

TurBiScat PM 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, set-up, 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 failure to observe the instruction manual.

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 complies with the requirements for affixing the CE marking within the European Union (EU).



EU Declaration of Conformity TurBiScat PM 40

<https://www.sigrist.com/Dokument/?revid=16855>



EU Declaration of Conformity SiDis AD 40

<https://www.sigrist.com/Dokument/?revid=16864>



UKCA Declaration of Conformity

The device meets the requirements for affixing the UKCA marking within the United Kingdom.



UKCA Declaration of Conformity TurBiScat PM 40

<https://www.sigrist.com/Dokument/?revid=16854>



UKCA Declaration of Conformity SiDis AD 40

<https://www.sigrist.com/Dokument/?revid=16863>



2.5 Representation conventions

Symbols and text markings

This document contains various symbols and text markings.

Symbol







Name

Tip

Function

Provides the reader with supporting information about the action currently described.

Symbol	Name	Function
	Action	The triangle marks actions that must be performed in the appropriate order.
	Reaction	The white triangle marks the reaction to an action.
Target group	Cross-reference	Cross-references are used to refer to a page within the document. They are linked and can be executed in electronic form with a mouse click.
	Function editable	The menu function currently described is editable.
	Function read-only	The menu function currently described is read-only.
«Menu»	Menu	«Menus» or «functions» included in the software.
[Ok]	Button	Buttons used for navigation in the SIGRIST-Webinterface.
<i>Device-specific</i>	Placeholder	Stands as a placeholder for unspecified, changing term.

3 Your Safety

3.1 Intended use

The TurBiScat PM 40 and its peripherals are designed for turbidity measurement in liquids. Possible applications can be found in the following areas:

Areas of application

- Food and beverage industry

Applications

- Filtration monitoring in beverages such as beer, fruit juices, spirits
- Monitoring of centrifuges, separators, whirlpools in the beverage industry
- Turbidity measurement in oils, sugar solutions, foodstuffs

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 accessory parts 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.

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 damage the device and render it inoperable.

- ▶ The device may only be connected to voltage sources that match the nameplate.

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 nevertheless come into contact with aggressive chemicals, check it immediately for damage.

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



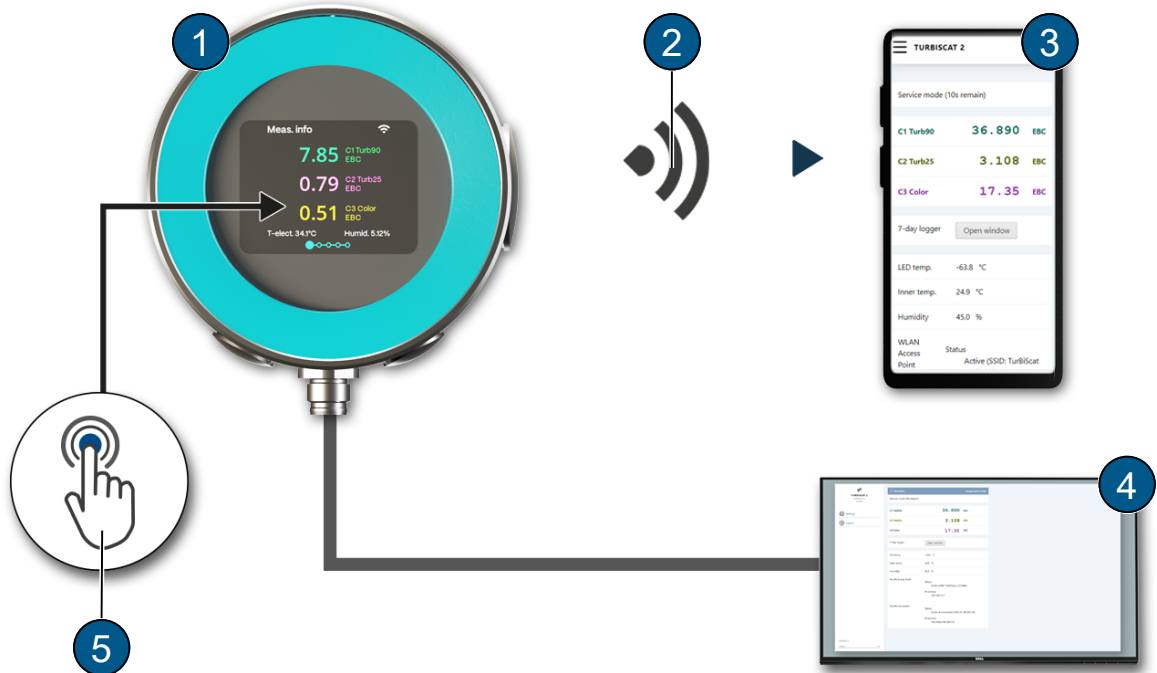
Unauthorised access by third parties may lead to changes in the configuration and incorrect measurements therefore cannot be ruled out.

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

4 Device data

4.1 General view

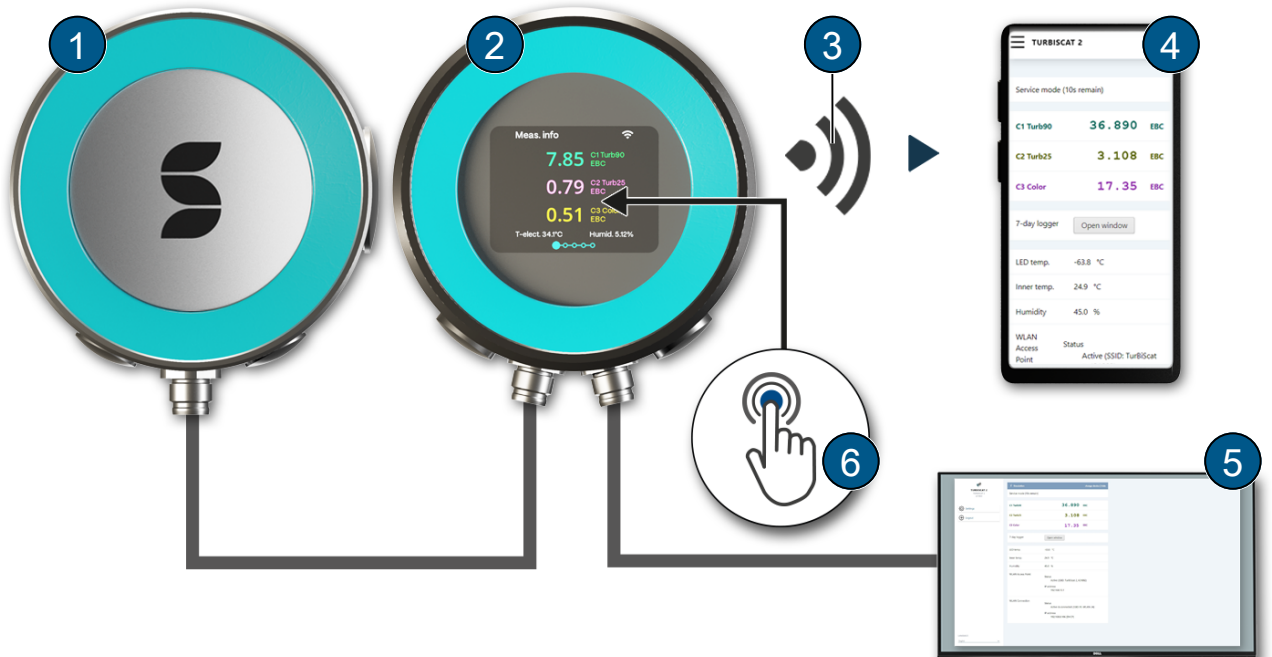
4.1.1 TurBiScat PM 40 with display



TurBiScat PM 40 with display

- (1) TurBiScat PM 40
- (2) WLAN connection
- (3) WLAN input device
- (4) Operating device or control system
- (5) Touchscreen

4.1.2 TurBiScat PM 40 with SiDis AD 40



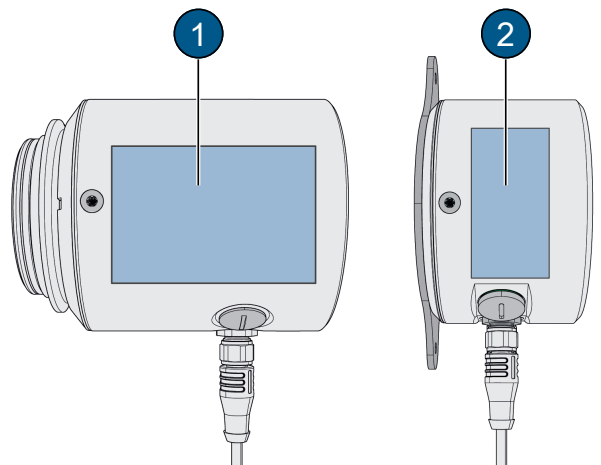
TurBiScat PM 40 with SiDis AD 40

- (1) TurBiScat PM 40 without display
- (2) SiDis AD 40
- (3) WLAN connection
- (4) WLAN input device
- (5) Operating device or control system
- (6) Touchscreen

4.2 Nameplate

The nameplates are placed on the TurbiScat PM 40 **(1)** and SiDis AD 40 **(2)**. They contain:

- Device type
- Type ext.: Device name
- PN: Article number
- SN: Serial number
- U: Service voltage
- P: Power
- DOM: Production date
- Conformity information
- Warning notice
- 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/Turbidity-Meters-Analyzers-Liquid/TurBiScat-PM-40/Parts>



5 Mounting

5.1 General information on mounting

Use detailed dimension drawings for photometer and control device mounting.

- Distance between photometer and stray light sources > 2 m.
- Avoid the formation of gas bubbles on the sensor head by using a suitable fitting position.
- Distance between the photometer and pipe bends and cross-section-changing elements > 1 m.

5.2 Mounting position of the photometer



For vertical fitting, the plugs must point downwards. For horizontal fitting, the plugs should be on the left side.

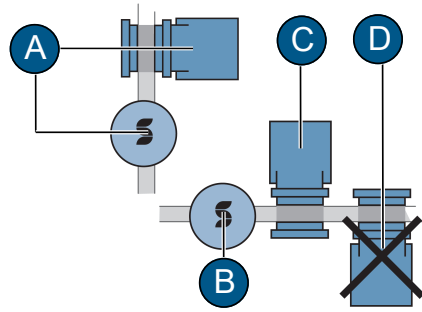
In process line

Fitting position **(A)** and **(B)**: Permitted

Fitting position **(C)**: Permissible under the following conditions:

- Medium temperature:
 - -10 ... +80° C
 - 120° C max. 2 h
 - 150° C max. 1 h
- Continuous medium flow at > 2 bar pressure

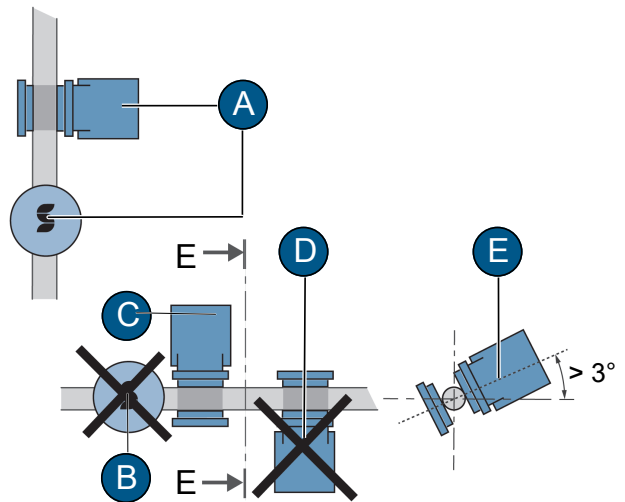
Fitting position **(D)**: Impermissible



EHEDG-compliant

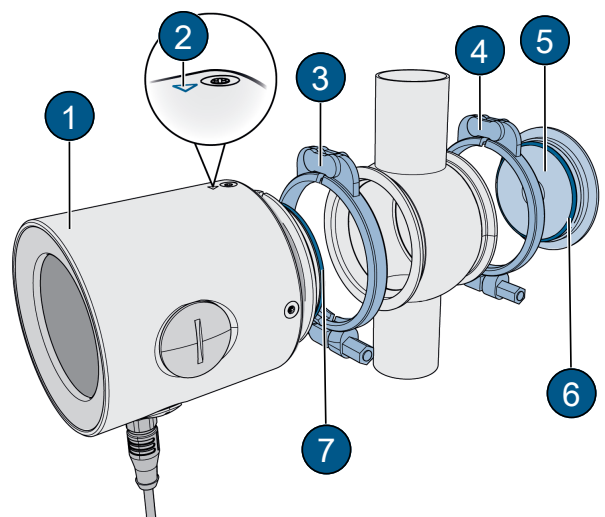
Fitting positions **(A)**, **(C)** and **(E)**: Permitted

Fitting position **(B)** and **(D)**: Impermissible



5.3 Fitting in VARINLINE® connector

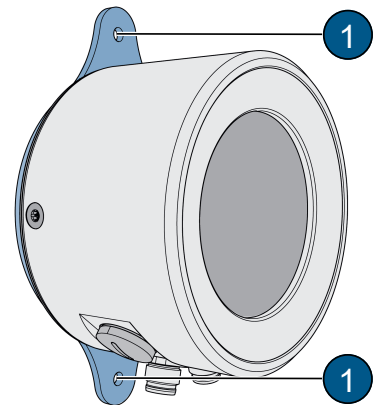
- ▶ Mount photometer **(1)** including seal **(7)** with clamp ring **(3)** on VARINLINE® connector.
- ▶ Make sure that the marking **(2)** points in the flow direction.
- ▶ Mount blanking plate **(5)**, including seal **(6)** with clamp ring **(4)** on VARINLINE® connector.



5.4 Mounting SiDis AD 40

5.4.1 Wall mounting

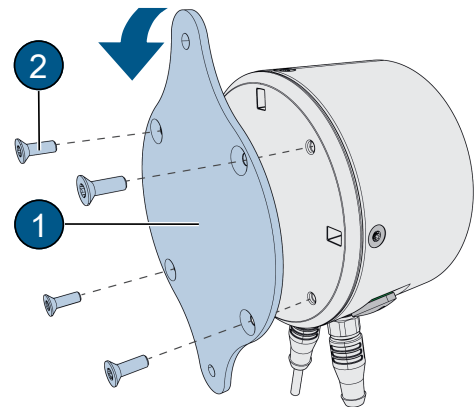
- ▶ Mount SiDis AD 40 on the wall with two screws **(1)** according to the dimension drawing.



5.4.2 Rotate mounting plate

If necessary, the mounting plate can be rotated by 90° as follows:

- ▶ Loosen four screws **(2)**.
- ▶ Turn the mounting plate **(1)** in the desired position.
- ▶ Fasten with four screws **(2)**.



6 Electrical installation

⚠ DANGER

Danger due to improper connection of the operating voltage.

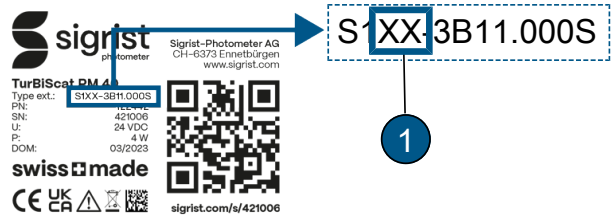
Improper connection of the electrical service voltage can be life-threatening. The system can also be damaged in the process.



- ▶ 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.
- ▶ Use shielded cables and connect the cable shield to earth.

6.1 Determine communication module

The integrated communication module can be seen on the nameplate [▶ 11]. The following codes (1) are possible: IO = EG_IO | PE = EG_PoE | PB = EG_Profibus | PN = EG_Profinet

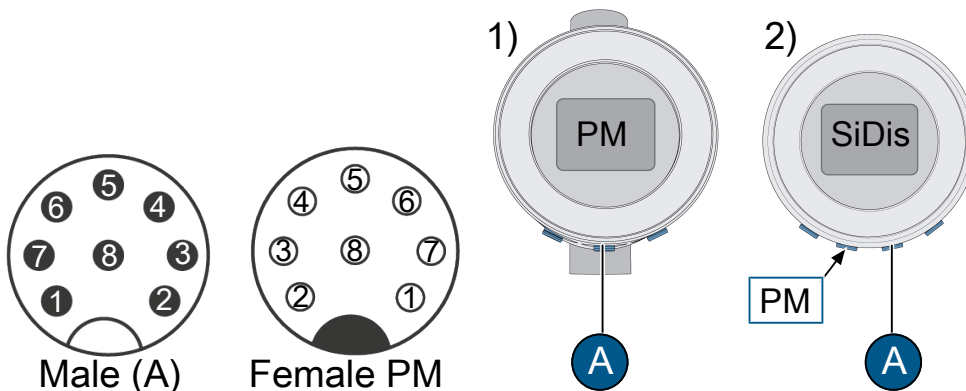


6.2 Photometer connection

A distinction is made between two variants:

- Photometer (PM) with integrated display and connections ¹⁾
- Photometer (PM) without display connected with SiDis AD 40 ²⁾

6.2.1 EG_IO



(A) M12 8-pin connector A Coded

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

RS485 Modbus RTU

Configurable with or without 120 Ω termination.

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

Digital input 5-28 VDC

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

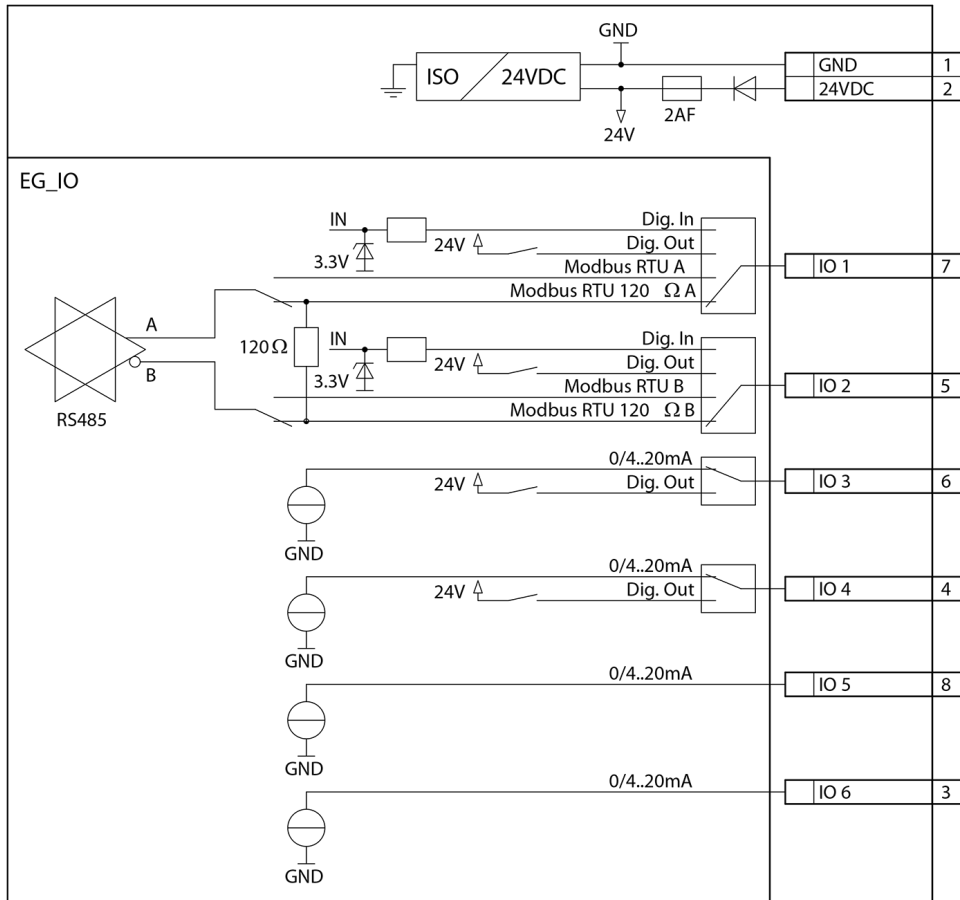
Digital output "High Side Switch" max. 20 mA

Function	Designation	Plug 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

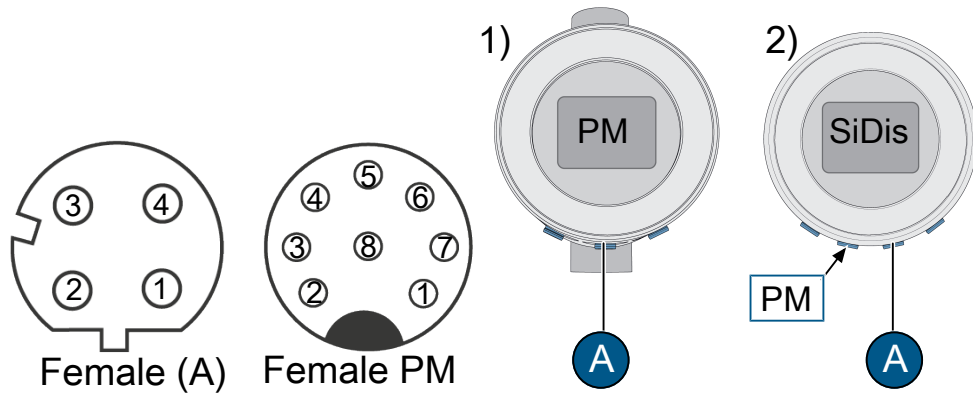
Function	Designation	Plug pin no.	Colour
Current 1	IO3	6	pink
Current 2	IO4	4	yellow
Current 3	IO5	8	red
Current 4	IO6	3	green

Wiring diagram EG_IO



6.2.2 EG_PoE

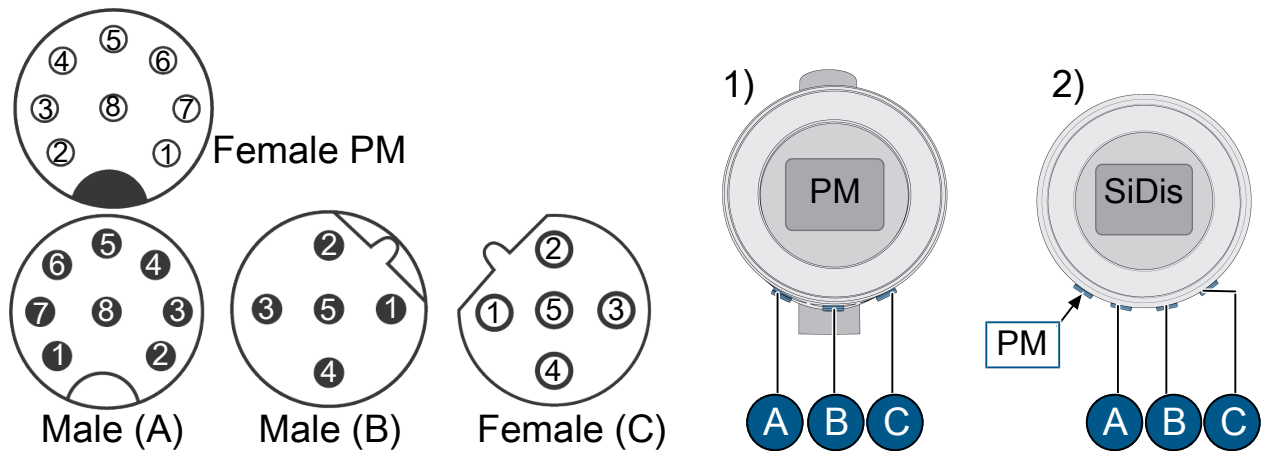
- PoE (802.3af, class 0)
- Cable characteristics: Cat. 6, STP, AWG 24/7, TIA-568A. Fast Ethernet 100Base_T supported
- Available web services: Web server, Modbus TCP



(A) M12 4-pole socket D Coded

Function	Plug pin no.
TX+	1
TX-	2
RX+	3
RX-	4

6.2.3 EG_Profibus



(A) M12 8-pole plug A Coded

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

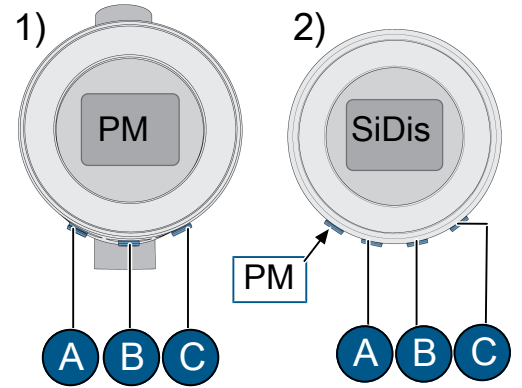
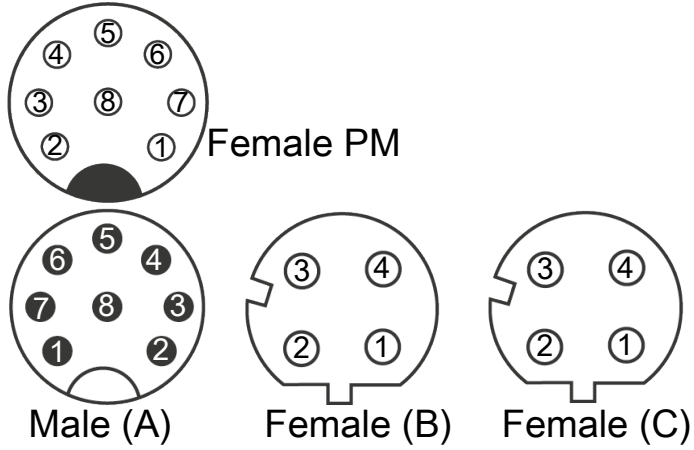
(B) M12 5-pin plug B Coded

Function	Plug pin no.
5V	1
PB_A	2
GND	3
PB_B	4

(C) M12 5-pin socket B Coded

Function	Plug pin no.
5V	1
PB_A	2
GND	3
PB_B	4

6.2.4 EG_Profinet



(A) M12 8-pole plug A Coded

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

(B) Port 1 / (C) Port 2 M12 4-pin socket D Coded

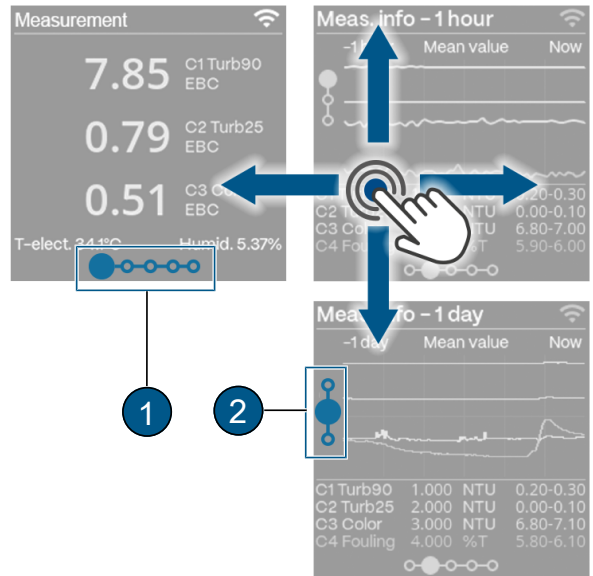
Function	Plug pin no.
TX+	1
TX-	2
RX+	3
RX-	4

7 Operation

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

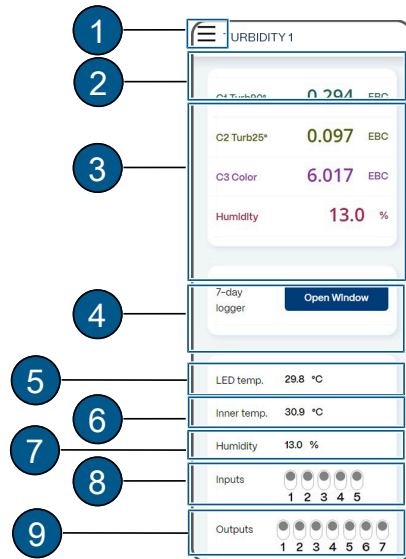
7.1 Display

Navigation is done by swiping gestures. Navigation aids are located at the bottom (1) and on the left (2). Without activity, the display switches to the standard display after one minute.



7.2 SIGRIST-Webinterface

- (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.
- ▶ Establish service voltage.
 - ▷ Start screen appears.

Rotate display if necessary

Rotating the display is only possible in the start-up display.

- ▶ Briefly touch rotation symbol **(1)**.
 - ▷ The display rotates by 90°.
- ▶ Repeat until the display is in the correct position.



Activating the WLAN

- ▶ Navigate to «WLAN connection».
- ▶ Swipe down.
 - ▷ WLAN 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

- ▶ Access URL with QR code.

Alternative:

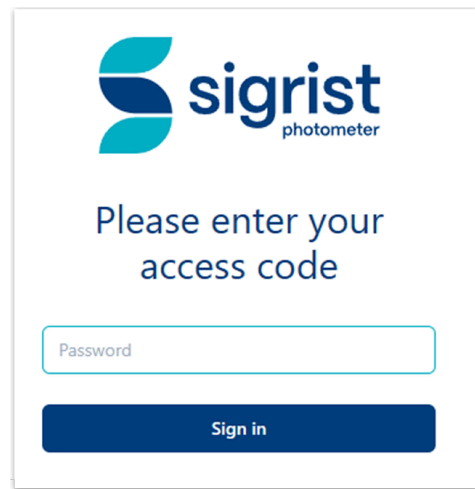
- ▶ Open browser (e.g. Chrome, Safari).
- ▶ Enter the displayed URL (192.168.10.1).
 - ▷ Login screen appears.



Log in to SIGRIST-Webinterface

- ▶ Log in without password.

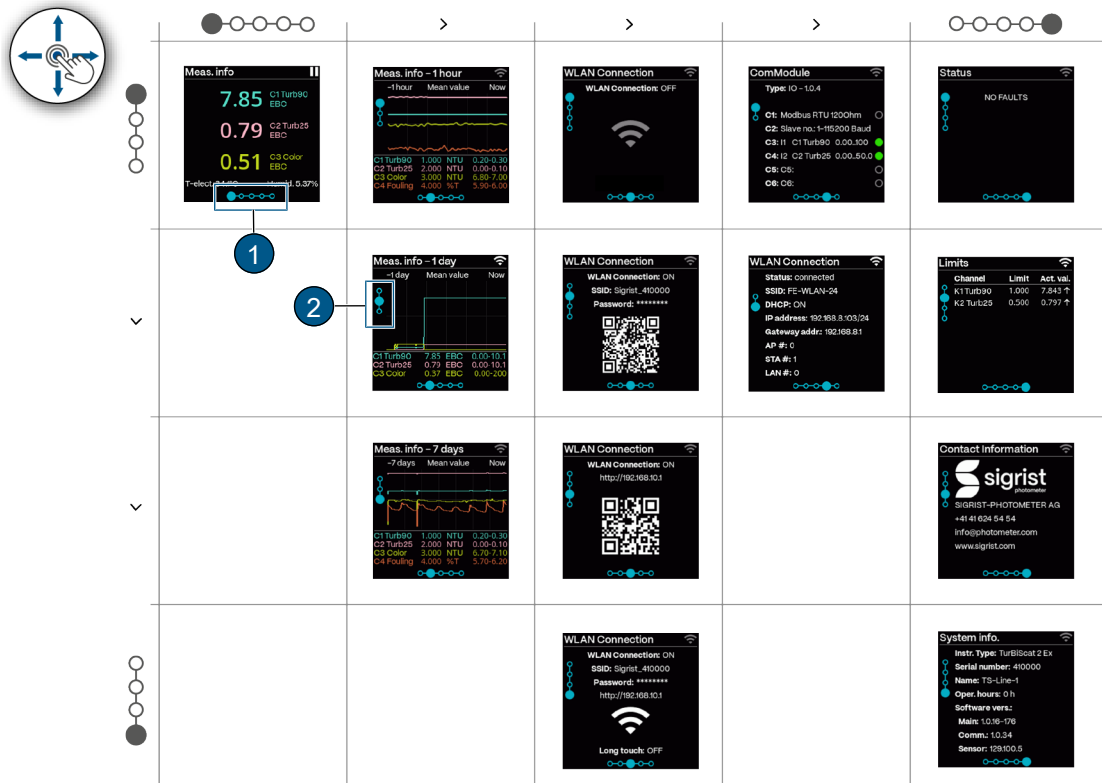
Recommendation: Secure access to the SIGRIST-Webinterface with a password.



9 Settings

9.1 Displays on the photometer

Navigation is done by swiping gestures. Navigation aids are located at the bottom (1) and left (2). Without activity, the display switches to the standard display after one minute.

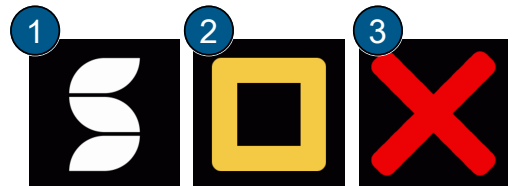


Displays on the photometer

Sensor status

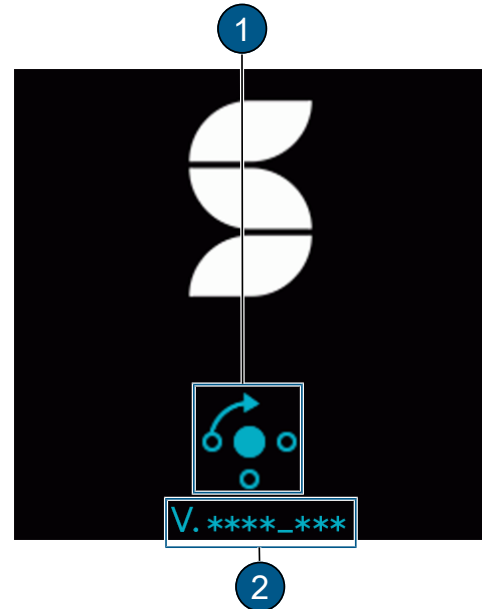
Set standard display see menu Display [▶ 37](#).

- (1) No fault
- (2) Warning
- (3) Error

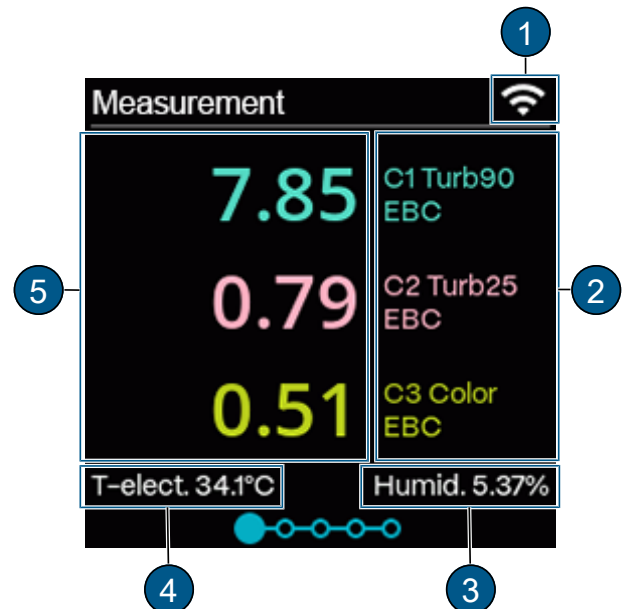


Start display

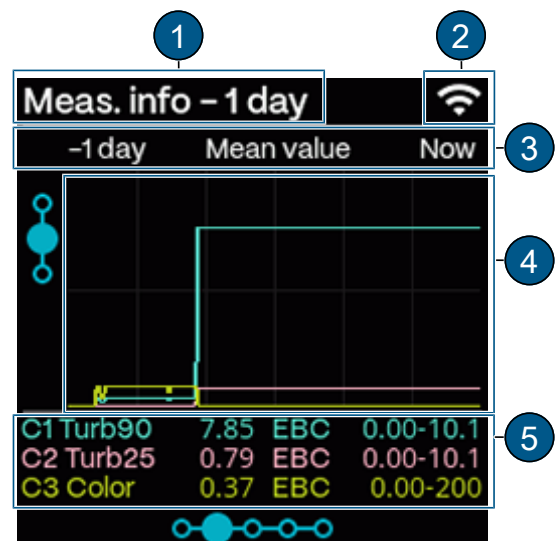
- (1) Symbol for rotating the display [▶ 19] (only possible during start display)
- (2) Software version

**Measurement display**

- (1) WLAN status (Off → grey/ On → light)
- Other symbols: Logger is saving data/ Pause symbol (unit in service)
- (2) Channel name with unit
- (3) Humidity in the sensor
- (4) Temperature in the sensor
- (5) Measured value

**Graphic display**

- (1) Measurement info
- (2) WLAN status (Off → grey/ On → light)
- (3) Period: Function of how the measuring value is displayed.
- (4) Measuring value display with three time periods: 1 hour/ 1 day/ 7 days
- (5) Channel name with measuring value, unit and displayed measuring range.

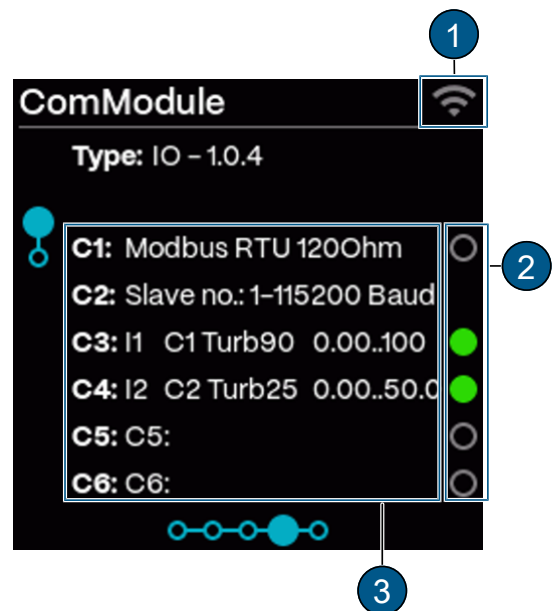


WLAN

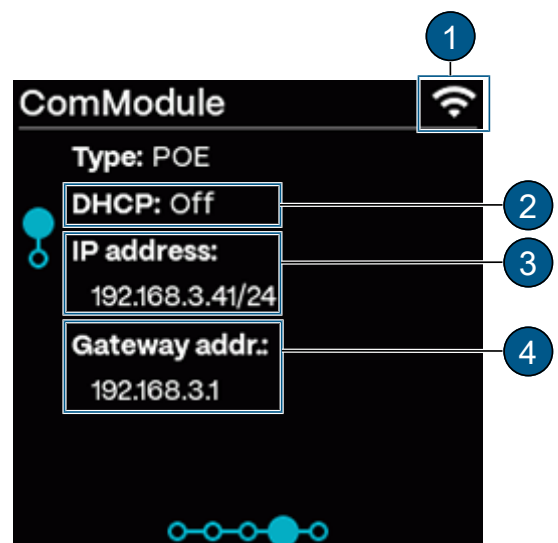
Establish WLAN connection during Commissioning
[▶ 19](#).

**Communication modules (ComModule)****IO module:**

- (1) WLAN status (Off → grey/ On → light)
- (2) Module status: Grey → Inactive/ Blue → Active in idle mode/ Green → Active/ Red → Error.
- (3) Assigned function: Parametrisable

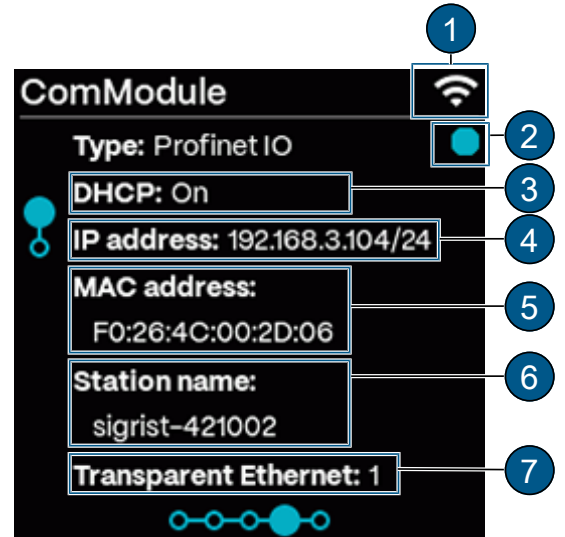
**PoE module:**

- (1) WLAN status (Off → grey/ On → light)
- (2) DHCP: On/ Off
- (3) Assigned IP address
- (4) Gateway address

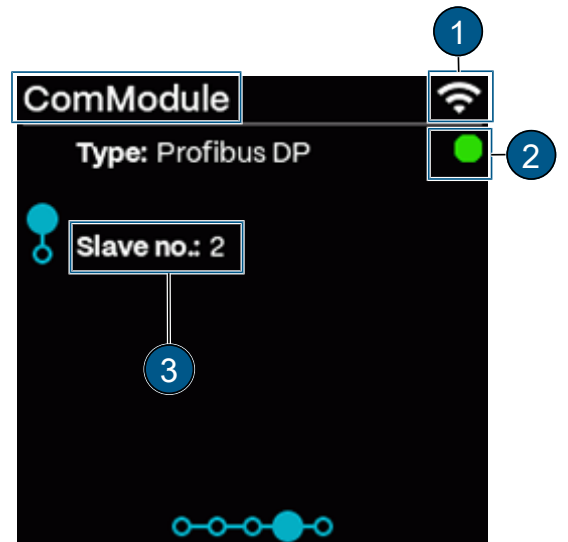


Profinet IO module:

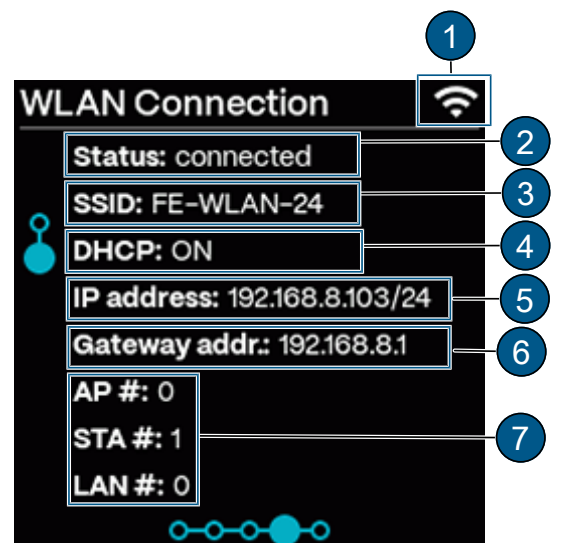
- (1) WLAN status (Off → grey/ On → light)
- (2) Module status: Grey → Inactive/ Blue → Active in idle mode/ Green → Active/ Red → Error.
- (3) DHCP: On/ Off
- (4) Assigned IP address
- (5) MAC address
- (6) Station name of the unit
- (7) Transparent Ethernet: 1: Sigrist web server/ 0: Web server of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

**Profibus DP module:**

- (1) WLAN status (Off → grey/ On → light)
- (2) Module status: Grey → Inactive/ Blue → Active in idle mode/ Green → Active/ Red → Error.
- (3) Slave no.

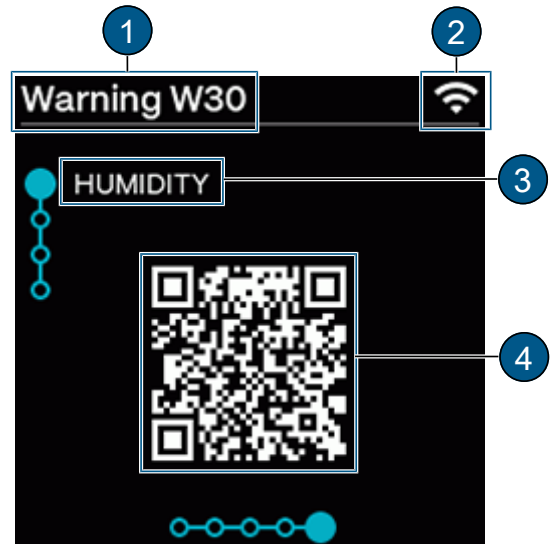
**WLAN connection**

- (1) WLAN status (Off → grey/ On → light)
- (2) Connection status
- (3) SSID: Name of the WLAN network
- (4) DHCP: On/ Off
- (5) Assigned IP address
- (6) Gateway address
- (7) Connected devices
 - WLAN base station (AP)
 - WLAN connection (STA)
 - LAN connection (POE, Profinet)



Status

- (1) Meter status
- (2) WLAN status (Off → grey/ On → light)
- (3) Error/warning message
- (4) QR code for error description

**Limit values**

Only limit values with an over/under limit are displayed.

- (1) WLAN status (Off → grey/ On → light)
- (2) Affected channel
- (3) Limits: Set limit
- (4) Act. Val: Current measuring value of the channel

Channel	Limit	Act. val.
K1 Turb90	1.000	7.843 ↑
K2 Turb25	0.500	0.797 ↑

Contact information

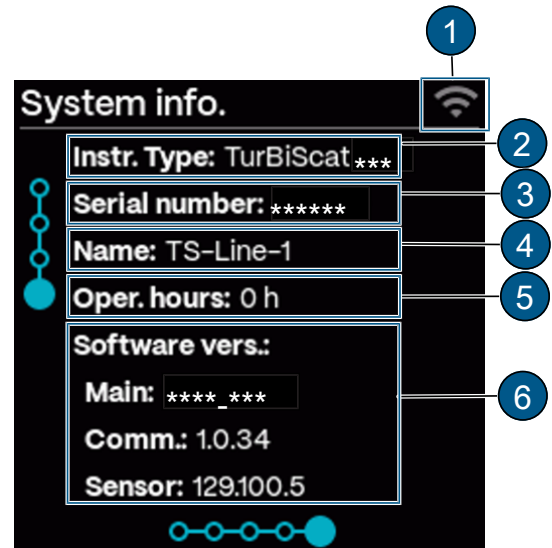
For display adjustment, see System menu.

- (1) WLAN status (Off → grey/ On → light)
- (2) Manufacturer of the unit
- (3) Telephone number of the supplier
- (4) Email address of the supplier
- (5) Web address of the supplier



System info

- (1) WLAN status (Off → grey/ On → light)
- (2) Device type
- (3) Serial number
- (4) Designation of the measuring point/device
- (5) Oper. hours: Operating hours (h)
- (6) Software version:
 - Main controller
 - Communication controller
 - Sensor controller

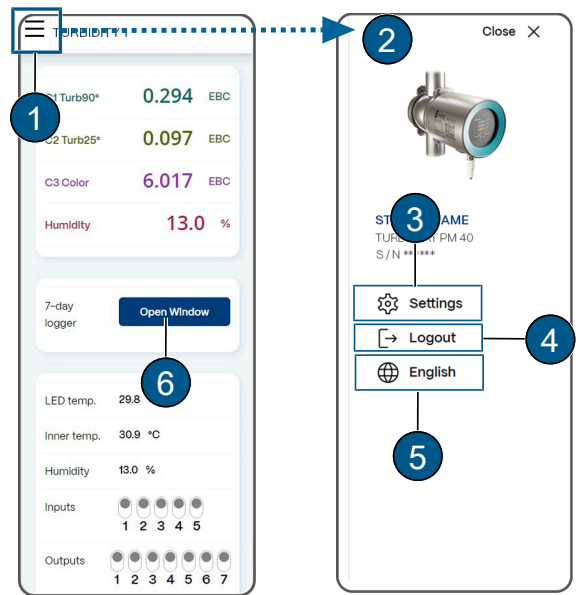


9.2 Sigrist-Webinterface

9.2.1 Homepage

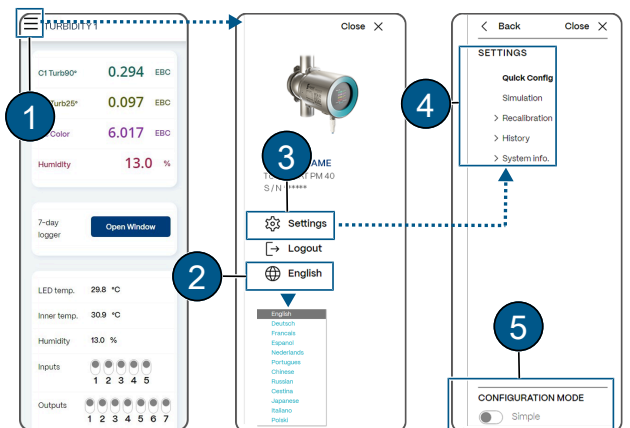
After logging in, the Sigrist-Webinterface appears in the measuring mode.

- (1) Open menu
- (2) Start menu
- (3) Photometer settings Simple/ [▶ 28] Extended [▶ 33] configuration mode
- (4) Logging on/off
- (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


If necessary, change the configuration mode.

9.3.1 Menu: Configuration


Parameter	Values	Default value
 «WLAN region» Select the region in which the device is operated. In the USA, WLAN channels 1 ... 11 are used. In the other countries, channels 1 ... 13 are used.	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 Communication module EG_IO

Only available with communication module EG_IO.


Parameter	Values	Default value
 «Function» Select configuration templates: Connection to SICON/SiDis: IO 1: RS485 A/ IO 2: RS485 B/ IO 3 ... 6 Inactive 0/4..20mA outputs_ [▶ 29]: IO 1: Digital output - Warning, Error, prioritised/ 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 configuration mode [▶ 33].	Connection to SICON/SiDis 0/4..20 mA output *) Customer-specific	





Connection to SICON/ SiDis

Parameter	Values	Default value
 «Integration» Set the integration time for all measuring channels.	0 ... 60000 s	10



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

0/4..20 mA outputs

Parameter	Values	Default value
 «Integration» Set the integration time for all measuring channels.	0 ... 60000 s	10






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 a fault (only relevant for current range 4 ... 20 mA).	0 ... 4 mA	2 mA

Current output 1 ... n

Parameter	Values	Default value
 «Source n» List of available sources. To reduce current consumption, set current outputs that are not needed to Inactive .	C1...C4/ Math 1...2/ Humidity/ Inactive	C1 (Turb90)
 «Measuring range n» Set the from ... to values of the measuring range.	-5000 ... 1E9	0 ... 1000








9.3.1.2 Communication module EG_PoE

Only available with communication module EG_PoE.

Parameter	Values	Default value
 «DHCP» Automatic assignment of IP addresses. <ul style="list-style-type: none"> DHCP On: Assigned IP address, gateway address and subnet mask are displayed. DHCP Off: Enter IP address, gateway addr., sub-net 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

9.3.1.3 Communication Module EG_Profinet

Only available with communication module EG_Profinet.





Parameter	Values	Default value
 «Station name» Enter the station name.		
 «DHCP» Automatic assignment of IP addresses.	On/ Off	On
	<ul style="list-style-type: none"> • DHCP On: Assigned IP address, gateway address and subnet mask are displayed. • DHCP Off: Enter IP address, gateway addr., sub-net mask and DNS server manually. 	
 «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
 «DNS server» Enter DNS server address. Appears if DHCP is set to Off .	XXX.XXX.XXX.XXX	0.0.0.0
 «Profinet Transparent Mode» <ul style="list-style-type: none"> • On: Sigrist web server and Modbus TCP is accessible via Profinet connection. • Off: Web server of gateway module (HMS) is accessible. 	On/ Off	On



9.3.1.4 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
 «Measured value mode» Simulate measured values at outputs. Each measured value has its own multiplication factor to the basic simulation value (basic simulation value: Static = 1, Dynamic 1 ... 2). With Simu value an own basic value can be preset.	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 faults	Off
 «Current outputs» Specific values output at current outputs.	Off/ 0 ... 20 mA	Off

	Parameter	Values	Default value
	«Outputs» Output specific states at digital outputs.	Off/ All Off/ All On/ 1 ... n On	Off
	«Light source» Manually switch the light source on or off for test purposes or fault location (1 = LED turbidity, 2 = LED colour (optional)).	Off/ 1, 2	Off


9.3.3 Menu: Recalibration

Submenu: Recalibration C1 ... Cn


	Parameter	Values	Default value
	«Nominal value» Enter the value of the control unit belonging to the unit or the nominal value for the formazine solution.	<i>Device-specific</i>	-
	«Actual value» Current measured value.	<i>Current measured value</i>	-
	«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 ... 2.000	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>	

Parameter	Values	Default value
 «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 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. The generation takes approx. 30 seconds.	[Download]	
System Info\ Backup & Restore		
Parameter	Values	Default value
 «Backup» Save configuration to measuring device. For identification, enter a description according to the software text.	[Create New]	
 «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

If necessary, change the configuration mode.

9.4.1 Menu: IO module EG_IO

Only available with communication module EG_IO.


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
 «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 a fault (only relevant for current range 4 ... 20 mA).	0 ... 4 mA	2 mA
 «Name ext. in.» Assign a designation to an external input signal (maximum 7 characters).	...	External
 «Prio. ext. in.» Assign a priority to the external input signal.	Off/ Warning/ Fault/ Prio fault	Warning

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

Parameter	Values	Default value
 «Function»	1) Off/ Modbus RTU 120 Ω/ Modbus RTU/ Digital input/ Digital output/ Current output	Off


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 terminating resistor)
- Modbus RTU (without terminating resistor)

Parameter	Values	Default value
 «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» 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. Prio fault: Active when a prioritised fault has occurred. Fault: Active when a fault has occurred. Warning: Active when a warning has occurred. Service: Active when the unit is in service mode. Adjustment: Active when the unit is performing an adjustment. Sensor check: Active when a sensor check is in progress. Humidity: Active when the humidity limit value is exceeded. Limit value: Active when limit value is active. After activation, additional parameters appear for the definition of the limit value (here ▶ 35).	Inverse/ Prio fault/ Fault/ Warning/ Service/ Adjustment/ Sensor check/ Humidity/ Limit value	Prio fault/ Fault/ Warning

Digital input (5–28V)

Parameter	Values	Default value
 «Digital input» Input signal triggers the corresponding function. Inverse: Invert functions. So that the function is triggered at signal 0. Operation/Serv.: Switching between measuring mode and service mode. Sensor check: Start sensor check. External: Activate external warning message.	Inverse/ Operation serv./ Sensor check/ External	-


Current output (max. 700 Ω)


Parameter	Values	Default value
 «Source» Available sources.	C1 ... Cn/ M1 ... Mn/ Humidity/ Inac- tive	Inactive


Parameter	Values	Default value
 «Measuring range» From ... To values of the measuring range.	0 ... 4000	0 ... 1000


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» Available sources.	C1 ... Cn/ M1 ... Mn/ Humidity	C1 Turb90

 «Mode» Set whether the limit value function is inactive or should react to undercutting or exceeding the limit value.	Inactive/ Exceed./ Undershoot.	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
---	-------------	-----

9.4.2 Menu: IO module EG_PoE

See communication module EG_PoE [▶ 29](#)

9.4.3 Menu: IO module EG_Profibus

See communication module EG_Profibus [▶ 30](#)

9.4.4 Menu: IO module EG_Profinet

See communication module EG_Profinet [▶ 30](#)




9.4.5 Menu: WLAN

WLAN\ General










Parameter	Values	Default value
 «WLAN region» Select the region in which the device is operated. In the USA, WLAN channels 1 ... 11 are used. In the other countries, channels 1 ... 13 are used.	List of regions	USA

WLAN\ base station

Parameter	Values	Default value
 «MAC address» Displays the MAC address of the WLAN access point.	F0:26:4C:XX:XX:XX	Device-specific

Parameter	Values	Default value
 «SSID» Displays the SSID of the WLAN base station.	XXXXXX	Device-specific
 «Deactivate after» If there is no active connection, the WLAN access point is deactivated after the set time.	...	300 s
 «Password» Enter the password for the WLAN access point.	XXXXXX	

WLAN\ WLAN connection













Parameter	Values	Default value
 «Active» Switch the WLAN connection on/off.	On/ Off	-
 «DHCP» Automatic assignment of IP addresses. <ul style="list-style-type: none"> • DHCP On: Assigned IP address, gateway address and subnet mask are displayed. • DHCP Off: Enter IP address, gateway addr., sub-net mask and DNS server manually. 	On/ Off	On
 «Set up» Select network and enter password. The connection may be interrupted and must be re-established.	[Start...]	Device-specific
 «Network ID (SSID)» Display the ID (SSID) of the connected network.	XXXXXX	-
 «MAC address» Displays the MAC address of the WLAN connection.	F0:26:4C:XX:XX:XX	Device-specific
 «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

9.4.6 Menu Configuration

See Simple Configuration Mode\ Configuration [▶ 28](#)

9.4.7 Menu: Display

Display\ General

Parameter	Values	Default value
 «Values» Selection of the measuring value display in the graphic display.	Min. value/ Max. value/ Mean value	Mean value
 «For service» Value displayed in the graphic display during service operation.	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.	0 ... 100%	60%
NOTICE! Low brightness reduces power consumption and extends the life of the display.		
 «Power-saving mode» Time period after which the display brightness on the photometer is reduced without manipulation.	0 ... 65535 s	300 s
 «Standard display» If «Show Idle Icon» is disabled, the display will change to the standard display after 3 minutes of inactivity.	Values/ 1 hour/ 1 day/ 7 days/ Sensor status	Values
Display\ channel D1 ... Dn		
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.	C1 ... Cn/ M1 ... Mn/ Humidity/ Inactive	Cn
 «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.	Off/ On	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 minimum value.	Off/ On	On
 «Max. value» Set the maximum value of the graphic display when automatic scaling is switched off.	0 ... 999999	1,000

9.4.8 Menu: SimulationSee Simple Configuration Mode\ Simulation [▶ 30](#)**9.4.9 Menu: Recalibration**See Simple configuration mode\ Recalibration [▶ 31](#)**9.4.10 Menu: Sensor check**

Parameter	Values	Default value
 «Sensor check» The sensor check is an internal plausibility check of the photometer.	start...	
 «Check interv.» Set the interval between two sensor checks. If the value is 0, the function is inactive. If the function is active, the first sensor check takes place one hour after the device is switched on.	0 ... 10000	24 h (1 day)

9.4.11 Menu: Logger









Parameter	Values	Default value
 «Interval» Set cycle of data storage to microSD card.	0 .. 60000 s	60 s
 «Dist. symbol» Set character between two columns.	Tab/ comma	Tab
 «End character» End of line character definition (Windows: CR + LF/ Mac: CR, Unix: LF).	CR + LF/ CR/ LF	CR + LF
 «SD card folder» Displays the contents of the SD card. Data can be downloaded and deleted.	Display ...	

Logger / Data

Parameter	Values	Default value
 «Active» Activates the logger function and saves the measuring values.	On / Off	Off
 «Fault» Saves the error message.	On/ Off	Off
 «Measured current» Saves the measured current.	On/ Off	Off
 «Indoor temp» Storage of photometer internal temperature.	On/ Off	Off


Parameter	Values	Default value
 «LED-Temp» Storage of LED temperature.	On/ Off	Off
 «Humidity» Storage of humidity value.	On / Off	Off






9.4.12 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
 «Date format» Set the format of the date.	DD.MM.YYYY/ DD/MM/YYYY/ MM/DD/YYYY	DD.MM.YYYY
 «Summer time» Set daylight saving time. For Europe , daylight saving time is set on the last Sunday in March and winter time on the last Sunday in October.	No/ Yes/ Europe	Europe
 «OTA update transmits extended diagnostic data» During an online firmware update, operating hours, temperatures, voltages, intensities of the light sources 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

9.4.13 Menu: Meas. Channels




Meas. Channels\ Channel C1... Cn





Parameter	Values	Default value
 «Linearisation» Definition of a customer-specific linearisation with eight interpolation points (actual/nominal value pairs). Measured values are linearly interpolated between basic values. Measured values that are smaller than the smallest nominal basic value are treated as the smallest basic value. Measured values outside the highest nominal basic value are displayed as an overflow (****).	[Define...]	1100/1100 - 0.000/0.000

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 measured value. The unit can be set separately Set unit [▶ 40].	EBC: 1.000, NTU: 4.000/ FTU: 4,000	1,000
 «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).	...	EBC


9.4.14 Menu: Math. Channels

Math. Channels M1 ... Mn

Parameter	Values	Default value
 «Function» Selection of a predefined function for calculating different channels: <ul style="list-style-type: none"> • $a \cdot K_1 + b \cdot K_2 + c \cdot K_3 + d \cdot K_4$ (Weighted addition of channels set to extinctions (log)) • $10^{(a \cdot \log(K_1) + b \cdot \log(K_2) + c \cdot \log(K_3) + d \cdot \log(K_4))}$ (Weighted addition of channels set to transmission (Lin)) • $\frac{K_1}{K_2}$ (Formation of quotients for second channels) • $\frac{K_1 - K_2}{K_1}$ (Difference of two channels in relation to the first channel) 	Inactive a*C1+... 10^(a*logC1+... C1/C2 (C1-C2)/ C1	Device-specific
 «Offset» Offset value is added to the measured value.	-5000 ... 999999	0,000
 «Scaling» Set the scaling factor for adaptation to laboratory values. The scaling factor is multiplied by the measured value.	-5000 ... 999999	1,000

Parameter	Values	Default value
 «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 designation to identify this channel (max. 7 characters).	...	Device-specific
 «Unit» Enter the unit (max. 7 characters).	...	
 «Coeff. a/b/c/d» Set the coefficient value a/b/c/d within the function.	-5000 ... 99999	Device-specific

9.4.15 Menu: Measuring info

Parameter	Values	Default value
 «Measuring info» View various values of the current measuring operation. Measured values C1..C4/ Math values M1..M2/ Inner temperature/ LED temperature/ Humidity value/ +5V analogue voltage/ -10V analogue voltage	-	-

9.4.16 Menu: History

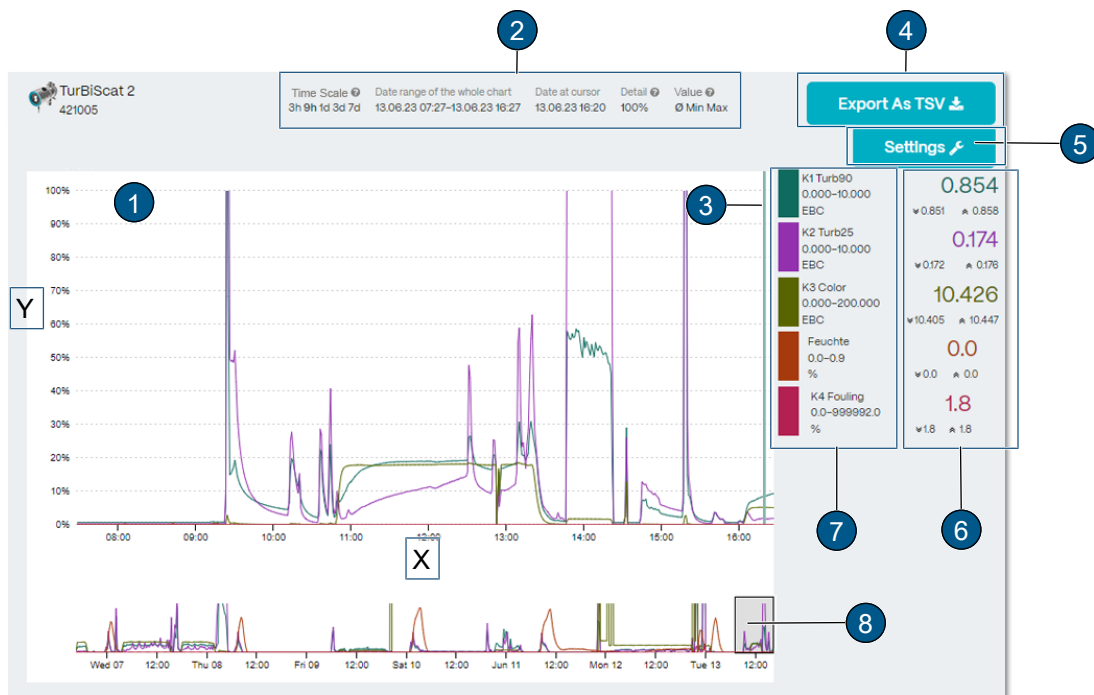
See Simple configuration mode\ History [▶ 31](#)

9.4.17 Menu: System info

See Simple configuration mode\ System info [▶ 31](#)

9.5 Logger diagram

Detailed graphic display of measured values over the last seven days.



Graphical display of measuring values (1)

Display over a certain period of time ((X): Time axis/ (Y:) measuring range). The curve colour corresponds to the corresponding measuring channel (7).

Time scales (2)

Define the time period from which the logger data is to be loaded (preview of data points under position (8))

- Large displayed range (1) corresponds to selected range under position (8).
- Date cursor: Date of the displayed measurement value (cursor position).
- Detail: Percentage of all displayed measurement points.
- Values: Determines whether the curves represent minimum, maximum or average values.

Cursor position (3)

Set time of measuring value display by mouse movement.

Export (TSV) (4)

Logger file is exported as .txt file.

Settings (5)

Set the measuring ranges per channel (drop-down menu). Changes are adopted for the graphic display on the unit.

Measured value display cursor position (6)

Measured value display refers to cursor position (3). The minimum (double arrow down), maximum (double arrow up) and average values are displayed.

Measuring value channels (7)

List of available measuring channels. Each channel can be activated or deactivated.

Time segment of measured value display (8)

Set the time segment of the measured value display (duration and time can be set).

9.6 Field bus**9.6.1 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.

9.6.2 Fault codes

The fault codes apply to all field bus versions. For the error description and corresponding measures, see here [▶ 50](#)].

No fault	Prioritised faults	Fault	Warnings
0: NO FAULTS	1: DEFAULT VALUES	8: SERIAL 1	10: SERIAL 3
	3: CRC EXPERTS	9: SERIAL 2	27: ADJUSTMENT
	4: CRC USER	16: U ANALOG	28: SENSOR CHECK
	5: CRC DISPLAY	17: MEASURING FAULT	29: OVER.TEMP
		19: LIGHT SOURCE 1	30: HUMIDITY
		20: LIGHT SOURCE 2	33-37: CURRENT 1 ... 4
		77: HUMIDITY	41: TEMP.SENSOR
			43: EXTERNAL ON
			53: IO_PORT
			57: HIGH ABSORPTION

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

9.6.3 Modbus RTU/ TCP**9.6.3.1 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».

9.6.3.2 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.

9.6.3.3 Address table Modbus RTU/ TCP

NOTE



Writing data to non-documented addresses.

Writing data to non-documented addresses can lead to the device becoming non-functional.

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

The following values can be read with Modbus function 4:

Register	Address	Data type	Function	Values
30001	0x0000	Unsigned integer bits 15-0	Status	Fault codes ▶ 42]
30002	0x0001	Unsigned integer bits 15-0	Fault source	0: Local
30003	0x0002	Real 32-bit Intel single precision bits 15-0	Measured 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	Measured 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	Measured 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	Measured 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	Measured 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	Measured 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	Measured value channel 7	
30016	0x000F	Real 32-bit Intel single precision bits 31-16		

Settings

Register	Address	Data type	Function	Values
30017	0x0010	Real 32-bit Intel single precision bits 15-0	Measured 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		
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		

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
Annual	Manual adjustment	Check calibration	Operator
Annual	VARINLINE® housing seals	Replace	Operator

10.2 Replace desiccant

NOTE



Condensation inside the electronics

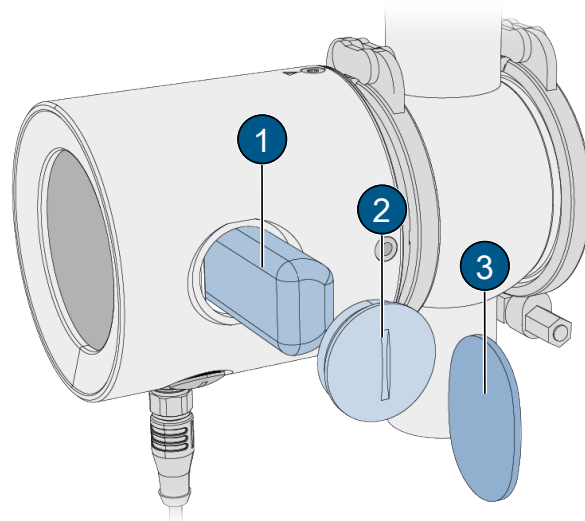
When the sample medium is cold, humidity can condense when the unit is opened and damage the electronics.

- ▶ 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 tool (3).
- ▶ Replace desiccant (1).
- ▶ Mount cover (2) immediately.

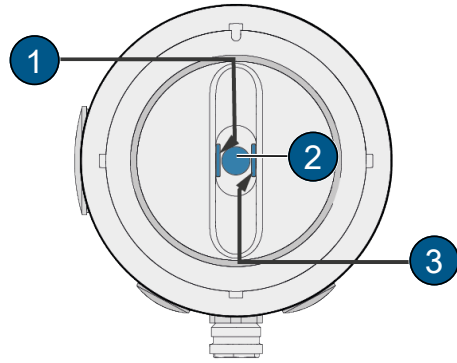


10.3 Clean sensor head

WARNING!

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

- ▶ Remove the photometer.
- ▶ Clean windows (1), (2), (3) with mild, abrasive-free cleaning agent (e.g. alcohol or soap). Use a soft, non-lint cloth.
- ▶ Install the photometer.



10.4 Calibration check

Calibration check, general

- An adjustment leads to deviations from the previous measured value.
- The turbidity measuring channels (C1, C2) can be calibrated with the solid reference and tap water or formazine.
- For the contamination and colour channel (C3, C4), distilled water is used.

⚠ DANGER

Skin or eye damage caused by formazine (hydrazine sulphate).

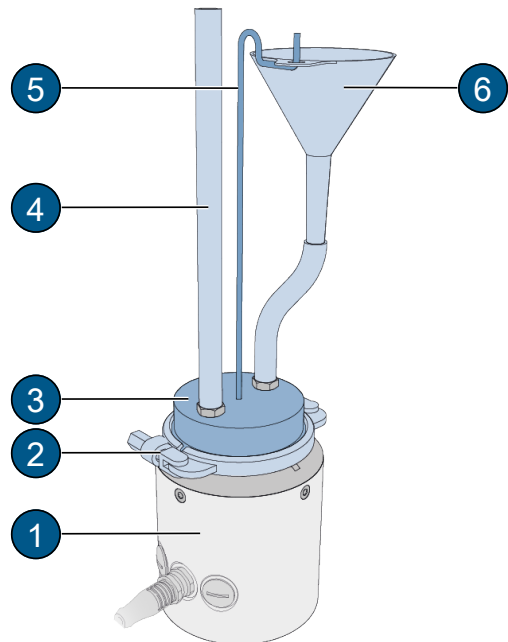
Unprotected skin or eye contact with formazine may cause skin or eye damage.



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

10.4.1 Overview of control unit

- (1) TurBiScat PM 40
- (2) Clamp ring
- (3) Adapter VARINLINE®
- (4) Level indicator
- (5) Filling funnel holder
- (6) Filling funnel



Overview of control unit

10.4.2 Cleaning the control unit

NOTE

Cleaning the control unit

Unsuitable cleaning agents can cause damage to the solid body.

- ▶ Clean the control unit with a soft, lint-free cloth, inside and out. In case of heavy soiling, a mild, abrasive-free cleaning agent can be used (e.g. alcohol).
- ▶ Put the protective cover on the control unit and store it in the case.
- ▶ The control unit must be stored away from dirt, humidity, frost and temperatures above +80 °C.



10.4.3 Carry out calibration check with control unit

NOTE

Use of an incorrect control unit.

The use of an incorrect control unit can falsify the calibration check.

- ▶ The control unit number must match the serial number of the unit.



Removing the photometer

WARNING!

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

- ▶ Removing the photometer

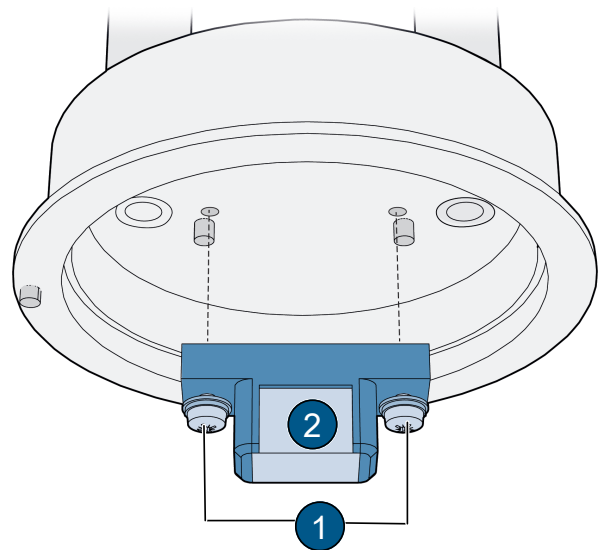
Establishing the WLAN connection

- ▶ Establish WLAN connection with mobile device.
- ▶ Place the device on a soft and flat surface with the sensor head pointing upwards. Avoid using a metal plate as a base (WLAN connection interruption).

Remove solid reference from control unit

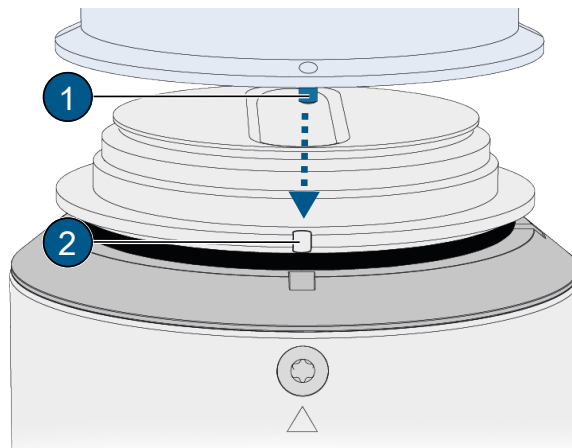
When testing with formazine (C1, C2) and zeroing (C3, C4), remove the solid reference from the control unit (Calibration check [▶ 46](#)).

- ▶ Loosen two screws **(1)**.
- ▶ Remove the solid reference **(2)** from the control unit.



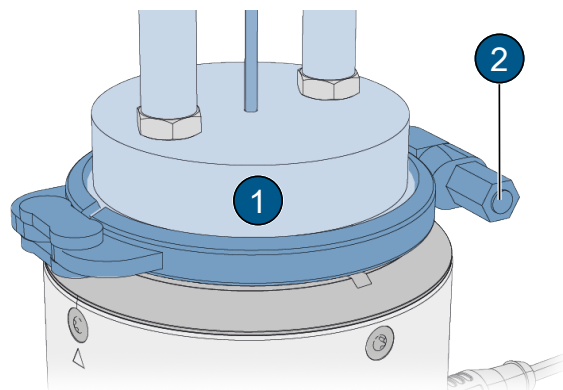
Put on control unit

- ▶ Align pin (1) with recess (2).
- ▶ Put on the control unit.



Fastening the control unit (VARINLINE® connection)

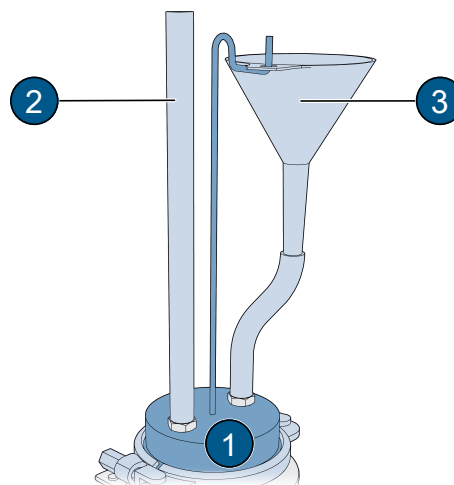
- ▶ Attach control unit (1) to the photometer with clamp ring (2).



Filling the control unit

- ▶ Fill control unit (1) with test medium via filling funnel (3).
- ▶ Make sure that the level indicator (2) is filled up to approx. half.

Bubble formation can be prevented by filling slowly. Residual bubbles can escape by rocking the unit back and forth or by squeezing the hose quickly.



Carry out calibration check

- ▶ Open the Settings\ «**Recalibration**» menu.
- ▶ Select the channel to be calibrated.
- ▶ Check or enter the nominal value.
 - Adjust control unit with solid reference (C1, C2): «**Nominal value**» must match the one on the control unit.
 - Adjustment with formazine (C1, C2): Enter the value of the formazine solution in the «**Nominal value**» menu.
 - Zero point adjustment (C3, C4) with ultrapure water: Enter value 0 in the «**Nominal value**» menu.
- ▶ Press [**initiate..**].
 - ⇒ Calibration check is started.
 - ⇒ Calibration check successful **OK**.
- ▶ Repeat the procedure for each channel.

Calibration check not OK (adjustment fault)

- ▶ Check for correct installation of the control unit.
- ▶ Check window contamination on the sensor head.
- ▶ Check test medium for air bubbles.

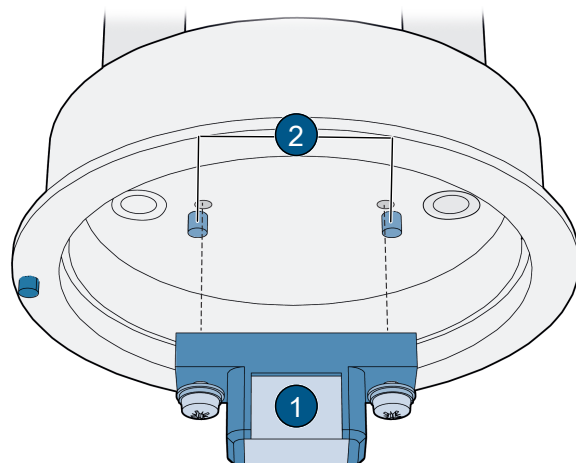
- ▶ Check the nominal values.
- ▶ Initiate calibration check again.



If the calibration check is not successful, contact the responsible national agency.

Complete the calibration check

- ▶ Empty control unit and remove from photometer.
- ▶ Install the photometer.
- ▶ Put photometer into operation.
- ▶ Align solid reference (1) with pins (2) and fasten.
- ▶ Clean the control unit [▶ 47].
 - ▷ The calibration check is completed.

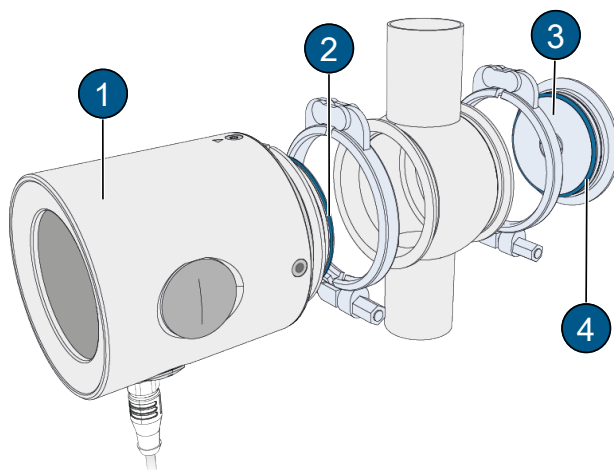


10.5 Replace seals (VARINLINE® connection)

WARNING!

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

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



10.6 Spare parts

Spare parts are available online.

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



11 Troubleshooting

11.1 Isolate faults

Malfunction

No display

Error message in display

Measured value seems wrong

Measure

- ▶ Check service voltage.
- ▶ Analyse error message (Warning/error/priority messages).
- ▶ 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 malfunction, either the measuring value (1) or a corresponding status symbol (2) is displayed according to the parameterization.

With a swipe movement, the detailed information appears.

Warning messages

- System remains in operation.
- Evaluate measurement results with caution.
- The warning disappears after the cause has been rectified.

▶ Call up QR code (5).

▶ Rectify cause promptly.

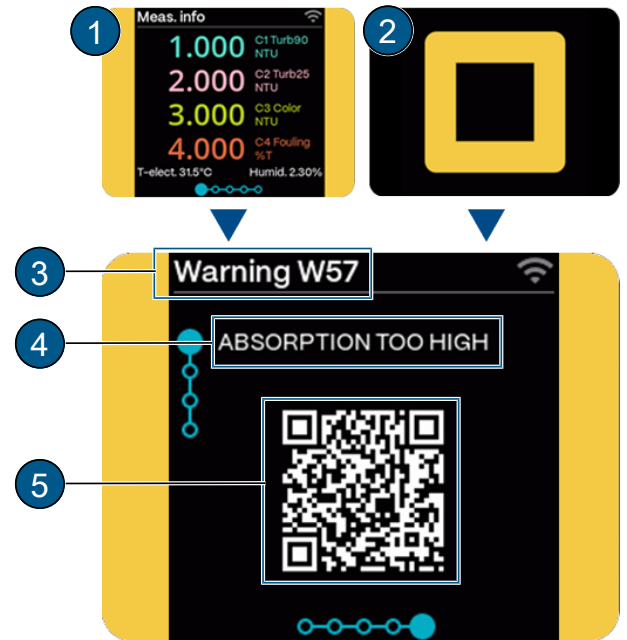
(1) Warning message with measured value display

(2) Warning status symbol

(3) Warning code

(4) Warning message

(5) QR code



(Prio) error messages

- Measured values are set to 0.
- Operation is impossible.

▶ Call up QR code (5).

▶ Rectify the cause immediately.

(1) Error message with measured value display

(2) Status symbol (prio) error

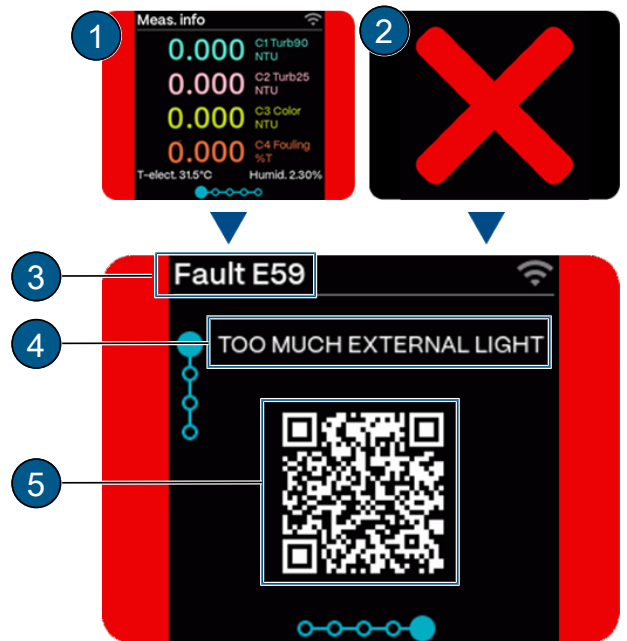
(3) Fault code

(4) Error message

(5) QR code

NOTICE!

Prioritised errors must be cleared by a service engineer.



11.3 Warning messages

The following warning messages may be displayed during operation.

Code	Message	Description	Possible causes
W9	SERIAL 2	Communication interruption between main controller and communication controller	<ul style="list-style-type: none"> • Defective electronics • Contact service engineer
W10	SERIAL 3	Communication interruption between main controller and IO module	<ul style="list-style-type: none"> • Defective electronics • Contact service engineer
W25	U ON	Input voltage is outside the permissible range (24 VDC)	<ul style="list-style-type: none"> • Operating voltage is faulty

Code	Message	Description	Possible causes
W27	ADJUSTMENT	Adjustment of the device could not be carried out	<ul style="list-style-type: none"> • Device is soiled • Nominal value for adjustment does not match the value of the medium
W28	SENSOR CHECK	Automatic sensor check failed	<ul style="list-style-type: none"> • Too much external light near the measuring cell (e.g. sight glass) • Device open • Defective optics/electronics Contact service engineer
W29	OVERTEMP	Temperature in the device has exceeded 65 °C	<ul style="list-style-type: none"> • Medium or ambient temperature too high • No or defective cooling unit
W30	HUMIDITY	Relative humidity in the device above the set limit value	<ul style="list-style-type: none"> • Desiccant is saturated • Housing seal defective • Device was open too long
W33	CURRENT 1...8	Current output is disturbed	<ul style="list-style-type: none"> • Open connection terminals • Interruption in the current loop of the measured value output Contact service engineer
...			
W40			
W41	TEMP.SENSOR	Inner temperature sensor has failed	<ul style="list-style-type: none"> • Defective electronics Contact service engineer
W43	EXTERNAL ON	An external event is signalled via a digital input	<ul style="list-style-type: none"> • External fault
W53	IO_PORT	Communication interruption to touch screen	<ul style="list-style-type: none"> • Defective electronics Contact service engineer
W57	ABSORPTION TOO HIGH	Light beam blocked by the measuring cell	<ul style="list-style-type: none"> • Very dark medium or foam
W78	SERVICE	Indicates when maintenance is due	<ul style="list-style-type: none"> • Contact service engineer

11.4 Fault messages

The following fault messages may be displayed during operation.

Code	Message	Description	Possible causes
E8	SERIAL 1	Communication interruption between main controller and sensor board	<ul style="list-style-type: none"> • Defective electronics Contact service engineer
E16	U ANALOG	One of the internal analogue voltages is outside the permissible range	<ul style="list-style-type: none"> • Defective electronics Contact service engineer
E17	MEASURING FAULT	Measurement value acquisition is disturbed	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Defective light source Contact service engineer

Code	Message	Description	Possible causes
E20	LIGHT SOURCE 2	Detector for monitoring the light source is not receiving light from the corresponding light source.	<ul style="list-style-type: none"> Defective light source Contact service technician.

11.5 Prio fault messages

The following Prio fault messages may be displayed during operation.

Code	Message	Description	Possible causes
P1	DEFAULT VALUES	Default values have been loaded	<ul style="list-style-type: none"> Defective electronics Contact service technician
P3	CRC EXPERTS	An error was detected during the check of the expert data.	<ul style="list-style-type: none"> Defective electronics Contact service engineer
P4	CRC USER	An error was detected when checking the user data	<ul style="list-style-type: none"> Defective electronics Contact service engineer
P5	CRC DISPLAY	An error was detected when checking the display data	<ul style="list-style-type: none"> Defective electronics Contact service engineer

12 Specification sheet

12.1 TurBiScat PM 40

Service voltage

24 VDC \pm 10 % (EG_PoE 48 VDC)

Warm-up time

< 3 min

Power consumption

Max. 4 W

Max. pressure

- Max. 4 MPa (40 bar) → Sensor head with sapphire window
- Measuring cell → observe specification, standard Varinline housing 1 MPa (10 bar)

Medium temperature

- -10 ... +100° C
- 120° C max. 2 h
- 150° C max. 1 h

Ambient temperature

- -10 ... +50°C
- +55° C → max. medium temperature +85° C
- +60° C → max. medium temperature +75° C

Ambient humidity

0 ... 100 % relative humidity

Material

- Housing: Stainless steel 1.4301
- Touchscreen: Soda-lime tempering glass

Parts in contact with medium:

- Sensor head: Hastelloy C-22 (2.4602)
- Window: Sapphire
- VARINLINE® housing: Stainless steel 1.4404

Dimension

Ø 100.5 x 128 mm

Tube connections

DN 40 ... DN 150, 1 1/2" ... 6" VARINLINE® housing

Weight

Approx. 2.3 kg

Protection class

IP 66

Display (model -S1XX only)

- Display: 2.4" with touch screen
- Resolution: 320 x 240 pixels

WLAN module (model -S1XX only)

WLAN according to IEEE 802.11 b/g/n

12.2 General

Turbidity measurement

Measuring principle

90° / 25° scattered light measurement

Wavelength

650 nm

Measuring range

0 ... 1000 EBC (0 ... 4000 NTU) turbidity

Measuring ranges

Arbitrarily configurable

Lowest measuring value

20 mEBC

Smallest recommended measuring range

0 ... 1 EBC

Resolution

0.001 EBC turbidity

Reproducibility

2 units calibrated with the same formazine

EBC**90°****25°**

0 ... 2

± 1 %

± 1 %

2 ... 100

± 2 %

± 3 %

100 ... 1000

± 10 %

± 10 %

Linearity

0.01 EBC turbidity in the range 0 ... 2 EBC

Repeatability (2 measurements with 1 device)

0.001 EBC turbidity or ±0.25 % of measuring value

Temperature stability< -0.15 %^{C-1} of upper limit of the range**Reaction time**

< 2 s (step response)

Colour measurement (optional)**Measuring principle**

Absorption

Wavelength

430 nm

Measuring range

0 ... 50 EBC colour (layer fixed)

Smallest measuring range

0 ... 5 EBC colour

Reproducibility

± 0.3 EBC colour

Repeatability

± 0.2 EBC colour

12.3 SiDis AD 40**Service voltage**

24 VDC ± 10 % (EG_PoE according to standard)

Power consumption with photometer

Max. 4 W

Display

- Display: ¼ VGA with touchscreen
- Resolution: 320 x 240 pixels with 2.4" diagonal

WLAN module

WLAN according to IEEE 802.11 b/g/n

Protection class

IP 66

Weight

Approx. 0.4 kg

Dimensions

Ø 105.5 x 71 mm

Material

- Housing: PC / ABS UL94 V0
- Touchscreen: Soda-lime tempering glass

12.4 Communication modules

EG_IO

6 configurable inputs / outputs:

- Max. 2 digital inputs: 5 ... 28 VDC
- Max. 4 digital outputs: High-side switch max. 20 mA
- Max. 4 active current outputs: 0/4 ... 20 mA, max. 700 ohm
- Modbus RTU

EG_PoE

Ethernet LAN connection with Power over Ethernet:

- Ethernet according to 10/100BaseT
- PoE according to 802.3af, class 0

EG_Profibus

Profibus DP-V1 slave

EG_Profinet

Profinet IO, conformity class B

13 Returns

Return 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 at 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 unit completely and dry it.
- ▶ Before packing, seal the openings of the device with adhesive tape or pins so that no parts of the packaging 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 accessories 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 note the RMA number on the outside of the packaging.
 - ▷ Packed in this way, the devices can be transported by 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.

- ▶ Disconnect the operating voltage.
- ▶ Remove the photometer.
- ▶ Clean sensor head.
- ▶ Check the desiccant and, if necessary, Replace desiccant.
- ▶ 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, aluminium	Recycling via used glass and scrap metal collection points
Battery	Lithium	Recycling via locally organised collection points
Photometer housing	Stainless steel plus in combination with glass	Scrap metal collection points
Desiccant	Molecular sieve	Normal waste disposal (chemically harmless)

Your service partner

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