

INSTRUCTION MANUAL

**WCS-Interface Module,  
Profibus**

**WCS-PG210**





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## Used symbols



*This symbol warns the user of potential danger. Nonobservance may lead to personal injury or death and/or damage to property.*

**Warning**



*This symbol warns the user of potential device failure. Nonobservance may lead to the complete failure of the device or other devices connected.*

**Attention**



*This symbol calls attention to important notes.*

**Note**

## Security advice



*This product must not be used in applications, where safety of persons depend on the correct device function. This product is not a safety device according to EC machinery directive.*

**Warning**

## Notes

These operating instructions refer to proper and intended use of this product. They must be read and observed by all persons making use of this product. This product is only able to fulfill the tasks for which it is designed if it is used in accordance with specifications of Pepperl+Fuchs.

The warranty offered by Pepperl+Fuchs for this product is null and void if the product is not used in accordance with the specifications of Pepperl+Fuchs.

Changes to the devices or components and the use of defective or incomplete devices or components are not permitted. Repairs to devices or components may only be performed by Pepperl+Fuchs or authorized work shops. These work shops are responsible for acquiring the latest technical information about Pepperl+Fuchs devices and components. Repair tasks made on the product that are not performed by Pepperl+Fuchs are not subject to influence on the part of Pepperl+Fuchs. Our liability is thus limited to repair tasks that are performed by Pepperl+Fuchs.

The preceding information does not change information regarding warranty and liability in the terms and conditions of sale and delivery of Pepperl+Fuchs.

This device contains sub-assemblies that are electrostatically sensitive. Only qualified specialists may open the device to perform maintenance and repair tasks. Touching the components without protection involves the risk of dangerous electrostatic discharge, and must be avoided. Destruction of basic components caused by an electrostatic discharge voids the warranty!

Subject to technical modifications.

Pepperl+Fuchs GmbH in D-68301 Mannheim maintains a quality assurance system certified according to ISO 9001.



### 1 Working principle

The WCS-PG210 acts as interface between the WCS reading head and the Profibus. The data are transmitted between the reading head(s) and the WCS-PG210 with RS 485 interface and from the WCS-PG210 to the control via the Profibus DP. A maximum of four WCS reading heads type LS221 (or LS121) can be connected. If several reading heads are connected, they must have different addresses. The WCS-PG210 functions as a Profibus slave and disposes, independent of the Profibus, of the current reading head data.

The module has the following configuration:

- Baud rate: max. 12 MBaud (automatic detection)
- Diagnosis data: max. 8 Byte
- Sync: supported
- Freeze: supported
- Identification No.: 0x2079

### 2 Installation and commissioning

The installation of the interface module is done by clip-on attachment on a 35 mm top-hat rail (EN 50022-35).

The dimensions of the interface module are: 90 x 127 x 55 in mm (W x H x D).

Terminal		Designation
1	24 V (Pwr)	Operating voltage interface module / Operating voltage reading heads
2	0 V (Pwr)	Ground interface module / Ground reading heads
3	RS 485-	Data line RS 485- to reading head
4	RS 485+	Data line RS 485+ to reading head
5	not used	not used

Table 2.1: Terminal connection WCS-PG210

#### 2.1 Operating voltage of the interface module

The operating voltage (24 V DC  $\pm$  20%) for the interface module is connected to terminals 1 and 2 of the 5-pole push-lock terminal. When the operating voltage is connected correctly, the green "Power" LED must be illuminated.

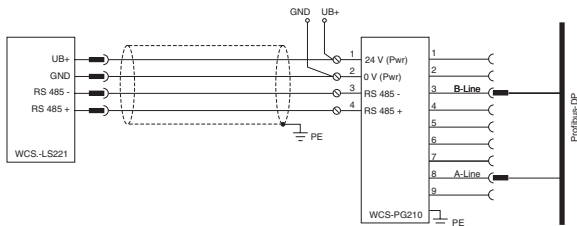


Fig. 2.1: Electrical connection

## 2.2 Connection of the reading head(s)

The voltage supply for the reading heads is connected to screw terminals 1 and 2 of the plug connector (same terminals as for connection of operating voltage). The RS 485 data lines to the reading heads are connected to terminals 3 and 4. The "Interface" sliding switch must always be set to position "485". If the module is at the beginning or end of the data line to the reading heads, the RS 485 terminating resistor must be activated. To do so, set the sliding switch "RS 485-Termination" to "On". If only one reading head is connected to the WCS-PG210, this switch must always be set to "On".

Terminal of reading head			Terminal Interface module
WCS2A	WCS3A	WCS3B	
2	1	1	1
4	2	2	4
1	3	4	3
3	5	3	2

## 2.3 Connection to control

The connection to the Profibus DP is via a 9-pole plug connector as per Profibus norm. For this, a 9-pole Sub-D plug is required which is plugged into the 9-pole Sub-D socket on the device. This plug is not part of the supply of the interface module.

PIN assignment of the 9-pole plug connector:

PIN	Designation
1	protective earth
2	not assigned
3	B-Line
4	not assigned
5	Ground
6	5 VDC
7	not assigned
8	A-Line
9	Ground

The Profibus address (in hex code) is set with the two rotary switches "Profibus-ID" "High" and "Low". Example: Address 19 (=13h): High = 1, Low = 3.

The terminating resistor in the Profibus can be switched on ("On") or off ("Off") with the "Termination" sliding switch.

## 2.4 Device LEDs

**Power:** The green LED must be illuminated. It indicates the correct voltage supply of the WCS-PG210.

**BusPower:** The LED is connected directly to the supply voltage on the Profibus side.

**BusState:** Green continuous

Data exchange in Profibus

Red/green flashing

WCS-PG210 waiting for Profibus configuration data

Red continuous

Error on Profibus

BusError

When the red LED is illuminated, no data exchange is taking place on the Profibus.

**State:** Green continuous

Data exchange with the reading heads. The number of the reading head currently polled is shown via the four LEDs "Error No/Select ID". The table below shows the assignment of the LEDs "Select ID" to the reading head addresses.



ErrorNo Select ID				Reading head address
8	4	2	1	
0	0	0	1	0
0	0	1	0	1
0	1	0	0	2
1	0	0	0	3

### Red continuous

The interface module has detected an error or a warning. The WCS-PG210 displays the binary coded error or warning number via the LEDs "Error No/Select ID" and also transmits the number to the Profibus master via the external diagnosis byte.

Error (number 1...7):

Switch interface module on and off. If the error still occurs the module must be replaced.

Warning (number 8...15):

The warning serves merely as information and is displayed by the WCS-PG210 for one minute and then automatically reset.

## 2.5 Description of error code

Error No. / Select ID				Designation
8	4	2	1	
0	0	0	0	reserved
0	x	x	x	internal error interface module
1	x	x	0	internal warning interface module
1	0	0	1	timeout receiving data from reading head
1	0	1	1	error at data transfer from reading head
1	1	0	1	Field bus error (configuration error, no connection,...)
1	1	1	1	internal warning interface module

### 2.6 Data exchange with the Profibus DP master

For configuring the master, the configuration file (GSD file) is needed. The file can be downloaded from our web page <http://www.pepperl-fuchs.com>. The configuration data permit the selection of one, two, three or four reading heads connected. Independent of the number of reading heads selected, a byte is reserved for the activation of the reading head(s) in the master, 4 bytes per reading head are reserved for the response data. (Configuration data with 4 reading heads: 0x20, 0xD1, 0xD1, 0xD1, 0xD1).

### 2.7 Activation of reading head(s)

	Read.head Address 3		Read.head Address 2		Read.head Address 1		Read.head Address 0	
Bit	7	6	5	4	3	2	1	0
	0	F0	0	F0	0	F0	0	F0

See section 4.1 to 4.3 for information on F0 function.

### 2.8 Data format of interface module for one reading head (4 bytes)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word n	0	0	0	0	0	P18	P17	P16	P15	P14	P13	P12	P11	P10	P09	P08
Word n+1	P07	P06	P05	P04	P03	P02	P01	P00	0	0	0	DB	ERR	OUT	A1	A0

The significance of the data bits is explained in section 4.3.

### 2.9 Profibus diagnosis

In addition to the standard diagnosis data (6 bytes), a device-specific diagnosis of the WCS-PG210 is supported. The length of the specific diagnosis data is 1 byte, giving a maximum length of the diagnosis data of 8 bytes. If an error or warning is present, the corresponding code is transmitted via the diagnosis byte. This code is also shown via the 4 LEDs "Error No/Select ID" when the red state LED is illuminated, i. e. the content of the diagnosis byte is a replica of the LED display.

## 3 Technical data

<b>General specifications</b>	
Installation	DIN rail mounting
<b>Electrical specifications</b>	
Operating voltage	24 V $\pm$ 20 %
Power consumption $P_0$	$\leq$ 3.6 W (without reading heads)
<b>Interface 1</b>	
Connection of	control system
Interface type	PROFIBUS DP
Transfer rate	max. 12 MBit/s, Automatic baud rate detection
Data output format	binary code
Bus termination resistor	switchable
<b>Interface 2</b>	
Connection of	Read head
Connectable reading heads	WCS-LS221, WCS-LS121
Interface type	RS 485
Transmission method	half duplex
Transfer rate	62.5 kBit/s
RS 485 termination resistor	switchable
Refresh cycle of reading head	1 ms
<b>Standard conformity</b>	
Emitted interference	EN 55011
Interference rejection	DIN EN 50082-2
<b>Ambient conditions</b>	
Operating temperature	0 ... 45 °C (273 ... 318 K), no moisture condensation
Storage temperature	-40 ... 70 °C (233 ... 343 K)
Relative humidity	$\leq$ 80 %
<b>Mechanical specifications</b>	
Connection type	Interface 1: 9-pin Sub-D connector Interface 2: terminal connection $\leq$ 2.5 mm <sup>2</sup> , 5 pin
Housing width	90 mm
Height of housing	127 mm
Housing depth	55 mm
Protection degree	IP24
Material	plastic
Installation position	any position
Mass	approx. 200 g

Table 3.1: Technical data

### 3.1 Electrical connection

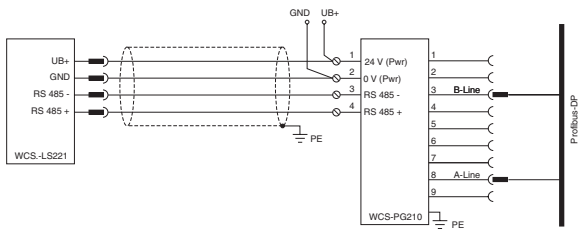


Fig. 3.1: Electrical connection

### 3.2 Dimensions

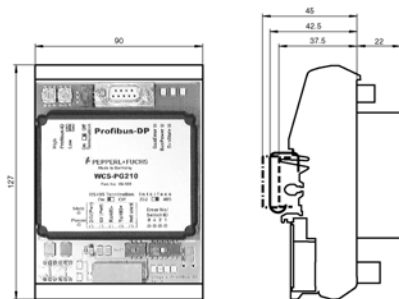


Fig. 3.2: Dimensions

## 4 Appendix

### 4.1 Activation of reading head

A0, A1	A1	A0	
	0	0	Reading head address 0
	0	1	Reading head address 1
	1	0	Reading head address 2
	1	1	Reading head address 3
F0	F0		Function number for reading head
	0		Transmitting positional value
	1		Transmitting diagnosis result

### 4.2 Diagnosis function F0=1

The reading head can be requested to perform a diagnosis of the optoelectronics by means of the request byte. The reading head must be outside the code rail. On the new generation reading head types (WCS2A, WCS2B, WCS3A and WCS3B), the degree of dirt accumulation on the optical unit is monitored automatically during operation and the diagnosis bit (DB) set if dirt accumulation is too high. Thus the specific request for diagnosis to the reading head via F0 in the request byte is no longer necessary. However for reasons of downwards compatibility this function is also supported by the new reading heads.

### 4.3 Data from reading head

Function number for reading head F0 = 0 (Transmitting positional value)				
ERR	DB	OUT	Description	Optical syst reading head
0	0	0	Current positional value in P00...P18, binary coded	good
0	0	1	Reading head outside code rail, no positional value	good
			P0...P18 = 0 -> Reading head is partially out of the code rail	
			P0 = 1, P2...P18 = 0 -> Reading head is complete out of the code rail	
0	1	0	Current positional value in P00...P18, binary coded	bad
0	1	1	No positional value, reading head outside code rail	bad
1	x	x	No positional value, error signal from reading head, error number in P00...P04, binary coded	-

Diagnosis bit DB displays the result of the automatic self diagnosis of the reading head.

Function number for reading head F0=1 (Transmitting diagnosis result)				
ERR	DB	OUT	Description	Optical syst. reading head
0	1	0	Diagnosis invalid, reading head not outside code rail	-
0	1	1	Diagnosis result in P16...P18	
			P16...P18 = 0	good
			P16...P18 > 0	bad
1	x	x	Error signal from reading head, error no. in P00...P04, binary coded	-

## 5 Notes

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