

SiCon XX 40

Operating Manual



1 Imprint

Consideration of applicable standards and guidelines

The content of this document has been compiled in accordance with applicable **standards** and **directives** and the **state of the art**.

The manufacturer accepts no liability for damage due to:

- Non-compliance with the instruction manual
- Non-intended use
- Use of untrained staff
- Unauthorised modifications

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2 About this document

2.1 Purpose of the instruction manual

This instruction manual is intended to ensure the safe, proper and efficient use of the device. It contains the relevant information for safety, design, function, commissioning, operation, maintenance and disposal over the entire product life cycle.

Failure to comply with the instruction manual and the safety instructions may result in hazards and restrictions for:

- life and limb of the operating staff
- the system and material assets
- the reliable, trouble-free operation of the unit.

NOTE



Non-compliance with the instruction manual

Sigrist-Photometer AG accepts no liability for damage resulting from non-compliance with the operating instructions.

2.2 Storage of the instruction manual

The instruction manual is an integral part of the unit. It must be available to staff at all times.

2.3 Target group

Qualified staff

This document is intended for trained staff who are familiar with the local conditions.

2.4 Representation conventions

Symbols and text markings

This document contains various symbols and text markings.

Symbol	Name	Function
	Tip	Provides the reader with supporting information about the action currently being described.
✓	Prerequisite	The check mark indicates a prerequisite that must be met before an action is performed.
▶	Action	The triangle indicates actions that must be performed in the specified order.
⇒	Interim result	The arrow indicates an interim result, e.g.: ▶ Press the button. ⇒ A new window appears.
▷	Reaction	The white triangle indicates the reaction to an action.
Representation conventions ▶ 5]	Cross-reference	Cross-references are used to refer to a page within the document. They are linked and can be executed electronically with a click of the mouse.
	Function editable	The menu function currently being described is editable.
	Function read-only	The menu function currently being described is read-only.
«Menu»	Menu	«Menus» or «functions» included in the software.

Symbol	Name	Function
[OK]	Button	Buttons used to navigate the Sigrist web interface.
<i>Device-specific</i>	Placeholder	Serves as a placeholder for an unspecified, changing term.

3 Your Safety

3.1 Intended use

The SiCon XX 40 is a multichannel control unit for connecting up to eight sensors.

3.2 Foreseeable misuse

DANGER

Hazards in case of foreseeable misuse

Incorrect use of the device can result in injuries to persons, process-related consequential damage and damage to the device and its periphery. In the following cases, the manufacturer cannot guarantee the protection of persons and the device and therefore does not accept any liability:



- ▶ The device is used outside the area of application.
- ▶ The device is not installed, set up or transported properly.
- ▶ The device is not installed and operated according to the operating instructions.
- ▶ The device is operated with accessories that are not expressly recommended by Sigrist-Photometer AG.
- ▶ Improper modifications are made to the device.
- ▶ The device is operated outside the specifications.
- ▶ The device is exposed to shocks, vibrations or other mechanical forces.

3.3 Warnings

The warnings are four-tiered: Danger, warning, caution, notice. They include: Nature of the hazard, possible consequences and measures to avert it.

Signal word	Meaning
DANGER	Signal word to indicate a hazard with high risk, which will directly result in death or serious physical injury.
WARNING	Signal word to indicate a hazard with medium risk, which can possibly result in death or serious physical injury.
CAUTION	Signal word to indicate a low-risk hazard that may result in minor or moderate bodily injury.
NOTE	Signal word for a potentially harmful situation in which the equipment or an object in its vicinity may be damaged.

3.4 Residual risks

The device has been built in accordance with the applicable standards and the recognised safety rules and corresponds to the state of the art. However, according to the risk assessment of the applied safety standard DIN EN 61010-1, injuries to persons, damage to the device or material damage to the infrastructure cannot be completely ruled out during use.

Danger from electricity



The device is operated at 24 VDC. If a power supply unit (100...240 VAC) is used in addition, there is a risk of electric shock with fatal consequences if exposed cables are touched.

- ▶ Do not operate the device unless it has been professionally installed and repaired.
- ▶ Only operate the device if all cables are undamaged.
- ▶ Never operate the power supply with the housing removed or open.

Danger due to incorrect supply voltage



An incorrect supply voltage may cause damage and lead to non-functionality of the device.

- ▶ The device may only be connected to power sources that match the rating plate.

Danger from moisture and condensation on electronic components during operation.



Moisture inside the device may lead to damage and render the device non-functional.

- ▶ Carry out maintenance work as described in the operating instructions.

Danger from use of aggressive chemicals for cleaning



The use of aggressive cleaning agents can damage the device.

- ▶ Do not use aggressive chemicals or solvents for cleaning.
- ▶ If the device has come into contact with aggressive chemicals nonetheless, check it for damage immediately.

Unauthorised access to the device



Unauthorised access by third parties may lead to changes in the configuration and incorrect measurements therefore cannot be ruled out.

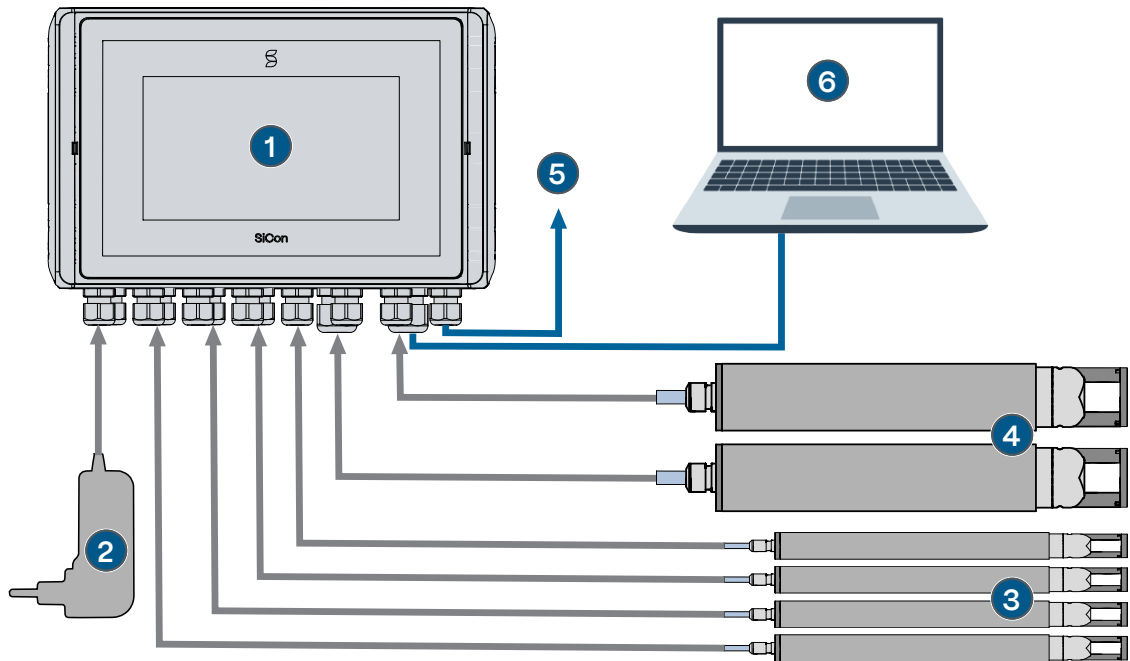
- ▶ Ensure that the operator takes safety precautions to prevent unauthorised access.

4 General view

4.1 Product information

The SiCon XX 40 control unit, featuring the latest touchscreen technology and colour display, allows the connection and operation of up to 8 sensors. It is suitable for use as a central operation unit in a system with several sensors and photometers. The SiCon XX 40 enables sensor data to be read and processed according to customer-specific requirements. Up to 9 values per page can be displayed on several pages, depending on the version. The display allows the reading of measuring values, curves with progression, as well as status and alarm notifications. The measuring data can be recorded and exported over several days. In addition, the control unit offers all options for easy system integration via various interfaces.

4.2 Functional principle



Connection example for the SiCon PM 40

- | | |
|--|------------------------|
| (1) SiCon XX 40 | (2) 24 VDC |
| (3) Further sensors | (4) 2 photometers |
| (5) Connection to the customer interface | (6) Ethernet interface |

Up to 8 sensors can be connected to the SiCon XX 40 (1), depending on the version. In the example, two AquaScat S (4) and four other sensors (3) are connected to a water treatment system.

The power supply is via a 24 VDC connection (2).

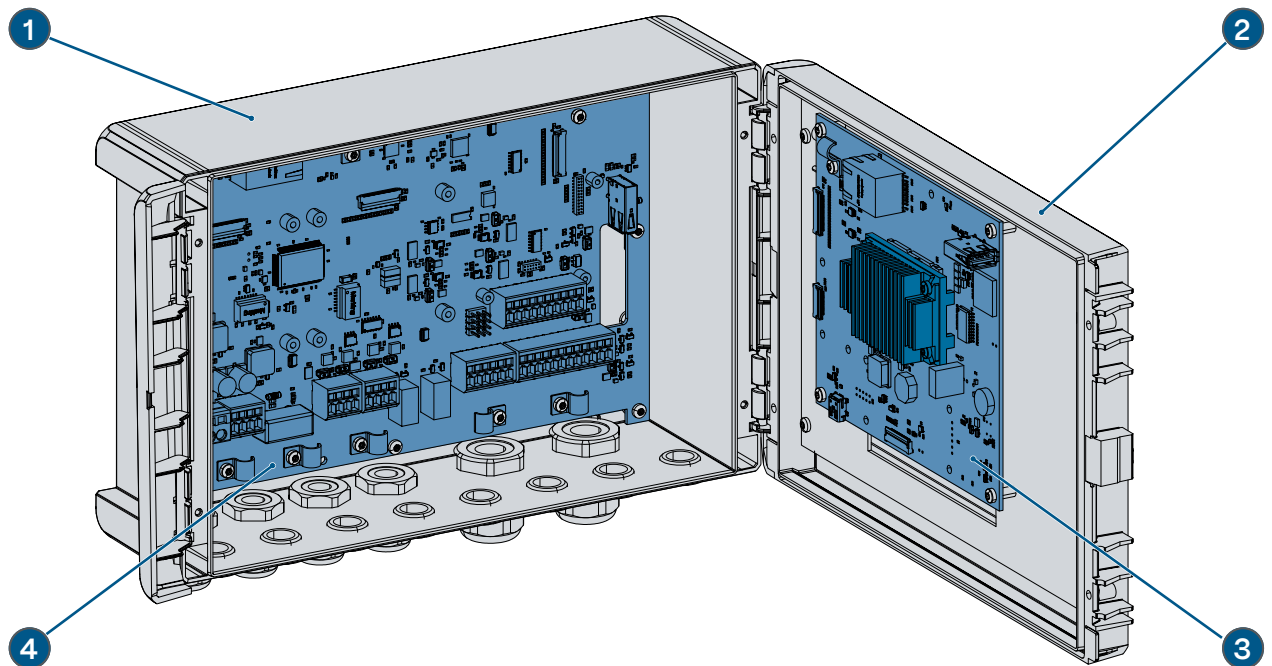
This allows all measuring data of the system to be displayed and managed at one central location. All sensors can be connected via the connection to the customer interface (5).

For more convenient operation, an external device (e.g. notebook), which replicates the SiCon XX 40 display exactly, can be ► 24 connected via the Ethernet interface (6).

The basic setting is made on the sensor/photometer. The SiCon XX 40 enables the measuring values to be further processed and exported.

4.3 General view

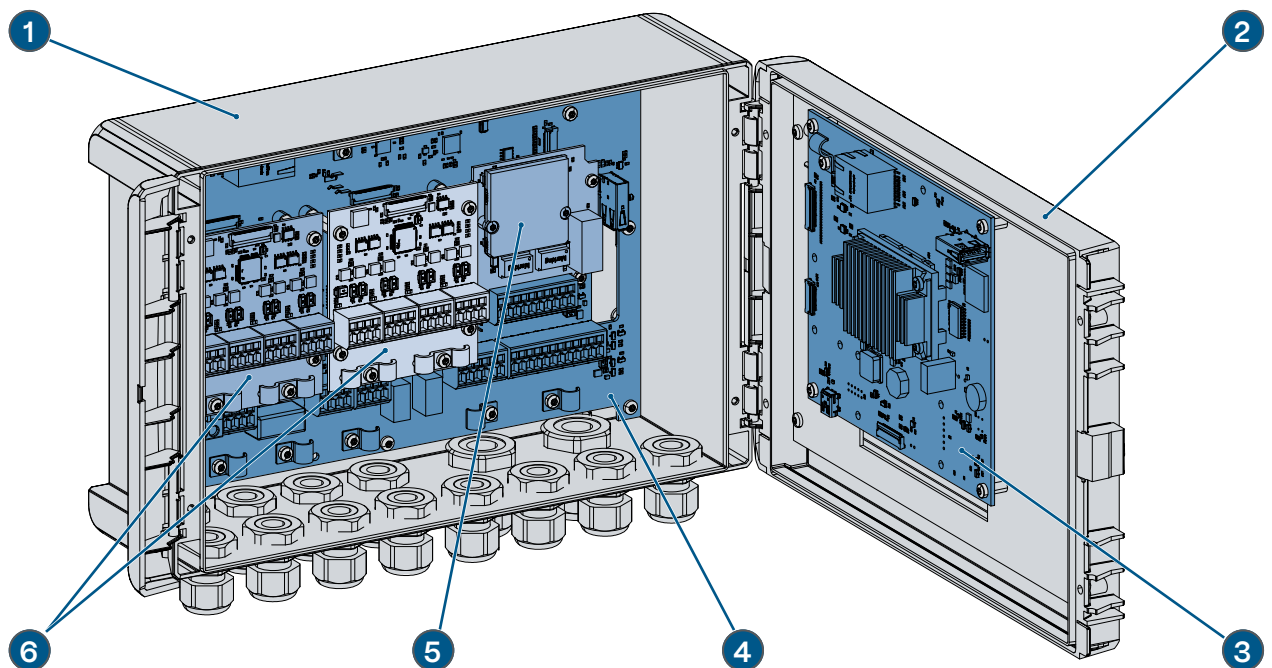
4.3.1 SiCon ST 40



Overview of the SiCon ST 40

- | | |
|----------------|-------------------|
| (1) Housing | (2) Housing cover |
| (3) Main board | (4) Adapter board |

4.3.2 SiCon AD/PM 40

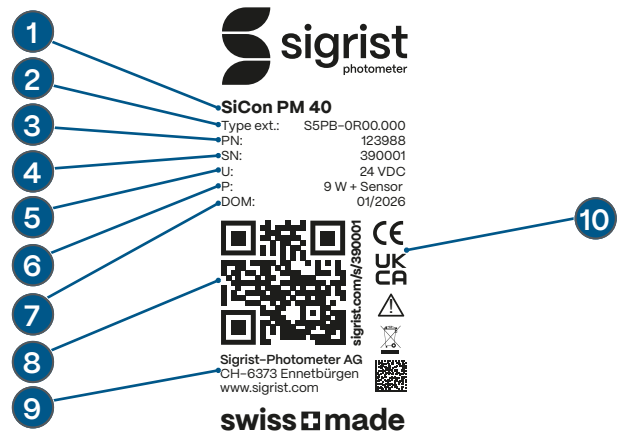


Overview of the SiCon AD/PM 40

- | | |
|-------------------------------------|----------------------------|
| (1) Housing | (2) Housing cover |
| (3) Main board | (4) Adapter board |
| (5) Communication module (optional) | (6) Link module (optional) |

4.4 Nameplate

- (1) Device type
- (2) Expansion type
- (3) Article number
- (4) Serial number
- (5) Service voltage
- (6) Power
- (7) Date of manufacture
- (8) Link to documentation
- (9) Manufacturer
- (10) Certificates



4.5 Versions

The SiCon XX 40 is available in different versions. Depending on the version, the SiCon XX 40 can be equipped with communication and link modules, allowing up to 8 sensors to be connected.

Version	SiCon ST 40	SiCon AD 40	SiCon PM 40
Type	Up to 2 sensors	Up to 5 sensors	Up to 8 sensors
Connection	2 photometers	2 photometers or 1 photometer & 1x 4 compatible external probes	2 photometers with addi- tional link modules for up to max. 8 sensors
Analogue outputs • 0/4...20 mA, max. 700 burden	4	4	4
Digital inputs or outputs (con- figurable) • Inputs: 5...28 VDC • Outputs High-side switch 24 V, max. 20 mA	4	4	4
Relay	2	2	2
Number of communication modules (interface to the con- trol system) • 4 analog/digital outputs • Profibus • Profinet • Modbus RTU	-	1	1
Link modules • 4x RS485 • 4x Ethernet • 4x analogue inputs	-	1 (only analogue input or RS485 hub, passive)	2
Ethernet/Modbus TCP	1	1	1

Tab. 1: SiCon XX 40 versions

4.5.1 Determining version

SiCon ST 40: Standard (2 sensors, 10 channels)

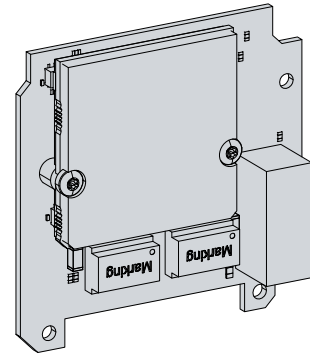
SiCon	ST	40	-	S	5	0	0	-	0	0	0	0	.	0	0	0
Without expansion																

SiCon AD 40 ADvanced (2 sensors, 10 channels, expandable)

SiCon	AD	40	-	S	5	X	X	-	0	X	0	0	.	0	0	0	
Communication module						0	0										
• Standard (without optional modules)						I	O										
• IO: 0/4...20 mA, Modbus TCP						P	B										
• Profibus DP						P	N										
• Profinet IO																	
Sigrist link module 1 (sensor – SiCon XX 40 connection)											0						
• Standard (without module)											A						
• LM_Analog: 4x analogue inputs											P						
• LM_RS485_Hub (passive): 4x distributors RS485											:						

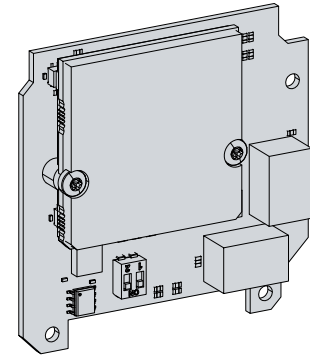
EG_Profinet

AD/PM 40 only



EG_Profibus

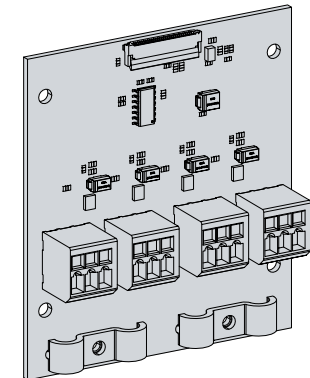
AD/PM 40 only



4.5.3 Link modules [LinkModule]

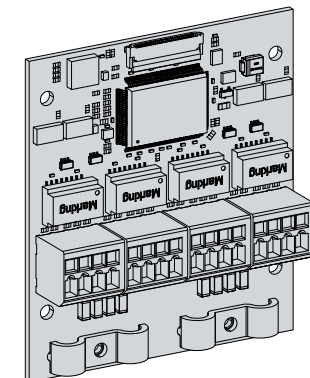
LM_Analog

AD/PM 40 only



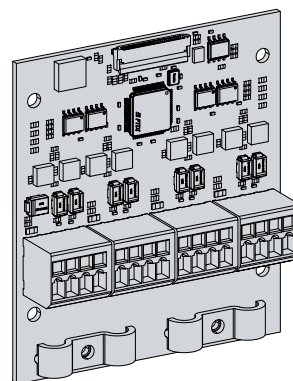
LM_Ethernet

PM 40 only



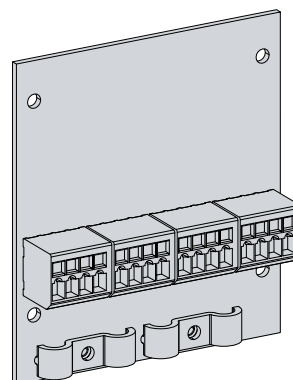
LM_RS485

PM 40 only



LM_RM485_Hub

AD/PM 40 only

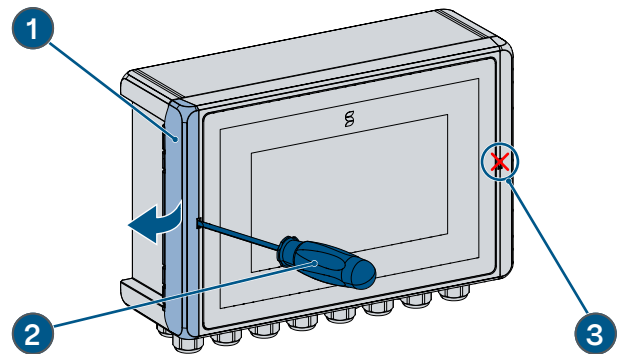


5 Mounting

5.1 Open device

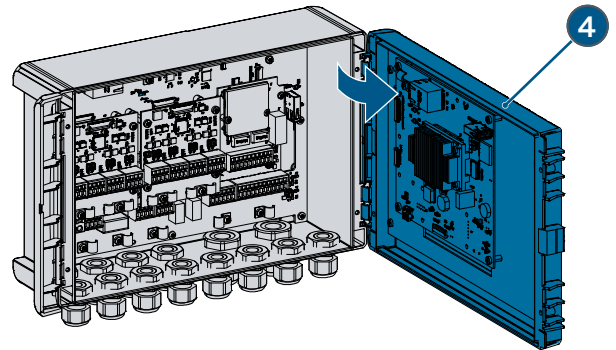
Open cover

- Position the slotted screwdriver (2) on the left-hand cover (1).
- Press the slotted screwdriver (2) to the right to open the cover (1).
- **NOTICE!**
The cover on the right (3) is sealed. It cannot be opened and acts as a hinge.



Open the housing cover

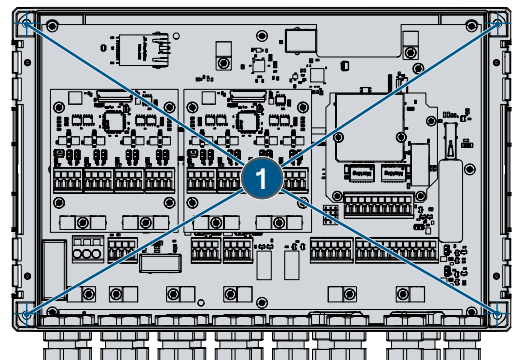
- Flip open the housing cover (4).



5.2 Wall mounting

The device can be mounted on the wall. Ensure that the cables are always routed downward!

- Hold the device in the final position.
- Mark the holes (1) and fasten the device depending on the mounting surface.
- The dimensions are shown on the Dimension drawing SiCon XX 40 [▶ 44].



6 Electrical installation

DANGER

Danger due to improper connection of the service voltage.

Improper connection of the electrical service voltage can be life-threatening. The system can also be damaged in the process.



- ▶ The connection must be made by a specialist in accordance with local regulations.
- ▶ The device must be de-energised throughout the electrical installation process.
- ▶ Install a disconnection device near the power supply to disconnect the device from the supply connection. The disconnection device should be easily accessible and marked.

The SiCon XX 40 is pre-assembled as ordered. Link modules or communication modules are already installed, depending on the version. Modules can also be retrofitted. All component connections are described in this section. When modules are retrofitted, it must be ensured that the appropriate version is available and that the software and licenses have been updated accordingly.

The main board in the housing cover is fully connected upon delivery and requires no further installation.

The device is not energised until commissioning takes place.

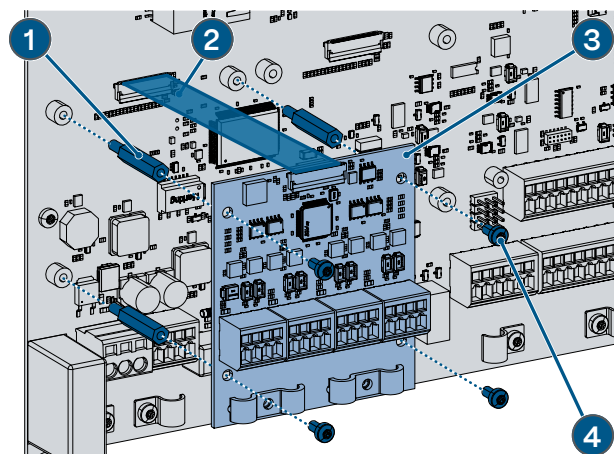
The housing cover is open [▶ 15](#) for access to the components.

6.1 Mounting additional modules (optional)

The control unit versions SiCon AD 40 and SiCon PM 40 can be upgraded with additional modules to connect further sensors. The possible combinations can be found in the Versions [▶ 11](#) section.

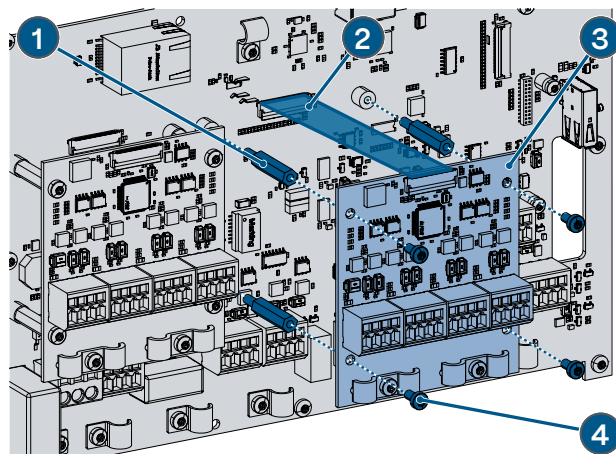
Install link module 1 on the adapter board

- ▶ Mount 4 spacer bolts (1).
- ▶ Connect the ribbon cable (2) to the adapter board.
- ▶ Mount link module (3) to the adapter board using 4 screws (4).
- ▶ Connect the ribbon cable (2) to the link module (3).



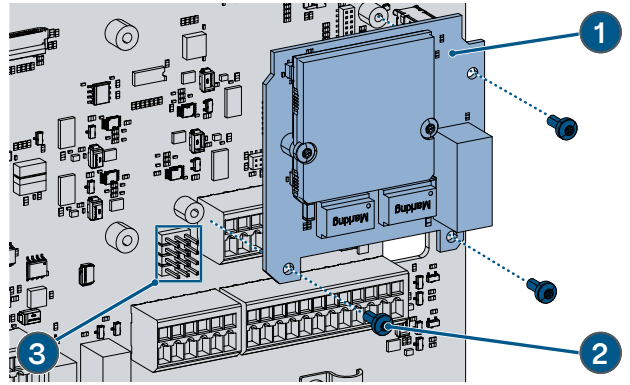
Install link module 2 on the adapter board

- ▶ Mount 4 spacer bolts (1).
- ▶ Connect the ribbon cable (2) to the adapter board.
- ▶ Mount link module (3) to the adapter board using 4 screws (4).
- ▶ Connect the ribbon cable (2) to the link module (3).



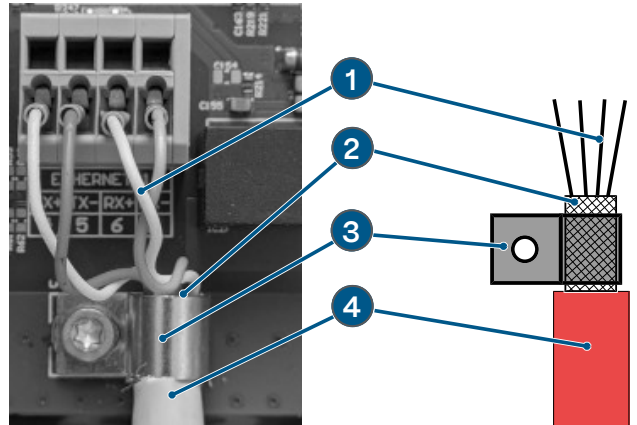
Installing the communication module on the adapter board

- ▶ Carefully attach the communication module (1) and mount it on the adapter board using 3 screws (2).
- ▶ Check [▶ 18] the position of the 4-way jumper J1 (3).

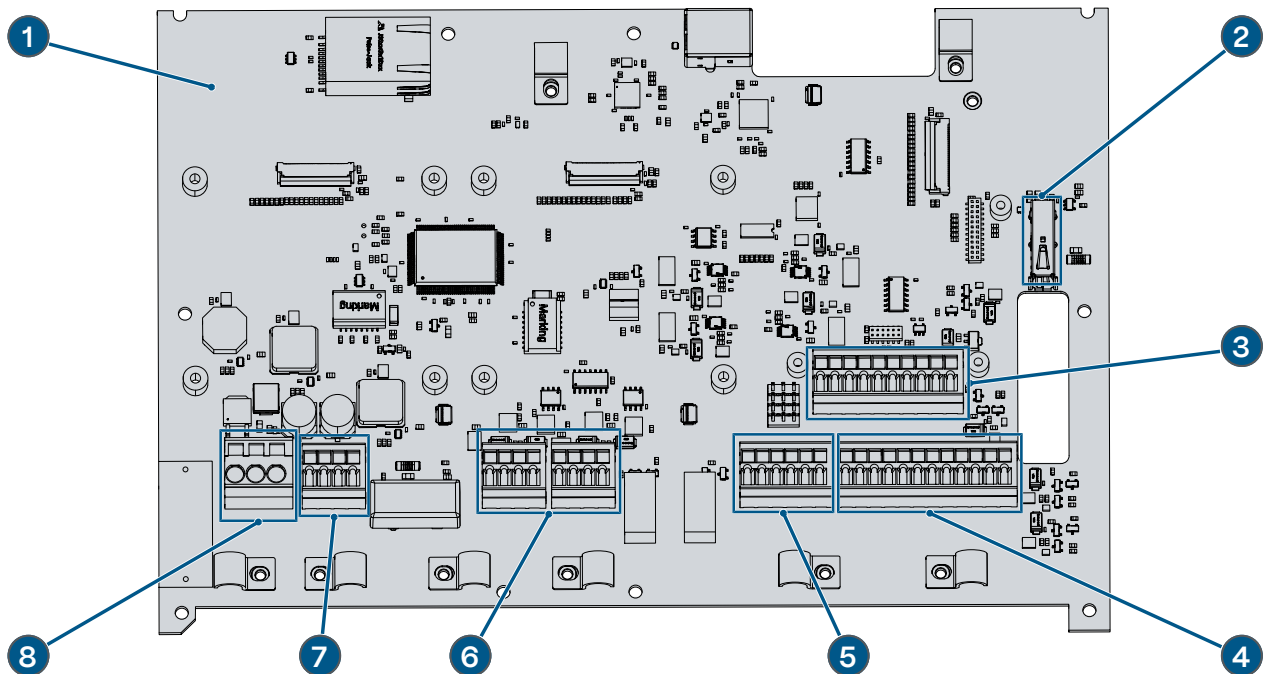


6.2 Connecting the shielded cables

- ▶ Strip insulation (4) to match the size of the cable clip (3).
- ▶ Ensure that the cable shielding (2) is completely covered by the cable clip (3).
- ▶ Shorten the cable strands (1) to the correct length and connect.



6.3 Overview of the adapter board



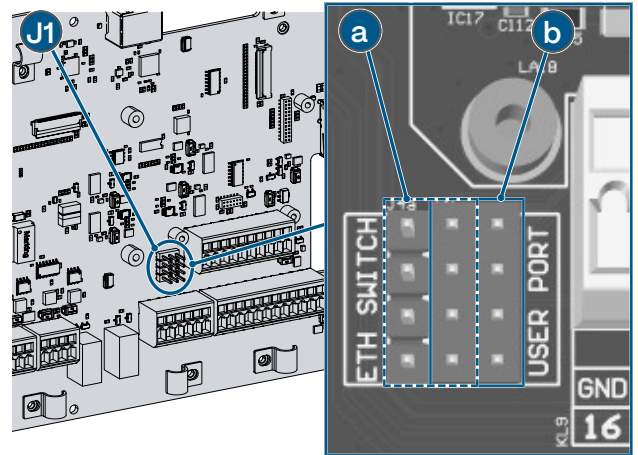
Overview of the adapter board

- | | |
|--------------------------|---------------------------|
| (1) Adapter board | (2) USB port |
| (3) Communication module | (4) Outputs and/or inputs |
| (5) 2x relay | (6) 2x RS485 sensors |
| (7) Ethernet interface | (8) 24 VDC supply |

6.4 Connecting communication modules (3)

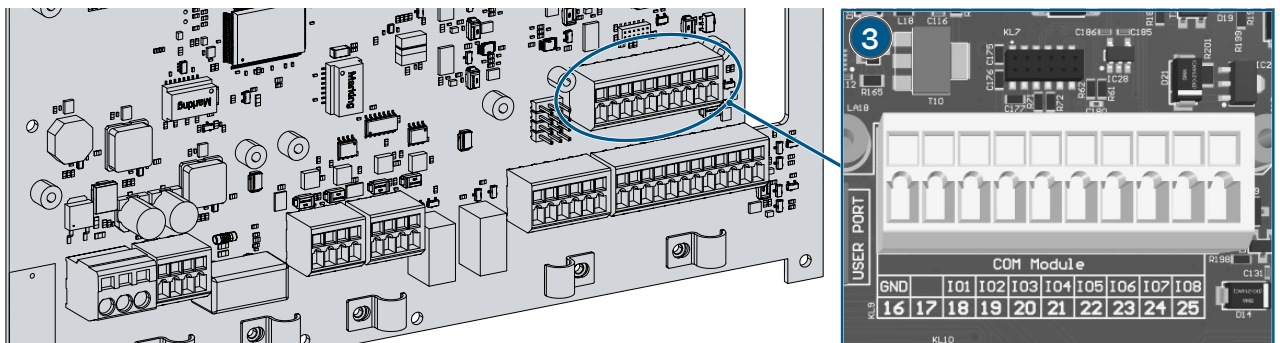
Connecting 4-way jumper J1

The 4-way jumper (**J1**) is inserted at different positions depending on the communication module [ComModule] used. On delivery, the 4-way jumper (**J1**) is pre-mounted at the USER PORT (**b**) position. It may only be moved to the ETH SWITCH (**a**) position when using the EG_Profinet communication module – and only if necessary.



ComModule	ETH SWITCH position (a)	USER PORT position (b)
- EG_IO - EG_Profibus	NOTICE! Not allowed. There is a risk of damage to the device!	Signals from the communication module are available at the COM module plug-in connector.
EG_Profinet	Ethernet from Profinet and SiCon XX 40 are interconnected. The network connection is via ETHERNET 1 or IO5...IO8 on the COM module plug-in connector.	Ethernet from PROFINET and SiCon XX 40 are separated. Signals from the communication module are available on the COM module plug-in connector.

6.4.1 Connecting EG_IO



(3) Com modules

Function	Designation	Plug-in connector pin no.
GND	GND	16

RS485 Modbus RTU

Configurable with or without 120 Ω termination.

Function	Designation	Plug-in connector pin no.
A	IO1	18
B	IO2	19

Digital input 5-28 VDC

Function	Designation	Plug-in connector pin no.
In 1	IO1	18
In 2	IO2	19

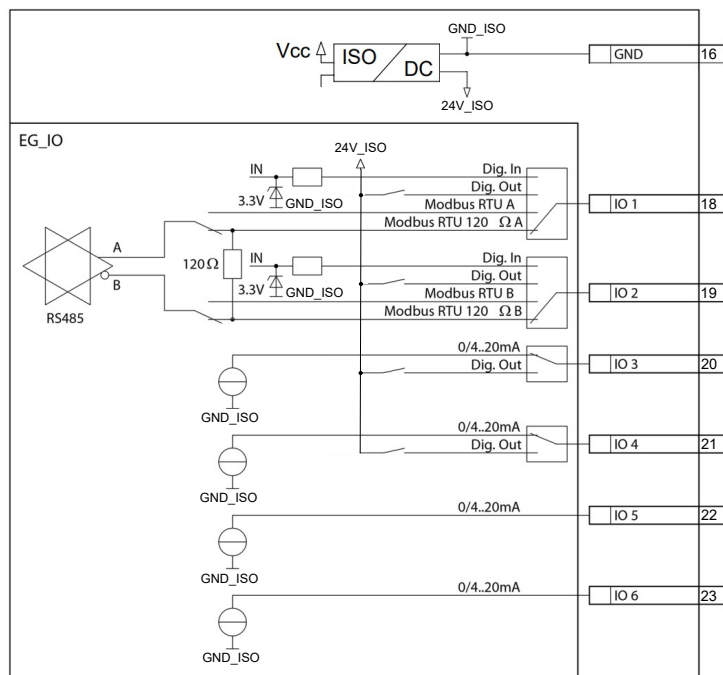
Digital output "High Side Switch" max. 20 mA

Function	Designation	Plug-in connector pin no.
Out 1	IO1	18
Out 2	IO2	19
Out 3	IO3	20
Out 4	IO4	21

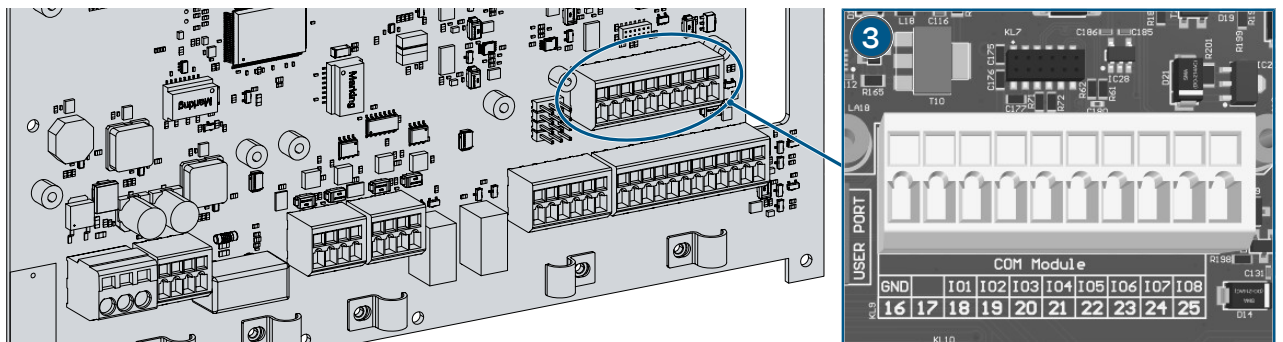
Current output 0/4...20 max. 700 Ω

Function	Designation	Plug-in connector pin no.
Current 1	IO3	20
Current 2	IO4	21
Current 3	IO5	22
Current 4	IO6	23

Wiring diagram EG_IO



6.4.2 Connecting EG_Profibus



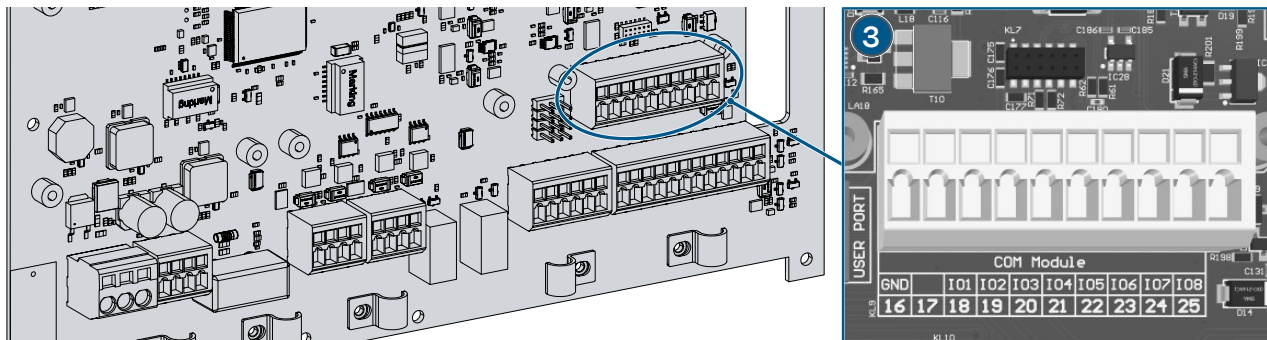
(3) Com modules

The connection is duplicated and can be used for Profibus daisy-chaining.

Function	Designation	Plug-in connector pin no.
PB_A	IO1	18
PB_B	IO2	19
PB_5 V	IO3	20

Function	Designation	Plug-in connector pin no.
PB_GND	IO4	21
PB_A	IO5	22
PB_B	IO6	23
PB_5 V	IO7	24
PB_GND	IO8	25

6.4.3 Connecting EG_Profinet

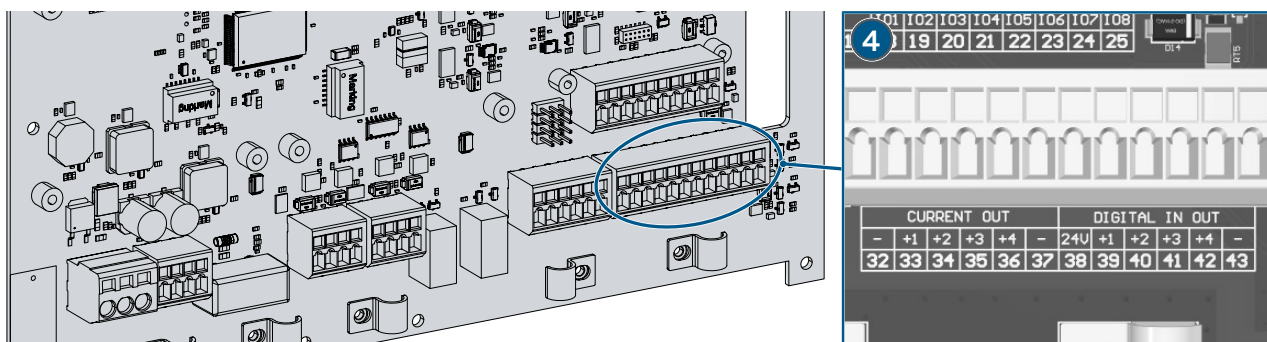


(3) Com modules

Connection via 2-port Ethernet switches.

Function	Designation	Plug-in connector pin no.
Port 2 TX+	IO1	18
Port 2 TX-	IO2	19
Port 2 RX+	IO3	20
Port 2 RX-	IO4	21
Port 1 TX+	IO5	22
Port 1 TX-	IO6	23
Port 1 RX+	IO7	24
Port 1 RX-	IO8	25

6.5 Connecting outputs and inputs (4)



(4) Inputs/outputs

Power output terminal 04...20 max. 700 Ω

Function	Designation	Plug-in connector pin no.
GND	-	32
Current 1	+1	33
Current 2	+2	34
Current 3	+3	35

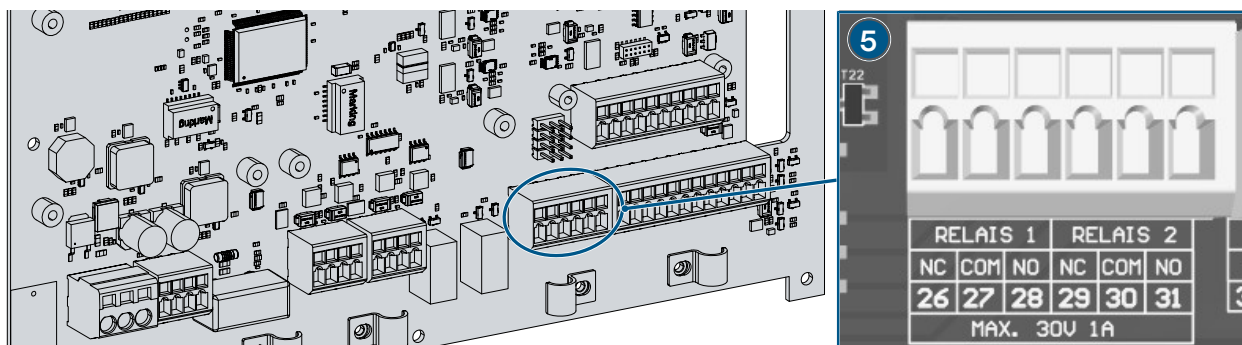
Function	Designation	Plug-in connector pin no.
Current 4	+4	36
GND	-	37

DIGITAL IN, Digital input 5–28 VDC

Function	Designation	Plug-in connector pin no.
24 V output	24 V	38
In 1	+1	39
In 2	+2	40
In 3	+3	41
In 4	+4	42
GND	-	43

DIGITAL OUT, digital output "high-side switch" max. 20 mA

Function	Designation	Plug-in connector pin no.
24 V output	24 V	38
Out 1	+1	39
Out 2	+2	40
Out 3	+3	41
Out 4	+4	42
GND	-	43

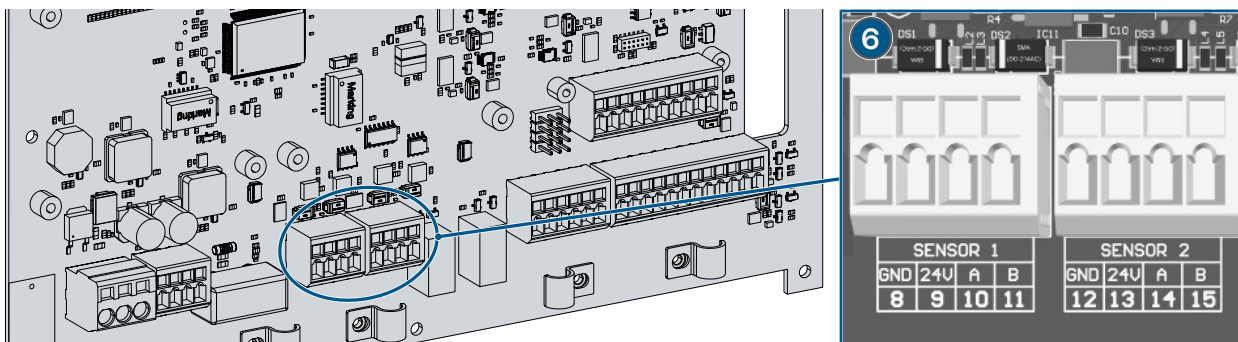
6.6 Connecting the relay (5)**(5)** 2x relay**RELAY 1 (max. 30 V, 1 A)**

Designation	Plug-in connector pin no.
NC	26
COM	27
NO	28

RELAY 2 (max. 30 V, 1 A)

Designation	Plug-in connector pin no.
NC	29
COM	30
NO	31

6.7 Connecting RS485 sensors (6)



(6) 2x RS485 sensors

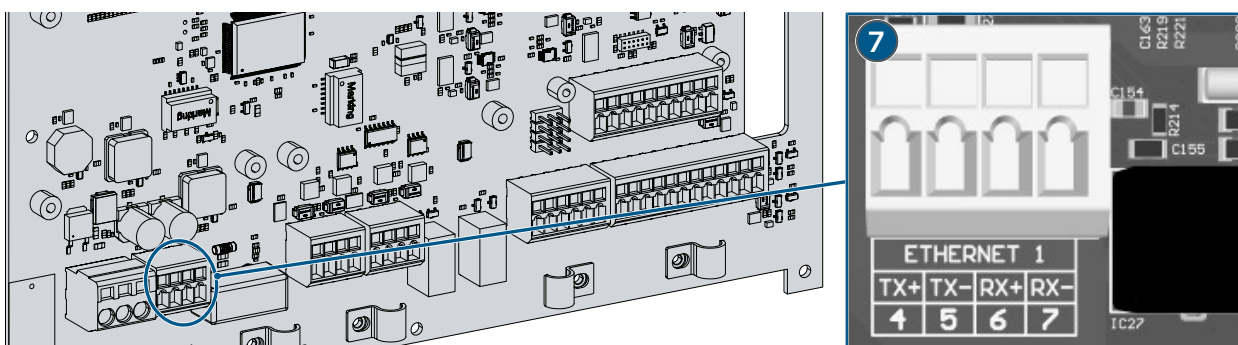
SENSOR 1

Designation	Plug-in connector pin no.	Type Cable colour (4-pin)	Type Cable colour (8-pin)
GND	8	white	white
24 V	9	brown	brown
A	10	blue	blue
B	11	black	grey

SENSOR 2

Designation	Plug-in connector pin no.	Type Cable colour (4-pin)	Type Cable colour (8-pin)
GND	12	white	white
24 V	13	brown	brown
A	14	blue	blue
B	15	black	grey

6.8 Connecting the Ethernet interface (7)

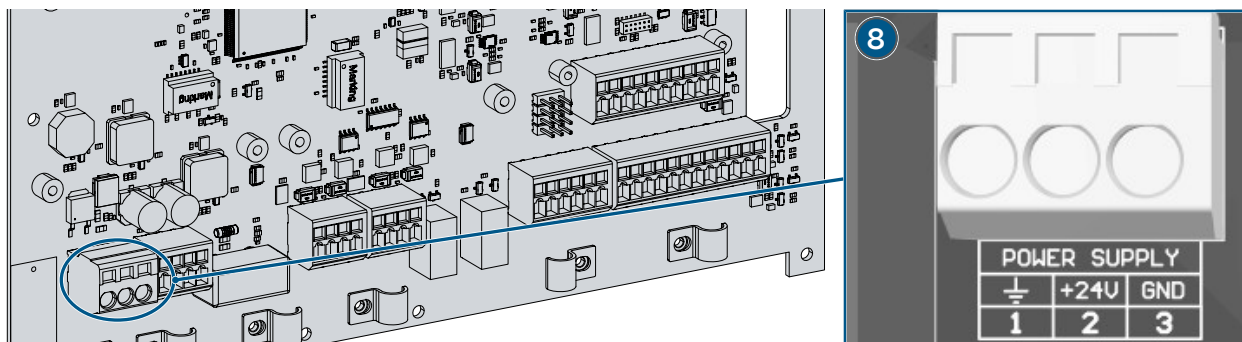


(7) Ethernet customer interface

ETHERNET 1

Designation	Plug-in connector pin no.	Type Cable colour
TX+	4	white/green
TX-	5	green
RX+	6	white/orange
RX-	7	orange

6.9 Connecting 24 VDC power supply (8)



(8) 24 VDC power supply

- ▶ **WARNING!**
Connecting in the de-energised state!
- ▶ **WARNING!**
Connect earthing to ensure perfect electromagnetic compatibility and stable equipotential bonding!

Designation	Plug-in connector pin no.
$\perp$	1
+24V	2
GND	3

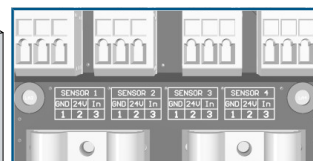
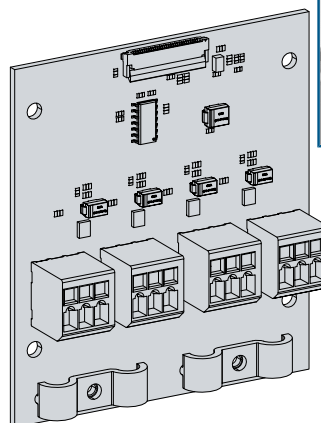
6.10 Connecting the link modules

LM_Analog link module

4x current inputs 0/4...20 mA

SENSOR 1...4

Designation	Plug-in connector pin no.
GND	1
24 V	2
In	3

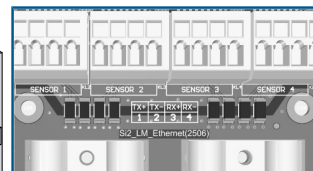
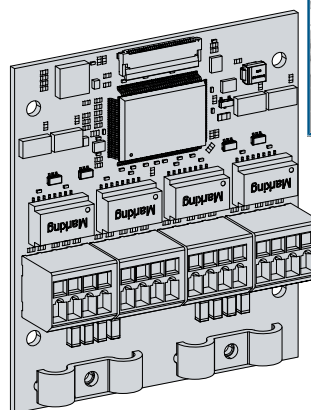


LM_Ethernet link module

4x Ethernet for photometer

SENSOR 1...4

Designation	Plug-in connector pin no.	Typical cable colour
TX+	1	white/green
TX-	2	green
RX+	3	white/orange
RX-	4	orange

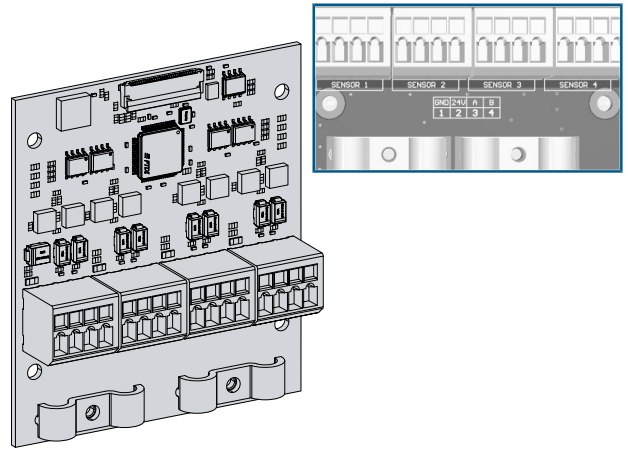


LM_RS485 link module

4x RS485 for photometer

SENSOR 1...4

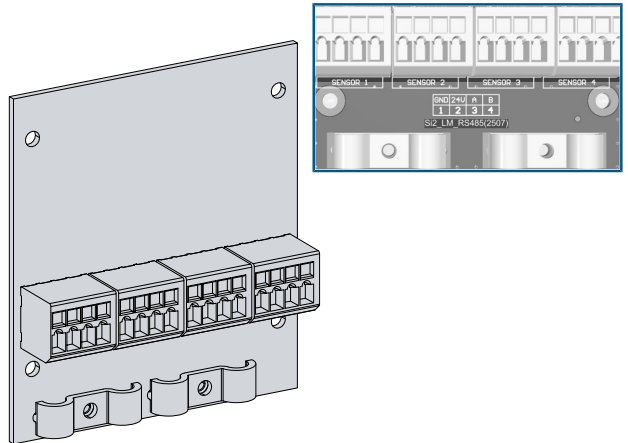
Designation	Plug-in connector pin no.	Typical cable colour
GND	1	white
24 V	2	brown
A	3	blue
B	4	grey

**LM_RS485_HUB link module**

4x RS485 passive distributor for compatible external probes

SENSOR 1...4

Designation	Plug-in connector pin no.	Typical cable colour
GND	1	white
24 V	2	brown
A	3	blue
B	4	grey

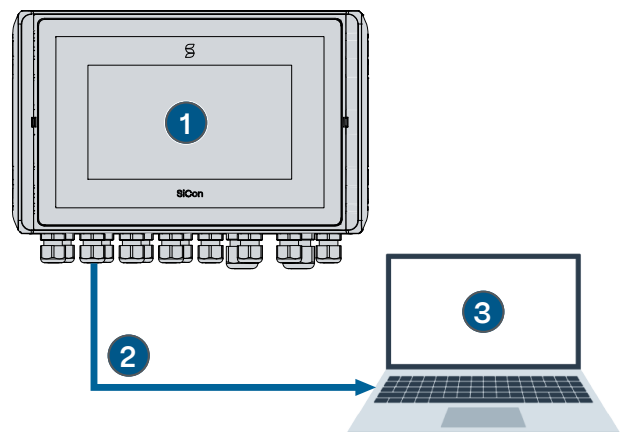
**6.11 Connecting the photometers/sensors**

When connecting the sensors/photometers, the following must be observed:

- ▶ The total power input of the sensors must not exceed 20 W.
- ▶ Shielded cables must be used. The cable shielding must be placed on the earthing terminal provided.
- ▶ For cable lengths of more than 5 m (standard cable length of the photometer), we recommend the use of an electrical enclosure.
- ▶ The specifications regarding the cable cross-section can be found in the documentation for the photometer concerned.
- ▶ For cable lengths of more than 5 m, twisted and shielded cables (SF/UTP) should be used in pairs. Characteristic impedance $120 \pm 20 \Omega$, capacitance $< 60 \text{ pF/m}$.
- ▶ Since different cable types are used depending on the photometer model, the corresponding instruction manual must be observed.

6.12 Connecting SiCon XX 40 to Windows PC**Connecting the Ethernet cables**

- ✓ The SiCon XX 40 (1) is switched off.
- ▶ Connect the Ethernet cable (2) to the Ethernet interface in the SiCon XX 40 (1). [\[p. 22\]](#)
- ▶ Connect the Ethernet cable (2) to the Windows PC (3).
- ▶ Switch on the SiCon XX 40 (1).



In order for PC and SiCon XX 40 to be able to communicate with each other, the two devices must be on the same subnet.

Setting the IP address on the Windows PC

- ▶ Open «Windows/Settings/Network and Internet».
- ▶ Open «Ethernet Properties».
- ▶ If the IP assignment (1) is set to "Automatic (DHCP)", [change] it.
- ▶ Set the IP assignment (1) to "Manual".
- ▶ Switch on «Internet protocol version 4 (IPv4)» (2).
- ▶ Set the IP address (3) (e.g. 192.168.1.10).
- ▶ Set the subnet mask (4) (e.g.: 255.255.255.0).
- ▶ If necessary, set the gateway (5).
- ▶ [Save] the settings (6).

The screenshot shows the 'Edit IP settings' window in Windows. It includes fields for 'Manual' selection, 'IPv4' toggle, 'IP address' (192.168.1.10), 'Subnet mask' (255.255.255.0), 'Gateway' (0.0.0.0), 'Preferred DNS', 'DNS over HTTPS' (Off), and 'Alternative DNS'. A 'Save' button is at the bottom, with a 'Cancel' button next to it. Numbered callouts 1 through 6 point to these specific elements in order.

Configuring the SiCon XX 40

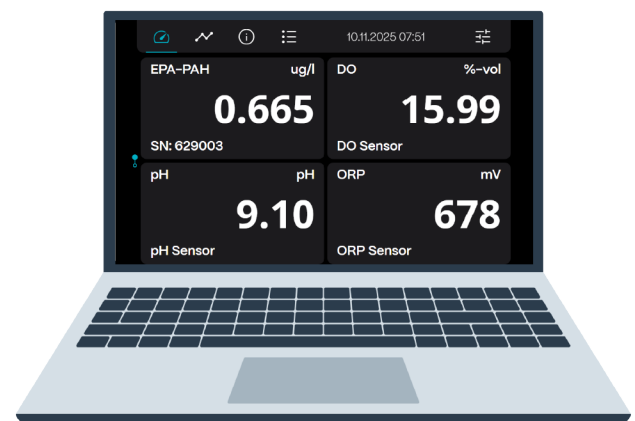
The SiCon XX 40 is configured as a DHCP client by default.

- ▶ Select the «Devices» menu and then select SiCon XX 40.
- ▶ Open «Settings».
- ▶ Select «Ethernet / LAN 1».
- ▶ Enter the IP address (1) (identical to Windows PC).
- ▶ Enter the subnet mask (2) (identical to Windows PC).
- ▶ [Save] the settings (3).

The screenshot shows the SiCon XX 40 settings interface. It displays 'Settings' for 'Ethernet/LAN 1'. Fields include 'DHCP' (toggle), 'IP address' (192.168.1.1), 'Sub-net mask' (255.255.255.0), 'Gateway addr.' (0.0.0.0), 'DNS-Server', and 'MAC address' (f0:26:4c:00:53:af). A 'Save' button is at the bottom right. Numbered callouts 1 through 3 point to the IP address, subnet mask, and the Save button respectively.

Access to the web interface

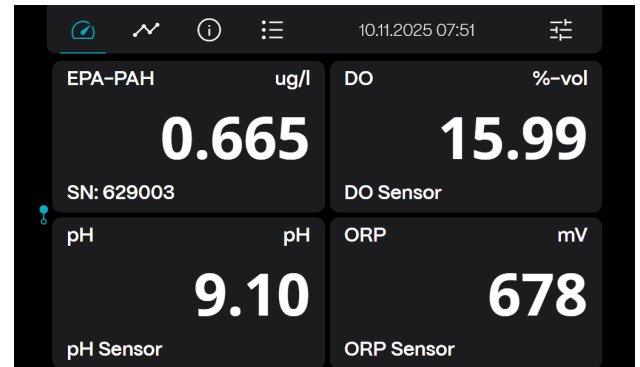
- ▶ Open a web browser on the Windows PC.
- ▶ Enter the IP address.
Example: <https://192.168.1.10>
 - ⇒ The web interface of the Sicon XX 40 is displayed.
- ▶ The SiCon XX 40 is connected to the Windows PC.



7

Commissioning

- ✓ The device and all photometers/sensors are correctly mounted and connected.
- ▶ Connect the service voltage.
 - ⇒ The device starts up, the dashboard is displayed.
- ▶ Set the language [▶ 28](#).
- ▶ Log in [▶ 28](#) as a user.
- ▶ Add device(s) [▶ 29](#).
- ▶ Configure the settings [▶ 34](#) you want.



8 Operation

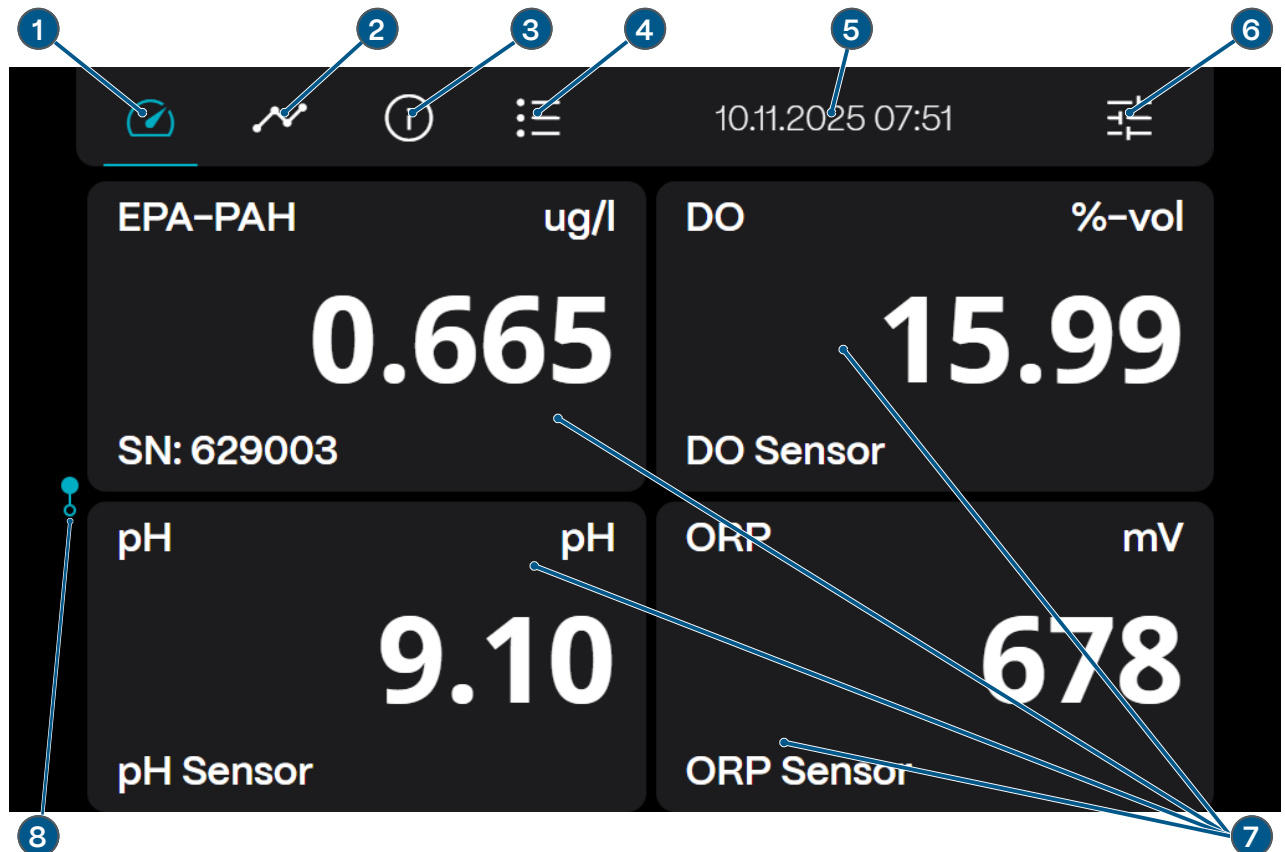
8.1 Operating concept

The SiCon XX 40 is a higher-level control unit. It is used to merge the data from several measuring devices (photometers and sensors). The data can be read, collected, displayed and exported from the individual measuring devices.

It is not possible to overwrite the actual device data. However, individual data can be renamed and reused.

The user interface (GUI) is operated via a touchscreen. The dashboard can be customised,

Overview of the user interface



- | | |
|------------------------------|---------------------|
| (1) Dashboard | (2) Data logger |
| (3) Events | (4) Devices |
| (5) Timestamp | (6) Settings |
| (7) Measuring device display | (8) Page navigation |

Functions

Up to 9 measuring device readings (7) can be displayed on the dashboard (1). Multiple pages are possible; the number of pages is displayed via the page navigation (8).

In the «data logger» (2) menu, up to 4 values per page can be graphically displayed, recorded and exported. Multiple pages are possible; the number of pages is displayed via the page navigation (8).

In the «Events» (3) menu, current and past events [40] (warning and (priority) error messages) are displayed and read out.

The connected devices (including SiCon XX 40) are displayed in the «Devices» (4) menu. Up to 8 devices can be added [29], depending on the version.

The timestamp (5) is located in the display header.

The brightness and language of the user interface can be set in the «Settings» (6) menu. The login area [28] is also located here.

8.2

Setting the language

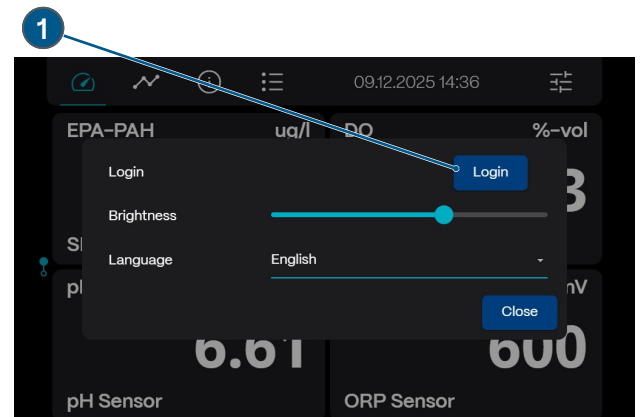
- ▶ Select the «Settings» menu.
- ▶ Select the current language (1).
- ▶ Select the target language (3) in the new window.
- ▶ Close (2).
- ▷ The language is set.



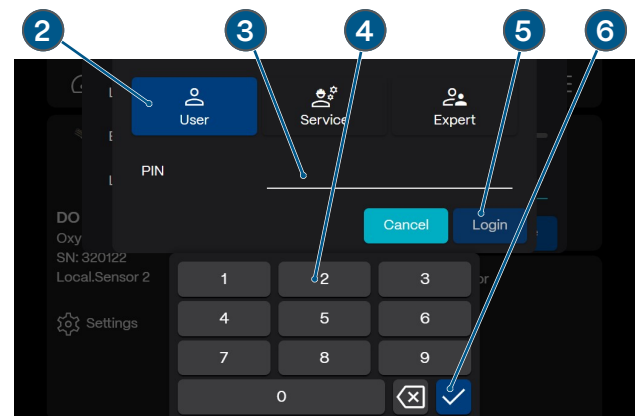
8.3

Login

- ▶ Select the «Settings» menu.
- ▶ Select Login (1).

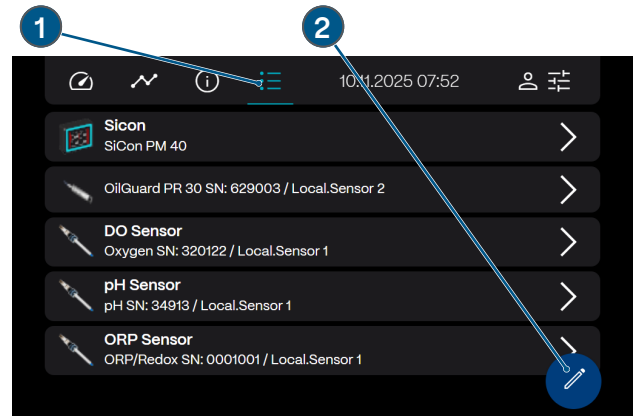


- ▶ Select User (2).
- ▶ Select the PIN field (3).
 - ⇒ The keypad (4) appears.
- ▶ Enter the user PIN (default: 0).
- ▶ Confirm (6).
 - ⇒ The keypad (4) closes.
- ▶ Select Login (5).
 - ▷ The user is logged in.

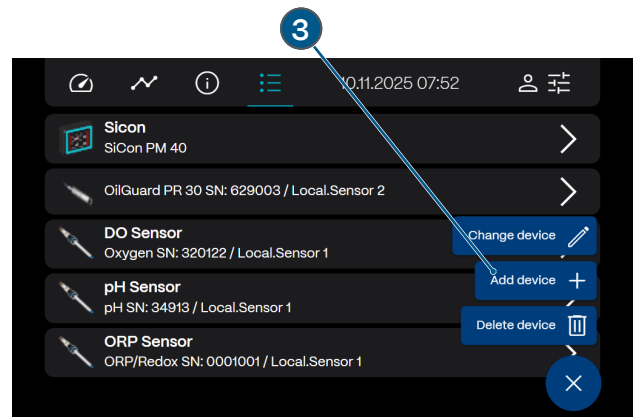


8.4 Adding a device

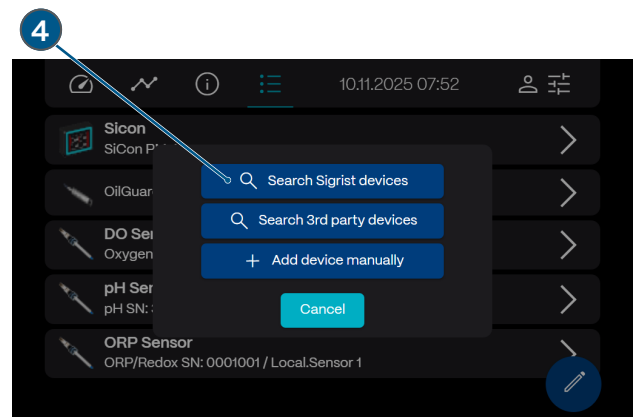
- ✓ The user is logged in [▶ 28].
- ▶ Select the «Devices» (1) menu.
- ▶ Select [Edit] (2).
 - ⇒ The additional menus appear.



- ▶ Select [Add Device] (3).
 - ⇒ The options appear.



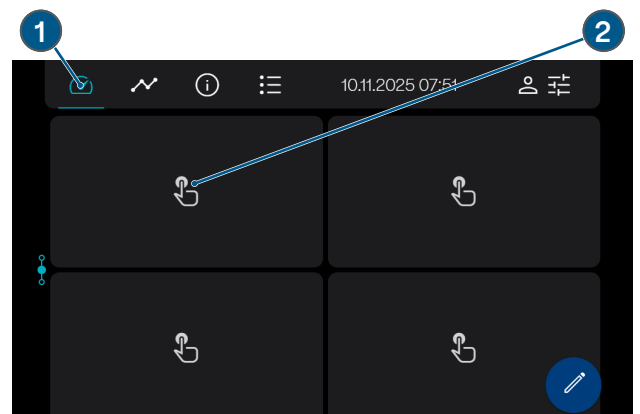
- ▶ Search device (4).
 - ⇒ All devices found are displayed.
- ▶ Select and add the device you want.
 - ▷ The device is added.



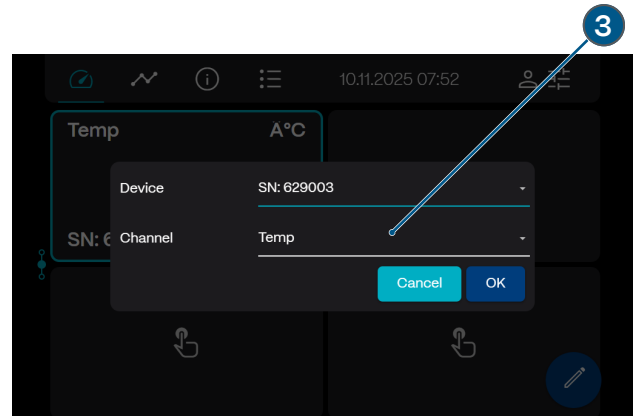
8.5 Configuring the dashboard

Configuring the new measuring device display

- ✓ The user is logged in [▶ 28].
- ▶ Select the dashboard (1).
- ▶ Select the required position of the measuring device display (2) (long press).

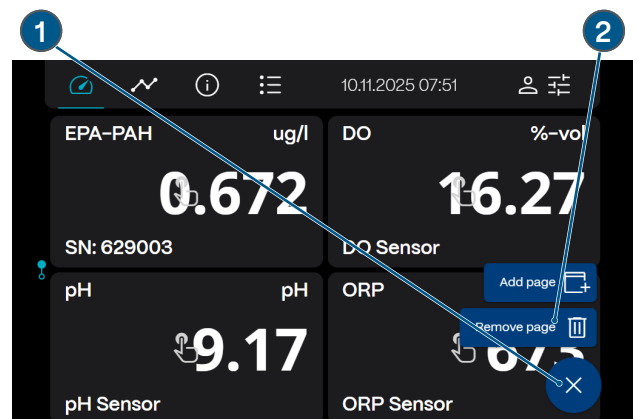


- ▶ Select the channel **(3)**.
- ▶ Confirm with **[OK]**.
 - ⇒ The measuring device display is configured.

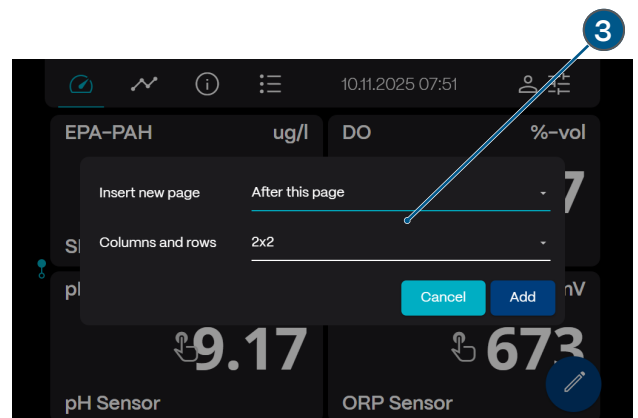


Add new page

- ✓ The user is logged in [▶ 28](#).
- ▶ Select **[Edit]** **(1)**.
- ▶ Select **[Add page]** **(2)**.

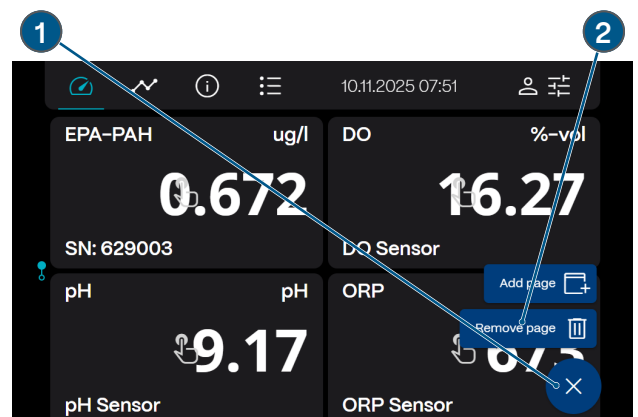


- ▶ Select Display options **(3)**.
- ▶ Confirm with **[Add]**.
 - ⇒ The page is added.

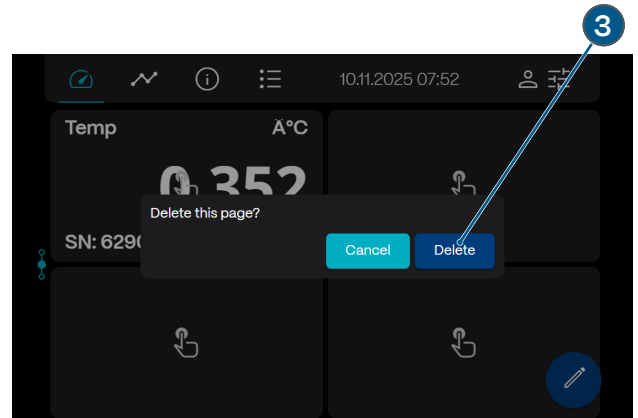


Remove page

- ✓ The user is logged in [▶ 28](#).
- ▶ Select **[Edit]** **(1)**.
- ▶ Select **[Remove page]** **(2)**.



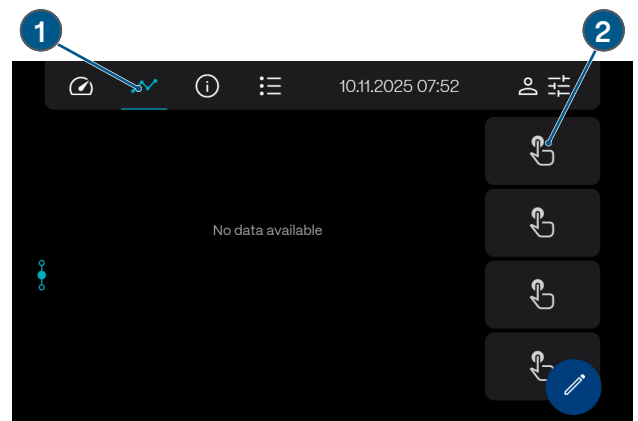
- ▶ Confirm with **[Remove]** (3).
- ⇒ The page is removed.
- ▷ The dashboard is configured.



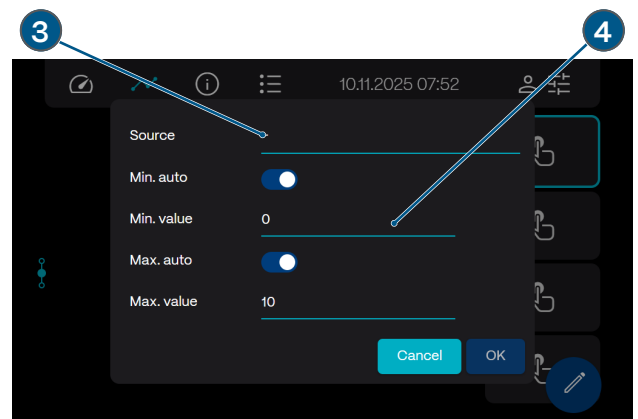
8.6 Configuring the logger

Assigning a new logger

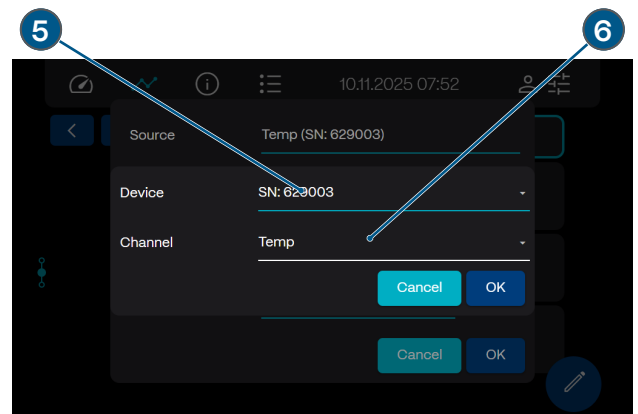
- ✓ The user is logged in [▶ 28].
- ▶ Select «**Logger**» (1).
- ▶ Select the required position of the new logger source (2) (long press).



- ▶ Select Source (3).
- ▶ Set minimum and maximum values (4).
- ▶ Confirm with **[OK]**.



- ▶ Select the device (5).
- ▶ Select the channel (6).
- ▶ Confirm with **[OK]**.
- ⇒ The new logger is assigned.



Editing the logger

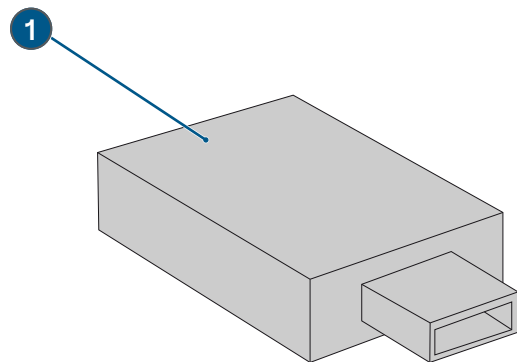
- ▶ To assign another logger, select New logger (7).
- ▶ To add or remove a page, select [Edit] (8).
- ▶ The logger is configured.



8.7 Updating the firmware

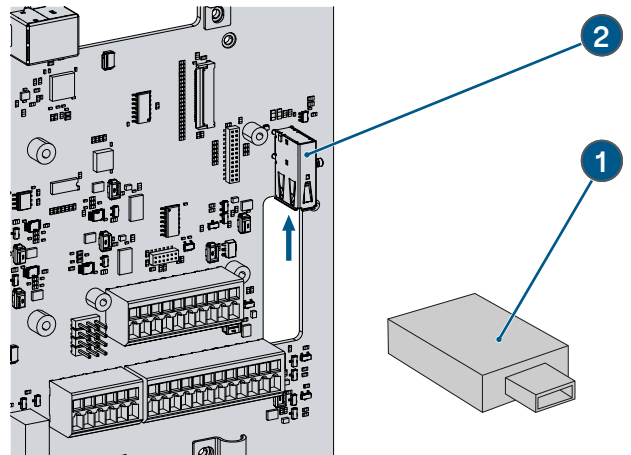
Preparations

- ✓ USB stick (1) with FAT32 formatting.
- ✓ The "Software for SiCon XX 40 devices.zip" file is provided on the PC (can be requested from customer service).
- ▶ Unzip update file (... .raucb).
- ▶ Connect the USB stick (1) to the PC.
- ▶ Create a new directory called «Update» on the USB stick (1).
- ▶ Copy the update file (... .raucb) to the «Update» directory.



Running the update

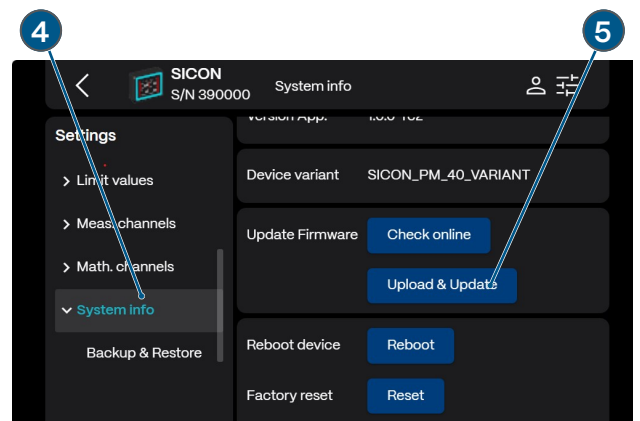
- ▶ Switch off the SiCon XX 40.
- ▶ Open device [▶ 15].
- ▶ Plug the USB stick (1) into the USB port (2).



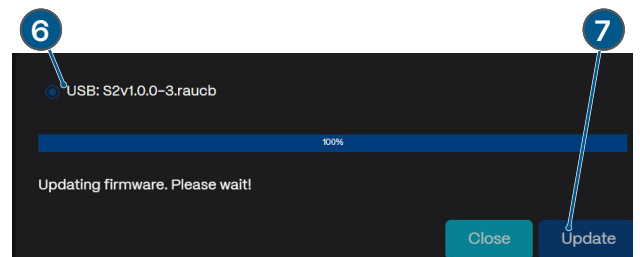
- ▶ Switch on the SiCon XX 40.
- ▶ Log in [▶ 28] as a user.
- ▶ Select «Devices» (1).
- ▶ Select SiCon XX 40 (2).
 - ⇒ A new window opens.
- ▶ Select «Settings» (3).



- ▶ Select «System info» (4).
- ▶ Select [Upload & Update] (5).
 - ⇒ The SiCon XX 40 searches for an update file in the «Update» directory.



- ▶ Select file (6).
- ▶ Select [Update] (7).
 - ⇒ The firmware is updating.
 - ⇒ Once the update reaches 100%, the device will restart.
 - ▷ The firmware update is complete.



9 Settings

9.1 Device settings – examples

Various device settings can be configured on the SiCon XX 40. The procedure is always the same.

Open the Settings menus.

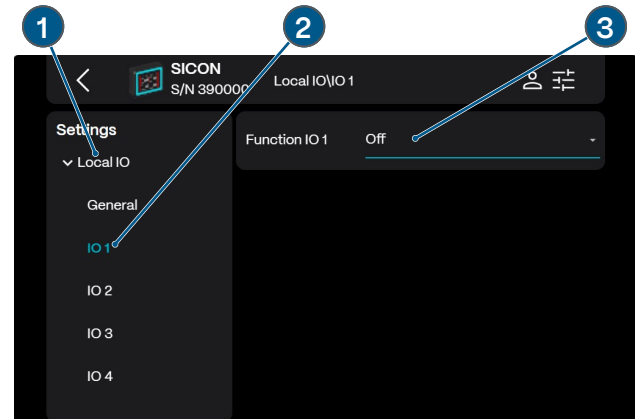
- ✓ The user is logged in [▶ 28].
- ▶ Select the «Devices» (1) menu.
- ▶ [Select SiCon XX 40] (2).
 - ⇒ A new window opens.
- ▶ Open «Settings» (3).
 - ▷ Device settings can now be configured.



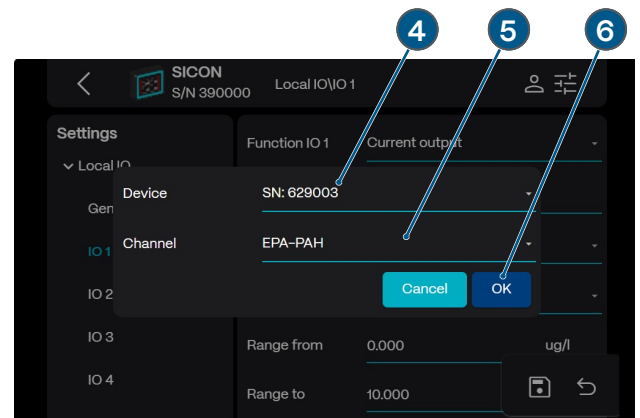
Here are some examples:

Example: Configuring the analogue output

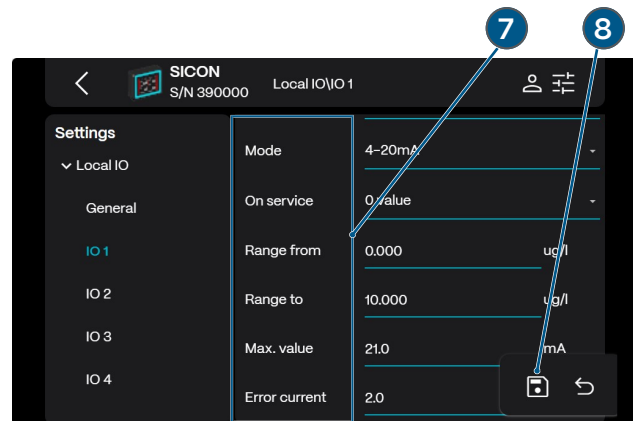
- ▶ Open IO Local (1).
- ▶ Select IO 1 (2).
- ▶ Select Function (3) (from the drop-down menu).
 - ⇒ A new window appears.



- ▶ Select Source (4) (from the drop-down menu).
- ▶ Select Channel (5) (from the drop-down menu).
- ▶ Confirm with [OK] (6).
- ⇒ More parameters appear.

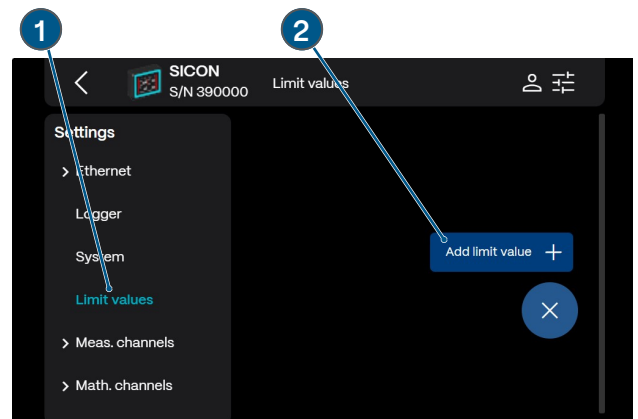


- ▶ Select and configure more parameters (7).
- ▶ Confirm with save (8) to finish.
 - ▷ The analogue output is configured.

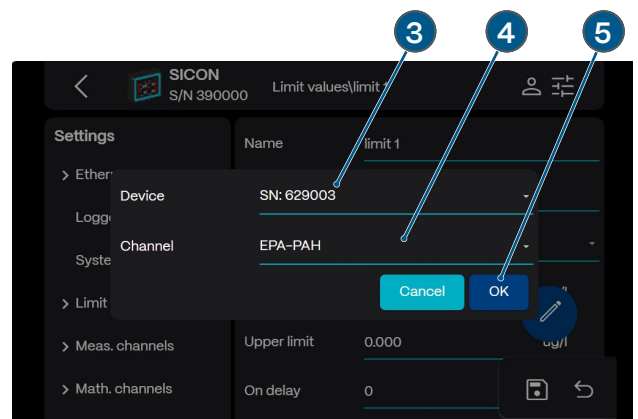


Example: Configuring limit values

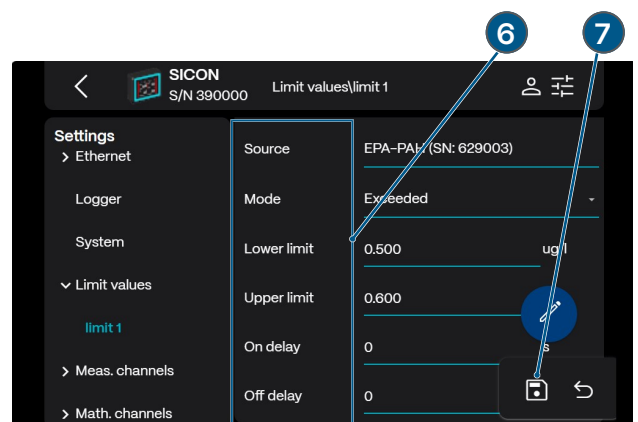
- ▶ Open Limit values (1).
- ▶ Select Add limit (2).
 - ⇒ A new window appears.



- ▶ Select Source (3) (from the drop-down menu).
- ▶ Select Channel (4) (from the drop-down menu).
- ▶ Confirm with [OK] (5).
 - ⇒ More parameters appear.

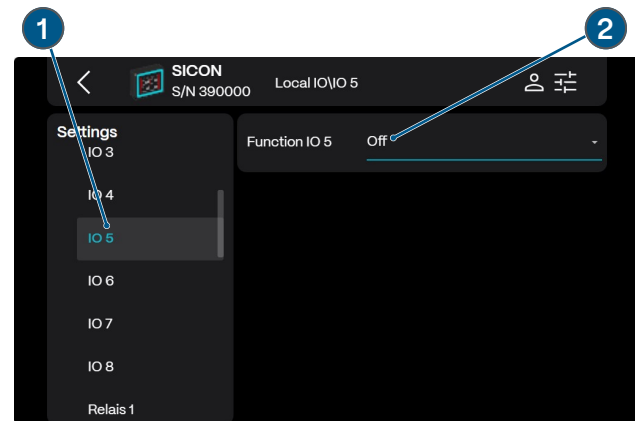


- ▶ Select and configure more parameters (6).
- ▶ Confirm with save (7) to finish.
 - ▷ The limit is configured.

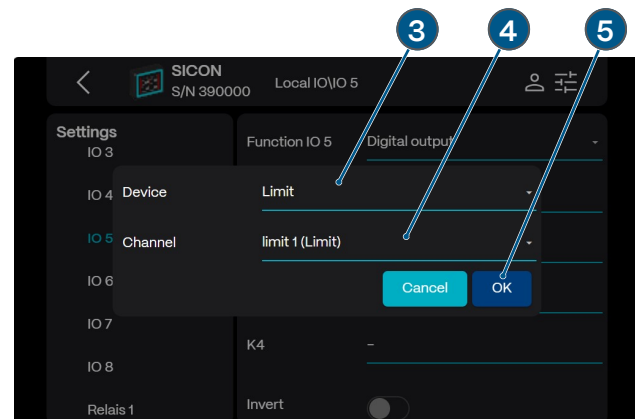


Example: Configuring the digital output

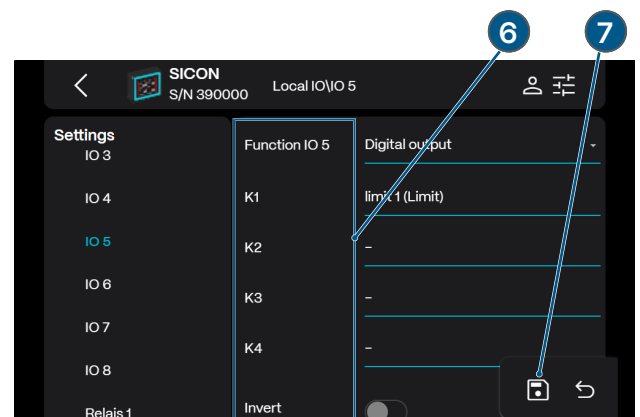
- ▶ Open digital output, e.g. IO 5 (1).
- ▶ Select Function (2) (from the drop-down menu).
⇒ A new window appears.



- ▶ Select Source (3) (from the drop-down menu).
- ▶ Select Channel (4) (from the drop-down menu).
- ▶ Confirm with [OK] (5).
⇒ More parameters appear.



- ▶ Select and configure more parameters (6).
- ▶ Confirm with save (7) to finish.
▷ The digital output is configured.



9.2 Field bus

9.2.1 Modbus RTU/TCP

9.2.1.1 Modbus RTU general

- The EG_IO module must be integrated.
- The Modbus RTU interface must be activated and parametrised in the menu «IO module EG_IO».

9.2.1.2 Modbus TCP – general

- The Modbus TCP must be activated and parameterised in the «Ethernet/Modbus TCP» menu.
- Communication is running on port 502.
- A maximum of 4 Modbus TCP connections is permitted. Any unused connection will be terminated after 30 seconds.

9.2.1.3 Module table Modbus RTU/TCP

NOTE



Non-functionality due to writing data to undocumented addresses

Writing data to undocumented addresses can lead non-functionality of the device.

- Only documented addresses according to the module table may be used.

A maximum of 24 measuring values with associated status can be read with Modbus function 4:

Register	Address	Data type	Function	Values
30001	0x0000	Unsigned integer bits 15...0	Status	Bits 8-15: Fault codes ¹⁾ Bit 0-7: 0
30002	0x0001	Real 32-bit Intel single precision bits 15...0	Measuring value ²⁾ Channel 1	
30003	0x0004	Real 32-bit Intel single precision bits 15...0	Measuring value ²⁾ Channel 2	
...				
30048	0x0047	Real 32-bit Intel single precision bits 15...0	Measuring value ²⁾ Channel 24	
30050	0x0049	Unsigned integer bits 15...0	Status measuring value Channel 1 + 2	Bits 8-15: Status measuring value Channel 1 ³⁾ Bits 0-7: Status measuring value Channel 2 ³⁾
30051	0x0050	Unsigned integer bits 15...0	Status measuring value Channel 3 + 4	Bits 8-15: Status measuring value Channel 3 ³⁾ Bits 0-7: Status measuring value Channel 4 ³⁾
...				
30061	0x0060	Unsigned integer bits 15...0	Status measuring value Channel 23 + 44	Bits 8-15: Status measuring value Channel 23 ³⁾ Bits 0-7: Status measuring value Channel 24 ³⁾

¹⁾ Fault codes bits 8-15:

- Bit 8: SiCon XX 40 error (0=OK, 1=error). Set if the SiCon XX 40 encounters an error.
- Bit 9: Sensors error (0=OK, 1=error). Set if one or more sensors encounter an error.

²⁾ Measuring value:

- 2 registers per measuring value. In order to obtain the correct float value, the two registers must first be swapped (CDAB word order).

³⁾ Status of measuring value:

- Value < 126: Sensor error code (see sensor instruction manual)
- Value = 126: Communication error with sensor
- Value = 127: Invalid data

All available measuring values are displayed according to the assignment of the output channels in the menu «**IO Mod. EG_IOGeneral**» or «**EthernetModbus TCP**».

9.2.2 Profibus-DP/Profinet-IO data

The data is divided into 15 input and 3 output modules. The individual modules can be omitted and assigned to any slots.

The implementation is identical for all Sigrist devices. It may be that not all data are used, depending on the device type. Modules/data not used in the SiCon XX 40 are shown in grey.

Module table

Module name	Data type	Byte size	In/Out	Description	Min.	Max.
Status	Byte	1	In	Bit 7: Live Bit 0-6: Fault codes ¹⁾		
	Byte	1	In	Limit status 1...8		
Meas. values 1...2	2xReal	8	In	Meas. values 1...2		
Meas. values 3...4	2xReal	8	In	Meas. values 3...4		
Meas. values 5...8	4xReal	16	In	Meas. values 5...8		
Meas. values 9...16	8xReal	32	In	Meas. values 9...16		
Meas. values 17...24	8xReal	32	In	Meas. values 17...24		
Status 1...2	2xByte	2	In	Status of measuring value 1...2 ²⁾		
Status 3...4	2xByte	2	In	Status of measuring value 3...4 ²⁾		
Status 5...8	4xByte	4	In	Status of measuring value 5...8 ²⁾		
Status 9...16	8xByte	8	In	Status of measuring value 9...16 ²⁾		
Status 17...24	8xByte	8	In	Status of measuring value 17...24 ²⁾		
Diagnosis	Sint	1	In	Humidity		
	SInt	1	In	Electronics temperature		
	SInt	1	In	Heater temperature		
	SInt	1	In	Soiling		
Control In	Byte	1	In	Live inverse		
	Byte	1	In	Operating mode		
	Byte	1	In	Start (LabScat)		
	Byte	1	In	Lin table (LabScat)		

Module name	Data type	Byte size	In/Out	Description	Min.	Max.
Config In	Byte	1	In	Integration 1...8		
	Byte	1	In	Heater set point		
	Byte	1	In	Heater max. value		
	Byte	1	In	LV1-4 Cut-in delay		
	Byte	1	In	LV1-4 Cut-out delay		
	Byte	1	In	LV5-8 Cut-in delay		
	Byte	1	In	LV5-8 Cut-out delay		
	Byte	1	In	Hysteresis LV ³⁾		
Config Limits In	8xReal	32	In	Limit 1...8		
	Real	4	In	Scaling 1		
	Real	4	In	Flow rate LV		
	Real	4	In	Soiling LV		
Control Out	Byte	1	Out	Live inverse	0	255
	Byte	1	Out	Operating mode	0	4
	Byte	1	Out	Start (LabScat)	0	2
	Byte	1	Out	Lin table (LabScat)	0	7
Config Out	Byte	1	Out	Integration 1...8	0	255
	Byte	1	Out	Heater set point	0	100
	Byte	1	Out	Heater max. value	0	75
	Byte	1	Out	LV1...4 Cut-in delay	0	255
	Byte	1	Out	LV1...4 Cut-out delay	0	255
	Byte	1	Out	LV5...8 Cut-in delay	0	255
	Byte	1	Out	LV5...8 Cut-out delay	0	255
	Byte	1	Out	Hysteresis LV ³⁾	0	100
Config Limits Out	8xReal	32	Out	Limit 1...8	-5000	1.00E+09
	Real	4	Out	Scaling 1	0.1	10
	Real	4	Out	Flow rate LV	-10	20000
	Real	4	Out	Soiling LV	0.001	1000

¹⁾Fault codes bits 0-6:

- Bit 0: SiCon XX 40 error (0=OK, 1=error). Set if the SiCon XX 40 encounters an error.
- Bit 1: Sensors error (0=OK, 1=error). Set if one or more sensors encounter an error.

²⁾Status of measuring value:

- Value < 126: Sensor fault code (see sensor instruction manual).
- Value = 126: Communication fault with sensor.
- Value = 127: Invalid data.

³⁾Hysteresis limit:

- Lower limit = upper limit * (100.0 - value / 100)

All available measuring values are displayed according to the assignment of the output channels in the menu «**IO Mod. EG_Profinet/General**» or «**IO Mod. EG_Profibusb/General**».

When writing, all values must be within the permissible limits, otherwise all changes will be discarded.

Communication monitoring:

There are two options for monitoring communication.

- The first option is a live bit (module: Status – bit 7), which alternates between 0 and 1 every second. If this option is used, an adequate evaluation logic is required.
- The second option is an inverse byte. A value can be written to the corresponding address (module: Control Out – live inverse), after a time of max. 3...5 s the value is output inverted (module: Control In – live inverse).

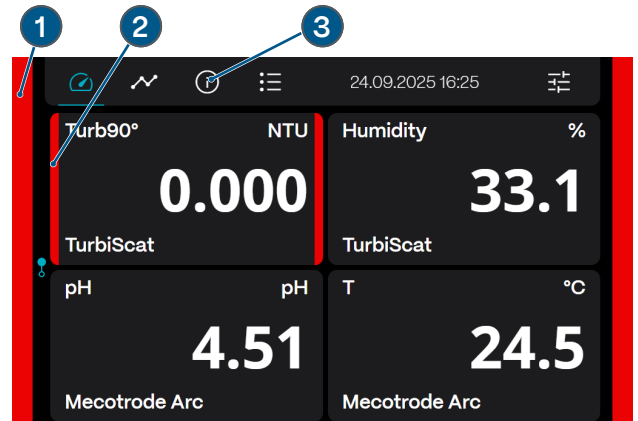
10 Troubleshooting

10.1 Events

Event display on dashboard

If an event occurs, it is displayed on the dashboard with coloured sidebars (1). If the event concerns a connected measuring device, this is also displayed with coloured sidebar (2).

► Select [Events] (3) for more detailed information.

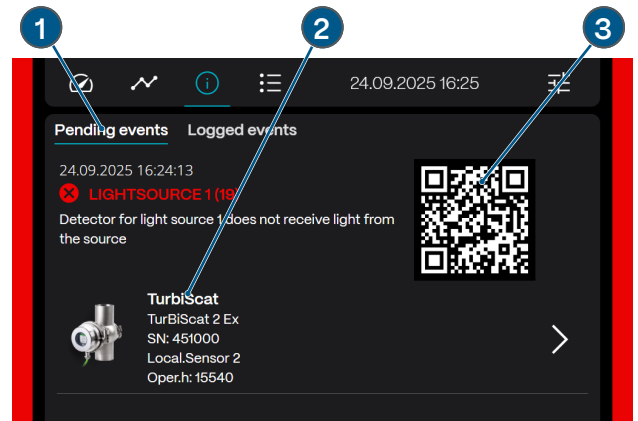


Current events

Detailed information on the active event can be read out in the «Current Events» (1) menu.

The affected measuring device (2) is displayed.

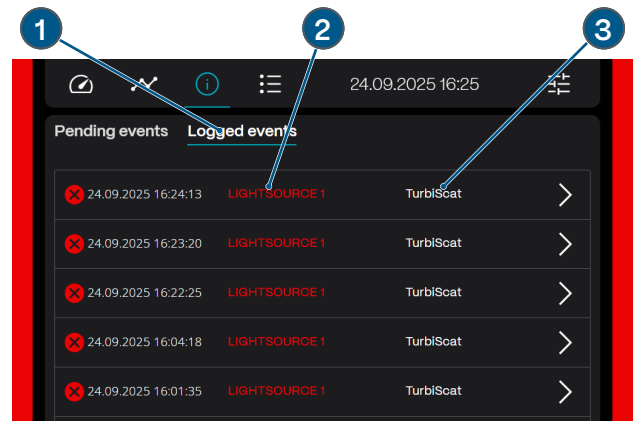
► For detailed information on the current event, scan the QR code (3).



Past events

«Recent events can be viewed in the »Logged events (1) menu. The error source (2) in question is listed with a time stamp and the affected measuring device (3).

► For detailed information on an event, select that event.



Event categories

The following event categories are displayed on Sigrist devices.

Colour	Category	Description
Yellow	WARNING	Warnings call attention to an unusual condition. They have the following effects: • System remains in operation. • Measuring results must be evaluated with caution. • The cause of the warning should be corrected in a timely manner. • Once the cause has been corrected, the warning is automatically cleared.

Colour	Category	Description
Red	ERROR	Errors indicate a malfunction which makes correct measured value acquisition impossible. They have the following effects: - Measuring values are set to 0. - Assigned current outputs are set to the programmed measured current «in case of an error». - Assigned limits are deactivated. - If an output is programmed for errors, it is switched.
Red	PRIO	Prioritised errors draw attention to a serious malfunction. Further operation is impossible and the measuring values are set to 0. Prioritised errors can only be cleared by a service technician.

10.2 Warning messages

The following warning messages may be displayed during operation.

For warning messages of connected devices, see the instruction manual for the device concerned.

Code	Message	Cause	Remedy
W1230	RAM MEMORY	Not enough free RAM.	- Restart the device. - If the problem persists, contact a service engineer.
W1231	CONFIG MEMORY	Not enough free configuration memory	- Delete any unused configuration. - If the problem persists, contact a service engineer.
W1232	DATA MEMORY	Not enough free data memory.	- Clear data logger. - If the problem persists, contact a service engineer.
W1240	CPU TEMPERATURE	CPU temperature too high.	Check the max. permissible ambient temperature of the SiCon XX 40.
W1241	BOARD TEMP.	Board temperature too high.	Check the max. permissible ambient temperature of the SiCon XX 40.
W1242	CPU LOAD	CPU usage too high.	- Restart the device. - If the problem persists, contact a service engineer.

10.3 Error messages

The following error messages may be displayed during operation.

For error messages of connected devices, see the instruction manual of the device concerned.

Code	Message	Cause	Remedy
E1110	COMMUNICATION	Fault communicating with sensor.	- Check cable connection and sensor power supply. - Defective electronics Contact a service engineer
E1111	LINKMODULE	Link module fault	Defective electronics Contact a service engineer
E1121	ADAPTERBOARD	Fault communicating with adapter board.	Defective electronics Contact a service engineer
E1122	ADAPTERB. SW UPDATE	Update adapter board software error.	- Restart the SiCon XX 40. - If the problem persists, contact a service engineer.
E1123	CONFIGURATION	Unable to load configuration onto the SiCon XX 40.	Load the appropriate configuration for the device, check whether the required licenses are available.

Code	Message	Cause	Remedy
E1124	LICENSE	Unable to load license.	Request the correct license for the device.
E1125	INVALID DEVICE	The serial number or device type does not match the configuration.	Connect the correct device or delete the existing device from the configuration and import the new device.

10.4 Prio error messages

The following prio error messages may be displayed during operation.

For prio error messages of the connected devices, see the instruction manual for the device concerned.

Code	Message	Cause	Remedy
P1005 ... P1016	PROCESS XXX	Software no longer functioning properly.	If the problem persists, contact a service engineer.
P1030	RAM MEMORY	Not enough free RAM.	If the problem persists, contact a service engineer.
P1031	CONFIG MEMORY	Not enough free configuration memory	- Delete any unused configuration. - If the problem persists, contact a service engineer.
P1032	DATA MEMORY	Not enough free data memory.	- Clear data logger. - If the problem persists, contact a service engineer.
P1040	CPU TEMPERATURE	CPU temperature too high.	Check the max. permissible ambient temperature of the SiCon XX 40.
P1041	BOARD TEMP.	Board temperature too high.	Check the max. permissible ambient temperature of the SiCon XX 40.
P1042	CPU LOAD	CPU usage too high.	If the problem persists, contact a service engineer.

11 Specification sheet

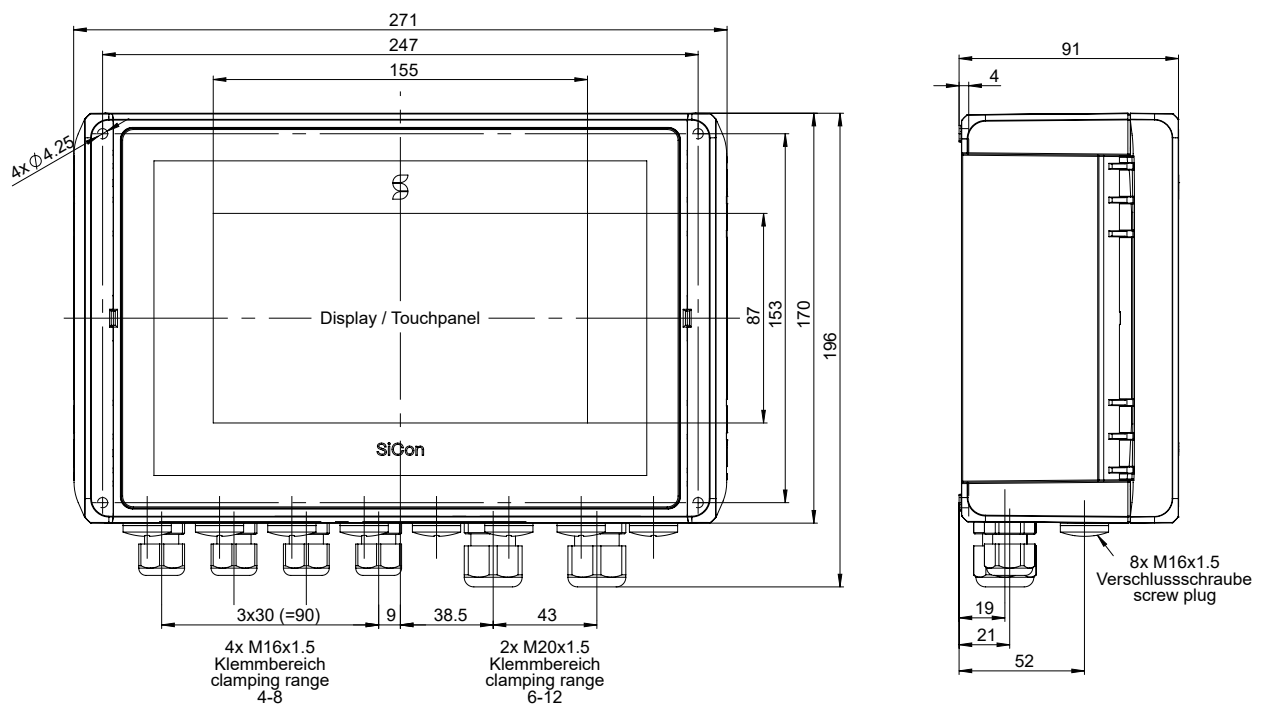
System data	Values
Service voltage	24 VDC $\pm$ 10%
Power input	9 W + power input sensor, total: max. 40 W
Weight	1.6 kg
Protection class	III
Housing material	Polycarbonate UL 49 V0
Dimensions	271 x 170 x 90 mm
Space required	approx. 290 x 260 x 100 mm + space to open the door
Protection degree:	IP66
Protection degree of open housing	IP20
Installation location	Indoors
Geographical operating altitude	2000 m
Ambient temperature	-20...+50 °C
Storage temperature	-30...70 °C
Ambient humidity	0 ... 95% relative humidity
Mounting	Wall mounting 4 x $\varnothing$ 4 mm screws, mounting feet (optional), pipe mounting (optional) $\varnothing$ 50...70 mm, or $\varnothing$ 32...50 mm
Operating system	Linux
Memory	2 GB RAM, 8 GB eMMC
Real time clock buffer	30 days

Display	Values
Display	7" colour display with touch screen resolution: 1024 x 600 pixels
Active range	154.21 x 85.92 mm
Viewing angle	at least 70°, typ. 80°
Cable bushings	2 x 6...12 mm; 4...12 x 4...8 mm

Device data	SiCon ST 40	SiCon AD 40	SiCon PM 40
Maximum number of sensors in total	2	2 (5 with combined input)	2, 8 with additional link modules
RS485 connections	2 (115200 baud)	2 (115200 baud)	2 (115200 baud)
Link modules (opt. interfaces to sensors)	-	1 x analogue input or 1 x RS485 passive, optional	2, optional
Network connection	1 x Ethernet LAN 100 Mbit/s	1 x Ethernet LAN 100 Mbit/s	1 x Ethernet LAN 100 Mbit/s
Analogue outputs	4	4	4
Digital inputs or outputs (configurable)	4	4	4
Number of communication modules (interface to the control system)	-	1	1
Profibus DP communication module	-	optional	optional
Profinet IO communication module	-	optional	optional

Device data	SiCon ST 40	SiCon AD 40	SiCon PM 40
IO communication module (Modbus RTU + analogue IO)	-	optional	optional
USB	USB port (Type A, 2.0) for data export, software update		
Relay	2 x 30 V, 500 mA	2 x 30 V, 500 mA	2 x 30 V, 500 mA
Number of measuring channels	10	10	20
Protocol support			
Profibus DP	-	optional	optional
Profinet IO	-	optional	optional
Modbus RTU	-	optional	optional
Modbus TCP	yes	yes	yes
Operator interface, local	Touch display	Touch display	Touch display
Operator interface (remote access)	Web browser (TCP/IP)	Web browser (TCP/IP)	Web browser (TCP/IP)
Historical data			
- 32 days	-	optional	yes
- 370 days	-	-	optional
Dashboards			
Number of dashboards	2	2	8
Measuring values per dashboard	max. 4	max. 4	max. 9
Diagram display	no	optional	yes

11.1 Dimension drawing SiCon XX 40



12 Returns

Returns to the appropriate country representative

For all devices and spare parts that are returned, a completed RMA form must be sent to the responsible Sigrist-Photometer AG country representative (RMA form 14711D can be downloaded from www.sigrist.com).

DANGER

Residues of hazardous media

Depending on the area of application, a dismantled device may contain residues of hazardous media. These residues can endanger persons.



- ▶ Thoroughly clean all surfaces that come into contact with the media.
- ▶ Remove all aggressive, toxic or hazardous substances in or on the device, as well as on the associated peripheral devices.
- ▶ Note the decontamination process on the RMA form and have it confirmed.

Use the original packaging when returning the photometer. If this is not available, observe the following instructions.

- ▶ Empty the device completely and dry it.
- ▶ Before packaging, seal the openings of the device with tape or pins so that no parts of the packaging units can penetrate inside.
- ▶ The device contains optical and electronic components. Ensure with the packaging that no impact can affect the device during transport.
- ▶ Pack all peripheral devices and accessory parts separately and label them with the serial number of the photometer. This prevents later confusion and facilitates the identification of the parts.
- ▶ Enclose the completed RMA form and mark the RMA number on the outside of the packaging.
 - ▷ Packaged in this way, the devices can be transported using all standard freight routes.

13 Decommissioning/storage

Decommissioning

The purpose of decommissioning is to properly prepare the individual components for storage.

DANGER



Danger from voltage inside the device.

Connecting electrical cables can be life-threatening. The system can also be damaged in the process. Local regulations must always be observed for electrical installations.

► Disconnect the service voltage to the control unit and remove electrical connections.

► Remove the control unit.

► Make sure that all covers and closures are locked.

Storing the components

There are no special storage requirements for the control units. However, the following information must be heeded:

- The control unit contains electronic components. Storage must comply with the standard conditions for such components. In particular, ensure that the storage temperature is in the range -30 ... +70 °C.
- The control unit and its accessory parts must be protected from the effects of weather, condensing humidity and aggressive gases during storage.

14 Disposal

The components must be disposed of in accordance with regional legal regulations. The components do not have any radiation sources that are harmful to the environment. The materials used must be disposed of or reused in accordance with the following table:

Category	Materials	Disposal option
Packaging	Cardboard, paper	Reuse as packaging material, local disposal points, incineration plants
	Protective films, polystyrene shells	Reuse as packaging material, recycling
Electronics	Printed circuit boards, electro-mechanical components, display and cables	To be disposed of as electronic waste
Optics	Glass, plastic and stainless steel	Recycling via used glass and scrap metal collection points
Photometer housing	Stainless steel	Scrap metal collection points
Desiccant	Molecular sieve	Normal waste disposal (chemically harmless)

Glossary

GUI

User interface (abbreviated GUI from the English graphical user interface)

Your service partner

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