

PhaseGuard ST 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 Conformity

EU declaration of conformity



The device fulfils the requirements for affixing the CE mark within the European Union (EU).

EU Declaration of Conformity PhaseGuard ST 40

<https://www.sigrist.com/71f2>



UKCA Declaration of Conformity



The device fulfils the requirements for the application of the UKCA mark within the United Kingdom.

UKCA Declaration of Conformity PhaseGuard ST 40

<https://www.sigrist.com/a17c>



2.5 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.

Symbol	Name	Function
	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  6]	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.
[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 photometer and its peripherals are designed for detecting phase transitions in liquids.

Areas of application

- Food and beverage industry
- Dairy processing industry
- Chemical, pharmaceutical industry

Applications

- Monitoring and control of phase transitions in beverages such as beer, fruit juices, etc.
- Optimisation of beer/yeast separation
- Cleaning monitoring (CIP), for example in the dairy industry
- Minimisation of product losses
- Recognition of phase transitions during product changes and product ejections
- Faster process sequences thanks to better resolution and start-stop conditions

3.2 Restrictions on use

DANGER

Use in hazardous areas

The use of this device in potentially explosive atmospheres may cause explosions.

- ▶ The device must not be operated in potentially explosive areas or rooms.
- ▶ Additional components, such as control units or tablets, must not be operated in potentially explosive areas or rooms.
- ▶ The device must not be used for explosive sample substances.



3.3 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.



3.4 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.

Signal word

Meaning

NOTE

Signal word for a potentially harmful situation in which the equipment or an object in its vicinity may be damaged.

3.5**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 with 24 VDC (PoE 48 VDC). If a power supply unit (100 ... 240 VAC) is also used, there is a risk of electric shock with fatal consequences if open cables are touched.

- ▶ Do not operate the device unless it has been properly installed and repaired.
- ▶ Only operate the device if all cables are undamaged.
- ▶ Never operate the power supply with the case 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 due to high pressures

During maintenance, repairs or adjustments to a pressurised pipeline, injury to persons, damage to the device or material damage to the infrastructure may occur.

- ▶ Be sure to drain the process line before removing the photometer.
- ▶ Always consult the operating instructions for maintenance, repairs or adjustments to pipelines.

Danger due to liquids

Escaping medium at the device or at the connections can lead to flooding of the room or material damage to the infrastructure.

- ▶ Check for leaks regularly.
- Ingress of moisture and condensation on electronic components can cause damage.
- ▶ Carry out maintenance work as described in the operating instructions.
 - ▶ Avoid accumulation of condensation on optical and electrical surfaces.

Risk of leakage at the process line

Leakage at the process line can lead to escaping medium. Contact with the medium can lead to burns, chemical burns or poisoning with a fatal outcome.

- ▶ Ensure that the device meets the requirements of the medium.
- ▶ Take protective measures and wear protective clothing.

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.

Faulty measured value display during operation

Incorrect display of measurements cannot be completely ruled out.

- ▶ Apply the access code to prevent parameters from being changed by unauthorised persons.
- ▶ Carry out maintenance work as described in the operating instructions.

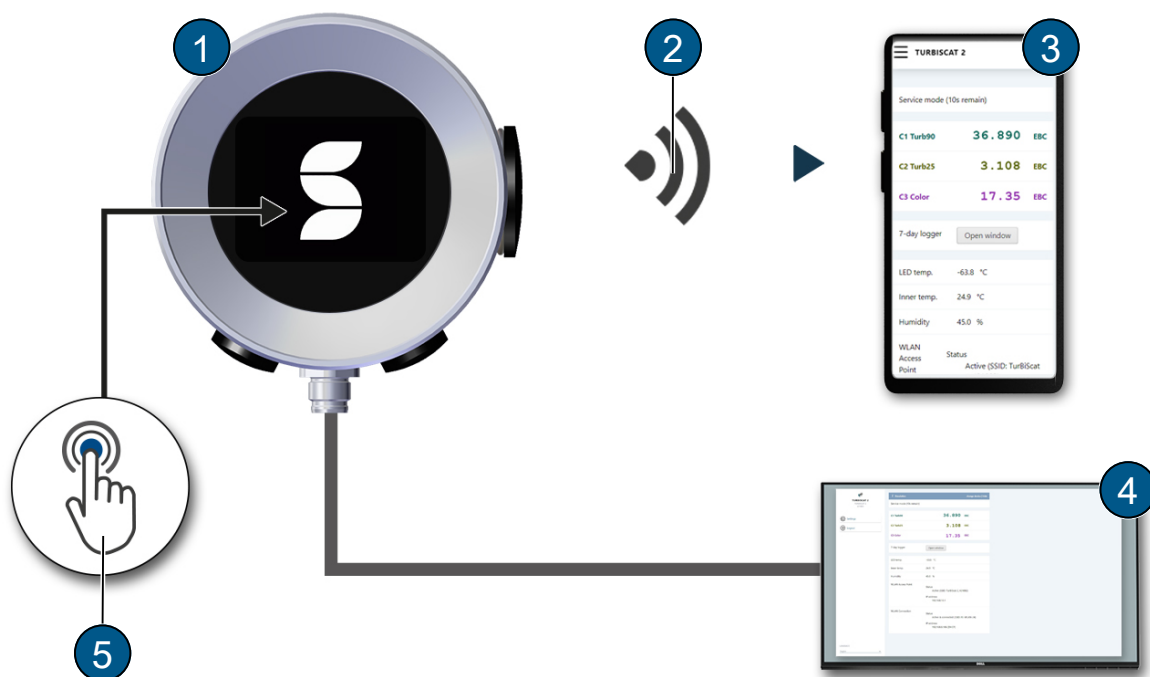
Unauthorised access to the device

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 Device data

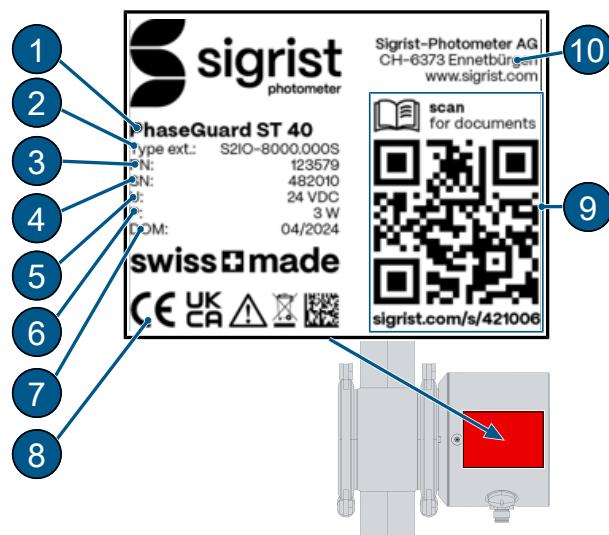
4.1 General view



- (1) Photometer
- (2) WLAN connection
- (3) WLAN input device
- (4) Operating device or control system
- (5) Touchscreen

4.2 Nameplate

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



4.3 Scope of supply and accessory parts



The scope of delivery can be found in the sales documents.

The accessory parts are available online.

<https://www.sigrist.com/en/Turbidity-Meters-Analyzers-Liquid/PhaseGuard-ST-40/Parts>



5 Mounting

5.1 General information on mounting

Use detailed dimension drawings for mounting the photometer and control unit.

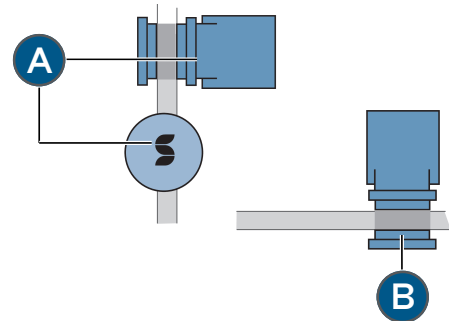
- Distance of photometer to interfering light sources > 2 m.
- Prevent the formation of gas bubbles on the sensor head by using a suitable installation position.
- Distance of photometer from cable bends and elements that change the cross-section > 1 m.
- Ensure that the installation position is self-draining.

5.2 Mounting position of the photometer

In process line

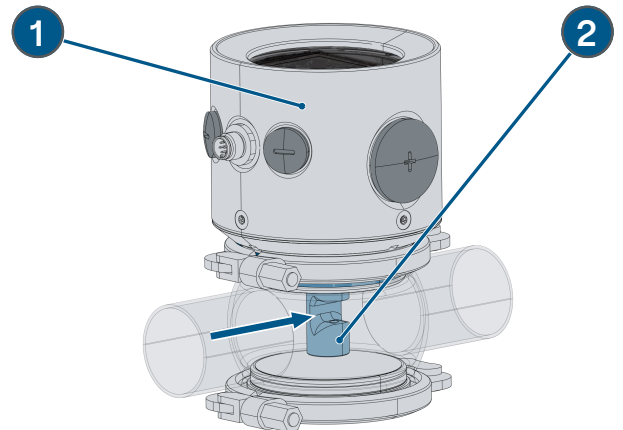
VARINLINE® housing (spherical housing): EHEDG-compliant

Installation position (A) and (B): Permitted



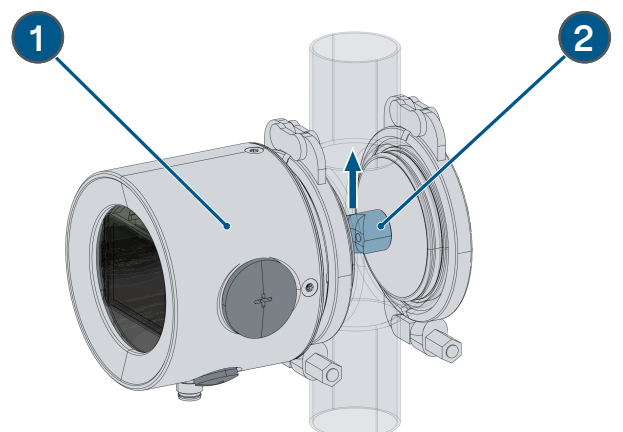
Horizontal fitting

- When fitting the photometer (1) horizontally, ensure that the sensor (2) is fitted in the flow direction of the medium. To ensure this, align the plug along the pipe.



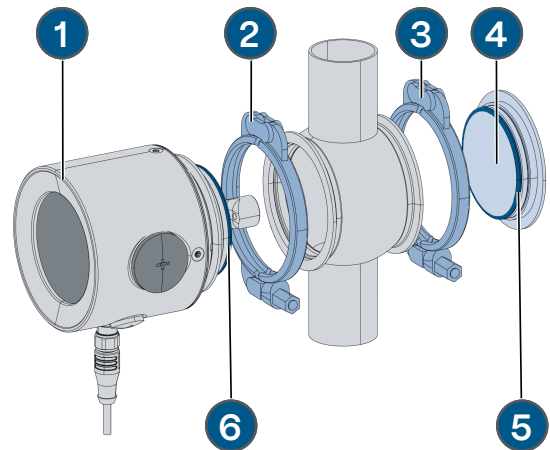
Vertical fitting

- When fitting the photometer (1) vertically, ensure that sensor (2) is fitted in the flow direction of the medium. To ensure this, align the plug downwards.



5.3 Fitting in VARINLINE® connection

- ▶ Mount photometer (1) including seal (6) with clamp ring (2) on the VARINLINE® connection.
- ▶ Mount sealing plate (4), including seal (5) with clamp ring (3) to the VARINLINE® connection.



6 Electrical installation

DANGER

Danger due to improper connection of the operating voltage.



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

- ▶ Connection must be carried out by a specialist in accordance with local regulations.
- ▶ Install a disconnecting device near the power supply to disconnect the device from the mains. The disconnecting device should be easily accessible and labelled.

6.1 Determine communication module

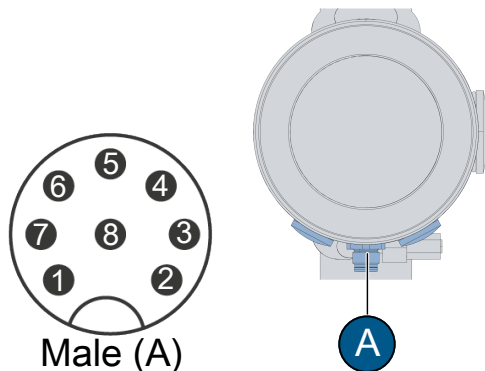
The integrated communication module can be seen on the Rating plate [▶ 10](#). The following codes (1) are possible: LT = EG_LT | IO = EG_IO | PE = EG_PoE | PB = EG_Profibus | PN = EG_Profinet



6.2 Photometer connection

The shielding of the 8-pole conducting cable is connected to the housing on the device manufacturer side. The functional assignment of the individual wires depends on the installed communication module(type plate).

6.2.1 EG_LT

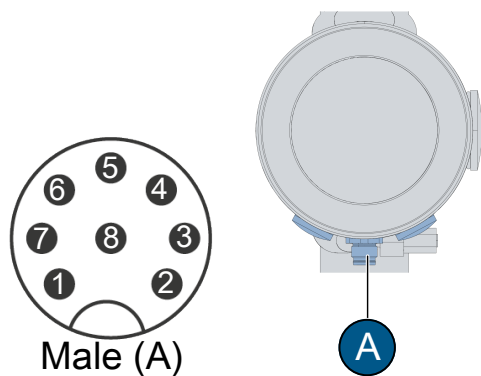


(A) M12 8-pin plug-in connector A coded

Function	Designation	Plug-in connector pin no.	Colour
GND	GND	1	white
24 V	24 V	2	brown
IN	IO1	7	blue
24 V 10 kΩ ¹⁾	IO2	5	grey
OUT1	IO3	6	Pink
OUT2	IO4	4	Yellow
Current 1	IO5	8	red
GND	IO6	3	green

¹⁾ for IN control

6.2.2 EG_IO

**(A) M12 8-pin plug A Coded**

Function	Designation	Plug-in connector pin no.	Colour
GND	GND	1	white
24 V	24 V	2	brown

RS485 Modbus RTU

Configurable with or without 120 Ω termination.

Function	Designation	Plug-in connector pin no.	Colour
A	IO1	7	blue
B	IO2	5	grey

Digital input 5–28 VDC

Function	Designation	Plug-in connector pin no.	Colour
IN 1	IO1	7	blue
IN 2	IO2	5	grey

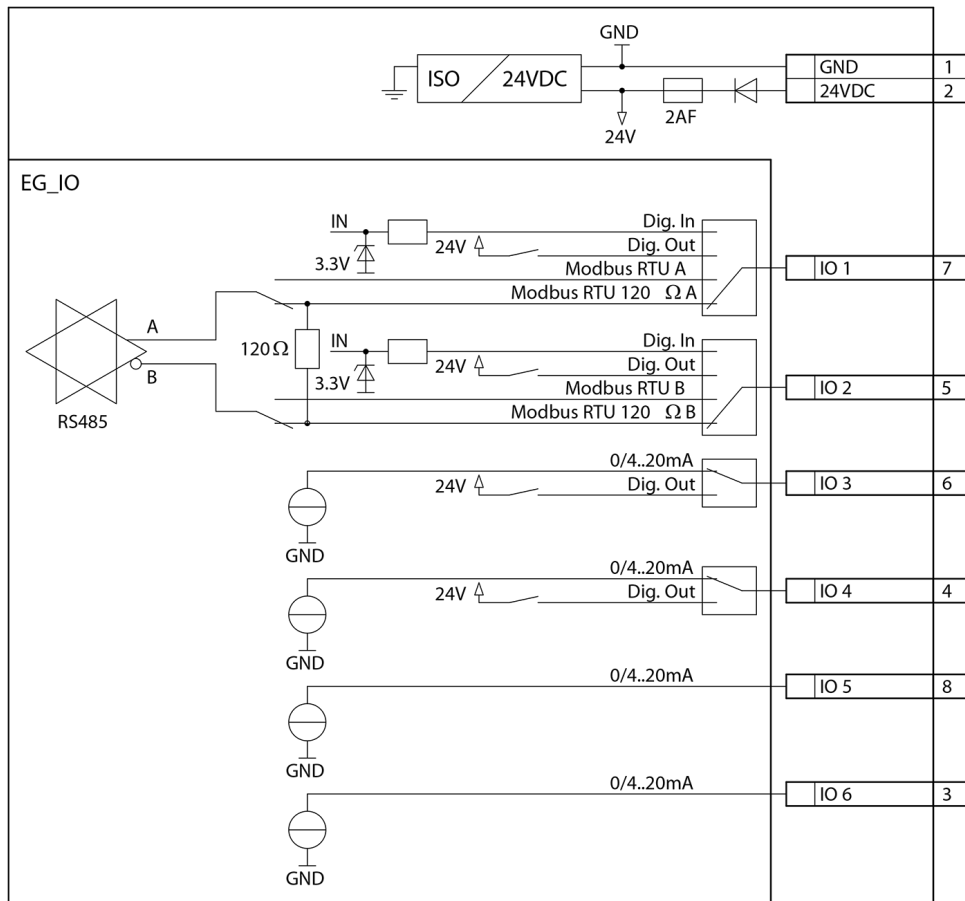
Digital output "High Side Switch" max. 20 mA

Function	Designation	Plug-in connector pin no.	Colour
OUT 1	IO1	7	blue
OUT 2	IO2	5	grey
OUT 3	IO3	6	Pink
OUT 4	IO4	4	Yellow

Current output 0/4...20 max. 700 Ω

Function	Designation	Plug-in connector pin no.	Colour
Current 1	IO3	6	Pink
Current 2	IO4	4	Yellow
Current 3	IO5	8	red
Current 4	IO6	3	green

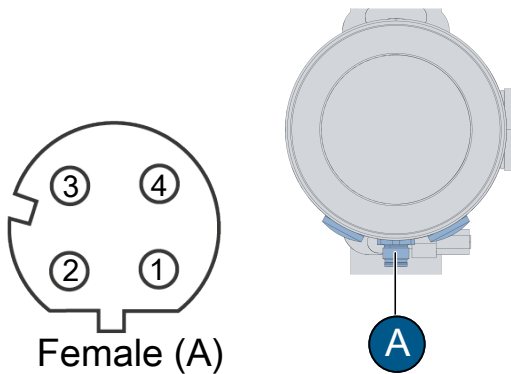
Wiring diagram EG_IO



6.2.3

EG_PoE

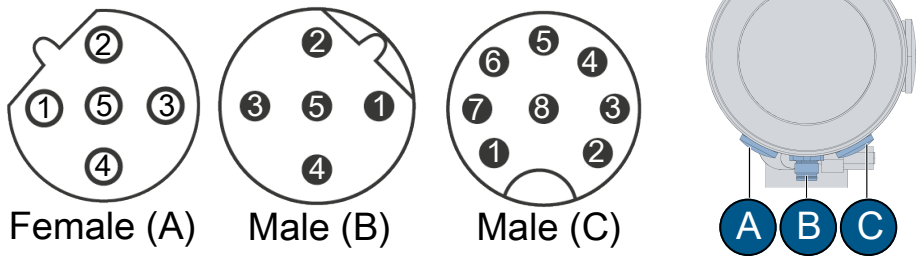
- PoE (802.3af, class 0)
- Cable characteristics: Cat. 6, STP, AWG 24/7, TIA-568A. Fast Ethernet 100Base_T supported
- Available web services: Web server, Modbus TCP



(A) M12 4-pin socket D coded

Function	Plug-in connector pin no.	Colour
TX+	1	Yellow
RX+	2	white
TX-	3	orange
RX-	4	blue

6.2.4 EG_Profibus



(A) M12 5-pin socket B Coded

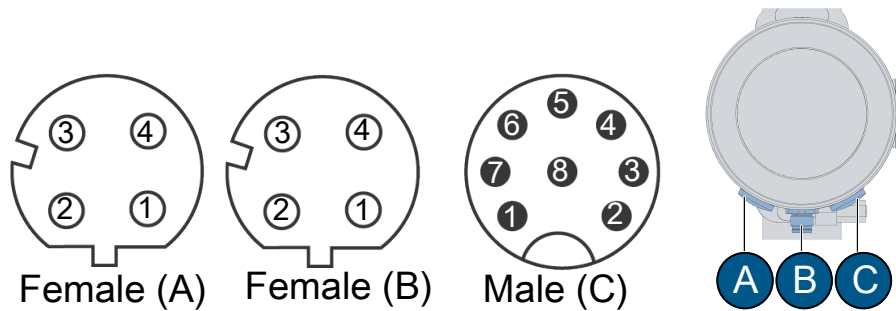
Function	Plug-in connector pin no.	Colour
5V	1	brown
PB_A	2	white
GND	3	blue
PB_B	4	Black

(B) M12 5-pin plug B Coded

Function	Plug-in connector pin no.	Colour
5V	1	brown
PB_A	2	white
GND	3	blue
PB_B	4	Black

(C) M12 8-pin plug A Coded

Function	Plug-in connector pin no.	Colour
GND	1	white
24V	2	brown

6.2.5 EG_Profinet**(A) Port 2 M12 4-pin socket D Coded / (B) Port 1**

Function	Plug-in connector pin no.	Colour
TX+	1	Yellow
RX+	2	white
TX-	3	orange
RX-	4	blue

(C) M12 8-pin plug A Coded

Function	Plug-in connector pin no.	Colour
GND	1	white
24V	2	brown

6.3 Connection at a distance

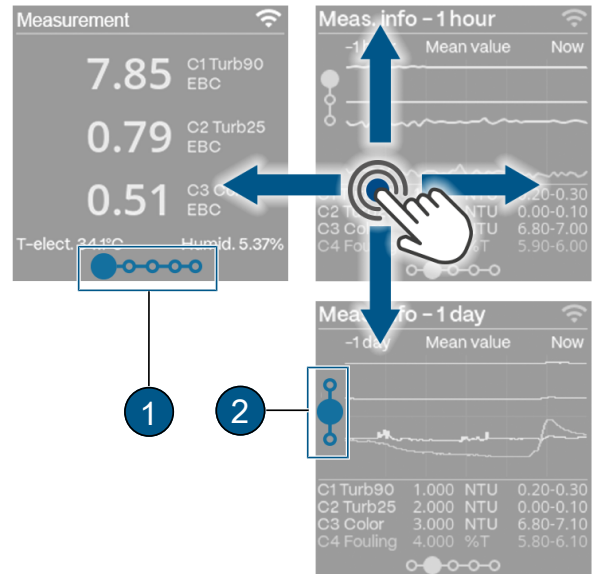
With the standard cable (0.2 mm²) maximum distances of 100 m are possible. For longer distances, the cable cross-section must be increased so that the cable resistance does not exceed 10 ohms.

7 Operation

The most important operating data can be viewed on the local display. Parametrisation is carried out via a WLAN-capable device

7.1 Display

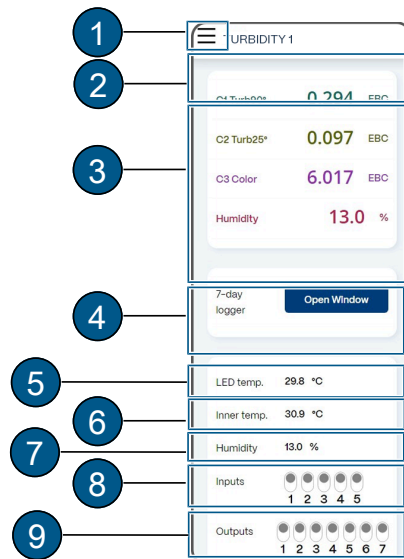
Navigation is carried out using swipe gestures. Navigation aids are located at the bottom (1) and left (2). If there is no activity, the display switches to the default display after one minute. The content depends on the device configuration. Example:



7.2 SIGRIST-Webinterface

The content depends on the device configuration. Example:

- (1) Menu settings
- (2) Status
- (3) Current measured values
- (4) 7 day logger diagram
- (5) LED temperature
- (6) Sensor internal temperature
- (7) Sensor humidity
- (8) Status inputs
- (9) Status outputs

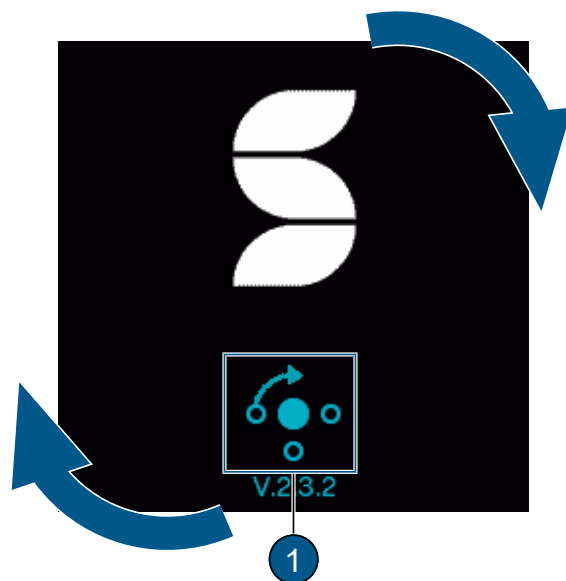


8 Commissioning

- ▶ Ensure correct mounting and electrical installation.
- ▶ Ensure that the process line is filled with sample medium.
- ▶ Establish service voltage.
 - ▷ Start screen appears.

Rotate display if necessary

- ▶ Tap the rotary symbol (1).
- ▷ Display rotates by 90°.
- ▶ Repeat until the display is in the correct position.



Activate WiFi access point

- ▶ Navigate to «WiFi Access Point».
- ▷ WiFi access point is activated.



Connect mobile device

NOTICE!

No VPN connection must be active on the mobile device.

- ▶ Connect the mobile device to the WLAN with the QR code.
- ▶ Confirm the warning "No Internet connection" with [OK].
 - ▷ The mobile device is connected.

Alternative:

- ▶ Connect the mobile device to the WLAN.
- ▶ Select the displayed SSID.
- ▶ Enter the displayed access code.
- ▶ Confirm the warning "No Internet connection" with [OK].
 - ▷ The mobile device is connected.



Sigrist-Webinterface Open

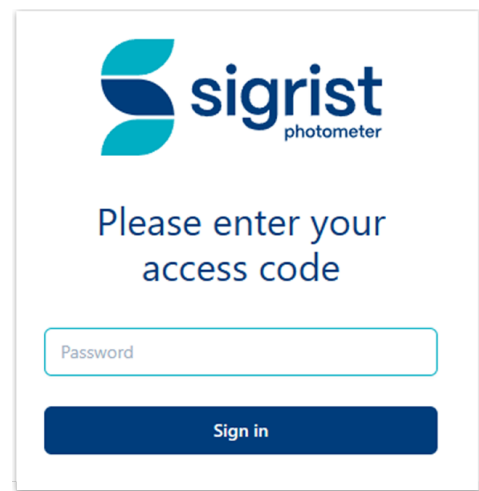
- ▶ Open Internet browser (e.g. Chrome, Safari).
- ▶ Enter the displayed URL (192.168.10.1).
 - ▷ Login screen appears.

Alternatively, access URL with QR code.



Log in to Sigrist-Webinterface

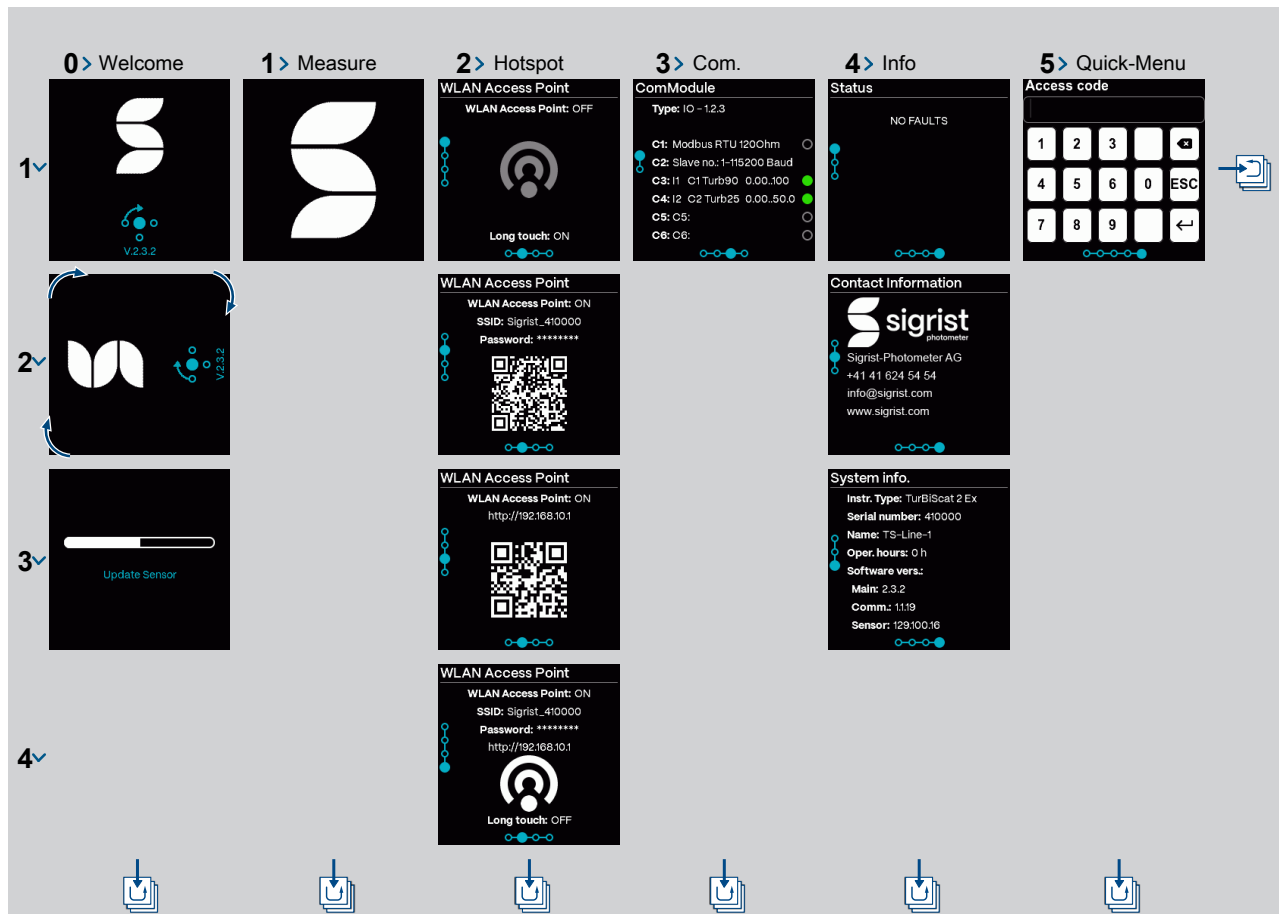
- ▶ Log in without password with **[Sign in]** .
- For detailed information, see instruction manual.



9 Settings

9.1 Displays

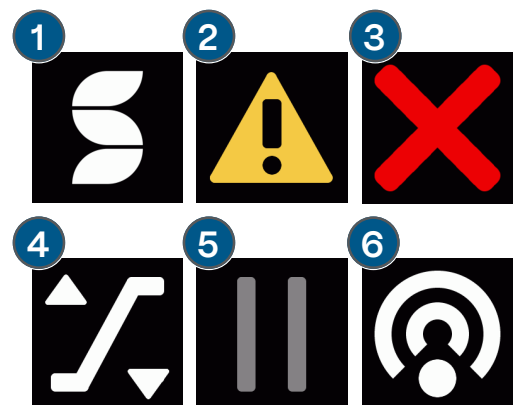
Navigation is carried out using swipe gestures. Navigation aids are located at the bottom and on the left. If there is no activity, the display switches to the standard display after one minute.



Displays on the photometer

Status displays

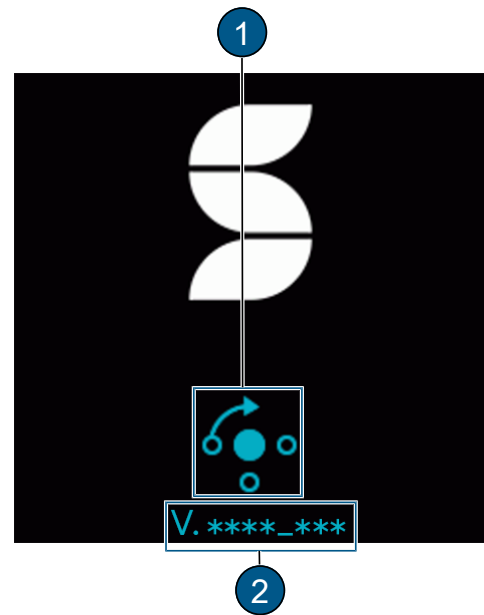
- (1) Device in measuring mode, no malfunction.
- (2) Warning
- (3) Error
- (4) Limit value
- (5) Pause (service mode)
- (6) Base station active



9.1.1 Menu 0: Start display

Start display

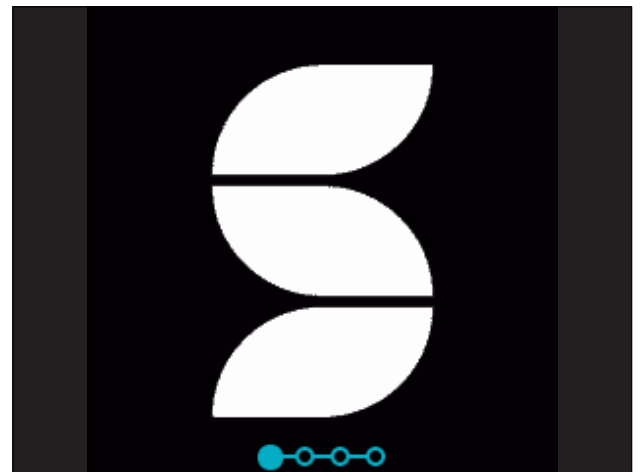
- (1) Symbol for rotating the display
- (2) Software version



9.1.2 Menu 1: Measurement displays

Measuring mode

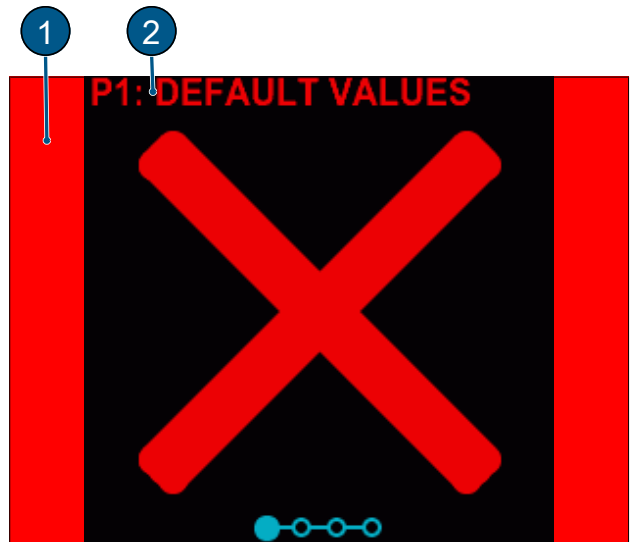
The Sigrist symbol indicates that the photometer is in measuring mode. The measured values can be read out via the Sigrist-Webinterface [▶ 29](#).



Fault

The photometer indicates an error. Details can be read out via Sigrist-Webinterface [\[► 29\]](#).

- (1) Side bars are coloured red.
- (2) Fault indication in the display

**Warning**

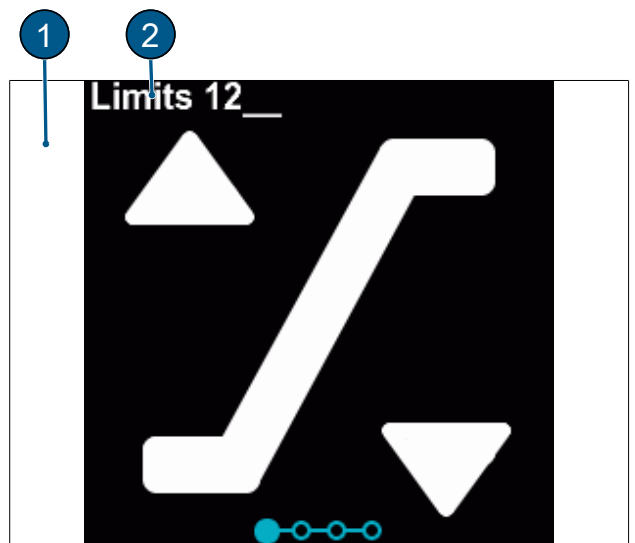
The photometer shows a warning. Details can be read out via Sigrist-Webinterface [\[► 29\]](#).

- (1) Side bars are coloured yellow.
- (2) Warning indication in the display

**Limit values exceeded/not reached**

The photometer has exceeded/fallen below the limit values. Details can be read out via Sigrist-Webinterface [\[► 29\]](#).

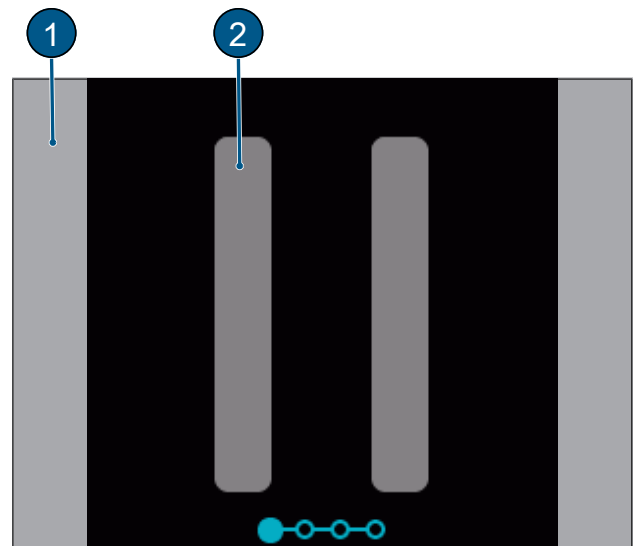
- (1) Side bars are coloured white.
- (2) Indication in the display which channels have exceeded/fallen below the limits.



Pause (service mode)

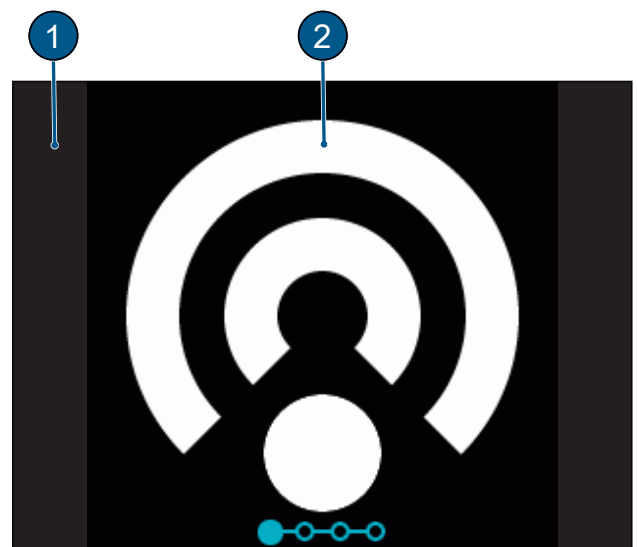
The photometer is in service mode (active access web interface) and shows the pause status. The measured value acquisition is paused. As soon as service mode is exited, this display disappears.

- (1) Side bars are coloured grey.
- (2) Pause status is displayed.

**WLAN base station active**

If the WLAN base station (for connection with mobile device) is activated, this is shown on the measurement display.

- (1) Side bars are not coloured.
- (2) WLAN base station is active.

**9.1.3****Menu 2: WLAN base station****WLAN**

Establish WLAN connection during Commissioning.

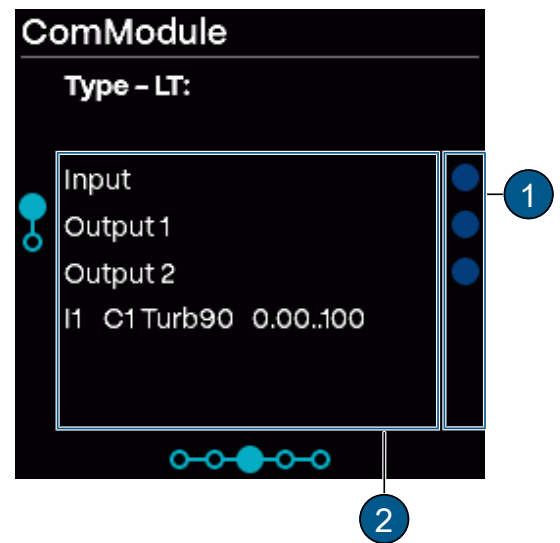


9.1.4 Menu 3: Communication module

LT module:

(1) Module status: Grey → Inactive/Blue → Active in idle mode/Green → Active/Red → Error

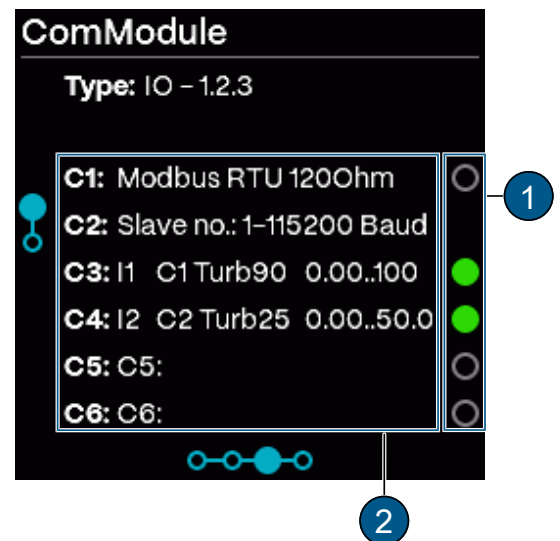
(2) Assigned function: Can be parametrised



IO module:

(1) Module status: Grey → Inactive/Blue → Active in idle mode/Green → Active/Red → Error

(2) Assigned function: Can be parametrised

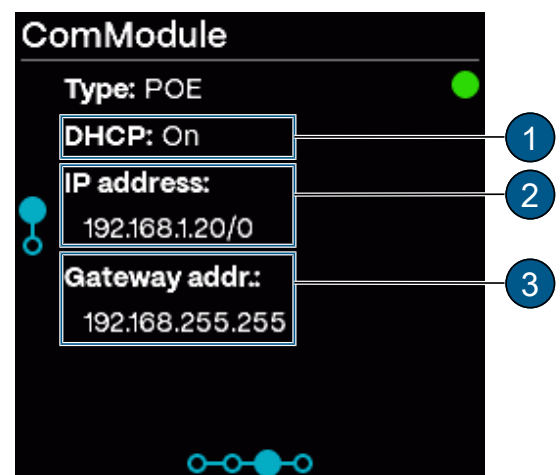


PoE module:

(1) DHCP: On/Off

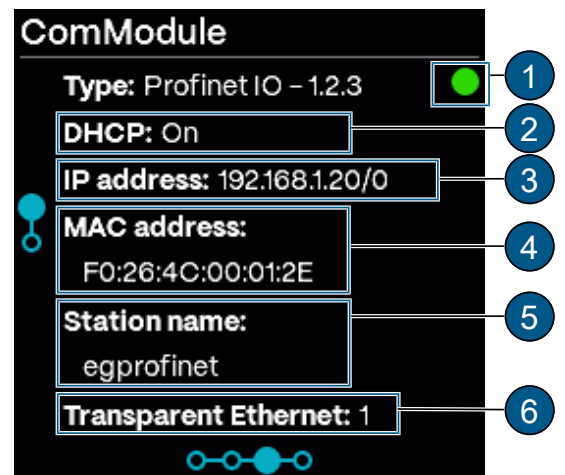
(2) Assigned IP address

(3) Gateway address

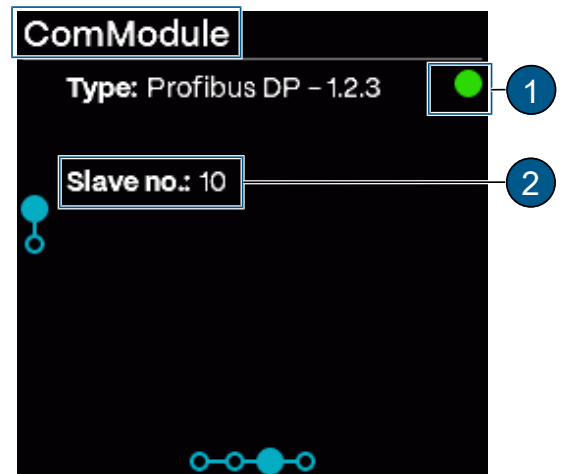


Profinet IO module:

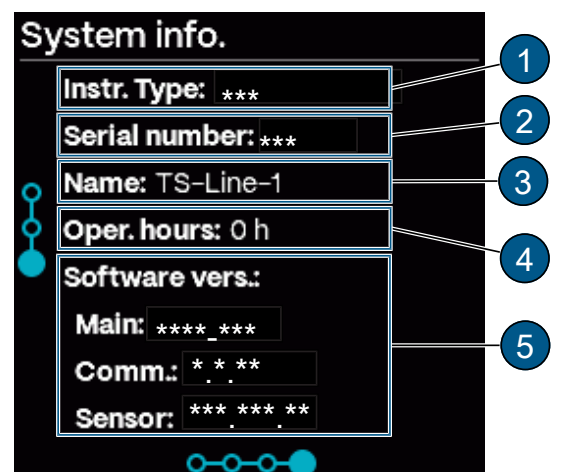
- (1) Module status: Grey → Inactive/Blue → Active in idle mode/Green → Active/Red → Error
- (2) DHCP: On/Off
- (3) Assigned IP address
- (4) MAC address
- (5) Station name of the device
- (6) Transparent Ethernet: 1: Sigrist web server/0: Web server of gateway module

**Profibus DP module:**

- (1) Module status: Grey → Inactive/Blue → Active in idle mode/Green → Active/Red → Error
- (2) Slave no.

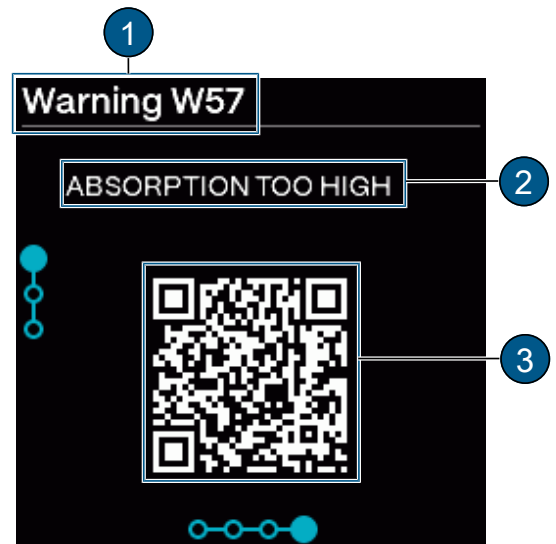
**9.1.5****Menu 4: Information****System info**

- (1) Device type
- (2) Serial number
- (3) Designation of the measuring station/device
- (4) Oper. hours: Operating hours (h)
- (5) Software version:
- Main controller
 - Communication controller
 - Sensor controller



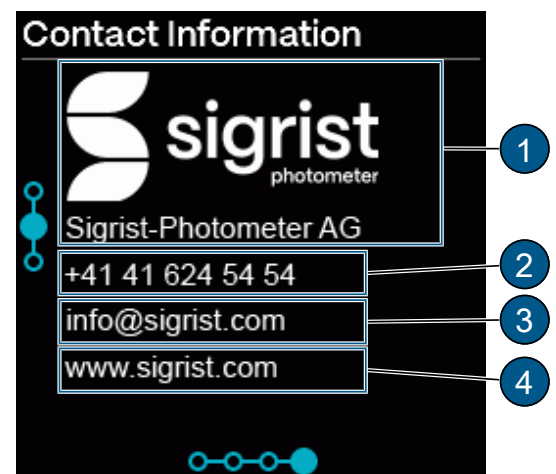
Status

- (1) Fault/warning code
- (2) Error/warning message
- (3) QR code for fault description

**Contact information**

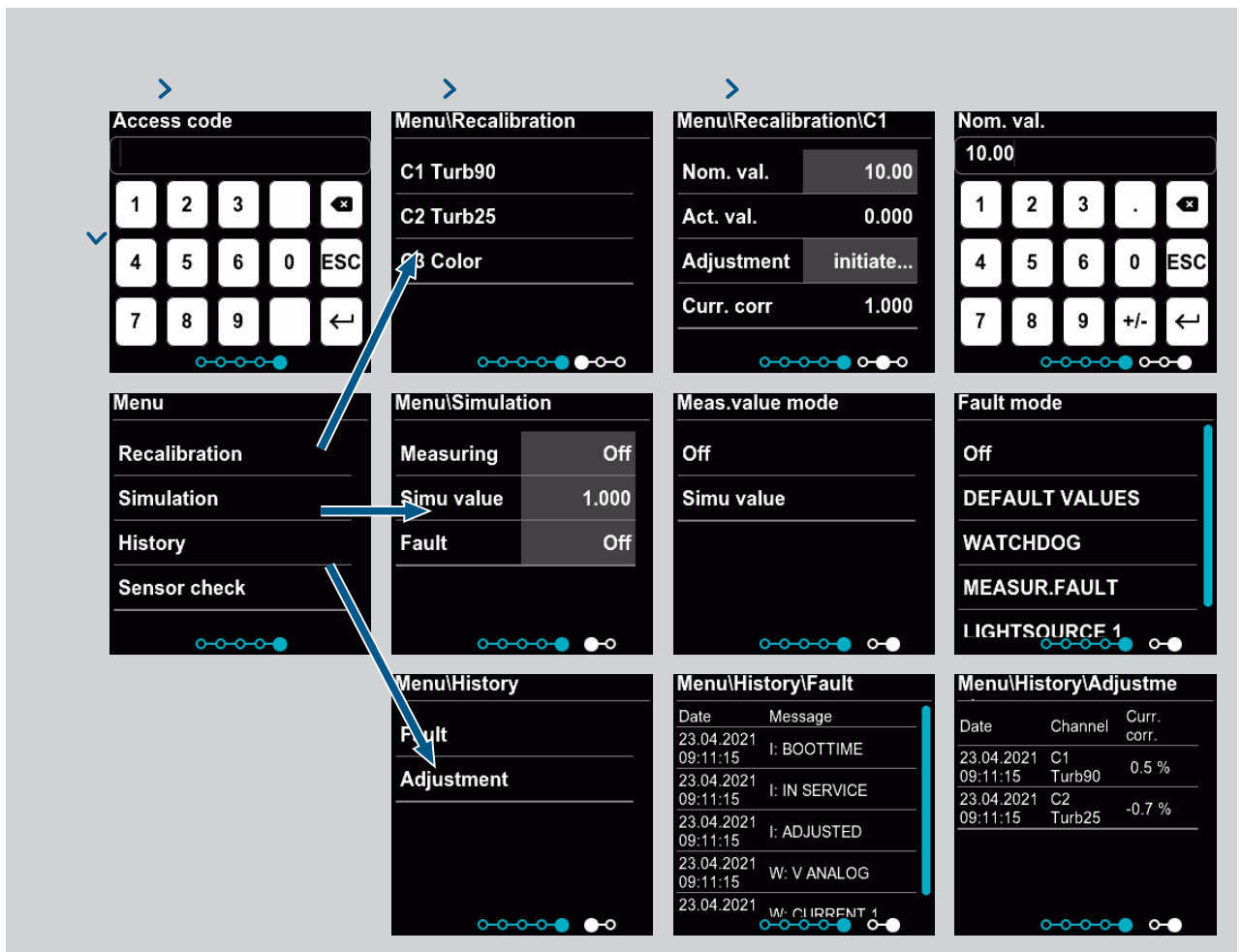
For display customisation, see System menu.

- (1) Manufacturer of the device
- (2) Telephone number of the supplier
- (3) Email address of the supplier
- (4) Web address of the supplier



9.1.6 Menu 5: Quick menu

The most important functions can be set directly on the photometer in the integrated quick menu. More detailed functions are set at Sigrist-Webinterface [▶ 29](#).



Quick menu overview

Access to the quick menu

On delivery, the access code is "0". This should be adjusted after initial commissioning in the menu «Simple configuration mode / Configuration / Access code».

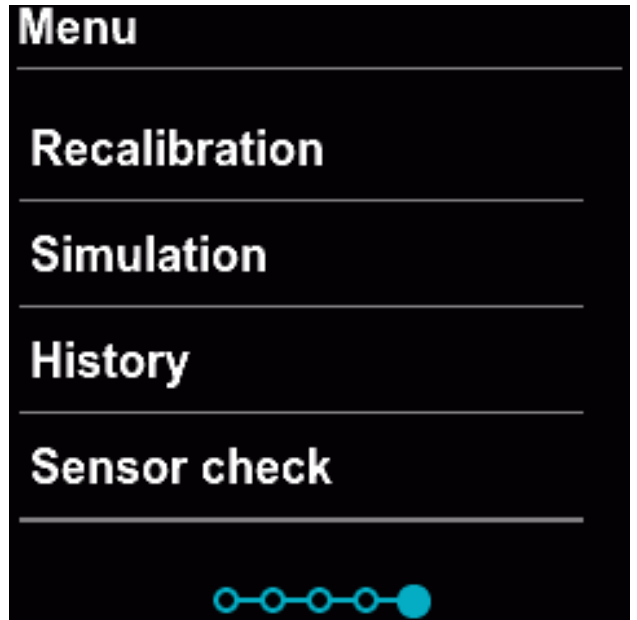
► Enter the access code (service code).

► Confirm with  .



Select setting

- ▶ Select the desired setting.
- ▶ Enter the setting.

**Navigate**

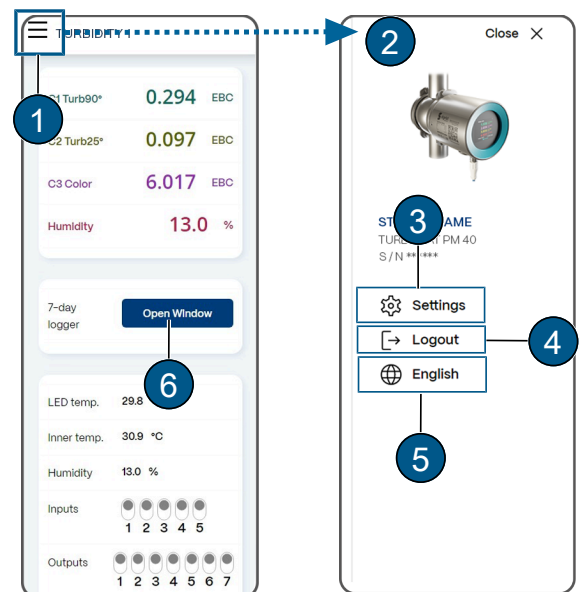
You can navigate within the quick menu with your finger. Swipe to scroll and tap to select a menu item. To exit the quick menu, swipe from left to right until you are back in the main menu.

9.2 Sigrist-Webinterface

9.2.1 Homepage

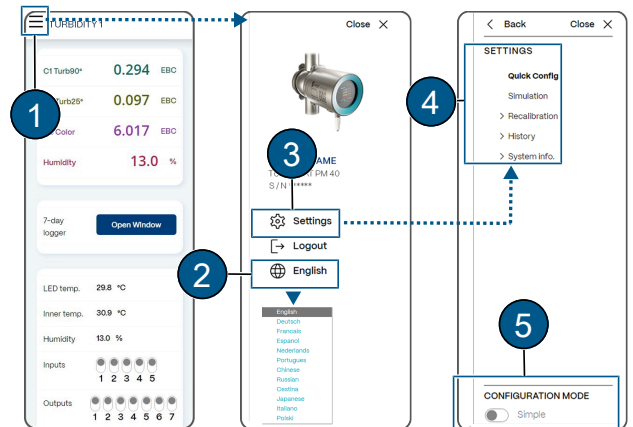
After logging in, the Sigrist-Webinterface appears in measuring mode. The content depends on the device configuration. Example:

- (1) Open menu
- (2) Start menu
- (3) Settings for the photometer Simple [▶ 36](#)/Advanced [▶ 36](#) configuration mode
- (4) Log in/log out
- (5) Change language
- (6) Open logger diagram



9.2.2 First steps

- ▶ Open menu (1).
- ▶ Select «language» (2).
- ▶ Select [settings] (3).
 - ▷ The Simple Configuration Mode (4) appears (Advanced Configuration Mode (5))



9.3 Simple configuration mode

9.3.1 Menu: Configuration

	Parameter	Values	Default value
	«WLAN region» Select the region in which the device is operated. WLAN channels 1...11 are used in the USA. Channels 1...13 are used in other countries	List of regions	USA
	«System time» Apply the date and time.	Adjust...	
	«Image rotation» Orientation of the display.	0°, 90°, 180°, 270°	0°
	«Access code» Enter access code (numbers only). Used to protect against unauthorised access.	...	0
	«Designation» Enter the name of the measurement point identification in the Sigrist-Webinterface (max. 13 characters).	...	

9.3.1.1 EG_LT communication module

Only available with communication module EG_LT.

	Parameter	Values	Default value
	«0/4mA...20 mA» Set current range for measured value output.	0...20 mA/4...20 mA	4...20 mA
	«For service» Set the measured value output in service mode.	0 Value/Last value	Last value
	«Max. value» Set the highest possible current value at the measured value output. Current values above 20.0 mA correspond to more than 100% measured value of the current measuring range.	20...21 mA	21 mA
	«If fault» Set the current value to be output in the event of an error (only relevant for current range 4...20 mA).	0...4 mA	2 mA

Current output 1

	Parameter	Values	Default value
	«Source n» List of available sources. To reduce power supply, set power output terminals that are not needed to Inactive .	K1...Kn/Humidity/Inactive	Cn
	«Measuring range n» Set from...to values of the measuring range.	-5000...1E9	Log: 0...3/Lin: 0...100

9.3.1.2 Communication module EG_IO

Only available with communication module EG_IO.

Parameter

Values

Default value



«Function»

Connection to SICON/SiDis
0/4...20 mA output
*) Own settings

Select parametrisation templates:

Connection to SICON/SiDis:

- IO 1: RS485 A
- IO 2: RS485 B
- IO 3...6 Inactive

0/4...20mA Outputs_ [▶ 32](#):

- IO 1: Digital output - warning, error, priority
- IO 2: Digital output - Inactive
- IO 3: Current output channel 1
- IO 4: Current output channel 2
- IO 5: Current output channel 3
- IO 6: Current output channel 4

*) Further settings can be made in the Advanced parametrisation mode [▶ 36](#).

Connection to SICON/SiDis

Parameter

Values

Default value

All other parameters can be set on the SICON/SiDis or mobile device.

0/4...20 mA outputs

Parameter

Values

Default value



«0/4mA...20 mA»

0...20 mA/4...20 mA

4...20 mA

Set current range for measured value output.



«For service»

0 Value/Last value

Last value

Set the measured value output in service mode.



«Max. value»

20...21 mA

21 mA

Set the highest possible current value at the measured value output. Current values above 20.0 mA correspond to more than 100% measured value of the current measuring range.



«If fault»

0...4 mA

2 mA

Set the current value to be output in the event of an error (only relevant for current range 4...20 mA).

Power output 1...n

Parameter

Values

Default value



«Source n»

K1...Kn/Humidity/Inactive

Cn

List of available sources. To reduce power supply, set power output terminals that are not needed to **Inactive**.

Parameter	Values	Default value
 «Measuring range n» Set from...to values of the measuring range.	-5000...1E9	Log: 0...3/Lin: 0...100

9.3.1.3 Communication module EG_PoE

Only available with EG_PoE communication module.

Parameter	Values	Default value
 «DHCP» Automatic assignment of IP addresses. • DHCP On: Assigned IP address, gateway address and subnet mask are displayed. • DHCP Off: Enter IP address, gateway address, subnet mask and DNS server manually.	On/Off	On
 «IP address» Enter IP address.	XXX.XXX.XXX.XXX	192.254.1.1
 «Gateway addr.» Enter gateway address.	XXX.XXX.XXX.XXX	192.255.255.0
 «Sub-net mask» Enter subnet mask.	XXX.XXX.XXX.XXX	255.255.255.0
 «DNS server» Enter DNS server address. Appears if DHCP is set to Off .	XXX.XXX.XXX.XXX	0.0.0.0

9.3.1.4 Communication Module EG_Profinet

Only available with EG_Profinet communication module.

Parameter	Values	Default value
 «Station name» Enter the station name.		
 «DHCP» Automatic assignment of IP addresses. • DHCP On: Assigned IP address, gateway address and subnet mask are displayed. • DHCP Off: Enter IP address, gateway address, subnet mask and DNS server manually.	On/Off	On
 «IP address» Enter IP address.	XXX.XXX.XXX.XXX	169.254.1.1
 «Gateway addr.» Enter gateway address.	XXX.XXX.XXX.XXX	169.254.1.0
 «Sub-net mask» Enter subnet mask.	XXX.XXX.XXX.XXX	255.255.255.0

	Parameter	Values	Default value
	«DNS server» Enter DNS server address. Appears if DHCP is set to Off .	XXX.XXX.XXX.XXX	0.0.0.0

	«Profinet transparent mode» - On: SIGRIST web server and Modbus TCP can be accessed via Profinet connection. - Off: Web server of gateway module (HMS) is accessible. NOTICE! Automatically set to "On" after device startup.	On/Off	On
---	--	--------	----

9.3.1.5 Communication module EG_Profibus

Only available with communication module EG_Profibus.

	Parameter	Values	Default value
	«Slave no.» Enter slave number.	1 ... 126	1

9.3.2 Menu: Simulation

	Parameter	Values	Default value
	«Measuring value mode» Simulate measuring value at outputs. Each measuring value has its own multiplication factor to the basic simulation value (basic simulation value: Static = 1, Dynamic 1...2). With Simu value , an individual basic value can be specified.	Off/Static/Dynamic/Simu value	Off
	«Simu value » If the Simu value function is set in the Measured value mode menu, the value specified here is applied as the basic simulation value.	...	1000
	«Fault mode» Simulate fault messages at the digital interfaces.	Off/List of errors	Off
	«Power output terminals» Specific values output at power output terminals.	Off/0...20 mA	Off
	«Outputs» Output specific states at digital outputs.	Off/All Off/All On/1...n On	Off

9.3.3 Menu: Recalibration

Submenu: Recalibration K1...Kn

	Parameter	Values	Default value
	«Set point» Value of recalibration medium.	-	0
	«Actual value» Current measured value.	Current measured value	-

	Parameter	Values	Default value
	«Adjustment» Triggers the adjustment. Calculates a new correction factor from the actual and nominal values.	Trigger...	-
	«Act.corr» Specifies the current correction factor, which corrects the deviation from the factory calibration.	0,500...2000	1,000

9.3.4 Menu: History

History\ Fault

	Parameter	Values	Default value
	«Fault» View recorded warnings, faults, prio faults and information.	-	-

History\ Adjustment

	Parameter	Values	Default value
	«Adjustment» View chronologically recorded adjustment values.	-	-

9.3.5 Menu: System info

	Parameter	Values	Default value
	«Device type» View the device type.	<i>Device name</i>	
	«Serial number» View the serial number. This number is important when contacting customer service.	<i>Device-specific</i>	
	«Operating hrs.» View the operating hours since initial commissioning at the factory.	xxx	
	«Version Main» Software version of the main controller.	-	
	«Version Sensor» Software version of the sensor controller.	-	
	«Version Comm» Software version of the communication controller.	-	
	«Version IO» Software version EG_IO, for devices with EG_IO.	-	

	Parameter	Values	Default value
	«Version Web» Software version of the interface for the Sigrist-Webinterface.	-	
	«Update firmware» Check online: With an Internet connection, it is possible to check whether new software is available. A valid DNS server address must be available in the communication module. Select file: Select new firmware. Upload & update: Upload firmware to sensor.	[Check online] [Select file...] [Upload & update]	
	«Reset to factory settings» Restore factory settings.	[Load...]	
	«Support information» Generate zip file with current data and configuration values for support. Generation takes approx. 30 seconds.	[Download]	

System info/Save & restore

	Parameter	Values	Default value
	«Backup» Save parameterization to measuring device. Enter a description according to the software text for identification.	[Create]	
	«Restore» Select one of the displayed configurations: Restore: Load selected version. NOTICE! The current configuration is overwritten and cannot be restored. Download: Download selected configuration. Delete: Delete selected configuration.	[Restore...] [Download...] [Delete...]	
	«Restore challenge» Individual code for loading the factory configuration.	xxxx	

9.4 Advanced configuration mode

9.4.1 Menu: IO module EG_LT

Only available with communication module EG_LT.

IO Configuration\General

	Parameter	Values	Default value
	«0/4mA...20 mA» Set current range for measured value output.	0...20 mA/4...20 mA	4...20 mA
	«For service» Set the measured value output in service mode.	0 Value/Last value	Last value

Parameter	Values	Default value
-----------	--------	---------------



«Max. value»	20...21 mA	21 mA
--------------	------------	-------

Set the highest possible current value at the measured value output. Current values above 20.0 mA correspond to more than 100% measured value of the current measuring range.



«If fault»	0...4 mA	2 mA
------------	----------	------

Set the current value to be output in the event of an error (only relevant for current range 4...20 mA).



«Name ext. in.»	...	External
-----------------	-----	----------

Assign a name to an external input signal (max. 7 characters).



«Prio. ext. inp.»	Off/Warning/Error/ Priority error	Warning
-------------------	--------------------------------------	---------

Assign a priority to the external input signal.

IO1 – Digital input

Parameter	Values	Default value
-----------	--------	---------------



«Digital input»	Inverse/operation serv./sensor check/external	-
-----------------	--	---

Input signal triggers the corresponding function.
Inverse: Invert the functions. So that the function is triggered at signal 0.
Operation/Serv.: Switching between measuring mode and service operation.
Sensor check: Start sensor check.
External: Activate external warning message.

IO2 – 24 V

No parameters.

IO3,4 – Digital output (high-side switch – max. 20 mA)

Parameter	Values	Default value
-----------	--------	---------------



«Digital output»	Inverse/prioritised error/error/warn- ing/service/calibration/sensor check/ humidity/limit value	Prioritised error/error/warning
------------------	--	---------------------------------

When an event occurs, a signal is output to the correspondingly configured IO. If several functions are selected for an output, they are linked with a logical OR, i.e. the signal is output as soon as one of the events occurs.
Inverse: Invert function.
Prioritised error: Active when a prioritised error has occurred.
Fault: Active when a fault has occurred.
Warning: Active when a warning has occurred.
Service: Active when the device is in service mode.
Adjustment: Active when the device is performing an adjustment.
Sensor check: Active when a sensor check is in progress.
Humidity: Active if the humidity limit is exceeded.
Limit: Active when the limit is active. After activation, additional parameters are displayed for defining the limit (here [▶ 37](#)).

Digital output\limit value

This function only appears if the limit value has been activated in the "Digital output" function.

Parameter	Values	Default value
-----------	--------	---------------



«Source»	K1...Kn/ Humidity	-
----------	-------------------	---

Available sources.

	Parameter	Values	Default value
	«Mode» Set whether the limit value function is inactive or should react to undercutting or exceeding the limit value.	Inactive/exceeded/below	Inactive
	«Upper limit» Set upper limit value.	0...999999	1,000
	«Lower limit» Set lower limit value.	0...999999	0,900
	«Cut in delay» Enter the cut-in delay for the respective limit value channel.	0...60000	0 s
	«Cut-out delay» Enter the cut-out delay for the respective limit value channel.	0...60000	0 s

IO5 – Power output (max. 700 Ohm)

	Parameter	Values	Default value
	«Source» Available sources.	K1...Kn/Humidity/Inactive	Inactive
	«Measuring range» From...to values of the measuring range.	Device-specific	Device-specific

9.4.2 Menu: IO module EG_IO

Only available with communication module EG_IO.

IO configuration\ IO 1...6

The assigned functions vary depending on the selection of IO 1...6

Function	IO 1	IO 2	IO 3	IO 4	IO 5	IO 6
Modbus RTU 120 Ω	RS485 A	RS485 B				
Modbus RTU	RS485 A	RS485 B				
Digital input (5...28V)	x	x				
Digital output (high-side switch – max. 20 mA)	x	x	x	x		
Current output (max. 700 Ω)			x	x	x	x

IO configuration\General

	Parameter	Values	Default value
	«0/4mA...20 mA» Set current range for measured value output.	0...20 mA/4...20 mA	4...20 mA

	Parameter	Values	Default value
	«For service» Set the measured value output in service mode.	0 Value/Last value	Last value
	«Max. value» Set the highest possible current value at the measured value output. Current values above 20.0 mA correspond to more than 100% measured value of the current measuring range.	20...21 mA	21 mA
	«If fault» Set the current value to be output in the event of an error (only relevant for current range 4...20 mA).	0...4 mA	2 mA
	«Name ext. in.» Assign a name to an external input signal (max. 7 characters).	...	External
	«Prio. ext. inp.» Assign a priority to the external input signal.	Off/Warning/Error/ Priority error	Warning
Modbus RTU 120Ohm/Modbus RTU			
	«Function» Parameters are assigned to the functions and can be configured as required. ¹⁾ The Off function disables the function. • Modbus RTU with 120 Ω (with matching resistor) • Modbus RTU (without matching resistor)	¹⁾ Off/Modbus RTU 120 Ω /Mod- bus RTU/digital input/digital output/ power output	Channel-specific
	«Sigi-Link» Activate interface parameters for the connection to SICON/SiDis.	Off/On	Off
	«Slave no.» Define the slave number with which the photometer is addressed in the control system.	1...240	1
	«Baud rate» Set the baud rate of the Modbus interface (baud rate in bits/s).	4800/9600/19200/38400, 57600/115200/230400 baud	115200 baud
	«Parity» Set the parity bits of the Modbus interface.	None/even/odd	Even
	«Stop bit» Set the number of stop bits of the Modbus interface.	1/2	1

Digital output (high-side switch – max. 20 mA)

Parameter	Values	Default value
«Digital output»	Inverse/prioritised error/error/warning/service/calibration/sensor check/humidity/limit value	Prioritised error/error/warning



When an event occurs, a signal is output to the correspondingly configured IO. If several functions are selected for an output, they are linked with a logical OR, i.e. the signal is output as soon as one of the events occurs.

Inverse: Invert function.

Prioritised error: Active when a prioritised error has occurred.

Fault: Active when a fault has occurred.

Warning: Active when a warning has occurred.

Service: Active when the device is in service mode.

Adjustment: Active when the device is performing an adjustment.

Sensor check: Active when a sensor check is in progress.

Humidity: Active if the humidity limit is exceeded.

Limit: Active when the limit is active. After activation, additional parameters are displayed for defining the limit (here).

Digital input (5...28V)

Parameter	Values	Default value
«Digital input»	Inverse/operation serv./sensor check/external	-



Input signal triggers the corresponding function.

Inverse: Invert the functions. So that the function is triggered at signal 0.

Operation/Serv.: Switching between measuring mode and service operation.

Sensor check: Start sensor check.

External: Activate external warning message.

Power output terminal (max. 700 Ω)

Parameter	Values	Default value
«Source»	K1...Kn/ Humidity/Inactive	Inactive



Available sources.

«Measuring range»	Device-specific	Device-specific
-------------------	-----------------	-----------------



From...To Values of the measuring range.

Digital output\limit value (IO 1...4)

This function only appears if the limit value has been activated in the "Digital output" function.

Parameter	Values	Default value
«Source»	K1...Kn/ Humidity	-



Available sources.

«Mode»	Inactive/exceeded/below	Inactive
--------	-------------------------	----------



Set whether the limit value function is inactive or should react to undercutting or exceeding the limit value.

«Upper limit»	0...999999	1,000
---------------	------------	-------



Set upper limit value.

**«Lower limit»**

0...999999

0,900

Set lower limit value.

**«Cut in delay»**

0...60000

0 s

Enter the cut-in delay for the respective limit value channel.

**«Cut-out delay»**

0...60000

0 s

Enter the cut-out delay for the respective limit value channel.

9.4.3 Menu: IO module EG_PoESee communication module EG_PoE [▶ 33](#)**9.4.4 Menu: IO module EG_Profibus**See communication module EG_Profibus [▶ 34](#)**9.4.5 Menu: IO module EG_Profinet**See communication module EG_Profinet [▶ 33](#)**9.4.6 Menu: WLAN****WLAN\ General****Parameter****Values****Default value****«WLAN region»**

List of regions

USA

Select the region in which the device is operated. WLAN channels 1...11 are used in the USA. Channels 1...13 are used in other countries

WLAN\ base station**Parameter****Values****Default value****«MAC address»**

F0:26:4C:XX:XX:XX

Device-specific

Displays the MAC address of the WLAN access point.

**«SSID»**

XXXXXX

Device-specific

Displays the SSID of the WLAN base station.

**«Deactivate after»**

...

300 s

If there is no active connection, the WLAN access point is deactivated after the set time.

**«Password»**

XXXXXX

Enter the password for the WLAN access point.

9.4.7 Menu ConfigurationSee Simple Configuration Model\ Configuration [▶ 31](#)**9.4.8 Menu: Display**

Display\ General

	Parameter	Values	Default value
	«Values» Selection of the measured value display in the graphic display.	Min. value/Max. value/Average value	Mean value
	«For service» Value shown in the graphic display during service mode.	0 Value/Last value	Last value
	«Image rotation» Set the orientation of the display on the photometer.	0°/90°/180°/270°	0°
	«Display brightness» Set the brightness of the display on the photometer. NOTICE! Low brightness reduces power consumption and extends the life of the display.	0...100 %	50%
	«Power-saving mode» Time period after which the display brightness on the photometer is reduced without manipulation.	0...65535 s	300 s

Display\ channel D1 ... Dn

Settings refer to the display in the web user interface (not on the device).

	Parameter	Values	Default value
	«Source» Sequence of the measuring channels as they are to be shown in the display. The source refers to the channels defined in the «Meas. Channels» menus.	K1...Kn/Humidity/Inactive	Inactive
	«Resolution» Set the number of decimal places after the decimal point to be used for displaying measured values.	1/1.2/1.23/1.234	1,234
	«Min. auto» Activate automatic scaling of the graphic display to the minimum value.	On/Off	Off
	«Min. value» Set the minimum value of the graphic display when automatic scaling is switched off	0...999999	0,000
	«Max. auto» Activate automatic scaling of the graphic display to the maximum value.	On/Off	On
	«Max. value» Set the maximum value of the graphic display when automatic scaling is switched off.	0...999999	1,000

9.4.9 Menu: Simulation

See Simple parameterization mode/Menu: Simulation [▶ 34](#)

9.4.10 Menu: Recalibration

See Simple parameterization mode/Menu: Recalibration [▶ 34](#)

9.4.11 Menu: System

	Parameter	Values	Default value
	«Mandatory operation» Time period after which the device automatically returns to measuring mode without manipulation (mandatory operation). This prevents the measuring device from remaining in service mode for any length of time and no relevant measured value/ limit value being output.	60 s...60000 s	900 s
	«OTA update sends extended diagnostic data» During an online firmware update, operating hours, temperatures, voltages, light source intensities and the error history are transmitted.	On/Off	On
	«Contact information» Enter line 1 of the contact information (max. 47 characters).	...	Sigrist-Photometer AG
	«Contact information» Enter line 2 of the contact information (max. 47 characters).	...	Switzerland
	«Contact information» Enter line 3 of the contact information (max. 47 characters).	...	+41 41 624 54 54
	«Contact information» Enter line 4 of the contact information (max. 47 characters).	...	info@sigrist.com

9.4.12 Menu: Meas. Channels

Meas. Channels\Channel K1...Kn

	Parameter	Values	Default value
	«Offset» Offset value is added to the measured value.	-5000...999999	0,000
	«Scaling» Set the scaling factor for a customer-specific unit of measurement or for adaptation to laboratory values. The scaling factor is multiplied by the measuring value. The unit can be set separately, e.g. E = 1,000, EBC = 25,000, etc. with Set unit ▶ 43 .	Device-specific	-
	«Integration» Set the integration time for the forming of measured values. The integration is done via a low-pass filter. The set integration time corresponds to the step response of the measured value from 0...90 %.	0...60000 s	10 s
	«Designation» Enter the name to identify this channel (max. 7 characters).	...	Channel-specific
	«Unit» Set character string for a customer-specific unit (max. 7 characters).	...	-

9.4.13 Menu: Special functions

	Parameter	Values	Default value
	«Temp. warning» View the limit for the OVER.TEMP. warning.	-	69 °C
	«Humidity warning» Viewing the limit for the HUMIDITY warning.	-	12 %

9.4.14 Menu: Measuring info

	Parameter	Values	Default value
	«Measurement info» View various values of the current measuring mode. Measured values K1...Kn/indoor temperature/humidity value/+5 V analogue voltage/+2.5 V analogue voltage	-	-

9.4.15 Menu: History

See Simple parameterization mode/Menu: History [▶ 35](#)

9.4.16 Menu: System info

See Simple parameterization mode/Menu: System info [▶ 35](#)

9.5 Field bus

9.5.1 General requirements

- The computer or the control system must be compatible with the bus system Modbus RTU/TCP, Profibus DP or Profinet IO.
- The photometer must be equipped with the appropriate communication module.

9.5.2 Fault codes

The fault codes apply to all field bus versions. The fault description and corresponding measures can be found here [▶ 52](#).

No fault	Prioritised faults	Fault	Warnings
0: NO FAULTS	1: DEFAULT VALUES 3: CRC EXPERTS 4: CRC USER 5: CRC DISPLAY 63: SOFTWARE VER-SION	8: SERIAL 1 9: SERIAL 2 10: SERIAL 3 16: U ANALOG 17: MEASURING FAULT 19: LIGHT SOURCE 1 77: HUMIDITY	2: WATCHDOG 27: RECALIBRATION 29: OVER.TEMP 30: HUMIDITY 33-40: CURRENT 1 ... 8 41: TEMP. SENSOR 43: EXTERNAL ON 53: IO_PORT 78: SERVICE 82: BATTERY

EXTERNAL (43) can be configured by the user as a warning, fault or prioritised error.

9.5.3 Modbus RTU/TCP

9.5.3.1 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».

9.5.3.2 Modbus TCP general

- The EG_POE module or the EG_Profinet module with active transparent mode must be integrated. Alternatively, the Modbus TCP interface is available on the WLAN interfaces.
- The communication runs on port 502.

- Only one Modbus TCP connection may exist at the same time. An unused connection is terminated after 30 seconds.

9.5.3.3 Address 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.

The following values can be read using Modbus function 4:

Register	Address	Data type	Function	Values
30001	0x0000	Unsigned integer bits 15...0	Status	Fault codes
30002	0x0001	Unsigned integer bits 15...0	Source Progress Limit	Bits 0-7 : Value 0=Local; 1-8: Slave Bits 0-7: With LabScat progress Bits 8-15: Limit status
30003	0x0002	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 1	
30004	0x0003	Real 32-bit Intel single precision bits 31...16		
30005	0x0004	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 2	
30006	0x0005	Real 32-bit Intel single precision bits 31...16		
30007	0x0006	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 3	
30008	0x0007	Real 32-bit Intel single precision bits 31...16		
30009	0x0008	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 4	
30010	0x0009	Real 32-bit Intel single precision bits 31...16		
30011	0x000A	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 5	
30012	0x000B	Real 32-bit Intel single precision bits 31...16		
30013	0x000C	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 6	
30014	0x000D	Real 32-bit Intel single precision bits 31...16		
30015	0x000E	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 7	
30016	0x000F	Real 32-bit Intel single precision bits 31...16		
30017	0x0010	Real 32-bit Intel single precision bits 15...0	Measuring value Channel 8	
30018	0x0011	Real 32-bit Intel single precision bits 31...16		
30019	0x0012	Real 32-bit Intel single precision bits 15...0	Math channel 1	
30020	0x0013	Real 32-bit Intel single precision bits 31...16		

Register	Address	Data type	Function	Values
30021	0x0014	Real 32-bit Intel single precision bits 15...0	Math channel 2	
30022	0x0015	Real 32-bit Intel single precision bits 31...16		
30055	0x0036	Unsigned integer 32-bit bits 15-0	Serial no.	Serial number
30056	0x0037	Unsigned integer 32-bit bits 31-16		
30057	0x0038	Unsigned integer 32-bit bits 15-0	SW vers.	Software version (4 bytes): major version, minor version, patch, build
30058	0x0039	Unsigned integer 32-bit bits 31-16		

9.5.4 Profibus-DP

- The EG_Profibus module must be integrated. This supports the DP-V1 standard.
- The connection to the Profibus master must be established.
- If the device is used as an end device, the bus must be correctly terminated.
- The slave number must be set in the "EG_Profibus IO module" menu.
- The correct GSD file (SIG11D4.gsd) must be loaded in the Profibus master, the required modules must be plugged in and the associated variables must be defined.

9.5.5 Profinet-IO

- The EG_Profinet module must be integrated. This supports conformance class B.
- The connection to the Profinet master must be established.
- The interface parameters must be set in the «**EG_Profinet communication module**» menu. Alternatively, these can be set using a Profinet configuration tool.
- The correct GSDML file (GSDML-V2.44-Sigrist-Photometer AG-EG_Profinet-20240621.xml) must be loaded in the Profinet master, the required modules must be plugged in and the associated variables must be defined.
- If «**Profinet transparent mode**» is active, the device's web server can be accessed. If the mode is inactive, the web server of the gateway module (HMS) can be accessed for diagnostic purposes.

9.5.6 Profibus-DP/Profinet-IO data

The data is divided into 15 input and 3 output modules. Only the first two modules are required for the basic functionality. The individual modules can be omitted and assigned to any slots.

The implementation is identical for all Sigrist devices. Depending on the device type, not all data is used.

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		
	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		
Status 3...4	2xByte	2	In	Status of measuring value 3...4		
Status 5...8	4xByte	4	In	Status of measuring value 5...8		
Status 9...16	8xByte	8	In	Status of measuring value 9...16		
Status 17...24	8xByte	8	In	Status of measuring value 17...24		
Diagnosis	SIInt	1	In	Humidity		
	SIInt	1	In	Electronics temperature		
	SIInt	1	In	Heater temperature		
	SIInt	1	In	Soiling		
Control In	Byte	1	In	Live inverse		
	Byte	1	In	Operating mode		
Control In	Byte	1	In	Start (LabScat)		
	Byte	1	In	Lin table (LabScat)		
Config In	Byte	1	In	Integration 1...8		

Module name	Data type	Byte size	In/Out	Description	Min.	Max.
	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	GW hysteresis *)		
Config Limits In	8xReal	32	In	Limit value 1...8		
Config Limits In	Real	4	In	Scaling 1		
	Real	4	In	Flow rate GW		
	Real	4	In	Soiling GW		
Control Out	Byte	1	Out	Live inverse	0	255
	Byte	1	Out	Operating mode	0	4
Control Out	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
Config Out	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	GW hysteresis*)	0	100
Config Limits Out	8xReal	32	Out	Limit value 1...8	-5000	1.00E+09
Config Limits Out	Real	4	Out	Scaling 1	0.1	10
	Real	4	Out	Flow rate GW	-10	20000
	Real	4	Out	Soiling GW	0001	1000

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

All available measuring values (meas. channels, math channels, analogue channels) are output in sequence under "Meas. values 1...n".

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. On the one hand, a live bit (module: status – bit 7), which alternates between 0 and 1 every second. If this 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). Write access to the photometer must be permitted for this function. This can be enabled via the menu "IO module EG_Profi/Control -> External".

10 Servicing

⚠ CAUTION

Unit damage due to lack of maintenance



Lack of or inadequate maintenance as well as the use of non-original Sigrist spare parts may damage the device and lead to measurement errors.

- ▶ Always carry out servicing work according to the servicing schedule.
- ▶ Only use original Sigrist spare parts.
- ▶ In case of high strain or rough environmental influences, shorten servicing intervals and replace wear parts more frequently.

10.1 Maintenance schedule

The maintenance interval must be adjusted according to the environmental conditions.

Recommendation:

When	What	Action	Who
Annual/ "Humidity" warning	Desiccant	Replace	Operator
Annual	Sensor head	Cleaning	Operator
	Manual adjustment	Check calibration	Operator
	VARINLINE® housing seals	Replace	Operator

10.2 Replace desiccant

NOTE



Condensation inside the electronics

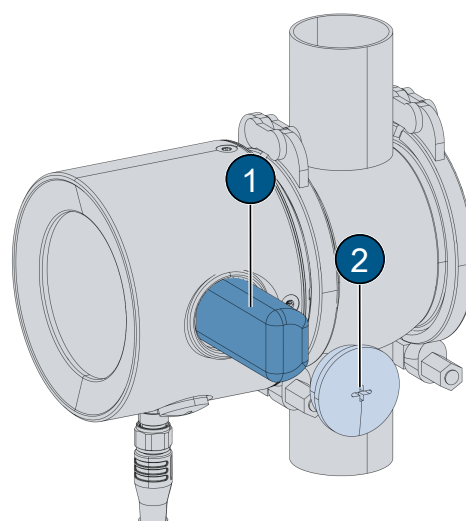
When the sample medium is cold, humidity can condense when the unit is opened and damage the electronics.

- ▶ Only open the photometer when the medium temperature is $\geq$ room temperature.



If the desiccant is changed frequently, have the seal checked by a service technician.

- ▶ Remove cover (2) with a Phillips screwdriver.
- ▶ Replace desiccant (1).
- ▶ Fit cover (2) immediately.



10.3 Cleaning

The appliance is designed for CIP (Cleaning in Place) and does not need to be removed for cleaning in the system.

- ▶ Do not use aggressive cleaning agents or chemicals that may affect the contact surface of the material with the product.

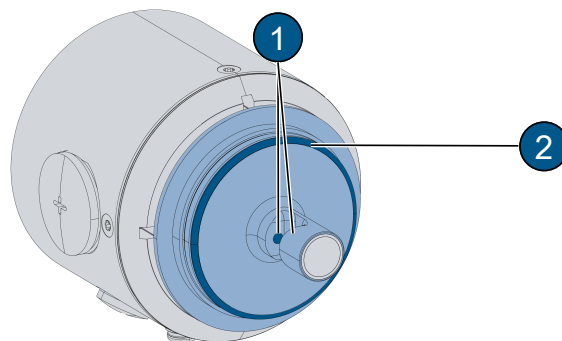
- For applications outside the food industry, the cleaning interval must be adapted to the medium.

10.3.1 Clean sensor head

WARNING!

Do not remove the photometer without first draining the process line!

- Dismantling the photometer.
- Clean the sapphire window (1) with a mild, abrasive-free cleaning agent (e.g. alcohol or soap). Use a soft, non-fraying cloth for this purpose.
- If necessary, replace O-ring (2).
- Install the photometer.



10.4 Manual adjustment

DANGER

Skin or eye damage due to leaking medium

Unprotected skin or eye contact with medium can cause skin or eye damage.

- Wear protective goggles and gloves.
- Wash hands after work.



10.4.1 Calibration check, general

- A recalibration leads to deviations from the previous measuring value.
- A zero medium (e.g. distilled water) is used for the calibration.

10.4.1.1 Carrying out zero adjustment

- Clean the sensor head.
- Fill line with zero medium.
- Open the «**Settings/recalibration**» menu.
- Check the set point. **Must be 0.**
- Press **[Trigger]** recalibration.
 - ▷ The recalibration is started.
 - ▷ Recalibration successful.

If recalibration is faulty:

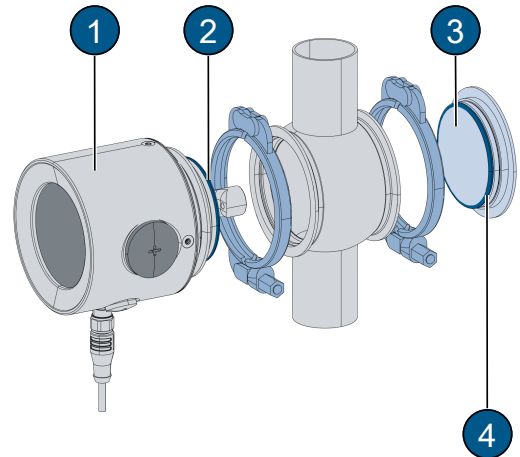
- Check window soiling on the sensor.
- Check the test medium for air bubbles.
- Check set point values.
- Trigger recalibration again.
- If recalibration is unsuccessful, contact your local representative.

10.5 Replace seals (VARINLINE® connection)

WARNING!

Do not remove the photometer without first draining the process line!

- ▶ Remove photometer (1) and sealing plate (3).
- ▶ Replace seal (2) on the sensor head.
- ▶ Replace seal (4) on sealing plate (3).
- ▶ Fit photometer (1) and sealing plate (3).



10.6 Spare parts

Spare parts are available online.

<https://www.sigrist.com/Turbidity-Meters-Analyzers-Liquid/PhaseGuard-ST-40/Parts>



11 Troubleshooting

11.1 Isolate faults

Malfunction	Measure
No display	▶ Check service voltage.
Error message in display	▶ Analyse error message (Warning/error/priority messages).
Measured value seems wrong	▶ Ensure correct operating conditions of the sample medium. ▶ Check calibration. ▶ Check correct mounting. ▶ Ensure that servicing duty has been carried out correctly. ▶ Perform sensor check.

11.2 Warning/(Prio) error messages

In the event of a fault, a corresponding status symbol (1) is displayed.

Warning messages

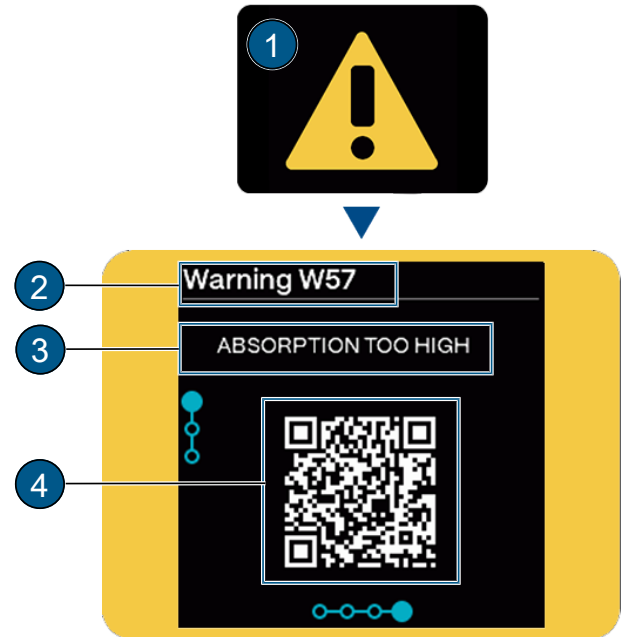
- System remains in operation.
- Evaluate measurement results with caution.
- Warning disappears after the cause has been rectified.
- ▶ Call up QR code (4).
- ▶ Remedy the cause promptly.

(1) Warning status symbol

(2) Warning code

(3) Warning message

(4) QR code



(Prioritised) error messages

- Measured values are set to 0.
- Operation is impossible.
- ▶ Call up QR code (4).
- ▶ Remedy the cause immediately.

(1) Status symbol (prioritised) error

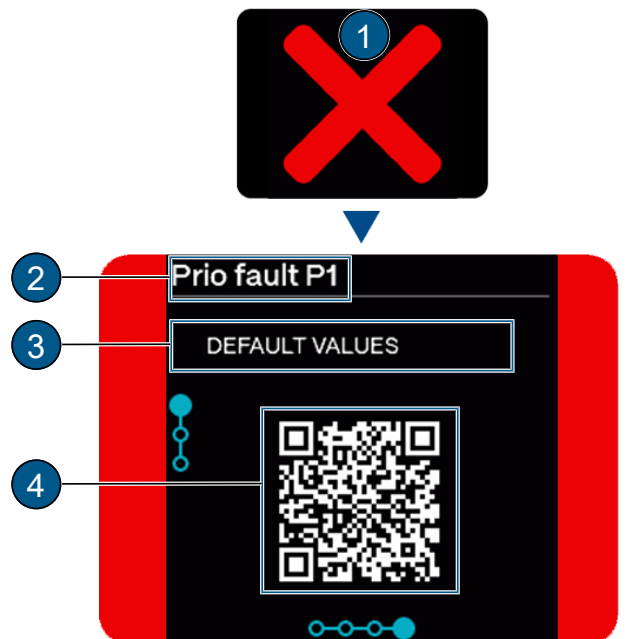
(2) Error code

(3) Error message

(4) QR code

NOTICE!

Prioritised errors must be deleted by a service technician.



11.3 Warning messages

The following warning messages may be displayed during operation.

Code	Message	Cause	Remedy
W2	WATCHDOG	• Internal fault monitoring triggered • Programme has been restarted	• Ensure stable 24 V supply • Exclude EMC influences • Defective electronics • Contact service engineer
W27	RECALIBRATION	• Device is soiled • Set point for recalibration does not match the value of the medium	• Clean measuring cell and control unit if necessary • Check control unit/medium • Check set point • Check light path

Code	Message	Cause	Remedy
W29	OVERTEMP	Temperature in the device has exceeded 69 °C	- Check medium and ambient temperature and adjust if necessary - Repair or install cooling system
W30	HUMIDITY	Relative humidity in the device above the set limit value	- Replace desiccant - Replace housing seal - Localise leaks and rectify defect
W33 ...	CURRENT 1...8	Current output is disturbed	- Open connection terminals - Interruption in the current loop of the measured value output
W40		Contact service engineer	
W41	TEMP.SENSOR	Inner temperature sensor has failed	- Defective electronics - Contact service engineer
W43	EXTERNAL ON	An external event is signalled via a digital input	- Analyse external fault - Check cabling
W78	SERVICE (only with optional SiDis)	Indicates when maintenance is due	Contact service engineer
W82	BATTERY (only with optional SiDis)	Battery level too low	- Set date and time - Replace the battery

11.4 Fault messages

The following fault messages may be displayed during operation.

Code	Message	Cause	Remedy
E8	SERIAL 1	Communication interruption between main controller and sensor board	- Defective electronics - Contact service engineer
E9	SERIAL 2	Communication interruption between main controller and communication module	- Defective electronics - Contact service engineer
E10	SERIAL 3	Communication interruption between main controller and communication module	- Defective electronics - Contact service engineer
E16	U ANALOG	One of the internal analogue voltages is outside the permissible range	- Defective electronics - Contact service engineer
E17	MEASURING FAULT	Measurement value acquisition is disturbed	- Instrument not in process line - Air bubbles present in the medium - Extraneous light near the measuring point (e.g. sight glass) - Defective electronics - Contact service engineer
E19	LIGHT SOURCE 1	Detector for monitoring the light source is not receiving light from the corresponding light source.	- Defective light source - Contact service engineer

11.5 Prio fault messages

The following prio error messages may be displayed during operation.

Code	Message	Cause	Remedy
P1	DEFAULT VALUES	Default values have been loaded	- Defective electronics - Contact service technician
P3	CRC EXPERTS	An error was detected during the check of the expert data.	- Defective electronics - Contact service engineer

Code	Message	Cause	Remedy
P4	CRC USER	An error was detected when checking the user data	Defective electronics Contact service engineer
P5	CRC DISPLAY	An error was detected when checking the display data	Defective electronics Contact service engineer
P63	SOFTWARE VERSION	File system does not match firmware (faulty update)	Repeat update process

12 Specification sheet

Photometer	Values
Service voltage	24 VDC $\pm$ 10 % (EG_PoE according to standard)
Power input	3 W
Max. pressure	1 MPa (10 bar) / 100 °C
Medium temperature	-10...+100 °C ...85 °C at ambient temperature 55 °C ...75 °C at ambient temperature 60 °C 120 °C max. 2 h
Ambient temperature	-10...+50 °C
Ambient humidity	0...100 % relative humidity
Path lengths	PhaseGuard ST 40 - H2XX-0000...: 10 mm PhaseGuard ST 40 - H2XX-8000...: 5 mm
Warm-up time	<3 min.
Material	General: - Housing: Stainless steel 1.4301 / AISI 304 - Sensor head: Stainless steel 1.4404 / AISI 316L - Window: Sapphire - Touchscreen: Soda-lime tempering glass
Dimensions	Ø100.5 x 137 mm
Weight	1.5 kg
Connections	DN 40...DN 150, 1 1/2" ...6" VARINLINE® housing
Protection class	IP66
Certification	EHEDG EL Class I
Display	2.4" display with touchscreen Resolution: 320 x 240 pixels
Cleaning	CIP/SIP compatible up to 120 °C
WLAN module	WLAN according to IEEE 802.11 b/g/n

Measurement	Values
Measuring principle	Extinction
Wavelength	870 nm
Measuring range	0...100 %
Measuring range	Can be configured as required
Temperature stability	$\pm$ 0.05 %/K
Reaction time	<0.3 s with 0 s integration time

Accuracy	Values
Resolution	0.5%
Reproducibility	$\pm$ 1 %
Repeatability	$\pm$ 1 %

Communication modules	Values
LT (standard)	1 current output 0/4...20 mA, max. 700 Ohm 1 dig In, 2 dig Out

Communication modules**Values**

IO	6 configurable inputs/outputs: • Max. 2 digital inputs: 5...28 VDC • Max. 4 digital outputs: High-side switch max. 20 mA • Max. 4 power output terminals: 0/4...20 mA, max. 700 Ohm • Modbus RTU
PoE	Ethernet LAN connection with Power over Ethernet: • SIGRIST web user interface • Modbus TCP • Ethernet according to 10/100BaseT • PoE according to 802.3af, class 0
Profibus	Profibus DP-V1 slave
Profinet	Profinet IO, conformity class B

13 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.

14 Decommissioning/storage

Prepare components for storage

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

- ▶ Dismantling the photometer.
- ▶ Clean sensor head.
- ▶ Check desiccant and replace if necessary.
- ▶ Ensure that all openings on the device are sealed.

Storing the components

Ensure that the following conditions are met for storage:

The components contain electronic parts. Storage must meet the usual conditions for such components. In particular, ensure that the storage temperature is in the range -20 ... +60 °C.

All components that come into contact with the medium during operation must be dry and clean for long-term storage.

All components must be protected from the effects of weather, condensing humidity and aggressive gases during storage.

15 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)

Your service partner

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