OPERATING INSTRUCTION

WI180C-PNS01

WI180C-PNS01 PROFINET coupler

SICK
Sensor Intelligence.

Described product

WI180C-PNS01

Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Information on the operating instructions

Read these operating instructions carefully before starting any work in order to familiarize yourself with the product and its functions.

The operating instructions are an integral part of the product and should remain accessible to the personnel at all times. When handing this product over to a third party, include these operating instructions.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the product is integrated. Information on this can be found in the operating instructions for the machine or system.

1.2 Further information

You can find the product page with further information via the SICK Product ID:
pid.sick.com/{P/N}/{S/N}
(see "Product identification via the SICK product ID", page 8).

The following information is available depending on the product:

- This document in all available language versions
- Data sheets
- Other publications
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Software
- Accessories

1.3 Symbols and document conventions

Warnings and other notes

DANGER
Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.

WARNING
Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.

CAUTION
Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.

NOTICE
Indicates a situation presenting possible danger, which may lead to property damage if not prevented.

NOTE
Highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Instructions to action

► The arrow denotes instructions to action.

1. The sequence of instructions is numbered.
2. Follow the order in which the numbered instructions are given.

✓ The tick denotes the results of an action.

2 Safety information

2.1 General safety notes

- The mounting, electrical installation and configuration of the device must be carried out by professionally qualified personnel only.
- Before mounting, it is imperative that you familiarize yourself with the operating instructions for the connected devices.
- When mounting and electrical installation work is being carried out, always comply with applicable health and safety and environmental regulations.
- The device must not be used outdoors or in areas with flammable/explosive atmospheres!
- When installing the device, always consider the electrical connected loads.
- Replace faulty or damaged cables and male connectors immediately.
- Replace damaged or faulty couplers immediately.
- When mounting the device, it is imperative that you use suitable mounting equipment and that you consider their specific requirements.
- Ensure a constant power supply to the device within the set parameters.
- Only operate the device within the set operating parameters.
- Regularly check that the device is functioning properly.
- Structural modifications to the device are not permitted.
- The device is not designed as a safety product.
- This device complies with the Radio Safety Requirements (EMC) for the industrial sector (Radio Safety Class A). It may cause radio interference if used in a residential area.

2.2 Correct use

Correct use requires that the device is used industrially indoors without any specific climatic and atmospheric requirements. Any use outside of the areas mentioned in each case will be considered to be incorrect use and void any warranty claims against SICK AG.

2.3 Forseeable misuse

Not taking account of the pin assignment or using an incorrect adapter cable may damage or destroy the connected PROFINET coupler.

Connecting the PROFINET coupler to signal or power cables that are too long may lead to a loss of data and damage to the PROFINET coupler.

3 Product description

3.1 Product identification via the SICK product ID

SICK product ID

The SICK product ID uniquely identifies the product. It also serves as the address of the web page with information on the product.

The SICK product ID comprises the host name pid.sick.com, the part number (P/N), and the serial number (S/N), each separated by a forward slash.

The SICK product ID is displayed as text and QR code on the type label and/or on the packaging.

Figure 1: SICK product ID

3.2 Product information

Table 1: Product information

Product name	WI180C-PNS01
Article number	6068091
Device version	PROFINET
Manufacturer	SICK AG

3.3 Product characteristics

The device is an interface coupler, which can be used to connect connected devices (e.g. WLL180) to a PROFINET IO network. The relevant devices are connected via a simple plug system on the side of the coupler.

Usually, the entire system is mounted on a mounting rail close to the application.

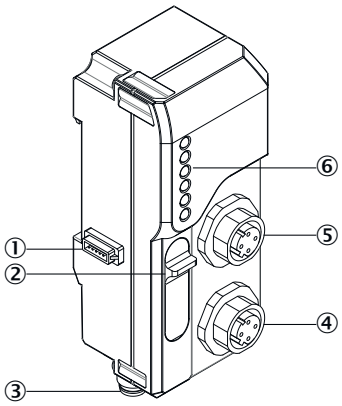
The coupler supports up to 16 connected devices, which are likewise connected to one another via the plug system.

Further properties:

- PROFINET IO device
- Option to communicate via function block (e.g. Siemens SFB52 or SFB53)
- 2 Ethernet ports with transmission speed of 10 or 100 MBaud

Further specifications can be found in the technical data (see "Technical data", page 22).

3.4 Setup and function



① Bus male connector (system bus)
② Service port
③ Power supply connection (M8), 4-pin
④ D-coded M12 connector, 4-pin, PROFINET / Ethernet
⑤ D-coded M12 connector, 4-pin, PROFINET / Ethernet
⑥ Status LEDs

3.5 Interfaces

3.5.1 PROFINET

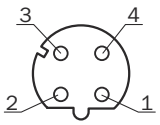


Table 2: PROFINET pin assignment

Pin	Pin assignment
1	Tx+
2	Rx+
3	Tx-
4	Rx-

3.5.2 Power supply

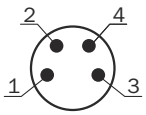


Table 3: Power supply pin assignment

Pin	Pin assignment
1	+12 – 24 VDC
2	Not assigned
3	GND
4	Not assigned

3.5.2.1 UL Satisfaction Ratings

The total control output current and ambient temperature will be retricted as follows depends on the number of sensors (proximity switch) connected to the programmable controller.

Up to 3 units:

Input	**12 - 24 V dc, max. 1.02 A, Class 2**
Output	12 - 24 V dc, max. 0.45 A, Class 2
Maximum surround air Temperature +55 °C.	

Up to 8 units:

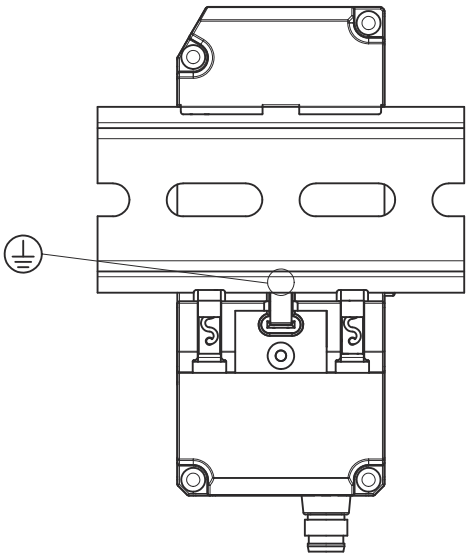
Input	**12 - 24 V dc, max. 1.02 A, Class 2**
Output	12 - 24 V dc, max. 0.8 A, Class 2
Maximum surround air Temperature +50 °C.	

Up to 16 units:

Input	**12 - 24 V dc, max. 1.02 A, Class 2**
Output	12 - 24 V dc, max. 0.8 A, Class 2
Maximum surround air Temperature +45 °C.	

3.5.3 Grounding

The device is grounded via the mounting rail by means of a spring contact:



4 Transport and storage

4.1 Transport

Either transport the device in the original packaging or use a padded transport container. Make sure that you comply with the maximum permitted environmental conditions (see "Technical data", page 22).

4.2 Storage

If you want to store the devicefor a relatively long time, pack it as you would for transport. Make sure that the storage location complies with the permitted environmental conditions (see "Technical data", page 22).

5 Mounting

5.1 Required materials

You need the following additional materials to mount the device:

- grounded mounting rail (pre-mounted)
- pre-assembled cable (max. 30 m) with M8 female connector (see "Interfaces", page 9)
- pre-assembled cable for PROFINET with M12 D-coded male connector (see "Interfaces", page 9)
- one or more signal sources (e.g. WLL180T)
- small slotted screwdriver

5.2 Preparing mounting location

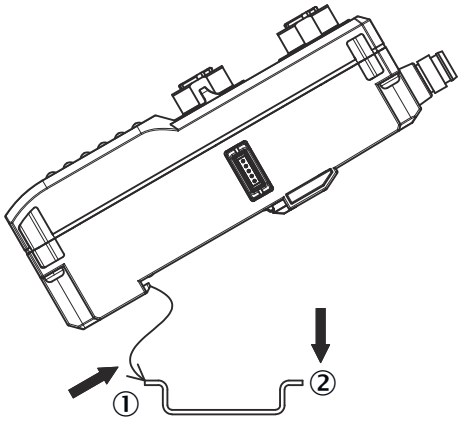
1. Mount a grounded mounting rail in the same area as the application.
2. Lay the two pre-assembled cables so that they can easily be connected to the connections of the device. If necessary, use cable channels, cable ties and cable grips.

5.3 Scope of delivery

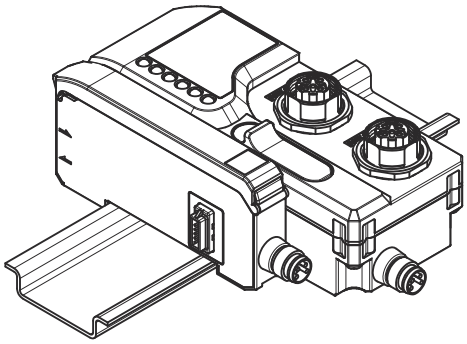
- WI180C-PNS01
- Quick start instructions

5.4 Mounting procedure

1. Carefully unpack the device.



2. Clamp the device onto the mounting rail, as shown in the image.
3. Clamp the series-connected devices onto the mounting rail as shown in their mounting instructions.



4. Push the series-connected devices onto the 5-pin connection on the left side of the device. Make sure that the sequence is correct (see the operating instructions for the relevant device).
5. Fix the connected devices on the mounting rail without any spaces.

5.5 Connecting the device

NOTE
Switch the power supply off before you connect or replace the devices.

1. Connect the male M12 D-coded connector for the PROFINET network to the PROFINET connection on the device and secure it using the sleeve nut.
2. Connect the female M8 connector on the power supply to the underside of the device and screw the male connector tight.

6 Commissioning

6.1 Configuration

The device is configured with appropriate PLC/PROFINET tools. This includes addressing and module selection.

1. Call up your PLC/PROFINET engineering tool.
2. Download the current GSD file for device from www.sick.com.
3. Install the GSD file in your engineering tool.

6.2 Switching on

1. Switch on the power supply for the device.
2. Wait approximately two seconds until the device indicates that it is ready, see "LED status indicators", page 15.

7 Operation

7.1 Safety

A few guidelines must be followed to ensure the operational safety of the device:

- Carry out a daily functional check (see "Daily thorough check", page 15).
- If you want to connect devices to the device or remove devices, switch off the power supply first.
- Only operate the device under the specified operating conditions (see "Technical data", page 22).

7.2 Daily thorough check

You should carry out the following functional checks once a day:

- Check the function of the LED indicators.
- Use appropriate status queries to check communication with each of the connected devices.

7.3 LED status indicators

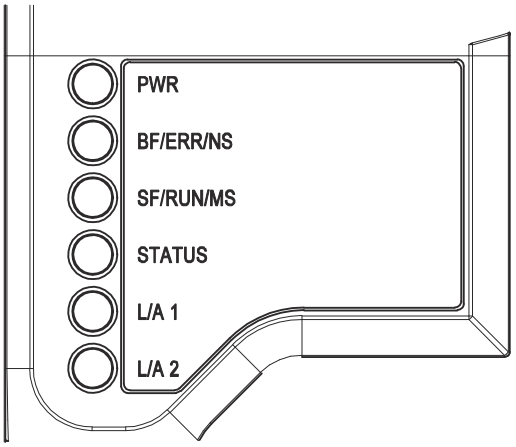


Table 4: LED status indicators

LED	Indication	Meaning
PWR	green	Power on
	dark	Power off
BF (Bus fault)	dark	PROFINET connection ok
	red	Device offline from PROFINET
	red blinking	PROFINET communication start-up or invalid configuration
SF (System fault)	dark	PROFINET connection ok
	red	System fault of the device
STATUS	dark	Device not configured
	green	Device running
L/A1 (Link/Activity 1)	dark	No network connection on port 1
	green	Network connected on port 1
L/A2 (Link/Activity 2)	dark	No network connection on port 2
	green	Network connected on port 2

7.4 Device slots and modules

The device is structured in different slots.

Slot 1 represents the PROFINET coupler.

Slots 2 to 17 represent the connected devices as shown in the following figure.

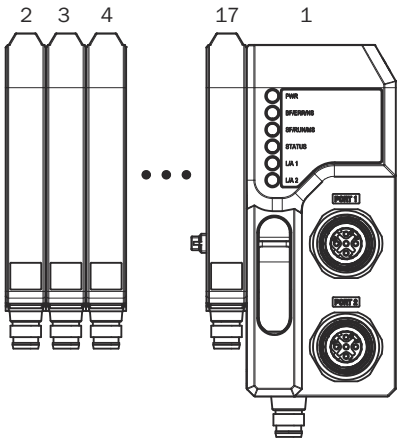


Figure 2: Slots and modules

WI180C-PNS01 supports up to 16 device modules. The following products are supported:

Table 5: Supported products

Supported products	Product description	Note
WLL180T-L* WLL180T-M*	Fiber amplifier base unit	• WLL180T base unit can only be placed as module #1 (left-most on DIN rail) • No extra power supply to WLL180T device required
WLL180T-E* WLL180T-F*	Fiber amplifier expansion unit	• WLL180T expansion unit can only be placed as module #2 ... #16 • No extra power supply to WLL180T device required
WLL80	Fiber amplifier base unit & expansion unit	• WLL80 base unit can only be placed as module #1 (left-most on DIN rail) • WLL80 expansion unit can only be placed as module #2 ... #16 • No extra power supply to WLL80 device required

Supported products	Product description	Note
OD1 on one input of AOD1-M	Displacement sensor evaluation base unit	• For each AOD1 unit plugged, the total number of pluggable modules decreases by one (max. 8 AOD1 units possible) • If AOD1 and WLL180T are used in combination with WI180C-PN, all WLL180T devices must be placed left from the AOD1 • AOD1-M base unit can only be placed as Module #1/2 (left-most on DIN rail) • Power supply to AOD1-M device required
OL1 on one input of AOD1-M	Displacement sensor evaluation base unit	
OD1 on one input of AOD1-S	Displacement sensor evaluation expansion unit	• For each AOD1 unit plugged, the total number of pluggable modules decreases by one (max. 8 AOD1 units possible) • If AOD1 and WLL180T are used in combination with WI180C-PN, all WLL180T devices must be placed left from the AOD1 • AOD1-S expansion unit can only be placed as module #3/4 ... #15/16 • Power supply to AOD1-S device required
OL1 on one input of AOD1-S	Displacement sensor evaluation expansion unit	
KTL180-ML* KTL180-MM*	Fiber contrast sensor base unit	• KTL180 base unit can only be placed as module #1 (left-most on DIN rail) • No extra power supply to KTL180 device required
KTL180-ME* KTL180-MF*	Fiber contrast sensor expansion unit	• KTL180 expansion unit can only be placed as module #2 ... #16 • No extra power supply to KTL180 device required

7.5 Cyclic communication via PROFINET IO

The device special variant supports module 3 (WI180C Q1 inputs) only:

Table 6: Module information

Module	Module Ident No	Applicable slot	Data direction	Byte address	Function
3	0x0103	1	Input	0 ... 1	Q1 value device #1 ... #16

NOTE
Module 3 is fixed in slot 1.

7.6 IO Data

The device supports the following IO data:

Table 7: Module information

			Module#	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
Slot Number		Device allocation	Byte address	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	Device function
Input	1	Device	0									x	x	x	x	x	x	x	x	Value of Channel 1 (Q1)
			1	x	x	x	x	x	x	x	x									

7.7 Acyclic communication via PROFINET IO

Function blocks are used for communicating with record data of the connected devices.

Examples:

Standard function blocks:

- Read SFB52 RDREC dataset
- Write SFB52 WRREC dataset

7.8 Record data

The device supports the following records:

Table 8: Record data

Index No.	Function	Details		Access	Length (bytes)	Description
0	Products Series			R	2	0x1505
		b15-12	Manufacturer			1: SICK AG
		b11-8	Categories			5: Communication unit
		b7-0	Family			<Category 5> 5: WI180C-PN
1	Product Type			R	2	1: WI180C-PN
2	Firmware Version			R	2	1
3	Protocol Version			R	2	1
4	Product Revision			R	2	1
5	Vendor Name			R	2 ... 16	"SICK AG"
6	Product Name			R	2 ... 32	"WI180C-PNS01"
7	Product ID			R	2 ... 16	4864 (0x1300)
8	User Tag Name			R/W	2 ... 32	Blank space (default)
9	Operation Status			R	2	0: Idle 2: Run
10	Vendor ID			R	2	257 (0x101)
11	Network Profile			R	2 ... 32	"Profinet Coupler"
95	Product serial number			R	16	
97	Number of sensors			R	2	0 ... 16
98	Error Code			R/W	2	Get last error code / Delete last (any write value)

Index No.	Function	Details	Access	Length (bytes)	Description
212	Factory Reset		W	2	3: Execute

8 Diagnosis

The device implements the following manufacturer-specific channel errors:

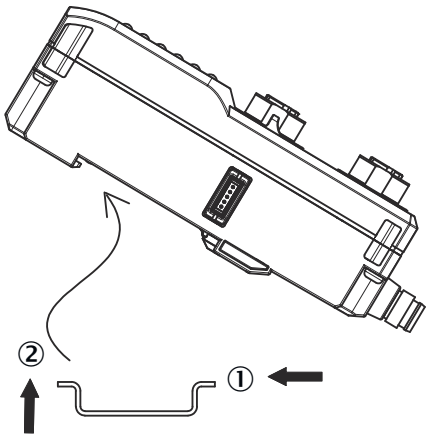
Table 9: Error meanings

Error type	Extended error type	Error text
19	-	WI180 system communication error
19	6	Number of modules in WI180 system changed
19	11	WI180 system internal communication error

9 Decommissioning

9.1 Dismantling

1. Switch off the power supply for the device.
2. Disconnect the male connector of the power supply and the PROFINET male connector.
3. Detach the mountings for the connected devices.
4. Disconnect the connected devices from the bus male connector of the device.
5. Carefully push up the device until you can tip it forwards.



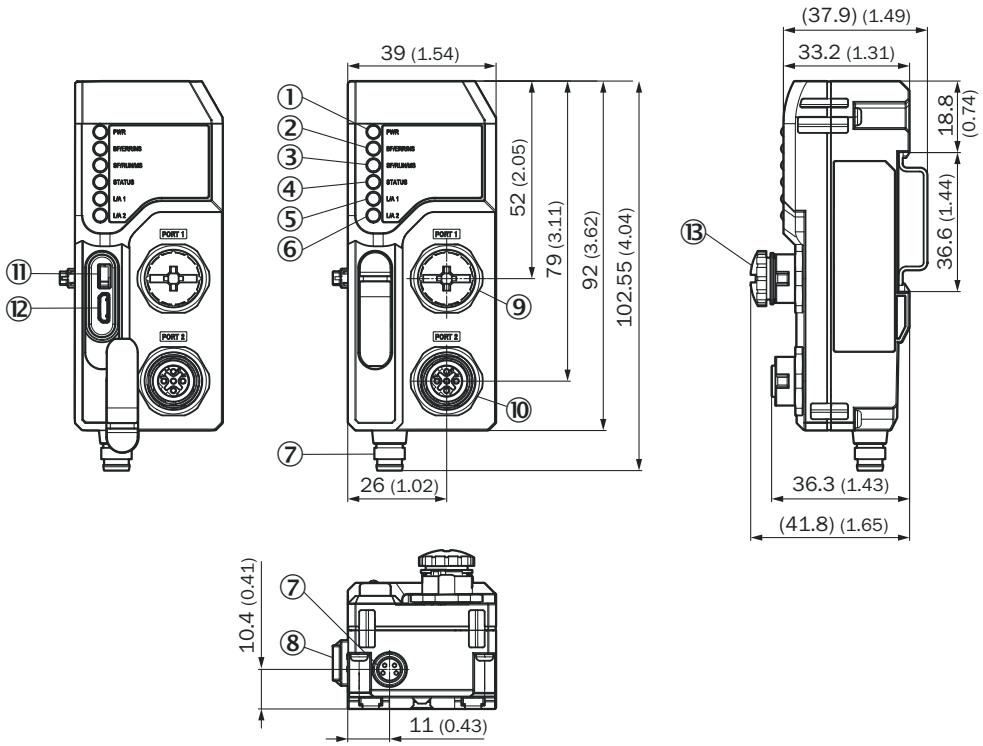
6. Remove the device from the mounting rail.

9.2 Disposal

At the end of its service life, the device must be disposed of correctly as waste electronics. Take the regulations in your country into account also.

10 Technical data

10.1 Dimensional drawings



① PWR-LED
② BF/ERR/NS-LED
③ SF/RUN/MS-LED
④ STATUS-LED
⑤ L/A1-LED
⑥ L/A2-LED
⑦ Power supply connection M8, 4-pin
⑧ Bus male connection, 5-pin (system bus)
⑨ D-coded M12 connector, 4-pin, PROFINET / Ethernet
⑩ D-coded M12 connector, 4-pin, PROFINET / Ethernet
⑪ Factory reset button
⑫ Service port (USB, Micro-B)

10.2 Technical data

Electrical

Table 10: Electrical data

Description	Value
Supply voltage	12 – 24 VDC ±10 %
Power consumption (without connected devices)	3 W
Switch-on delay	1000 ms
Switch-on delay (overall system)	2000 ms
LEDs	PWR, BF/ERR/NS, SF/RUN/MS, STATUS, L/A1, L/A2

Description	Value
Power supply	Male M8 plug connector, 4-pin
Other interfaces	Male bus connector, 5-pin, internal system bus 2 x M12 4-pin D-coded, PROFINET

PROFINET IO

Table 11: PROFINET IO data

Description	Value
Maximum number of modules to be connected	16
Transmission speed	100 MBit/s
Maximum distance between nodes	100 m
Process data	2 Bytes Input, 0 Byte Ausgang Min. cycle time 1 ms
Asynchronous data	supported, see "Record data", page 18
Compliant standard	IEEE802.3u (100Base-Tx)
Conformance class	Class C (PROFINET IRT)
Netload class	III
Ethernet ports	2
PROFINET features	Media Redundancy (MRP), network diagnostic (MIB/SNMP), topology detection, port diagnostic (Up/Down), connection diagnostic (connection length measurement), I&M0...4, auto device replacement, reduction ratio, openVAS tested
GSD file	available (V2.2, V2.32, V2.33, V2.34)

EMC

Table 12: EMC data

Description	Value
Noise immunity (Length of cable ≤30 m)	in accordance with EN 61000-6-2/ EN 61131-2
Emission	in accordance with EN 55011, class A

Product safety

Table 13: Product safety data

Description	Value
Protection class	3
Short-circuit protection	in accordance with VDE 0160

Mechanical

Table 14: Mechanical data

Description	Value
Protection category	IP54[1]
Sensitivity to vibrations	IEC 60068, 10 – 55 Hz

Description	Value
Shock resistance	IEC 60068, 500 m/s^2 (~50 g)
Housing material	Polycarbonate
Dimensions (HxWxD) in mm	39 x 102.55 x 36.3

1 Valid, if WI180C-PNS01 is connected via internal system bus with modules which fullfill IP54

Environmental parameters

Table 15: Environmental parameters

Description	Value
Air humidity (operation/storage)	35 – 85 % relative humidity
Temperature range (storage)	-40 – +70 °C
Temperature range (Operation, ≤3 connected devices)	-25 – +55 °C [1]
Temperature range (Operation, ≤8 connected devices)	-25 – +50 °C [1]
Temperature range (Operation, ≤16 connected devices)	-25 – +45 °C [1]

1 Temperature ranges valid if no output current on connected devices

10.3 Ordering information, accessories

Table 16: Ordering information

Type	Description	Part number
YF8U14-020VA3XLEAX	Female connector, M8, 4-pin, straight, 2 m cable	2095888
YF8U14-050VA3XLEAX	Female connector, M8, 4-pin, straight, 5 m cable	2095889
YG8U14-020VA3XLEAX	Female connector, M8, 4-pin, angled, 2 m cable	2095962
YG8U14-050VA3XLEAX	Female connector, M8, 4-pin, angled, 5 m cable	2095963
SSL-1204-G02MZ90	Male connector, M12, 4-pin, straight, D-coded, 2 m cable	6048241
BEF-EB01-W190	Rail end piece for block mounting	5313011

11 Annex

11.1 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at www.sick.com. To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

8022756.1GL8/2024/01/26/en

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Sensor Intelligence.