M1)
- Aluminum track: secures the code rail and guides the trolley, available in 2.5 m sections (WCS2-PS1-2,5M)
- Adapter plates (2): butt connector (WCS2-MC1)
- Compression tubing: secures code rail within the track, ordered per meter (WCS-MF1)
- Roller-based installation tool: locks code rail within the track (WCS2-FT1)
- Brackets: centrally-mounted locking bracket (WCS2-LB1), one snap-lock bracket per 4 feet (WCS2-MH2-UNI)
- Guiding trolley: one guide trolley required per reader (WCS2-GT09-P1)
- Cleaning brushes (optional): trolley-mounted brushes that keep the code rail free of debris (WCS-GT-BR)

WCS3 Aluminum Profile System with Guide Trolley

When using a WCS3B series system, there are options for aluminum track mounting or bracket mounting. A trolley system is available for use with the outdoor housing. When using the WCS3B aluminum track, the following components are required:

- Code rail: polyester laminate (WCS3-CS70-L1) or stainless steel (WCS3-CS70-M1)
- Aluminum track: secures the code rail, available in 2 m sections (WCS3-PS1-2M)
- Adapter plate: interconnect track sections (WCS3-PS1)
- Compression tubing: secures code rail within the track, ordered per meter (WCS-MF1)
- Snap-lock bracket system: secures track to structure, options exist for thru-hole, c-track, or Unistrut installation (WCS3-MH*)
- The WCS3 trolley (WCS3-GT09-P1-O) uses the same track system as the WCS2B series with WCS3 code rail

5 Selecting the Connectors and Cables

The final step required to set up a WCS system is to define the connection between the reader and the controller. WCS2B and WCS3B systems provide an industry-standard 12-mm quick disconnect: RS-485 models use a 5-pin connector, while SSI models require an 8-pin type. Below is a table to help select the appropriate Pepperl+Fuchs connecting cable or field-attachable connector.

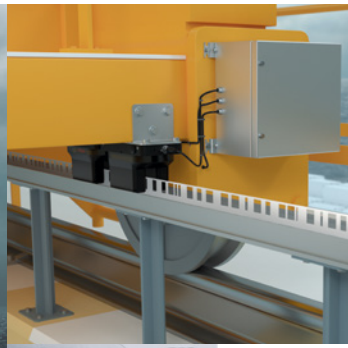
Model Number	V15-G-*M-PUR-ABG*	V19-G-*M-PUR-ABG*	V19-G-*M-PUR-A5S-WCS	V19SY-G-BK*M-PUR-ABG*
Interface	RS-485	SSI	SSI	EtherNet/IP, PROFINET
Technical Data	5-pin, M12 female cable, PUR jacket, shielded	8-pin, M12 female cable, PUR jacket, shielded	8-pin, 6 conductor, M12 female cable, PUR jacket, shielded, twisted pair	8-pin, Y-coded, M12 male cable, PUR jacket, shielded

Model Number	V15-G-ABG-PG9	V19-G-ABG-PG9	WCS-V45DIN-8P	V19SY-Y-V1D/V1S
Interface	RS-485	SSI	EtherNet/IP, PROFINET	EtherNet/IP, PROFINET
Technical Data	5-pin, M12 female field-attachable connector (cable is user-specified)	8-pin, M12 female field-attachable connector (cable is user-specified)	Terminal block, converts 8-pin RJ45 connector to terminal screws	Y-splitter, M12 plug 8-pin Y-coded to M12 socket 4-pin D-coded and M12 plug 4-pin A-coded

Pepperl+Fuchs offers connecting cables in a variety of lengths and jacket materials. Contact your local account manager or technical support if the listed models do not meet your requirements.

Typical Applications

- Gantry, automatic, and slewing cranes
- Automated storage and retrieval systems, moving carriages
- Monorail conveyors, rail-mounted intralogistics
- Elevators, lifting gear
- Galvanizing plants
- Carriage detection



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