

WI180C-EN

WI180C-EN Ethernet/IP coupler

SICK
Sensor Intelligence.



Described product

WI180C-EN

Manufacturer

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Original document

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Contents

1	About this document.....	5
1.1	Information on the operating instructions.....	5
1.2	Further information.....	5
1.3	Symbols and document conventions.....	5
2	Safety information.....	7
2.1	General safety notes.....	7
2.2	Correct use.....	7
2.3	Reasonably foreseeable misuse.....	7
2.4	Qualification of personnel.....	7
3	Product description.....	8
3.1	Product identification via the SICK product ID.....	8
3.2	Product characteristics.....	8
3.3	Structure and function.....	9
3.4	Interfaces.....	9
3.4.1	Ethernet/IP.....	9
3.4.2	Power supply.....	9
3.4.3	Grounding.....	10
4	Transport and storage.....	11
4.1	Transport.....	11
4.2	Storage.....	11
5	Mounting.....	12
5.1	Required materials.....	12
5.2	Preparing mounting location.....	12
5.3	Scope of delivery.....	12
5.4	Mounting procedure.....	12
5.5	Connecting the device.....	13
6	Commissioning.....	14
6.1	Parameterization.....	14
6.2	Integration as a generic module.....	14
6.3	Integration using an EDS file.....	16
6.4	IP address of the WI180C-EN.....	16
6.5	Switching on.....	17
7	Operation.....	18
7.1	Security.....	18
7.2	Daily thorough check.....	18
7.3	LED status indicators.....	18
7.4	Device slots and classes.....	19
7.4.1	Module sequence.....	21
7.5	Supported classes.....	21

7.6	Identity Object.....	22
7.7	Assembly object.....	24
7.7.1	I/O assemblies.....	25
7.7.2	I/O assemblies with process data.....	25
7.7.3	Configuration assemblies.....	27
7.8	Manufacturer-specific classes.....	27
7.8.1	Class 100 gateway information.....	27
7.8.2	Class 101 WLL180T.....	29
7.8.3	Class 102 KTL180.....	31
7.8.4	Class 103 OD1 on AOD1.....	34
7.8.5	Class 104 OL1 on AOD1.....	39
7.8.6	Class 128 module configuration.....	41
8	Diagnostics.....	42
9	Maintenance.....	43
10	Decommissioning.....	44
10.1	Dismantling.....	44
10.2	Disposal.....	44
11	Technical data.....	45
11.1	Dimensional drawings.....	45
11.2	Technical data.....	45
11.3	Ordering information, accessories.....	47
12	Annex.....	48
12.1	Conformities and certificates.....	48

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 Reasonably foreseeable misuse

Not taking the pin assignment into account or using an incorrect adapter cable may damage or destroy the connected Ethernet/IP coupler.

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

2.4 Qualification of personnel

Any work on the product may only be carried out by personnel qualified and authorized to do so.

Qualified personnel are able to perform tasks assigned to them and can independently recognize and avoid any potential hazards. This requires, for example:

- technical training
- experience
- knowledge of the applicable regulations and standards

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 characteristics

The device is an interface coupler that can be used to connect connected devices (e.g. WLL180T) to the Ethernet/IP network. The relevant devices are connected via a simple plug system on the side of the coupler.

Normally the entire system is installed on a mounting rail near the application.

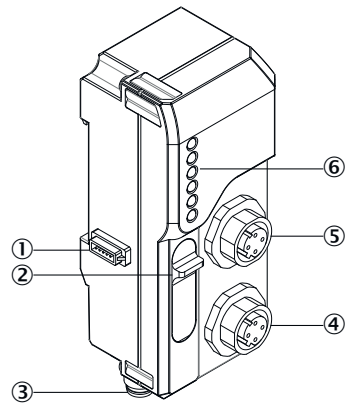
The coupler supports up to 16 connected devices, which are likewise connected to one another via the plug system.

Further properties:

- Ethernet/IP adapter
- Configuration via CIP classes, config assembly object
- EDS, DLR and QoS support
- BootP/DHCP support
- Address conflict monitoring (ACD)
- 2 Ethernet connections with transmission rate of 100 Mbaud

Further specifications can be found in the technical data ([see "Technical data", page 45](#)).

3.3 Structure and function



- ① Bus male connector (system bus)
- ② Maintenance port
- ③ Voltage supply connection M8, 4-pin
- ④ D-coded plug connector M12, 4-pin, Ethernet/IP
- ⑤ D-coded plug connector M12, 4-pin, Ethernet/IP
- ⑥ Status LEDs

3.4 Interfaces

3.4.1 Ethernet/IP

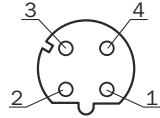


Table 1: Ethernet/IP pin assignment

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

3.4.2 Power supply

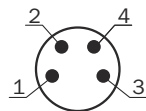


Table 2: Power supply pin assignment

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

3.4.2.1 UL Satisfaction Ratings



The total control output current and ambient temperature will be restricted 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:

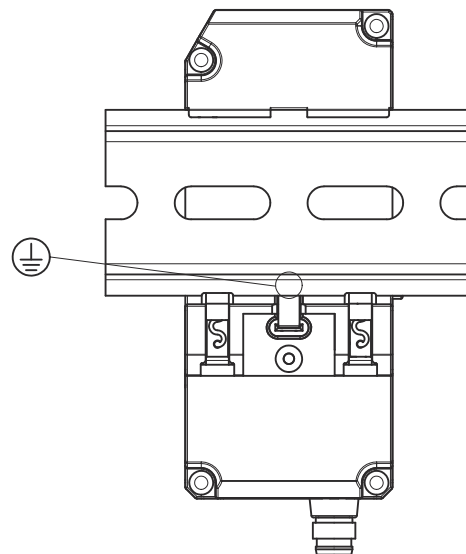
Input	12 - 24 V dc, max. 1.02 A, Class 2
Output	12 - 24 V dc, max. 0.8 A, Class 2
Maximum surround air Temperature +50°C.	

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.	

3.4.3 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 45](#)).

4.2 Storage

If you want to store the device for 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 45](#)).

5 Mounting

5.1 Required materials

You need the following additional materials to mount the device:

- Grounded mounting rail (pre-assembled)
- Pre-configured cable (max. 30 m) with M8 female connector (see "Interfaces", page 9)
- Pre-configured cable for Ethernet/IP with D-coded M12 male connector (see "Interfaces", page 9)
- One or more signal sources (e.g. WLL180T)
- Small slotted screwdriver

5.2 Preparing mounting location

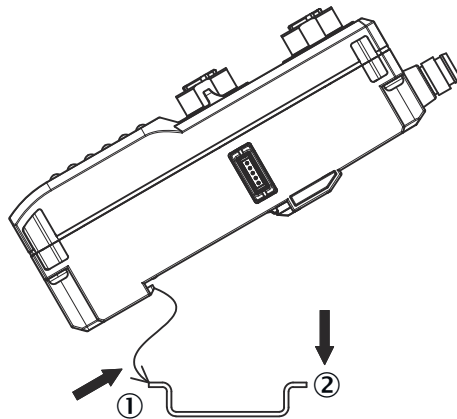
1. Mount a grounded mounting rail in the same area as the application.
2. Lay the two pre-assembled cables so that they can easily be connected to the connections of the device. If necessary, use cable channels, cable ties and cable grips.

5.3 Scope of delivery

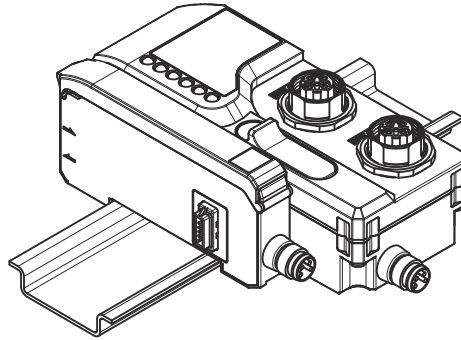
- WI180C-EN
- Quick start guide

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.¹⁾
5. Fix the connected devices on the mounting rail without any spaces.

5.5 Connecting the device



NOTE

Switch off the voltage supply before you connect or replace the devices.

1. Connect the D-coded M12 male connector for the Ethernet/IP network to the Ethernet/IP connection on the device, and fasten it with the coupling nut.
2. Connect the M8 female connector to the voltage supply on the bottom of the device and tighten the corresponding male connector.

¹⁾ see the operating instructions for the relevant device

6 Commissioning

6.1 Parameterization

The WI180C-EN can be integrated in Ethernet/IP control systems in different ways.



NOTE

All configuration information relates to controls manufactured by Beckhoff, which are configured and diagnosed with the TwinCAT™ configuration tool.

Integration in Ethernet/IP

The WI180C-EN can be integrated in Ethernet/IP in the following ways:

- As a generic module:
All module settings must be selected manually.
- Using an EDS file:
The WI180C-EN module settings have been predefined.

Configuration

The parameters are configured offline, then written to the WI180C-EN and activated on switching to online mode. The following options are available for configuring the WI180C-EN:

- The configuration assembly
- The controller tags in the controller organizer

Configuration options when integrating as a generic module

- If you have integrated the WI180C-EN as a generic module, then you can configure it dependent on the Connection Parameters entered.
- If the **configuration assembly** is activated under **Connection Parameters**, you must perform the configuration using the configuration assembly.

Configuration options when integrating using the EDS file

- If you have integrated the WI180C-EN using the EDS file, then you can configure it dependent on the selected instances of the I/O assemblies.

Table 3: Overview of connection types

Connection type	Assembly	Description	Note
Exclusive owner with config	I/O assembly: 101 through 103 Configuration assembly: 100	This connection type sends and receives process data and contains a configuration assembly	
Input only without config	I/O assembly: 104 Configuration assembly: –	This connection type sends process data and does not contain a configuration assembly.	

6.2 Integration as a generic module

1. Right-click on the Ethernet icon and select the **New Module...** command.
- ✓ The **Select Module** dialog box opens.
2. In the **Select Module** dialog box, select the **By Category** index card.
3. Open the **Communication** structure tree.
4. In the **Communication** structure tree, select the **ETHERNET-MODULE (Generic Ethernet Module)** module and click on **OK**.
- ✓ The **Module Properties [module name]** dialog box opens.

Module settings

1. In the **Module Properties [module name]** dialog box, enter a name and the IP address assigned for the WI180C-EN.
2. Enter the settings for Input, Output, and Configuration as follows:
When using the **generic module**, 4 bytes of header data must be added to the payload lengths stated in [table 17](#)
Example:
 - Input: assembly instance: 101; length according to [table 17](#): 2 bytes
 - Information stated in the generic module: 6 bytes



NOTE

When stating the data length, pay attention to the data type selected under **Comm Format!**

When using the **generic assembly**, header information is now transmitted in bytes 0:3 in the WI180C-EN input data:

- Bit 0: Run/Idle (1 = Run Mode | 0 = Idle Mode)
- Bit 1: Claim Output Ownership (COO) Flag - not used for MLG-2
- Bit 2 ... 3: Ready for Ownership of Outputs (ROO) Flags - not used for MLG-2
- Bit 4 ... 31: Reserved by CIP

The actual WI180C-EN payload starts at byte 4.

- Output: Assembly instance: 193
Select this instance if you do not want to write any output data. The output parameter is set to 193 (input only).
- Output: Assembly instance: 103; size: 4 bytes
Select this instance if you want to send output data.

The composition of the Control output data can be found in [section 7.7.2.3](#).



NOTE

When stating the data length, pay attention to the data type selected under **Comm Format!**

- Configuration: Assembly instance: 100; size: 1
Instance 100 of the assembly object is hereby selected.



NOTE

The assembly object contains a configuration assembly. The configuration assembly is represented by instance 100. Before the configuration assembly can be called up by the control, valid data must be written to it. An empty configuration assembly or a configuration assembly containing invalid data can lead to a control error.

Downloading the configuration to the control

1. Load the configuration to the control.
- ✓ The status displays for Run Mode, Controller OK, and I/O OK turn green.

Checking communication

The data received by the control from the WI180C-EN can be displayed in order to check that communication between the control and the WI180C-EN is working correctly.

1. In the **Controller Organizer**, open the **Controller Test Setup, Controller Tags** folder.
2. In the **Name** column of the **Controller Tags**, open the node with the name previously entered for the WI180C-EN.

6.3 Integration using an EDS file

Common configuration tools can import an EDS file for integration of the WI180C-EN into the Ethernet/IP™ network.

The EDS file for the WI180C-EN is available for download from www.sick.de (WI180C-EN EDS file).

Refer to your configuration tool's documentation for how to import the file into your system.

Prerequisites

- You are using an Allen Bradley control system with “RSLogix 5000” control software V22 or higher (or another control that facilitates integration using an EDS file).
- The WI180C-EN has an IP address (see ["IP address of the WI180C-EN", page 16](#)).
- The EDS file has been integrated into the control software using the Rockwell Hardware Installation Tool.

Setting up communication

1. Right-click on the Ethernet icon and select the **New Module...** command.
✓ The **Select Module Type** dialog box opens.
2. Select the WI180C-EN on the **Catalog** index card.
✓ The **Module Properties [module name]** dialog box opens.
3. Enter a name (freely selectable) in the **Name** field and the IP address defined for the WI180C-EN in the **IP Address** field.
✓ In the **Module Definition** area, the default connection **Input Only (104)** is shown as **Connections**. This is instance 104 of the assembly object.

Changing the instance of the assembly object

1. Click on **Change...** if you would like to change this instance.
2. Select e.g. Exclusive Owner 101.
3. Under **Size**, select the data format UINT-16.

Checking communication

The data received by the control from the WI180C-EN can be displayed in order to check that communication between the control and the WI180C-EN is working correctly.

1. In the **Controller Organizer**, open the **Controller Test Setup, Controller Tags** folder.
2. In the **Name** column of the **Controller Tags**, open the node with the name previously entered for the WI180C-EN.

6.4 IP address of the WI180C-EN

The IP address of the WI180C-EN can be assigned as follows:

- Static allocation
- Via BOOTP
- Via DHCP

Static allocation

Using the TCP/IP object, a fixed IP address can be configured via the control. To do so, an initial connection must be established via the default address (192.168.0.1).

Assigning the IP address via BOOTP or DHCP

If your control has a BOOTP or DHCP server, you can assign an IP address to the WI180C-EN via this server.

1. Start up the BOOTP/DHCP server (usually in the Start menu of your PC/notebook under **Rockwell Software, BOOTP-DHCP Server, BOOTP-DHCP Server**).
- ✓ The WI180C-EN is displayed as a node in the program window of the BOOTP/DHCP server; its MAC address is also displayed, but not its assigned IP address.
2. Double-click to open the WI180C-EN in the BOOTP/DHCP server.
3. In the **IP Address** field, enter a valid and available address and click **OK**.
4. Click on **Clear History**.
- ✓ After a while, the WI180C-EN is displayed with the entered IP address under **Request History**, as well as under **Relation List**.

Freezing the assigned IP address



NOTE

The procedure below will allow you to ensure that the WI180C-EN retains the IP address assigned via DHCP, even after a restart:

1. Deactivate the DHCP function in the WI180C-EN, by setting **attribute 3** of the **TCP/IP interface object** to 0. You can do this in the Rockwell BOOTP/DHCP server, for example, by clicking the **Disable BOOTP/DHCP** button.
- ✓ After a restart, the WI180C-EN starts up with the IP address that was previously assigned and backed up in the non-volatile memory.
The RSLinx Classic tool can be used to check again whether the control detects the set IP address.
2. Start up RSLinx Classic (usually in the Start menu of your PC/notebook under **Rockwell Software, RSLinx, RSLinx Classic**).
3. In the program, click the **RSWho** button.
4. Then open the path **AB_ETHIP1, Ethernet**.
- ✓ The WI180C-EN can be seen below its IP address.

6.5 Switching on

1. Switch on the voltage supply for the device.
2. Wait approximately 2 seconds until the device indicates that it is ready [see "LED status indicators", page 18](#).

7 Operation

7.1 Security

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 18).
- If you want to connect devices to the device or remove devices, switch off the voltage supply first.
- Only operate the WI180C-EN under the specified operating conditions (see "Technical data", page 45).

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

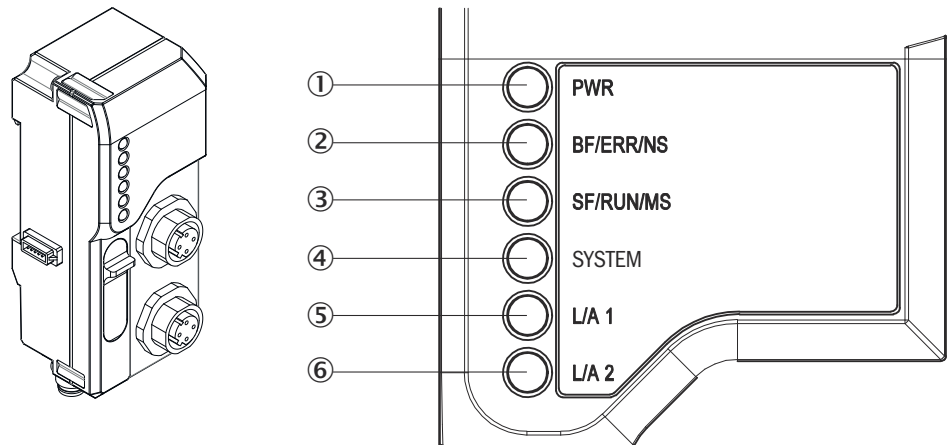


Table 4: LED status indicators

	LED	Display	Meaning	
①	PWR	Green	●	Voltage supply on
			○	Voltage supply off
②	NS (network status)	Red/green	○	No voltage or IP address
			Alternately red/green	Self-test when switching on
			◐ (red)	Connection timeout
			● (red)	IP address assigned to a different device
			◐ (green)	Valid IP address, no connection
			● (green)	Valid IP address and CIP connection
③	MS (module status)	Red/green	Alternately red/green	Self-test when switching on
			● (red)	Error (device not in operation)
			◐ (red)	Warning (but device in operation)
			● (green)	Device in operation

	LED	Display		Meaning
④	SYSTEM	Green	○	Device not configured
			●	Device is running
⑤	L/A1 (link/activity 1)	Green	○	No network connection at connection 1
			●	Network connection at connection 1 available, no communication
			☉	Network connection, communication active
⑥	L/A2 (link/activity 2)	Green	○	No network connection at connection 2
			●	Network connection at connection 2 available, no communication
			☉	Network connection, communication active

7.4 Device slots and classes

WI180C-EN uses CIP classes to represent each connected device.

The module slots Slot0 to 15 represent the connected devices, as shown in the figure below.

Instance 1 is the module on the far outer left (away from the WI180C).

The **instance** counting restarts for each device class.

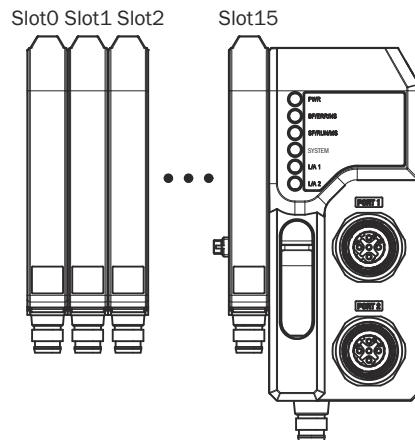


Figure 2: WI180C-EN with device modules

The WI180C-EN 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 basic device	<ul style="list-style-type: none"> The WLL180T basic device can be installed only as Module 1 (on the far outside left of the mounting rail) No additional voltage supply is required for the WLL180T device

Supported products	Product description	Note
WLL180T-E WLL180T-F	Fiber amplifier expansion module	<ul style="list-style-type: none"> The WLL180T basic device can be installed only as Module 2 to Module 16 No additional voltage supply is required for the WLL180T device
OD1 at one input of AOD1-M	Displacement sensor Evaluation unit basic device	<ul style="list-style-type: none"> For each AOD1 unit connected, the number of plug-gable modules decreases by one (max. 8 AOD1 devices possible) If AOD1 and WLL180T are used in combination with WI180C-EC, all WLL180T devices must be placed on the left of AOD1 The AOD1-M basic device can be installed only as Module 1/2 (on the far outside left of the mounting rail) Voltage supply required for the AOD1-M device
OL1 at one input of AOD1-M	Displacement sensor Evaluation unit basic device	
OD1 at one input of AOD1-S	Displacement sensor Evaluation unit expansion module	<ul style="list-style-type: none"> For each AOD1 unit connected, the number of plug-gable modules decreases by one (max. 8 AOD1 devices possible) If AOD1 and WLL180T are used in combination with WI180C-EC, all WLL180T devices must be placed on the left of AOD1 The AOD1-S expansion module can be installed only as Module 3/4 to Module 15/16 Voltage supply required for the AOD1-S device
OL1 at one input of AOD1-S	Displacement sensor Evaluation unit expansion module	
KTL180-ML KTL180-MM	Fiber contrast sensor basic device	<ul style="list-style-type: none"> The KTL180 basic device can be installed only as Module 1 (on the far outside left of the mounting rail) No additional voltage supply is required for the KTL180 device
KTL180-ME KTL180-MF	Fiber contrast sensor expansion module	<ul style="list-style-type: none"> The KTL180 expansion module can be installed only as Module 2 to Module 16 No additional voltage supply is required for the KTL180 device

7.4.1 Module sequence

Apart from the general compatibility between gateways and sensors (see "Device slots and classes", page 19), there are restrictions in regard to the sequence of the modules in the WI180 system. (Background: Some older modules, in particular the WLL180T, cannot work with the data or timing of newer modules; the older modules therefore need to be located to the left of the newer ones because the data flow is from left to right).

Definition: Left - right → far right is where the WI180 gateway is located.

Rules:

- Every WLL180T module must be located to the left of every other module type.
- A KTL180 module must be located to the right of a WLL80T module and to the left of an AOD1 module.
- Every AOD1 module must be located to the right of every other module type.

7.5 Supported classes

The WI180C-EN supports the following classes:

Table 6: Supported standard classes

Class code	Class	Description	Services	Instances
0x01	Identity Object	Contains all device-specific data (e.g., ID, device type, device status, etc.)	Get_Attribute_Single Get_Attribute_All Reset	1
0x02	Message router object	Contains all supported class codes for the MLG-2 and the max. number of connections	-	1
0x04	Assembly object	Groups together the data for several objects into a single object	Get_Attribute_Single Set_Attribute_Single	5
0x06	Connection manager object	Contains connection-specific attributes for triggering, transport, connection type, etc.	Get_Attribute_Single	1
0x47	Device level ring (DLR) object	Contains the status and configuration attributes of the DLR protocol	Get_Attribute_Single Get_Attribute_All	1
0x48	Quality of service (QoS) object	Contains mechanisms for processing data flows with different priorities	Get_Attribute_Single Set_Attribute_Single	1
0xF5	TCP/IP interface object	Contains the attributes for TCP/IP, such as IP address, subnet mask, and gateway or reference for the IP address via DHCP	Get_Attribute_Single Set_Attribute_Single Get_Attribute_All	1
0xF6	Ethernet link object	Contains connection-specific attributes, such as transmission speed, interface status, and MAC address	Get_Attribute_Single Set_Attribute_Single Get_Attribute_All Get_and_Clear	2

Table 7: Supported manufacturer classes

Class code	Class	Description	Services	Instances
0x64	Gateway Configuration	Contains all manufacturer-specific information on the WI180C-EN gateway	Get_Attribute_Single Set_Attribute_Single	1
0x65	WLL180T module	Contains all manufacturer-specific information on a connected WLL180T module	Get_Attribute_Single Set_Attribute_Single	0 ... 16
0x66	KTL180 module	Contains all manufacturer-specific information on a connected KTL180 module	Get_Attribute_Single Set_Attribute_Single	0 ... 16
0x67	AOD1/OD1 module	Contains all manufacturer-specific information on a connected OD1 (via AOD1) module	Get_Attribute_Single Set_Attribute_Single	0 ... 16
0x68	AOD1/OL1 module	Contains all manufacturer-specific information on a connected OL1 (via AOD1) module	Get_Attribute_Single Set_Attribute_Single	0 ... 16
0x80	Module Configuration	Contains information on which module is in which device slot	Get_Attribute_Single Set_Attribute_Single	1

7.6 Identity Object

Table 8: Class services of the identity object

Service code	Service	Description
0x01	Get_Attribute_All	Returns the values of all attributes
0x0E	Get_Attribute_Single	Returns the values of an attribute

Table 9: Class attributes of the identity object

Attribute ID	Access	Description	Data type
1	Get	Object revision index	UINT
2	Get	Highest instance number in this class	UINT
6	Get	Highest class attribute ID that appears	UINT
7	Get	Highest instance attribute implemented	UINT

Table 10: Instance services of the identity object

Service code	Service	Description
0x01	Get_Attribute_All	Returns the values of all attributes
0x0E	Get_Attribute_Single	Returns the values of an attribute
0x05	Reset	Resets the device: 0 = The device is reinitialized (power on) 1 = The device is reinitialized (power on) and reset to factory settings.

**NOTE**

If you reset to factory settings, you will lose all data that has already been configured.

- The factory settings are restored as soon as 1 is written.
- The WI180C-EN will be reset too. Therefore, the control reports, where necessary, an error that the WI180C-EN is no longer available.

Table 11: Instance attributes of the identity object

Attribute ID	Access	Data type	Name	Default value
0x01	R	UINT	Vendor ID	0x0328 corresponds to the SICK vendor ID
0x02	R	UINT	Device type	0x000C
0x03	R	UINT	Product Code	0x4300
0x04	R	STRUCT	Revision	Contains the firmware revision number UINT 0x0001 UINT 0x0001
0x05	R	WORD	Status	see table 12
0x06	R	UDINT	Serial Number	yywwnnnn
0x07	R	Short_String	Product name	WI180C-EN
0x08	R	USINT	State	Current device status 0 = Non-existent 1 = Self-test 2 = Standby 3 = Operation 4 = Serious remediable error 5 = Serious non-remediable error 255 = Default value

Table 12: Bits of the status instance attribute

Bit	Name	Description	Default value
0	Owned	0 = no connection with the master 1 = connection established with the master	0
1	-	Reserved	0
2	Configured	0 = device with standard configuration 1 = no standard configuration	0
3	-	Reserved	0
4 ... 7	Extended device status field	Manufacturer-specific status bits	see table 13
8	Minor recoverable status	0 = no error 1 = error that can be reset (device not in error status)	0
9	Minor unrecoverable status	0 = no error 1 = error that cannot be reset (device not in error status)	0
10	Major recoverable status	0 = no major error 1 = major error that can be reset (device in error status)	0

Bit	Name	Description	Default value
11	Major unrecoverable status	0 = no major error 1 = major error that cannot be reset (device in error status)	0
12 ... 15	-	Reserved	0000

Table 13: Bits 4 to 7 of the status instance attribute

Possible combinations Bits 4 ... 7	Description
0000	Device in self-test
0001	Firmware update in progress
0010	At least one connection error
0011	No I/O connection established
0100	Configuration in non-volatile memory (EEPROM) failed
0101	Major error, bit 10 or bit 11 = 1
0110	At least one connection in Run operating mode
0111	At least one connection present, all in Idling operating mode
1,000 ... 1,111	Reserved

7.7 Assembly object

Class code 0x04

The assembly object enables data attributes from different objects to be grouped together into one single object. The WI180C-EN supports the static assembly of attributes only, hence why the number of instances is fixed.

Table 14: Class services of the assembly object

Service code	Service	Description
0x0E	Get_Attribute_Single	Returns the values of an attribute

Table 15: Class attributes of the assembly object

Attribute ID	Access	Description	Data type
1	Get	Object revision index	UINT

Table 16: Instance services of the assembly object

Service code	Service	Description
0x0E	Get_Attribute_Single	Returns the values of an attribute
0x10	Set_Attribute_Single	Sets the value of an attribute

Table 17: Instance attributes of the assembly object

Instance	Attribute ID	Access	Description	Default value
100	3	Get/Set	Configuration data (see "Configuration assemblies", page 27)	0
	4	Get	Size 16	16
101	3	Get	Process data (see "I/O assemblies", page 25)	0x0000
	4	Get	Size	2
102	3	Get	Process data (see "I/O assemblies", page 25)	0x0000 0000 0000 0000
	4	Get	Size	8

Instance	Attribute ID	Access	Description	Default value
103	3	Get/Set	Process data (see "I/O assemblies", page 25)	0x0000 0000
	4	Get	Size	4
104	3	Get	Process data (see "I/O assemblies", page 25)	0x0000 0000 0000 0000 0x0000 0000 0000 0000 0x0000 0000 0000 0000 0x0000 0000 0000 0000
	4	Get	Size	32

7.7.1 I/O assemblies

Different I/O assemblies are available for the WI180C-EN. The table grid below (see [table 18](#)) shows the contents of the assemblies.



NOTE

- You select the I/O assembly as the Connection under Module Properties.
- In principle, several connections can be established from the control to the WI180C-EN. However, the data provided via the WI180C-EN is fundamentally restricted. The WI180C-EN will reject connections once the limit has been reached. In this case, the WI180C-EN outputs the following error codes:
 - 01h = general error code
 - 0113h = extended error code

Table 18: I/O assemblies

Content	Data type	Assembly			
		101	102	103	104
Switching signals Q1 of all modules	UINT-16	x	x	-	-
Switching signals Q2 of all modules	UINT-16	-	x	-	-
Switching signals Q3 of all modules	UINT-16	-	x	-	-
Error status of all modules	UINT-16	-	x	-	-
Measured value of all modules	ARRAY[16] OF UINT-16	-	-	-	x
Teach command for all modules	UINT-16	-	-	x	-
Confirm errors for all modules	UINT-16	-	-	x	-

7.7.2 I/O assemblies with process data

7.7.2.1 Switching signals

Table 19: Q1

Access	Data type	Description
R	UINT-16	This part of the instance transmits the first switching signal Q1 of all connected modules

Table 20: Q2

Access	Data type	Description
R	UINT-16	This part of the instance transmits the second switching signal Q2 of all connected modules

Table 21: Q3

Access	Data type	Description
R	UINT-16	This part of the instance transmits the third switching signal Q3 of all connected modules and/or the status of the external input of all connected modules (function depends on module)

Table 22: Error status

Access	Data type	Description
R	UINT-16	This part of the instance transmits the error status of all connected modules

7.7.2.2 measured values

Table 23: Transmission of measured values

Contents	Format	Byte	Type
Measured value Slot0	UINT-16	0	Lowest-order byte
		1	Highest-order byte
...			
Measured value Slot15	UINT-16	30	Lowest-order byte
		31	Highest-order byte

7.7.2.3 I/O assemblies for initiating operating functions

Table 24: Teach

Access	Data type	Description
R/W	UINT-16	This part of the instance is used to initiate the teach function on the connected modules of the WI180C-EN.

The object's individual functions are stored in 16-bit:

Table 25: Details

Bit	Slot	Description
Bit 0	Teach slot 0	Teach for module in slot0 <ul style="list-style-type: none"> 0 = Normal function 1 = At rising signal edge teach execution. Depending on the teach type (e.g. 2-point teach), the falling signal edge is used to execute the second part of the teach.
...		
Bit 15	Teach slot15	Teach for module in Slot15

Table 26: Error confirmation

Access	Data type	Description
R/W	UINT-16	This part of the instance is used to reset errors detected on the connected modules of the WI180C-EN.

The object's individual functions are stored in 16-bit:

Table 27: Details

Bit	Slot	Description
Bit 0	Acknowledge Slot0	Confirm error module in Slot0 <ul style="list-style-type: none"> 0 = Normal function 1 = Reset fault
...		

Bit	Slot	Description
Bit 15	Acknowledge Slot15	Confirm error module in Slot15

7.7.3 Configuration assemblies

Most I/O assemblies contain a **configuration assembly**, which is sent to the WI180C-EN when a cyclic connection is being established or when the controller is restarted. The values are then adopted by the WI180C-EN.



NOTICE

Interaction with service data, **Class 100**, Attribute 0xD3.

Instance 100 Configuration Assembly

Table 28: Instance 100 Configuration Assembly

Byte	Designation	Data length	Data type	Description
0	Global diagnosis	1 Byte	BOOL	Bit 0 of the byte determines the function: 0 = All diagnostics switched off 1 = All diagnostics switched on

7.8 Manufacturer-specific classes

Table 29: Nomenclature for access and data types

Abbreviation	Meaning
R	Read only access
R/W	Read/write access
STRG	String = a chain of characters of varying length
BOOL	Boolean = logical value 0 or 1
ENUM	Freely selectable values within a limited value range (e.g. BLACK, RED, BLUE, YELLOW)
INT	Signed Integer = Signed integer value (e.g. INT-32 = -2,147,483,648 ... 2,147,483,647)
UINT	Unsigned integer = Integer value (e.g. UINT-32 = 0 ... 4,294,967,295)
ARRAY	Data sequence of a data type (e.g. Array UINT-8 = Character string of the data type UINT-8)
RECORD	Data sequence with different data types (e.g. UINT-8, UINT-32, UINT-32, UINT-16)
STRUCT	Data sequence with different data types (e.g. UINT-8, UINT-32, UINT-32, UINT-16)



NOTE

A string in EtherNet/IP consists of 2 bytes of length information followed by a byte container of the specified length.

7.8.1 Class 100 gateway information

Table 30: Class services of class 100

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 31: Instance services of class 100

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute
10h	Set_Attribute_Single	Sets the value of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Attribute ID	Function	Access	Data type	Content/meaning
0x01	Q1 of all modules	R	UINT	Output state of first output of all modules (every bit 0 = Off, 1 = On)
0x02	Q2 of all modules	R	UINT	Output state of second output of all modules (every bit 0 = Off, 1 = On)
0x03	Q3 of all modules	R	UINT	Output state of third output or external input of all modules (every bit 0 = Off, 1 = On)
0x06	Teach in all modules	R/W	UINT	This attribute enables the switching point(s) of all modules to be taught-in. The first switching point is taught when a bit changes from 0 to 1 (or the teach-in process is started in the case of dynamic teach-in). The second switching point (for two-point teach-in) is taught when a bit changes from 1 to 0 (or the teach-in process is ended in the case of dynamic teach-in).
0x07	Error confirmation of all modules	R/W	UINT	(every bit 0 = No action, 1 = Acknowledge error).
0x08	Product series	R	UINT	Bit 15 ... 12 = Manufacturer (1 = SICK) Bit 1 ... 8 = Categories (5 = Communication unit) Bit 7 .. 0 = Family (9 = WI180C-EN)
0x09	Product type	R	UINT	1 = WI180C-EN
0x0A	firmware version	R	UINT	
0x0B	Protocol version	R	UINT	1
0x0C	Product version	R	UINT	1
0x0D	Vendor name	R	STRG(7)	"SICK AG"
0x0E	Product name	R	STRG(9)	"WI180C-EN"
0x0F	Product ID	R	STRG(7)	"6068090"
0x10	User ID	R/W	STRG(32)	max. 32 characters
0x11	Operating status	R	UINT	0 = Initialization, 2 = Execution
0x12	Manufacturer ID	R	UINT	0x0328
0x13	Network profile	R	STRG(19)	"Ethernet/IP Coupler"
0x67	Serial number	R	STRG(11)	
0x68	Number of modules present	R	UINT	0 ... 16
0x6A	Last error code	R/W	UINT	Reset via any write access
0xD0	Firmware identifier application	R	STRG(4)	
0xD1	Firmware identifier communication	R	STRG(12)	
0xD2	Find me	R/W	UINT	0 = Stop, 1 = Initialization
0xD3	Global diagnosis	R/W	UINT	0 = Off, 1 = On ¹
0xDC	Reset to factory settings	W	UINT	3: Execute

¹ Note interdependency: Function can also be set via the **CONFIG-Assembly**.

7.8.2 Class 101 WLL180T

Table 32: Class services of class 101

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 33: Instance services of class 101

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute
10h	Set_Attribute_Single	Sets the value of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Table 34: WLL180T

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x01	Output 1		R	BOOL	Output state of first output (0 = Off, 1 = On)
0x02	Output 2		R	BOOL	Output state of second output (0 = Off, 1 = On)
0x03	Output 3 / Ext. input		R	BOOL	Output state of external input (0 = Off, 1 = On)
0x04	Error Status		R	BOOL	Error status (0 = No error, 1 = Error)
0x05	Light level		R	UINT	Measured value of received light
0x06	Teach request		R/W	BOOL	Coding see Class 100 - Attribute 0x06
0x07	Error Clear		R/W	BOOL	Acknowledgment of error message (when value changes from 00 to 01)
0x08	Product series	-	R	UINT	0x1101 (model with 1 output)
		-			0x1102 (model with 2 outputs)
		b15-12 Manufacturer			1: SICK
		b11-8 Categories			1: Fiber amplifier
		b7-0 Family			1: WLL180T 1 output 2: WLL180T 2 outputs
-					
0x09	Product type		R	UINT	17: WLL180T
0x0A	firmware version		R	UINT	0x0200 or higher
0x0C	Product version		R	UINT	1
0x0D	Vendor name		R	STRG	"SICK AG"
0x0E	Product name		R	STRG	Respective product type name
0x0F	Product ID		R	STRG	Respective product type code
0x10	User ID		R	STRG	Reserved (max. 32 characters)
0x11	Operating status		R/W	UINT	0 = Initialization 1: Idle 2: Execute 3: In use by user
0x6A	Error code		R/W	UINT	Read: Last error code write any value: delete last error code
0x6C	Display		R/W	UINT	0: Numeric display 1: Bar graph 2: Percentage display

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x6E	Teach-in mode	CH1	R/W	UINT	0: 1-point 1: 2-point 2: Auto 3: Zone 4: Glass
0x6F		CH2	R/W	UINT	
0x70	Response speed		R/W	UINT	0: 16 us 1: 70 us 2: 250 us 3: 2 ms 4: 8 ms
0x71	Sender strength		R/W	UINT	0: low strength 1: medium strength 2: normal
0x72	MF input		R/W	UINT	0: External teach-in 1: Test input 2: Synchronization 3: Reset counter 4: Master teach-in 5: No function
0x73	Key lock		R/W	UINT	0: cancel 1: Completely locked 2: Locked, but external teach-in available
0x74	Operating mode	CH1	R/W	UINT	0: Light on 1: Dark on
0x75		CH2	R/W	UINT	
0x76	Threshold	CH1 Lower limit	R/W	UINT	-999 ... 9,999 All values outside the range will be replaced by the nearest valid values.
0x77		CH1 Upper limit	R/W	UINT	
0x78		CH2 Lower limit	R/W	UINT	
0x79		CH2 Upper limit	R/W	UINT	
0x7A	Counter setting	CH1	R/W	UINT	0: Delay off 1: Single pulse
0x7B		CH2	R/W	UINT	
0x7C	Delay time off	CH1	R/W	UINT	0 ... 9,999: 0 ... 9,999 ms -1 ... -9: 0.1 ... 0.9 ms
0x7D	Delay time on	CH1	R/W	UINT	
0x7E	Delay time off	CH2	R/W	UINT	
0x7F	Delay time on	CH2	R/W	UINT	
0x83	Hysteresis		R/W	UINT	1 ... 40
0x85	ASC (automated switching threshold adjustment)		R/W	UINT	0: Off 1: Normal
0x86	Eco Mode		R/W	UINT	0: Off 1: Display in energy-saving mode
0x87	Reverse display		R/W	UINT	0: Normal 1: Display reversed
0xD0	Save zero reset		R/W	UINT	Write any value to clear zero reset
0xD1	Cancel zero reset		R/W	UINT	Write any value to clear zero reset
0xD2	Teach-in 1-point		R/W	UINT	1: CH1 2: CH2
0xD3	Teach in 2-point		R/W	UINT	1: CH1 2: CH2
0xD4	Reset		R/W	UINT	3: Execute

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0xDB	Return to start menu		R/W	UINT	Write any value to return to start menu
0xDC	Reset to factory settings		R/W	UINT	3: Execute

7.8.3 Class 102 KTL180

Every KTL180 contains its own instance of this class. The counting begins at 1 at the module on the left (side away from the WI180).

Table 35: Class services of class 102

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 36: Instance services of class 102


Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute
10h	Set_Attribute_Single	Sets the value of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Table 37: Class 102 KTL180

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x01	Output 1		R	BOOL	Output state of first output (0 = Off, 1 = On)
0x02	Output 2		R	BOOL	Output state of second output (0 = Off, 1 = On)
0x03	Output 3 / Ext. input		R	BOOL	Output state of external input (0 = Off, 1 = On)
0x04	Error Status		R	BOOL	Error status (0 = No error, 1 = Error)
0x05	Light level		R	UINT	Measured value of received light
0x06	Teach request		R/W	BOOL	<p>For rising edge (0 → 1) = Start teach-in / 1st switching point For falling edge (0 → 1) = Stop teach-in / 2nd switching point If teach-in errors occur, error code 0x001F is output. If the teach-in is successful, the write operation succeeds.</p> <hr/> <p>NOTICE Single-point teach-in requires a signal level > 0, otherwise the teach-in process fails.</p>
0x07	Error Clear		R/W	BOOL	Acknowledgment of error message (when value changes from 00 to 01)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x08	Product series	-	R	UINT	1,111 h (model with 1 output)
		-			1112h (model with 2 outputs)
		b15-12 Manufacturer			1: SICK
		b11-8 Categories			1: Fiber amplifier
		b7-0 Family			11: KTL180 1 output
		-			12: KTL180 2 outputs
		-			17: KTL180-ME2P41, 6068621
0x09	Product type		R	UINT	17: KTL180-ME2P41, 6068621
0x0A	firmware version		R	UINT	For example: 0x0102 = V1.2
0x0C	Product version		R	UINT	1
0x0D	Vendor name		R	STRG	“SICK AG”
0x0E	Product name		R	STRG	Respective product type name
0x0F	Product ID		R	STRG	Respective product type code
0x10	User ID		R/W	STRG	Reserved (max. 32 characters)
0x11	Operating status		R	UINT	0 = Initialization 1: Busy 2: Execute 3: In use by user During the active teach-in process = Busy
0x6A	Error code		R/W	UINT	Read: Last error code write any value: delete last error code
0x6C	Display		R/W	UINT	0: Numeric display 1: Bar graph 2: Percentage display
0x6E	Teach-in mode	CH1	R/W	UINT	0: Single-point teach-in 1: Two-point teach-in 2: Dynamic Teach-in mode for teach request via: <ul style="list-style-type: none"> • Attribute 0x06 • Attributes 0xD2 and D3 • Process data For devices without Q2, the write operation is also successful.
0x6F		CH2	R/W	UINT	
0x70	Response speed		R/W	UINT	0: 16 us 1: 200 us Higher response speed = longer exposure time = higher measured values: required for large sensing distances or dark materials
0x71	Receiver amplification		R/W	UINT	0: Low 1: Standard 2: High (higher amplification = higher measured values: required for large sensing distances or dark materials) 3: Auto (automatic selection after teach-in)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x72	MF input		R/W	UINT	0: External teach-in 1: Teach-in all 2: L/D selection 3: Blanking 4: No function
0x73	Key lock		R/W	UINT	0: cancel 1: Completely locked 2: Locked, but external teach-in available
0x74	Operating mode	CH1	R/W	UINT	0: Auto (as per teach-in process) 1: Light switching 2: Dark switching For devices without Q2, the write operation is also successful.
0x75		CH2	R/W	UINT	
0x76	Threshold	CH1 Lower limit	R/W	UINT	-999 ... 9,999 All values outside this range are replaced by the nearest valid values.
0x77		CH1 Upper limit	R/W	UINT	
0x78		CH2 Lower limit	R/W	UINT	
0x79		CH2 Upper limit	R/W	UINT 	
0x7A	Delay settings	CH1	R/W	UINT	0: Delay off 1: Single pulse For devices without Q2, the write operation is also successful. Delay settings on the display are not synchronous with the fieldbus
0x7B		CH2	R/W	UINT	
0x7C	Delay time off	CH1	R/W	UINT	0 ... 9,999: 0 ... 9,999 ms
0x7D	Delay time on	CH1	R/W	UINT	-1 ... -9: 0.1 ... 0.9 ms
0x7E	Delay time off	CH2	R/W	UINT	For devices without Q2, the write operation is also successful.
0x7F	Delay time on	CH2	R/W	UINT	
0x81	Synchronization		R/W	UINT	0 = Asynchronous 1: Synchronous
0x83	Sensitivity		R/W	UINT	Window size, only relevant for single point teach-in 0: 10% 1: 20% 2: 50%
0x85	ASC (automated switching threshold adjustment)		R/W	UINT	0: Off 1: On
0x86	Eco Mode		R/W	UINT	0: Off 1: Display in energy-saving mode
0x87	Reverse display		R/W	UINT	0: Normal 1: Display reversed
0x8F	Master teach-in		W	UINT	2: Execute (If the value is not set to 3, an error is output)
0x90	Backup job		W	UINT	1: Job 1 2: Job 2 3: Job 3 4: Job 4 5: Job 5

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x91	Load job		W	UINT	1: Job 1 2: Job 2 3: Job 3 4: Job 4 5: Job 5
0xD0	Save zero reset		W	1 byte	Sets value to 0.
0xD1	Cancel zero reset		W	1 byte	Restores normal value scale.
0xD2	Teach-in 1 point or start for dynamic teach-in		W	UINT	1: CH1 2: CH2 For devices without Q2, the write operation is also successful.
0xD3	Teach-in 2 point or stop for dynamic teach-in		W	UINT	1: CH1 2: CH2 For devices without Q2, the write operation is also successful.
0xDA	Reset		W	UINT	3: Execute Running teach-in process is aborted.
0xDB	Return to start menu		W	UINT	Write any value to return to start menu A running teach-in process is aborted.
0xDC	Reset to factory settings		W	UINT	3: Execute Switching thresholds are also reset

7.8.4 Class 103 OD1 on AOD1

Table 38: Class services of class 103

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 39: Instance services of class 103

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute
10h	Set_Attribute_Single	Sets the value of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Table 40: Class 103 OD1 on AOD1

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x01	Output 1		R	BOOL	Output state of first output (0 = Off, 1 = On)
0x02	Output 2		R	BOOL	Output state of second output (0 = Off, 1 = On)
0x03	Output 3 / Ext. input		R	BOOL	Output state of third output (0 = Off, 1 = On)
0x04	Error Status		R	BOOL	Error status (0 = No error, 1 = Error)
0x05	Measured value		R	UINT	Distance measurement
0x06	Teach request		R/W	BOOL	Coding see Class 100 Attribute
0x07	Error Clear		R/W	BOOL	Acknowledgment of error message (when value changes from 00 to 01)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x08	Product series	-	R	UINT	0x1301 (15 mm model)
		-			0x1302 (35 mm model)
		-			0x1303 (100 mm model)
		b15-12 Manufacturer			1: SICK
		b11-8 Categories			3: Displacement
		b7-0 Family			1: OD1 15 mm
		-			2: OD1 35 mm
		-			3: OD1 100 mm
0x09	Product type		R	UINT	1: AOD1
0x0A	firmware version		R	UINT	0x0100
0x0C	Product version		R	UINT	0
0x0D	Vendor name		R	STRG	"SICK AG"
0x0E	Product name		R	STRG	Respective product type name
0x0F	Product ID		R	STRG	Respective product type code
0x10	User ID		R/W	STRG	Reserved (max. 32 characters)
0x11	Operating status		R/W	UINT	0 = Initialization 1: Idle 2: Execute 3: In use by user
0x6A	Error code		R/W	UINT	Read: Last error code write any value: delete last error code
0x6C	Threshold	Near	R/W	UINT	-32,768 ... 32,767 (default: depending on sensor type)
0x6D		Far	R/W	UINT	-32,768 ... 32,767 (default: depending on sensor type)
0x6E	Output hysteresis		R/W	UINT	0 ... 32,767 (default: depending on sensor type)
0x6F	Calculation flags		R/W	UINT	0: No calculation 1: Calculation
0x70	Calculation coefficient addition		R/W	UINT	-10,000 ... 10,000 (default: 0)
0x71	Calculation coefficient multiplication		R/W	UINT	-10,000 ... 10,000 (default: 1)
0x72	Calculation coefficient division		R/W	UINT	1 ... 32,767 (default: 1)
0x73	Monitor cumulative values		R/W	UINT	Field bus channel 2 data selection (0: Head2, 1: Cumulative value)
0x74	Cumulative values	Head1	R/W	UINT	0: None 1: Add 2: Subtract 3: Difference
0x75		Head2	R/W	UINT	
0x76		Left unit Head1	R/W	UINT	
0x77		Left unit Head2	R/W	UINT	
0x78	I/O polarity		R/W	UINT	0: PNP (N/O / Normally open) 1: NPN (N/O / Normally open) 2: PNP (N/C / Normally closed) 3: NPN (N/C / Normally closed)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x79	Output selection	Out1	R/W	UINT	0: Off 1: Calculated GO 2: Calculated LO 3: Calculated HI 4: Head 1 GO 5: Head 1 LO 6: Head 1 HI 7: Head 2 GO 8: Head 2 LO 9: Head 2 HI
0x7A		Out2	R/W	UINT	
0x7B		Out3	R/W	UINT	
0x7C	Selection of external Input		R/W	UINT	0: Off 1: Teach-in (rising: far, falling: near) 2: OBSB teach-in 3: Zero reset 4: Laser off
0x7D	Selection of analog output		R/W	UINT	0: Off 1: Calculated 2: Head 1 3: Head 2
0x7E	Analog scaling		R/W	UINT	0: Off 1: On
0x7F	Analog scaling (max.)	10 V / 20 mA	R/W	UINT	-32,768 ... 32,767 (default: 10,000)
0x80	Analog scaling (min.)	0 V / 4 mA	R/W	UINT	-32,768 ... 32,767 (default: -10,000)
0x81	Baud rate				0: No sensor head 1: 9.6 k 2: 19.2 k 3: 38.4 k 4: 57.6 k 5: 115.2 k 6: 230.4 k 7: 312.5 k 8: 460 k 9: 500 k 10: 625 k 11: 833 k 12: 921 k 13: 1,250 k (default: 9)
0x89	Product series, amplifier	b15–b0: Amplifier product series	R	UINT	0x1503

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x8A	Switching point	Near	R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: -1,000) OD1 35 mm: -2,249 ... 2,249 (default: -300) OD1 100 mm: -7,499 ... 7,499 (default: -1,000)
0x8B		Far	R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: 1,000) OD1 35 mm: -2,249 ... 2,249 (default: 300) OD1 100 mm: -7,499 ... 7,499 (default: 1,000)
0x8C	Background ObSB		R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: 0) OD1 35 mm: -2,249 ... 2,249 (default: 0) OD1 100 mm: -7,499 ... 7,499 (default: 0)
0x8D	Tolerance ObSB		R/W	UINT	OD1 15 mm: 0 ... 7,499 (default: 1,000) OD1 35 mm: 0 ... 2,249 (default: 300) OD1 100 mm: 0 ... 7,499 (default: 1,000)
0x8E	Moving average		R/W	UINT	0: over one value 1: 8 values 2: 64 values 3: 512 values
0x8F	Teach-in mode		R/W	UINT	0: 2-Point 1: 1-Point 2: ObSB
0x90	Sampling rate		R/W	UINT	0: 500 us 1: 1,000 us 2: 2,000 us 3: 4,000 us 4: Auto
0x91	Key lock		R/W	UINT	0: Unlocked 1: Locked
0x92	Switching behavior		R/W	UINT	0: Light ON 1: Dark ON
0x93	Calibration, near distance		R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: -5,000) OD1 35 mm: -2,249 ... 2,249 (default: -1,500) OD1 100 mm: -7,499 ... 7,499 (default: -5,000)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x94	Calibration, far distance		R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: 5,000) OD1 35 mm: -2,249 ... 2,249 (default: 1,500) OD1 100 mm: -7,499 ... 7,499 (default: 5,000)
0x95	Error behavior		R/W	UINT	0: Clamp 1: Hold
0x96	Clamp holding time		R/W	UINT	0 ... 9,999 (default: 0)
0x98	Zeroing value		R/W	UINT	OD1 15 mm: -7,499 ... 7,499 (default: 0) OD1 35 mm: -2,249 ... 2,249 (default: 0) OD1 100 mm: -7,499 ... 7,499 (default: 0)
0x9C	Barycenter		R/W	UINT	0: Max. light 1: Closest 2: 2nd point 3: 3rd Point 4: 4th Point 5: 5th Point
0x9F	Hysteresis value		R/W	UINT	OD1 15 mm: 0 ... 7,499 (default: 50) OD1 35 mm: 0 ... 2,249 (default: 50) OD1 100 mm: 0 ... 7,499 (default: 50)
0xA0	Sensitivity		R/W	UINT	0: Auto adjust 1: Min. sense 2: 2nd sense 3: 3rd Sense 4: 4th Sense 5: 5th Sense 6: Max. sense
0xA1	Light threshold		R/W	UINT	0: Lowest 1: Lower 2: Middle 3: Upper
0xA3	Key lock active		R/W	UINT	0: Display active if locked 1: Display inactive if locked
0xD0	Save zero reset		R/W	UINT	
0xD1	Cancel zero reset		R/W	UINT	
0xD2	Teach-in 1-point		R/W	UINT	
0xD3	Teach in 2-point		R/W	UINT	
0xD4	Teach-in ObSB		R/W	UINT	
0xDA	Reset		R/W	UINT	3: Execute
0xDB	Return to start menu		R/W	UINT	Write any value to return to start menu
0xDC	Reset to factory settings		R/W	UINT	3: Execute

7.8.5 Class 104 OL1 on AOD1

Table 41: Class services of class 104

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 42: Instance services of class 104

Service code	Service	Description
0Eh	Get_Attribute_Single	Returns the values of an attribute
10h	Set_Attribute_Single	Sets the value of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x04	Error Status		R	BOOL	Error status (0 = No error, 1 = Error)
0x05	Measured value		R	UINT	Distance measurement
0x07	Error Clear		R/W	Bool	Acknowledgment of error message (when value changes from 00 to 01)
0x08	Product series	-	R	UINT	0x1321
		b15–12 Manufacturer			1: SICK
		b11–8 Categories			3: Displacement
		b7–0 Family			21: OL1
0x09	Product type		R	UINT	11: AOD1 / OL1
0x0A	firmware version		R	UINT	0x1011
0x0C	Product version		R	UINT	0
0x0D	Vendor name		R	STRG	“SICK AG”
0x0E	Product name		R	STRG	Respective product type name
00F	Product ID		R	STRG	Respective product type code
0x10	User ID		R/W	STRG	Reserved (max. 16 characters)
0x11	Operating status		R/W	UINT	0 = Initialization 1: Idle 2: Execute 3: In use by user
0x6C	Threshold	Near	R/W	UINT-16	-32,768 ... 32,767 (default: depending on sensor type)
0x6D		Far	R/W	UINT-16	-32,768 ... 32,767 (default: depending on sensor type)
0x6E	Output hysteresis		R/W	UINT-16	0 ... 32,767 (default: depending on sensor type)
0x6F	Calculation flags		R/W	UINT-16	0: No calculation 1: Calculation
0x70	Calculation coefficient addition		R/W	UINT-16	-10,000 ... 10,000 (default: 0)
0x71	Calculation coefficient multiplication		R/W	UINT-16	-10,000 ... 10,000 (default: 1)
0x72	Calculation coefficient division		R/W	UINT-16	1 ... 32,767 (default: 1)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x73	Monitor cumulative values		R/W	UINT-16	Field bus channel 2 data selection (0: Head2, 1: cumulative value)
0x74	Cumulative values	Head1	R/W	UINT-16	0: None 1: Add 2: Subtract 3: Difference
0x75		Head2	R/W	UINT-16	
0x76		Left unit Head1	R/W	UINT-16	
0x77		Left unit Head2	R/W	UINT-16	
0x78	I/O polarity		R/W	UINT-16	0: PNP (N/O / Normally open) 1: NPN (N/O / Normally open) 2: PNP (N/C / Normally closed) 3: NPN (N/C / Normally closed)
0x79	Output selection	Out1	R/W	UINT-16	0: Off 1: Calculated GO 2: Calculated LO 3: Calculated HI 4: Head 1 GO 5: Head 1 LO 6: Head 1 HI 7: Head 2 GO 8: Head 2 LO 9: Head 2 HI
0x7A		Out2	R/W	UINT-16	
0x7B		Out3	R/W	UINT-16	
0x7C	Selection of external Input		R/W	UINT-16	0: Off 1: Teach-in (rising: far, falling: near) 2: OBSB teach-in 3: Zero reset 4: Laser off
0x7D	Selection of analog output		R/W	UINT-16	0: Off 1: Calculated 2: Head 1 3: Head 2
0x7E	Analog scaling		R/W	UINT-16	0: Off 1: On
0x7F	Analog scaling (max.)	10 V / 20 mA	R/W	UINT-16	-32,768 ... 32,767 (default: 10,000)
0x80	Analog scaling (min.)	0 V / 4 mA	R/W	UINT-16	-32,768 ... 32,767 (default: -10,000)
0x81	Baud rate				0: No sensor head 1: 9.6 k 2: 19.2 k 3: 38.4 k 4: 57.6 k 5: 115.2 k 6: 230.4 k 7: 312.5 k 8: 460 k 9: 500 k 10: 625 k 11: 833 k 12: 921 k 13: 1,250 k (default: 9)
0x89	Product series, amplifier	b15–b0: Amplifier product series	R	UINT	0x1503
0x8E	Moving average		R/W	UINT-16	1 ... 128 (scanning points)

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x8F	Measurement type		R/W	UINT-16	0: Positive edge 1: Negative edge 2: Width
0x90	Sampling rate		R/W	UINT-16	0: 500 µs (fixed value)
0x97	Direction of measurement		R/W	UINT-16	0: From top to bottom 1: From bottom to top
0x98	Zeroing value		R/W	UINT-16	-9,999 ... 5,000 (default: 0)
0xA0	Sensitivity		R/W	UINT-16	0: Min Sense 1: 2nd Sense 2: 3rd sense 3: 4th Sense 4: Max Sense 5: Adjusted
0xD0	Save zero reset		R/W	UINT-16	
0xD1	Cancel zero reset		R/W	UINT-16	
0xDC	Reset to factory settings		R/W	UINT-16	3: Execute

7.8.6 Class 128 module configuration

Table 43: Class services of class 128

Service code	Service	Description
01h	Get_Attribute_All	Returns the values of all attributes
0Eh	Get_Attribute_Single	Returns the values of an attribute

Table 44: Instance services of class 128

Service code	Service	Description
01h	Get_Attribute_Single	Returns the values of all attributes
0Eh	Get_Attribute_Single	Returns the values of an attribute

¹ The available instance service depends on the type of access for the respective attribute.

Attribute ID	Function	Detailed description	Access	Data type	Content/meaning
0x01	Slot0		R	Struct	Module information
				UINT	Product series
				Byte	Class
				Byte	Instance
0x02	Slot1		R	Struct	Module information
				UINT	Product series
				Byte	Class
				Byte	Instance
...					
0x10	Slot15		R	Struct	Module information
				UINT	Product series
				Byte	Class
				Byte	Instance

8 Diagnostics

The device transmits error states in various ways. If a connected module detects a fault, this is transmitted in the corresponding “Error information” process data.

In addition, the class **Gateway Configuration** 0x64 in attribute 105 contains the code of the last error to occur. The following table shows possible errors:

Last Gateway Error (0x64 0x69)	Description
0x0206	Number of connected modules changed during operation.
0x0107	Invalid module connected to gateway.
0x0108	The assignment of the connected modules is wrong (see chapter 7.4).

If the WI180C-EN is integrated in an Allen Bradley control system, certain error messages may occur whose message texts cannot be clearly assigned. The following error messages come from the RSLogix 5000 software.

Error code	Message	Possible cause
16#0108	Connection Request Error: Connection Type (Multicast/Unicast) not supported.	Check whether the configuration assembly (instance 100) is activated. If it is, check whether the configuration data within it is correct and has been fully configured.
16#0114	Electronic Keying Mismatched: Electronic keying product code and/or vendor ID mismatched.	Check whether the incorrect EDS file has perhaps been selected.
16#0127	Connection Request Error: Invalid output size.	Check whether the correct communication format is being used for the control. The control's default value is Data DINT . The WI180C-EN needs the Input Data DINT communication format.
16#0204	Connection Request Error: Connection timed out.	Check the supply voltage at the WI180C-EN. Check the Ethernet cables of the WI180C-EN for interruptions. Check whether the IP address of the WI180C-EN matches the IP address stored in the control. Possible causes: Following a restart, the WI180C-EN has lost the IP address assigned to it (see "IP address of the WI180C-EN" , page 16).

9 Maintenance

SICK sensors are maintenance-free.

We do, however, recommend that the following activities are undertaken regularly:

- Clean the sensor surfaces regularly, making sure no metallic debris on the surface
- Do not use aggressive cleaning agents such as isopropanol, methylated spirits or peroxides etc.
- Do not use any substances to cover the sensor head such as paints, lacquers
- Check the mounting nuts fittings and plug connectors/screw connections every 6 months
- Ensure sensor and mounting nuts are screwed and tighten properly
- Ensure connectors and screw connections are fasten properly

No modifications may be made to devices.

Subject to change without notice. Specified product properties and technical data are not written guarantees.



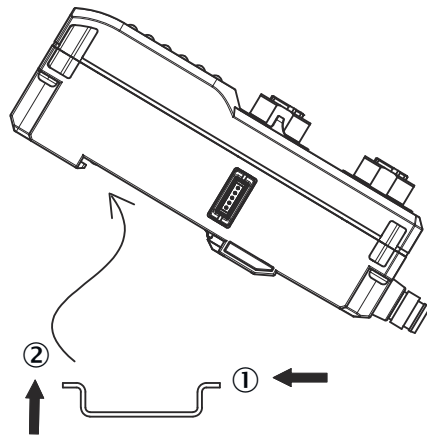
NOTICE

Maintenance work should be conducted by authorized trained personnel with proper tools and follows standard maintenance procedures.

10 Decommissioning

10.1 Dismantling

1. Switch off the power supply for the device.
2. Disconnect the male connector of the power supply and the EtherNet/IP 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.



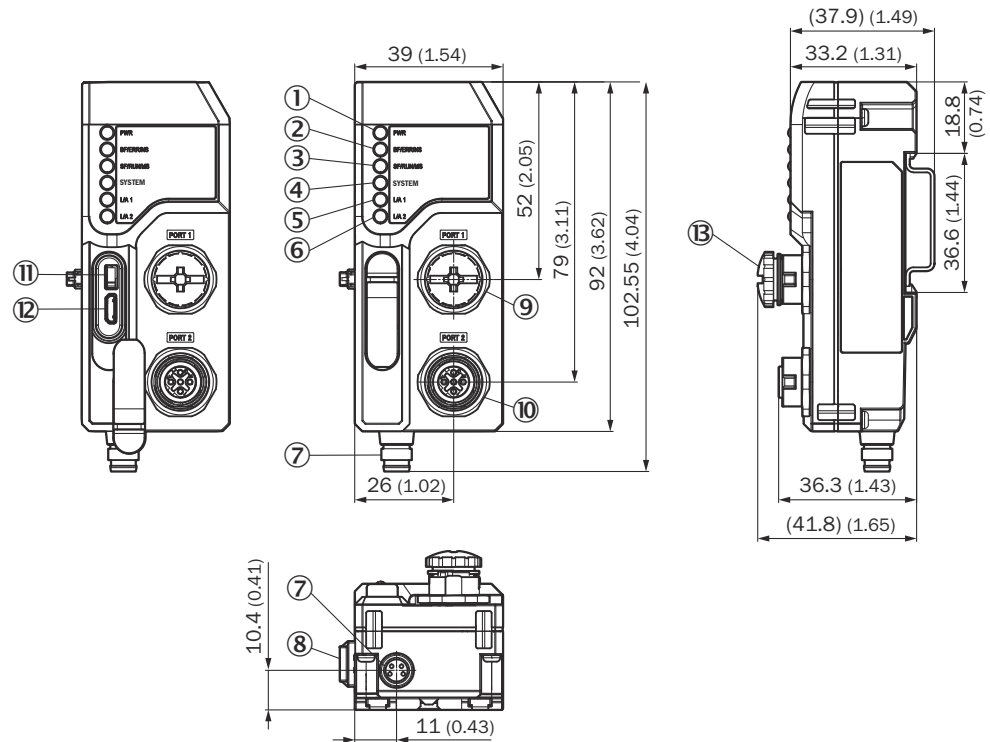
6. Remove the device from the mounting rail.

10.2 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.

11 Technical data

11.1 Dimensional drawings



- ① PWR-LED
- ② BF/ERR/NS-LED
- ③ SF/RUN/MS-LED
- ④ SYSTEM LEDs
- 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, EtherNet/IP
- ⑩ D-coded M12 connector, 4-pin, EtherNet/IP
- ⑪ Factory reset button
- ⑫ Service port (USB, Micro-B)
- ⑬ M12 Connector Cap (accessory)

11.2 Technical data

Electrical system

Table 45: Electrical data

Description	Value
Supply voltage	12 ... 24 VDC ± 10%
Power consumption (without connected devices)	3 W
Switch-on delay	1,000 ms
Switch-on delay (complete system)	2,000 ms

Description	Value
LEDs	PWR, BF/ERR/NS, SF/RUN/MS, SYSTEM, L/A1, L/A2
Voltage supply	M8 male connector, 4-pin
Other interfaces	Bus male connector, 5-pin, internal system bus 2 x M12 male connector, 4-pin, D-coded, Ethernet/IP

Ethernet/IP

Table 46: Ethernet/IP data

Description	Value
Maximum number of modules that can be connected	16
Transmission rate	100 Mbit/s
Maximum distance between nodes	100 m
Process data (implicit connection)	Depending on selected assemblies Minimum cycle time: 1 ms
Asynchronous data (explicit connection)	Manufacturer-specific classes per module
Max. number of connections	8
CIP services	DLR, QoS
Observed standard	IEEE802.3u (100Base-Tx)
Ethernet connections	2
EDS file	Available on www.sick.com

EMC

Table 47: 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 48: Product safety data

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

Mechanical system

Table 49: Mechanical data

Description	Value
Enclosure rating	IP54 ¹
Vibration resistance	IEC 60068, 10 ... 55 Hz
Shock resistance	IEC 60068, 500 m/s ² (~50 g)
Housing material	Polycarbonate
Dimensions (W x H x D) in mm	39 x 102.55 x 36.3

¹ Valid if WI180C-EC is connected to modules that comply with IP54 via internal system bus

Environmental parameters

Table 50: 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 apply if there is no output current at the connected devices

11.3 Ordering information, accessories

Table 51: 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

12 Annex

12.1 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).

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1800 33 48 02 – tollfree
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E-Mail office@sick.at

Belgium/Luxembourg
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E-Mail info@sick.be

Brazil
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E-Mail comercial@sick.com.br

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