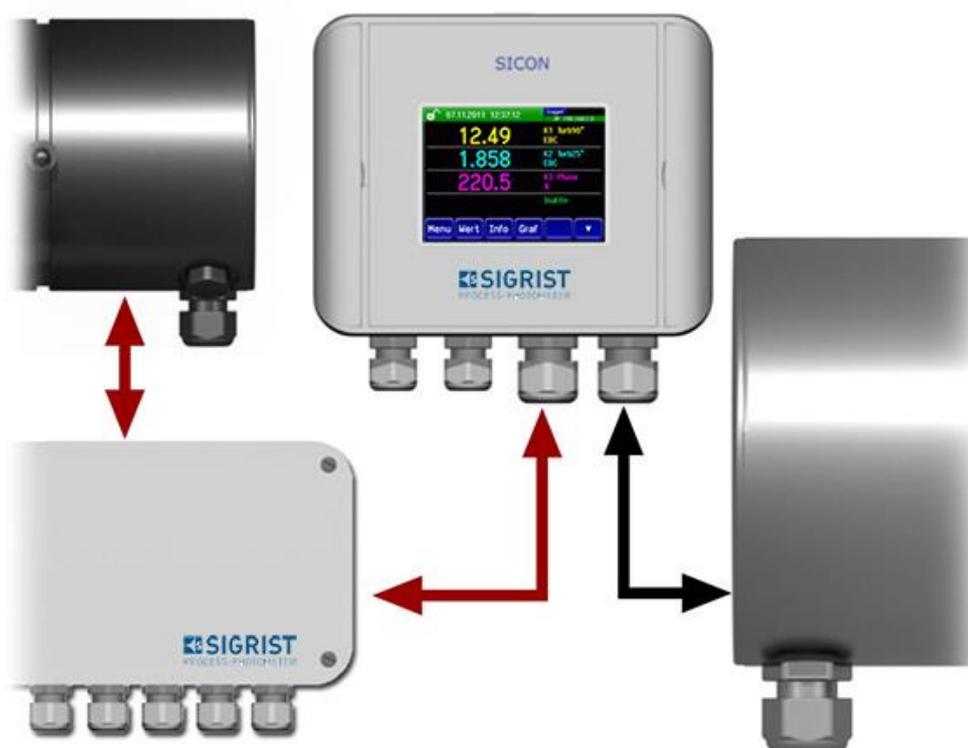


INSTRUCTION MANUAL

SICON M



Multi-Channel Control Unit

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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/

1.2 Purpose of the Instruction Manual

This Instruction Manual provides the user with helpful information about the entire life cycle of the SICON M 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
11776E	Reference Handbook	More sophisticated menu functions and work-steps for advanced users.
11777E	Service Manual	Repair and conversion instructions for service engineers.
10944DEF	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 (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 SICON M is a multi-channel control unit for connecting up to eight instruments.

1.9 User requirements

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

1.10 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

1.11 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.

1.12 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

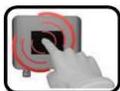
All **pictograms** used in this document are explained below:



Additional information about the current topic.



Practical procedures when working with the SICON M.



Manipulations on the touchscreen.



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

2 Instrument overview

2.1 Possible uses

2.1.1 General information on the SICON M

- The SICON M can process eight parallel measuring channels.
- The source of the eight measuring channels can be freely programmed (e.g. one measuring value from eight instruments, or four measuring values from two instruments).
- A connection box is additionally required in order to connect more than two photometers.

2.1.2 Simultaneous operation with two photometers

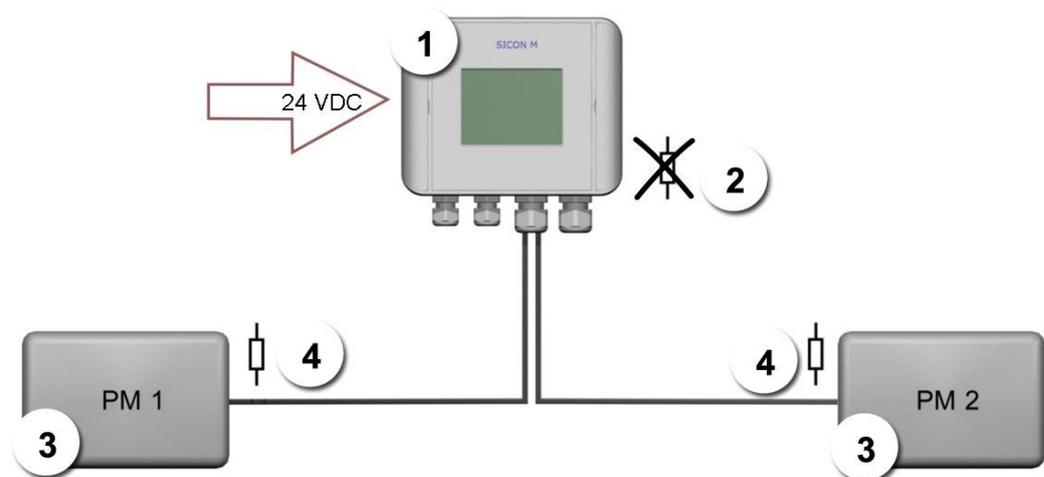


Figure 1: Simultaneous connection of two photometers to the SICON M

①	SICON M	②	Matching resistor not set in the SICON M
③	Photometer 1 .. 2	④	Matching resistor set in the photometer

A maximum of two photometers can be connected to the SICON M directly. The cable length between PM1, SICON M and PM2 must not exceed 800 meters. For cable lengths of more than 5 meters (standard cable length of the photometer), we recommend using a junction box.



The cable specifications can be found in the documentation of the corresponding photometer. The settings for the matching resistors are described in the Reference Handbook (search term: DIL switch, matching resistor). Twisted pair, shielded cables should also be used for cable lengths of more than 5 meters.

2.1.3 Operation via an active Conn-A connection box

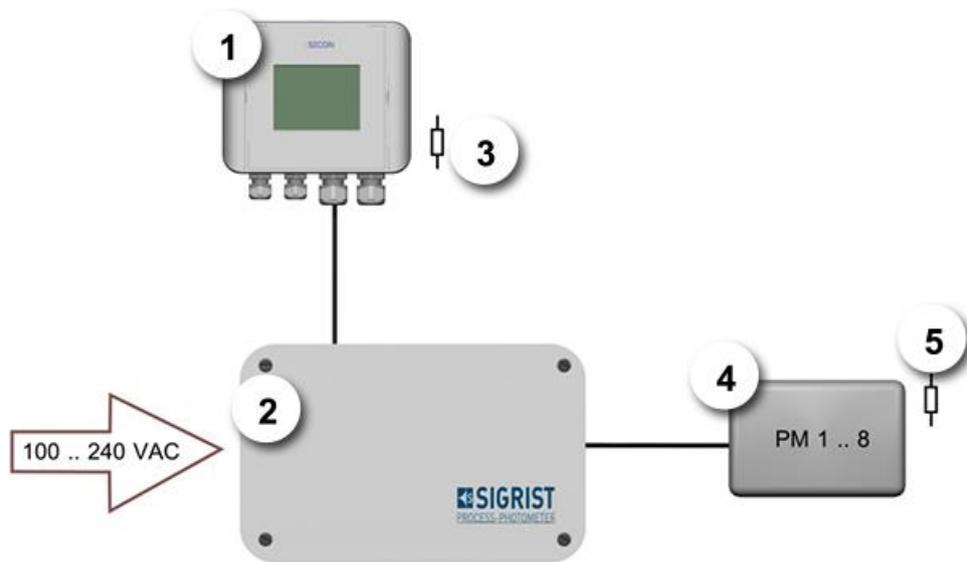


Figure 2: SICON M with Conn-A connection box

①	SICON M	②	Active Conn-A connection box
③	Matching resistor set in the SICON M	④	Photometer 1 .. 8
⑤	Matching resistor switched on for each photometer 1 .. 8		

Eight sensors/photometers can be connected on the SICON M using the active Conn-A connection box. The maximum cable length between a sensor/photometer and the active Conn-A connection box is 800 meters. Each of the eight connections is equipped with its own interface driver. This is a point-to-point connection between the sensor and the Conn-A connection box. The matching resistor must be switched on for all sensors (standard setting).

For cable lengths of more than 5 meters (standard cable length of the photometer), we recommend using a junction box. Twisted pair, shielded cables should also be used.



The specifications for the cable cross-section can be found in the documentation of the corresponding photometer.

2.2 Designation of the components

2.2.1 Designation of the SICON M

The SICON M control unit is fitted with the following rating plate:



Figure 3: Designation of the SICON M

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

2.2.2 Designation of the Powerbox

The Powerbox is fitted with the following rating plate:

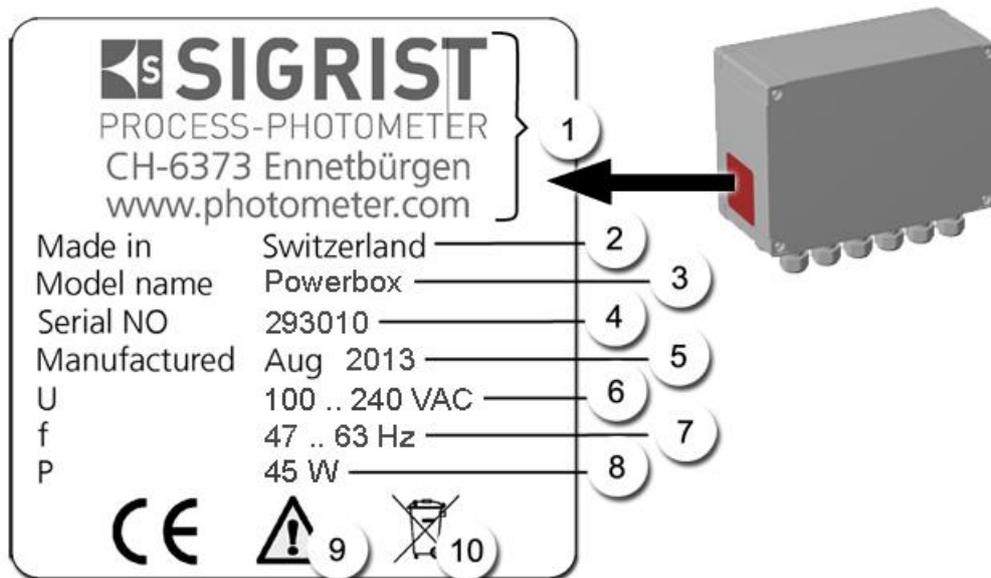


Figure 4: Designation of the Powerbox

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

2.3 Scope of supply and accessories

2.3.1 Standard scope of supply for the SICON M

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	119040	SICON M: 24 VDC multi-channel control unit		

Documentation:

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	11775	Instruction Manual		German French English
1	11776	Reference Handbook		German English

2.3.2 Optional accessories for the SICON M

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	118442	Profibus DP, interfaces pcb		
1	118445	Modbus RTU, interfaces pcb		
1	121121	Profinet IO, interfaces pcb		
1	119796	HART, interfaces pcb		
1	119130	4-way current output module		
1	119795	4-way current input module		

PCS.	ART. NO.	NAME	VIEW	VARIANT
1	109534	Connection box 65 x 50 x 35 mm for SIREL / SICON M		
1	119045	24 VDC mains de- vice 20 W, input 100 to 240 VAC/47 to 63 Hz		IP66 protection
1	119920	Conn-A connec- tion box for SICON M / AquaMaster		Operation of max. eight photometers. With integrated 20 W mains device. Input 100 – 240 VAC
1	119921	Powerbox with 8- pin connection ca- ble		12 relay contacts and 4 digital inputs
1	118826	IP66 Ethernet ca- ble for SICON M		

2.4 Technical data for the SICON M

2.4.1 Technical data for the SICON M

SICON M DATA	VALUES
Dimensions	160 x 157 x 60 mm
Service voltage	9 .. 30 VDC
Power consumption	5 W
Display	¼ VGA with touchscreen Resolution: 320 x 240 pixels with 3.5" diagonal
Outputs/inputs	<p>Outputs:</p> <ul style="list-style-type: none"> ▪ 4 x 0/4 .. 20 mA outputs, 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. ▪ Optional: With an integrated 4-way current output, four additional outputs (0/4 .. 20 mA, galvanically isolated up to max. 50 V relative to ground and max. 500 Ω burden) are available. <p>Inputs:</p> <ul style="list-style-type: none"> ▪ 5 x digital inputs up to max. 30 VDC, freely configurable.
Digital and analog interface cards	Ethernet, Modbus TCP, SD card (log, SW update, diagnostics) Optional: Modules for Profibus DP, Modbus RTU, Profinet IO, HART and 4-way current output, 4-way current input
Weight	Approx. 0.6 kg
Protection class	IP66
Housing material	ABS

2.4.2 Technical data for the Conn-A connection box

CONN-A	VALUES
Usage	Active connection box for 8 sensors up to 800 meters
Service voltage	100 .. 240 VAC, 47 .. 63 Hz or 9 .. 30 VDC (DC voltage dependent on the connected sensors)
Power consumption	Max. 25 W (the power consumption of the connected sensors/photometers must not exceed 20 W)
Maximum operating altitude	2,000 m above sea level
Protection class	IP66
Weight	1.1 kg
Dimensions	Approx. 180 x 155 x 85 mm (W x H x D)
<i>Housing material</i>	PC

2.4.3 Technical data for the Powerbox

DATA	VALUES
Usage	System expansion with 12 relays and 4 digital inputs
Dimensions	Approx. 255 x 200 x 90 mm (W x H x D)
Service voltage	100 .. 240 VAC, 47 .. 63 Hz or 24 VDC
Power consumption	Max. continuous power 45 W / peak power 70 W
Weight	2 kg
Protection class	IP66
Maximum operating altitude	<ul style="list-style-type: none"> ▪ No limit if the instrument is operated with 24 VDC. The relay voltage must also not exceed 24 V. ▪ 2'000 meters above sea level (6,600 feet) with service voltage of 250 V.
Digital inputs	4 x digital inputs up to max. 30 VDC, freely configurable.
Relay outputs	12 x relay contacts, 250 VAC, 4 A
Housing material	PC

2.4.4 24 VDC mains device

Data	Values
Service voltage	100 .. 240 VAC, 47 .. 63 Hz
Power consumption	Max. continuous power 25 W
Maximum operating altitude	2'000 m above sea level
Protection class	IP66
Weight	0.66 kg
Dimensions	Approx. 130 x 155 x 55 mm (W x H x D)
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 or opened.



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.



CAUTION!

Moisture and condensation on electronic components during operation.

Damage may occur if moisture enters the inside of the SICON M.



CAUTION!

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

If moisture enters the instrument, the SICON M can be damaged.

- Work inside 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.
- Use flow meter.
- Perform the specified servicing duties.

3.3 Warning and danger symbols on the instrument



WARNING!

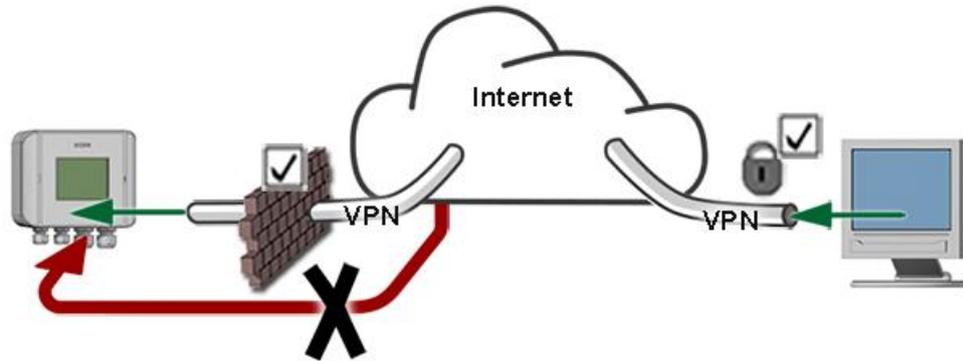
There are no warning or danger symbols on the instrument.

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 1.8
- 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

4.1 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!

Connecting the service voltage.

Improper connection of the service voltage can be potentially fatal. The system may also be damaged. Local regulations for electrical connection must be observed at all times.

Further, the following basic principles must be observed:

- 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.
- 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.
- On systems with a service voltage of between 100 and 240 VAC, a back up fuse with a max. tripping current of 16 A must be present. The cables must be able to withstand this load.
- If faults cannot be remedied, the system must be put out of operation and protected against inadvertent operation.

5.2 Installation of the SICON M

5.2.1 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).	

5.2.2 Overview of the opened SICON M control unit

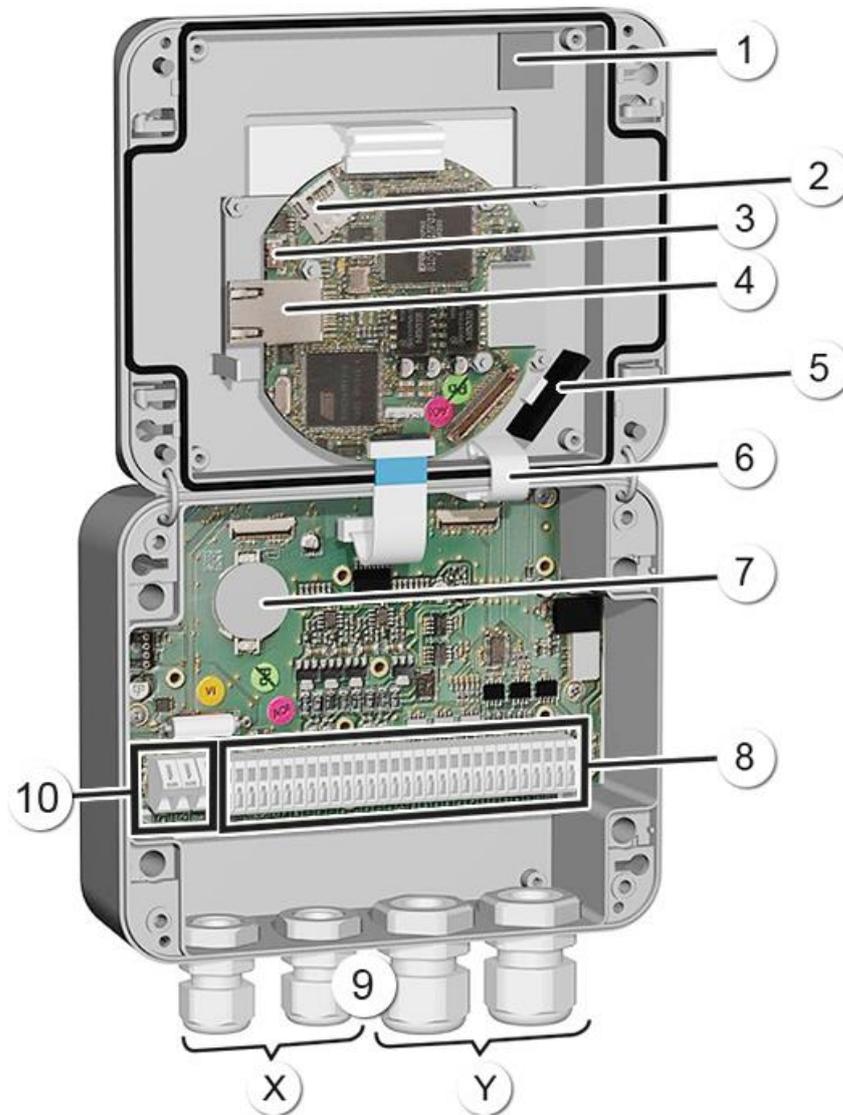


Figure 5: Overview of SICON M

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 9 .. 30 VDC

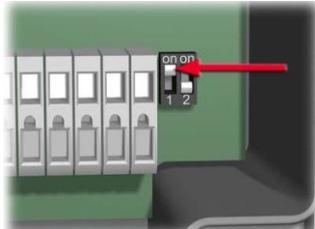
5.3 Connecting the SICON M



Figure 6: SICON M terminal block

Establish the electrical connections in the following sequence:



	TERMINAL	MEANING	REMARKS	
			Terminal	Description
1.	8 .. 11	Connection of the photometer A maximum of two photometers can be connected directly to terminals 8 .. 11.	8	GND (ground)
			9	24 V
			10	A
			11	B
2.	4 .. 7	Connection of the external expansion module (optional)	4	SDA
			5	SDA GND
			6	SCL
			7	SCL GND
3.	12 .. 19	Curr. outputs 1 .. 4	Maximum burden 500 Ohm	
4.	21	Relay	Terminal 21 is closed de-energized	
5.	22 .. 27	Digital optocoupler outputs	Terminals 22 .. 27 are open de-energized	
6.	28 .. 32	Digital inputs		
7.	33 .. 34	Internal power supply for operating signals	DIL switch (1) must be ON. → Reference Handbook 	
8.	1 .. 3	Service voltage	9 .. 30 VDC (ColorPlus 2 UV: 24 VDC ± 10 %)	



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

5.4 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.

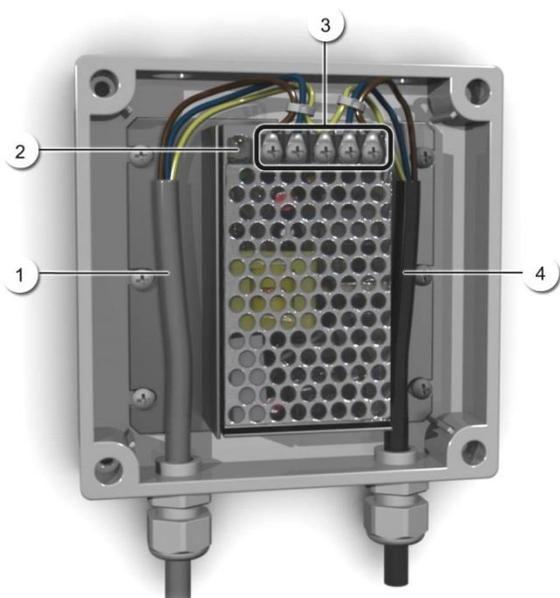


Figure 7: Optional power supply with removed cover

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

5.5 Connecting the Conn-A connection box

5.5.1 Overview of SICON M and Conn-A connection box

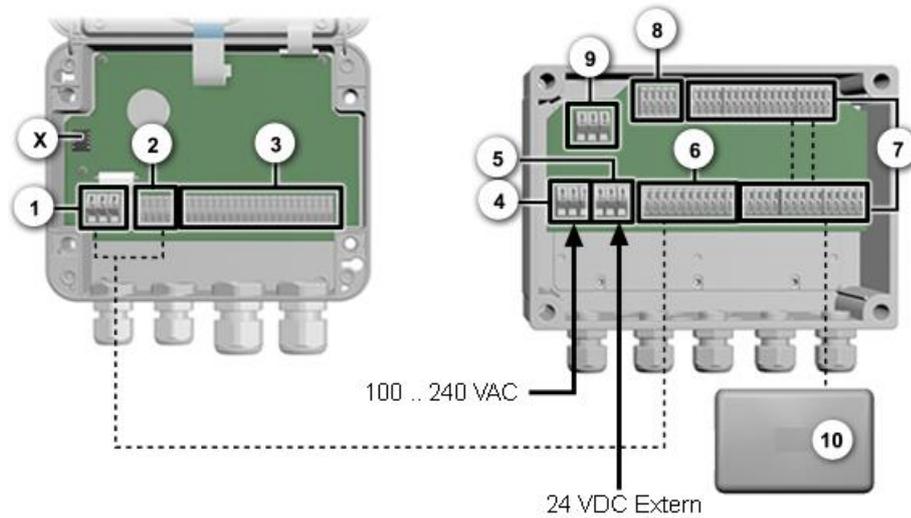


Figure 8: SICON M and Conn-A connection box, opened

①	DC Power SICON M Terminals 1 .. 3	②	Powerlink SICON M Terminals 4 .. 11
③	Customer connections Terminals 12 .. 34	④	AC Power In, Conn-A connection box Terminals 1 .. 3
⑤	DC Power Conn-A (from internal mains device, or from external source) Terminals 4 .. 6	⑥	Powerlink Terminals 7 .. 15
⑦	Connection of sensors/photometer Terminals 16 .. 35 / 44 .. 63	⑧	Powerlink output to Powerbox Terminals 39 .. 43
⑨	AC Power Out connection to mains device Terminals 36 .. 38	⑩	Sensor/photometer
ⓧ	Driver IC for the Powerlink		

5.5.2 Connecting the Conn-A connection box

The terminals are assigned as follows for connecting the Conn-A and SICON M:

Conn-A terminals		SICON M terminals	
15	Shielding	1	\perp Protective earth / shielding
7	White/green	4	SDA
8	Green	5	SDA GND
9	White/brown	6	SCL
10	Brown	7	SCL GND
11	White/orange	3	GND
12	Orange	2	24V
13	White/blue	10	A
14	Blue	11	B

For operation with the Conn-A connection box, the driver IC for the Powerlink must be installed on the plug-in socket in the SICON M (Figure 8, pos. X). This is included in the scope of supply for the Conn-A connection box. The SICON M is powered by the Conn-A connection box and requires no power supply itself.



During attachment, pay attention to the orientation of the driver IC. The markings on the socket and IC must match.

In the **Spec. function** menu the **Conn-A** parameter should be set to **On** (Reference Handbook).

5.6 Connecting the sensors/photometers



Note the following when connecting the sensors/photometers:

- The total power consumption of the sensors must not exceed 20 W.
- For cable lengths of more than 5 meters (standard cable length of the photometer), we recommend using a junction box.
- The specifications for the cable cross-section can be found in the documentation of the corresponding photometer.
- Twisted pair, shielded cables (SF/UTP) should be used for cable lengths of more than 5 meters. Characteristic impedance 120 ± 20 Ohm, capacitance < 60 pF/m.
- As there are different cable types depending on the photometer model, please refer to the specific Instruction Manual.

5.7 Mains connection 100 .. 240 VAC

Conn-A / Powerbox terminals	Cable color	Function
1	Green/yellow	Mains protective earth
2	Brown	Mains live
3	Blue	Mains neutral conductor

5.8 Connecting the external 24 VDC power supply to the connection box

If an external 24 VDC power supply is used instead of the internal 100 to 240 VAC mains device, then the leads from the internal mains device connected to terminals 5 and 6 must first be removed, insulated and stored away.



- The SICON M and all connected sensors are powered via the 24 VDC power supply.
- The 24 VDC mains device must have sufficient reserve capacity.
- The voltage must be constant and must not be disturbed by other consumers that are connected to the same power supply.

Conn-A terminals	Cable color	Function
4	Green/yellow	Protective earth
5		24 VDC
6		GND

5.9 Connecting the Powerbox

5.9.1 General information on connecting the Powerbox



The connection cables between the Powerbox, photometer, control units and external connections should be long enough so that there is sufficient freedom of movement when carrying out servicing duties.

- The mains connection terminals are provided in duplicate so that the power supply can be fed easily to an additional unit (e.g. Conn-A).
- If the Powerbox is operated via an external 24 V power supply, then this can be connected to terminals 4 .. 6. There is no explicit 24 V version.

5.10 Safety pointers for the electrical connection



DANGER!

Connecting the service voltage.

Improper connection of the service voltage can be potentially fatal. The system may also be damaged. Local regulations for electrical connection must be observed at all times.

Further, the following basic principles must be observed:

- 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.
- 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.
- On systems with a service voltage of between 100 and 240 VAC, a back up fuse with a max. tripping current of 16 A must be present. The cables must be able to withstand this load.
- If faults cannot be remedied, the system must be put out of operation and protected against inadvertent operation.

5.10.1 Connecting the SICON M to the Powerbox

Application:

- SICON: Expansion of power relay
- SICON M: Expansion of power relay, valve switching

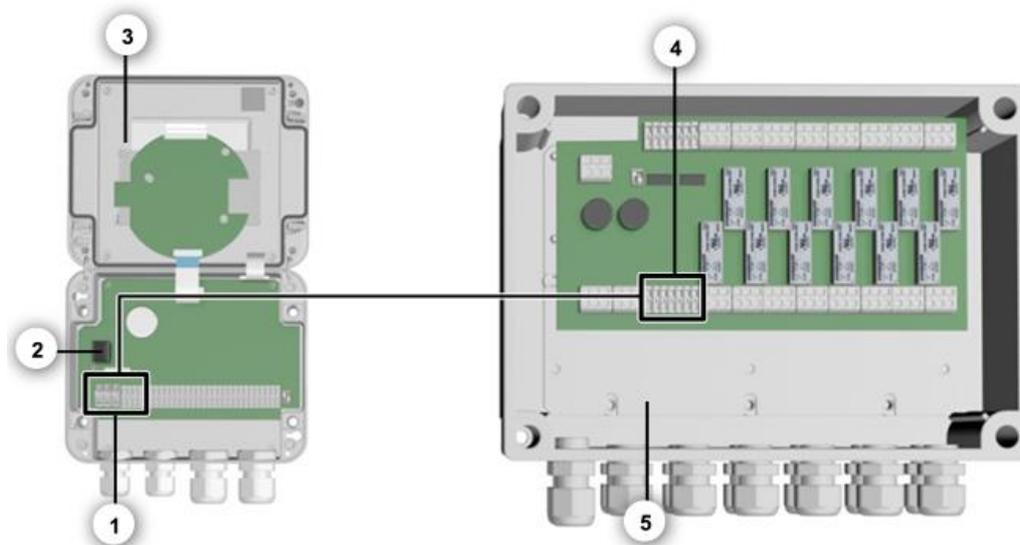


Figure 9: Terminal position when connecting the SICON M to the Powerbox

①	Terminals for Powerlink (terminals 1 .. 7) in the SICON M	②	Driver IC for the Powerlink
③	SICON M	④	Terminals for Powerlink (terminals 7 .. 13) in the Powerbox
⑤	Powerbox		

The terminals are assigned as follows for connecting the SICON M and the Powerbox:

Powerbox		SICON M terminals	
13	Shielding	1	⏏ Protective earth / shielding
7	White/green	4	SDA
8	Green	5	SDA GND
9	White/brown	6	SCL
10	Brown	7	SCL GND
11	White/orange	3	GND
12	Orange	2	24V
	White/blue / Unused		Unused
	Blue / Unused		Unused

In the SICON M, install the driver IC for the Powerlink on the plug-in socket (Figure 9, pos. 2). This is included in the scope of supply for the Powerbox.



- During attachment, pay attention to the orientation of the driver IC. The markings on the socket and IC must match.
- The SICON M is powered by the Powerbox.

5.11 Connecting the field bus interfaces (optional)

5.11.1 Overview of Profibus DP and Modbus RTU

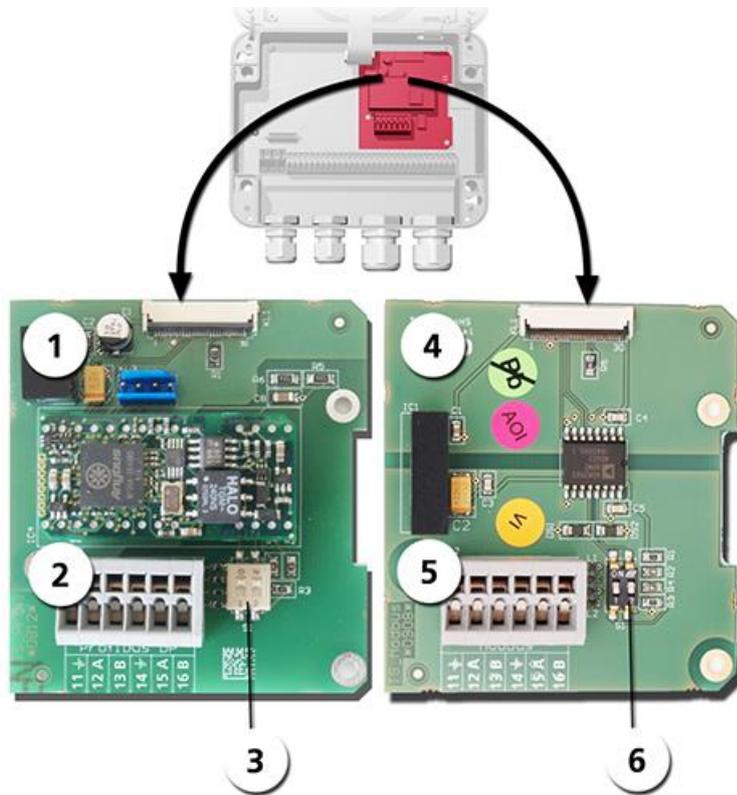


Figure 10: Overview of the Profibus DP and Modbus RTU modules

①	Field bus interface (connection printed circuit board) for Profibus DP .	④	Field bus interface (connection printed circuit board) for Modbus RTU .
②	Profibus DP terminals.	⑤	Modbus RTU terminals.
③	DIL switch for matching resistors. Switches (1 and 2) must be ON .	⑥	DIL switch for matching resistors. Switches (1 and 2) must be ON .

5.11.2 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

5.11.3 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.

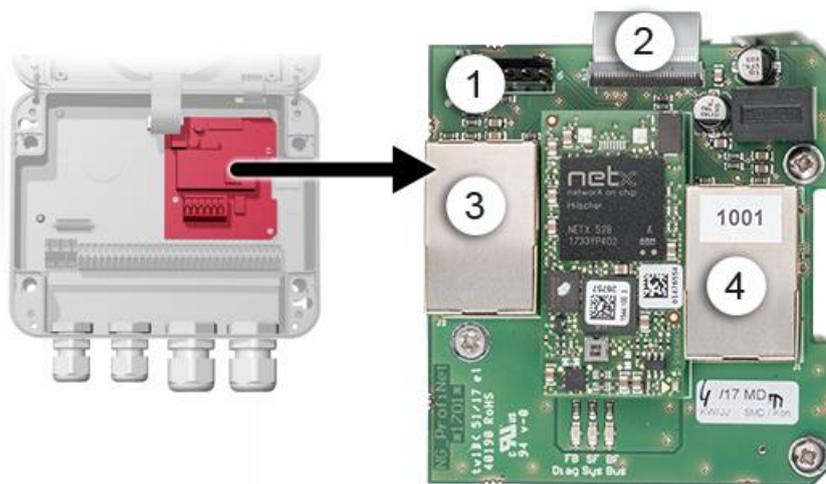


Figure 11: Overview of the Profinet IO module

①	Field bus interface (connection print) for Profinet IO	②	Connector for SICON M
③	Ethernet port 1	④	Ethernet port 2

5.11.4 Overview of HART



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

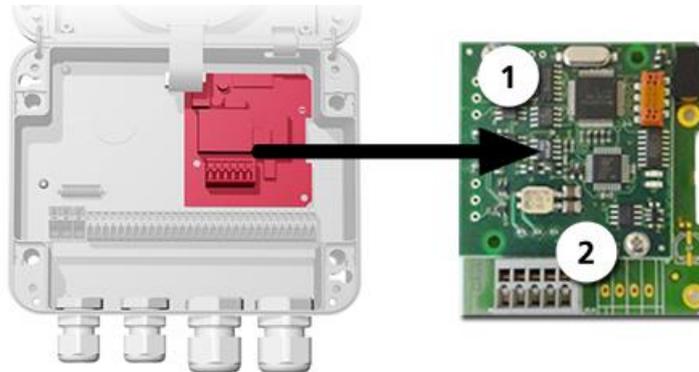


Figure 12: Position of the HART module

①	Field bus interface (connection print) for HART. Serves as interface to HART.	②	HART terminals
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5.11.5 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.

5.12 Connecting the analog modules (optional)

5.12.1 Overview of 4-way current output

The configuration of the current outputs is described in the Section 8.5.

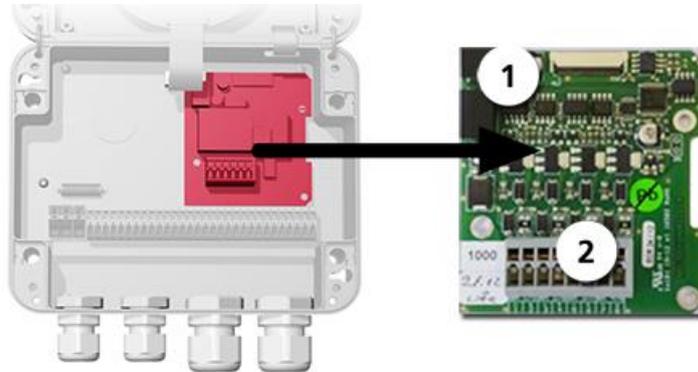


Figure 13: Overview of the 4-way current output module

①	4-way current output	②	Terminals
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5.12.2 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.

5.12.3 Overview of the 4-way current input

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

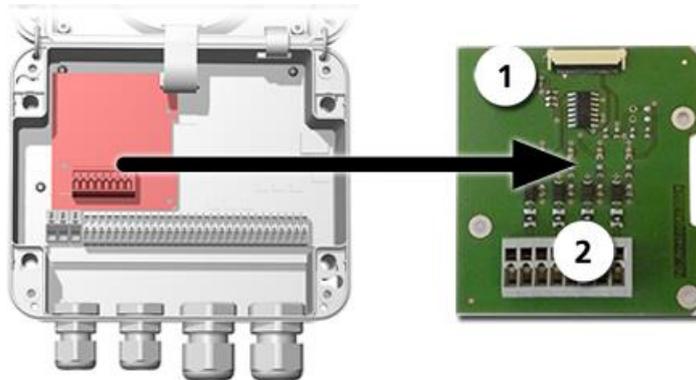


Figure 14: Overview of the 4-way current input module

①	4-way current input	②	Terminals
---	---------------------	---	-----------

5.12.4 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.

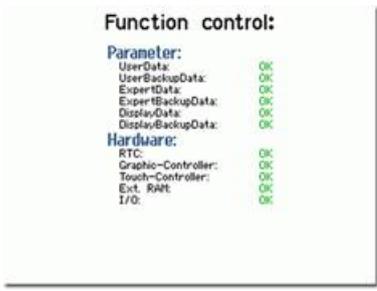
6 Commissioning



The initial start-up of the web user interface via the Ethernet interface is described in the Reference Handbook. If malfunctions occur, consult the Section 10.

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



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Ensure that the SICON M and all photometers are correctly mounted and connected.	
2.	Switch on the matching resistors in the two terminal devices. Switch off the matching resistors in all other instruments.	Section 2.1.2
3.	3.1: Establish the service voltage. The welcome screen appears on the display.  The factory setting language is English. Accordingly, the displayed language during the initial start-up is English.	
	3.2: The instrument carries out an internal functional check.	
	3.3: The instrument is ready for measurement. Measuring mode begins (displayed value according to factory settings).	
4.	Set the operating language.	Section 8.1
5.	Assign the slave numbers to the connected photometers.	Section 8.2/ Section 8.3
6.	Set the measuring channels to be displayed.	Section 8.4
7.	Set the current outputs.	Section 8.5
8.	Set the limits.	Section 8.6

	WORKSTEP	ADDITIONAL INFO / IMAGES
9.	Set the outputs.	Section 8.7
10.	Set the date and time.	Section 8.8
11.	Make the individual settings on the connected photometers (Sensor 1 .. 8 menu).	Consult the Instruction Manual of the respective instrument.
12.	Enter the access code.	Section 8.9
13.	Copy the configured data to the microSD card.	Section 8.10

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 Control elements in measuring mode



Figure 15: Control elements in measuring mode

①	Menu button Enter the menu. Section 7.3	②	Valu button Numerical representation of the measuring values. Section 7.4
③	Info button Displays the information screen. Section 7.5	④	Diag button Graphical representation of the measuring values. Section 7.6
⑤	Up arrow Go to previous page.	⑥	Down arrow Four channels are displayed per page. Pressing this button displays more channels.

7.3 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 7.10.

7.4 Valu button

Pressing the **Valu** button displays the measuring values in numerical form. This is described in detail in Section 7.8.

7.5 Info button

When you press the **Info** button, a general overview of the instrument settings appears. These settings are described in the following chapters.

7.5.1 Page 1, Info button

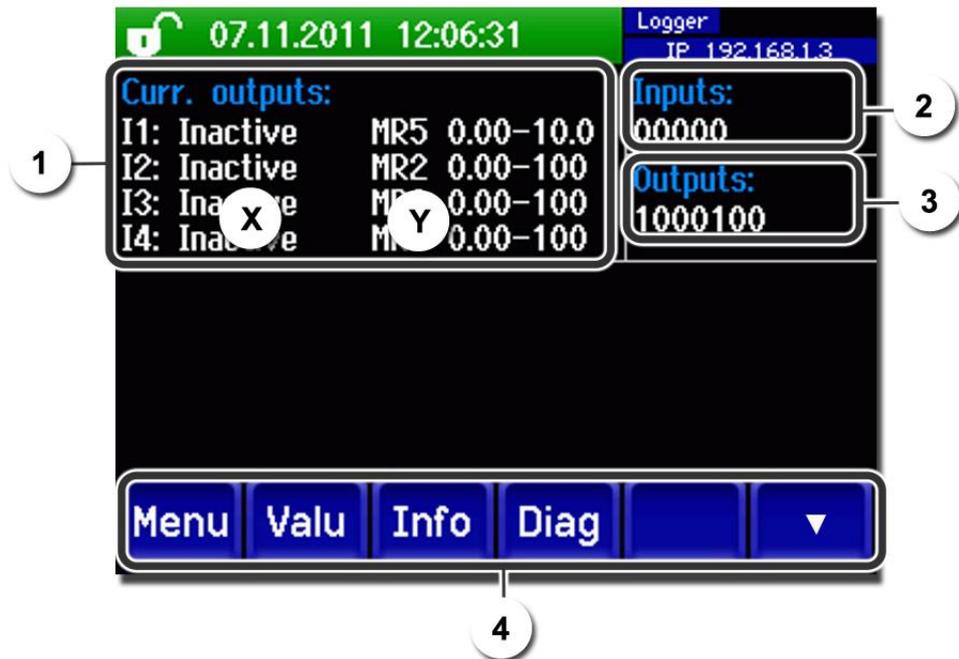
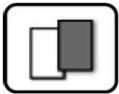


Figure 16: Info screen, page 1

①	Information about the current outputs: Standard I1 .. I4 (with additional print I1 .. I8) X: Source of the current output Y: Measuring range of the current output	②	Status of the inputs → Reference Handbook
③	Status of the outputs → Reference Handbook	④	Main menu buttons

7.5.2 Page 2, Info button

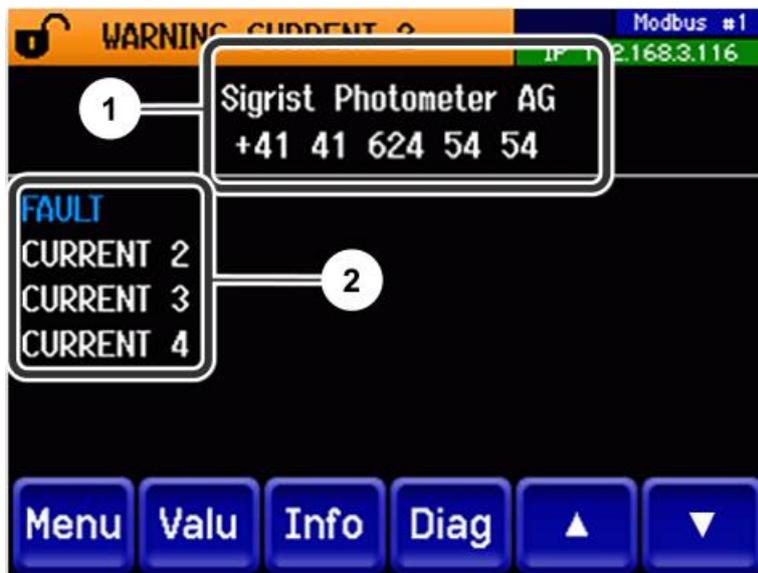


Figure 17: Info screen, page 2

①	Contact information	②	Display of up to 5 pending fault messages
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7.5.3 Page 3, Info button

The state of all connected sensors is displayed here.

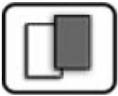


Figure 18: Info screen, page 3

①	Sensor name	②	Serial numbers of the corresponding sensor
③	Fault message Section 10		

7.6 Diag button

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

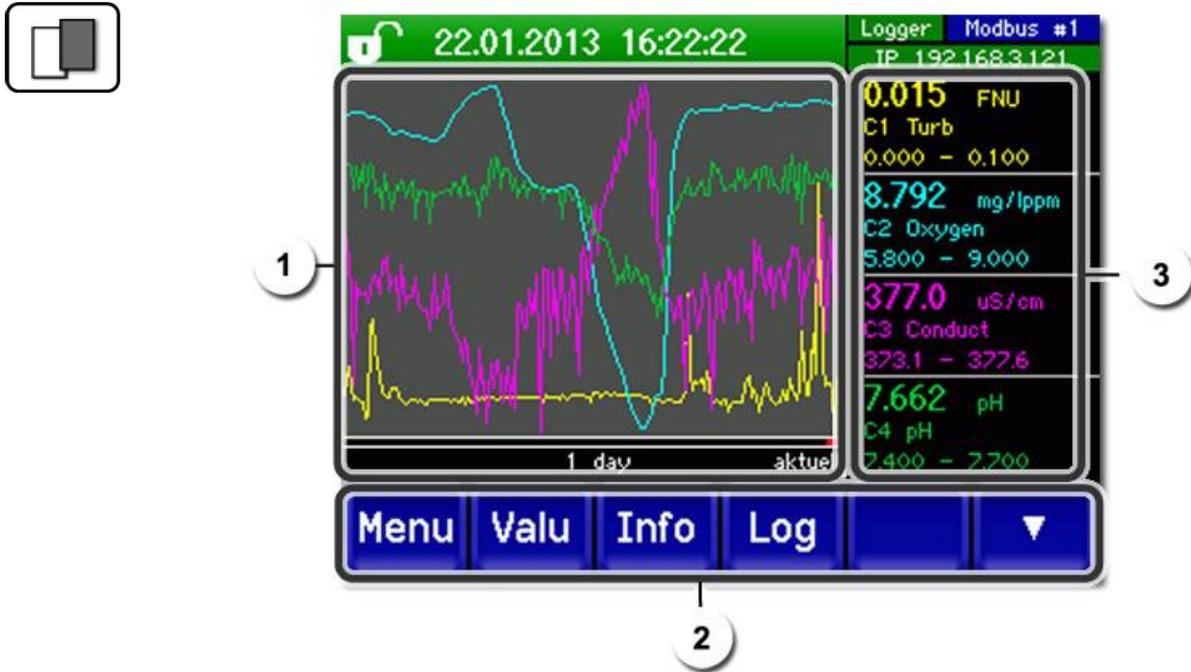


Figure 19: Graphic representation of the measuring values

<p>① Graphic representation of the measuring values</p> <p>The measuring values can be recorded from 3 minutes to 32 days and 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 Main menu buttons</p> <p>i The logger functions (Log button) are described in Section 7.7.</p>
<p>③ Measuring channels:</p> <p>Numerical representation of the set measuring channels.</p> <ul style="list-style-type: none"> ▪ Current measured value (e.g. 0.013 FNU). ▪ Measuring channel with name (e.g. C1 Turb). ▪ Scaling of the Y-axis (e.g. 0.000 to 0.100). <p>i The channel names shown in the figure are examples and can be adjusted individually.</p>	

7.7 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 reinitialised. 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:

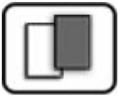


Figure 20: Functions of the Log display

<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 </>: Moves the cursor position. The cursor moves faster when these buttons are held down longer. <</>>: 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.

7.8 Displays in measuring mode



Figure 21: Displays in measuring mode

<p>①</p>	<p>Measuring value(s) For values which are greater than the maximum measuring range, no measuring value is displayed; instead **** is displayed.</p>	<p>②</p>	<p>Status line In measuring mode, the status line is green and shows the date and time. 1 If faults should occur, warning and fault messages are shown here and the status line changes to orange or red.</p>								
<p>③</p>	<p>Interface information</p> <ul style="list-style-type: none"> ▪ Top left: Logger status ▪ Top right: Modbus, HART, Profinet or Profibus status ▪ Below: Ethernet IP status The following messages are possible: <ul style="list-style-type: none"> - IP not connected (cable not connected) - IP DHCP running... - IP 169.254.1.1 (example address) <p>Color coding:</p> <table border="1" data-bbox="480 1615 879 1845"> <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</p>	<p>Channel name with unit 1 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										

7.9 Lock / unlock the touch screen



MANIPULATION						
1.	Press the lock icon top left.					
2.	<p>Within one second press the key bottom at the outside right.</p> <p>Depending on the initial state, the lock icon changes as follows:</p> <table border="1" data-bbox="451 835 991 981"> <tbody> <tr> <td></td> <td>Touch screen unlocked</td> </tr> <tr> <td></td> <td>Touch screen locked</td> </tr> </tbody> </table>		Touch screen unlocked		Touch screen locked	
	Touch screen unlocked					
	Touch screen locked					

7.10 Switching to service mode

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



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	 Factory setting is 0 .
3.	Select menu Local or S 1 .. 8 .	Now the instrument is 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 value.
- The limits are deactivated.
- If an output for service is programmed, it is activated.
- Error messages are suppressed.

* This applies when the **Local parameters\Current outputs\General\For service** is set to **Measure**.



For measuring mode press the **Meas** button. When switching from service mode to measuring mode, an hourglass appears in the information bar for about 20 seconds. The measuring values are frozen during this time.

7.11 Control components in service mode

7.11.1 Input elements in service mode

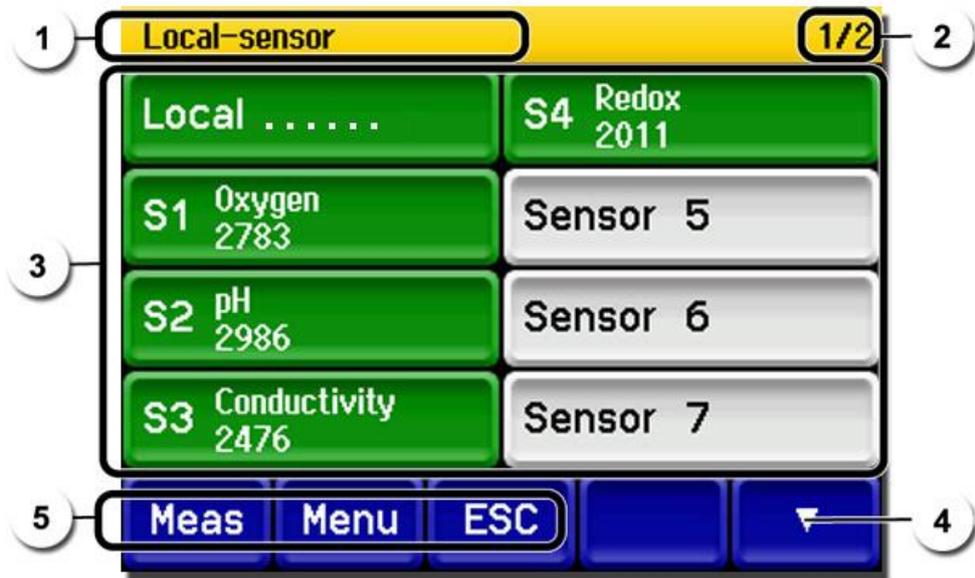


Figure 22: Input elements in service mode

①	Path specification	②	Page number / total number of pages
③	Main menus All functions of the SICON M and interfaces are configured in the Local menu. Depending on the integrated sensors, the corresponding menus S 1 .. 8 (sensor 1 .. 8) appear here. The sensors can be configured in these menus.	④	Next page
⑤	Meas button: The instrument switches to measuring mode. Menu button: The display goes back one level but remains in service mode. ESC button: The display goes back one level in the menu hierarchy until measuring mode is reached again.		

7.11.2 Numerical entry

The following screen is for entering numbers and data:

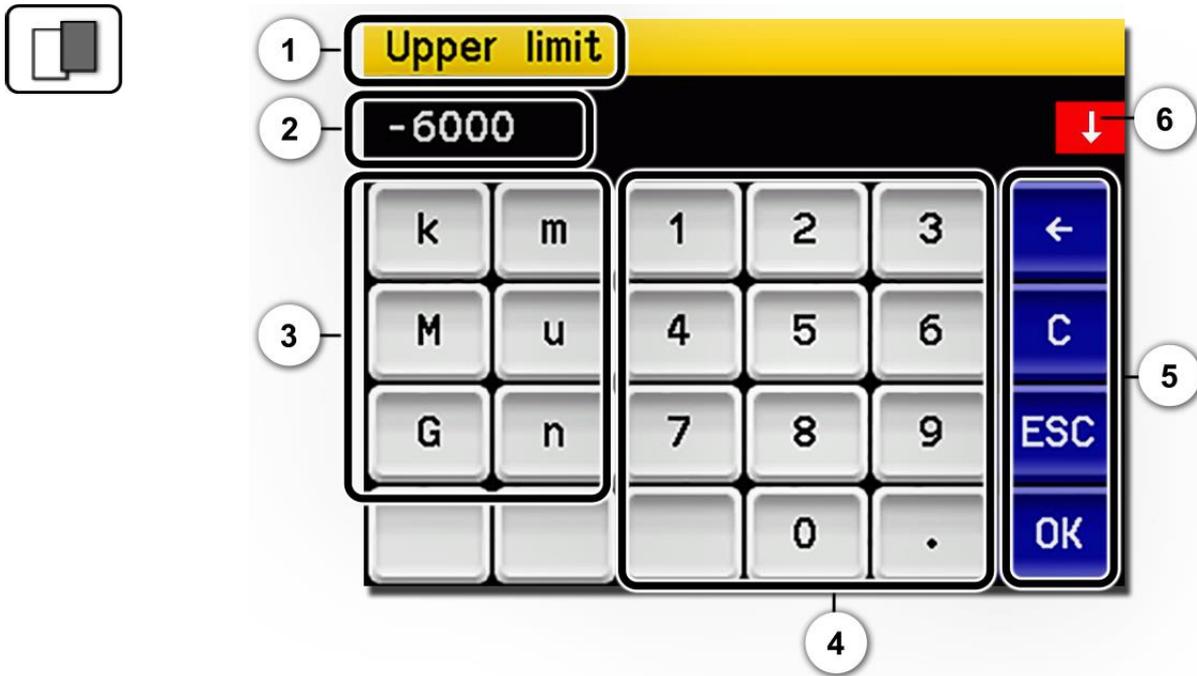
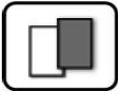


Figure 23: Numerical entry

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. C : Clears the displayed value. ESC : Touching the ESC field causes the display to go back one level in the menu hierarchy. The entered value is not saved. OK : 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

7.11.3 Single selection of functions



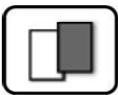
The single selection is identifiable by the **ESC** button in the lower right corner.

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 24: Example of single selection

7.11.4 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 25: Example of multiple selection

8 Settings

8.1 Setting the operating language

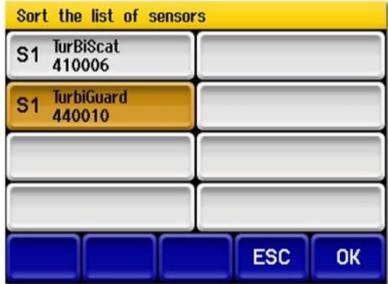
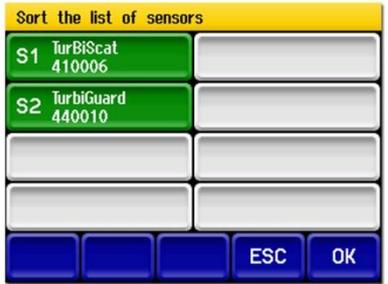


	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	i Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Configuration button to access language selection.	i If the desired menu does not appear, press the arrow key bottom right.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

8.2 Assigning slave numbers without Conn-A

Each individual instrument must have an assigned slave number so that the photometer can be recognized by SICON M.



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	 Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Digi. interf. button.	
5.	Press the Signet button.	
6.	<p>Press start... to start the network scan.</p> <p>After a few seconds of searching for connected photometers, a list with all found photometers appears.</p> <p>If there is an address conflict, the concerned photometer appears orange in the list (see upper figure).</p> <p>In this case, the slave numbers must be re-assigned. To do this, the photometers must now be selected in the desired sequence.</p> <p>The new slave number is shown and the associated button changes to green (see lower figure).</p> <p>When all photometers have been assigned a slave number, confirm by pressing OK.</p>	<p>Two instruments were detected. Both are defined as slave number 1. This is an address conflict.</p>  <p>Re-assignment of the slave numbers:</p> 
7.	Press the Meas button.	

8.3 Assigning slave numbers with Conn-A

An automatic search must be started so that the photometers can be recognized by SICON M.

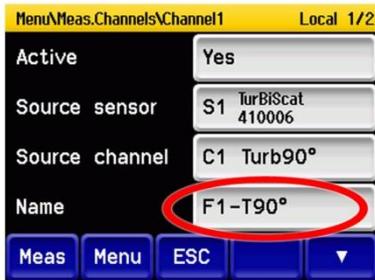


	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	 Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Digi. interf. button.	
5.	Press the Signet button.	
6.	Press start... to start the network scan. A search is now made on all eight ports of the Conn-A for connected sensors/photometers. After the search is completed, the Local-sensor menu is automatically opened. The detected sensors/photometers are listed here.	
7.	Press the Meas button.	

8.4 Setting the measuring channels and the display

Setting of which channel should display the connected instruments



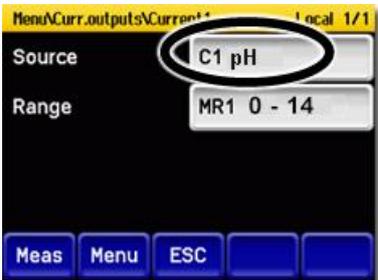
	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	 Factory setting is 0 .
3.	Press the Local button.	
4.	Press the down arrow button and press the Meas. channels button. Select the desired channel 1 .. 8.	
5.	At the Active menu item, set the button to Yes . If set to No , this channel is inactive.	
6.	Select the source from the Source sensor menu item. Here you can select one of the connected photometers.	E.g. TurBiScat, PhaseGuard etc.
7.	Select the source from the Source channel menu item. Here you can select the desired measuring value of the photometer defined under Source sensor .	
8.	Enter the name of the channel in the Name menu.  The name should be unique, since it is referred to in other settings for the display (e.g. current outputs etc.)	
9.	Enter the unit of the measuring value in the Unit menu.	
10.	Press the ESC button. The Meas. channels menu is displayed. Define the other channels as described under points 4 to 9.	
11.	Press ESC and then the up arrow button. All menu items of Local are displayed.	
12.	Press the Display button and then select the desired channel 1 .. 8.	



	MANIPULATION	ADDITIONAL INFO / IMAGES
13.	<p>Select the source of the measuring channel from the Source menu item. This name is displayed to simplify identification of the measuring channel.</p> <hr/> <p>i The source defined under Channel 1 is displayed in the operation display at the top. Channel 2 is displayed in the second position, and so on. The other menu items refer to settings of the graphic display and are described in the Reference Handbook.</p>	
14.	<p>Press the ESC button. The Display menu is displayed. Define the other channels as described under points 12 to 13.</p>	
15.	<p>Press the Meas button.</p>	

8.5 Setting the current outputs



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	i Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Curr. outputs button.	i If the desired menu does not appear, press the arrow at the bottom right.
5.	Select the Current 1 .. 4 (1 .. 8) menu.	
6.	Select the source of the measuring channel from the Source menu item. This name is displayed to simplify identification of the measuring channel.	 <p>The channels defined under Meas.channels, three math channels and two analog channels are available for selection. → Reference Handbook</p>
7.	Select the Range menu.	MR1 .. MR8 (see table below) In 1, In 2, Auto 1, Auto 2 → Reference Handbook
8.	Press the Meas button.	The instrument is in measuring mode again.

Measuring range no.	Measuring range (standard)	Measuring range (customer-specific)
MR1	0 .. 1000	
MR2	0 .. 100	
MR3	0 .. 50.0	
MR4	0 .. 20.0	
MR5	0 .. 10.0	
MR6	0 .. 5.00	
MR7	0 .. 2.00	
MR8	0 .. 1.00	

If other measuring ranges are needed, you can re-program the table above as required.
→ Reference Handbook

8.6 Setting the limits



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	i Factory setting is 0 .
3.	Press the Local button.	i If the desired menu does not appear, press the arrow at the bottom right.
4.	Press the Limits button.	
5.	Select Limit 1 .. 8 .	
6.	Select the source of the measuring channel from the Source menu item. This name is displayed to simplify identification of the measuring channel.	 <p>The channels defined under Meas.channels, three math channels and two analog channels are available for selection. → Reference Handbook</p>
7.	Define the Mode .	<p>The following selection is available:</p> <ul style="list-style-type: none"> ▪ Inactive (limit monitoring of this channel is deactivated) ▪ Exceeded (limit active when the set threshold is exceeded) ▪ Undershot. (limit active when the set threshold is undershot)
8.	Define the upper limit, lower limit, cut-in delay and cut-out delay with the number pad.	i Pressing the current number value takes you to the entry mode.
9.	Press the Meas button.	The instrument is in measuring mode again.

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

8.6.1 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 26), 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 **Undershot**, then while the lower threshold is undershot the limit is active and remains active until the upper threshold is again exceeded.

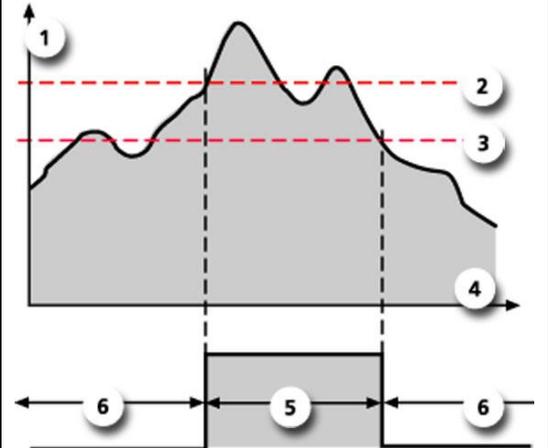


Figure 26: Threshold diagram

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

8.6.2 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 "_".



8.7 Setting the outputs



	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the Menu button.	
2.	Enter the access code and confirm with OK .	i Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Inp./outputs button.	i If the desired menu does not appear, press the arrow at the bottom right.
5.	Press the Outputs button.	
6.	Select the Output 1 .. n menu.	
7.	Activate the outputs (multiple selection possible).	<p>Activated outputs are highlighted green.</p> <ul style="list-style-type: none"> ▪ Invert: Inverts the outputs ▪ Prio fault ▪ Fault ▪ Warning ▪ Service ▪ Limit 1 .. 8 <p>The other buttons MR-Out... and Valve/Channel are for automatic measuring range switching and for multiple sample switching with valves (Reference Handbook).</p>
8.	Press the Meas button.	The instrument is in measuring mode again.

8.8 Setting the date and time



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

8.9 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 Menu button.	
2.	Enter the access code and confirm with OK .	 Factory setting is 0 .
3.	Press the Local button.	
4.	Press the Configuration button.	 If the desired menu does not appear, press the arrow key bottom right.
5.	Press the button to the right of the Access code description text.	
6.	Enter the access code and confirm with OK .	
7.	Press the Meas button.	Instrument again in measuring mode.



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

Enter your personal access code here:

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

8.10 Back up configured data

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



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

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

WHEN	WHO	WHAT	PURPOSE
Every 10 years or as needed	Operator	Change the battery in the SICON M (Section 9.2)	Obligatory measure for maintaining functional efficiency.

Table 1: Servicing schedule

9.2 Changing the battery in 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.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the SICON M.	
2.	Open the SICON M according to Section 5.2.1.	
3.	Remove the battery (circle).	
4.	Insert the new battery.	
5.	Close the SICON M.	
6.	Re-establish the service voltage.	
7.	Set the date and time.	

10 Troubleshooting

10.1 Pinpointing malfunctions

DETECTABLE MALFUNCTION	MEASURE
No reading	<ul style="list-style-type: none"> ▪ Check whether the supply voltage is connected.
Fault message in the display	<ul style="list-style-type: none"> ▪ Analyze the fault message according to Section 10.2 to Section 10.4.
The reading appears to be wrong	<ul style="list-style-type: none"> ▪ Ensure that the sample to be measured corresponds to the operating conditions. Section 2.4 ▪ Check whether the system is correctly mounted. Section 4 ▪ Ensure that the servicing duties have been performed according to the servicing schedule. Section 9

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"> ▪ 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. ▪ When the cause of the warning has been remedied, it is automatically deleted. ▪ If an output for warnings is programmed, it is activated. ▪ When the Warning message occurs, the color of the status display changes to orange and the warning text describes the warning in question. 	<p>Warning message from the SICON M:</p>  <p>Example: WARNING HUMIDITY</p> <p>Warning message from a connected photometer with slave number 1 (S1):</p>  <p>Example: WARNING S1 HUMIDITY</p> <p>If the cause of a warning message is from a connected photometer, S1 .. 8 appears between WARNING and the name.</p>

The following warning messages can be displayed:

WARNING	DESCRIPTION	POSSIBLE CAUSES
V IN	The input voltage is outside the permitted range (9-30 VDC).	<ul style="list-style-type: none"> ▪ The service voltage is faulty.
ADJUST FAULT	The adjustment of the instrument could not be performed.	<ul style="list-style-type: none"> ▪ The instrument is soiled. ▪ The nominal value for the adjustment does not match the value of the medium.

WARNING	DESCRIPTION	POSSIBLE CAUSES
SENSOR CHECK	The automatic sensor check failed.	<ul style="list-style-type: none"> ▪ Too much external light in the vicinity of the measuring cell (e.g. sight glass). ▪ Instrument open. ▪ Defective optics/electronics. → Service technician
OVER TEMP	The temperature in the instrument has exceeded 65 °C.	<ul style="list-style-type: none"> ▪ The medium or ambient temperature is too high and defective/no cooling.
HUMIDITY	The relative humidity in the instrument has risen above the set limit.	<ul style="list-style-type: none"> ▪ The desiccant is saturated. ▪ The gaskets on the electronic component are defective. ▪ Instrument was open too long.
CURRENT 1 .. 8	Current output 1 is disturbed.	<ul style="list-style-type: none"> ▪ Terminals are open. ▪ Interruption of the current loop of the measuring value output.
VENTILATOR	The ventilator does not reach its nominal speed.	<ul style="list-style-type: none"> ▪ The ventilator is soiled or blocked. ▪ The ventilator is defective.
FLOW RATE	The flow rate is outside the permitted limits.	<ul style="list-style-type: none"> ▪ The supply lines are clogged.
HEATER	The heater does not reach its nominal temperature.	<ul style="list-style-type: none"> ▪ Heating performance is insufficient. ▪ Heater defective.
SOILING	Soiling has exceeded the permitted limit.	<ul style="list-style-type: none"> ▪ The instrument is soiled and has to be cleaned.
NEGATIVE VAL	The measuring value has exceeded the negative limit.	<ul style="list-style-type: none"> ▪ The instrument is soiled. ▪ The 100% adjustment was performed incorrectly.
TEMP.SENSOR	The inner temperature sensor failed.	<ul style="list-style-type: none"> ▪ Defect in the electronic system. → Service technician
EXTERNAL ON	<p>A digital input defined as External is active.</p> <p> EXTERNAL ON can be changed in the display text and in the priority. → Reference Handbook</p>	<ul style="list-style-type: none"> ▪ Depending on the signal transmitter.
WATCHDOG	<p>The internal fault monitoring has been actuated.</p> <p>The program has been re-started.</p>	<ul style="list-style-type: none"> ▪ Program crash.

Table 3: Possible warning messages

10.3 Fault messages and effect on operation

<p>FAULT</p> <p>If a fault occurs during operation, it has the following effects:</p> <ul style="list-style-type: none"> ▪ A fault is a malfunction which prevents correct measurement value acquisition. ▪ The measuring values of the concerned photometer go to 0. ▪ Assigned current outputs go to the programmed electrical current If fault. ▪ Assigned limits are deactivated. ▪ If an output for fault messages is programmed, it is activated. ▪ When the Fault message appears, the color of the status display changes to red and the text describes the fault in question. <p>i When the cause of the fault has been remedied, it is automatically deleted.</p>	 <p>Fault message from SICOM M:</p> <p>Example: FAULT S1 SERIAL 1</p>  <p>Fault message from a connected photometer with slave number 2 (S2):</p> <p>Example: FAULT S2 SERIAL 1</p> <p>If the cause of a fault message comes from a connected photometer, S1 .. 8 (S2) appears between FAULT and the Name (LED FAILURE).</p>
---	--

The following fault messages can be displayed:

FAULT	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"> ▪ Different delivery data on photometer and control unit.
SERIAL 1 .. 8	The control unit cannot establish a connection to the photometer with slave number 1 .. 8.	<ul style="list-style-type: none"> ▪ Interrupted connection to photometer 1 .. 8. ▪ Defect in the electronic system. → Service technician
V ANALOG	One of the internal analog voltages is outside the permitted range.	<ul style="list-style-type: none"> ▪ Defect in the electronic system. → Service technician

FAULT	DESCRIPTION	POSSIBLE CAUSES
MEASUR.FAULT	Measuring value acquisition is faulty.	<ul style="list-style-type: none"> ▪ Consult the operating instructions of the concerned photometer.
AN.MEAS.FAULT	The measurement value acquisition of an analog input is faulty.	<ul style="list-style-type: none"> ▪ Defect in the electronic system. → Service technician
ANALOG IN 1	The minimum permitted input current on analog input 1 is undershot.	<ul style="list-style-type: none"> ▪ Interruption of the current loop of the reading input. ▪ Connected signal transmitter is defective.
ANALOG IN 2	The minimum permitted input current on analog input 2 is undershot.	<ul style="list-style-type: none"> ▪ Interruption of the current loop of the reading input. ▪ Connected signal transmitter is defective.
LED 1.. 4 FAILURE	The detectors receive no light from LED 1 .. 4.	<ul style="list-style-type: none"> ▪ Defective light source. → Service technician
IO PORT	Actuation of the inputs/outputs in the SICON M is disturbed.	<ul style="list-style-type: none"> ▪ Interrupted connection between SICON M cover and connection print.
POWER LINK	Actuation of the extended inputs/outputs via the Powerlink is disturbed.	<ul style="list-style-type: none"> ▪ Interrupted connection to photometer 1.
CHANNEL 1 .. 8	A digital input that was defined as a channel 1 .. 8 fault signals a fault.	<ul style="list-style-type: none"> ▪ Depending on the signal transmitter.
ALL CHANNELS	A digital input that was defined as a group fault signals a fault.	<ul style="list-style-type: none"> ▪ Depending on the signal transmitter.
MASTER SW VERS	This fault message is displayed when the software version of the SICON M is older than the version of the connected instrument.	<ul style="list-style-type: none"> ▪ 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 Handbook

Table 4: Possible fault messages

10.4 Prioritized fault messages and their effect on operation

PRIO (PRIORITIZED FAULT)	
<p>When there is a prioritized fault, the cause of the malfunction is serious. If a prioritized fault occurs during operation, it has the following effects:</p> <ul style="list-style-type: none"> ▪ When there is a prioritized fault, the cause of the malfunction is serious. ▪ A prioritized fault on the SICON M sets all measuring values to 0. ▪ A prioritized fault on a sensor/photometer sets the concerned measuring values to 0. ▪ The current output goes to the programmed electrical current If fault. ▪ The limits are deactivated. ▪ If an output for prioritized faults is programmed, it is activated. ▪ When the Prio message occurs, the color of the status display changes to red and the text describes the prioritized fault in question. ▪ Prioritized faults can be cleared only by a service engineer. 	<div data-bbox="1038 360 1449 667" style="border: 1px solid black; padding: 5px;">  </div> <p>Example: PRIO DEFAULT VALUES</p> <p>If the cause of a prioritized fault is from a connected photometer, S1 .. 8 appears between PRIO and the name.</p>

The following prioritized fault messages can be displayed:

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

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.

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 SICON M.
- Description of operation conditions (place, power supply, measured medium, temperature etc.)
- Application and Instruction Manual.

12 Decommissioning/Storage

12.1 Decommissioning the control unit

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



	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	<div style="border: 1px solid black; padding: 5px;">  Life-threatening voltage inside the instrument. Connecting the electrical lines is extremely dangerous. Parts of the system can also be damaged. Local regulations for electrical installations must be observed at all times. </div> <p>Interrupt the service voltage to the control unit and remove the electrical connections.</p>	
2.	Remove the control unit.	Section 5.2
3.	Make sure that all covers are closed and all locks on the photometer and control unit are locked.	

12.2 Storing the components

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

- The control unit contains electronic components. Storage for such components must fulfill the usual conditions. It is important to note that the storage temperature must be between -20 and +50 °C.
- All components that come into contact with the medium during operation have to be dry and clean for a long time before being put into storage.
- The control unit and accessories must be protected from 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 SICON M 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 2.2). 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.

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

14 Disposal



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

The control units have 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	To be disposed of as electronic waste
Housing	ABS, PC	Recycling via centers for recycling plastics
Battery	Lithium	Recycling via locally organized collection point

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
111834	Battery	Section 9.2

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