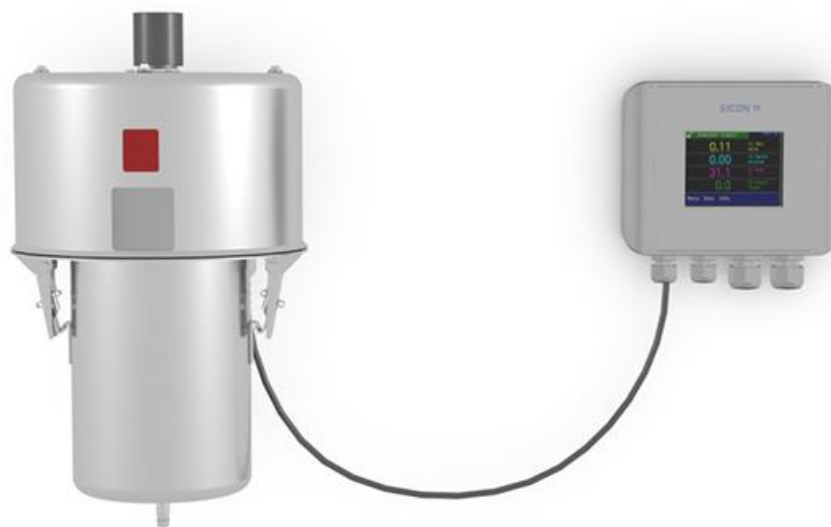


# INSTRUCTION MANUAL

## VisGuard 2



**Visibility Monitor / Dust Monitor**

SIGRIST-PHOTOMETER AG  
Hofurlistrasse 1  
CH-6373 Ennetbürgen  
Switzerland

Tel. +41 41 624 54 54  
Fax +41 41 624 54 55  
info@photometer.com  
www.photometer.com

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# 1 General user information

## 1.1 Terms used in this document (glossary)

Please refer to our website for specialist terms: [www.photometer.com/en/glossary/](http://www.photometer.com/en/glossary/)

## 1.2 Purpose of the Instruction Manual

This Instruction Manual provides the user with helpful information about the entire life cycle of the VisGuard 2 and its peripheral devices. Before commissioning the instrument, you should be completely familiar with the Instruction Manual.

## 1.3 Target group of the documentation

The Instruction Manual is intended for all persons who are responsible for the operation and maintenance of the instrument.

## 1.4 Additional documentation

DOC. NO.	TITLE	CONTENT
14166E	Brief Instructions	The most important functions and the servicing schedule.
14265E	Instructions for extractive application	Information for extractive application.
14165E	Reference Handbook	More sophisticated menu functions and worksteps for advanced users.
14289E	Data Sheet	Descriptions and technical data about the instrument.
14168E	Service Manual	Repair and conversion instructions for service engineers.
14288DEF	Declaration of Conformity	Compliance with the underlying directives and standards.

## 1.5 Copyright provisions

This document has been written by SIGRIST-PHOTOMETER AG. Copying or modifying the content or giving this document to third parties is permitted only with the express consent of SIGRIST-PHOTOMETER AG.

## 1.6 Document storage location

This document is part of the product. It should be stored in a safe place and always be close at hand for the user.

## 1.7 Order document

The most recent version of this document can be downloaded at [www.photometer.com](http://www.photometer.com) (first time registration required).

It can also be ordered from a SIGRIST representative in your country (→ Instruction Manual "Customer service information").

## 1.8 Proper use

The photometer and its peripherals are designed for measuring visibility and dust in non-explosive atmospheres at ambient temperatures of between -30 °C (minimum) and 55 °C (maximum).

## 1.9 Use restrictions



**EXPLOSION  
HAZARD!**

### Operation in an inappropriate environment.

Use in explosive areas can cause explosions, which can lead to the death of persons in the vicinity.

- It is not permitted to operate the instrument in explosion hazardous areas or rooms.
- It is not permitted to use the instrument with explosive sample substances.

## 1.10 User requirements

The instrument may be operated only by trained technical personnel who have read and understood the content of the Instruction Manual.

## 1.11 Declaration of conformity

Current technological principles were followed in designing and manufacturing the instrument. They comply with the applicable guidelines concerning safety and duty to take due care.



EU: The measuring instrument meets all applicable requirements within the European Union (EU) for carrying the CE mark.



Please refer to the separate declaration of conformity for details. Section 1.4



## 1.12 Dangers when not used properly



**DANGER!**

### Operation when not used properly.

Improper use of the instrument can cause injuries to persons, process-related consequential damage and damage to the instrument and its peripherals.

In the following cases the manufacturer cannot guarantee the protection of persons and the instrument and therefore assumes no legal responsibility:

- The instrument is used in a way not included in the described area of application.
- The instrument is not properly mounted, set up or transported.
- The instrument is not installed and operated in accordance with the Instruction Manual.
- The instrument has been operated with accessory parts which SIGRIST-PHOTOMETER AG has not expressly recommended.
- Improper changes to the instrument have been performed.
- The instrument has not been operated within the specifications, in particular concerning pressure and temperature.
- The instrument is exposed to vibrations, shocks or other mechanical forces.

## 1.13 Meaning of the safety symbols

All **danger symbols** used in this document are explained below:



**DANGER!**

### Danger due to electrical shock that may result in serious bodily injury or death.

Non-observance of this notice may lead to electrical shocks and death.



**EXPLOSION  
HAZARD!**

### Danger due to explosion that may result in serious bodily injury or death.

Non-observance of this notice may cause explosions resulting in serious property damage and death.



**WARNING!**

### Warning about bodily injury or hazards to health with long-term effects.

Non-observance of this warning may lead to injuries with possible long-term effects.



**CAUTION!**

### Notice about possible material damage.

Non-observance of this notice may cause material damage to the instrument and its peripherals.

## 1.14 Meaning of the pictograms

All **pictograms** used in this document are explained below:



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Additional information about the current topic.

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---

Practical procedures when working with the VisGuard 2.

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Manipulations on the touchscreen.

---



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The screenshot is an example and may differ from current device.

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## 2 Instrument overview

### 2.1 Overview of a measuring point with SIPORT 2

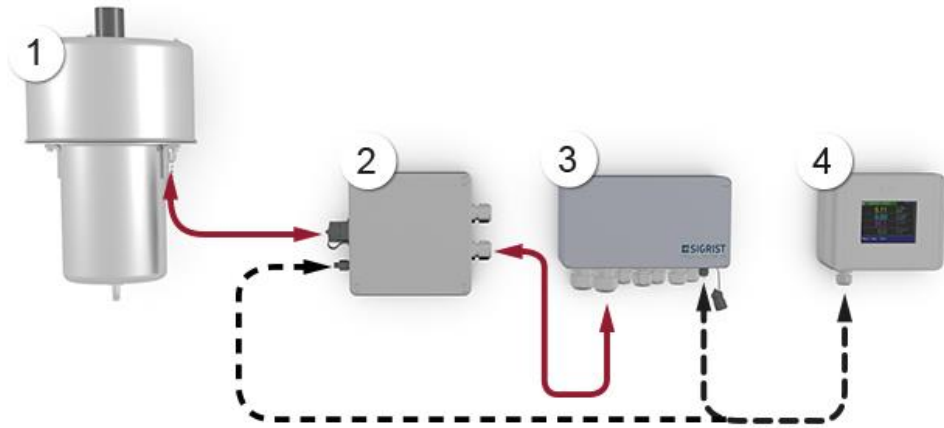


Figure 1: Overview of a measuring point with VisGuard 2 In-situ

①	VisGuard 2 In-situ	②	Connection box (optional)
③	SIPORT 2 connection box	④	SICON-C portable control unit, can be connected to the SIPORT 2 or connection box via cable

### 2.2 Overview of a measuring point with SICON only

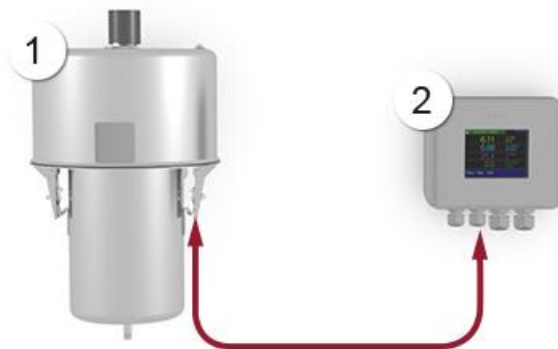


Figure 2: Overview of a measuring point with VisGuard 2 In-situ connected to the SICON

①	VisGuard 2 In-situ	②	SICON (M) control unit
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## 2.3 Overview of a multiple measuring point with SICON M

Up to eight VisGuard 2 instruments can be connected and operated on the SICON M.

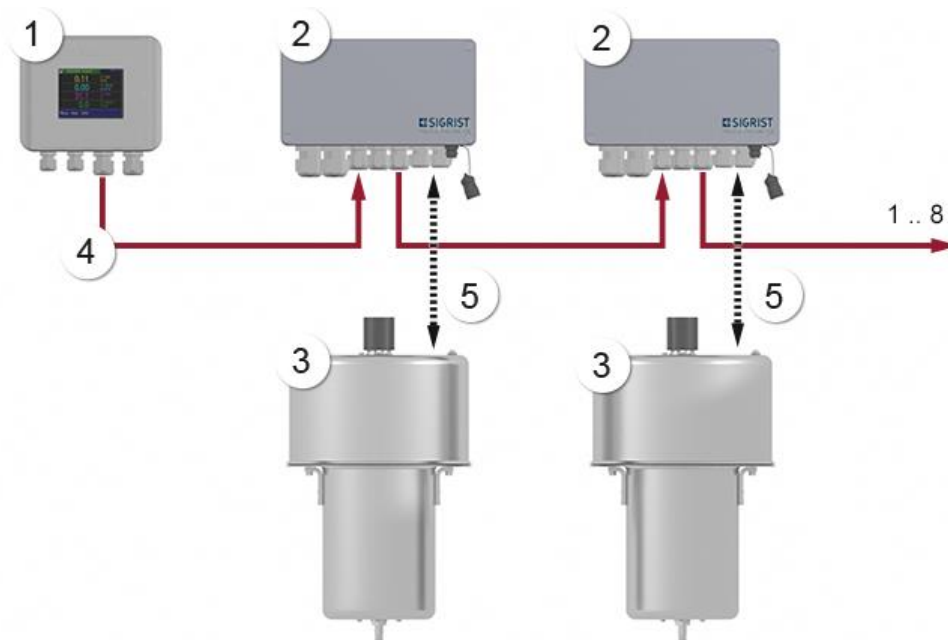


Figure 3: Overview of a multiple measuring point with VisGuard 2

①	SICON M multi-channel control unit	②	SIPOINT 2 connection box with integrated Modbus RTU with repeater
③	VisGuard 2 In-situ (1 .. 8)	④	RS-485 bus connection
⑤	Connection cable to VisGuard 2		

## 2.4 Designation of the instruments

### 2.4.1 Designation of the VisGuard 2

The VisGuard 2 is fitted with the following rating plate:

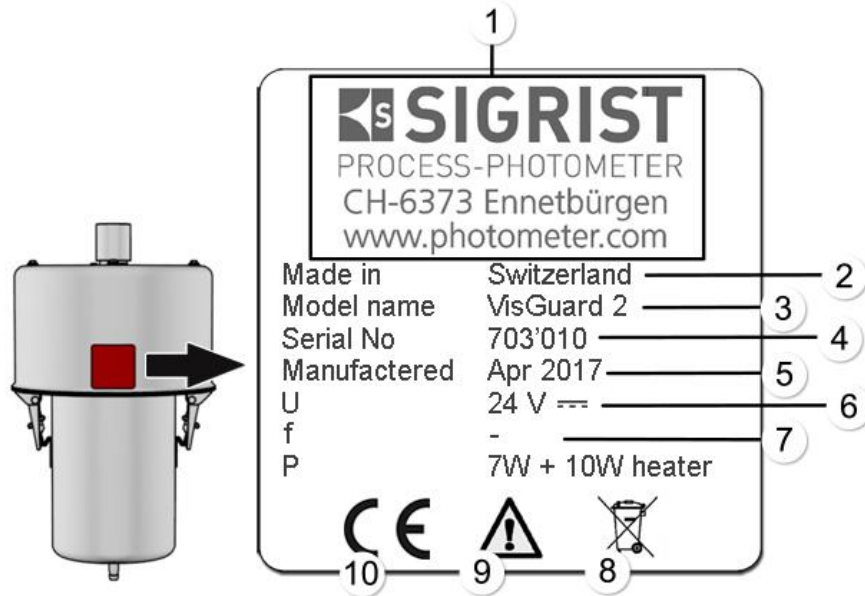


Figure 4: Designation of the VisGuard 2

①	Manufacturer	②	Country of origin
③	Product name	④	Serial number
⑤	Date of manufacture	⑥	Service voltage
⑦	Frequency range	⑧	Power
⑨	Observe the Instruction Manual	⑩	Observe the disposal information

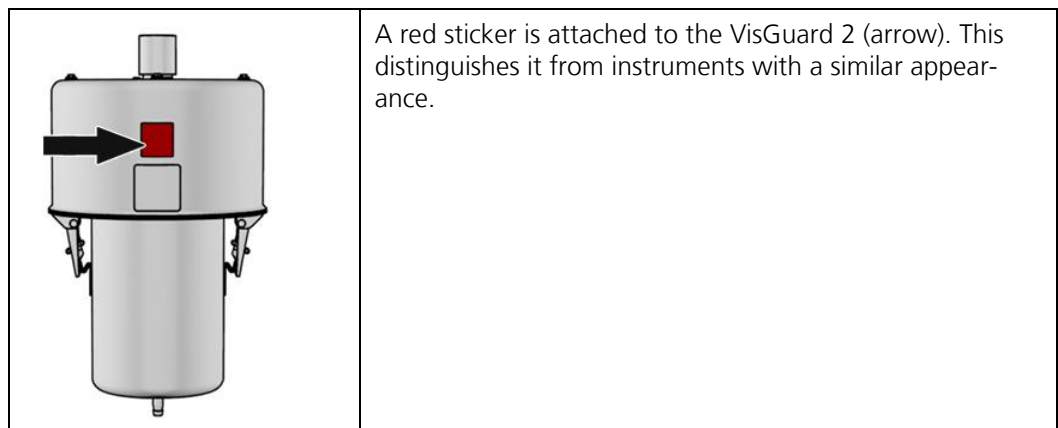


Figure 5: Red sticker for identifying the VisGuard 2

### 2.4.2 Designation of the SICON (M/-C)

The SICON (M/-C) control unit is fitted with the following rating plate:

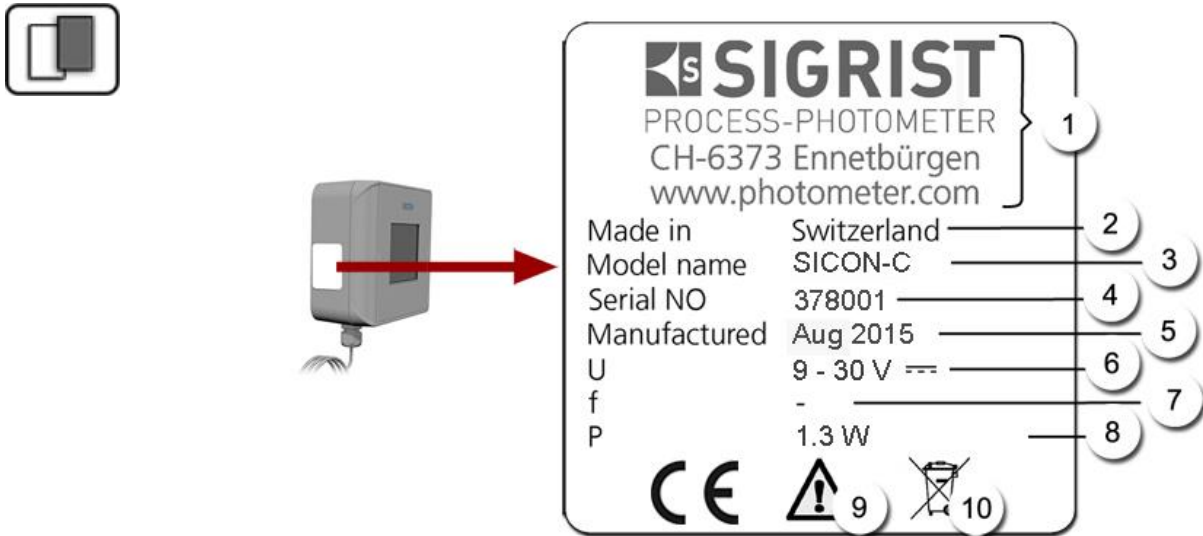


Figure 6: Designation of the SICON-C

①	Manufacturer	②	Country of origin
③	Product name	④	Serial number
⑤	Date of manufacture	⑥	Service voltage
⑦	Frequency range	⑧	Power
⑨	Observe the Instruction Manual	⑩	Observe the disposal information

### 2.4.3 Designation of the SIPOINT 2

The SIPOINT 2 connection box is fitted with the following rating plate:

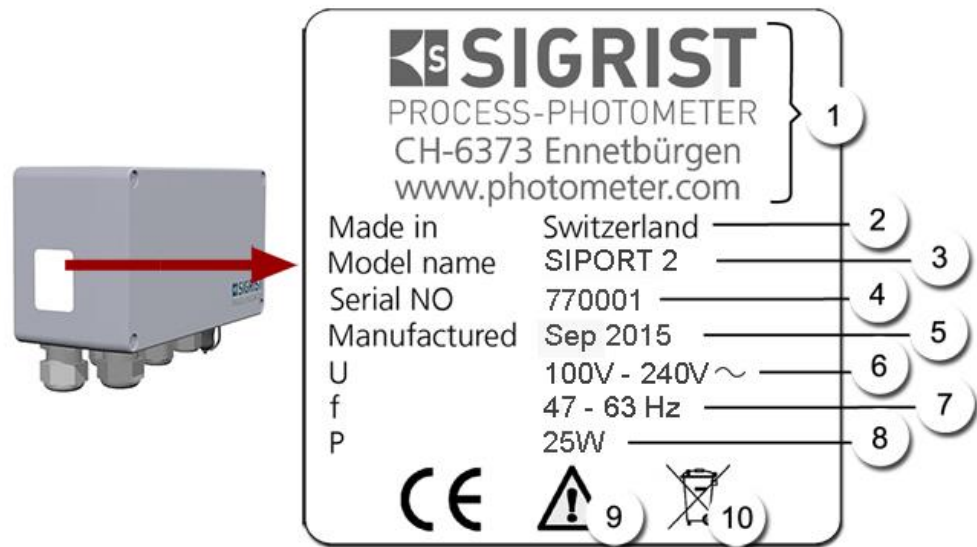







Figure 7: Rating plate on SIPOINT 2

①	Manufacturer	②	Country of origin
③	Product name	④	Serial number
⑤	Date of manufacture	⑥	Service voltage
⑦	Frequency range	⑧	Power
⑨	Observe the Instruction Manual	⑩	Observe the disposal information


## 2.5 Scope of supply and accessories

### 2.5.1 Standard scope of supply for the VisGuard 2






Pcs.	Art. no.	Name	View	In-situ	Extractive
1	120688	VisGuard 2 In-situ		X	
1	120686	VisGuard 2 Extractive (extraction length 30 .. 500 m)			X
	120687	VisGuard 2 Extractive (extraction length up to 30 m)			
1	-	Gas sampling system GSS5: 0 .. 5 m GSS30: 5 .. 30 m GSS500: 30 .. 500 m GSSM: Multiple sample			X
1	118342	SICON control unit		X	X
	119040	SICON M control unit			
1		SIPORT 2 connection box with integrated	 Option: Instrument socket with protection cover 120387	X	X
	120287	Profibus DP			
	120288	StromRel			
	120289	Modbus RTU			
	121118	Profinet IO			
1		Connection print for SIPORT 2 without housing, with integrated		X	X
	120389	Profibus DP			
	120390	StromRel			
	120391	Modbus RTU			
	121119	Profinet IO			













Attached documents:

Pcs.	Doc. no.	Name	View	Variant
1	14162	Instruction Manual		German French English
1	14165	Reference Manual		German English
1	14166	Brief Instructions		German French English

## 2.5.2 Optional scope of supply for the VisGuard 2

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	120290	SICON-C portable control unit		
1	112677	Checking unit		
1	120342	Junction box		
1	112408	Sample heater 25 W/230 VAC		
1	120802	Sample heater 24 VDC/10 W		→ Reference Manual

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	118358	High-temperature cable, 8-pin, length by meter, for connection to the SIPOINT 2		
1	120393	High-temperature cable, 8-pin incl. connector, L = 1.5 m, for connection to the SIPOINT 2 with connection socket		
1	118637	High-temperature cable, 4-pin, length by meter, for SICON connection		
1	120790	Current/digi. input for SIPOINT 2		For SIPOINT 2
1	118442	Profibus DP interfaces print		For SICON (M)
1	118445	Modbus RTU interfaces print		For SICON (M)
1	121121	Profinet IO interfaces print		For SICON (M)
1	119796	HART module		For SICON (M)
1	119130	4-way current output		For SICON (M)
1	119795	4-way current input		For SICON (M)
1	119045	24 VDC mains device		20 W, IP66, input 100 to 240 VAC

## 2.6 Technical data for the VisGuard 2

### General:

Data	Values
Measuring principle	Scattered light measurement
Measurement span	0 .. 1000 PLA oder 0 .. 30000 mE/m
Wavelength	880 nm
Resolution	± 0.001 mE/m
Reproducibility	± 0.06 mE/m, or ± 1 %
Reaction time	2 s
Measuring angle	30 °
Sample pressure	Max. ± 3000 Pa (± 30 mbar)
Ambient temperature	-30 .. 55 °C
Ambient humidity	0 .. 100 % rel. humidity

### VisGuard 2 photometer:

Data	Values
Service voltage	24 VDC
Power consumption	7 W + optional heater 10 W
Weight	6.5 kg (In-situ), 5.0 kg (Extractive)
Protection class	IP66 (with splash guard only)
Photometer material	Stainless steel 1.4435 / 1.4571
Cable standard	High-temperature cable: <ul style="list-style-type: none"> <li>▪ Length: as needed</li> <li>▪ Type: 4 x 2 x 0.80 mm<sup>2</sup></li> <li>▪ FE180, E30-E90</li> </ul>
Dimensions	ca. Ø 209 mm x 366 mm (See detailed dimension sheet)

**SICON-C portable control unit:**

<b>Data</b>	<b>Values</b>
Service voltage	24 VDC
Power consumption	1.3 W
Display	¼ VGA with touchscreen Resolution: 320 x 240 pixels with 3.5" diagonal
Protection class	IP66
Weight	0.6 kg
Dimensions	160 x 152 x 60 mm (See detailed dimension sheet)
Housing material	ABS

**SIPORT 2 connection box:**

<b>Data</b>	<b>Values</b>
Service voltage	100 .. 240 VAC; 47 .. 63 Hz
Power consumption	25 W (maximum) <ul style="list-style-type: none"> <li>▪ VisGuard 2 In-situ, with sample heater: 24 W / 45 VA</li> <li>▪ VisGuard 2 In-situ, without sample heater: 12 W / 27 VA</li> </ul>
Interfaces	Profibus DP, Modbus RTU with repeater, StromRel module; optional: Current/Digi. Input, Profinet IO
Maximum operating altitude	2,000 m above sea level
Protection class	IP66
Weight	1.3 kg
Dimensions	220 x 155 x 91 mm Detailed dimension sheet according to
Housing material	Glass-fiber reinforced polyester

**SICON (M):**

<b>Data</b>	<b>Values</b>
Service voltage	24 VDC
Power consumption	5 W + photometer
Display	¼ VGA with touchscreen Resolution: 320 x 240 pixels with 3.5" diagonal
Outputs/inputs	Outputs: 4 x 0/4 .. 20 mA, galvanically isolated up to max. 50 V relative to ground and max. 500 Ω burden. 7 x digital outputs up to max. 30 VDC, freely configurable, 1 output as de-energized closed relay. Inputs: 5 x digital inputs up to max. 30 VDC, freely configurable
Interfaces	Ethernet, SD card (for logging, SW update, diagnostics), Modbus TCP, optional Modbus RTU, Profibus DP, HART or Profinet IO
Protection class	IP66
Weight	Approx. 0.6 kg
Dimensions	160 x 157 x 60 mm (See detailed dimension sheet)
Housing material	ABS

**Power Supply SP-C039**

<b>Data</b>	<b>Values</b>
Service voltage	100 .. 240 VAC, 47 .. 63 Hz
Power consumption	Max. 25 W
Maximum operating altitude	2,000 m above sea level
Protection class	IP66
Weight	0.66 kg
Dimensions	130 x 152 x 52 mm (See detailed dimension sheet)
Housing material	PC

## 3 General safety points

### 3.1 Dangers when properly used



**DANGER!**

#### **Damaged instrument or cabling.**

Touching damaged cables may lead to electrical shocks or death.

- The instrument may be operated only when the cables are undamaged.
- The instrument may be operated only if it has been properly installed or repaired.



**DANGER!**

#### **Dangerous voltage inside the instrument.**

Touching live components inside the instrument may lead to electric shocks resulting in death.

- The instrument must not be operated when the housing is removed.



**DANGER!**

#### **Damage to the instrument due to incorrect service voltage.**

If the instrument is connected to an incorrect service voltage, the instrument can be damaged.

- The instrument may be connected only to voltage sources as specified on the rating plate.



**DANGER!**

#### **Missing Instruction Manual after the instrument changes hands.**

Operating the instrument without knowledge of the Instruction Manual may lead to injuries to persons and damage to the instrument.

- If the instrument changes hands, always include the Instruction Manual.
- If the Instruction Manual is lost, you can request a replacement.  
Registered users can download the current version at [www.photometer.com](http://www.photometer.com).



**CAUTION!**

#### **Penetration of moisture as well as condensation on the electrical components during servicing duty.**

If moisture enters the instrument, the VisGuard 2 can be damaged.

- Work on the inside of the instrument may be performed only in a dry room and at room temperature. The instrument should be at operating or room temperature (avoid condensation on optical and electrical surfaces).



**CAUTION!**

#### **The use of aggressive chemicals when cleaning.**

Use of aggressive chemicals can cause damage to instrument components.

- Do not use aggressive chemicals or cleaning agents when cleaning.
- Should the instrument come in contact with aggressive chemicals, clean it thoroughly with a neutral cleaning agent.

## 3.2 Residual risk



**WARNING!**

**According to the risk assessment of the applied safety directive DIN EN 61010-1, there remains the risk of the displayed measuring values being incorrect. This risk can be reduced with the following measures:**

- Use an access code to prevent unauthorized persons from changing parameters.
- Perform the specified servicing duties.

## 3.3 Warning and danger symbols on the instrument



**WARNING!**

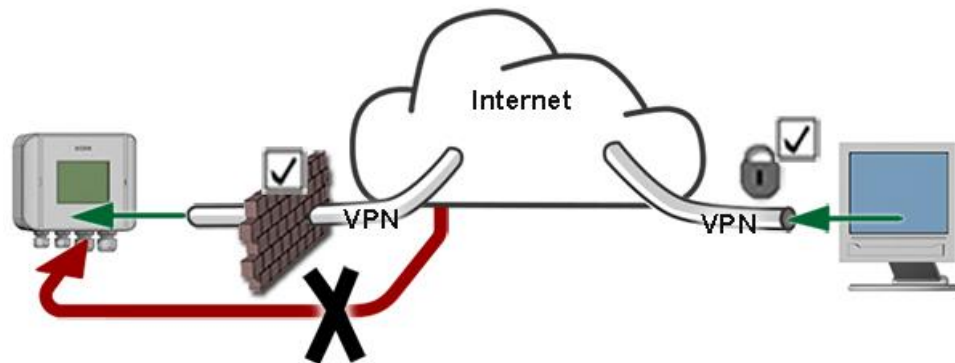
**There are no warning or danger symbols on the instrument.**

Users must ensure that they observe the safety measures as specified in the Instruction Manual at all times when working with the instrument and its peripheral equipment, even if no warning or danger symbols are attached to the instrument.

The following sections must be internalized:

- Section 1.9
- Section 1.12
- Section 1.13
- Section 3.1
- Section 3.2
- Observe safety pointers when performing the described procedures.
- Observe local safety pointers.

### 3.4 Preventing undesirable online access attempts



#### WARNING!

SIGRIST instruments are equipped with an integrated web user interface and Modbus TCP interface, thus offering state-of-the-art administration and control possibilities. However, if these are connected directly to the Internet, then any Internet user can in principle access your instrument and change the configuration.

Please note the following points to prevent this:

- Never connect the instrument directly to the Internet.
- Operate it behind a firewall and block access to the instrument.
- Only connect to branch offices via VPN.
- Change the standard password on commissioning.
- Always keep up to date with the latest changes regarding Internet security so that you can react promptly in the event of alterations.
- Install the latest updates immediately (also for the router and firewall).



## 4 Mounting



**CAUTION!**

### **Danger of the photometer falling onto the road if improperly mounted.**

The following requirements must be met when fastening the instruments in place:

- When fastening the photometer, screws with a diameter of at least **M8** must be used.
- The material quality of the screws used must correspond to the local mounting and installation guidelines.

### 4.1 General information on mounting the VisGuard 2

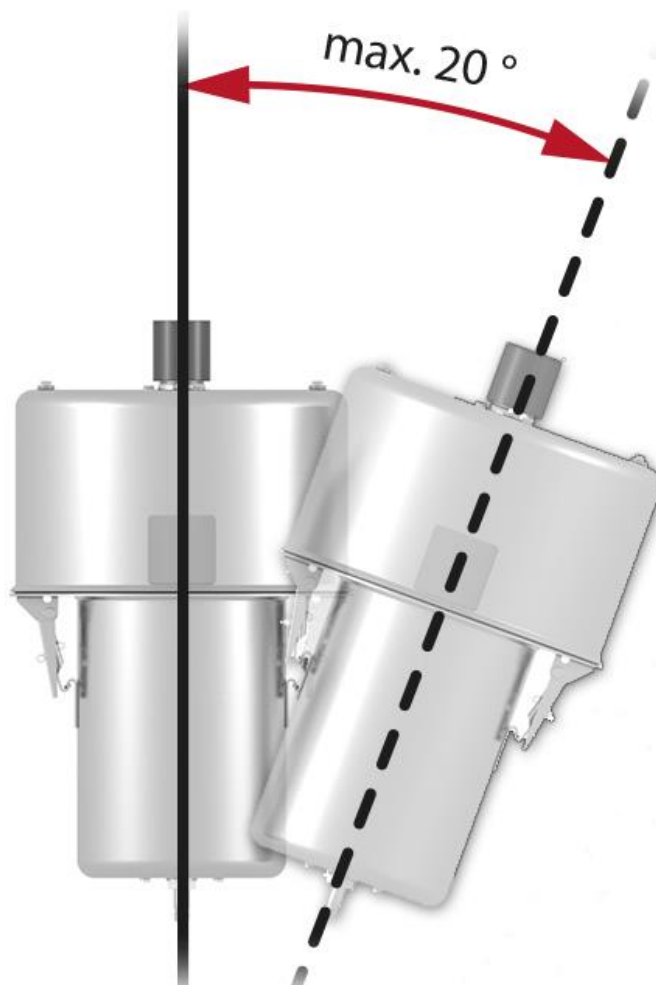


Figure 8: Installation position

- The VisGuard 2 must not be installed in the direct flow area of the ventilation system as different wind speeds and sandblasting effects can cause measuring faults.
- A vertical installation position is recommended. Increased soiling of the optics can be expected at deviations of more than 20°.

Mount the VisGuard 2 as follows:



	<b>WORKSTEP</b>	<b>ADDITIONAL INFO / IMAGES</b>
1.	Attach the screws in the measuring position according to the <b>VisGuard2-MB</b> dimension sheet.	
2.	Fasten the VisGuard 2 in place.	

## 4.2 Distances and corresponding cable cross-sections

The maximum distance (X) between the photometer and connection box is limited and depends on the cable cross-section used and the possible use of a 24 VDC sample heater. Shielded cables must be used.

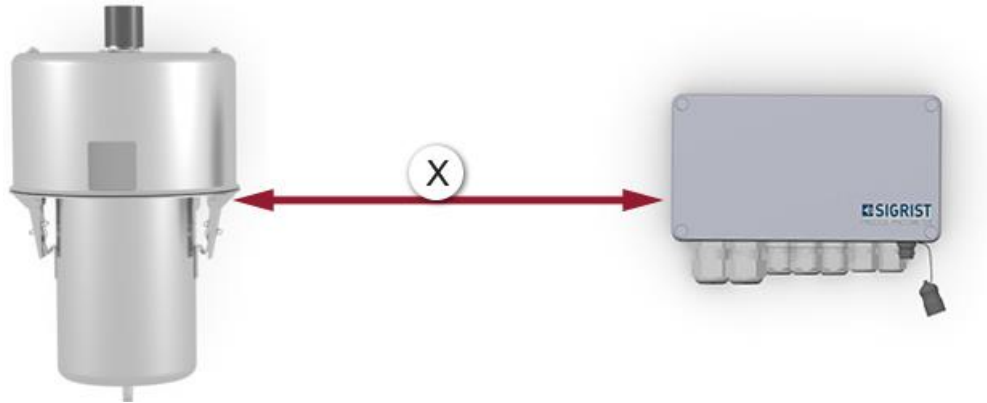


Figure 9: Arrangement of the components with the SIPORT 2 connection box

Cable cross-section **without** sample heater:

Cable cross-section [mm <sup>2</sup> ]	Max. length (X) [m]	Supplementary information
<b>0.50</b>	<b>140</b>	Standard for connection to SICON
0.75	200	
<b>1.00</b>	<b>250</b>	Standard for connection to SIPORT 2
1.50	400	
2.50	700	

Cable cross-section **with** 24 VDC sample heater:

Cable cross-section [mm <sup>2</sup> ]	Max. length (X) [m]	Supplementary information
<b>0.50</b>	<b>50</b>	Standard for connection to SICON
0.75	75	
<b>1.00</b>	<b>100</b>	Standard for connection to SIPORT 2
1.50	140	
2.50	250	

### 4.3 Mounting the optional junction box

A junction box is recommended in the event of longer cable distances. This should be positioned close to the photometer. The junction box is fastened using four screws on a solid, level surface according to the drawing **VDV1-MB**.

### 4.4 Mounting the SIPORT 2 connection box

The SIPORT 2 connection box is fastened using four screws on a solid, level surface according to the drawing **SIPORT2-MB**.


### 4.5 Mounting the SIPORT 2 without housing



**WARNING!**

#### **Life-threatening voltage on the SIPORT 2 without housing.**

Touching the SIPORT 2 without housing (SIPORT 2 connection print) can be potentially fatal. System components can also be damaged.

- The printed circuit board must be protected from environmental factors such as soiling and humidity.
- The SIPORT 2 without housing must only be accessible to authorized personnel.
-  Electrical contact protection must be ensured by the customer. Otherwise, the mains voltage is freely accessible on the rear of the printed circuit board.

The SIPORT 2 without housing is designed for installation in an electrical cabinet and is fastened using four screws (circles).

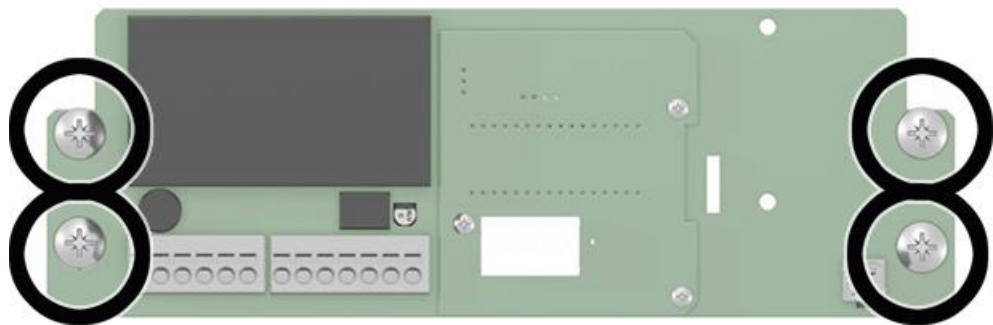
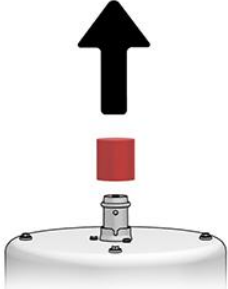
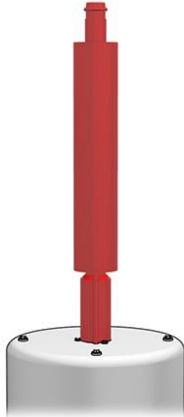
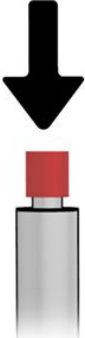

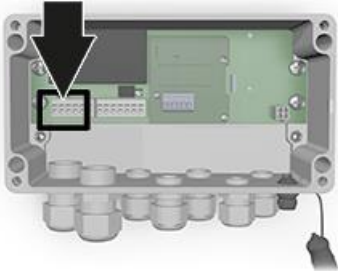


Figure 10: SIPORT 2 connection print without housing

## 4.6 Installing the 230 VAC sample heater on the VisGuard 2

Proceed as follows to install the sample heater:



	WORKSTEP	ADDITIONAL INFO / IMAGES								
1.	Remove the splash guard from the sample inlet of the VisGuard 2.									
2.	Insert the sample heater up to the stop in the sample inlet.									
3.	Attach the splash guard to the sample heater.									
4.	Establish the electrical connections to the SIPOINT 2 (arrow): <table border="1" data-bbox="467 1641 1002 1776"> <tr> <td>Terminal</td> <td>1 (P)</td> <td>2 (N)</td> <td>3 <math>\perp</math></td> </tr> <tr> <td>Color</td> <td>Brown</td> <td>Blue</td> <td>Yellow/green</td> </tr> </table>  Fuse protection is ensured via the line fuse of the SIPOINT 2 power supply.	Terminal	1 (P)	2 (N)	3 $\perp$	Color	Brown	Blue	Yellow/green	
Terminal	1 (P)	2 (N)	3 $\perp$							
Color	Brown	Blue	Yellow/green							

### 4.7 Mounting the SICON (M)



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Open the shutters.	
2.	Fasten the control unit to the wall using four screws (circles).	

## 5 Electrical installation

### 5.1 Safety pointers for the electrical connection



**DANGER!**

**The improper electrical connection of the components can be potentially fatal. The components can also be damaged.**

Note the following basic principles for the electronic connection:

- Local regulations must be observed at all times.
- Because the system has no main switch, a suitable disconnection device (switch, plug) should be installed near the service voltage. It must be designated and easily accessible.
- The power supply must have a back-up fuse with a max. tripping current of 16 A. The cables must be able to withstand this load.
- The mains cable must be able to withstand an ambient temperature of 70 °C.
- It is imperative that the protective conductor is connected.
- The system must not be charged with voltage until the installation is completed and all covers are mounted.
- If faults cannot be remedied, the system must be put out of operation and protected against inadvertent operation.

## 5.2 Installation with SIPOINT 2

### 5.2.1 Connecting the SIPOINT 2



The cable glands must be adjusted according to the outer diameter of the cables. The following cable glands are available:

- 2 x 8 .. 17 mm
- 3 x 8 .. 13 mm
- 2 x 5 .. 10 mm

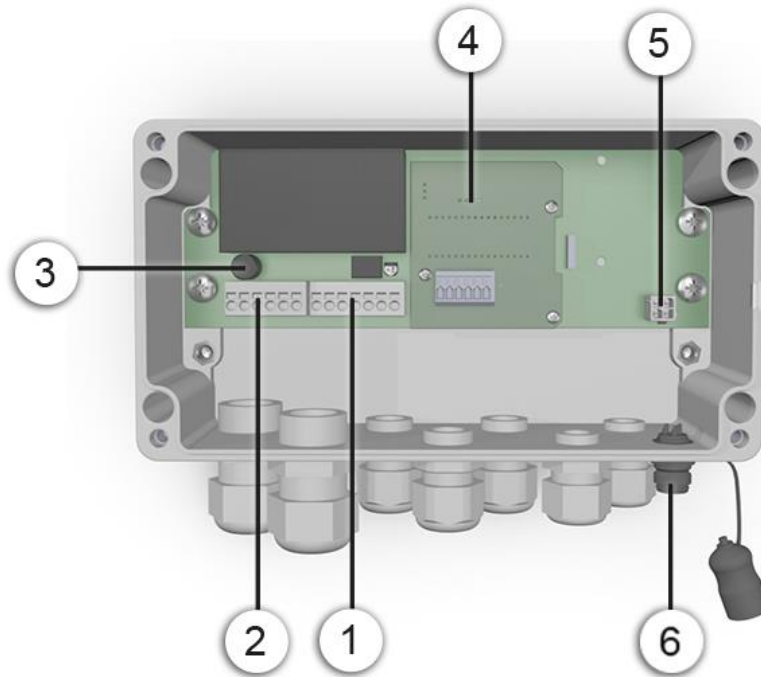


Figure 11: SIPOINT 2 when open

<p>① Photometer connection (cable cross-section: 0.2 .. 4.0 mm<sup>2</sup>)</p> <p><b>1</b> Optional connector available</p>	<p>② Connection for mains voltage and sample heater, 230 VAC (cable cross- section: 0.2 .. 4.0 mm<sup>2</sup>)</p>
<p>③ Fuse (microfuse 250V 2AT RM5)</p>	<p>④ The SIPOINT 2 is always fitted with one of the following interface modules:</p> <ul style="list-style-type: none"> <li>▪ Profibus DP</li> <li>▪ Modbus RTU</li> <li>▪ StromRel</li> <li>▪ Profinet IO</li> </ul> <p>(cable cross-section: 0.08 .. 1.5 mm<sup>2</sup>)</p>
<p>⑤ Connection of portable control unit on SIPOINT 2 without housing</p>	<p>⑥ Connection of portable control unit on SIPOINT 2 with housing</p>



A high-temperature cable must be used for the connection. Establish the electrical connections in the SIPORT 2 as follows:



TERMINAL NUMBER	MEANING	CABLE COLOR (SIGRIST) 8 WIRES	REMARKS
4	GND	Black and white	Photometer connection (Figure 11, pos. 1)
5	+24 V	Green and brown	
6	SA (RS-485)	Blue	
7	SB (RS-485)	Red	
8	A (RS-485)	Gray	
9	B (RS-485)	Yellow	
10		Drain wire	
1	P	Live	Mains voltage connection (Figure 11, pos. 2) Terminal pair for forwarding to other instruments (max. 16 A)
2	N	Neutral	
3		Protective earth	

### 5.2.2 Connecting the SIPORT 2 without housing

Installation is made according to Section 5.2.1.

The following requirements apply when installing the SIPORT 2 without housing:



**DANGER!**

**Life-threatening voltage on the SIPORT 2 without housing.**

Touching the SIPORT 2 without housing (SIPORT 2 connection print) can be potentially fatal. System components can also be damaged.

- Local regulations for electrical installations must be observed at all times.
- Installation may only be carried out by a trained electrician.
- The printed circuit board must be protected from environmental factors such as soiling and humidity.
- The SIPORT 2 without housing must only be accessible to authorized personnel.
- Electrical contact protection must be ensured by the customer. Otherwise, the mains voltage is freely accessible on the rear of the printed circuit board.

## 5.3 Connecting the field bus interfaces

### 5.3.1 Profibus DP: Overview and installation

- To connect to the Profibus DP, the Profibus module must be integrated in the SIPORT 2.
- In the **Digi.interf. \ General** menu, the **Module type** must be set to **Profibus DP** and the **Module location** to **SIPORT 2**.
- To be able to work with the Profibus, the bus parameters in the **Digi. interf. \ Profibus** menu must be set correctly. If the associated parameters are changed, the function becomes effective only after a restart.
- If the photometer is used as a terminal device, DIL switch S2/1 must be switched ON on the connection module (Figure 13, pos. 3).
- The addressing of the Profibus DP interface is described in Section 8.7.

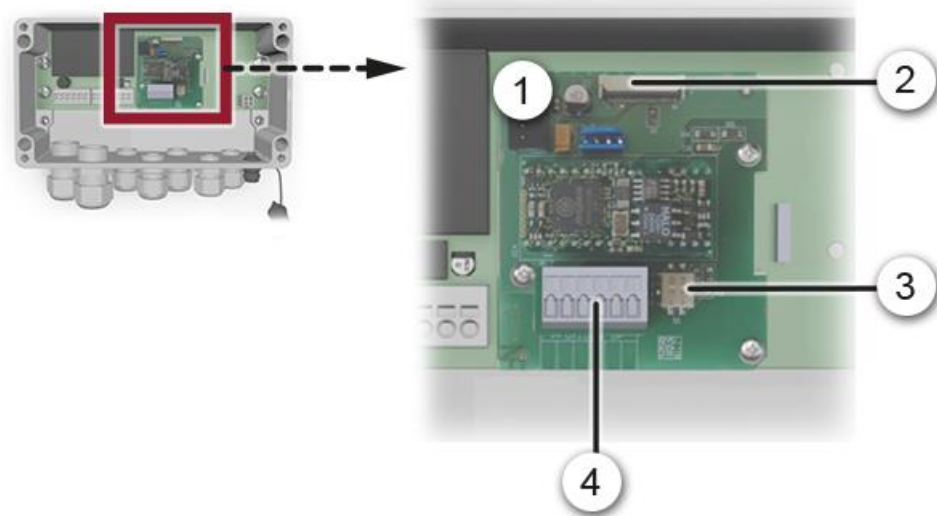


Figure 12: Overview of the Profibus DP module in the SIPORT 2

①	Fieldbus interface (connection print) for Profibus DP	②	Connector for SIPORT 2 print
③	DIL switch for end resistors. Switches (1 and 2) must be <b>ON</b>	④	Profibus DP terminals (Cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )

The Profibus DP/Modbus RTU terminals are assigned as follows:

TERMINALS	MODBUS / PROFIBUS	FUNCTIONAL DESCRIPTION
11 $\equiv$	Ground IN	Connection for cable shielding
12 A	RS485-A IN	Data connection
13 B	RS485-B IN	Data connection
14 $\equiv$	Ground OUT	Connection for cable shielding
15 A	RS485-A OUT	Data connection
16 B	RS485-B OUT	Data connection

### 5.3.2 Profinet IO: Overview and installation

- To connect to the Profinet IO, the Profinet IO module must be integrated in the SIPOINT 2.
- The module has an internal switch and provides two Ethernet ports.
- The cable is connected directly to the RJ45 plug of the Profinet IO module inside the instrument or via external M12 connectors.

**⚠** When connecting directly to the RJ45 plug, please note that only plugs with a short and flat design can be used.

- In the **Digi.interf. \ General** menu, the **Module type** must be set to **Profinet IO** and the **Module location** to **SIPOINT 2**.
- In the **Digi.interf. \ Profinet** menu, the station name, MAC address and connection status are shown. Moreover, it can be defined here whether the data should only be read or be read and written.

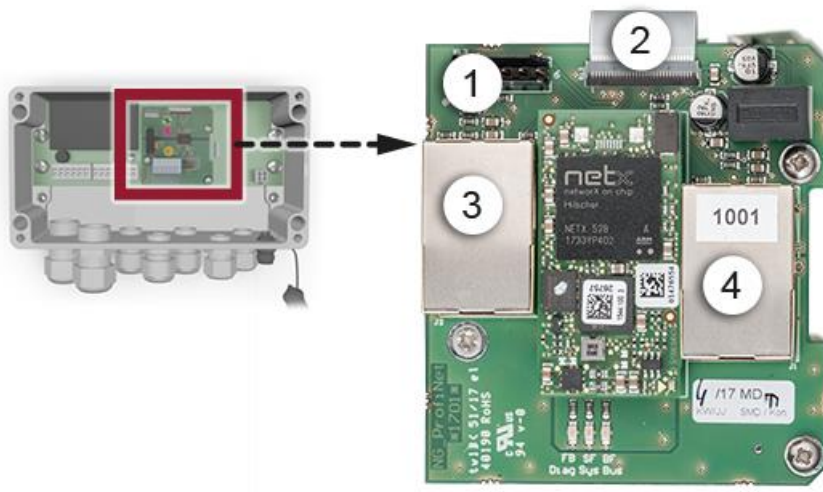


Figure 13: Overview of the Profinet IO module in the SIPOINT 2

①	Fieldbus interface (connection print) for Profinet IO	②	Connector for SIPOINT 2 print
③	Ethernet port 1	④	Ethernet port 2

### 5.3.3 Modbus RTU with repeater: Overview and installation

- To connect to the Modbus RTU with repeater, a Modbus module must be integrated in the SIPOINT 2.
- In the **Digi.interf. \ General** menu, the **Module type** must be set to **Modbus** and the **Module location** to **SIPOINT 2**.
- To be able to work with the Modbus, the bus parameters in the **Digi. interf. \ Modbus** menu must be correctly set. If the associated parameters are changed, the function becomes effective only after a restart.
- If the photometer is used as a terminal device, DIL switch S2/1 must be switched ON on the connection module (Figure 14, pos. 3).
- The addressing of the Modbus RTU interface is described in Section 8.9.
- Either a SICON M control unit or in-house control unit can be used as the Modbus master.
- A twisted pair, shielded cable (SF/UTP) should be used. Characteristic impedance  $120 \pm 20 \text{ Ohm}$ , capacitance  $< 60 \text{ pF/m}$ .
- In order to prevent equalizing currents on the shielding, the shielding is grounded via a capacitor on the insulated connection.

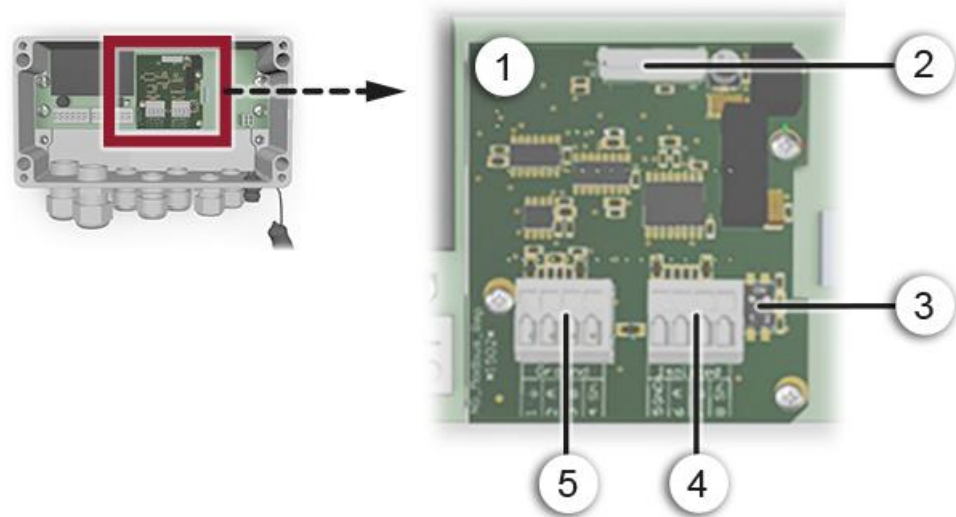


Figure 14: Overview of the Modbus RTU module in the SIPOINT 2

①	Fieldbus interface (connection print) for Modbus RTU with repeater	②	Connector for SIPOINT 2 print
③	DIL switch for matching resistors. Switches (1 and 2) must be <b>ON</b>	④	Modbus RTU terminals. Galvanically isolated. (Cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )
⑤	Modbus RTU terminals. Connected to ground potential. (Cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )		

The terminals of the RTU module are configured as follows:

TERMINALS	MODBUS	POTENTIAL	FUNCTIONAL DESCRIPTION
1 $\equiv$	GND – to ground potential	Ground potential	Connection of the GND line
2 A	RS485-A IN		Data connection
3 B	RS485-B IN		Data connection
4 Sh	Shield		Connection for cable shielding
5 GND	GND	Galvanically isolated	Connection of the GND line
6 A	RS485-A OUT		Data connection
7 B	RS485-B OUT		Data connection
8 Sh	Shield		Shielding via capacitor to ground potential

**Additional information on the Modbus RTU with repeater**

This module has a connection related to ground potential and a galvanically isolated connection. The signals are amplified so that several modules can be connected in series. To do this, a connection related to ground potential must always be connected to a galvanically isolated connection. The ground line must be used.

## 5.4 Connecting the analog modules

### 5.4.1 StromRel module: Overview and installation

- The configuration of the StromRel module is described in the Section 8.3.
- In the **Digi.interf. \ General** menu, the **Module type** must be set to **StromRel** and the **Module location** to **SIPORT 2**.
- The current outputs can be loaded with up to 500 Ohm.
- Using the semiconductor relay, currents up to 120 mA and voltages up to 50 V can be connected.
- The typical resistance when switched on is 20 Ohm. The switch is normally open.
- A connection diagram can be found in the reference manual.

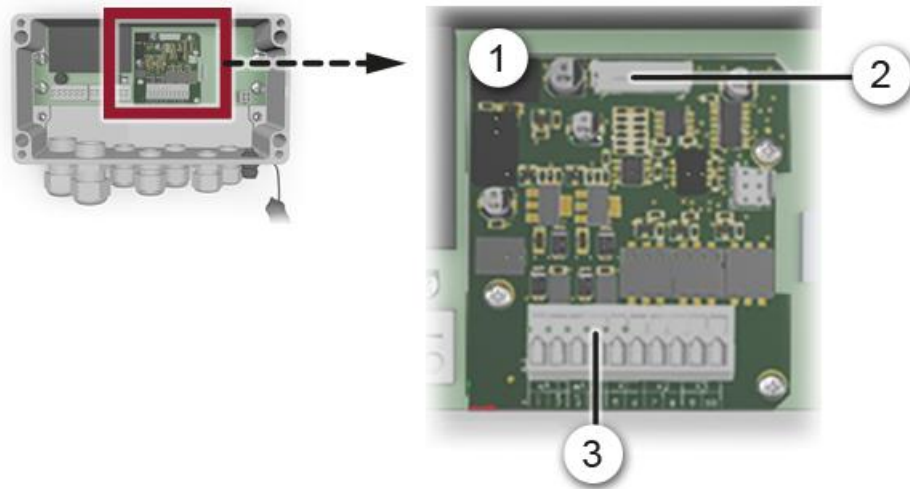


Figure 15: Overview of the StromRel module in the SIPORT 2

①	Interface for StromRel module	②	Connector for SIPORT 2 print
③	Terminals for StromRel module (Cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )		

The terminals of the StromRel module are configured as follows:

TERMINALS	FUNCTION	DESCRIPTION
1	mA 1 -	Current output 1
2	mA 1 +	
3	mA 2 -	Current output 2
4	mA 2 +	
5, 6	C1	Semiconductor relay 1
7, 8	C2	Semiconductor relay 2
9, 10	C3	Semiconductor relay 3

### 5.4.2 Current/Digi. input for SIPOINT 2

- Two 0/4 .. 20 mA current inputs are available.
- Both active and passive sensors can be connected.
- A digital input is available for connecting a fan with tacho output or a pressure monitor.

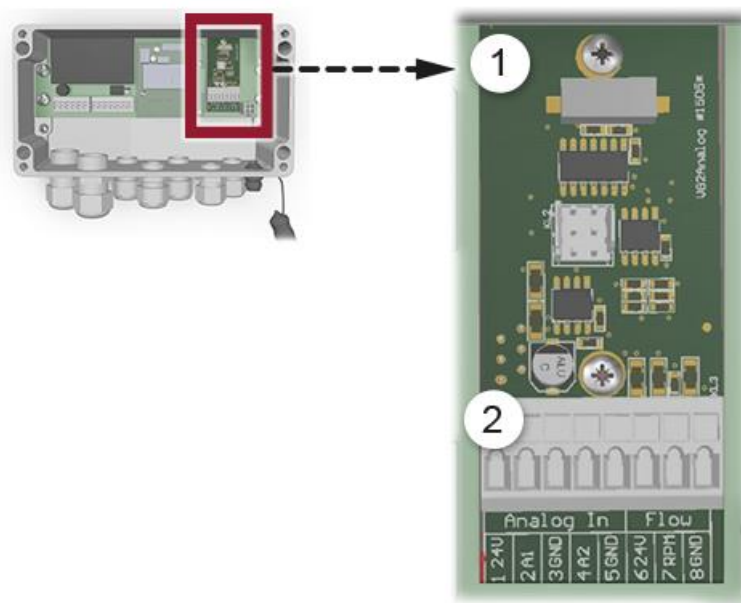


Figure 16: Overview of the current/Digi. input module in the SIPOINT 2

①	Current/Digi. input module	②	Terminals for the current/Digi. input module (cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )
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The terminals of the current/Digi. input module are configured as follows:

TERMINALS	FUNCTION	DESCRIPTION
1	24V	24V for passive sensors
2	A1	Current input 1
3	GND	
4	A2	
5	GND	Current input 2
6	24V	
7	RPM	
8	GND	Connection for fan with tacho signal or pressure monitor

### 5.4.3 Connecting an external analog sensor

- Connection is made on the optional current/Digi. input add-on module according to Section 5.4.2.
- A passive 4 .. 20 mA sensor is connected between terminals 1 (24V) and 2 (A1) or 4 (A2).
- An active 0/4 .. 20 mA sensor is connected between terminals 2 (A1) and 3 (GND) or between terminals 4 (A2) and 5 (GND).
- The analog input must be activated in the **Ana.channels \ Analog n \ Measurement** menu.
- The parameterization of the analog input is described in the Reference Manual.

### 5.4.4 Connecting a pressure monitor on extractive systems

- Connection is made on the optional current/Digi. input add-on module according to Section 5.4.2.
- A pressure monitor is connected to terminals 7 (RPM) and 8 (GND).
- The pressure monitor closes a contact when a sufficient sample volume is present.
- Monitoring is made via the **Spec. Function \ Ventilator limit** parameter.
- A value of 1.0 should be entered as the limit.
- If the contact does not close between terminals 7 and 8 for longer than 10 seconds, then the "VENTILATOR" warning is output.



### 5.4.5 Connecting the optional junction box

The photometer is connected to the junction box via a connector (1). There is the possibility of connecting the junction box to the SICON-C (2) portable control unit. This enables operation directly on the photometer during servicing duties. Two cable glands (4) are available for connecting to the control system.

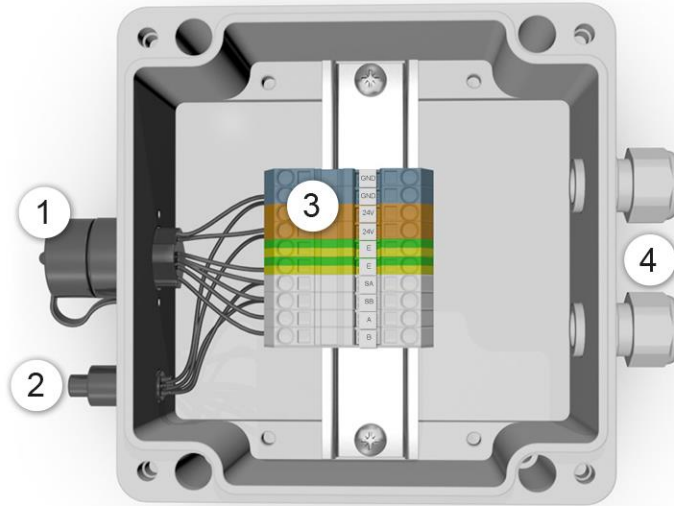


Figure 17: Junction box when open

①	Instrument socket for connecting the photometer	②	Instrument socket for connecting the SICON-C
③	Terminal strip (cable cross-section: 0.08 .. 1.5 mm <sup>2</sup> )	④	Two cable glands, clamping range 8 .. 13 mm

Establish the electrical connections in the junction box as follows:



Terminal designation	Cable color (Sigrist) 8 Wires with SIPORT 2	Cable color (Sigrist) 4 Wires with SICON	Remarks
GND	Black	Blue	Are connected to each other
GND	White	–	
24V	Green	Red	Are connected to each other
24V	Brown	–	
E, ground / $\perp$	–	Cable shielding	
E, ground / $\perp$	–	–	
SA	Blue	Gray	
SB	Red	Yellow	
A	Gray	–	
B	Yellow	–	

## 5.5 Connecting the SICON (M)

### 5.5.1 Opening the cover on the SICON (M)



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Open the shutters.	
2.	Loosen the fastening screws on the cover.	
3.	Open the cover.	
4.	Fasten the cover with the cover clamp. To do this, remove the cover clamp from the park position (X) and fasten the cover in position (Y).	

### 5.5.2 Overview of the opened SICON (M) control unit

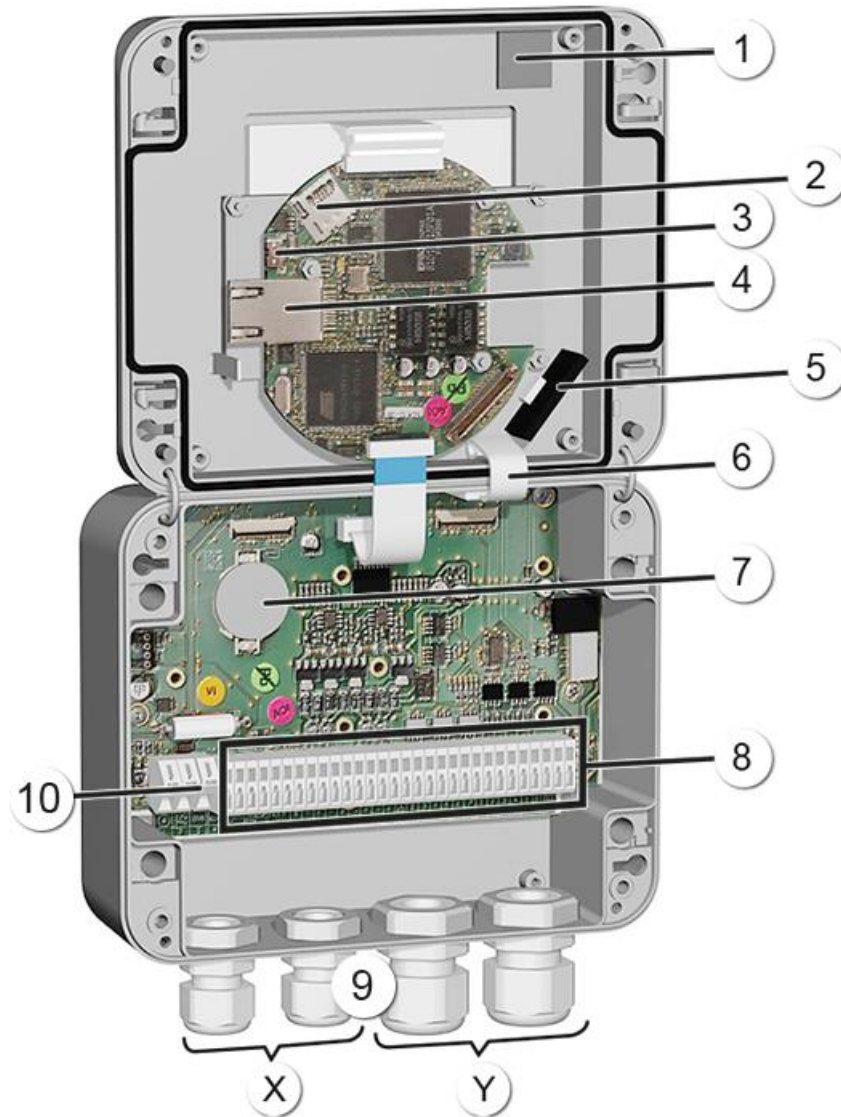


Figure 18: Overview of SICON (M)

①	Park position for cover clamp	②	microSD card (card for log data)
③	USB connection	④	Ethernet connection
⑤	SD card adapter with holder	⑥	Cover clamp in holding position
⑦	Battery	⑧	External connections
⑨	Cable glands X: 4 .. 8 mm Y: 8 .. 13 mm	⑩	Connections for the service voltage 24 VDC

### 5.5.3 Installation of the SICON (M)



**DANGER!**

**Life-threatening voltage inside the instrument.**

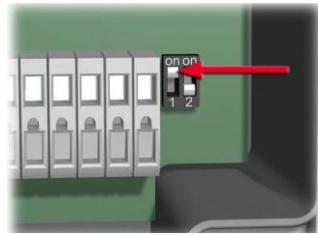
Connecting electrical lines can be extremely dangerous. Instrument parts may also be damaged. Local regulations for electrical installations must be observed at all times.



Figure 19: SICON (M) terminal block

Establish the electrical connections in the following sequence:



	TERMINAL	MEANING	REMARKS
1.	8 .. 11	Connection to the photometer	Terminal 8: GND (Ground) => Cable color: Blue
			Terminal 9: 24 V => Cable color: Red
			Terminal 10: A => Cable color: Gray
			Terminal 11: B => Cable color: Yellow
2.	4 .. 7	Connection of the external expansion module (optional)	
3.	12 .. 19	Curr. outputs 1 .. 4	Maximum loop resistance 500 Ohm.
4.	21 .. 27	Digital optocoupler outputs	Terminal 21 is closed de-energized
			Terminals 22 .. 27 are open de-energized
5.	28 .. 32	Digital inputs	
6.	33 .. 34	Internal power supply for operating signals	DIL switch (1) must be ON. → Reference Manual
			
7.	1 .. 3	Service voltage	24 VDC



The use of operating signals is described in the Reference Manual.

## 5.6 Connecting the field bus interfaces (optional)



Information on commissioning the field bus interfaces can be found in the Reference Handbook.

### 5.6.1 Overview of Profibus DP and Modbus RTU

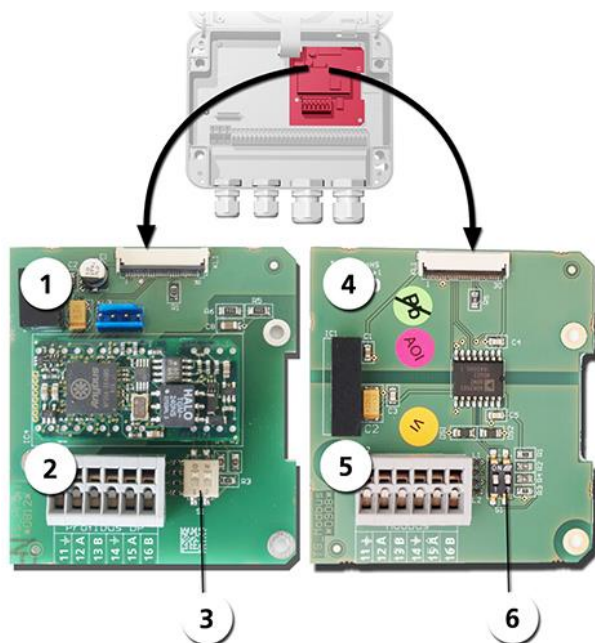


Figure 20: Overview of the Profibus DP and Modbus RTU modules

①	Field bus interface (connection PCB) for <b>Profibus DP</b> .	④	Field bus interface (connection PCB) for <b>Modbus RTU</b> .
②	Profibus DP terminals.	⑤	Modbus RTU terminals.
③	DIL switch for matching resistors. Switches (1 and 2) must be <b>ON</b> .	⑥	DIL switch for matching resistors. Switches (1 and 2) must be <b>ON</b> .

### 5.6.2 Connecting the Profibus DP or Modbus RTU

The terminals on the Profibus DP or Modbus RTU module are assigned as follows:

TERMINALS	PROFIBUS/ MODBUS	FUNCTIONAL DESCRIPTION
11 $\equiv$	Ground IN	Connection for cable shielding
12 A	RS 485-A IN	Data connection
13 B	RS 485-B IN	Data connection
14 $\equiv$	Ground OUT	Connection for cable shielding
15 A	RS 485-A OUT	Data connection
16 B	RS 485-B OUT	Data connection

### 5.6.3 Overview of Profinet IO

- To connect to the Profinet IO, the Profinet IO module must be integrated in the SICON (M).
- The module has an internal switch and provides two Ethernet ports.
- The cable is connected directly to the RJ45 plug of the Profinet IO module inside the instrument or via external M12 connectors.

**⚠** When connecting directly to the RJ45 plug, please note that only plugs with a short and flat design can be used.

- In the **Digi.interf. \ General** menu, the **Modul type** must be set to **Profinet IO**.
- In the **Digi.interf. \ Profinet** menu, the station name, MAC address and connection status are shown. Moreover, it can be defined here whether the data should only be read or be read and written.

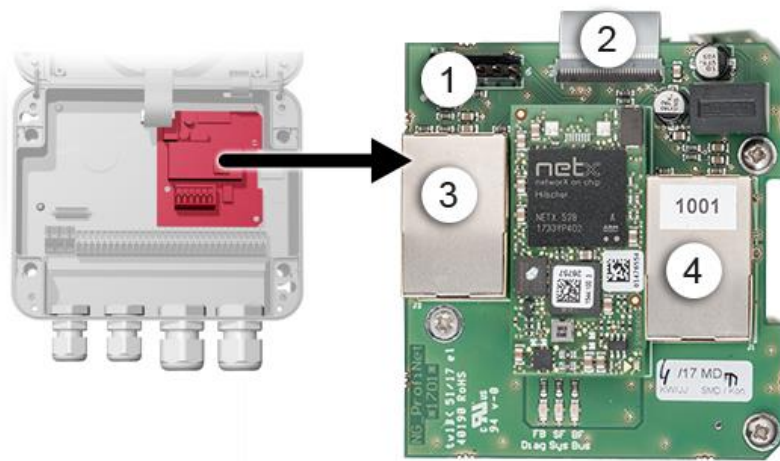


Figure 21: Overview of the Profinet IO module

①	Field bus interface (connection print) for Profinet IO	②	Connector for SICON (M)
③	Ethernet port 1 (can be used as in- or output)	④	Ethernet port 2 (can be used as in- or output)

### 5.6.4 Overview of HART



Information on commissioning the field bus interfaces can be found in the Reference Handbook.

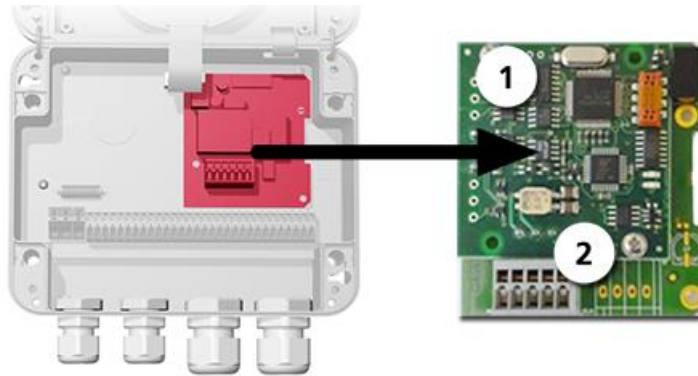


Figure 22: Overview of the HART module

①	Field bus interface (connection PCB) for HART. Serves as interface to HART.	②	HART terminals
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### 5.6.5 Connecting to HART

The terminals of the HART module are configured as follows:

Terminals	HART	Functional description
1	mA+ In	Must be connected with terminal 13 (mA 1+) of SICON (M).
2	mA- In	Must be connected with terminal 12 (mA 1-) of SICON (M).
3	Shield	Cable shielding.
4	mA+ Out	Current output 1 (+) with HART.
5	mA- Out	Current output 1 (-) with HART.

The loop resistance on current output 1 can be between 230 and 500 Ohm for HART communication.



## 5.7 Connecting the analog modules (optional)

### 5.7.1 Overview of 4-way current output

The configuration of the current outputs is described in the Section 8.3.

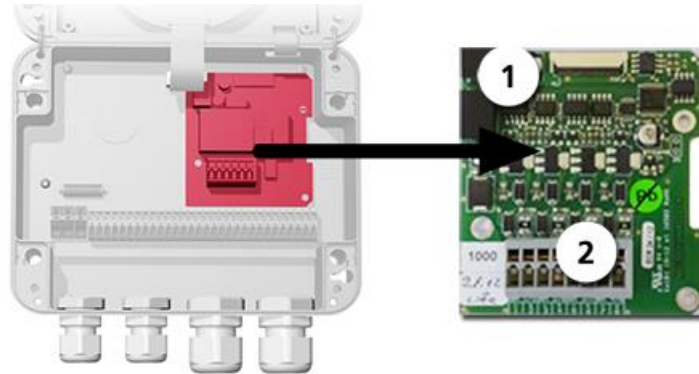


Figure 23: Overview of the 4-way current output module

①	4-way current output	②	Terminals
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### 5.7.2 Connecting the 4-way current output

The terminals of the 4-way current output are configured as follows:

Terminals	4-way current output	Functional description
1	mA 5 -	Current output 5
2	mA 5 +	
3	mA 6 -	Current output 6
4	mA 6 +	
5	mA 7 -	Current output 7
6	mA 7 +	
7	mA 8 -	Current output 8
8	mA 8 +	

The burden on the current outputs can be a maximum of 500 Ohm.



### 5.7.3 Overview of the 4-way current input

The configuration of the current inputs is described in the Reference Handbook.

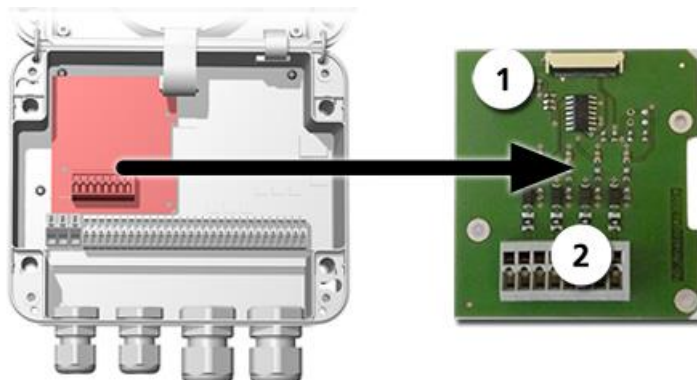


Figure 24: Overview of the 4-way current input module

①	4-way current input	②	Terminals
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### 5.7.4 Connecting the 4-way current input

The terminals of the 4-way current input are configured as follows:

Terminals	4-way current input	Functional description
1	In 1 -	Current input 1
2	In 1 +	
3	In 2 -	Current input 2
4	In 2 +	
5	In 3 -	Current input 3
6	In 3 +	
7	In 4 -	Current input 4
8	In 4 +	

Current inputs 1 .. 4 are intended for connecting external 0/4 .. 20 mA signals. The inputs are not galvanically isolated and the negative inputs are connected to the ground of the instrument. The input resistance is 100 Ohm.

### 5.7.5 Connecting an external analog sensor

- Connection is made on the 4-way current input module (Section 5.7.3).
- A passive 4 .. 20mA sensor is connected between terminal 9 (24V) of the SICON and terminal 2 (In 1+) of the 4-way current input.
- An active 0/4 .. 20 mA sensor is connected between terminal 2 (In 1+) and 1 (In 1-) of the 4-way current input.
- The inputs must be activated in the **Spec. Function \ No.of Cur.In.** menu and are then available as additional measuring channels C6 .. C8.
- The parameterization of measuring channels C6 .. C8 is described in the Reference Manual.

### 5.7.6 Connecting a pressure monitor on extractive systems

- A pressure monitor is connected to terminals 28 (Input 1) and 30 (ST) of the SICON.
- DIL switch S2/-1 must be ON.
- The pressure monitor closes a contact when a sufficient sample volume is present.
- In the **Inputs / outputs / Inputs / I1** menu, set to External and Invert.
- In the **Inputs/outputs / Inputs/General** menu, enter a fault name under **Name ext.in.** (e.g. FLOW) and set the **Prio.ext.in.** parameter to Warning.

### 5.7.7 Connecting the optional 24 VDC power supply



**DANGER!**

**Life-threatening voltage due to accidentally released voltage-carrying wires.**

- The wires of the supply connection must be secured with cable ties so that if one wire accidentally becomes loose no other parts can be charged with voltage.
- Cable with an outer diameter of 4 to 8 mm must be used.

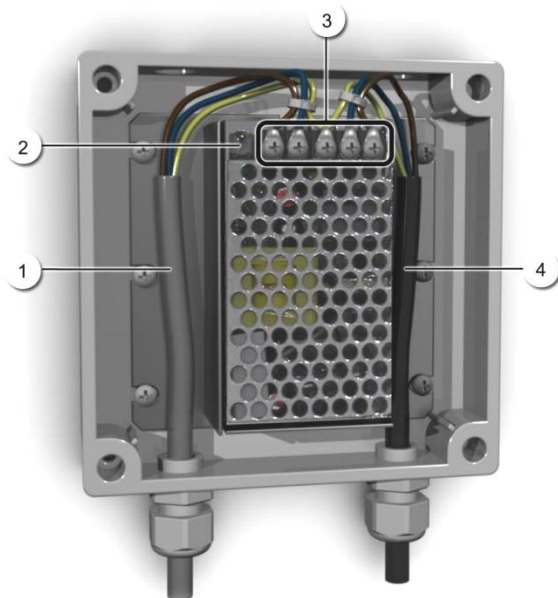


Figure 25: Optional power supply with removed cover

①	Cable to SICON (24 VDC)	②	Indicator lamp
③	Screw terminals	④	Cable from mains (100-240 VAC)

The terminals are assigned as follows for connecting the mains device:

Terminal designation in the power supply	Cable color	Terminal designation in the SICON	Function
+24 V	Brown	2: 9 V to 30 V	24 VDC
RTN	Blue	3: GND	Ground
Protective ground	Yellow-green	1: Ground connection	Ground connection
Protective ground			Mains protective ground
N			Mains neutral conductor
L			Mains live




# 6 Commissioning



The initial start-up of the web user interface is described in the Reference Manual.

Proceed with the initial start-up in accordance with the following table:



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Ensure that all components are correctly mounted and connected.	Section 4 and Section 5
2.	2.1: Establish the service voltage. On installations with SIPORT 2: 2.2: Plug the SICON-C into the SIPORT 2 according to Section 7.3 and wait until the welcome screen appears in the display.  The factory setting language is English.	
	2.3: The instrument is ready for measurement.	
3.	Set the language.	Section 8.1
4.	Set the current outputs.	Section 8.3
5.	Set the limits.	Section 8.4
6.	Set the outputs.	Section 8.5
7.	Set the recalibration.	Section 8.6
8.	If an optional Profibus module is present, set the Profibus parameters.	Section 8.7
9.	If an optional Profinet IO module is present, set the Profinet parameters.	Section 8.8
10.	If an optional Modbus module is present, set the Modbus parameters.	Section 8.9
11.	Set the date and time.	Section 8.2
12.	Enter the access code.	Section 8.10
13.	Carry out recalibration.	Section 9.6
14.	Back up the configured data.	Section 8.11

## 6.1 Additional measuring channels for smoke measurement

The VisGuard 2 can be used as both a visibility detector and smoke detector. To do this, a mode is available where the VisGuard 2 acts in the same way as a FireGuard 2 smoke detector (see Reference Manual).

To enable this function, the following channels are available in addition to the channel used for measuring the turbidity (**Turb**):

- Turbidity gradient (**Turb.Gr**): Change in turbidity per minute
- Temperature (**Temp**): Inner temperature of the instrument
- Temperature gradient (**Temp.Gr**): Change in temperature per minute
- Turbidity value without integration time (**Turb 0s**): For smoke detection



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The temperature measurement is an internal measurement that reacts with a delay.

---

# 7 Operation

## 7.1 Operation basics

In this document we describe the practical examples only for the first steps of the menu configuration. All other setting options are described in the Reference Handbook. Operation using the web user interface is described in detail in the Reference Handbook.



The instrument has a touchscreen. It is operated by touching with your finger. The navigation elements change color when touched.



**CAUTION!**

### Sensitive touchscreen.

The touch screen can be damaged through improper handling. Damage can be avoided with the following measures:

- Touch the touchscreen only with your fingers and not with sharp objects.
- Use only slight pressure to perform manipulations on the touchscreen.
- Do not use chemicals or solvents to clean the touchscreen.

## 7.2 LED display on the photometer

The VisGuard 2 has a red LED (circle) in order to indicate the most important events during measuring operation without a control unit.



Figure 26: Position of the LED display

The events are indicated on the LED according to the following table:

<b>LED status on the photometer</b>	<b>Meaning</b>	<b>Measures</b>
LED permanently off	Instrument is switched off or defective.	Switch on the instrument.
LED flashes every 15 seconds	The instrument is in measuring operation without faults.	
LED switches on and off in one-second intervals	Checking unit recording is running.	Wait until the LED goes out for 5 seconds.
LED switches on and off in four-second intervals	Limit is exceeded	Carry out the corresponding measures.
LED permanently lit	Fault	Isolate the fault according to Section 10.

### 7.3 Connecting SICON-C to SIPORT 2

The SICON-C (2) is connected to the SIPORT 2 (1) on the connector (X). The protection cap on the SIPORT 2 must be removed beforehand. If the SIPORT 2 is connected to the service voltage, the SICON-C starts automatically.

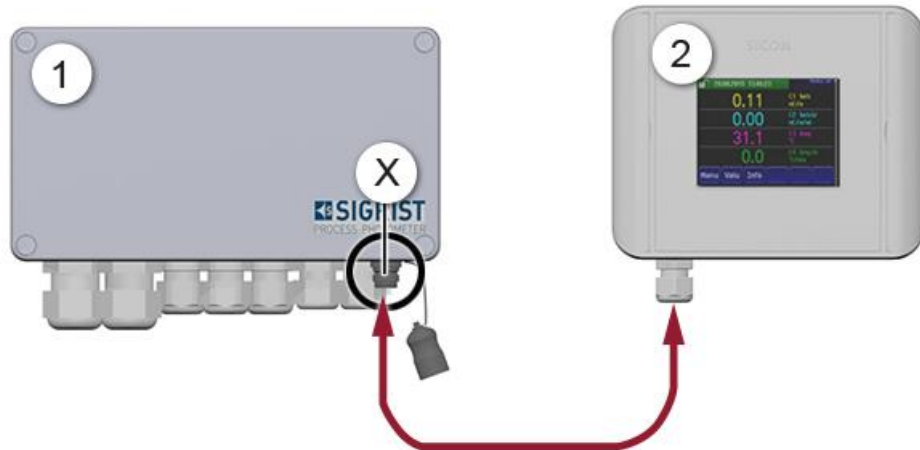


Figure 27: Connecting the SICON-C to the SIPORT 2 with housing

①	SIPORT 2	②	SICON-C
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The SICON-C has a touchscreen. Operation is made by touching the screen with your finger. The navigation elements change color when touched.



**CAUTION!**

**Sensitive touchscreen.**

The touch screen can be damaged through improper handling. Damage can be avoided with the following measures:

- Touch the touchscreen only with your fingers and not with sharp objects.
- Use only slight pressure to perform manipulations on the touchscreen.
- Do not use chemicals or solvents to clean the touchscreen.

**Protection class IP66**

If the Sicon-C connection plug is not used, the protective cap must always be mounted and be completely closed to ensure the protection class IP66.



## 7.4 Connecting the SICON-C to the SIPORT 2 without housing

The SICON-C (2) is connected to the SIPORT 2 without housing (1) on the connector (X). If the SIPORT 2 is connected to the service voltage, the SICON-C starts automatically.

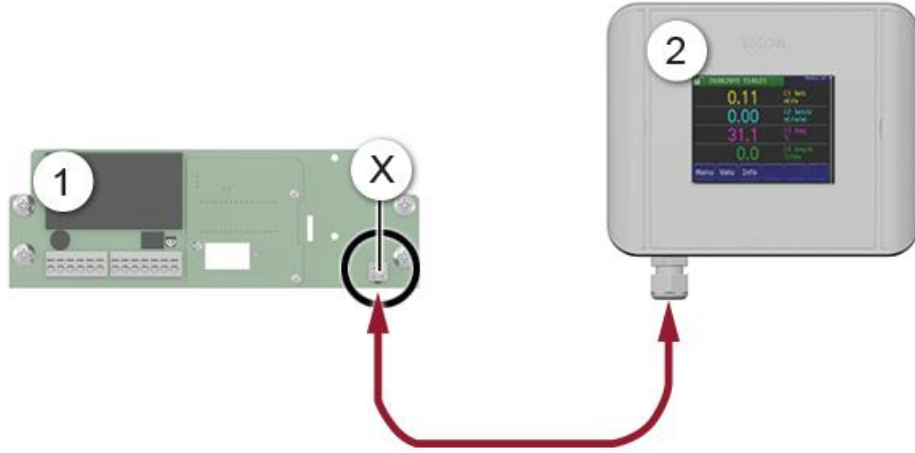


Figure 28: Connecting the SICON-C to the SIPORT 2 without housing

①	SIPORT 2 without housing	②	SICON-C
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## 7.5 Control elements in measuring mode



Figure 29: Control elements in measuring mode

①	<b>Menu</b> button Calls up the menu structure (Section 7.6)	②	<b>Valu</b> button Numerical representation of the measuring values (Section 7.7)
③	<b>Info</b> button Displays the information screen (Section 7.8)	④	<b>Diag</b> button Graphical representation of the measuring values (Section 7.9)
⑤	<b>Up arrow</b> Goes to the previous page.	⑥	<b>Down arrow</b> Goes to the next page.

## 7.6 Menu button

Pressing the **Menu** button and entering the access code takes you to the menu structure. Now the instrument is in service mode. Operator prompting in service mode is described in Section 7.14.

## 7.7 Valu button

Pressing the **Valu** button displays the measuring values in numerical form. This is described in detail in Section 7.11.

## 7.8 Info button

When you press the **Info** button, a general overview of the instrument settings appears. These are described below:

### 7.8.1 Info button, screen 1

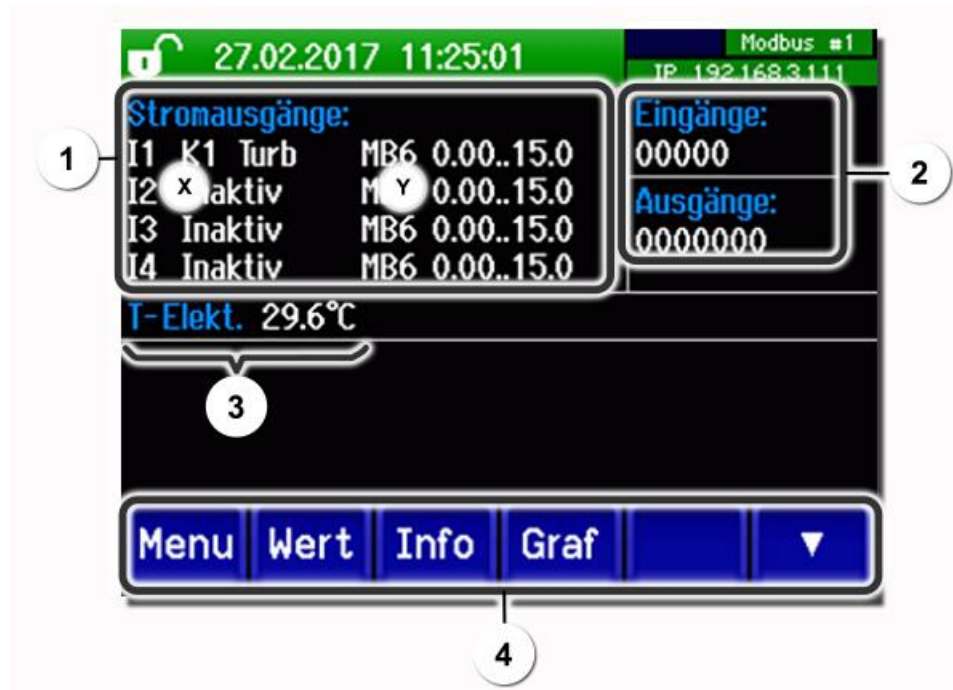


Figure 30: Info button, screen 1

<p>① <b>Information about the available current outputs</b> X: Source of the current output Y: Measuring range of the current output</p>	<p>② Status of the inputs/outputs → Reference Manual</p>
<p>③ Temperature of the electronics</p>	<p>④ Main menu buttons</p>

### 7.8.2 Page 2, Info button

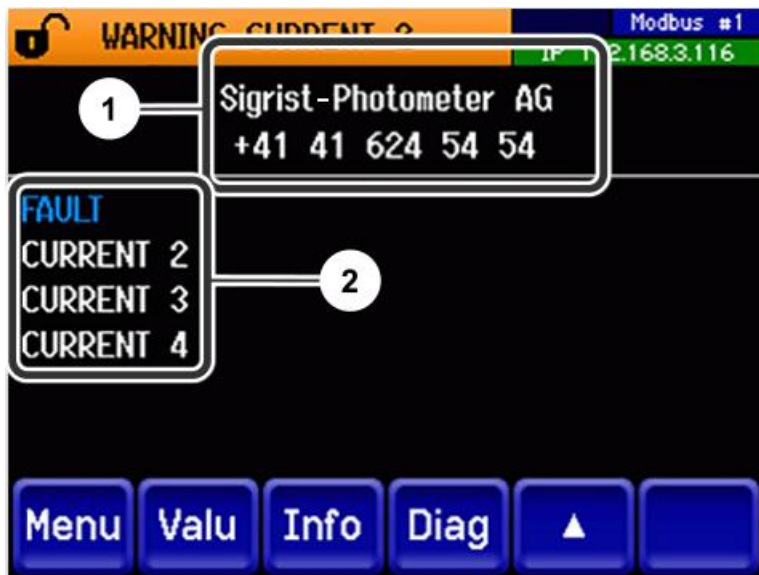


Figure 31: Info screen, page 2

①	Contact information	②	Display of up to 5 pending fault messages
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## 7.9 Diag button

When you press the **Diag** button, a diagram appears which graphically shows the measuring values over a certain period of time.

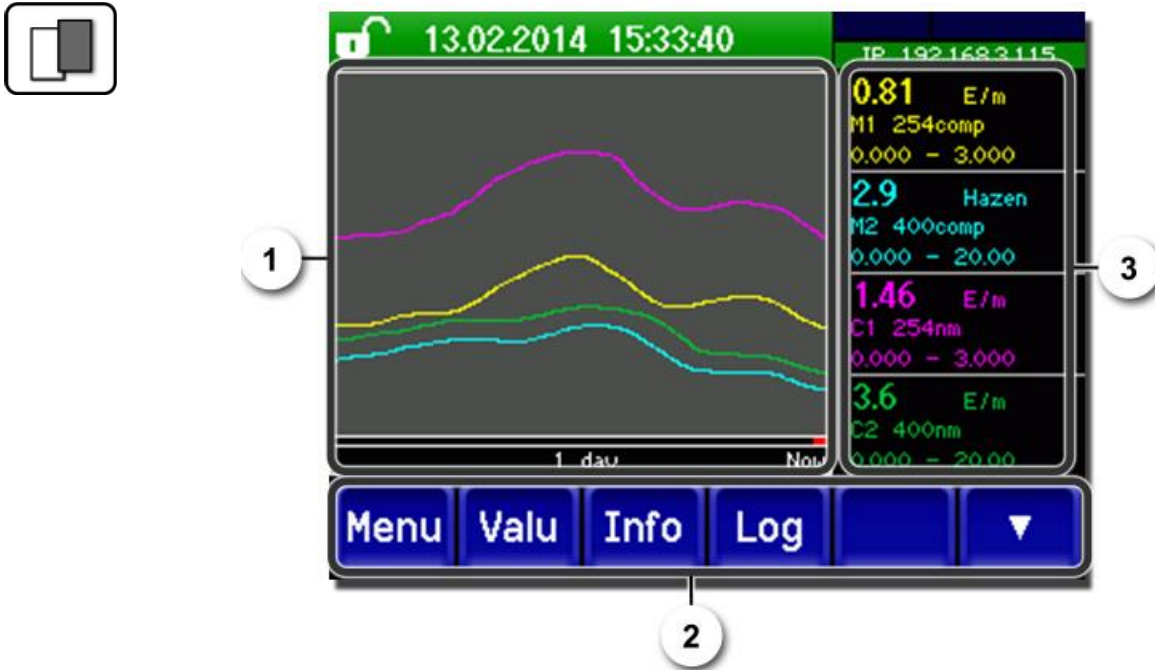


Figure 32: Graphic representation of the measuring values

<p>① <b>Graphic representation of the measuring values</b></p> <p>The measuring values can be recorded from 3 minutes to 32 days and are graphically represented. The color of the measuring value curves corresponds to the measuring channels on the right side of the display (position 3).</p>	<p>② <b>Main menu buttons</b></p> <p><b>i</b> The logger functions (<b>Log button</b>) are described in Section 7.10.</p>
<p>③ <b>Measuring channels:</b></p> <p>Numerical representation of the set measuring channels.</p> <ul style="list-style-type: none"> <li>▪ Current measuring value</li> <li>▪ Measuring channel with name</li> <li>▪ Scaling of the Y-ax</li> </ul>	

## 7.10 Functions of the log screen (Log button)



The screen logger works independently of the data logger, which is set in the **Logger** menu and writes to the microSD card.

The screen logger records the data of the last 32 days in one-minute intervals. The data can be called up from the Log menu. If the instrument is out of operation for more than 32 days, the logger data is restarted. An hourglass is shown for about 1.5 minutes in the graphic display. During this time, no logger data is available.

The **Log** button is found only in the main menu in the graphic screen; in the **Valu** screen, the **Diag** button has to be pressed first. When the **Log** button is pressed, the following screen appears:



Figure 33: Functions of the Log display

<p>① The cursor shows the time position which is represented at pos. 4. The cursor position can be changed either by briefly touching with your fingertip or by pressing the buttons.</p>	<p>② Represented time period The following time ranges can be set: 3 min./15 min./1 hour/ 3 hours/ 9 hours/1 day/3 days/10 days/ 32 days</p>
<p>③ The red bar indicates how much of the total time period is currently represented.</p>	<p>④ Measuring value which was measured at the cursor position.</p>
<p>⑤ &lt;/&gt;: Moves the cursor position. The cursor moves faster when these buttons are held down longer. &lt;&lt;/&gt;&gt;: Jumps forward or backward by the time period set in point 2. -/+ : Increases (+) or decreases (-) the screen section around the cursor position.</p>	



In the **Display/General** menu, you can define whether minimum, maximum or mean values are to be displayed (→ Reference Handbook). Pressing the **Diag** button takes you to the graphical representation.

## 7.11 Displays in measuring mode












Figure 34: Displays in measuring mode

<p>① Measuring value(s) For values which are greater than the maximum measuring range, no measuring value is displayed; instead, **** is displayed.</p>	<p>② Status line In measuring mode, the status line is green and shows the date and time. <b>i</b> If faults should occur, warning and fault messages are shown here and the status line changes to orange or red.</p>								
<p>③ Interface information</p> <ul style="list-style-type: none"> <li>▪ Top left: Logger status</li> <li>▪ Top right: Modbus, HART, Profinet or Profibus status</li> <li>▪ Below: Ethernet IP status The following messages are possible:             <ul style="list-style-type: none"> <li>- IP not connected (cable not connected)</li> <li>- IP DHCP running...</li> <li>- IP 169.254.1.1 (example)</li> </ul> </li> </ul> <p>Color coding:</p> <table border="1" data-bbox="491 1771 892 1944"> <tr> <td>Black</td> <td>Not active / not present</td> </tr> <tr> <td>Blue</td> <td>Activated, in quiescent mode</td> </tr> <tr> <td>Green</td> <td>Active</td> </tr> <tr> <td>Red</td> <td>Fault</td> </tr> </table>	Black	Not active / not present	Blue	Activated, in quiescent mode	Green	Active	Red	Fault	<p>④ Channel name with unit <b>i</b> The channel names shown in the figure are examples and can be adjusted individually.</p>
Black	Not active / not present								
Blue	Activated, in quiescent mode								
Green	Active								
Red	Fault								

## 7.12 Lock / unlock the touch screen




	MANIPULATION					
1.	Press the lock icon top left.					
2.	Within one second press the key bottom at the outside right. Depending on the initial state, the lock icon changes as follows:					
	<table border="1"> <tr> <td></td> <td>Touch screen unlocked</td> </tr> <tr> <td></td> <td>Touch screen locked</td> </tr> </table>		Touch screen unlocked		Touch screen locked	
	Touch screen unlocked					
	Touch screen locked					



## 7.13 Switching to service mode

The system is configured in service mode. The measuring procedure is interrupted and the main menus appear on the display. Service mode is accessed as follows:



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	The main menus appear.	The instrument is now in service mode.

The following applies in service mode:

- \* The measuring values remain on the last values on the digital interfaces.
- \* Depending on the configuration, the current outputs go to 0/4 mA or remain on the last measuring values.
- The limits are deactivated.
- If an output for service is programmed, it is activated.
- Fault messages are suppressed.

\* This does not apply when the **Current outputs\General\For service** parameter is set to **Measure**.




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For measuring mode, press the **Meas** button. When switching from service mode to measuring mode, an hourglass appears in the information bar for about 10 seconds. The measuring values are frozen during this time.

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## 7.14 Control components in service mode

### 7.14.1 Input elements in service mode

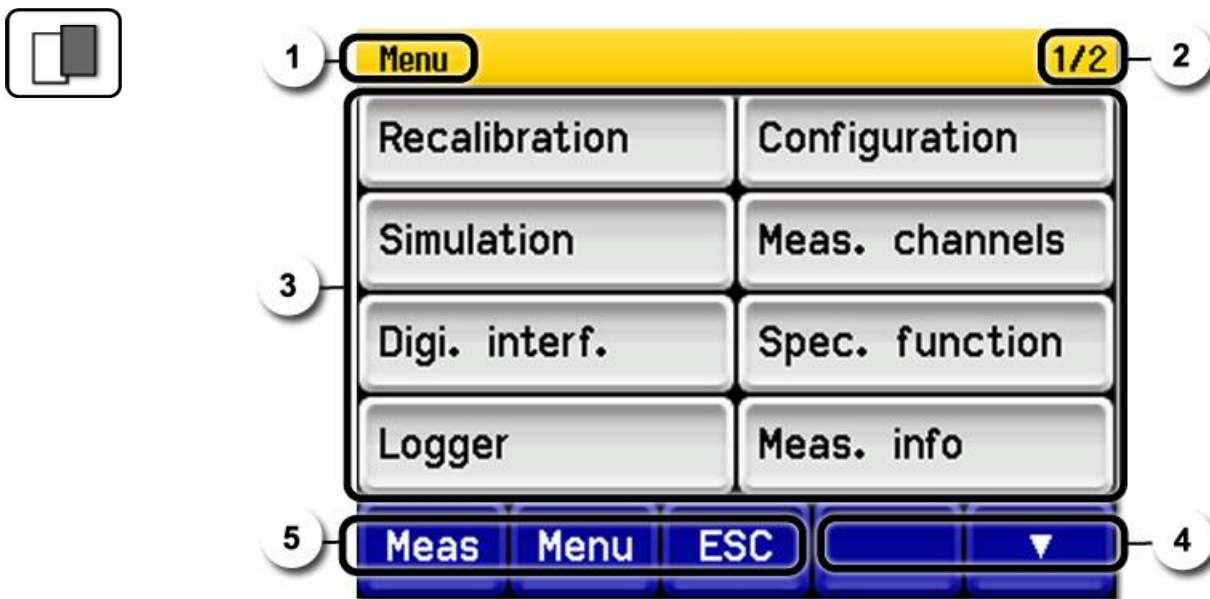


Figure 35: Input elements in service mode

①	Path specification	②	Page number / total number of pages
③	Main menus Instrument-specific menus of the photometer.	④	Next page
⑤	<b>Meas</b> button: The instrument changes to measuring mode. <b>Menu</b> button: The display goes back to main menus and remains in service mode. <b>ESC</b> button: The display goes back one level in the menu hierarchy until the measuring mode finally is reached.		

### 7.14.2 Numerical entry

The following screen is for entering numbers and data:

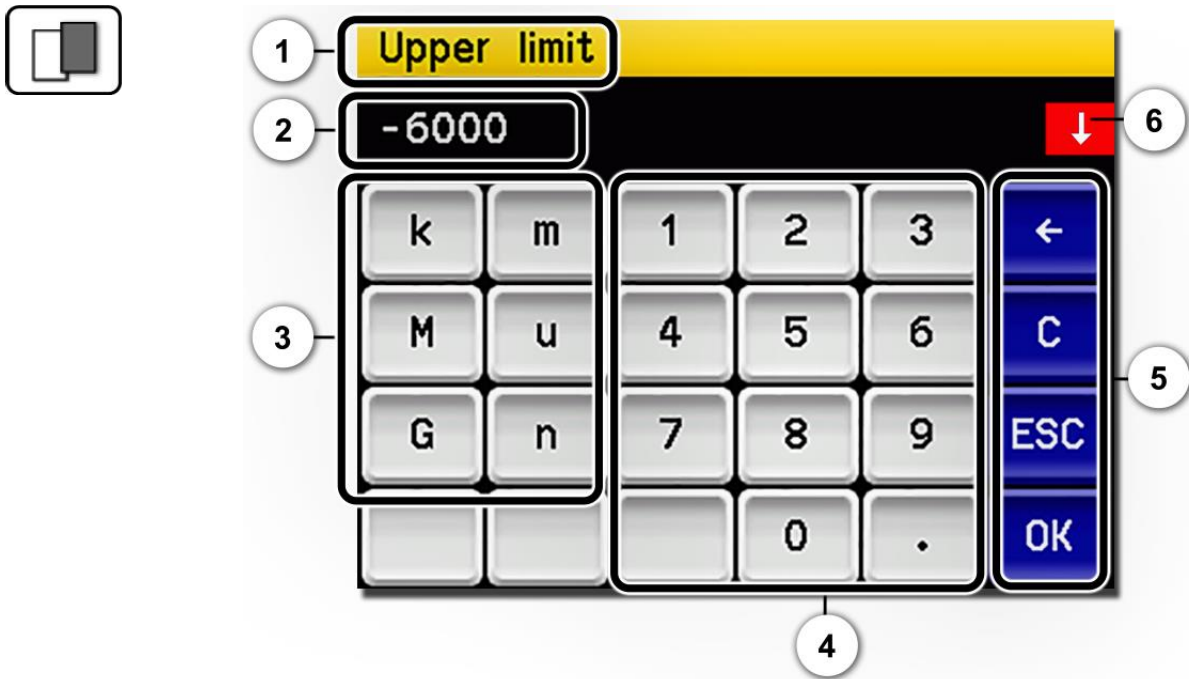


Figure 36: Numerical entry

①	Parameter name	②	Entered values
③	Prefix: For entering very large or very small values. This can be done as follows: 1. Enter value 2. Select SI prefix  Function: $n = 10^{-9}$ , $u = 10^{-6}$ , $m = 10^{-3}$ , $k = 10^3$ , $M = 10^6$ , $G = 10^9$	④	Numerical entry
⑤	$\leftarrow$ : Deletes one digit of the displayed value. <b>C</b> : Clears the displayed value. <b>ESC</b> : Touching the <b>ESC</b> field causes the display to go back one level in the menu hierarchy. The entered value is not saved. <b>OK</b> : Confirm entered value.	⑥	If the value entry is too high or too low, a white arrow appears in a red field top right.  Arrow points upward: Entry too high Arrow points downward: Entry too low

### 7.14.3 Single selection of functions



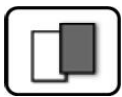
The single selection is identifiable by the **ESC** button in the lower right corner.

The currently selected function is green. Use the Up/Down arrows to navigate the options in long lists. Use the **ESC** button to cancel the entry. Pressing a selection item saves the configuration and completes the entry.



Figure 37: Example of single selection

### 7.14.4 Multiple selection of functions



The multiple selection is identifiable by the **OK** button in the lower right corner.

The currently selected values are green. Use the Up/Down arrows to navigate the options in long lists. Pressing a selection item changes the active status of the corresponding item. Press the **OK** button to save the configuration and complete the entry.



Figure 38: Example of multiple selection

## 8 Settings



### 8.1 Setting the operating language



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>Configuration</b> button to access language selection.	<b>i</b> If the desired menu does not appear, press the arrow bottom right.
4.	Press language field (circle). The list of all languages appears (factory setting is English).	
5.	Apply the desired language by pressing the corresponding field, or press the <b>ESC</b> button to cancel.	
6.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.


## 8.2 Setting the date and time



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>Configuration</b> button.	<b>i</b> If the desired menu does not appear, press the arrow bottom right.
4.	To enter the time, press the currently displayed time at the <b>Time</b> menu item and enter the new time with the number pad. Confirm entry with <b>OK</b> .	The time must be entered in the format <b>hh:mm:ss</b> . 
5.	To enter the date, press the currently displayed date at the <b>Date</b> menu item and enter the new date with the number pad. Confirm entry with <b>OK</b> .	The date must be entered in the format selected under the <b>Date format</b> menu item. 
6.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.

## 8.3 Setting the current outputs



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Set the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	Press the <b>Curr. outputs</b> button.	
4.	Select between <b>C1 .. n</b> .	
5.	Select the <b>Source</b> menu.	The following selection is available (when present): <ul style="list-style-type: none"> <li>▪ C1 .. n (measuring channels)</li> <li>▪ A1 .. 2 (analog channels)</li> <li>▪ Inactive</li> </ul>
6.	Select the <b>Range</b> menu.	MR1 .. MR8 (see table below) In 1, In 2, Auto 1, Auto 2 → Reference Manual
7.	Press the <b>Meas</b> button.	The instrument is in measuring operation again.

Measuring range no.	Measuring range (standard)	Measuring range (customer-specific)
MR1	0 .. 3000 mE/m	
MR2	0 .. 1500 mE/m	
MR3	0 .. 300 mE/m	
MR4	0 .. 150 mE/m	
MR5	0 .. 30 mE/m	
MR6	<b>0 .. 15 mE/m</b>	
MR7	0 .. 9 mE/m	
MR8	0 .. 3 mE/m	



If other measuring ranges are needed, the table above can be reprogrammed as required. Other parameters for the current outputs are described in the Reference Manual.

## 8.4 Setting the limits

The limits have to be configured accordingly so that they are not only displayed, but that the outputs are also switched. Section 8.5



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Set the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>Limits</b> button.	<b>i</b> If the desired menu does not appear, press the arrow at the bottom right.
4.	Select between <b>L1 .. n</b> .	
5.	Select the source.	The following selection is available: <ul style="list-style-type: none"> <li>▪ C1 .. n (measuring channels)</li> <li>▪ A1 .. 2 (analog channels)</li> </ul>
6.	Define the <b>Mode</b> .	The following selection is available: <ul style="list-style-type: none"> <li>▪ <b>Inactive</b> (limit monitoring of this channel is deactivated)</li> <li>▪ <b>Exceeded</b> (limit active when the set threshold value is exceeded)</li> <li>▪ <b>Undershot</b>. (limit active when the set threshold value is undershot)</li> </ul>
7.	Define the upper limit, lower limit, cut-in delay and cut-out delay with the number pad.	<b>i</b> Pressing the current number value takes you to the entry mode.
8.	Press the <b>Meas</b> button.	The instrument is in measuring operation again.



### 8.4.1 Upper and lower threshold value of a limit

A maximum of eight limits with upper and lower threshold can be programmed.

If the operating mode is set to **Exceeded** (Figure 39), then while the upper threshold is exceeded the limit is active and remains active until the lower threshold is again undershot.

If the operating mode is set to **Under-shot**, then while the lower threshold is undershot the limit is active and remains active until the upper threshold is again exceeded.

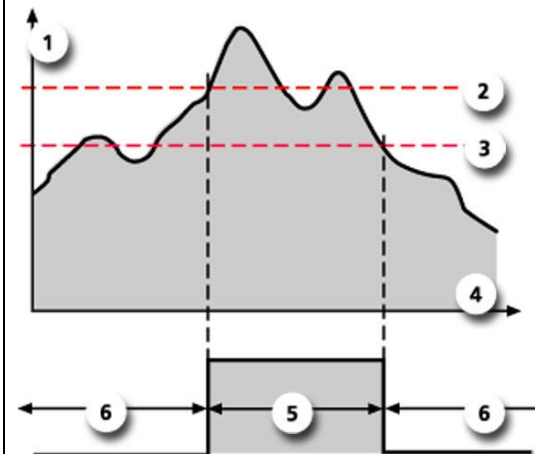


Figure 39: Threshold diagram

①	Measuring value	②	Upper threshold
③	Lower threshold	④	Time
⑤	Limit active	⑥	Limit passive

### 8.4.2 Reading if limit exceeded or undershot

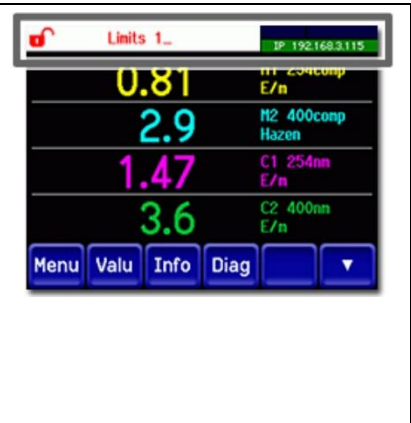


If a limit event occurs during operation, it has the following effects on measuring mode:

- Threshold value display indicates an unusual state.
- If an output for the corresponding limit channel is programmed, it is switched.

If the message **Limit** appears, the color of the status display changes to **white** and the numbers of the limit channels are listed with their channel numbers in **red** if limits have been exceeded or undershot.

Inactive limits are indicated with "\_".



## 8.5 Setting the outputs




	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>Inp./outputs</b> button.	<b>i</b> If the desired menu does not appear, press the arrow at the bottom right.
4.	Press the <b>Outputs</b> button.	
5.	<u>Select the outputs <b>A1 .. An</b>.</u>	<b>i</b> <u>If the outputs are activated in the <b>An</b> menu (green), the <b>Active</b> status is displayed. If no outputs are activated in the <b>An</b> menu, the <b>Inactive</b> status is displayed.</u>
6.	Activate the outputs (multiple selection possible).	<p>Activated outputs are highlighted green.</p> <ul style="list-style-type: none"> <li>▪ Invert: Inverts the outputs</li> <li>▪ Prio fault</li> <li>▪ Fault</li> <li>▪ Warning</li> <li>▪ Service</li> <li>▪ Adjustment</li> <li>▪ Sensor check</li> <li>▪ Limit 1 .. n</li> </ul> <p>The other buttons named <b>MR-Out...</b> are for automatic measuring range switching → Reference Handbook.</p>
7.	Press the <b>Meas</b> button.	The instrument is back in measuring mode.

## 8.6 Setting the recalibration

If the **Auto start recal.** parameter is activated, then the installation of the checking unit in the photometer automatically triggers a recalibration. This allows servicing duties to be carried out without the use of a control unit. The state of the recalibration can be monitored via the LED display (Section 7.2).




	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	Press the <b>Recalibration</b> button.	
4.	Press the <b>General</b> button.	
5.	Set <b>Auto start recal.</b> to <b>Active</b> or <b>Inactive</b> .	
6.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.

## 8.7 Setting the Profibus DP parameters

This setting only has to be carried out if the optional Profibus module is used.





	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	Press the <b>Digi. interf.</b> button.	
4.	Press the <b>Profibus DP</b> button.	
5.	In the <b>Control</b> menu, select either <b>Local</b> or <b>External</b> .	<ul style="list-style-type: none"> <li>▪ <b>Local:</b> Values can only be read via Profibus.</li> <li>▪ <b>External:</b> Values can be read and written via Profibus.</li> </ul>
6.	Enter the desired number under <b>Slave no.</b>	Values between 1 and 240 are possible.
7.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.
8.	To activate the parameters, the instrument must be switched off and then switched on again.	

## 8.8 Setting the Profinet IO parameters

This setting only has to be carried out if the optional Profinet IO module is used.




	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	Press the <b>Digi.interf.</b> button.	
4.	Press the <b>Profinet IO</b> button.	
5.	In the <b>Control</b> menu, select either <b>Local</b> or <b>External</b> .	<ul style="list-style-type: none"> <li>▪ <b>Local:</b> Values can only be read via Profinet.</li> <li>▪ <b>External:</b> Values can be read and written via Profinet.</li> </ul>
6.	If the station name has been changed since starting the program, this can be updated by pressing the <b>Station name load...</b> button.	 Loading the station name results in a brief interruption in communication.
7.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.
8.	To activate the parameters, the instrument must be switched off and then switched on again.	

## 8.9 Setting the Modbus RTU parameters

This setting only has to be carried out if the optional Modbus module is used.



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	 Factory setting is <b>0</b> .
3.	Press the <b>Digi. interf.</b> button.	
4.	Press the <b>Modbus</b> button.	
5.	Enter the desired number under <b>Slave no.</b>	Values between 1 and 240 are possible.
6.	Select the <b>Baudrate</b> menu.	Values between 4800 and 230400 baud are possible.
7.	Select the <b>Parity</b> menu.	The settings <b>None</b> , <b>Even</b> and <b>Odd</b> are possible.
8.	Select the <b>Stopbit</b> menu.	1 or 2 Stopbit are possible.
9.	Press the <b>Meas</b> button. The parameters are activated.	The instrument is in measuring mode again.

## 8.10 Setting or changing the access code

You can protect the settings of the instrument against unauthorized manipulations by defining your own access code.



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>Configuration</b> button.	<b>i</b> If the desired menu does not appear, press the arrow bottom right.
4.	Press the button to the right of the <b>Access code</b> description text.	
5.	Enter the access code and confirm with <b>OK</b> .	
6.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.



A forgotten access code can be cleared only by a SIGRIST service engineer.

Enter your personal access code here:

--	--	--	--	--	--

## 8.11 Backup configured data

These measures can be of use to the service engineers for service purposes.



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the <b>Menu</b> button.	
2.	Enter the access code and confirm with <b>OK</b> .	<b>i</b> Factory setting is <b>0</b> .
3.	Press the <b>System info.</b> button.	<b>i</b> If the desired menu does not appear, press the arrow bottom right.
4.	In the <b>User -&gt; SD</b> and <b>Expert -&gt; SD</b> sub-menus press the <b>Copy</b> function.	The user and expert data are copied to the microSD card. After a successfully completed procedure, acknowledge with the <b>OK</b> button.
5.	Press the <b>Meas</b> button.	The instrument is in measuring mode again.

# 9 Servicing



**CAUTION!**

**Damage to the instrument due to servicing duties that have not been carried out or have been carried out improperly.**

If servicing duties are not carried out according to the servicing schedule or non-original SIGRIST spare parts are used, this can lead to damage to the instrument or measuring errors.

In this case, SIGRIST-PHOTOMETER AG accepts no warranty claims made by the customer and is not responsible for any subsequent costs. To avoid this situation, please adhere to the following steps:

- Carry out servicing duties according to the servicing schedule (Section 9.1).
- When carrying out servicing duties, use original SIGRIST spare parts according to the spare parts list (Section 15). The use of third-party spare parts requires the written approval of SIGRIST-PHOTOMETER AG.
- If the instruments are subjected to heavy use or exposed to severe environmental conditions, servicing duties must be carried out more often as required. Wear parts in particular must be replaced more often depending on the circumstances.

## 9.1 Servicing schedule



**WARNING!**

**Alarms can be triggered during servicing duties. Therefore, evaluations of the alarm events should be suppressed in advance.**

WHEN	WHO	WHAT	PURPOSE
As needed	Operator	Cleaning the outside of the instrument. Section 9.2	Dirt on the outside of the VisGuard 2 does not have any effect on the measuring results. Cleaning is not absolutely essential.
Every 5 years or as needed	Operator	Cleaning the sample inlet. Section 9.3	Obligatory measure for maintaining functional efficiency.
Every 5 years or as needed	Operator	Replacing the gaskets according to the <b>VisGuard2/Seal-BA</b> drawing.	In the event of unsatisfactory measuring results.
<sup>1)</sup>	Operator	Replacing the filter cartridge in the VisGuard 2 In-situ. Section 9.4	For ensuring the required air flow.
Every 5 years	Operator	Replacing the fan on the VisGuard 2 In-situ. Section 9.5	Obligatory measure for maintaining functional efficiency.
As needed	Service center	Cleaning the optics. May be carried out only by trained personnel!	In the event of unsatisfactory measuring results.



WHEN	WHO	WHAT	PURPOSE
Annually or as needed	Operator	Recalibrating the VisGuard 2. Section 9.6	Measure for maintaining measuring accuracy. Interval dependent on measurement surroundings.
Every 10 years or as needed	Operator	Replacing the battery in the control unit. Section 9.7	Obligatory measure for maintaining functional efficiency.

Table 1: Servicing schedule

<sup>1)</sup> The service life of the filter cartridge is dependent on the operating conditions. Empirical values for "normal" road tunnels (e.g. no excessive, permanent humidities) are as follows:

Average exposure	Recommended interval
> 30 mE/m	As needed
15 .. 30 mE/m	1 year
10 .. 15 mE/m	2 years
5 .. 10 mE/m	3 years
< 5 mE/m	5 years

## 9.2 Cleaning the outside of the VisGuard 2



**CAUTION!**

### Damage to the photometer due to automatic tunnel cleaning

During automatic tunnel cleaning, it is recommended to remove the photometer from exposed locations.



Dirt on the outside of the instrument does not have any effect on the measuring results.

On In-situ instruments, the supplied protection covers must be attached before all forms of cleaning:

Position	During operation	For cleaning
Sample inlet at top		
Sample inlet at bottom		

Figure 40: Protection covers on the VisGuard 2 In-situ

### 9.3 Cleaning the sample inlet



Cleaning is necessary when deposits in the sample inlet cause a displacement of the zero point or an unstable measuring value.


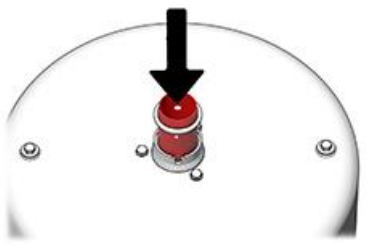
The following procedure describes how to clean the sample inlet:



**CAUTION!**

**Soiling of the optics due to improper cleaning of the sample inlet.**  
 Using brushes or pipe cleaners when cleaning the sample inlet can lead to soiling of the optics in the VisGuard 2.

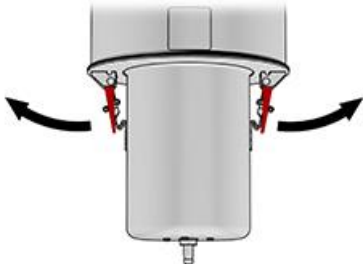
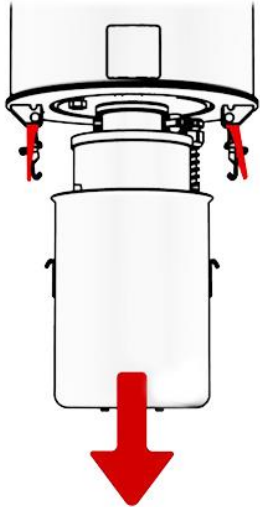
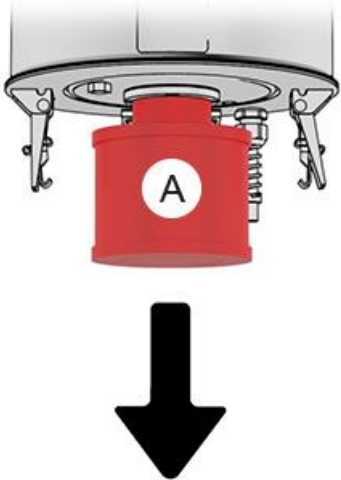


	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	In-situ: Remove the protection cover or heater from the sample inlet.   Warning: The heater can be very hot after operation and may cause burns.  Extractive: Remove the hose from the sample inlet.	
2.	Clean the sample inlet with a damp cloth.	
3.	Reattach the protection cover, heater or hose to the sample inlet.	
4.	The instrument can now be operated again.	

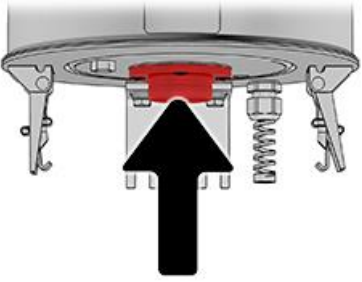
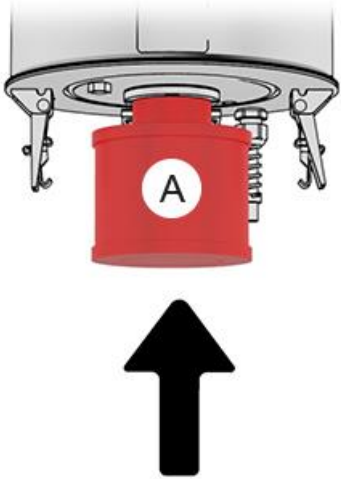
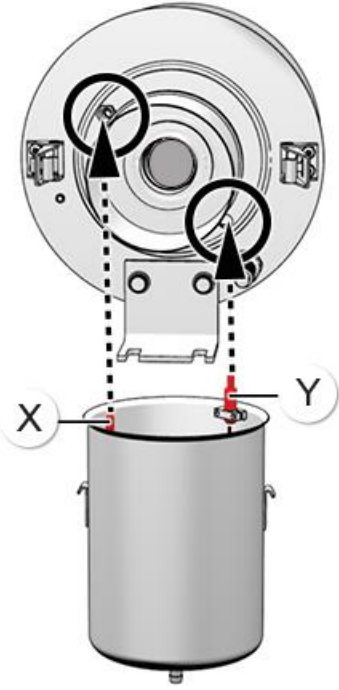
## 9.4 Replacing the filter cartridge in the VisGuard 2 In-situ

The filter cartridge can be replaced as follows:



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the photometer.	
2.	Remove the housing from the VisGuard 2.	<p>1. Open the clamps.</p>  <p>2. Remove the housing carefully.</p> 
3.	Pull the filter cartridge (A) out of the holder in a straight downward motion.	

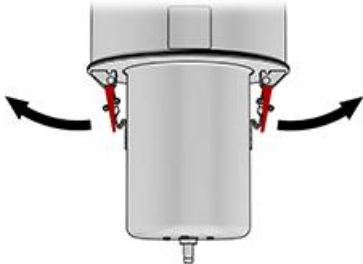
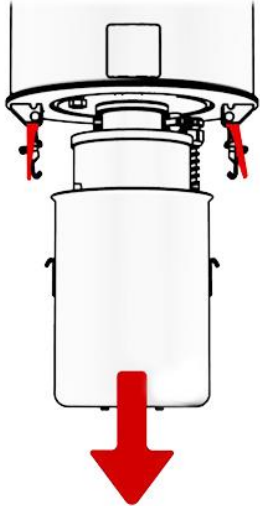
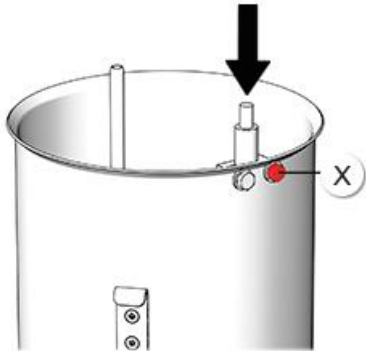


	WORKSTEP	ADDITIONAL INFO / IMAGES
4.	Clean the holder (arrow).	
5.	Position the new filter cartridge (A) on the holder and push upwards until the cartridge snaps into place.	
6.	Reattach the housing and fasten in place with the clamps. Ensure that the purging air connection (X) and the plug connection for the fan (Y) are aligned to the openings in the base plate.	

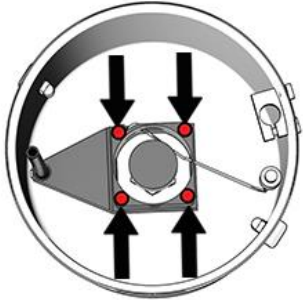
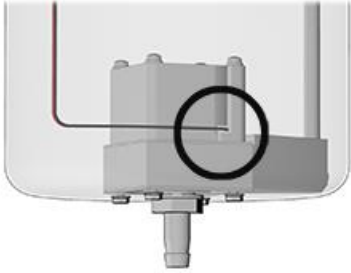
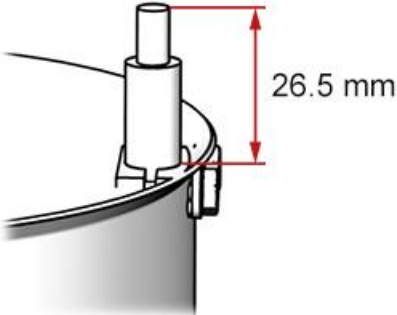
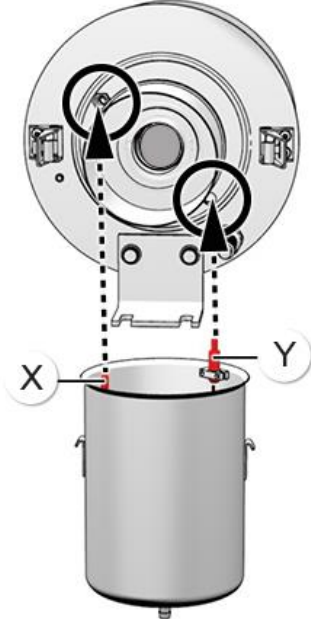
## 9.5 Replacing the fan on the VisGuard 2 In-situ

The fan can be replaced as follows:



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the photometer.	
2.	Remove the housing from the VisGuard 2.	<p>1. Open the clamps.</p>  <p>2. Remove the housing carefully.</p> 
3.	Loosen the screw on the right (X) and then push the connector downwards out of the holder (arrow). Remove the cable from the clip in the housing.	



	WORKSTEP	ADDITIONAL INFO / IMAGES
4.	Remove the old fan from the housing by removing the four screws (arrows).	
5.	Fasten the new fan in place on the base in the housing with the four screws. Ensure that the cable outlet is finally positioned facing downwards (circle).	
6.	Insert the connector into the holder from below. Ensure that the distance of 26.5 mm is maintained (see figure). Tighten the right-hand screw on the connector holder. Press the cable into the clip in the housing.	
7.	Reattach the housing and fasten in place with the clamps. Ensure that the purging air connection (X) and the plug connection for the fan (Y) are aligned to the openings in the base plate (circles).	

## 9.6 Recalibrating the VisGuard 2

### 9.6.1 General information on recalibrating the VisGuard 2



Recalibrating the photometer can result in deviations from the previous measuring value as the instrument is newly reset to a reference value (checking unit).

- Recalibration can be triggered via the control unit, or automatically by plugging in the checking unit. The automatic triggering of a recalibration can be activated under **Recalibration \ General \ Auto start recal.**
- The nominal values on two checking units can be saved in the VisGuard 2. The checking units are identified via a serial number.
- The checking unit currently in use must be defined in the **Recalibration \ C1 \ Cont. active** menu. Checking unit 1 is set as standard.

### 9.6.2 Setting checking unit number in use



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Switch to service mode as described in Section 7.13.	
2.	Select the checking unit currently in use in the <b>Recalibration \ C1 \ Cont. active</b> menu.	

### 9.6.3 Manual adjustment with a control unit

The following procedure describes how manual adjustment is made with a control unit:



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	In-situ: Remove the protection cover or heater from the sample inlet.	
	Warning: The heater can be very hot after operation and may cause burns.	
	Extractive: Remove the hose from the sample inlet.	
2.	On installations with SIPORT 2: Plug in the SICON-C on the SIPORT 2 connection box.	
3.	Switch the photometer to service mode as described in Section 7.13.	
4.	Check the serial number of the checking unit against the number of the instrument. These must match.	

	<b>WORKSTEP</b>	<b>ADDITIONAL INFO / IMAGES</b>
5.	Insert the checking unit into the sample inlet as follows: 1. Remove the protective casing from the checking unit. 2. Insert the checking unit into the sample inlet. <b>i</b> Ensure that the pin (A) is aligned to the groove (B) on the sample inlet. 3. Rotate the checking unit clockwise up to the stop to eliminate any play.	
6.	Switch to the <b>Recalibration\C1</b> menu.	
7.	Check whether the saved nominal value matches the information on the checking unit.	
8.	Carry out the adjustment as follows: Press the <b>initiate...</b> button and wait. The LED on the photometer also starts to flash. If the adjustment was successful, this is confirmed with <b>Adjustment OK</b> . This completes the adjustment. If the adjustment was <b>not</b> successful, it is indicated with <b>Adjust. fault</b> . In this case, check the points in the following list one after the other: <ul style="list-style-type: none"> <li>▪ Cleanliness of the checking unit?</li> <li>▪ Correct checking unit used?</li> <li>▪ Does the nominal value match the value on the checking unit?</li> <li>▪ Soiled optics in the instrument? In this case, contact the service technician.</li> </ul>	<b>i</b> If the check could not be successfully completed, contact your country representative. Section 11
9.	Remove the checking unit and reattach the protective casing.	
10.	Reattach the protection cover, heater or hose to the sample inlet.	
11.	The instrument can now be operated again.	



A new recalibration factor is determined if adjustment is successful. The deviation from the original state is displayed under **Curr. corr.**.



### 9.6.4 Automatically triggered adjustment



**WARNING!**

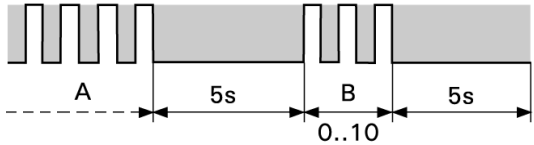
Alarms can also be triggered as a result of the automatically triggered adjustment.

The following procedure describes how automatic adjustment is made. However, this can only be carried out when **Auto start recal.** has been activated according to Section 8.6.

Automatic adjustment can be triggered with or without a control unit. If a control unit is present, it is recommended to switch to service operation before inserting the checking unit. In service operation, no alarms are output and the current output is set to a defined value. This prevents alarms from being triggered.



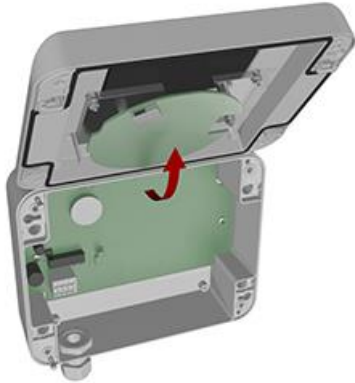
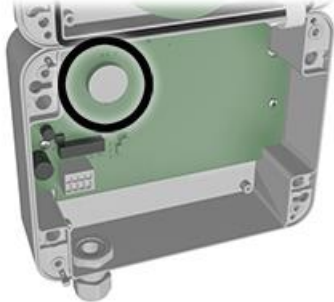


	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	In-situ: Remove the protection cover or heater from the sample inlet.  <div style="background-color: #e0e0e0; padding: 2px; border: 1px solid black; display: inline-block;">  Warning: The heater can be very hot after operation and may cause burns.                 </div>  Extractive: Remove the hose from the sample inlet.	
2.	Check the serial number of the checking unit against the number of the instrument. These must match.	
3.	Insert the checking unit into the sample inlet as follows: 1. Remove the protective casing from the checking unit. 2. Insert the checking unit into the sample inlet. <div style="border: 1px solid black; padding: 2px; display: inline-block;"> </div> Ensure that the pin (A) is aligned to the groove (B) on the sample inlet. 3. Rotate the checking unit clockwise up to the stop to eliminate any play. 4. The adjustment starts.	

	<b>WORKSTEP</b>	<b>ADDITIONAL INFO / IMAGES</b>
4.	<p>After the adjustment has been made successfully, the current soiling level is indicated by a flash code on the LED:</p> <ol style="list-style-type: none"> <li>1. The LED goes out for five seconds.</li> <li>2. The flash code indicates the current soiling level.</li> <li>3. A second phase where the LED goes out for five seconds indicates that the code is finished.</li> </ol>  <p>If the LED flashes more than five times, then the soiling level is too high. The VisGuard 2 must be cleaned according to the servicing schedule.</p> <ol style="list-style-type: none"> <li>4. Remove the checking unit.</li> </ol>	<p>A: Adjustment flashes approximately 10 times in one-second intervals.</p> <p>B: Flash code key:                      Flashes zero times = clean                      Flashes up to ten times = soiling limit reached</p>
5.	Remove the checking unit and reattach the protective casing.	
6.	Reattach the protection cover, heater or hose to the sample inlet.	
7.	The instrument can now be operated again.	

## 9.7 Changing the battery in the control unit



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Unplug the connection tot he instrument.	
2.	Open the flaps on the instrument.	
3.	Loosen the four screws (circles).	
4.	Open the cover of the instrument.	
5.	Remove the battery (circle) and replace with a new one.	
6.	Close the instrument.	

# 10 Troubleshooting

## 10.1 Pinpointing malfunctions

MALFUNCTION	MEASURE
No reading	<ul style="list-style-type: none"> <li>Check whether the supply voltage is connected.</li> </ul>
Fault message in the display	<ul style="list-style-type: none"> <li>Analyze the fault message according to the following actions.</li> </ul>
The reading appears to be wrong	<ul style="list-style-type: none"> <li>Carry out recalibration. Section 9.6</li> <li>Check whether the instrument is correctly mounted. Section 4</li> <li>Ensure that the servicing duties have been performed according to the servicing schedule. Section 9.1</li> </ul>

Table 2: Pinpointing malfunctions



If the listed measures do not lead to the desired results, please consult customer service. Section 11

## 10.2 Warning messages and effect on operation

Warnings indicate an unusual state.



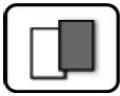
WARNINGS	
<p>If a warning occurs during operation, it has the following effects:</p> <ul style="list-style-type: none"> <li>The system continues to operate. However, the measuring results must be evaluated with caution. The cause of the warning message should be remedied at the next possible opportunity.</li> <li>When the cause of the warning has been remedied, it is automatically deleted.</li> <li>When the <b>Warning</b> message occurs, the color of the status display changes to <b>orange</b> and the warning text describes the warning in question.</li> </ul>	<p>Example: <b>WARNING CURRENT 1</b></p>


The following warning messages can be displayed:

WARNING MESSAGE	DESCRIPTION	POSSIBLE CAUSES
V IN	The input voltage is outside the permitted range (20 .. 26 VDC).	<ul style="list-style-type: none"> <li>▪ The service voltage is faulty</li> </ul>
SENSOR CHECK	The automatic sensor check failed.	<ul style="list-style-type: none"> <li>▪ Too much external light</li> <li>▪ Housing removed</li> <li>▪ Defect in the electronic system</li> </ul>
ADJUST FAULT	Recalibration could not be carried out.	<ul style="list-style-type: none"> <li>▪ The instrument is soiled</li> <li>▪ The nominal value for the adjustment does not match the value of the checking unit</li> </ul>
OVER TEMP	The temperature in the instrument has exceeded 65 °C.	<ul style="list-style-type: none"> <li>▪ The medium or ambient temperature is too high and defective/no cooling</li> </ul>
CURRENT 1 .. n	Current output 1 .. n is disturbed.	<ul style="list-style-type: none"> <li>▪ Terminals are open</li> <li>▪ Interruption of the current loop of the reading output</li> </ul>
TEMP.SENSOR	The inner temperature sensor failed.	<ul style="list-style-type: none"> <li>▪ Defect in the electronic system → Service technician</li> </ul>
VENTILATOR	The fan does not reach its nominal speed.	<ul style="list-style-type: none"> <li>▪ Fan removed</li> <li>▪ Fan defective</li> </ul>
EXTERNAL ON (Name ext.in.)	An external event is signaled via a digital input.	<ul style="list-style-type: none"> <li>▪ External malfunction</li> </ul>
SERVICE	Shows when service work is due.	<ul style="list-style-type: none"> <li>▪ Service work is due.</li> </ul>
VERS.SD CARD	The data on the microSD card does not match the current software.	<ul style="list-style-type: none"> <li>▪ Update was performed incorrectly.</li> </ul>
WATCHDOG	The internal fault monitoring has been actuated. The program has been re-started.	<ul style="list-style-type: none"> <li>▪ Program crash</li> </ul>

Table 3: Possible warning messages

### 10.3 Fault messages and effect on operation



FAULT	
<p>If a fault occurs during operation, it has the following effects:</p> <ul style="list-style-type: none"> <li>▪ A fault is a malfunction which prevents correct measurement value acquisition.</li> <li>▪ The measuring values of the concerned photometer go to <b>0</b>.</li> <li>▪ Assigned current outputs go to the programmed electrical current <b>If fault</b>.</li> <li>▪ Assigned limits are deactivated.</li> <li>▪ When the <b>Fault</b> message appears, the color of the status display changes to <b>red</b> and the text describes the fault in question.</li> <li>▪ If an output for faults is programmed, it is activated.</li> </ul>	 <p>Example: <b>FAULT SERIAL 1</b></p> <p><b>i</b> If the cause of the fault has been remedied, it is automatically deleted.</p>

The following fault messages can be displayed:

FAULT MESSAGE	DESCRIPTION	POSSIBLE CAUSES
SLAVE SW VERS	The software version of the photometer does not match that of the control unit.	<ul style="list-style-type: none"> <li>▪ Different delivery data on photometer and control unit. Carry out a slave update with a SICON-C. → Reference Manual</li> </ul>
SERIAL 1	The control unit cannot establish a connection to the photometer.	<ul style="list-style-type: none"> <li>▪ Interrupted connection to the photometer.</li> <li>▪ Defect in the electronic system. → Service technician</li> </ul>
V ANALOG	One of the internal analog voltages is outside the permitted range.	<ul style="list-style-type: none"> <li>▪ Defect in the electronic system. → Service technician</li> </ul>
MEASUR.FAULT	Measuring value acquisition is faulty.	<ul style="list-style-type: none"> <li>▪ External light (e.g. measuring cell removed).</li> <li>▪ Defect in the electronic system. → Service technician</li> </ul>
AN.MEAS.FAULT	The measuring value acquisition of the analog channels is disturbed.	<ul style="list-style-type: none"> <li>▪ Defect in the electronic system. → Service technician</li> </ul>
ANALOG IN 1/2	The input signal on analog input 1/2 is less than the error limit.	<ul style="list-style-type: none"> <li>▪ There is no input signal.</li> </ul>

FAULT MESSAGE	DESCRIPTION	POSSIBLE CAUSES
LIGHTSOURCE 1	The detector for monitoring the light source receives no light from the corresponding light source.	<ul style="list-style-type: none"> <li>Defective light source. → Service technician</li> </ul>
IO PORT	The connection between the NG_Haupt and NG_Bedi print in the SICON has been disturbed.	<ul style="list-style-type: none"> <li>Cable disconnected.</li> <li>Plug connection defective.</li> </ul>
POWERBOX	Actuation of the power box has been disturbed.	<ul style="list-style-type: none"> <li>Connection to the power box has been interrupted.</li> </ul>
MASTER SW VERS	This fault message is displayed when the software version of the SICON-C is older than the version of the connected photometer.	<ul style="list-style-type: none"> <li>Software is not the most recent version. In this case, the software of the control unit must be updated to the most recent version. → Reference Manual</li> </ul>

Table 4: Possible fault messages

## 10.4 Prioritized fault messages and their effect on operation



**CAUTION!**

When there is a prioritized fault, the cause of the malfunction is serious.



PRIORITIZED FAULT	Effects and Display
<p><b>PRIORITIZED FAULT</b></p> <p>If a prioritized fault occurs during operation, it has the following effects:</p> <ul style="list-style-type: none"> <li>The measuring values go to 0.</li> <li>Prioritized faults can be cleared only by a service engineer.</li> <li>When the <b>Prio</b> message occurs, the color of the status display changes to <b>red</b> and the text describes the prioritized fault in question.</li> </ul>	<p>Example: <b>PRIORITIZED FAULT</b></p>

The following prioritized fault messages can be displayed:

<b>PRIO MESSAGE</b>	<b>DESCRIPTION</b>	<b>POSSIBLE CAUSES</b>
DEFAULT VALUES	The default values were loaded.	<ul style="list-style-type: none"> <li>▪ If no parameters were initialized or if all parameters were lost, the default values are loaded.</li> </ul>
CRC EXPERTS	A fault was determined when the expert data was checked.	<ul style="list-style-type: none"> <li>▪ Electromagnetic malfunctions.</li> <li>▪ Defect in the electronic system.</li> </ul>
CRC USER	A fault was determined when the user data was checked.	<ul style="list-style-type: none"> <li>▪ Electromagnetic malfunctions.</li> <li>▪ Defect in the electronic system.</li> </ul>
CRC DISPLAY	A fault was determined when the display data was checked.	<ul style="list-style-type: none"> <li>▪ Electromagnetic malfunctions.</li> <li>▪ Defect in the electronic system.</li> </ul>
EXT RAM	A fault was determined when the RAM in the graphic controller was checked.	<ul style="list-style-type: none"> <li>▪ Defect in the electronic system.</li> </ul>
SW VERS	Software which is unsuitable for this instrument type was loaded.	<ul style="list-style-type: none"> <li>▪ Faulty software update. → Service technician</li> </ul>

Table 5: Possible prioritized fault messages



## 11 Customer service information

Should you have any questions, please contact the responsible service center in your country or region. If this is not known, SIGRIST-PHOTOMETER AG customer service in Switzerland would be glad to provide you with a contact address.

A current list of all SIGRIST country representatives is available online at [www.photometer.com](http://www.photometer.com).

Please have the following information ready when you contact a SIGRIST service point or customer service:

- The serial numbers of the connected instruments.
- A description of instrument behavior and the work steps when the problem occurred.
- A description of what you did when trying to solve the problem yourself.
- The documentation of the third-party products you use in conjunction with the VisGuard 2.
- Description of operation conditions (place, power supply, measured medium, temperature etc.)
- Application and Instruction Manual.

# 12 Decommissioning/Storage

## 12.1 Decommissioning the photometer

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



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage.	
2.	Remove the electrical connections.	Section 5
3.	Remove the VisGuard 2 from the measuring position and clean thoroughly.	
4.	Remove all other components.	
5.	Close all openings on the components.	

## 12.2 Storing the photometer

There are no special requirements for storing the instruments. However, please note the following information:

- The VisGuard 2 and the belonging components contains electronic parts. Storage for such components must fulfill the usual conditions. It is important to note that the storage temperature must be between -30 and +55 °C.
- All components that come into contact with the sample during operation have to be dry and clean for a long time before being put into storage.
- The measuring equipment with all of the accessory parts must be protected against weather factors, condensing humidity and aggressive gases during storage.

## 13 Packaging / Transport / Returning



**DANGER!**

### **Injuries to persons due to hazardous media residues in the returned instrument.**

Instruments that have come into contact with hazardous media may not be sent without the appropriate information on the corresponding repairs or professional decontamination (see RMA form).

- Precise information on the medium must be received by SIGRIST-PHOTOMETER in advance of the instrument to be repaired so that the necessary precautions can be taken when unpacking it.

The original packaging materials should be used for packaging the VisGuard 2 if possible. If the original packaging is no longer available, note the following information:

- Before packaging, close the openings of the instrument with adhesive tape or plugs so that no packaging materials can enter the instrument.
- The instrument contains optical and electronic components. Make sure that the packaging protects the instrument from being damaged by impacts during transport.
- All peripheral devices and accessory parts must be packaged separately and marked with the serial number of the photometer (Section 2.4). This prevents confusion and mix-ups later while also making it easier to identify parts.
- A RMA form (14711E) must be filled in and enclosed for all returned instruments and spare parts. This can be downloaded at [www.photometer.com](http://www.photometer.com).

When packaged as described above, the instruments can be transported via all usual shipping methods.

# 14 Disposal



Disposal of the system and its peripheral devices is to be carried out in compliance with regional statutory regulations.

The system has no environmentally damaging sources of radiation. The materials listed below should be disposed of or recycled as described in the following table:

CATEGORY	MATERIALS	DISPOSAL POSSIBILITIES
Packaging	Cardboard, wood, paper	Reuse as packaging material, local disposal center, incineration plants
	Protective foils, polystyrene shells	Reuse as packaging material, recycling
Electronics	Circuit boards, electromechanical components, display, touchscreen, transformer and cables	To be disposed of as electronic waste
Optics	Glass, aluminum	Recycling via centers for recycling glass and waste metal
Battery on SICON-C	Lithium	Recycling via locally organized collection point
VisGuard 2 housing	Stainless steel	Local disposal center

Table 6: Materials and their disposal

## 15 Spare parts list

The parts mentioned in this documentation and their article numbers are listed in the following table:

ARTICLE NUMBER	NAME	REMARKS
112409	Filter cartridge (In-situ)	→ Section 9.4
112407	Purge air filter (Extractive)	
120772	Fan (In-situ)	→ Section 9.5
112662	Splash guard (In-situ)	→ Section 9.2
112661	Splash guard set (In-situ)	Splash guard set for tunnel cleaning
112033	Instrument housing, top	→ Reference Manual
121430	Instrument housing, bottom (In-situ)	→ Section 9.5
	All gaskets according to enclosed drawing	→ According to drawing: VisGuard2/Seal-BA
118361	Cable gland M16 x 1.5, straight	→ Reference Manual (for replacing the control cable on the VisGuard 2)
116387	O-ring FPM 12 x 1.5	→ Reference Manual (for replacing the control cable on the VisGuard 2)
117442	Fuse, microfuse 250 V 2 AT RM5	→ Reference Manual
111834	Battery	→ Section 9.7

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SIGRIST-PHOTOMETER AG  
Hofurlistrasse 1  
CH-6373 Ennetbürgen  
Switzerland

Tel. +41 41 624 54 54  
Fax +41 41 624 54 55  
info@photometer.com  
www.photometer.com