

Assembly and operating instructions

DULCOPOOL Pro

Swimming pool controller

EN



A3207

Please carefully read these operating instructions before use. · Do not discard.
The operator shall be liable for any damage caused by installation or operating errors.
The latest version of the operating instructions are available on our homepage.

General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. The document is always aimed equally at women, men and gender-neutral persons. We kindly ask readers for their understanding in this simplification of the text.

Supplementary information

➞ Please read the supplementary information in its entirety.

Information



This provides important information relating to the correct operation of the unit or is intended to make your work easier.

Warning information

Warning information includes detailed descriptions of the hazardous situation, see ➞ *Chapter 2.1 'Labelling of Warning Information' on page 11.*

The following symbols are used to highlight instructions, links, lists, results and other elements in this document:

Tab. 1: More symbols

Symbol	Description
1. ➞	Action, step by step.
⇒	Outcome of an action.
➞	Links to elements or sections of these instructions or other applicable documents.
■	List without set order.
[Button]	Display element (e.g. indicators). Operating element (e.g. button, switch).
'Display/GUI'	Screen elements (e.g. buttons, assignment of function keys).
CODE	Presentation of software elements and/or texts.

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1 Functional description

The swimming pool controller was designed to measure and control temperature, pH, chlorine or bromine values using sensors and the control in conjunction with the corresponding adjustable components of the entire system.

The swimming pool controller will henceforth be referred to as the '*controller*' throughout these operating instructions.

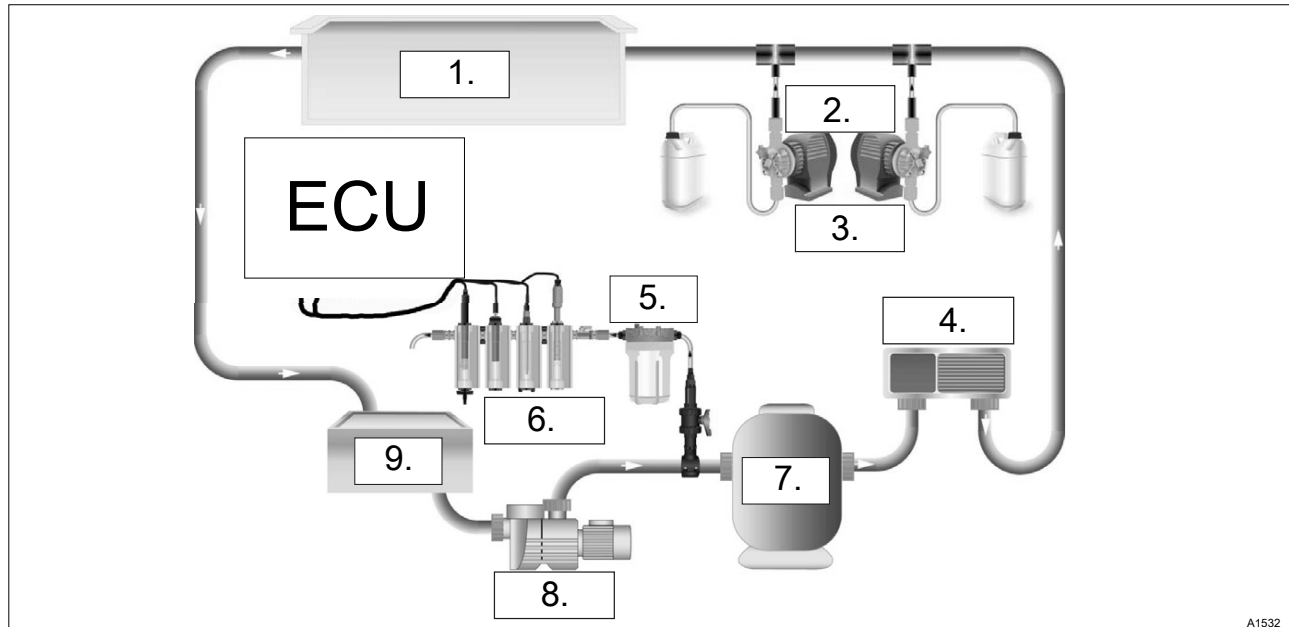


Fig. 1: Functional elements of the complete system

- | | |
|---|--|
| 1. Swimming pool | 6. In-line probe housing |
| 2. Metering pump for chlorine | 7. Primary flow filter for the swimming pool |
| 3. Metering pump for acid (pH) | 8. Circulating pump |
| 4. Heat exchanger | 9. Compensation tank |
| 5. Secondary flow filter for the bypass fitting | ECU Electronic Control Unit [<i>E</i> lectronic <i>C</i> ontrol <i>U</i> nit] |

The key functions

Designation	Function	Description
Control mode	P.I.D.	Injection time calculated as a %. 240 second relay injection cycle time.
	Hysteresis	
	All or nothing	
Type of actuators	Output relay outputs	Control of width modulation
Control direction	Up or down	
Alarms	Low and high alarms	Expressed in actual measured values. Control with high and low threshold.
Control	Control of the flow rate	Regulation of the injection to control the water circulation.
	Tank level	Regulation of the injection to control the height of the product to be injected.
Configuration	Selection of standard configuration	Automatic set-up of the machine.
Maintenance	Support with maintenance	Control of the regulation equipment.

Measuring parameters, measuring scales and control ranges

Parameter	Measuring scale	Customer's measuring scale	Precision
Temperature:	-5 ... 45 °C		± 0.5%
	0 ... 100 °C		± 0.5%
		-10 ... 100 °C	± 0.5%
pH value:	0 ... 14 pH value		± 0.5%
	1 ... 12 pH value		± 0.5%
		-1 ... 15 pH value	± 0.5%
ORP:	0 ... 1000 mV		± 0.5%
	-1000 ... 1000 mV		± 0.5%
		-1000 ... 1000 mV	± 0.5%
Free chlorine:	0.01 ... 0.5 mg/l		± 0.5%
	0.02 ... 2 mg/l		± 0.5%
	0.05 ... 5 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
	0.2 ... 20 mg/l		± 0.5%
	0.5 ... 50 mg/l		± 0.5%
	1 ... 100 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Active chlorine:	0.02 ... 2 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Total chlorine:	0.01 ... 0.5 mg/l		± 0.5%
	0.02 ... 2 mg/l		± 0.5%
	0.05 ... 5 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Chlorite:	0.01 ... 0.5 mg/l		± 0.5%
	0.02 ... 2 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
ClO ₂ (chlorine dioxide):	0.01 ... 0.5 mg/l		± 0.5%
	0.02 ... 2 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
H ₂ O ₂ (peroxide):	0.5 ... 50 mg/l		± 0.5%
	2 ... 200 mg/l		± 0.5%
	20 ... 2000 mg/l		± 0.5%

Parameter	Measuring scale	Customer's measuring scale	Precision
		0 ... 2000 mg/l	± 0.5%
BCDMH:	0.02 ... 2 mg/l		± 0.5%
	0.2 ... 10 mg/l		± 0.5%
	0.4 ... 15 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
DBDMH:	0.1 ... 1 mg/l		± 0.5%
	0.1 ... 5 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Free bromine:	0.1 ... 1 mg/l		± 0.5%
	0.1 ... 5 mg/l		± 0.5%
	0.1 ... 10 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Peracetic acid:	2 ... 200 mg/l		± 0.5%
	10 ... 2000 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Ozone:	0.1 ... 2 ppm		± 0.5%
		0 ... 2000 ppm	± 0.5%
O2 (oxygen):	0.2 ... 10 ppm		± 0.5%
	0.2 ... 20 ppm		± 0.5%
		0 ... 2000 ppm	± 0.5%
PHMB:	1 ... 100 mg/l		± 0.5%
		0 ... 2000 mg/l	± 0.5%
Turbidity:	0.2 ... 100 NTU		± 0.5%
		0 ... 2000 NTU	± 0.5%
Conductivity:	0 ... 5 mS/cm		± 0.5%
	0 ... 10 mS/cm		± 0.5%
	0 ... 20 mS/cm		± 0.5%
	0 ... 50 mS/cm		± 0.5%
	0 ... 100 mS/cm		± 0.5%
	0 ... 2000 mS/cm		± 0.5%
		0 ... 2000 mS/cm	± 0.5%
Flow rate:	0 ... 20 l/min		± 0.5%
	0 ... 50 l/min		± 0.5%
	0 ... 200 l/min		± 0.5%
		0 ... 2000 l/min	± 0.5%
Bandwidth:		0 ... 2000 l	± 0.5%

1.1 Nameplate

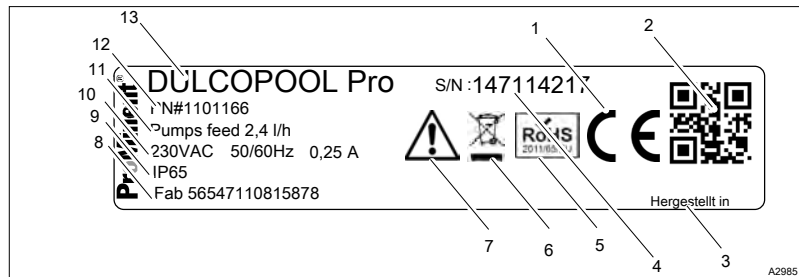


Fig. 2: The nameplate is located on the housing of the controller

- 1 CE
- 2 QR code
- 3 Country of manufacture
- 4 Serial number
- 5 RoHS
- 6 Information on disposal
- 7 Special risks. Read the manual
- 8 Manufacturer
- 9 Degree of protection
- 10 Supply voltage/Maximum power consumption in amps
- 11 Pump capacity
- 12 Order number
- 13 Product designation

2 Safety and responsibility

2.1 Labelling of Warning Information

Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed warning information and are provided as clear step-by-step instructions.

The warning information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



DANGER!

Nature and source of the danger

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

Description of hazard

- Denotes an immediate threatening danger. If the situation is disregarded, it will result in fatal or very serious injuries.



WARNING!

Nature and source of the danger

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in fatal or very serious injuries.



CAUTION!

Nature and source of the danger

Possible consequence: Slight or minor injuries. Material damage.

Measure to be taken to avoid this danger.

- Denotes a possibly hazardous situation. If the situation is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



NOTICE!

Nature and source of the danger

Damage to the product or its surroundings.

Measure to be taken to avoid this danger.

- Denotes a possibly damaging situation. If the situation is disregarded, the product or an object in its vicinity could be damaged.



Type of information

Hints on use and additional information.

Source of the information. Additional measures.

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

2.2 General safety information



WARNING!

Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.

Live parts

- Before opening the housing or before carrying out installation work, ensure that the device is de-energised.
- Disconnect damaged or faulty devices or devices that have been tampered with from the power supply.

Unauthorised access!

- Ensure that there can be no unauthorised access to the device.

Operating errors

- Ensure that the device is only operated by adequately qualified and technically expert personnel.
- Refer also to the operating instructions for sensors and fittings and any other units which may be fitted, such as sample water pumps ...
- The operator is responsible for ensuring that personnel are qualified.

Correct sensor operation

- Correct measurement and metering is only possible if the sensor is working perfectly.
- Regularly check and calibrate the sensor.

2.3 Intended use

INFORMATION: Intended use

- The device is designed to measure and regulate liquid media. The labelling of the measured variables is indicated in the controller display and is absolutely binding.
- The protection provided by the device can be impaired if this device is used in a manner not specified in the operating instructions.
- Only use the device in accordance with the technical details and specifications provided in these operating instructions and in the operating instructions for the individual components (such as sensors, fittings, calibration devices, metering pumps etc.).
- All other uses or modifications are prohibited.

INFORMATION: Time constant > 30 seconds

- The controller can be used in processes, which have a time constant of > 30 seconds.

INFORMATION: Interference resistance

- The device complies with the interference resistance provisions in accordance with EN 61326-1 and is intended for use in industrial electromagnetic environments and in residential areas.



WARNING!

Disturbance signal emissions Class A or B / Protection of radio reception

The device complies with the disturbance signal emissions test requirements for residential areas as a Class B (Residential area), Group 1 device.

With devices with communication interface

- B = Profibus,
- E = LAN,
- G = Profinet,

the device only complies with the limit values for a Class A device (other areas apart from residential), Group 1.

This device is then not intended to be used in residential areas and cannot guarantee appropriate protection of radio reception in these environments.

2.4 User qualification



WARNING!

Danger of injury with inadequately qualified personnel

The operator of the system / equipment is responsible for ensuring that the qualifications are fulfilled.

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone.

The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to.

Training	Definition
Instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfils the requirements made of an instructed person and who has also received additional training specific to the system from the manufacturer or another authorised distribution partner.
Trained, qualified personnel	A trained, qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his training, knowledge and experience, as well as knowledge of pertinent regulations. A trained, qualified employee must be able to perform the tasks assigned to him independently with the assistance of drawing documentation and parts lists. The assessment of a person's technical training can also be based on several years of work in the relevant field.
Electrical technician	An electrical technician is able to complete work on electrical systems and recognise and avoid possible dangers independently based on his technical training and experience as well as knowledge of pertinent standards and regulations. An electrical technician must be able to perform the tasks assigned to him independently with the assistance of drawing documentation, parts lists, terminal and circuit diagrams. The electrical technician must be specifically trained for the working environment in which the electrical technician is employed and be conversant with the relevant standards and regulations.
Service	The Service department refers to service technicians, who have received proven training and have been authorised by the manufacturer to work on the system.

3 Storage and transport

- **User qualifications, storage and transport:** trained personnel
↳ Chapter 2.4 'User qualification' on page 14

Ambient conditions for storage and transport:

- Temperature: -10 to + 70 °C,
- Air humidity: < 90 % relative air humidity (non-condensing).



Packaging material

Dispose of packaging material in an environmentally responsible way. All packaging components carry the corresponding recycling code ♻️.

4 Installation and assembly

- **User qualification, mechanical installation:** trained and qualified personnel ↪ *Chapter 2.4 'User qualification' on page 14*
- **User qualification, electrical installation:** electrical technician ↪ *Chapter 2.4 'User qualification' on page 14*

4.1 Ambient Conditions for Operation

Ambient conditions for operation

- Temperature: 0 °C ... + 50 °C
- Air humidity: < 90 % relative air humidity (non-condensing)

The controller may not be installed in hazardous environments or in places where it could be exposed to spraying water or chemicals. The installation site must be dry, well ventilated and free of corrosive gases.

Select an installation site without vibrations, on a suitable base surface without deformations.

Protect the controller from rain, frost and direct sunlight.

4.2 Scope of Delivery

The following components are included as standard with a controller.

Description	Quantity
Assembled device	1
Cable connection set DMTa/DXMa (metr.)	1
Operating instructions	1

4.3 Installation

- **User qualification, mechanical installation:** trained and qualified personnel ↪ *Chapter 2.4 'User qualification' on page 14*
- **User qualification, electrical installation:** electrical technician ↪ *Chapter 2.4 'User qualification' on page 14*

Remember to disconnect the controller from the power supply before undertaking installation and electrical wiring.

The prerequisite for protection class IP65 is that the terminal cover and transparent cover of the controller are sealed. Select and correctly seal cable openings according to the diameters of the cables.

4.3.1 Wall mounting

Mounting materials (contained in the scope of delivery)

- 1 x wall bracket
- 4 x PT screws 5 x 35 mm

Wall mounting

- 4 x washers 5.3
- 4 x rawl plug Ø 8 mm, plastic

Take the wall bracket out of the housing

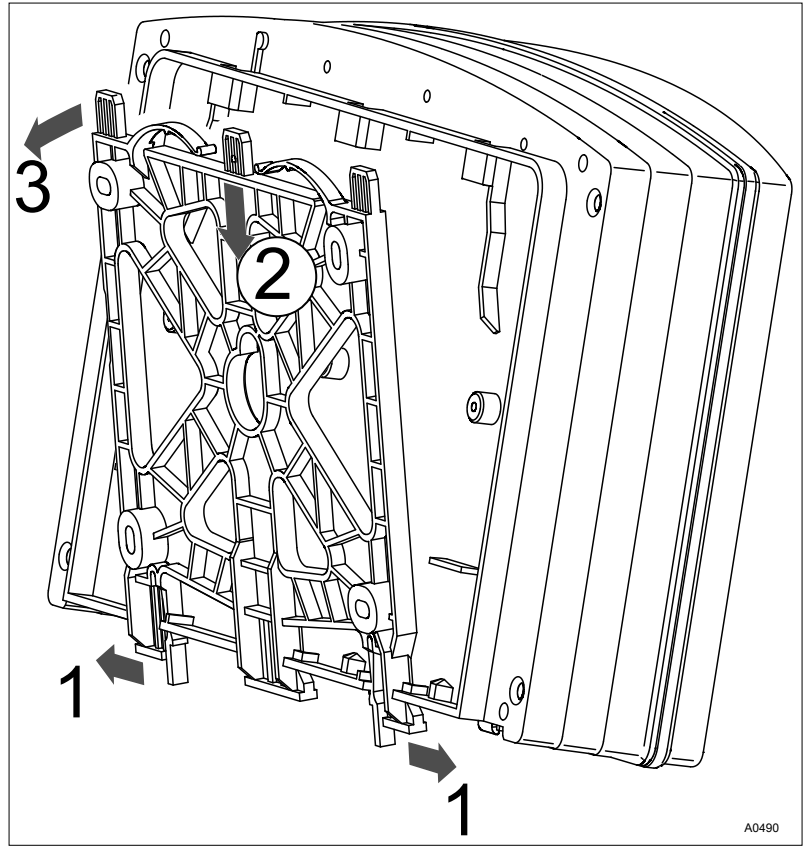


Fig. 3: Removing the wall bracket

1. ➤ Pull the two snap hooks (1) outwards
⇒ The wall brackets snaps slightly downwards.
2. ➤ Push the wall bracket downwards (2) from the housing and fold (3) it out
3. ➤ Use the wall bracket as a drilling template to mark the positions of four drill holes
4. ➤ Drill the holes: Ø 8 mm, d = 50 mm

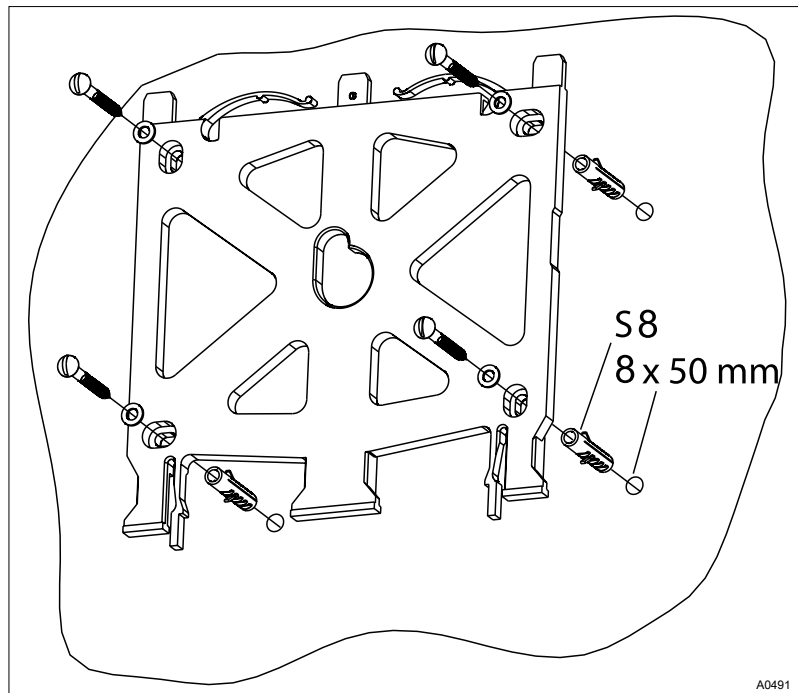


Fig. 4: Fitting the wall bracket

5. ➤ Screw the wall bracket into position using the washers, see Fig. 4

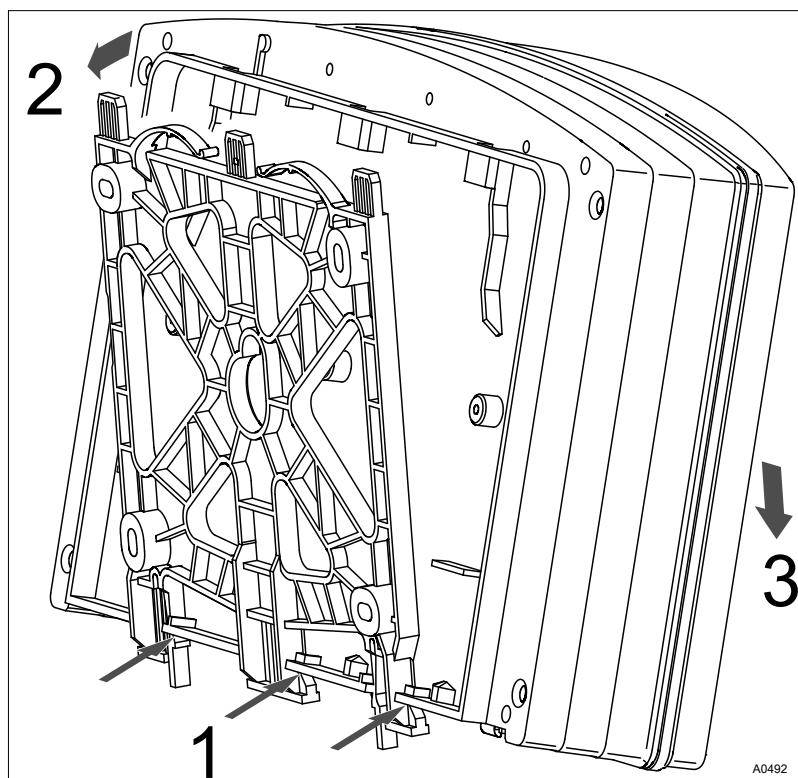


Fig. 5: Fitting the wall bracket

6. ➤ Hook the bottom of the housing (1) into the wall bracket
7. ➤ Lightly press the housing at the top (2) against the wall bracket
8. ➤ Then check that the housing is hooked in at the top and press down (3) until it audibly engages

4.3.2 Electrical installation

Put in place both hardware and software safety precautions to ensure that the controller switches to a safe operating status in the event of a fault. For instance, use limit switches, mechanical locks, ...

Ensure that the controller is not energised during installation.

Make sure that the installation is only carried out by technically trained personnel.

Pay attention to the technical data in these instructions.

4.3.2.1 Electrical isolating device and residual current devices (RCD)

It is the duty of the operator to provide and fit an electrical isolating device and residual current devices (RCD).

Quote from DIN EN 61010-1 (VDE 0411-1): "... A switch or circuit breaker must be used as the isolating device for PERMANENTLY CONNECTED DEVICES and multi-phase devices. If the switch is not part of a device, the installation instructions must state that

- a) a switch or circuit breaker has to be present in the building installation,
- b) this has to be positioned appropriately and must be easily accessible to the USER,
- c) this must be labelled as the isolating device for the device..."

We recommend using cables with one core or, in the event of cables with several cores, using a crimped end so that no core can come into contact with adjacent cables.

4.3.2.2 Cable Cross-Sections and Cable End Sleeves

	Minimum cross-section	Maximum cross-section	Stripped insulation length
Without cable end sleeve	0.25 mm ²	1.5 mm ²	
Cable end sleeve without insulation	0.20 mm ²	1.0 mm ²	8 - 9 mm
Cable end sleeve with insulation	0.20 mm ²	1.0 mm ²	10 - 11 mm

4.3.2.3 Preparation



NOTICE!

Cable strain relief

With control panel mounting, route the cables in a cable duct provided on site to provide strain relief.

1. ➤ Plan which threaded holes are to be broken out and label them.

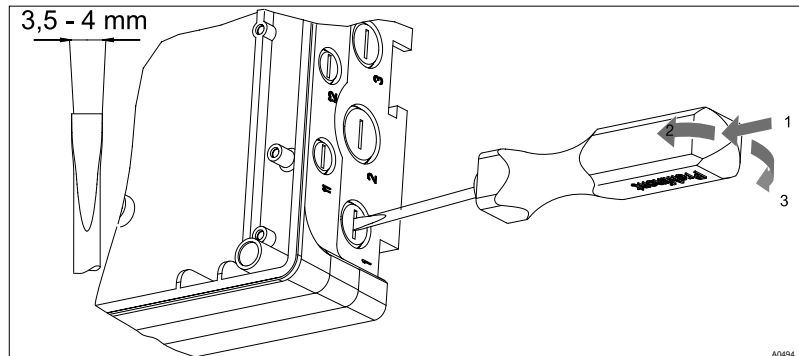


Fig. 6: Breaking out threaded holes

2. ➤ When breaking out the threaded holes, avoid pushing the screwdriver deep into the housing. Parts inside the unit could be damaged.

To break out the threaded holes, use a screwdriver (width 3.5 ... 4 mm, see Fig. 6) to break the slot in the centre of the threaded holes and remove the material.

3. ➤ De-burr the edges.

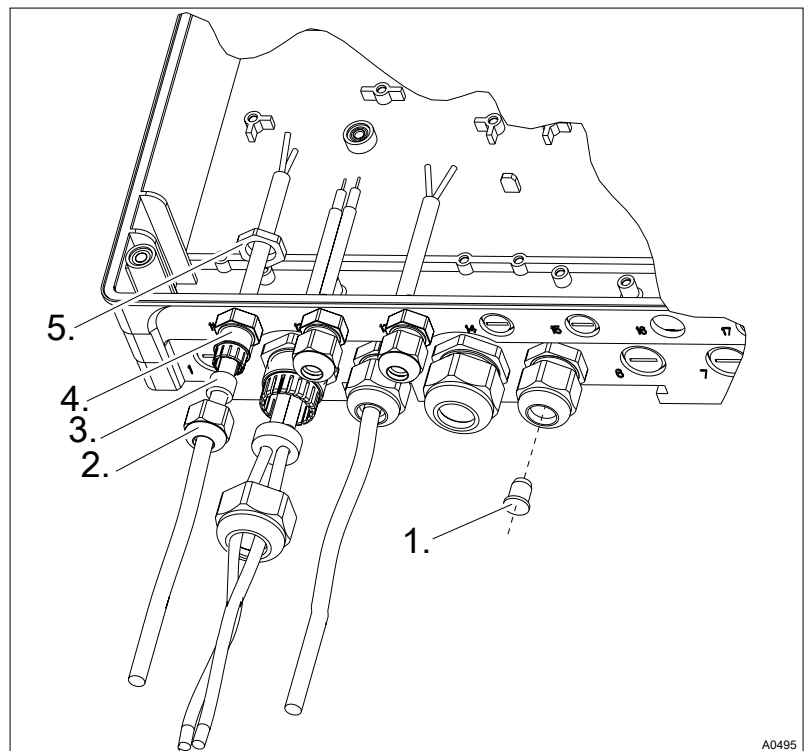


Fig. 7: Fitting the threaded connectors

1. Blanking plug
 2. Union nut
 3. Multiple sealing insert
 4. Threaded connector
 5. Locking nut
4. ➤ Screw the appropriate threaded connectors (4) using the corresponding locking nuts (5) and tighten firmly.
 5. ➤ Insert multiple sealing inserts (3) into the threaded connectors depending on the cable diameter used.
 6. ➤ Guide the cables into the threaded connectors.
 7. ➤ Connect the cables as shown on the wiring diagram.
 8. ➤ Tighten the union nuts (2) on the threaded connectors so that they are properly sealed.
 9. ➤ Place the front part of the housing onto the rear part.
 10. ➤ Manually tighten the four housing screws.
 11. ➤ Once again check that the seal is seated properly. Degree of protection IP 65 can only be achieved if it is correctly fitted.

IP 65 degree of protection

4.3.2.4 Terminal assignment

Left, bottom row

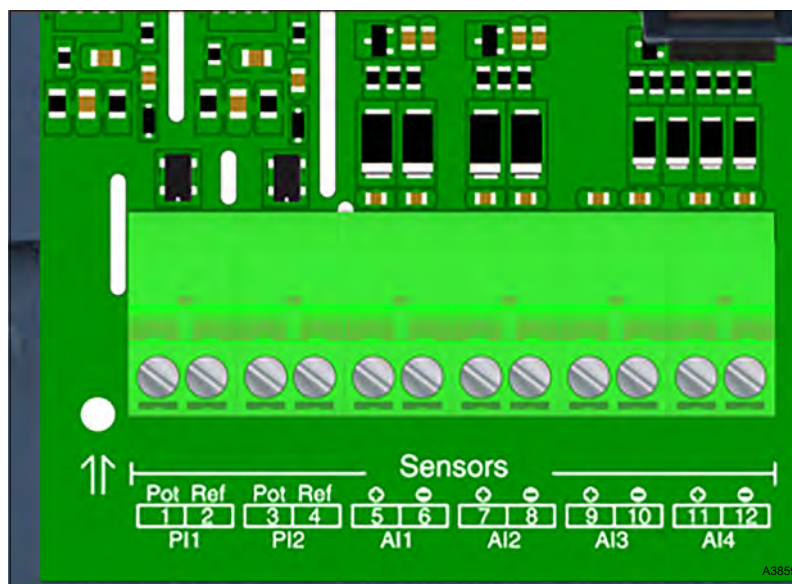


Fig. 8: Left, bottom row

Tab. 2: Legend: Left, bottom row

Legend:	
PI1+3	Pot.: pH or ORP sensor, inner conductor
PI2+4	Ref.: Reference electrode, shield
AI1+2	Analogue input 1 and 2 for chlorine sensors, galvanically isolated etc.
AI3+4	Analogue input 3 and 4 for turbidity sensors, not galvanically isolated etc.

Sensors	PI1	1	Pot.	pH sensor, mV, coaxial cable
		2	Ref	
	PI2	3	Pot.	ORP sensor, mV, coaxial cable
		4	Ref	
	AI1	5	(+)	Chlorine sensor, free chlorine
		6	(-)	
	AI2	7	(+)	Chlorine sensor, total chlorine
		8	(-)	
	AI3	7	(+)	e.g. level sensor, 0/4 ... 20 mA
		8	(-)	
	AI4	7	(+)	e.g. level sensor, 0/4 ... 20 mA
		8	(-)	

Middle, upper row

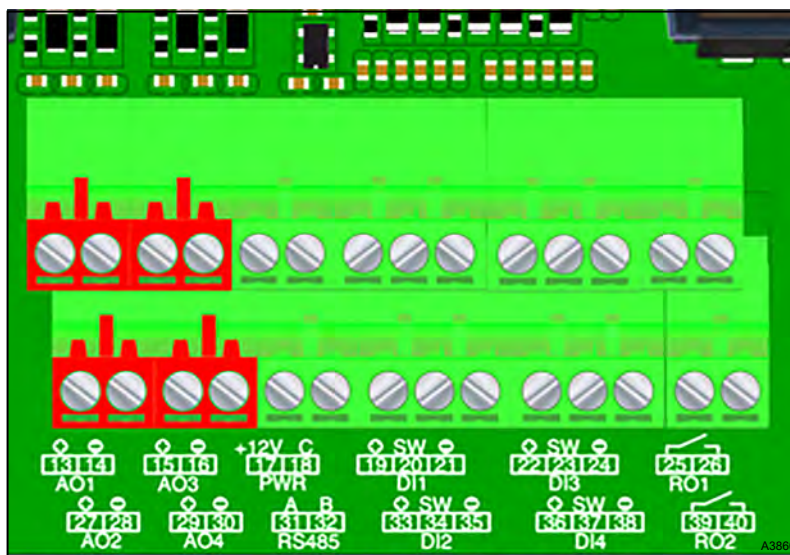


Fig. 9: Middle, upper row

Tab. 3: Legend: Middle, upper row

Legend:	
AO1+3	Analogue output 1 and 3, e.g. write output 0/4 ...20 mA
PWR	12 DC power supply, max. 500 mA
DI1+3	Digital output 1 and 3, e.g. metering pump control
RO1	Relay output 1, potential-free, e.g. metering pump control, N/O

"Analogue outputs, digital inputs, supply"	AO1	13	(+)	e.g. measured value output 0/4 ... 20 mA
		14	(-)	
	AO3	15	(+)	e.g. measured value output 0/4 ... 20 mA
		16	(-)	
	PWR	17	+12 V	e.g. conductivity sensor supply
		18	C	
	DI1	19	(+)	Sample water fault
		20	SW	
		21	(-)	
	DI3	22	(+)	Pause
		23	SW	
		24	(-)	
	RO1	25	COM	
		26	NO	

Middle, lower row

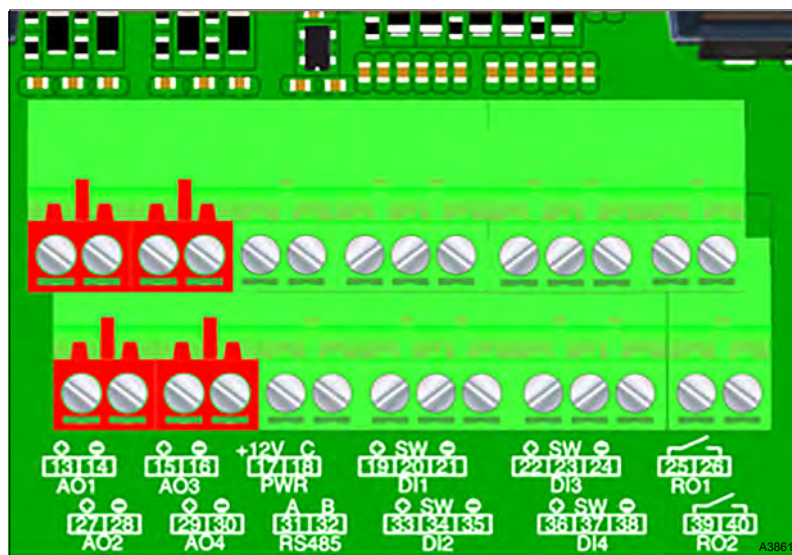


Fig. 10: Middle, lower row

Tab. 4: Legend: middle, lower row

Legend:	
AO2+4	Analogue output 1 and 3, e.g. write output 0/4 ... 20 mA
RS485	Modbus RTU
DI2+4	Digital output 1 and 3, e.g. metering pump control
RO2	Relay output 2, potential-free, e.g. metering pump control, N/O

"Analogue outputs, digital inputs, supply"	AO2	27	(+)	e.g. measured value output 0/4 ... 20 mA
		28	(-)	
	AO4	29	(+)	e.g. measured value output 0/4 ... 20 mA
		30	(-)	
	RS485	31	A	
		32	B	
	DI2	33	(+)	e.g. level switch
		34	SW	
		35	(-)	
	DI4	36	(+)	e.g. level switch
		37	SW	
		38	(-)	
	R02	39	COM	
		40	NO	

Right, upper and lower row

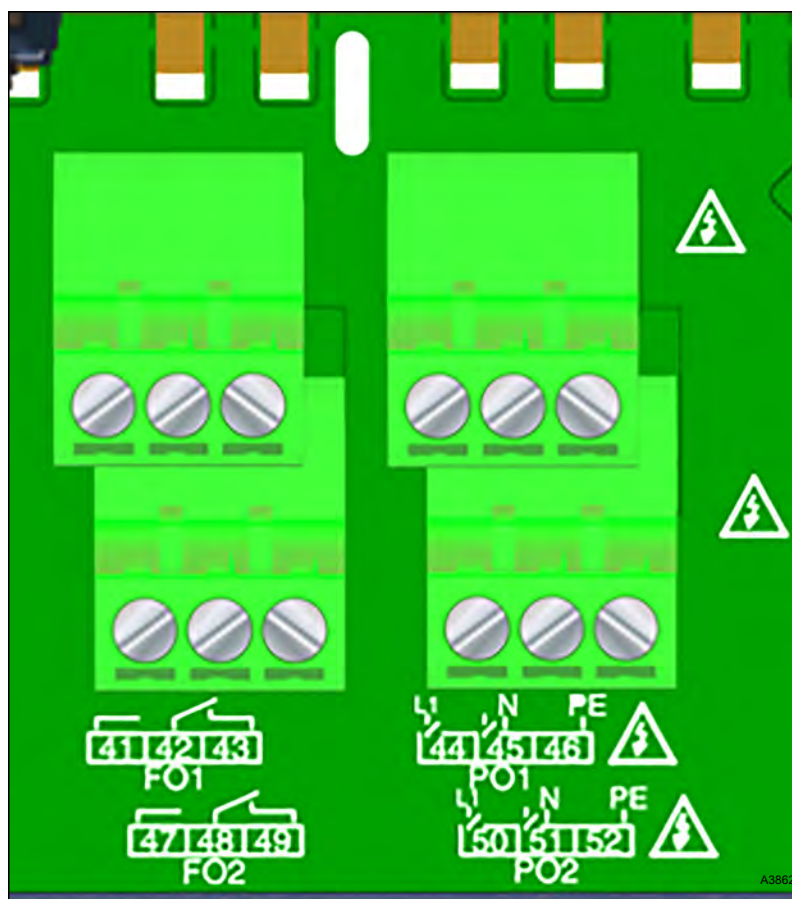


Fig. 11: Right, upper and lower row

Legend:

FO1, FO2	potential-free relay outputs, maximum 180/min.
PO1, PO2	Fed output relay outputs PO1 and PO2, metering, alarm, timer, 100 ... 240 V AC

Relay potential-free and fed	F01	41	NO	e.g. BT4b, pulse, pH sensor
		42	COM	
		43	NC	
	PO1	44	L1	e.g. DF2a, pH decrease agent
		45	N	
		46	PE	

Relay potential-free and fed	F02	47	NO	e.g. BT4b, pulse, chlorine increase agent
		48	COM	
		49	NC	
	PO2	50	L1	e.g. DF2a, chlorine increase agent
		51	N	
		52	PE	

X1, power supply, 100 ... 230 V AC

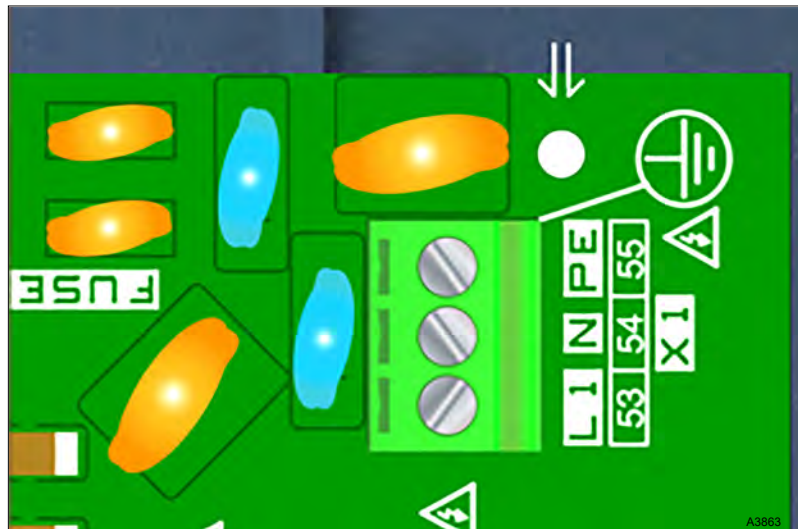


Fig. 12: X1, power supply, 100 ... 230 V AC

Tab. 5: X1, power supply, 100 ... 230 V AC

Power supply	53	L1
	54	N
	55	PE

4.3.2.5 Connecting the terminals

There is also a field containing connection information next to the terminals on the modules.

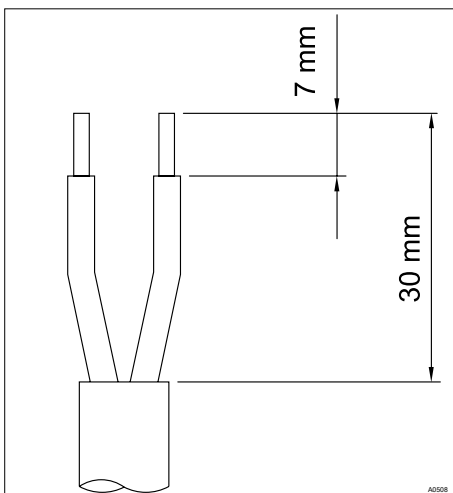


Fig. 13: Stripping back the cable sleeve

1. ➤ Strip the sleeve from the end of the cable as shown in Fig. 13 and press on the corresponding cable end sleeves.
2. ➤ To install the cables, push the screwdriver supplied right into the square opening of the respective terminal to insert the cable end into the terminal block.
3. ➤ Connect the cables according to the wiring diagram.
4. ➤ Check the cabling against the wiring diagram.

4.3.3 Replacing the internal fuse

User qualification, replacing the internal fuse: electrical technician
 ⚡ Chapter 2.4 'User qualification' on page 14

The controller features a spare fuse in position F5, which enables you to quickly replace a fuse if you need to. If you use the spare fuse, do not forget to replace the spare fuse.

1. ➤ Disconnect the system from the power supply.

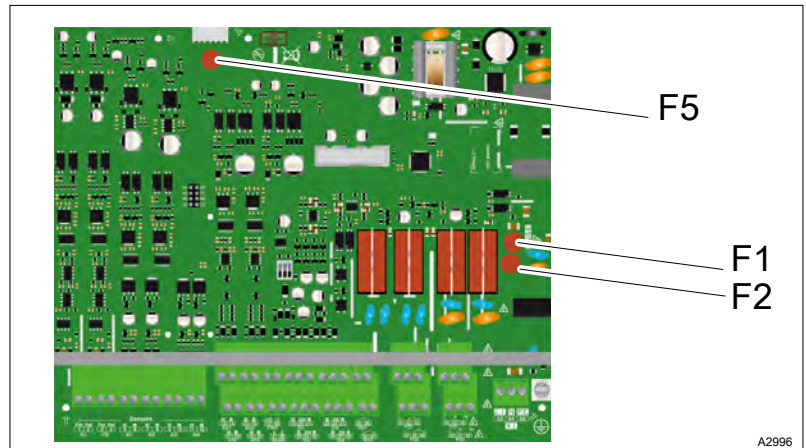


Fig. 14: Fuse (F1 or F2)

2. ➤ Look for the fuse to be replaced (F1 or F2) on the lower circuit board.
3. ➤ Remove the fuse to be replaced.
4. ➤ Fit a new fuse with the correct power rating.

4.3.4 Primary power supply

The device has its own wide range power unit. The device can be operated with an alternating voltage of between 90 V ... 240 V 50/60 Hz.

The device does not have its own mains switch. The device is fed directly when it is connected to the mains/power supply.

1. ➤ Use a 3-lead 1.5 mm² cable to connect up the power supply.
2. ➤ Strip away 7 mm of the insulation on the leads.

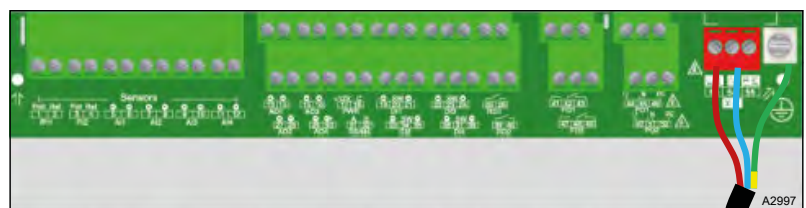


Fig. 15: Primary power supply

3. ➤ Guide the cable through a suitable cable gland.
4. ➤ Connect the phase to L1 and the neutral conductor to the N of the main terminal X1.
5. ➤ Use an M4 eyelet clamp to connect the earth to the PL1 bolt.
6. ➤ Tighten the cable gland to make a seal.

4.3.5 Measuring input connections

4.3.5.1 The device has 10 inputs

The device has 10 inputs:

- 2 potentiometric inputs PI1 & PI2 for pH and ORP sensors,
- 2 inputs AI1 & AI2, 4 ... 20 mA, isolated for temperature, chlorine or bromine measurement,
- 2 inputs AI3 & AI4, 4 ... 20 mA, non-isolated for temperature, chlorine or bromine measurement,
- 4 digital inputs DI1 ... DI4 for sensors.



Fig. 16: a) Potentiometric inputs PI1 & PI2

The controller has two potentiometric inputs to which a pH or ORP sensor can be connected.

Tab. 6: The supported sensors are defined as follows (pH):

	pH value 1...12	pH value 0...14	Customer*
pH value (input PI1 or PI2)	-•	-•	-•

(*): The customer's scale can be defined between -1 ... 15 pH.

Tab. 7: The supported sensors are defined as follows (ORP):

	0...1000 mV	+/- 1000 mV	Customer*
ORP value (input PI1 or PI2)	-•	-•	-•

(*): The customer's scale can be defined between -1000 ... 1000 mV.

Connecting the sensors

Connecting the sensor to PI1:

1. ➤ Use a coaxial cable.
2. ➤ Connect the cable core to the connector Pot (1).
3. ➤ Connect the shield to the connector Ref (2).
4. ➤ Tighten the cable gland to form a seal.

Connecting the sensor to PI2:

5. ➤ Use a coaxial cable.
6. ➤ Connect the cable core to the connector Pot (3).
7. ➤ Connect the shield to the connector Ref (4).
8. ➤ Tighten the cable gland to form a seal.

4.3.5.2 Isolated analogue inputs 4 ... 20 mA AI1 & AI2



Fig. 17: b) Isolated analogue inputs 4 ... 20 mA AI1 & AI2

The device has 2 isolated analogue inputs 4 ... 20 mA, to which a chlorine, bromine, ozone, hydrogen peroxide, peracetic acid, dissolved oxygen or PHMB sensor can be connected.

Tab. 8: Selectable parameter measuring ranges, additional measuring ranges that can be defined, see separate table for a definition of the measuring ranges

	0.01...0.5 mg/l	0.1...1 mg/l	0.02...2 mg/l	0.1...5 mg/l	0.2...10 mg/l	0.4...15 mg/l
Free chlorine	--•		--•	--•	--•	--•
Active chlorine			--•		--•	
Total chlorine	--•		--•	--•	--•	
Chlorite	--•		--•			
Chlorine dioxide	--•		--•		--•	
Peroxide						
Bromine BCDMH			--•		--•	--•
Bromine DBDMH		--•		--•	--•	
Free bromine		--•		--•	--•	
Peracetic acid						
Ozone			--•			
Dissolved oxygen					--•	
PHMB						

* The customer's scale can be defined between 0 ... 2000 (ppb, ppm, NTU, µg/l, mg/l, g/l or %)

Tab. 9: Selectable parameter measuring ranges, additional measuring ranges that can be defined, see separate table for a definition of the measuring ranges

	0.2...20 mg/l	0.5...50 mg/l	1...100 mg/l	2...200 mg/l	20...2000 mg/l	Customer*
Free chlorine	--•	--•	--•			--•
Active chlorine						--•
Total chlorine						--•
Chlorite						--•
Chlorine dioxide						--•
Peroxide		--•		--•	--•	--•
Bromine BCDMH						--•
Bromine DBDMH						--•
Free bromine						--•
Peracetic acid				--•	--•	--•
Ozone						--•
Dissolved oxygen	--•					--•
PHMB			--•			--•

* The customer's scale can be defined between 0 ... 2000 (ppb, ppm, NTU, µg/l, mg/l, g/l or %)

Connecting the sensors

Connecting the sensor to AI1:

1.  Use a two-core cable.
2.  Connect the sensor (+) core to the connector AI1 + (5).

Connecting the sensor to AI2:

3. ➤ Connect the sensor (-) core to the connector AI1 - (6).
4. ➤ Tighten the cable gland to form a seal.
5. ➤ Use a two-core cable.
6. ➤ Connect the sensor (+) core to the connector AI1 + (7).
7. ➤ Connect the sensor (-) core to the connector AI1 - (8).
8. ➤ Tighten the cable gland to form a seal.

4.3.5.3 Analogue inputs 4...20 mA non-isolated AI3 & AI4

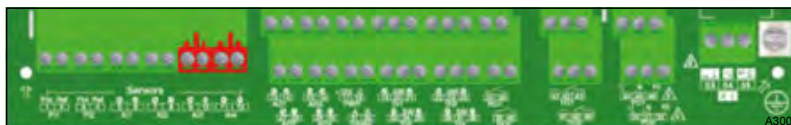


Fig. 18: Analogue inputs 4...20 mA non-isolated AI3 & AI4

The device has 2 analogue inputs 4 ... 20 mA, which are non-isolated and to which an isolated temperature, conductivity, turbulence, flow or volume sensor can be connected.

Tab. 10: The supported sensors are defined as follows:

	0.2 ... 100 NTU	Customer*
Turbidity	-•	-•

(*): The customer's scale can be defined between 0 ... 2000 (NTU or FNU).

Tab. 11: The supported sensors are defined as follows:

	-5 ... +45 °C	Customer*
Temperature	-•	-•

(*): The customer's scale can be defined between -10 ... 100 °C.

Tab. 12: The supported sensors are defined as follows:

	0 ... 5 mS/cm	0 ... 10 mS/cm	0 ... 20 mS/cm	0 ... 50 mS/cm	0 ... 100 mS/cm	0 ... 200 mS/cm	Customer*
Conductivity	-•	-•	-•	-•	-•	-•	-•

(*): The customer's scale can be defined between 0 ... 2000 (µS/cm, mS/cm).

Tab. 13: The supported sensors are defined as follows:

	Customer*
Volume (4 ... 20 mA)	-•

(*): The customer's scale can be defined between 0 and 2000 (litres, m³).

	0 ... 20 l/min	0 ... 50 l/min	0 ... 200 l/min	0 ... 10 m³/h	Customer*	
Flow rate (4 ... 20 mA)	-•	-•	-•		-•	

(*): The customer's scale can be defined between 0 ... 2000 (litres/min, litres/h or m³/h) in 4...20mA or pulse input.

4.3.5.4 Connecting the sensors

Connecting the sensor to AI3:

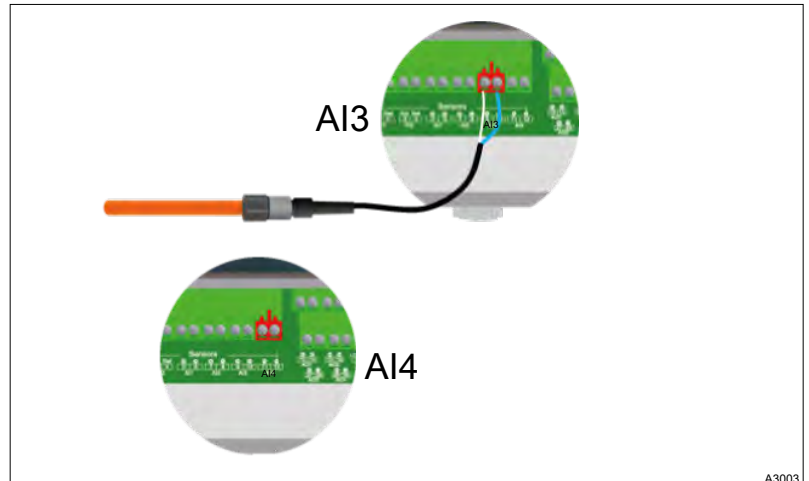


Fig. 19: Connecting the sensors AI3 and AI4

1. Use a two-core cable.
2. Connect the sensor (+) core to the connector AI3 + (9).
3. Connect the sensor (-) core to the connector AI3 - (10).
4. Tighten the cable gland to form a seal.
5. Use a two-core cable.
6. Connect the sensor (+) core to the connector AI4 + (11).
7. Connect the sensor (-) core to the connector AI4 - (12).
8. Tighten the cable gland to form a seal.

Connecting the sensor to AI2:

4.3.5.5 Digital inputs DI1 ... DI4

The controller has 4 digital inputs to which a tank base, a flow or another sensor or an R.I.C. (Remote Input Control) can be connected.

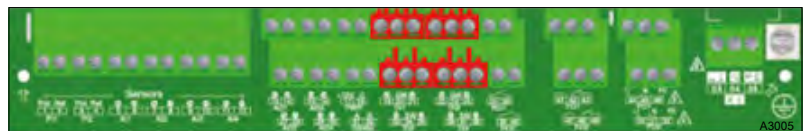


Fig. 20: Digital inputs DI1 ... DI4

Tab. 14: The supported sensors are defined as follows:

	0 ... 20 l/min	0 ... 50 l/min	0 ... 200 l/min	0 ... 10 m³/h	Customer*
Flow rate (pulses)	-•		-•	-•	-•

(*): The customer's scale can be defined between 0 ... 2000 (l/min, l/h or m³/h) in 4...20 mA or pulse input.

4.3.5.6 Connection of a tank base, a flow or another sensor or an R.I.C. (Remote Input Control)

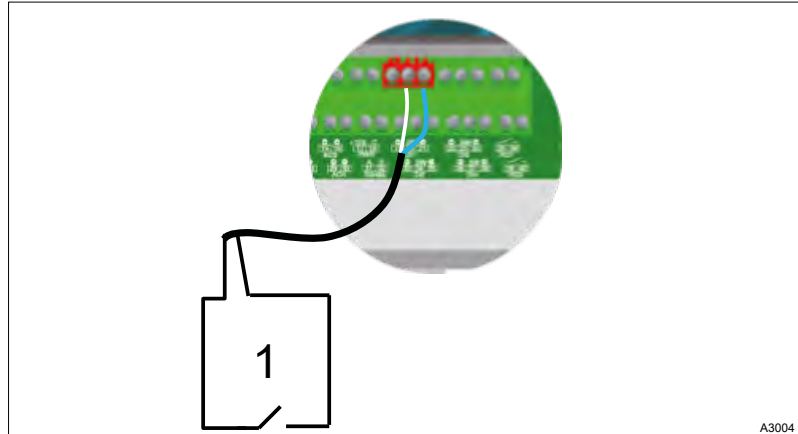


Fig. 21: Connection of a tank base, a flow or another sensor or an R.I.C. (Remote Input Control)

1 Contact

1. ➤ Use a two-core cable.
2. ➤ Connect a sensor core to connector DI1 (SW) (20).
3. ➤ Connect the other sensor core to the connector DI1 (minus) (21).
4. ➤ Tighten the cable gland to form a seal.

4.3.5.7 Connection of a flow switch sensor to DI2:



Fig. 22: Connection of a flow switch sensor to DI2

1. ➤ Remove the protective sleeve of the cable.
2. ➤ Strip away 7 mm of the insulation on the cores.
3. ➤ Guide the cable through the cable gland.
4. ➤ Connect the brown core to DI2 (plus) (33).
5. ➤ Connect the blue power core to DI2 (minus) (35).
6. ➤ Connect the black core to DI2 (SW) (34).
7. ➤ Tighten the cable gland to form a seal.

4.3.5.8 Connection of a flow meter sensor to DI3:

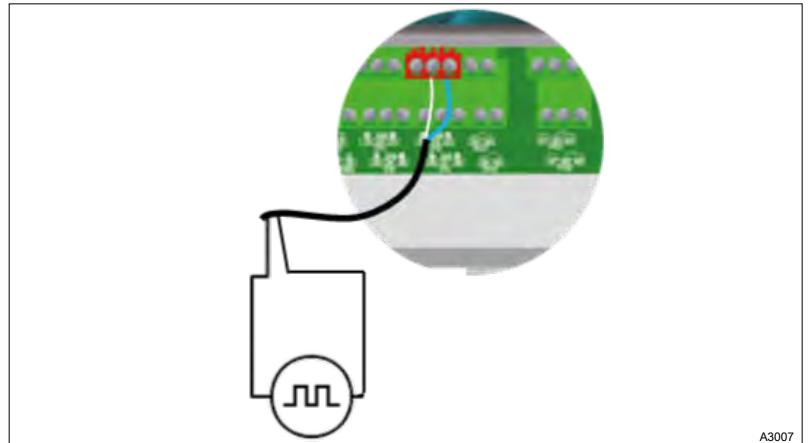


Fig. 23: Connection of a flow meter sensor to DI3

1. ➤ Use a two-core cable.
2. ➤ Connect a sensor core to connector DI3 (SW) (23).
3. ➤ Connect the other sensor core to the connector DI3 (minus) (24).
4. ➤ Tighten the cable gland to form a seal.

4.3.6 Connectors for self-fed relay outputs (PO1 and PO2)

The self-fed PO1 output relay output (primary power supply = voltage available at P3) can be used for metering, alarm, timer...

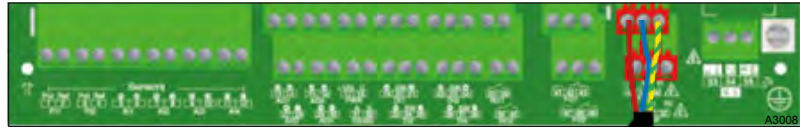


Fig. 24: Connectors for self-fed relay outputs (PO1 and PO2)

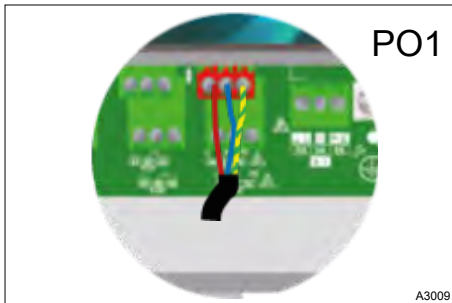


Fig. 25: Mains power terminal strip PO1

1. ➤ Strip away 7 mm of the insulation on the 3 leads of the power cable of the device.
2. ➤ Insert the 3-pole cable through a cable gland.
3. ➤ Connect the phase to L1 (44) and the neutral conductor to N (45) on the mains power terminal strip PO1.
4. ➤ Connect the earth to PE (46) on the mains terminal strip PO1.
5. ➤ Tighten the cable gland to make a seal.

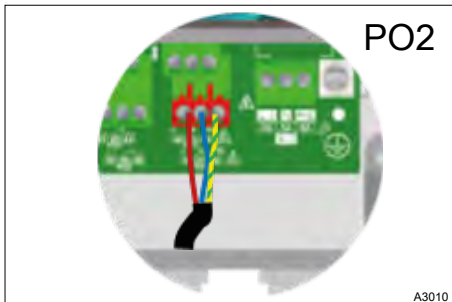


Fig. 26: Mains power terminal strip PO2

1. ➤ Strip away 7 mm of the insulation on the 3 leads of the power cable of the device.
2. ➤ Insert the 3-pole cable through a cable gland.
3. ➤ Connect the phase to L1 (50) and the neutral conductor to N (51) on the mains power terminal strip PO2.
4. ➤ Connect the earth to PE (52) on the mains terminal strip PO2.
5. ➤ Tighten the cable gland to make a seal.

4.3.7 Potential-free relay connections (FO1 and FO2)

The potential-free relay outputs can be controlled as alarm relays, for control or in timer mode, as required.

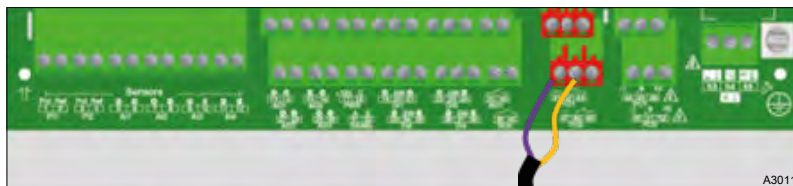


Fig. 27: Potential-free relay connections (FO1 and FO2)

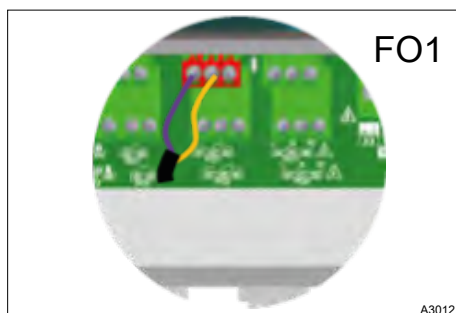


Fig. 28: Potential-free relay connections FO1

1. ➤ Use a 2-lead cable designed appropriately for use for voltage and power.
2. ➤ Remove the protective sleeve of the cable.
3. ➤ Strip away 7 mm of the insulation on the leads.
4. ➤ Guide the cable through the cable gland.
5. ➤ Connect the lead to COMMON (42) on the terminal block.
6. ➤ Connect the lead to WORK (41) on the terminal strip or to REST (43), depending on the function it is to perform.
7. ➤ Tighten the cable gland to make a seal.

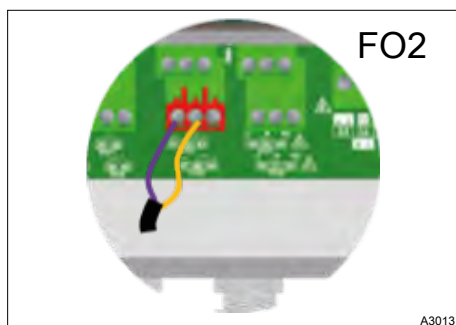


Fig. 29: Potential-free relay connections FO2

1. ➤ Use a 2-lead cable designed appropriately for use for voltage and power.
2. ➤ Remove the protective sleeve of the cable.
3. ➤ Strip away 7 mm of the insulation on the leads.
4. ➤ Guide the cable through the cable gland.
5. ➤ Connect the lead to COMMON (48) on the terminal block.
6. ➤ Connect the lead to WORK (47) on the terminal strip or to REST (49), depending on the function it is to perform.
7. ➤ Tighten the cable gland to make a seal.

4.3.8 Electronic relay outputs (RO1 and RO2)

The electronic relay outputs are primarily intended for the control of the metering pumps in pulse mode. The electronic relay outputs can also act as alarm relays, or be controlled in timer mode, as required.

The electronic relay outputs use electronic components for contact. The electronic relay outputs are used to drive pumps by their pulse input or for the control of an external output relay. These relays can switch a maximum voltage of 48 VAC and maximum current of 50 mA.

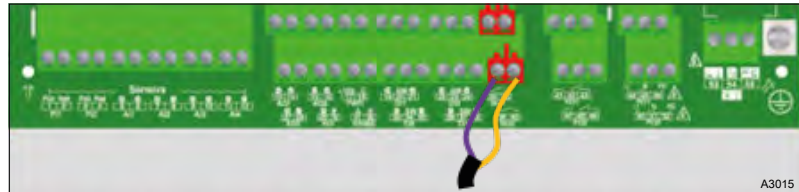


Fig. 30: Electronic relay outputs (RO1 and RO2)

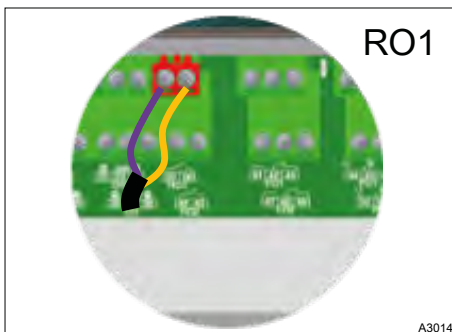


Fig. 31: Electronic relay output RO1

1. ➤ Use a 2-lead cable designed appropriately for use for voltage and power.
2. ➤ Remove the protective sleeve of the cable.
3. ➤ Strip away 7 mm of the insulation on the leads.
4. ➤ Guide the cable through the cable gland.
5. ➤ Connect the lead to COMMON (25) on the terminal block.
6. ➤ Connect the lead to WORK (26) on the terminal block.
7. ➤ Tighten the cable gland to make a seal.

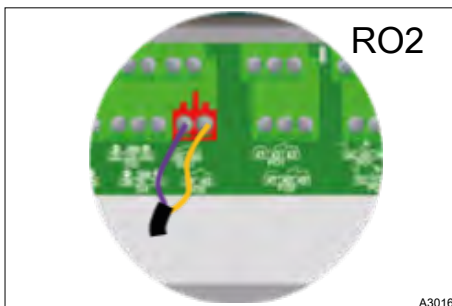


Fig. 32: Electronic relay output RO2

1. ➤ Use a 2-lead cable designed appropriately for use for voltage and power.
2. ➤ Remove the protective sleeve of the cable.
3. ➤ Strip away 7 mm of the insulation on the leads.
4. ➤ Guide the cable through the cable gland.
5. ➤ Connect the lead to COMMON (39) on the terminal block.
6. ➤ Connect the lead to WORK (40) on the terminal block.
7. ➤ Tighten the cable gland to make a seal.

4.3.9 4 ... 20 mA output connectors (AO1 ... AO4)

4 ... 20 mA outputs are used to transmit information to a building management system or control a metering system by a 4 ... 20mA signal. The analogue outputs are generative and work with an internal voltage of 12 VDC. The maximum load is 500 Ω. 4 ... 20 mA outputs are fully configurable. They can assign every parameter (measured or calculated) in control or data transmission mode.



Fig. 33: 4 ... 20 mA output connectors (AO1 ... AO4)

Output	Lead, plus	Lead, minus
AO1	13	14
AO2	27	28
AO3	15	16
AO4	29	30

Assignment:  *Further information on page 36*

1.  Use a 2-lead cable designed appropriately for use for voltage and power.
2.  Remove the protective sleeve of the cable.
3.  Strip away 7 mm of the insulation on the leads.
4.  Guide the cable through the cable gland.
5.  Connect the lead (plus) to the terminal block.
6.  Connect the lead (plus) to the terminal block.
7.  Tighten the cable gland to make a seal.

5 Commissioning

- **User qualification, commissioning:** trained user ↗ *Chapter 2.4 'User qualification' on page 14*

The device does not automatically start treating and metering the chemical product when you switch on the device. Only the user can initiate operation once they have made sure that the control unit is programmed in accordance with their needs.

The device is fully configurable. The predefined measuring parameters are displayed and the control processes are disabled when the device is switched on.

The device is delivered with standard programming. The user should modify this programming if the programming does not meet his needs. Refer to the relevant chapter to modify the programming of your controller.

1. ➤ Switch the device on.
2. ➤ Check whether everything is in order, your operating panel is switched on and other elements of your installation have not been tempered with.

6 Operating concept and operation

- **User qualification, operation:** trained user ↗ *Chapter 2.4 'User qualification' on page 14*

The device is equipped with a colour touchscreen, which can be used to perform all programming actions by pressing the screen. The touchscreen is a resistive touchscreen. You need to press firmly on the touchscreen to confirm the action.

Ensure that your device is correctly programmed. An excess of feed chemical or even a mixture of different feed chemicals can have harmful effects on human health and the environment.

The device offers different modes and types of displays that enable you to obtain all the information you need right away.

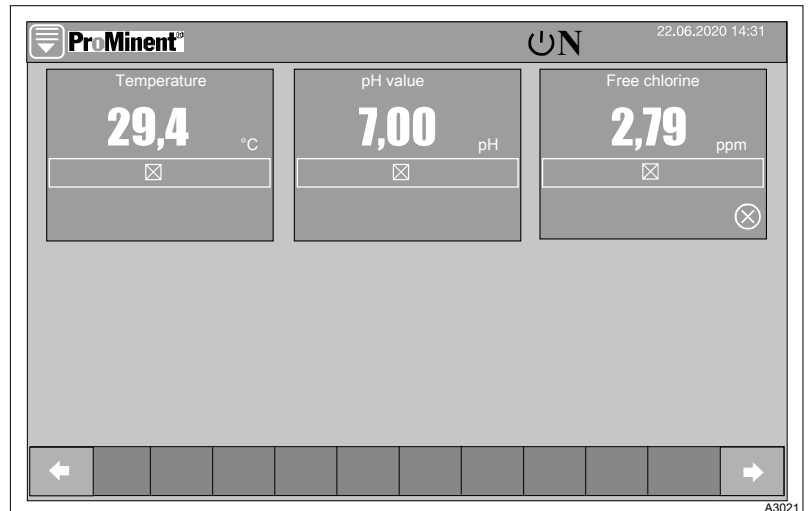


Fig. 34: Display mode, small X6

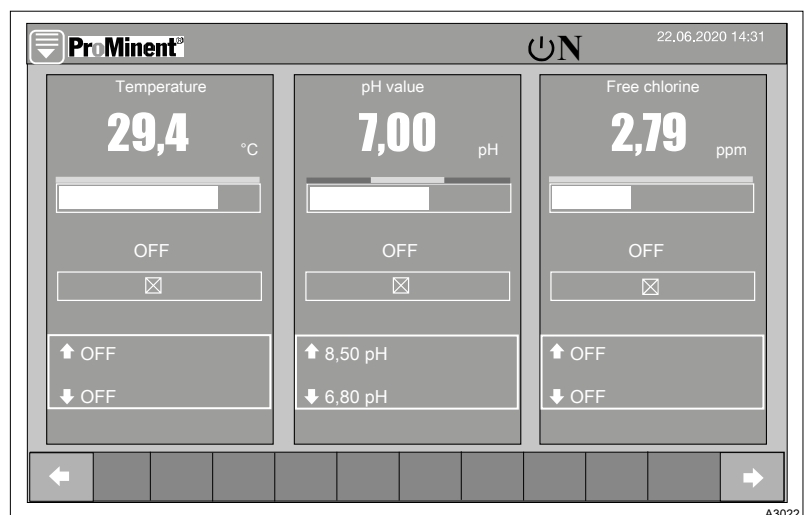


Fig. 35: Display mode, large x3

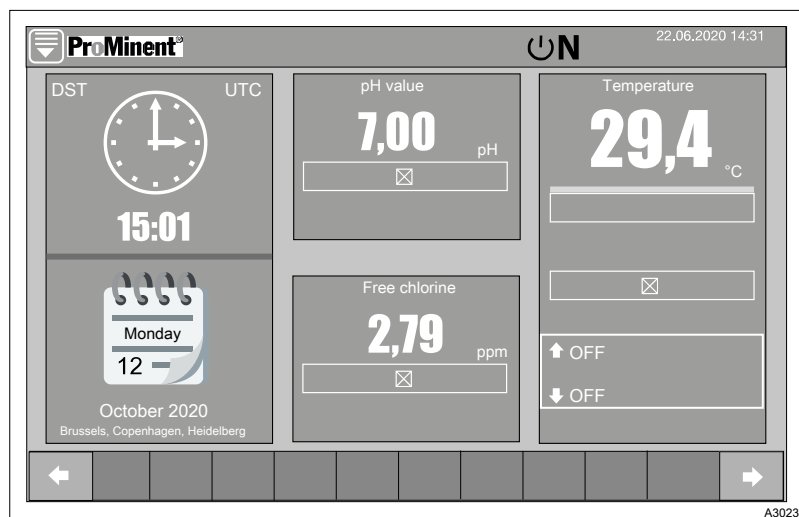


Fig. 36: Input mode

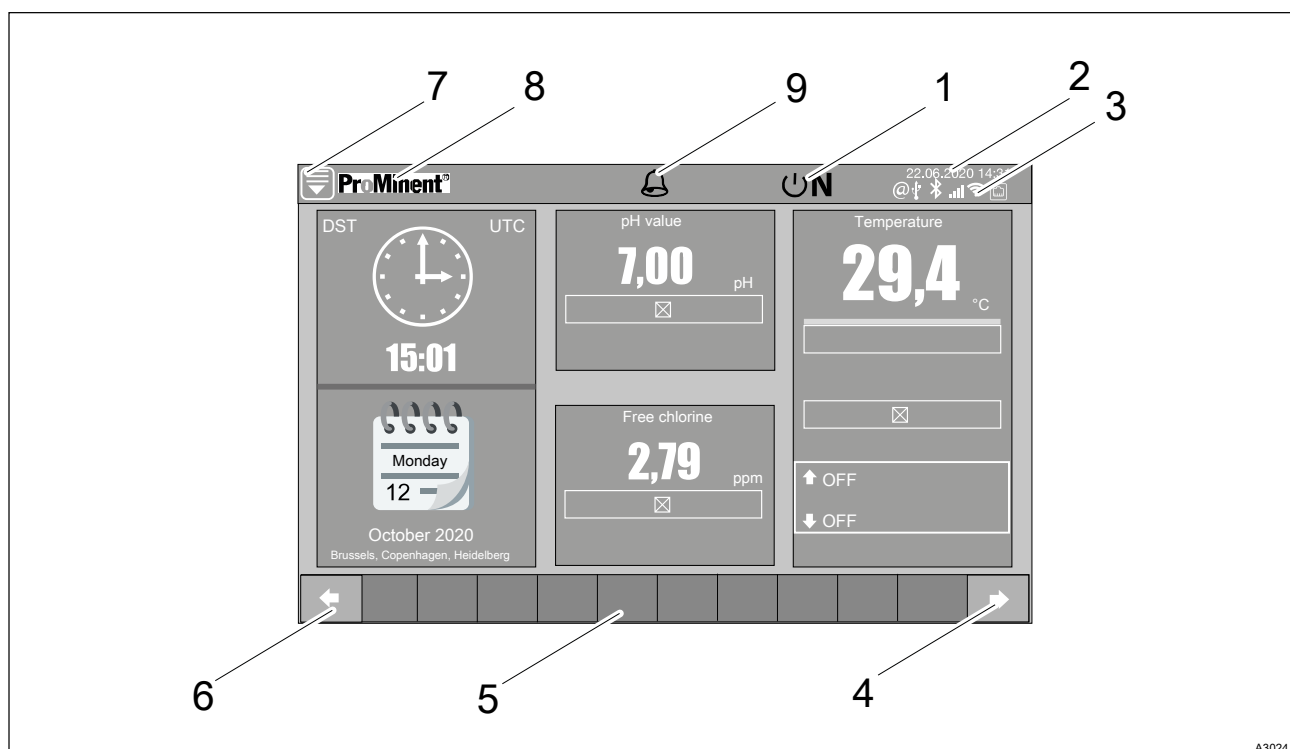


Fig. 37: Main controls/disabled elements are greyed out.

- | | |
|----------------------------|------------------------------|
| 1 Status: ON / OFF | 6 Key: to the preview screen |
| 2 Date and time | 7 Menu key |
| 3 Communication interfaces | 8 Device name |
| 4 Key: to the next screen | 9 Enabled alarm |
| 5 Various outputs | |

The movement arrows (4 and 6) can be accessed when multiple screens are programmed.

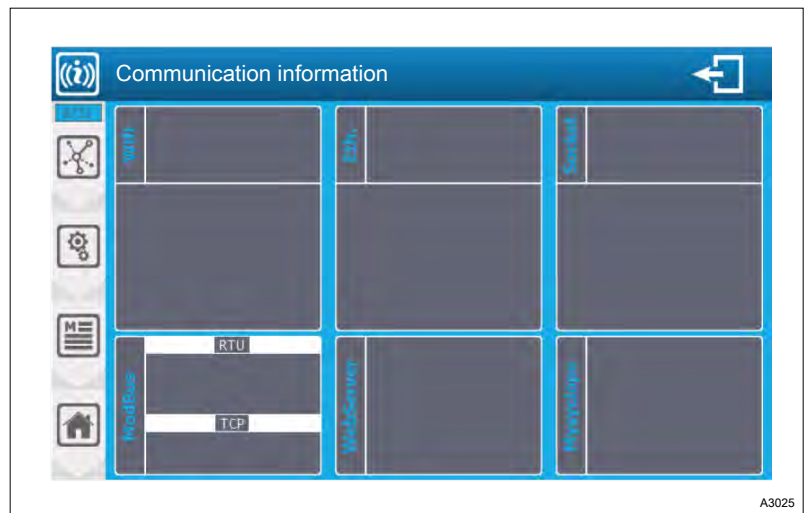


Fig. 38: Information on the communication interfaces

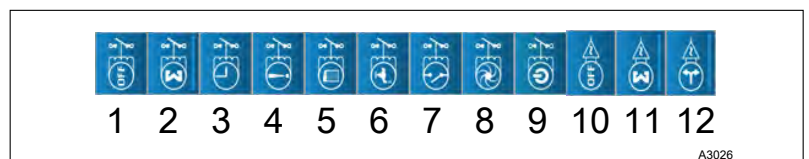


Fig. 39: Display of the outputs

- 1 Relay output not used
- 2 Relay output in metering mode*
- 3 Relay output on the timer
- 4 Relay output with alarm
- 5 Relay output on the lower storage tank
- 6 Relay output on water circulation
- 7 Relay output on contact
- 8 Relay output with flow
- 9 Relay output at the ON/OFF controller or parameter
- 10 4 ... 20 mA output not used
- 11 4 ... 20 mA output in metering mode*
- 12 4 ... 20 mA output in transmission mode

*: The symbols become animated when metering mode is enabled.

The rotation of the metering symbol depends on the capacity.

The visual status of the relay is displayed as closed when the relay is enabled.

Bar diagram



Fig. 40: Relay output in metering mode

The bar diagram (2) within a corresponding symbol visualises the approximate capacity of the element.

- 1 Display of the position
- 2 Bar diagram showing the metering capacity of the relay
- 3 Rotation according to the capacity

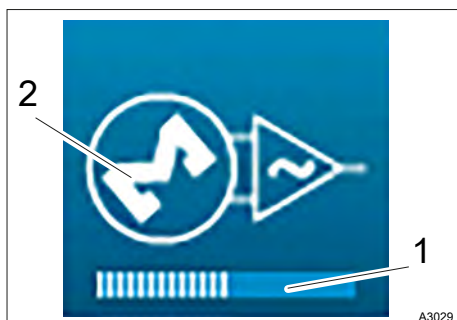
Protective fuse out of action



The self-fed PO1 and PO2 relays have a TR5 fuse. If a fuse is destroyed, a special symbol (see figure opposite) appears on the relevant output.

Fig. 41: Protective fuse out of action

4 ... 20mA output in metering mode

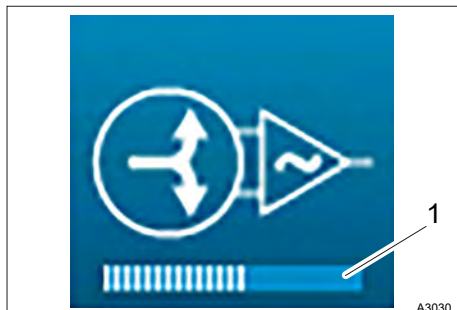


A bar diagram (1) showing the metering capacity of the 4 ... 20 mA output. Of 0 ... 100%.

Rotation (2) according to the capacity.

Fig. 42: 4 ... 20mA output in metering mode

4 ... 20mA output in transmission mode



A bar diagram (1) showing the level of the 4...20 mA output. From 0/4 mA ... 20 mA.

Fig. 43: 4 ... 20mA output in transmission mode

Issuing information

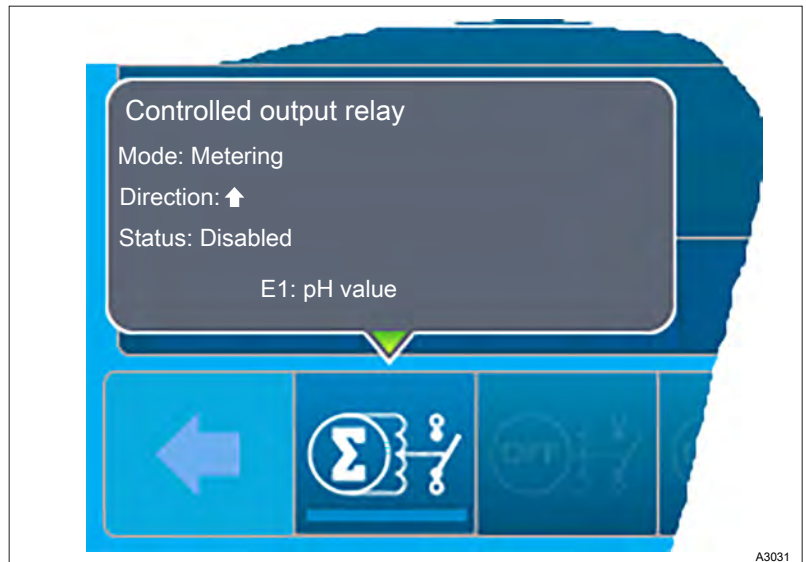
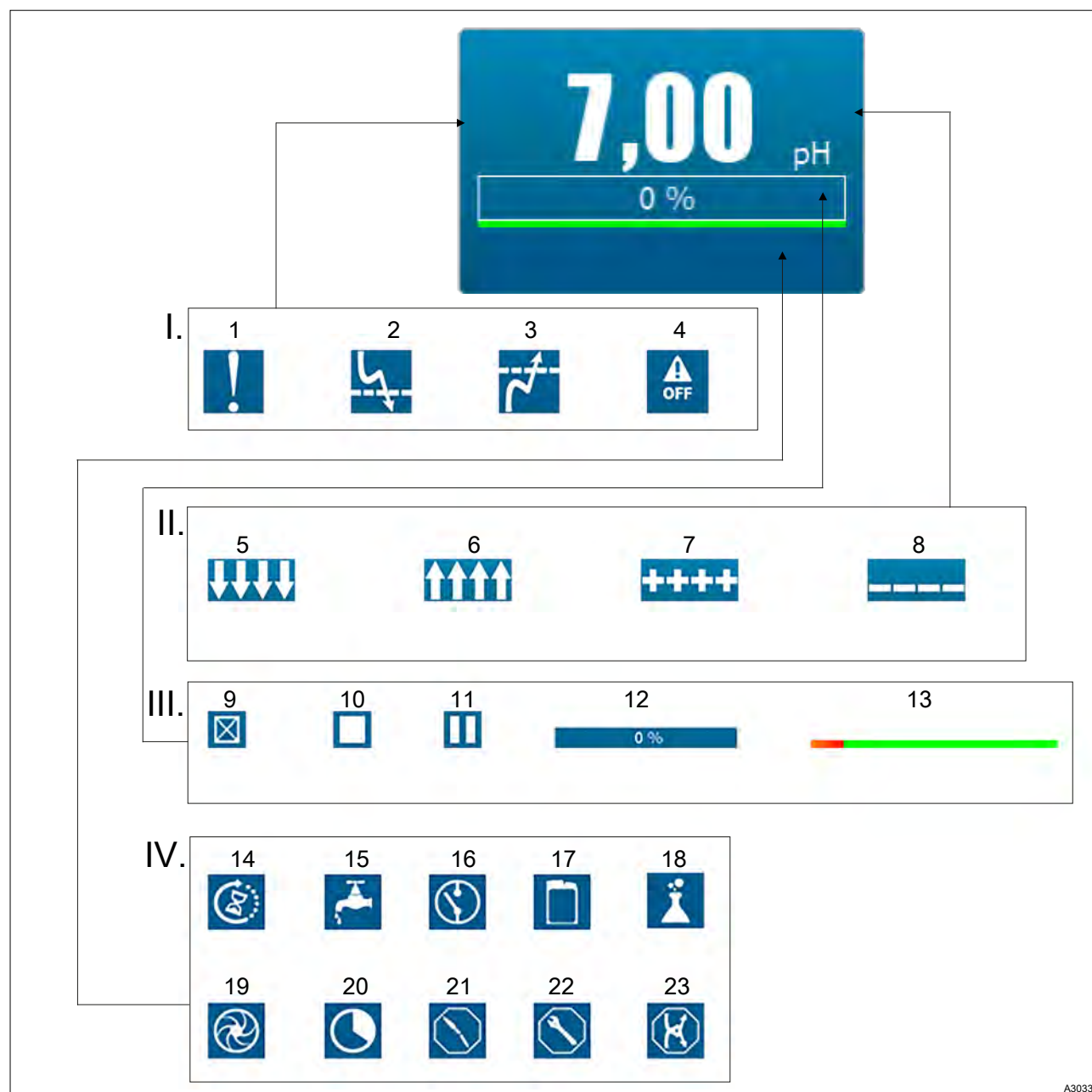


Fig. 44: Issuing information

When you click on one of the outputs, you obtain information about the programming and the status of the selected output. The information displayed may vary according to the configuration of the outputs.

6.1 Displaying details on the “Small x6” channels

Details of the measuring channel



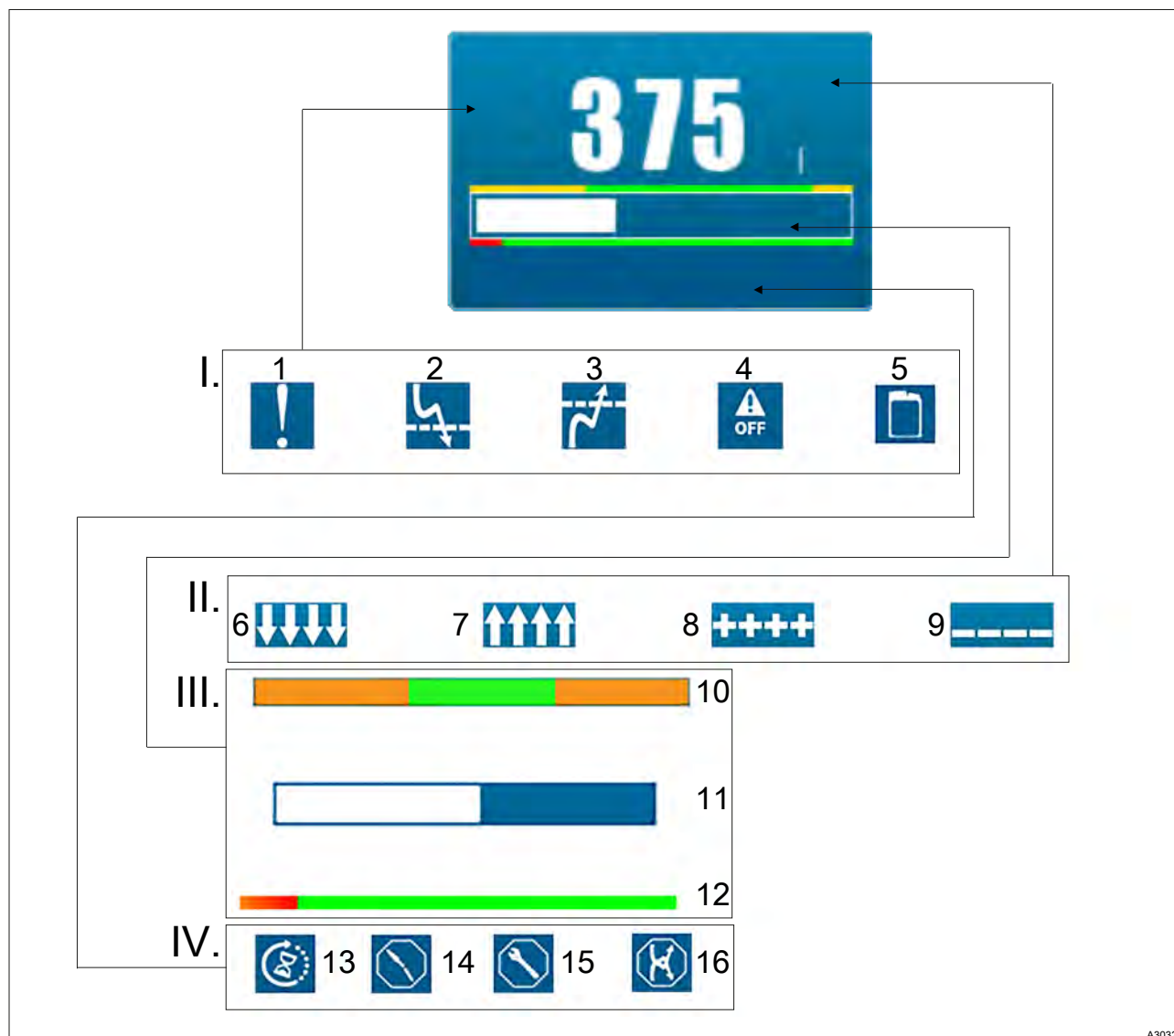
A3033

Fig. 45: Details of the measuring channel illustrated by pH

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Disabled setting
II: Measured value and units		
	5	Measured value lower than can be displayed on the scale.

Main group	Subgroup	Function
	6	Measured value higher than can be displayed on the scale.
	7	Measured value cannot be displayed.
	8	Measured value cannot be measured. Technical alarm
III: Metering status and capacity		
	9	No metering system available.
	10	Metering is stopped (STOP).
	11	Metering is paused.
	12	No metering in progress.
	13	Metering time bar when the maximum metering time is programmed.
IV: Notification area		
	14	Polarisation is in progress.
	15	Check the water supply.
	16	The power supply is disconnected.
	17	The feed chemical storage tank is empty.
	18	Overmetering. Overmetering has been detected.
	19	Check the flow or flow volume.
	20	The timer is active.
	21	The sensor is not operating.
	22	The sensor must be maintained and serviced.
	23	The sensor signal is unstable and fluctuating.

Details of the volume channel



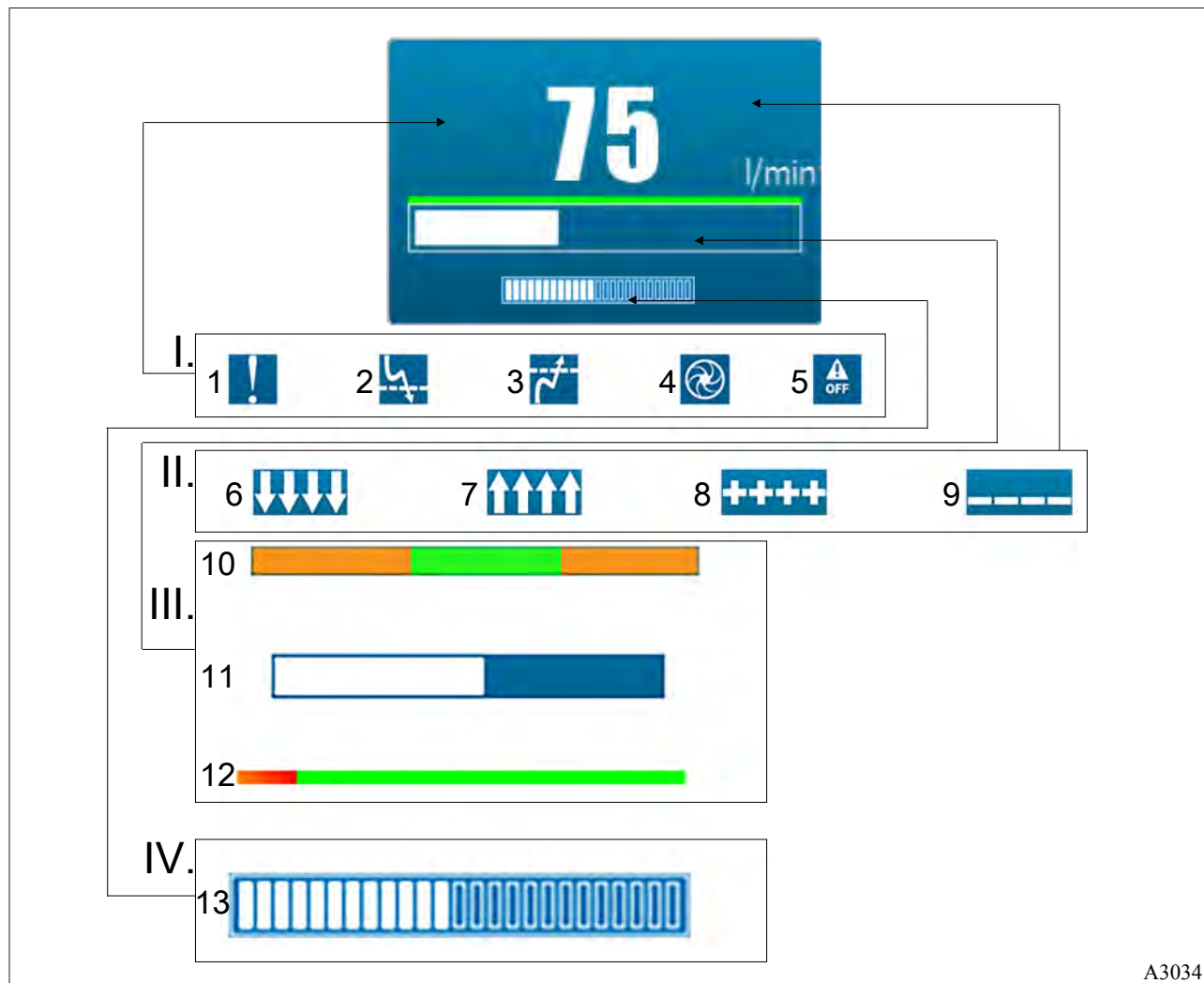
A3032

Fig. 46: Details of the volume channel

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Disabled setting
	5	The feed chemical storage tank is empty.
II: Measured value and units		
	6	Measured value lower than can be displayed on the scale.
	7	Measured value higher than can be displayed on the scale.
	8	Measured value cannot be displayed.
	9	Measured value cannot be measured. Technical alarm
III: Metering status and capacity		

Main group	Subgroup	Function
	10	Threshold low / threshold high
	11	Measured value
	12	Lower limit of metering shutdown, if set
IV: Notification area		
	13	Polarisation is in progress.
	14	The sensor is not operating.
	15	The sensor must be maintained and serviced.
	16	The sensor signal is unstable and fluctuating.

Details of the flow channel



A3034

Fig. 47: Details of the flow channel

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Check the flow or flow volume.
	5	Disabled setting
II: Measured value and units		
	6	Measured value lower than can be displayed on the scale.
	7	Measured value higher than can be displayed on the scale.
	8	Measured value cannot be displayed.
	9	Measured value cannot be measured. Technical alarm
III: Alarm status		
	10	Threshold low / threshold high

Main group	Subgroup	Function
	11	Measured value
	12	Lower limit of metering shutdown, if set
IV: Compensation status and capacity. If set.		
	13	Compensation status and capacity. If set. Compensation percentage as a %. If the flow is set in the compensation parameter.

Time control (widget)

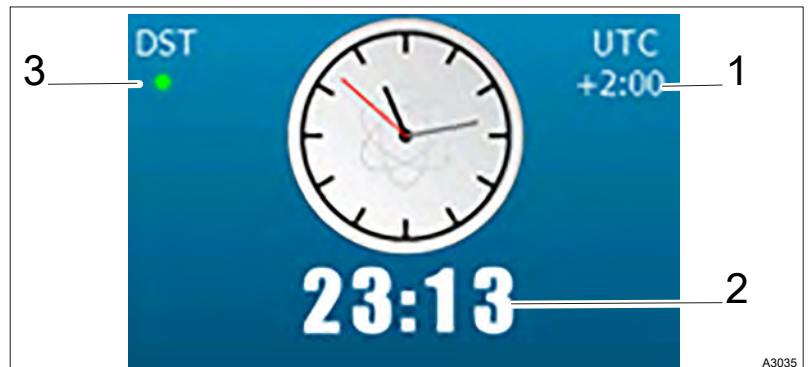


Fig. 48: Time control (widget)

Main group	Subgroup	Function
I: Time settings		
	1	Current local time shift to UTC / GMT
	2	Current time in the set format. Display of time in 24-hour or 12-hour a.m./p.m. format.
	3	Summer time/winter time: ■ Green: summer time enabled, ■ Grey: winter time enabled, ■ Red: time zone without time change.

6.2 Displaying details on the “Large x3” channels

Details of the measuring channel

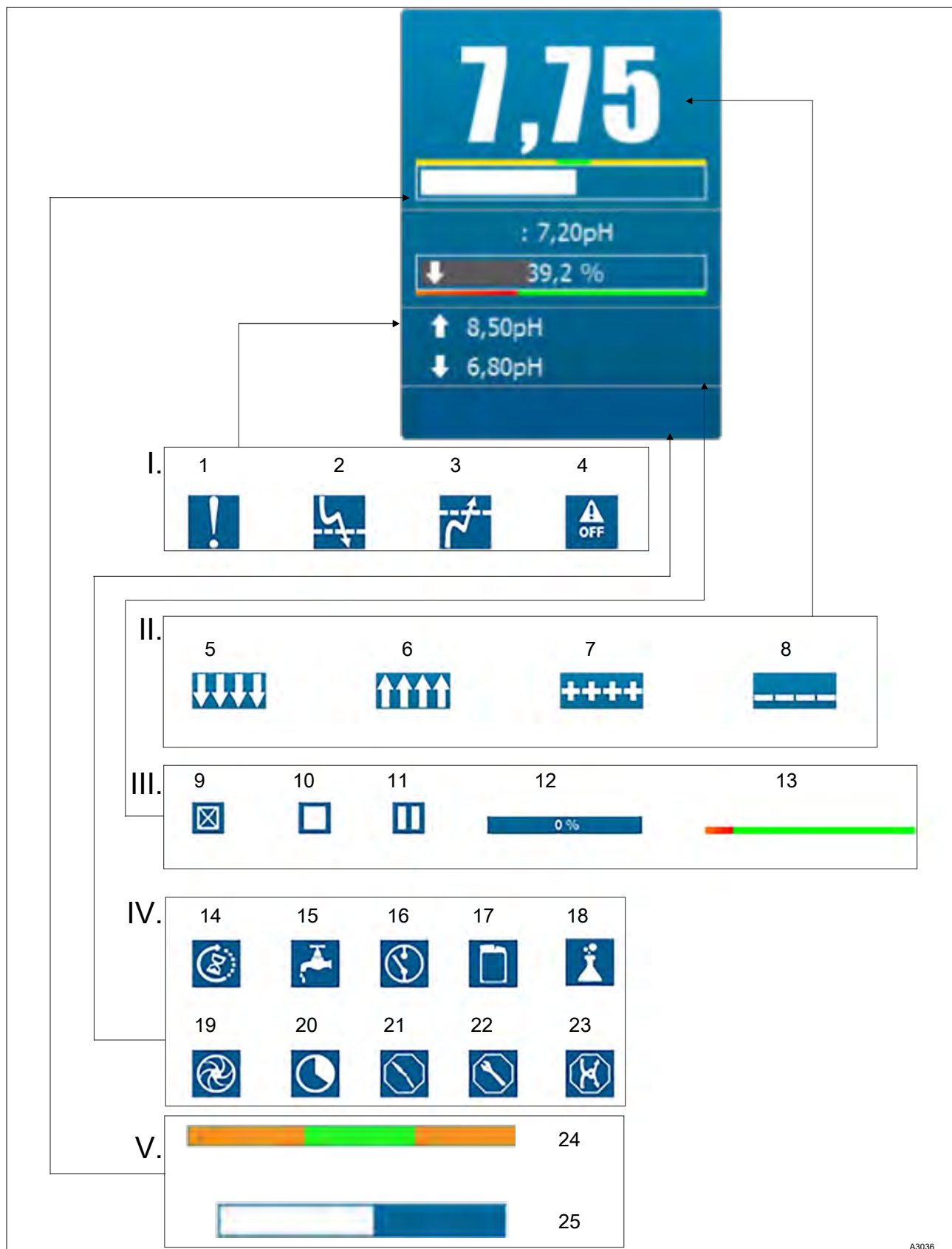


Fig. 49: Details of the measuring channel

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Disabled setting
	Alarm threshold OFF if not programmed	
II: Measured value and units		
	5	Measured value lower than can be displayed on the scale.
	6	Measured value higher than can be displayed on the scale.
	7	Measured value cannot be displayed.
	8	Measured value cannot be measured. Technical alarm
	Control setpoint OFF if not programmed	
III: Metering status and capacity		
	9	No metering system available.
	10	Metering is stopped (STOP).
	11	Metering is paused.
	12	No metering in progress.
	13	Metering time bar when the maximum metering time is programmed.
IV: Notification area		
	14	Polarisation is in progress.
	15	Check the water supply.
	16	The power supply is disconnected.
	17	The feed chemical storage tank is empty.
	18	Overmetering. Overmetering has been detected.
	19	Check the flow or flow volume.
	20	The timer is active.
	21	The sensor is not operating.
	22	The sensor must be maintained and serviced.
	23	The sensor signal is unstable and fluctuating.
V: Alarm status area		
	24	Threshold low / threshold high
	25	Measured value

Details of the volume channel

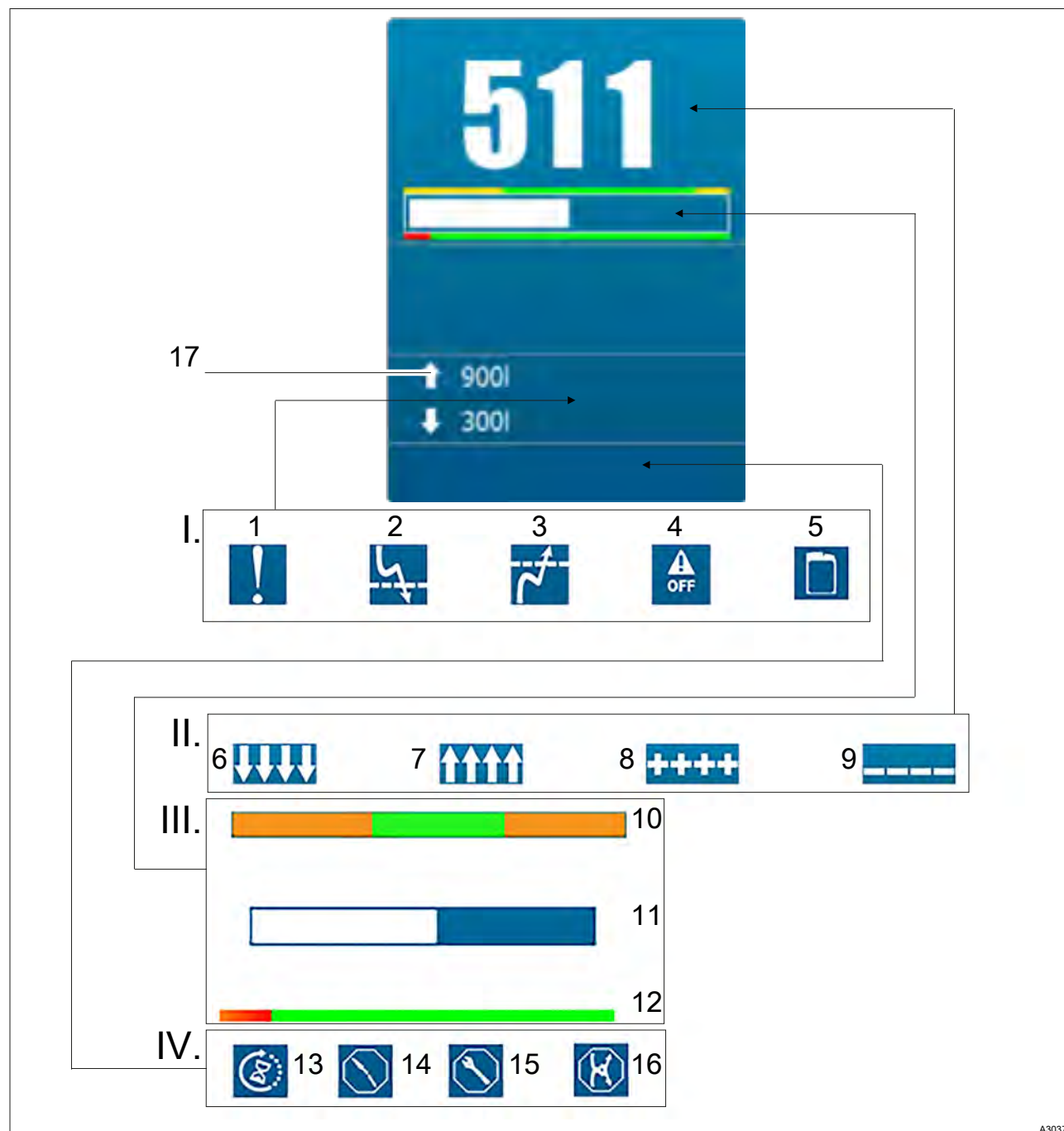
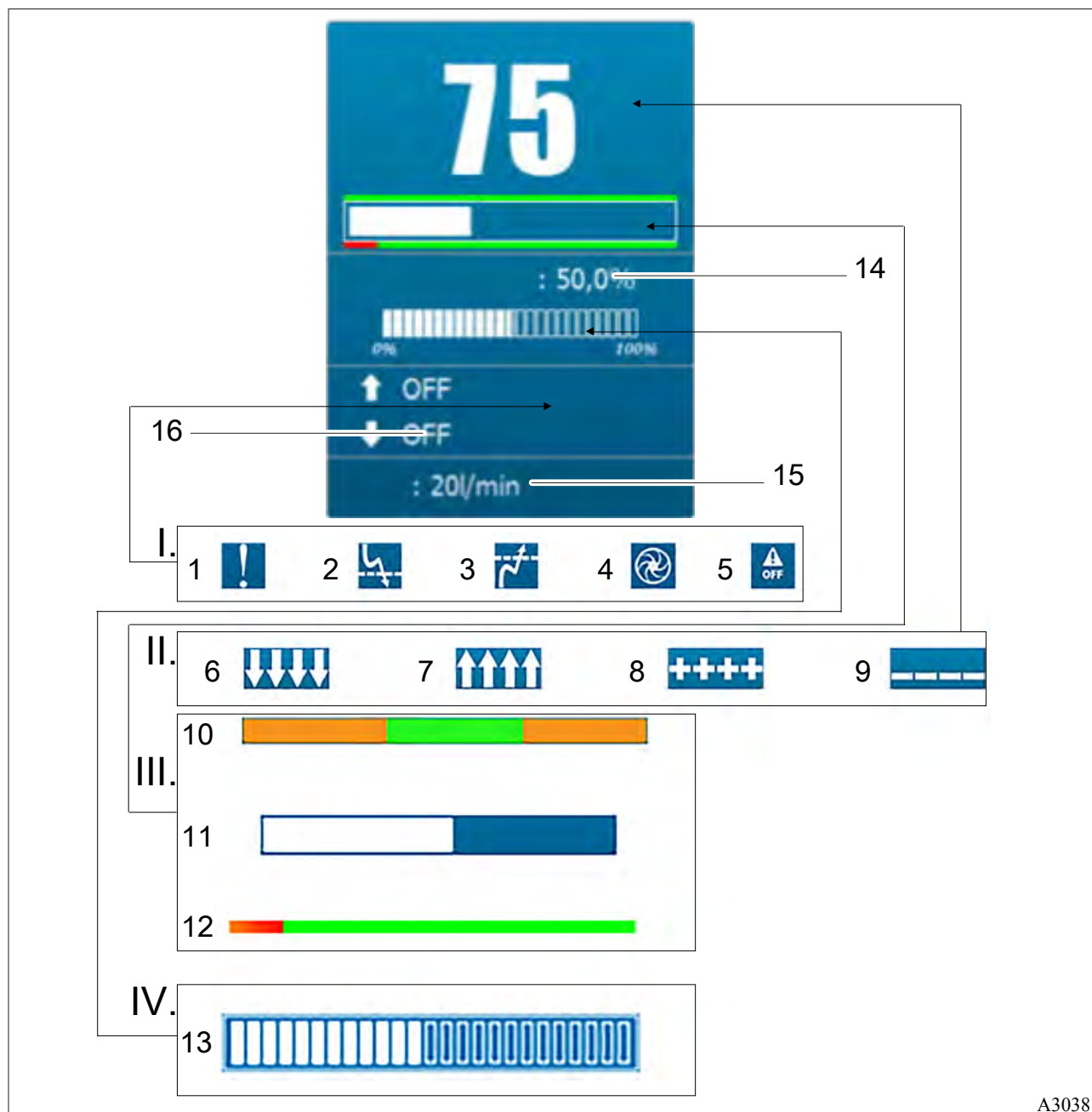


Fig. 50: Details of the volume channel

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Disabled setting
	5	The feed chemical storage tank is empty.
II: Measured value and units		

Main group	Subgroup	Function
	6	Measured value lower than can be displayed on the scale.
	7	Measured value higher than can be displayed on the scale.
	8	Measured value cannot be displayed.
	9	Measured value cannot be measured. Technical alarm
III: Metering status and capacity		
	10	Threshold low / threshold high
	11	Measured value
	12	Lower limit of metering shutdown, if set
IV: Notification area		
	13	Polarisation is in progress.
	14	The sensor is not operating.
	15	The sensor must be maintained and serviced.
	16	The sensor signal is unstable and fluctuating.
Alarm thresholds		
	17	OFF if not programmed

Details of the flow channel



A3038

Fig. 51: Details of the flow channel

Main group	Subgroup	Function
I: Alarm notifications		
	1	Technical alarm
	2	Measured value too low
	3	Measured value too high
	4	Check the flow or flow volume.
	5	Disabled setting
II: Measured value and units		
	6	Measured value lower than can be displayed on the scale.

Main group	Subgroup	Function
	7	Measured value higher than can be displayed on the scale.
	8	Measured value cannot be displayed.
	9	Measured value cannot be measured. Technical alarm
III: Alarm status		
	10	Threshold low / threshold high
	11	Measured value
	12	Lower limit of metering shutdown, if set
IV: Compensation status and capacity. If set.		
	13	Compensation status and capacity. If set. Compensation percentage as a %. If the flow is set in the compensation parameter.
Additional information		
	14	Metering percentage, OFF if not programmed
	15	Metering shutdown threshold, OFF, if not programmed
	16	Alarm threshold, OFF if not programmed

Time control (widget)



Fig. 52: A3039

Main group	Subgroup	Function
I: Time settings		
	1	Current local time shift to UTC / GMT
	2	Current time in the set format. Display of time in 24-hour or 12-hour a.m./p.m. format.
	3	Summer time/winter time: ■ Green: summer time enabled, ■ Grey: winter time enabled, ■ Red: time zone without time change.
	4	Day
	5	Month and year
	6	Current time zone

6.3 Detailed display of a channel

Showing the detailed display

Press on a field on the main screen to open the detailed display.



Fig. 53: Detailed view of a channel

The values and information are displayed in small miniature views. Further information can be found in [Chapter 6.1 'Displaying details on the "Small x6" channels' on page 44](#).

If the user code function is enabled, then a window opens up in which you are asked to input the user code if you wish to change a parameter from the detailed view. The code remains enabled until you exit the detailed view.

Enter the 4-digit code and confirm it when you are asked on the display to input the user code. You need to confirm the input again once you have entered new values.

Key: Cancel

This key cancels the current polarisation delay. The function is enabled if the hourglass symbol, which displays the time delay, is flickering.

- Key disabled (grey): the function is not available.
- Key enabled (green): the function is available.

Key: Clear

This key clears the overmetering memory and re-enables metering. The function is enabled when the overmetering symbol is displayed.

- Key disabled (grey): the function is not available.
- Key disabled (green): the function is available.

Key: Disabling parameters + Enabling parameters

You can end parameter management with this key. Alarms, metering, relays and 4 ... 20 mA outputs connected to these parameters are stopped.

Key: History

The key is disabled: the function will be available in the next software version.

Area: Information on the sensor

You can assign which sensor is used and program the sensor's parameters.

Area: Metering

List of metrics assigned to the parameter:

- FO1: output number
- ▼: feeder assembly
- PFM: operating mode of the system
- P.I.D: mode for calculation of metering

Setpoint key: used to change the parameter setpoint.

Max. time key: used to change the maximum metering time.

Area: Alarm threshold

List of alarm threshold values:

- Key: Upper alarm threshold, used to change the upper alarm threshold.
- Key: Lower alarm threshold, used to change the lower alarm threshold.
- Stop metering: Allows you to choose whether metering is to be stopped when the relevant threshold value is transgressed. The function is enabled here.

The box with the checkmark '*Stop metering*' is only visible when the alarm threshold is enabled.

"Control" area for the input variable: Flow

List of control thresholds:

- Key: Lower alarm threshold, used to change the lower alarm threshold.
- Key: Upper alarm threshold, used to change the upper alarm threshold.
- Key: Stop metering threshold is used to change the metering stop threshold.

"Control" area for the input variable: Volume

List of control thresholds

- Key: Stop metering threshold is used to change the metering stop threshold.

"Calibration" area

List of the different calibration parameters associated with the input.

- Offset: Indicates that the offset value has been set.
- Slope: Displays the slope percentage that has been set.
- Calibration button: This is used to change the calibration value.

Offset (illustrated by the pH value):

- display of the status sensor's offset calibration.
- The redder the bar diagram becomes, the closer the calibration limit becomes. This information can indicate the ageing of the sensor.
- The offset is expressed in the unit of the physical sensor input. The minimum and maximum values vary according to the sensor.

Slope (illustrated by the pH value):

- Display of the calibration status of the sensor's slope
- The redder the bar diagram becomes, the closer the calibration limit becomes. This information can indicate the ageing of the sensor.
- The slope is expressed as a percentage and can vary between 0 % ... 200 %. 100 % represents an uncalibrated slope.

If an incorrect value is entered or if it is outside the scale, then "Min: 0 ... Max: 14.00" appears red when you press "Enter".

If the value entered is correct, then the "Calibration performed successfully" window appears.

6.4 Input mode

The device has a 5" touchscreen. All commands are executed by pressing the designated areas of the touchscreen.

Screen for entering the installation programme or the user code

This screen appears when a user or installation code has been programmed.

To increase security, numbers in random order are displayed each time this screen appears.

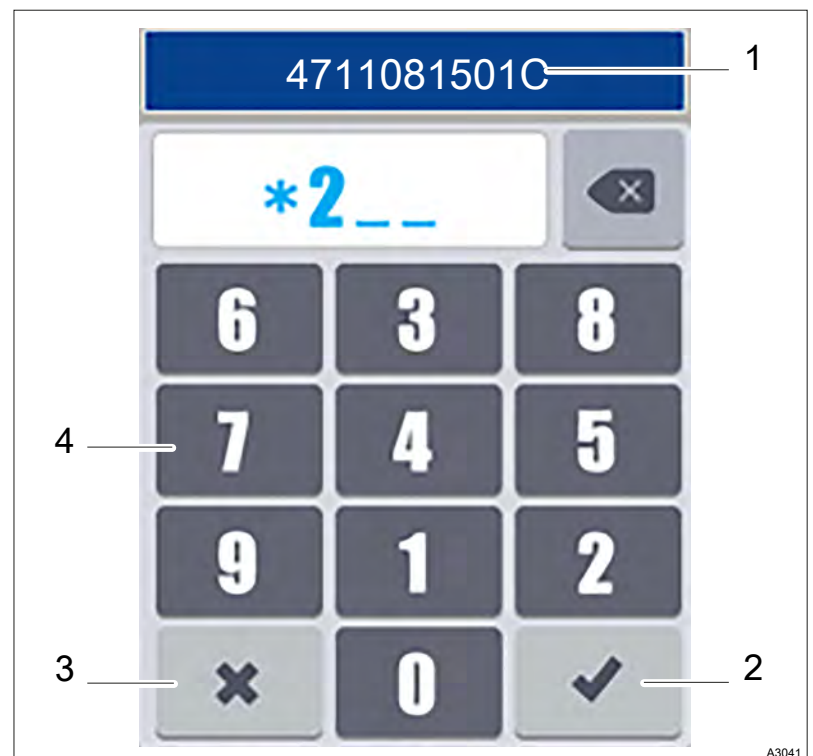


Fig. 54: This screen appears when a user or installation code has been programmed.

- 1 User password (example)
- 2 Key: Save input (Enter)
- 3 Key: Cancel
- 4 Number block

Screen to enter numerical values



Fig. 55: Screen to enter numerical values

- 1 Designation of the parameters
- 2 Key: Clear
- 3 Disable a functional key
- 4 Key: Cancel
- 5 Key: Save input (Enter)
- 6 Key: Negative values
- 7 Number block
- 8 Possible Min and Max values
- 9 Display of the entered value

Depending on the values to be entered, some functions may be greyed out because the functions are not used for the expected value.

The decimal character changes automatically depending on the language.

If an incorrect value is entered or if it is outside the scale, then the "Min: 0 ... Max: 14.00" area appears red when you press "Enter".

Alphanumeric keyboard



Fig. 56: Alphanumeric keyboard

- | | |
|--|--|
| 1 Input field in which the text entered appears. | 6 Key for special characters |
| 2 Clear/Back key | 7 Key for special characters |
| 3 Key: Save input (Enter) | 8 Keyboard type key (AZERTY, QWERTY, QUERTZ...). |
| 4 Caps Lock | 9 Shift key |
| 5 Cancel key (ESC) | |

All keys with the arrow symbol in the top right have additional characters that can be accessed by pressing them for 2 seconds.

To access characters with accents, press and hold the corresponding unaccented character for more than 2 seconds to display the list of available characters. This list is automatically closed as soon as any character is pressed.

Important input elements

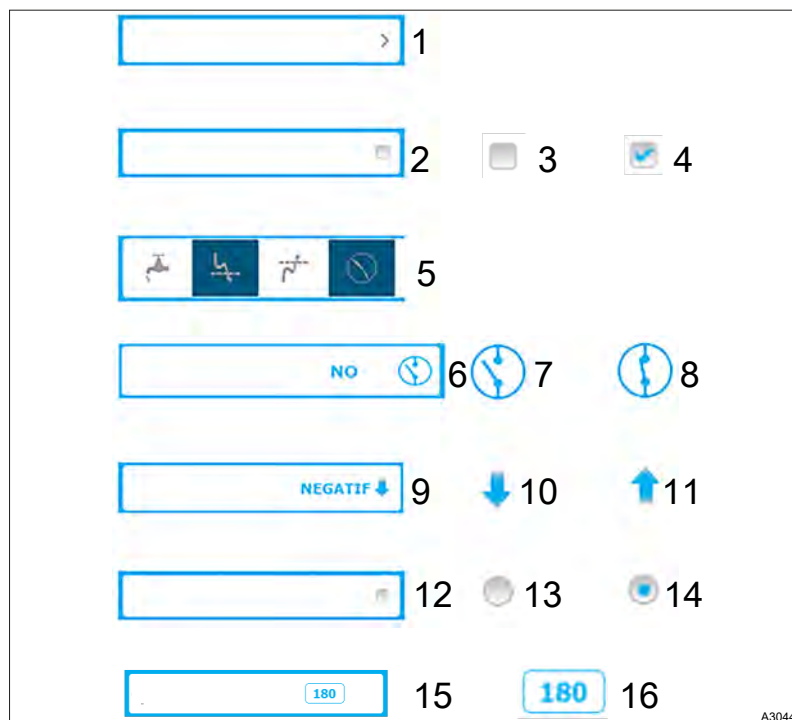


Fig. 57: Important input elements

Tab. 15: Important input elements

#	Function
1	Open a list. Press this key to open a list.
2	Key with checkbox to enable or disable functions.
3	Disabled.
4	Enabled.
5	Multiple selection version: press the required element to select the element.
6	Status box. The statuses of functions or elements can be defined in a status box.
7	Contact opened.
8	Contact closed.
9	Direction box. The active directions of functions or elements can be defined in a direction box.
10	Down.
11	Up.
12	Selection box. You can select or deselect functions or elements in a selection box.
13	Disabled
14	Enabled
15	Numerical box. A fixed numerical value can be defined in this numerical box
16	Press to open the numeric keyboard.

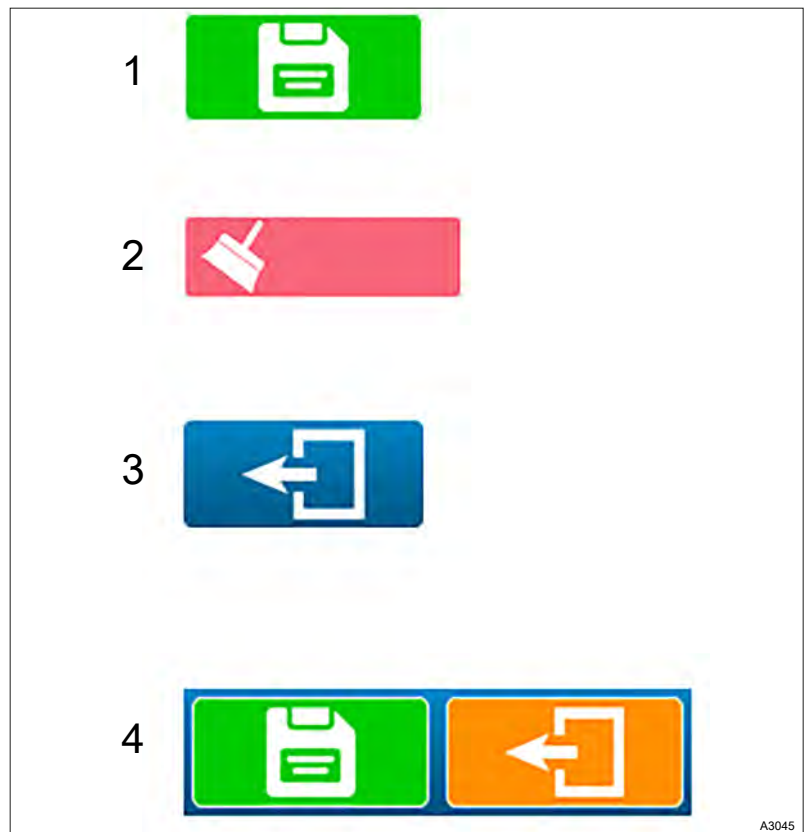


Fig. 58: Action keys

Tab. 16: Action keys

#	Function
1	Use this key to save a configuration.
2	Use this key to clear a configuration.
3	Use this key to return to the previous display.
4	With the "Save" and "Back" keys, when a change is made on a screen, the "Back" key appears orange and the "Save" key appears. Press "Back" to skip saving the changes. Press "Save" to complete saving the changes.

Selection lists

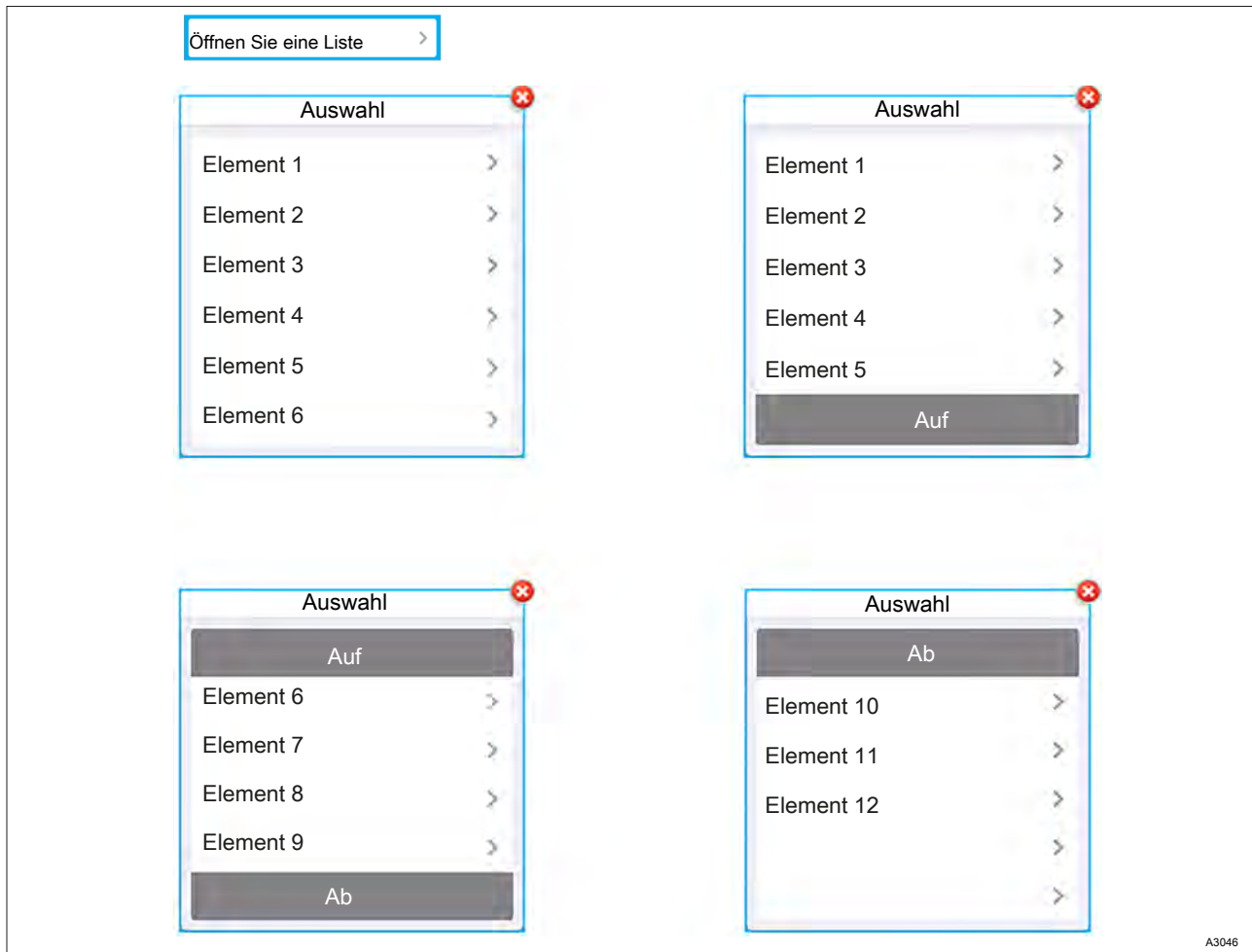


Fig. 59: Selection lists

If an action is symbolised by this type of key '*Open a list*', then a list with the corresponding elements opens. The "simple" list has a maximum of 6 entries; if the list is longer, '*Up*' and '*Down*' navigation buttons appear to help you move through the list.

Press on an element to select it.

Navigation bar

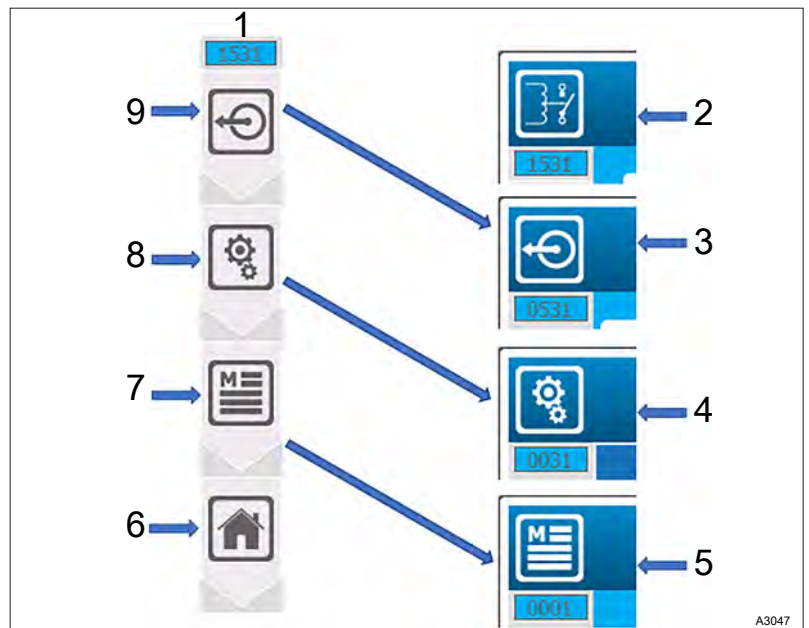


Fig. 60: Navigation bar (example)

- 1 Menu number
- 2 Menu, Output relays
- 3 Menu, Output selection
- 4 Menu, Installation
- 5 Main menu
- 6 Menu, Main screen
- 7 Main menu
- 8 Menu, Installation
- 9 Menu, Output selection

In the programming menu, each selection of a function adds a key to the navigation bar. You can go down one or more levels in the programming at any time by clicking on one of the menu keys.

The symbols in the navigation bar correspond to the identification symbols at the top left of every image.

Padlock symbol

The padlock symbol is used when a menu is password-protected or an option is locked by the configuration.

7 Communication programming instructions

7.1 Power supply output connector (PWR)

If you wish, you can use chlorine or bromine sensors that require an external power supply.

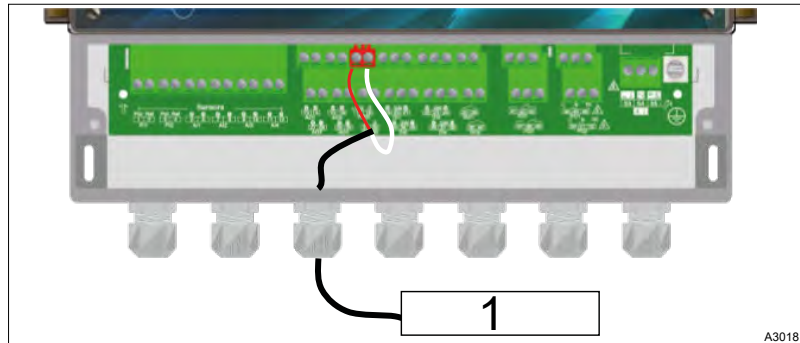


Fig. 61: Power supply output connector (PWR)

1 DWR equipment

1. ➤ Use a 2-lead cable designed appropriately for use for voltage and power.
2. ➤ Remove the protective sleeve of the cable.
3. ➤ Strip away 7 mm of the insulation on the leads.
4. ➤ Guide the cable through the cable gland.
5. ➤ Connect the lead (plus) to the terminal block (+12 V) 17.
6. ➤ Connect the lead (minus) to the terminal block (C) 18.
7. ➤ Tighten the cable gland to make a seal.

7.2 RS485 communication bus connections

The device has an RS485 communication port for connection to a computer. The computer must be equipped with a 485-port and communication software to record the measured values, alarms, and various statuses of the device.

Connection to the USB port of a computer

Note the cabling of the bus system.

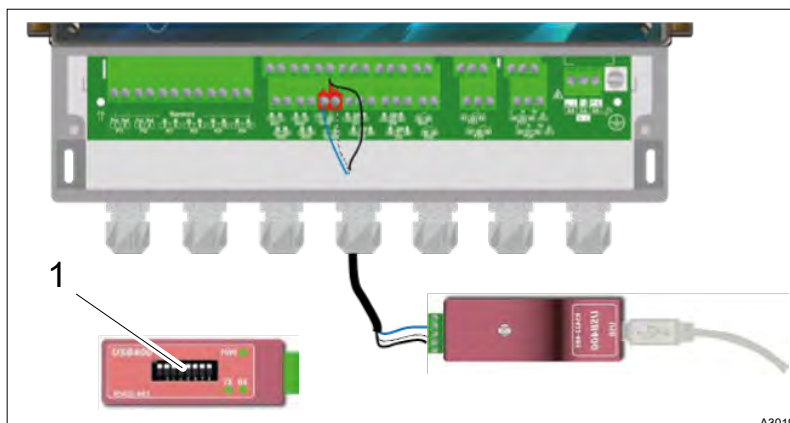


Fig. 62: Connection to the USB port of a computer

Blue (terminal no. 3):

White (terminal no. 4):

Black (terminal no. 5):

Configuration: All switches (1) to "ON".

1. Use a 3-lead cable designed appropriately for use for voltage and power.
2. Guide the cable through the cable gland.
3. Lead AA (no. 3) of the USB/485 converter to RS485 (A) (31).
4. Lead BB (no. 4) of the USB/485 converter to RS485 (B) (32).
5. Lead C (no. 5) of the USB/485 converter to DWR (C) (18)
6. Tighten the cable gland to make a seal.

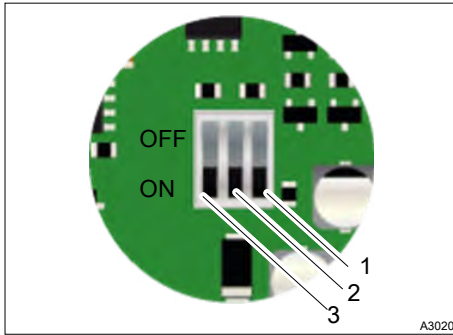
A USB/RS485 converter is recommended for connecting the device to a computer. Please read the documentation on the converter to connect it up.

Reference	Name
INF1021	USB ➔ 485 converter

The devices can be networked noting the order of the cables (parallel wiring).

Polarisation and termination of the RS485 bus

For safety reasons, it is essential that the device is de-energised before opening the housing to switch the microswitches.



- 1 Terminal RS
- 2 RS minus (B)
- 3 RS plus (A)

The bus can be poled from your device if necessary. To do so, switch the two microswitches (RS+ (A) and RS- (B)) on the electronic plug-in card to the ON position

If your device is the last device on the line of the RS485 bus, you can switch over the RS terminal. Switch RS to ON to enable termination of the line.

Fig. 63: Polarisation and termination of the RS485 bus

7.3 Internal GSM modem connector

Your mobile service plan must have a minimum data volume of 5 MB/month. Disable the PIN functions of the SIM card.

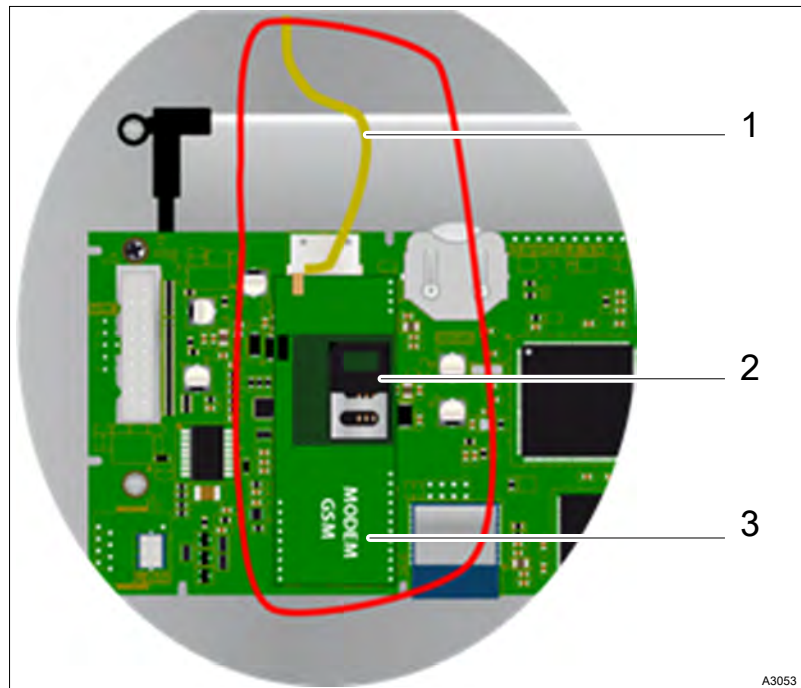


Fig. 64: Internal GSM modem connector

- 1 Antenna cable
- 2 SIM card
- 3 GSM modem

1. ➤ Install the GSM model (3) at its intended position.
2. ➤ Position the antenna (1) in a cable gland and connect the antenna using the cable supplied.
3. ➤ Position the SIM card (2) in its intended position.

7.4 Ethernet modem connector

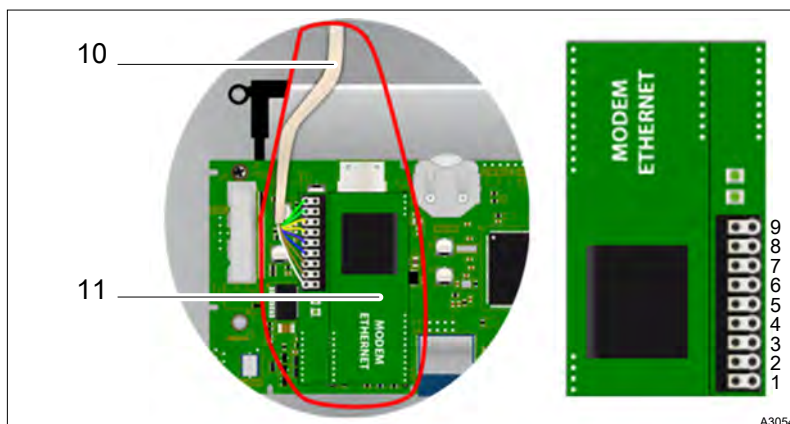


Fig. 65: Ethernet modem connector

- 1 Cable: Green/White
- 2 Cable: Green
- 3 Cable: Orange/White
- 4 Cable: Orange
- 5 Cable: Blue/White
- 6 Cable: Blue
- 7 Cable: Brown/White
- 8 Cable: Brown
- 9 Cable: Earthing
- 10 Connecting cable to the network
- 11 Ethernet modem

1. Install the Ethernet modem (11) at its intended position.
2. Guide the cable through the cable gland to the network (10).
3. Connect wires 1 ... 9, as shown.

7.5 Setting up the communication

To connect the device to the bus, the RS485 communication of the device and the other systems connected to the same bus must be identical.

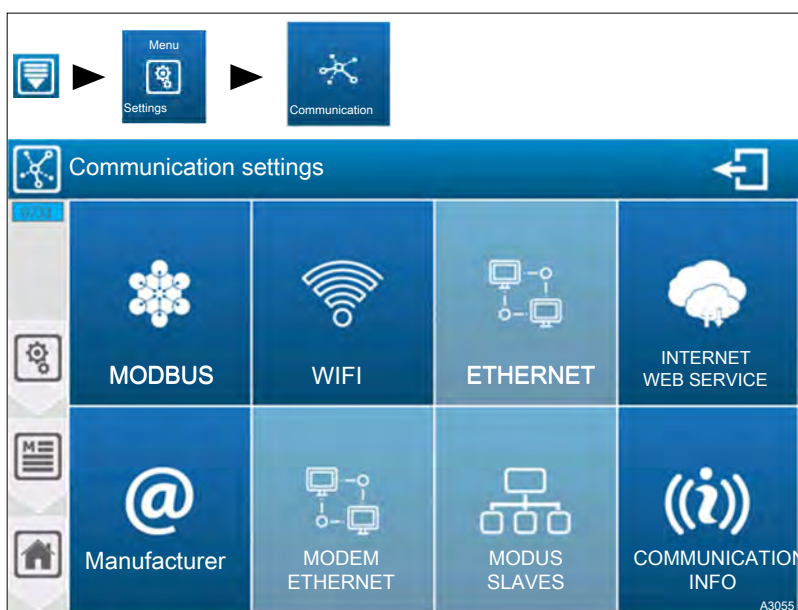


Fig. 66: Setting up the communication

The Ethernet is not yet available. The MODEM ETHERNET and MODBUS SLAVES keys are each accessible depending on the communication configuration.

7.5.1 Modbus configuration [1731]

Press the Modbus symbol (I.) to open the following screen.

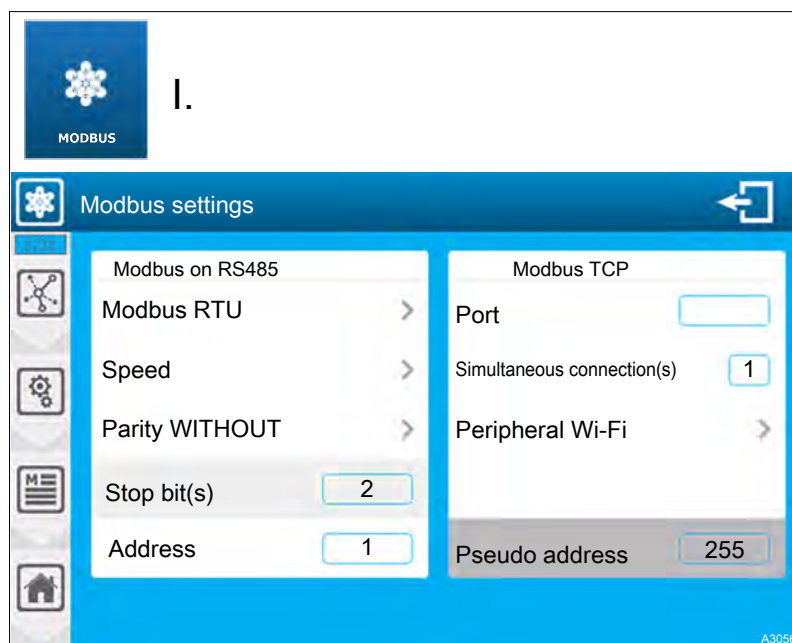


Fig. 67: Modbus configuration [1731]

Do not forget to configure the Wi-Fi parameters if the device connected to your Modbus is a Wi-Fi type.

When a change has been made, the "Save" button (disk symbol) appears, which you need to press to save your configuration.

Modbus via RS485

Modbus RTU

- Selection of Modbus communication mode: this selection button provides information on the selected mode (RTU). Press to change the Modbus communication mode.

Speed 19200

- Selection of Modbus communication speed: this selection button provides information on the selected speed (19200). Press this key to change the speed.

Parity

- Selection of Modbus communication parity: this selection button provides information on the selected parity (SANS). Press this key to change the Modbus communication parity.

Stop bit(s)

- Information on the configuration of the number of stop bit(s). This option cannot be configured: this option adapts to the parity configuration. It only provides information intended to help you with the configuration of your connection.

Address

- Modbus address input of your controller. This is the actual value (1). Press this selection key to open the number pad and enter the required value. The possible adjustment ranges from 1 to 247.

Modbus TCP

Port 520

- TCP port selection: this selection button provides information on the selected port (520). Press this key to change the TCP port selection.

Simultaneous connection(s)

- Selection of the number of simultaneous Modbus connections: this selection button gives the number of simultaneous connections. Press this key to change the simultaneous connection(s).

Peripheral Wi-Fi

- Selection of Modbus communication device: this selection button provides information on the selected device (Wi-Fi). Press this key to change the selected device.

Pseudo address

- Selection of pseudo Modbus communication address: this selection button provides information on the selected pseudo address (255). Press this key to change the pseudo address.

7.5.2 Wi-Fi configuration [2731]

Press the Wi-Fi symbol to open the following screen.

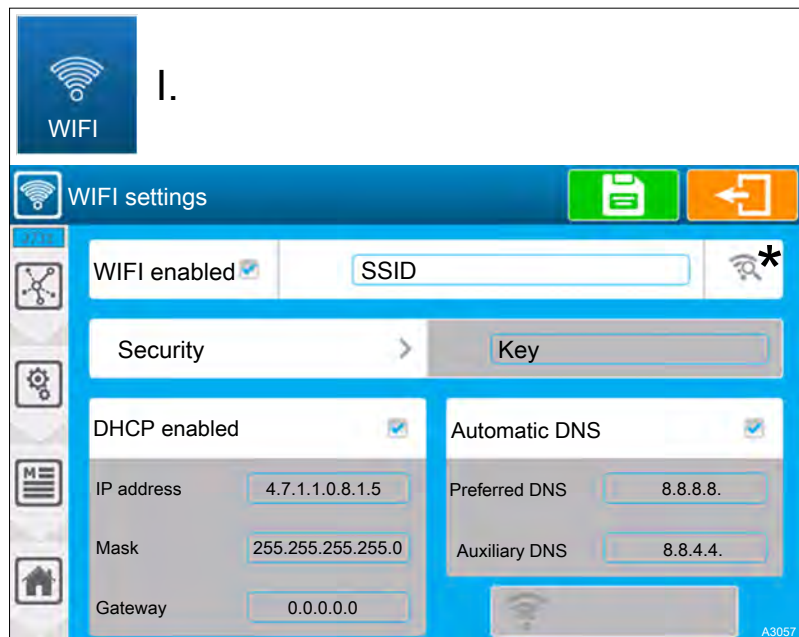


Fig. 68: Wi-Fi configuration [2731]

Wi-Fi enabled

- Enable the Wi-Fi built into your device. The Wi-Fi module is enabled when the checkbox is highlighted. Press the key to change the status of the key.

SSID

- Enter the name of the Wi-Fi network to which you wish to connect. Press the key to open the alphanumeric keyboard and enter the required value.

Scan the available networks *

- Press this key * to open the list of networks. Pressing this key starts the search for networks and displays a list of the networks found nearby.

Security

- Selection of the type of security key by your Wi-Fi network: this selection button provides information on the selected type (default: disabled). Press this key to change the security. Network security mode is automatically selected when you select a network from the available network search window.

Key

- If you have selected a security mode, this option is enabled and you need to enter the security key of the Wi-Fi network to which you wish to connect. Press the key to open the alphanumeric keyboard and enter the required value.

DHCP enabled

- The choice of the DHCP configuration of your network. Press the key to ENABLE/DISABLE DHCP.

IP Address

- If you disable DHCP, you need to enter the fixed IP address of your controller. Press the key to open the numeric keyboard and enter the required value.

Mask

- If you disable DHCP, you need to enter the subnet mask of your network. Press the key to open the numeric keyboard and enter the required value.

Gateway

- If you disable DHCP, you need to enter the gateway of your network. Press the key to open the numeric keyboard and enter the required value.

Automatic DNS

- Selection of the DNS configuration. Press the key to ENABLE/DISABLE DNS.

Preferred DNS

- If DNS management is not automatic, you need to enter the IP address of the primary DNS. Press the key to open the numeric keyboard and enter the required value.

Secondary DNS

- If DNS management is not automatic, you need to enter the IP address of the secondary DNS. Press the key to open the numeric keyboard and enter the required value.

Save:

- When a change has been made, the "Backup" button (disk icon) appears, which you need to press to save your configuration.

Wi-Fi configuration test

- Press the Connection test key to open the test window.
- The connection phases, module initialisation, and connection requirement for the selected network are displayed.
- If the connection is successful, the symbol appears green and the IP address assigned to the Wi-Fi is displayed.
- In the event of an error, the symbol is displayed in red and a message indicating the type of error is displayed.

Error list

- Password error = Password is incorrect.
- Timeout = Connection failed within the time limit.
- Network not found = SSID network was not found.
- Unknown error => An unknown error has occurred.

7.5.3 Ethernet modem configuration [3731]

This option is not yet available.

7.5.4 Internet and web server configuration [4731]

Press the Internet web service key to open the following screen.

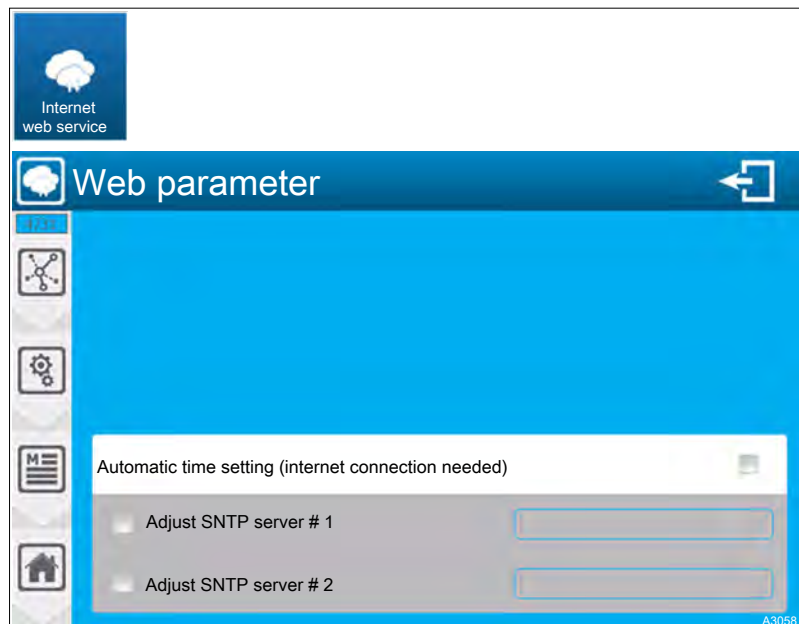


Fig. 69: Internet and web server configuration [4731]

Automatic time setting

- When this option is enabled, your regulatory authority will periodically check the time on the internet using the SNTP protocol. Your regulatory authority therefore needs to be connected and have internet access.

Adjusting SNTP server # 1

- Your device already has an SNTP server address. However, you can adapt the servers used for the setting and enter the first address here.

Adjusting SNTP server # 2

- While setting, your device attempts to reach the second server, if server #1 cannot be reached, if the checkbox is highlighted and the address entered.

7.5.5 MYSYCLOPE configuration [5731]

Press MYSYCLOPE to open the following screen.

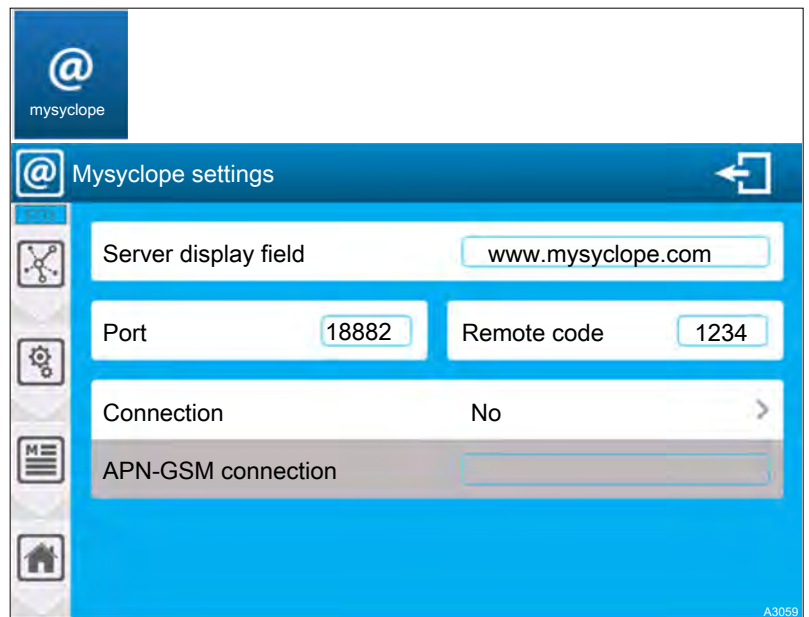


Fig. 70: MYSYCLOPE configuration [5731]

Server address www.mysyclope.com

- Input of the address of the mysyclope web server. Here is the address (www.mysyclope.com).
- Press the key (www.mysyclope.com) to open the alphanumeric keyboard and enter the required value.

Port 18882

- Input of the TCP connection port to the mysyclope website. This is the connection port (18882).
- Press the port key to open the alphanumeric keyboard and enter the required value.

Remote code 1234

- Input of the remote connection code from mysyclope to your device. This is the remote connection code (1234).
- Press the remote code key to open the numeric keyboard and enter the required value.

Connection No

- Selection of the connection mode to mysyclope (type of modem). Press this key to change the selected mode.

APN-GSM connection

- If you choose a connection with a GSM modem, you need to enter the APN code of your data card here.
- Press the APN-GSM connection key to open the alphanumeric keyboard and enter the required value.

Saving

- When a change has been made, the "Save" button (disk symbol) appears, which you need to press to save your configuration.

7.5.6 Ethernet modem configuration [6731]

Press Ethernet modem to open the following screen.

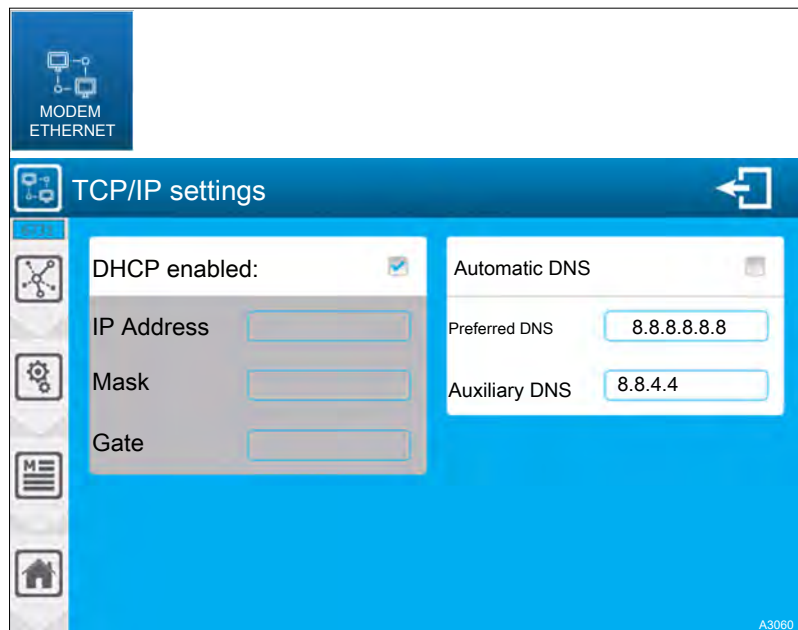


Fig. 71: Ethernet modem configuration [6731]

DHCP enabled

- Selection of the DHCP configuration of your network.
- Press the key to ENABLE/DISABLE DNS.

IP Address

- If you disable DHCP, you need to enter the fixed IP address of your device. Press the key to open the numeric keyboard and enter the required value.

Mask

- If you disable DHCP, you need to enter the subnet mask of your network. Press the mask to open the numeric keyboard and enter the required value.

Gate

- If you disable DHCP, you need to enter the gateway of your network. Press Gate to open the numeric keyboard and enter the required value.

Automatic DNS

- Selection of the DNS configuration. Press the Automatic DNS key to ENABLE/DISABLE DNS.

Preferred DNS 8.8.8.8.8

- If DNS management is not automatic, you need to enter the IP address of the primary DNS.
- Press Preferred DNS to open the numeric keyboard and enter the required value.

Secondary DNS 8.8.4.4

- If DNS management is not automatic, you need to enter the IP address of the secondary DNS.
- Press Secondary DNS to open the numeric keyboard and enter the required value.

Saving

- When a change has been made, the "Save" button (disk symbol) appears, which you need to press to save your configuration.

7.5.7 Modbus slave configuration [7731]

Press Modbus slave to open the following screen.

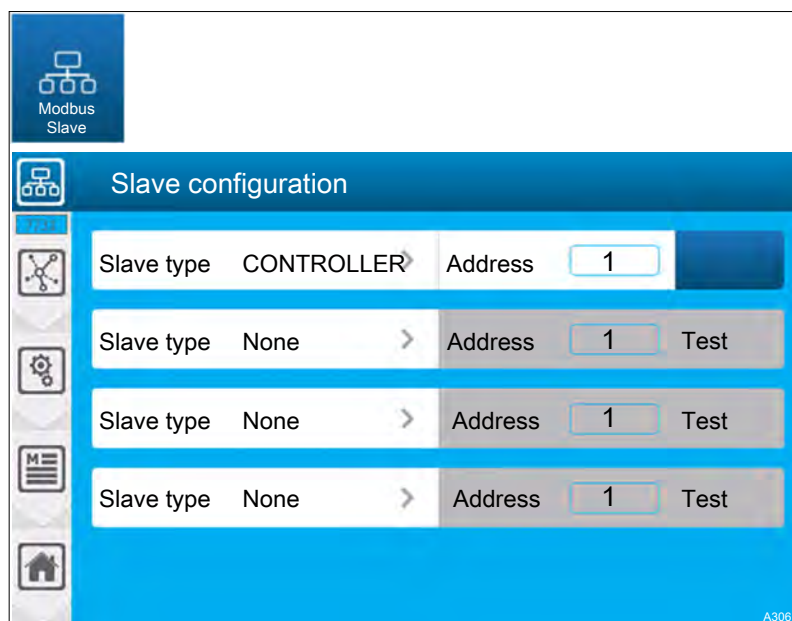


Fig. 72: Modbus slave configuration [7731]

Slave type CONTROLLER

- Selection of the type of the slave connection to the RS485 bus. This selection button provides information on the selected type (CONTROLLER). Press this key to change the type.

Address

- Input of the Modbus address of the slave. Caution: the address must be different from the Modbus address of your controller. Press Address to open the numeric keyboard and enter the required value. Possible adjustment from 1 ... 247.

Test

- Pressing the Test key lets you check whether the slave is correctly connected. First establish the RS485 connection between the two devices and then check whether the Modbus configuration is identical on the two devices. A positive or negative status message then appears.

Save:

- When a change has been made, the "Save" button (disk symbol) appears, which you need to press to save your configuration.

7.5.8 Communication information [8731]

Press Communication INFO to open the following screen.

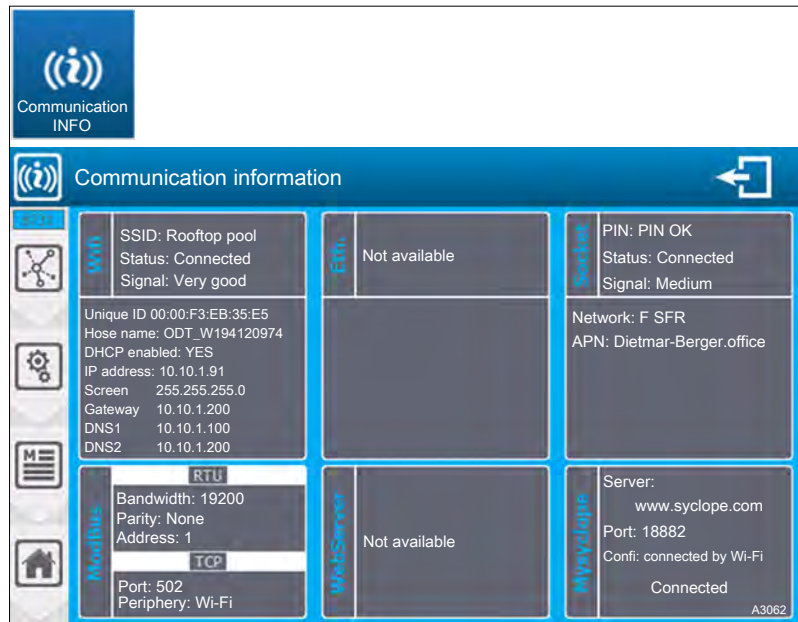


Fig. 73: Communication information [8731]

Wi-Fi

- This displays all the relevant information on the wireless network.
- The values displayed either correspond to the values set when DHCP mode is disabled or the values received via DHCP from the network to which the module is connected.

Ethernet (Eth.)

- This function is not yet available.

Socket

- This displays all the relevant information on the Ethernet or GSM network.
- The values displayed either correspond to the values set when DHCP mode is disabled or the values received via DHCP from the network to which the module is connected.

ModBus

- Reminder of the Modbus configuration.

Web server

- This function is not yet available.

Mysyclope

- Reminder of the configuration and status of the connection.

Identification of the device in the Ethernet network

- ODT_: Root
- W... = WiFi
- E...: Ethernet
- S...: Socket
- 4459865645 = Serial number of the device.

7.6 Modbus communication register

The registers are numbered according to the Modbus standard. These are "HOLDINGS REGISTERS" in the register range from 40001 ... 49999.

Some software and Modbus controllers use an address between 0 ... 65535.

The Modbus register 40001 thus corresponds to the Modbus address 0, the register 40002 corresponds to address 1 and so on and so forth.

Tab. 17: Address of the Modbus register

Modbus register	Number of registers	Name	Access	Format	Description
Interfaces					
41001	2	signal_POT1	r	REAL	Signal at the input POT PI1 [mV]
41003	2	signal_POT2	r	REAL	Signal at input POT PI2 [mV]
41005	2	Signal_AI1	r	REAL	Current at the input AI1 [mA]
41007	2	Signal_AI2	r	REAL	Current at the input AI2 [mA]
41009	2	Signal_AI3	r	REAL	Current at the input AI3 [mA]
41011	2	Signal_AI4	r	REAL	Current at the input AI4 [mA]
41013	2	Signal_MI1	r	REAL	Signal at the MI1 input [depending on the module]
41015	2	signal_MI2	r	REAL	Signal at the MI2 input [depending on the module]
41017	2	Signal_K1	r	REAL	Signal at the DIx input [depending on the switch configuration]
41019	2	Signal_K2	r	REAL	Signal at the DIx input [depending on the switch configuration]
41031	1	Signal_DI1	r	BOOL	0=OPEN / 1=CLOSED
41032	1	signal_DI2	r	BOOL	0=OPEN / 1=CLOSED
41033	1	signal_DI3	r	BOOL	0=OPEN / 1=CLOSED
41034	1	signal_DI3	r	BOOL	0=OPEN / 1=CLOSED
41041	1	Zustand_PO1	r	BOOL	0=OPEN / 1=CLOSED
41042	1	Zustand_PO2	r	BOOL	0=OPEN / 1=CLOSED
41043	1	Zustand_FO1	r	BOOL	0=OPEN / 1=CLOSED
41044	1	Zustand_FO2	r	BOOL	0=OPEN / 1=CLOSED
41045	1	Zustand_RO1	r	BOOL	0=OPEN / 1=CLOSED
41046	1	Zustand_RO2	r	BOOL	0=OPEN / 1=CLOSED
41056	2	Signal_AO1	r	REAL	Signal at the AO1 output [mA]
41058	2	Signal_AO2	r	REAL	Signal at the AO2 output [mA]
41060	2	Signal_AO3	r	REAL	Signal at the AO3 output [mA]
41062	2	Signal_AO4	r	REAL	Signal at the AO4 output [mA]

Modbus register	Number of registers	Name	Access	Format	Description
41076	1	Zustand_HO1	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41077	1	Zustand_HO2	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41078	1	Zustand_HO3	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41079	1	Zustand_HO4	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41080	1	Zustand_HO5	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41081	1	Zustand_HO6	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41082	1	Zustand_HO7	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41083	1	Zustand_HO8	r	BOOL	0 = Outside of the range / 1 = Within the range (schedule)
41092	2	Local time stamp	r	DWORD	Time since 1 January 1970 00h00 [s]
Values and statuses					
41101	1	geräte_zustand	rw	WORD	Bit 0: Device running Bit 1: Timer running Bit 2: Device layer formation Bit 3: Device stopped by timer
41201	2	param_E1_state	rw	DWORD	Compare with Param State
41203	2	param_E1_Messwert_Messung	r	REAL	Measured value [unit of measure]
41205	2	param_E1_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41207	2	param_E1_dosage_u	r	REAL	Metering control [1/1]
41209	2	param_E1_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41211	2	param_E1_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41251	2	param_E2_state	rw	DWORD	Compare with Param State
41253	2	param_E2_messur_e_value	r	REAL	Measured value [unit of measure]
41255	2	param_E2_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]

Modbus register	Number of registers	Name	Access	Format	Description
41257	2	param_E2_dosage_u	r	REAL	Metering control [1/1]
41259	2	param_E2_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41251	2	param_E2_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41301	2	param_E3_state	rw	DWORD	Compare with Param State
41303	2	param_E3_measur_e_value	r	REAL	Measured value [unit of measure]
41305	2	param_E3_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41307	2	param_E3_dosage_u	r	REAL	Metering control [1/1]
41309	2	param_E3_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41311	2	param_E3_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41351	2	param_E4_state	rw	DWORD	Compare with Param State
41353	2	param_E4_measur_e_value	r	REAL	Measured value [unit of measure]
41355	2	param_E4_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41357	2	param_E4_dosage_u	r	REAL	Metering control [1/1]
41359	2	param_E4_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41351	2	param_E4_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41401	2	param_E5_state	rw	DWORD	Compare with Param State
41403	2	param_E5_measur_e_value	r	REAL	Measured value [unit of measure]
41405	2	param_E5_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41407	2	param_E5_dosage_u	r	REAL	Metering control [1/1]
41409	2	param_E5_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41411	2	param_E5_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41451	2	param_E6_state	rw	DWORD	Compare with Param State
41453	2	param_E6_measur_e_value	r	REAL	Measured value [unit of measure]
41455	2	param_E6_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41457	2	param_E6_dosage_u	r	REAL	Metering control [1/1]

Modbus register	Number of registers	Name	Access	Format	Description
41459	2	param_E6_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41451	2	param_E6_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41501	2	param_E7_state	rw	DWORD	Compare with Param State
41503	2	param_E7_measured_value	r	REAL	Measured value [unit of measure]
41505	2	param_E7_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41507	2	param_E7_dosage_u	r	REAL	Metering control [1/1]
41509	2	param_E7_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41511	2	param_E7_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
41551	2	param_E8_state	rw	DWORD	Compare with Param State
41553	2	param_E8_measured_value	r	REAL	Measured value [unit of measure]
41555	2	param_E8_Kontrolle_w	rw	REAL	Control setpoint [unit of measure]
41557	2	param_E8_dosage_u	r	REAL	Metering control [1/1]
41559	2	param_E8_alarm_hoch	rw	REAL	High alarm value [unit of measure]
41551	2	param_E8_alarm_niedrig	rw	REAL	Low alarm value [unit of measure]
42001	2	sensor_PO1_Wert	r	REAL	PI1 sensor measured value [sensor unit]
42003	2	sensor_PO2_Wert	r	REAL	PI2 sensor measured value [sensor unit]
42005	2	sensor_AI1_Wert	r	REAL	AI1 sensor measured value [sensor unit]
42007	2	sensor_AI2_Wert	r	REAL	AI2 sensor measured value [sensor unit]
42009	2	sensor_AI3_Wert	r	REAL	AI3 sensor measured value [sensor unit]
42011	2	sensor_AI4_Wert	r	REAL	AI4 sensor measured value [sensor unit]
42013	2	sensor_MI1_Wert	r	REAL	Measured value of MI1 sensor [sensor unit]
42015	2	sensor_MI2_Wert	r	REAL	Measured value of MI2 sensor [sensor unit]
42017	2	sensor_KI1_Wert	r	REAL	DIx sensor measured value [sensor unit]
42019	2	sensor_KI2_Wert	r	REAL	DIx sensor measured value [sensor unit]

Modbus register	Number of registers	Name	Access	Format	Description
Measuring device					
42051	14	Unit	r	STRUCTURE	Device statuses and value
Channel					
42101	130	param_E1	r	STRUCTURE	E1 channel statuses and value
42301	130	param_E2	r	STRUCTURE	E2 channel statuses and value
42501	130	param_E3	r	STRUCTURE	E3 channels statuses and value
42701	130	param_E4	r	STRUCTURE	E4 channels statuses and value
42901	130	param_E5	r	STRUCTURE	E5 channel statuses and value
43101	130	param_E6	r	STRUCTURE	E6 channels statuses and value
43301	130	param_E7	r	STRUCTURE	E7 channels statuses and value
43501	130	param_E8	r	STRUCTURE	E8 channels statuses and value
Capteur					
45301	36	sensor_PI1	r	STRUCTURE	PI1 sensor statuses and values
45351	36	sensor_PI2	r	STRUCTURE	PI2 sensor statuses and values
45401	36	aufnehmer_AI1	r	STRUCTURE	AI1 sensor statuses and values
45451	36	Fühler_AI2	r	STRUCTURE	AI2 sensor statuses and values
45501	36	sensor_AI3	r	STRUCTURE	AI3 sensor statuses and values
45551	36	aufnehmer_AI4	r	STRUCTURE	AI4 sensor statuses and values
45601	36	sensor_MI1	r	STRUCTURE	MI1 sensor statuses and values
45651	36	sensor_MI2	r	STRUCTURE	MI2 sensor statuses and values
45701	36	aufnehmer_KI1	r	STRUCTURE	DIx sensor statuses and values
45751	36	aufnehmer_KI2	r	STRUCTURE	DIx sensor statuses and values
Contacts					
46051	12	Schalter_DI1	r	STRUCTURE	Contact status of DI1
46076	12	Schalter_DI2	r	STRUCTURE	Contact status of DI2
46101	12	Schalter_DI3	r	STRUCTURE	Contact status of DI3

Modbus register	Number of registers	Name	Access	Format	Description
46126	12	Schalter_DI4	r	STRUCTURE	Contact status of DI4
Relay					
46301	58	Relais_PO1	r	STRUCTURE	Statuses and value of the PO1 relay
46401	58	Relais_PO2	r	STRUCTURE	Statuses and value of the PO2 relay
46501	58	Relais_FO1	r	STRUCTURE	FO1 relay statuses and value
46601	58	Relais_FO2	r	STRUCTURE	FO2 relay statuses and values
46701	58	Relais_RO1	r	STRUCTURE	RO1 relay statuses and value
46801	58	Relais_RO2	r	STRUCTURE	Statuses and value of the RO2 relay
Sorting 4...20 mA					
47801	18	iout_AO1	r	STRUCTURE	Statuses and value of the output 4...20 mA AO1
47826	18	iout_AO2	r	STRUCTURE	Statuses and value of the output 4...20 mA AO2
47851	18	iout_AO3	r	STRUCTURE	Statuses and value of the output 4...20 mA AO3
47876	18	iout_AO4	r	STRUCTURE	Statuses and value of the output 4...20 mA AO4
Calendar					
48051	14	Kalander_HO1	r	STRUCTURE	HO1 calendar statuses and value
48076	14	Kalander_HO2	r	STRUCTURE	HO2 calendar statuses and value
48101	14	Kalander_HO3	r	STRUCTURE	HO3 calendar statuses and value
48126	14	Kalander_HO4	r	STRUCTURE	HO4 calendar statuses and value
48151	14	Kalander_HO5	r	STRUCTURE	HO5 calendar statuses and value
48176	14	Kalander_HO6	r	STRUCTURE	HO6 calendar statuses and value
48201	14	Kalander_HO7	r	STRUCTURE	HO7 calendar statuses and value
48226	14	Kalander_HO8	r	STRUCTURE	HO8 calendar statuses and value

7.7 Data formatting

BOOL

"BOOL" uses 1 register and can have two values 0 or 1.

Example: The register 41041 is the status of the PO1 relay.

- REG(41041) = 0: Relay, open
- REG(41041) = 1: Relay, closed

REAL

"REAL" uses 2 registers and allows the coding of floating point numbers to 32 bits.

Example: Register 41303 is the measured value of channel E03: the unit of this value is the unit selected in the measuring menu of the device. The hexadecimal coding is 0x3FF851EC for a measured value of 1.94 ppm.

- REG(41303) = 0x51EC
- REG(41303) = 0x3FF8

WORD

"WORD" uses 1 register for coding a 16-bit whole integer or a bit field.

Example (bits): Register 41101 contains the device status displays.

- REG(41101) = b00000000000000001
- REG(41101)(bit00) = 1: the device is running
- REG(41101)(bit01) = 0: the timer is not running
- REG(41101)(bit02) = 1: Control and alarms of at least one measuring channel are started
- REG(41101)(bit03) = 0: there is no active timer
- REG(41101)(bit04) - (bit15) = 0: not used

DWORD

"DWORD" uses 2 registers and allows the coding of a 32-bit whole integer or a bit field.

The register 41092 contains the local time of the device, which corresponds to the number of seconds since 1 January 1970. 27 April 2015 at 3h35min19sec is 1430141719 seconds from the reference date, the hexadecimal value is 0x553E3B17.

- REG(41092) = 0x3B17
- REG(41092) = 0x553E

ParamState

"dword" uses 2 registers and allows the coding of a 32-bit whole integer or a bit field.

- Bit 00 = 1: Parameter ON (control and alarms)
- Bit 01 = 1: Related sensor(s) in the start-up phase (active delay)
- Bit 02 = 1: Parameter paused
- Bit 03 = 0: Circulation contact or active flow meter (Ex: no water circulation in the room)
- Bit 04 = 1: Related sensors that need to be serviced (display of the 'key' logo)
- Bit 05 = 1: Parameter during metering
- Bit 06 = 1: Parameter with enabled alarm
- Bit 07 = 1: Parameter in pause due to a timer
- Bit 08 = 1: Related sensor(s) outside the scale or not connected
- Bit 09 = 1: Related sensor(s) measuring low outside the scale

- Bit 10 = 1: Related sensor(s) measuring high outside the scale
- Bit 11 = 1: Related sensor(s) unstable measurement
- Bit 12 = 1: "Low alarm enabled" parameter (alarm threshold exceeded)
- Bit 13 = 1: "High alarm enabled" parameter (alarm threshold exceeded)
- Bit 14 = 1: Overmetering parameter (maximum metering time exceeded)
- Bit 15 = 1: Empty volume in dosing tank
- Bit 16 = 1: Dosing tank empty
- Bit 17 at 31 = X: Internal operating information, 'random' values

8 Setting measuring and control parameters

- **User qualification, setting measuring and control parameters:**
trained user → Chapter 2.4 'User qualification' on page 14

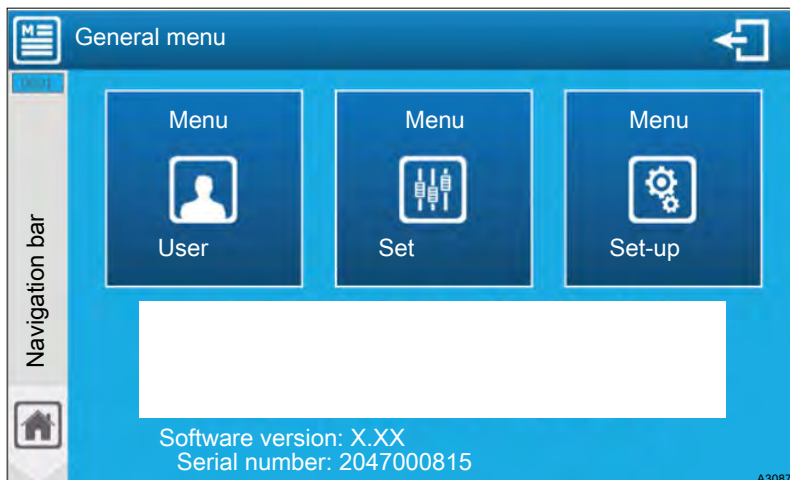


Fig. 74: Start screen for programming

If an access code has been set up to lock the 'SET' or 'SET UP' menu, then the two keys also have a small padlock symbol.

- Press the menu you wish to access to open the password entry window.
- Enter the 4-digit user code. Confirm the entry with the tick key to access the 'SET' or 'SET UP' menu

8.1 'SET UP' programming screen

You can access and change the entire configuration for initial use of your controller via the 'SET UP' menu. Press the 'SET UP menu' to open the following screen.

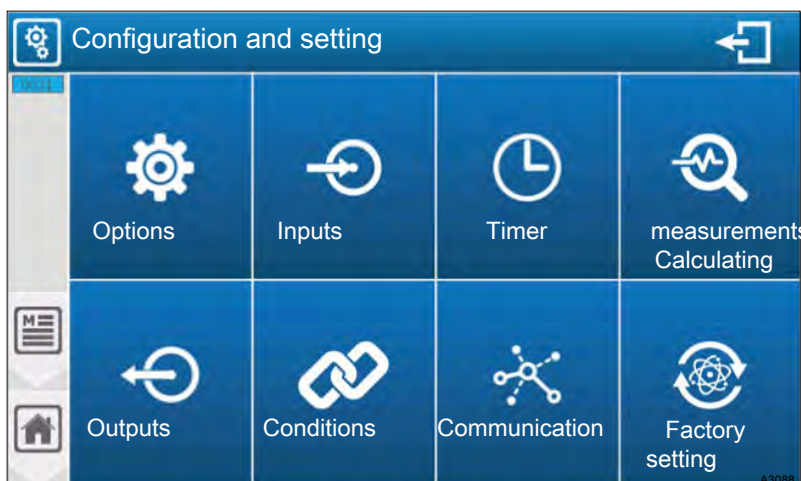


Fig. 75: Menu: Configuration and setting

- | | |
|---------|--|
| Options | The 'Options' menu lets you access the options available in the installation part. |
| Inputs | The 'Inputs' menu lets you access the options available in the installation part. |
| Timer | The 'Timer' menu lets you access the options available in the installation part. |

Calculating measurements	The ' <i>Calculating measurements</i> ' menu lets you access the options available in the installation part.
Outputs	The ' <i>Outputs</i> ' menu lets you access the options available in the installation part.
Conditions	The ' <i>Conditions</i> ' menu lets you access the options available in the installation part.
Communication	The ' <i>Communication</i> ' menu lets you access the options available in the installation part.
Factory setting	The ' <i>Factory setting</i> ' menu lets you access the options available in the installation part.
 Press on the respective menu item to move to the menu item.	

8.1.1 'Options' menu

 Press the '*Options*' menu item to move to the menu item.

Tab. 18: Options > 'Installation options' sub-menu

Menu item	Function
'Installation' locking code	Enable or disable the security code to access the ' <i>Installation</i> ' menu.
'Settings' locking code	Enable or disable the security code to access the ' <i>Settings</i> ' menu.
Use the installation code to lock the ' <i>Settings</i> ' level	Use the ' <i>Installer</i> ' code to lock the ' <i>Settings</i> ' menu
Lock the ' <i>Options</i> ' menu on the ' <i>Settings</i> ' level.	Lock and prevent access to the options in the ' <i>Settings</i> ' menu

 Press the right arrow key to move to the '*General configuration*' selection screen.

Tab. 19: Options > 'General configuration' sub-menu

Menu item	Function
'Automatically create a parameter for each sensor'.	If this option is enabled, a measuring parameter corresponding to the sensor type is created when a new sensor is added. It is still possible to change and/or delete this parameter in a second step. This option permits faster configuration for a simplified installation.
'Condition the flow rates only to this parameter'.	This option is used to separate the flow rate condition and the parameter control. If this box is not checked, control is undertaken at sensor level and the control levels need to be set separately for each parameter controlled. This means, for example, that the capacity is controlled differently with acid than with chlorine. If this field is checked, only one control level is defined for all control parameters.
'Condition the liquid level sensors only to this parameter'.	The same principle as with the previous option, but for the liquid level sensors 4 ... 20 mA.
'Enable the extended configuration of the flow switch/flow meter'.	If this box is checked, it is possible to manage the conditioning type between the flow switch and the flow meters to switch conditioning on or off. The logic conditions AND / OR can then be configured in the "Conditions" menu. If this box is not checked, the OR condition is active as standard

Menu item	Function
Enable the extended configuration of the 4 ... 20 mA outputs.	This option provides access to the special current settings. It is then possible to define the current generated in two special cases: In metering mode: ■ Error current, ■ Current across the range. In transfer mode: ■ Inhibition current, ■ Error current, ■ Current across the range.
Permit the choice between isolated / non-isolated sensors.	If this option is enabled, you can select from all input sensors from AI1 ... AI4. AI3 & AI4 4 ... 20 mA inputs are NOT isolated. If the above option is enabled, ensure that the sensor you select for these inputs is an isolated sensor.

8.1.2 'Inputs' menu

➞ Press the 'Inputs' menu item to move to the menu item.

The 'Inputs' menu provides access to the configuration of the sensors connected to the inputs (potentiometric, analogue 4 ... 20mA or digital).

The screen displays configured and unused inputs. You can change its configuration using an entry already configured or configure its installation by pressing an unused entry.

- PI1 and PI2 // Potentiometric inputs (pH, ORP)
- AI1 and AI2 // Isolated 4 ... 20 mA inputs
- AI3 and AI4 // Non-isolated 4 ... 20mA inputs
- DI1 and DI4 // Digital inputs (contact)

The labelling of the PIx, AIx and DIx inputs is printed on the front of the corresponding terminal of your controller.

8.1.2.1 General input symbols



Fig. 76: General symbols

- 1 Unused entry
- 2 Input with a potentiometric sensor
- 3 Input with a 4 ... 20 mA sensor
- 4 Input with a volume sensor
- 5 Input with a flow sensor
- 6 Input with a flow switch
- 7 Enter R.I.C. command and contact
- 8 Input with a level switch

8.1.2.2 Configuring 4 ... 20 mA analogue or potentiometric inputs



The AI3 and AI4 4 ... 20 mA inputs are not isolated when the above option is enabled. Make sure that the sensor selected for these inputs is an isolated sensor.

You can configure the 4 ... 20 mA analogue or potentiometric inputs here. Press the selection button to be set and set the respective input within the possible parameters.

To remove a sensor from the selection: select "NO" from the function list and save your configuration by pressing "SAVE".

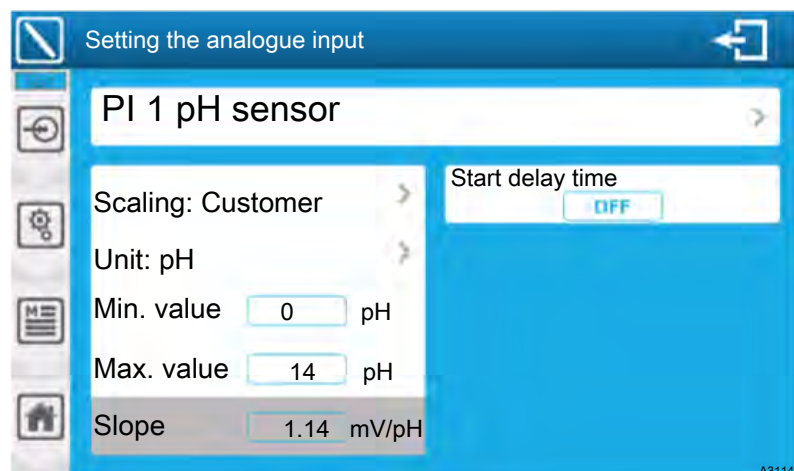


Fig. 77: Configuring 4 ... 20 mA analogue or potentiometric inputs

8.1.2.3 Configuration of the digital input

You can configure the digital inputs here. Press the selection button to be set and set the respective input within the possible parameters.

To remove a sensor from the selection: select " NO " from the sensor list and save your configuration by pressing "SAVE".

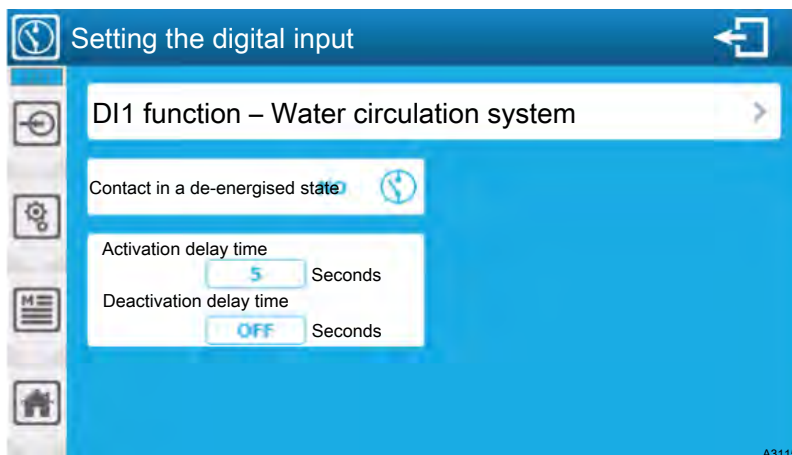


Fig. 78: Standard case

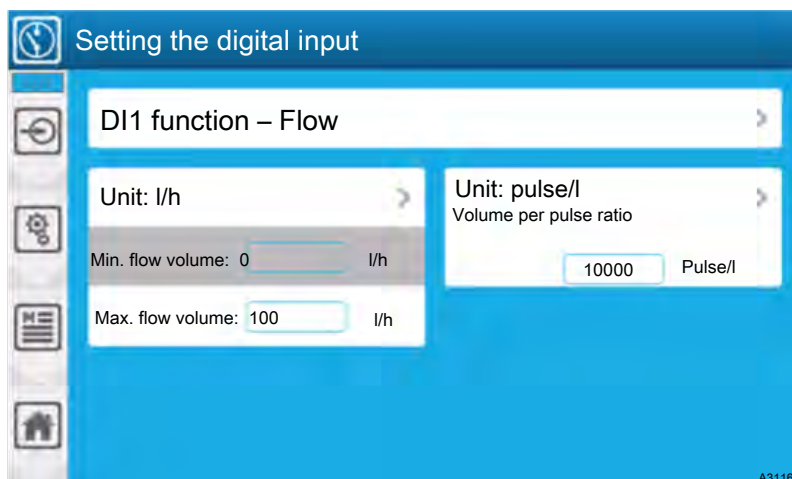


Fig. 79: Special case of a pulse flow

Volume per pulse ratio of 1,0000 pulse/l: enter the pulse weight for the flow calculation. This is the actual value (1.0000). This value is directly related to your flow rate and your system. Refer to the flow volume documentation to calculate the current value. Press the display field to open the numeric keyboard and enter the required value.

8.1.2.4 Menu: 'TIMERS' configuration and installation

The 'TIMERS' menu provides access to the configuration of the TIMERS, which can be used to control relay or parameter operation.

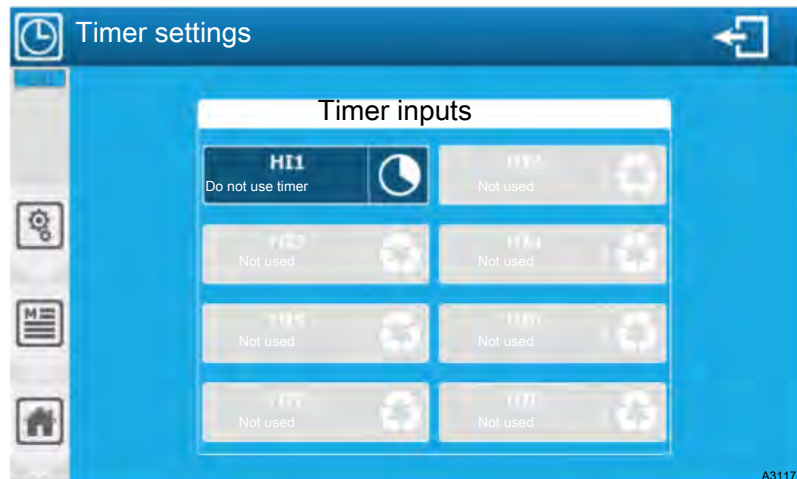


Fig. 80: Menu: 'TIMERS' configuration and installation

The screen displays the configured and unused timers. Configure your installation by pressing a timer already configured, changing its configuration or pressing a timer not used.

HI1 ... HI8 timer identification: The timers are identified by their HIx "code" (e.g. HI8) in the control screens.

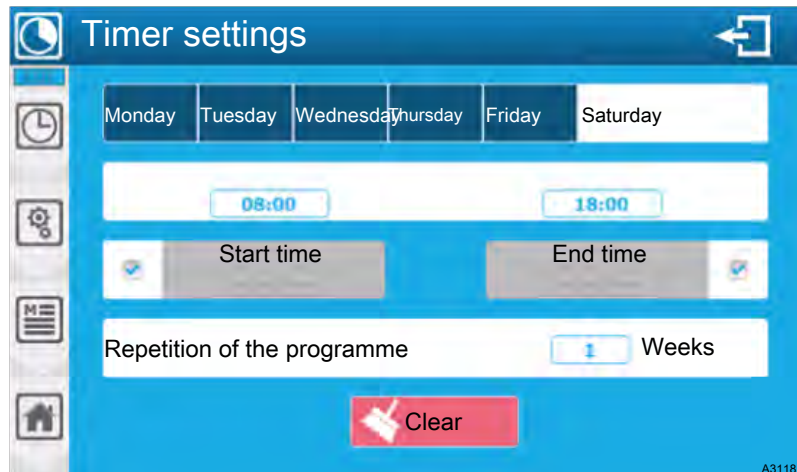


Fig. 81: Timer settings

Repetition of the programme: 1 week(s). Here, the entered value is (1); the timer is active every week. Type 2 for 1 week/2, 3 for 1 week/3 etc. Setting of 1 ... 52 is possible.

The relevant checkbox needs to be disabled to enable data management

8.1.2.5 Menu: 'MEASUREMENTS and CALCULATIONS' configuration and installation

The 'MEASUREMENTS and CALCULATIONS' menu lets you access the configuration of the measurements administered and displayed by the controller. This can be a simple measurement with one sensor or a calculation with several sensors. The device gives you a list of possible parameters based on the sensors previously configured.

If the 'Automatically create a parameter for each sensor' option is enabled when opening this screen, the list of parameters 'simply' already exists.

The sequence of parameters is totally independent of the sequence of the sensors. If the *'Automatically create a parameter for each sensor'* option is enabled, the sequence of the parameters created corresponds to the sequence in which you have added and configured your sensors.

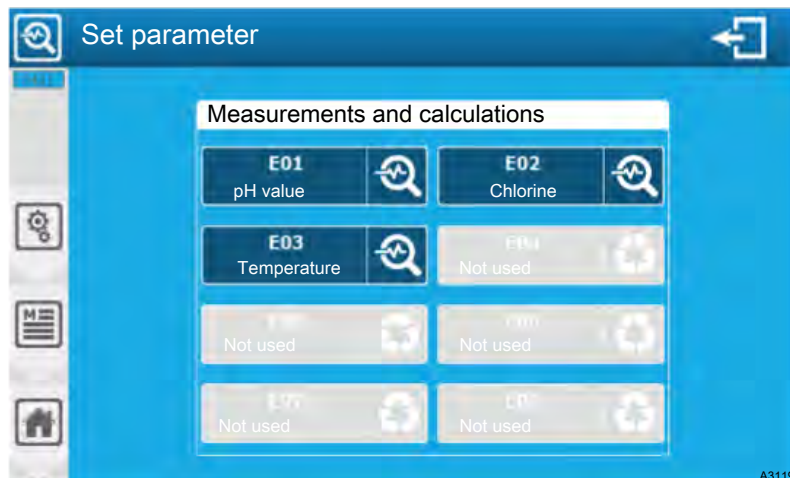


Fig. 82: 'MEASUREMENTS and CALCULATIONS' configuration and installation

The screen displays the configured and unused parameters. You can change the configuration of a parameter already configured by pressing it or configure it by pressing an unused parameter.

E01 ... E08 parameter identification. The parameters are identified by their EOx code in the screens.

8.1.2.6 Parameter configuration

The selection of the measured variables is directly related to the sensors installed and configured. The controller only delivers measurements for the configured sensors.

The controller automatically completes the parameter configuration fields when selecting the measurement on the basis of the information on the first available compatible sensor in its list. You can change this configuration if you need to.

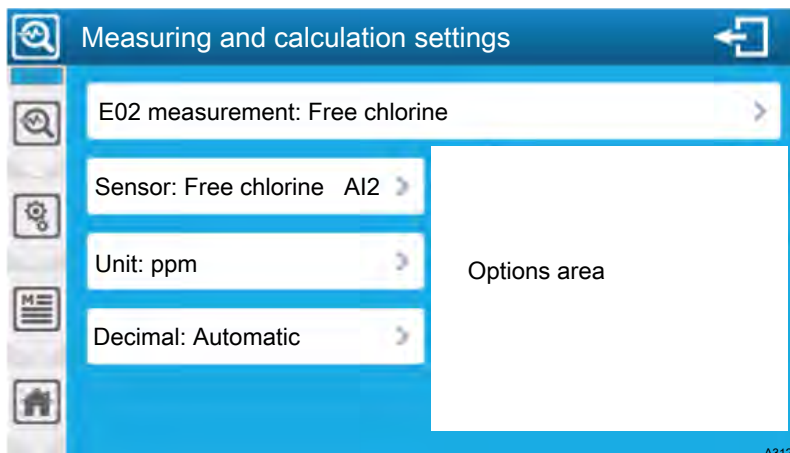


Fig. 83: Parameter configuration

The basis of parameter configuration. Depending on the selected parameter (measured, calculated, compensated...), additional configuration options are added on the right (Options area).

Select the sensor type to which the measurement is to be assigned. This selection button provides information on the type (e.g. Free chlorine) and input (e.g. AI1). Press this key to change the parameters.

8.1.2.7 Temperature compensation (pH or conductivity)

The pH measurement is dependent on the temperature of the sample medium. You have the option of selecting a temperature sensor (if one is installed) under '*Temperature compensation*'. The temperature sensor is used to adjust the measurement, correlated to the temperature of the sample medium. The value displayed is then the compensated value and no longer the measured value.

Make sure that your sensor is not already fitted with internal temperature compensation. Adding a new compensation would distort the measurement.

The input of the compensation factor becomes active when you select a temperature sensor. You need to enter the required value. Press the selection field to open the numeric keyboard. Enter the desired value. A setting of -99.0 ... + 99.0 %/°C is possible.

8.1.2.8 Calculation options for free chlorine, active chlorine and active bromine

Calculation options:

- Installed: Sensor for free chlorine and pH value; active chlorine is calculated.
- Installed: sensor for free bromine and pH value; active bromine is calculated.
- Installed: sensor for active chlorine and pH value; free chlorine is calculated.

pH sensor PI1: select the pH sensor, which is to be linked to the calculation. The selection button provides the selected sensor information (PI1). Press the selection button to change the values.

Temperature sensor: the pH measurement is dependent on the temperature of the sample medium. You have the option of selecting a temperature sensor (if one is installed) under '*Temperature compensation*'. The temperature sensor is used to adjust the measurement, correlated to the temperature of the sample medium. The value displayed is then the compensated value and no longer the measured value.

It is possible to select a temperature compensation sensor to adjust the pH value to the temperature of the sample medium. This sensor is an option and is not included in the basic calculation.

8.1.2.9 Calculation options for chloramine

Calculation options:

- Installed: sensor for free chlorine and total chlorine; chloramine is calculated.

Select the total chlorine sensor, which is to be linked to the calculation. Change the sensor information (AI1).

Select the pH sensor, which is to be linked to the calculation.

Temperature sensor: the pH measurement is dependent on the temperature of the sample medium. You have the option of selecting a temperature sensor (if one is installed) under 'Temperature compensation'. The temperature sensor is used to adjust the measurement, correlated to the temperature of the sample medium. The value displayed is then the compensated value and no longer the measured value.

It is possible to select a temperature compensation sensor to adjust the pH value to the temperature of the sample medium. This sensor is "optional" and is not included in the basic calculation.

8.1.3 Menu: Configuration and installation of the outputs

The 'OUTPUTS' menu lets you access the configuration of the relays and the 4 ... 20 mA outputs to be used. Press 'OUTPUTS' to open the following screen.

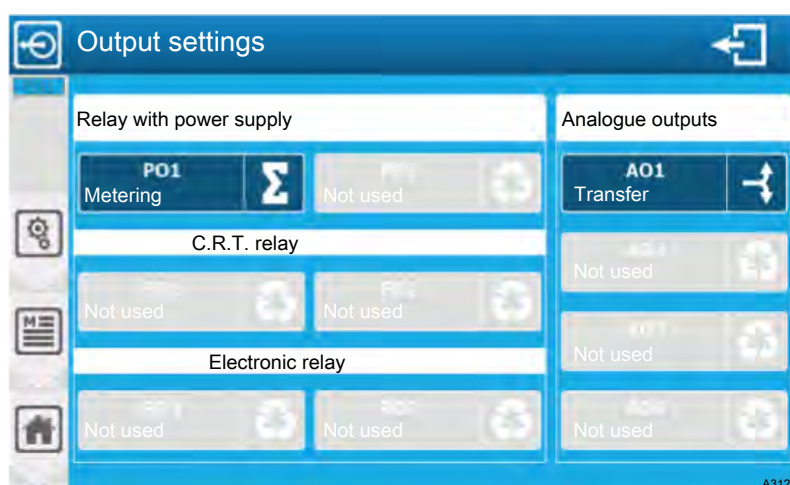


Fig. 84: Menu: Configuration and installation of the outputs



Fig. 85: General symbols

- 1 Unused output
- 2 Timer-controlled output
- 3 Metering-controlled output
- 4 Status-controlled output (contact)
- 5 Alarm-controlled output
- 6 4 ... 20 mA transfer output

The screen displays the configured and unused outputs. You can configure its installation by pressing configured outputs, changing the configuration or by pressing an unused output.

PO1 and PO2: self-powered relay outputs. These outputs do not have pulse frequency modulation (PFM).

FO1 and FO2 CRT: potential-free relay outputs. These outputs have pulse frequency modulation (PFM) but are limited to 180 pulses per minute.

RO1 and RO2: electronic relay outputs (single contact). These outputs have pulse frequency modulation (PFM), programmable up to 500 pulses/minute.

For your convenience, the names of the outputs POx, FOx, ROx, AOx are screen printed in front of the terminal of your device.

8.1.3.1 Relay outputs in metering (On/Off) control mode

An example of processing a relay in metering mode. Press [PO1 metering Σ] to open the following screen.

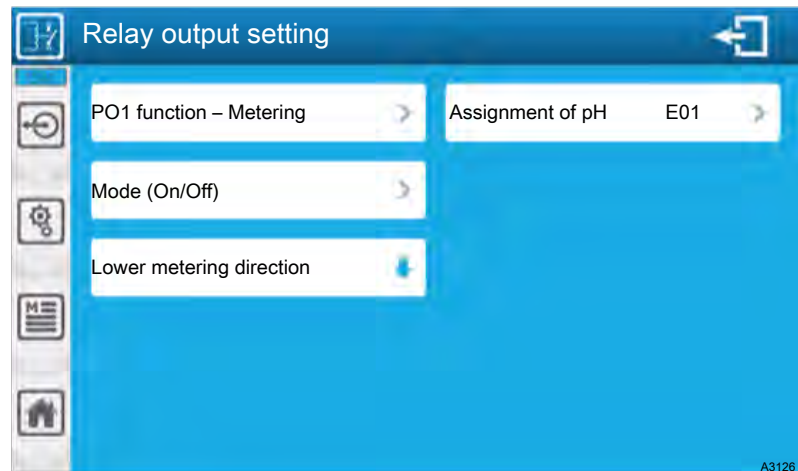


Fig. 86: Relay outputs in metering (On/Off) control mode

8.1.3.2 Relay outputs in PWM metering mode (pulse width modulation)

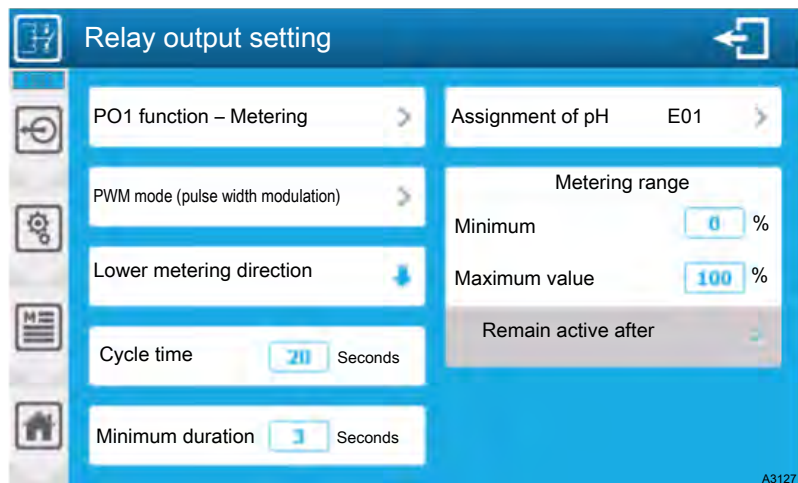


Fig. 87: Relay outputs in PWM metering mode (pulse width modulation)

'PO1 function - Metering': See "Controlling (On/Off) metering mode".

'Assignment of pH E0': See "Controlling (On/Off) metering mode".

'PWM mode (pulse width modulation)': Selection of the metering mode. This selection button provides the selected mode information (PWM (pulse width modulation)). Press this key to change the PWM.

'Lower metering direction': See "Controlling (On/Off) metering mode".

'Cycle time 20 seconds': Selection of the value corresponding to the total processing time of your swimming pool. The current value here is 20. Press the selection area to open the numeric keyboard and enter the required value. Possible adjustment from 10 ... 1800 seconds.

'Minimum duration 3 seconds': Enter the value for the minimum permitted time to switch on the metering relay. This setting enables the relay to have a longer service life, as brief switching on is not permitted. The requirement time accumulates until the minimum duration has been reached. The value here is 3. Possible setting of 0 ... 5 seconds

'Minimum metering range 0 %': Enter the value of the requirement as a minimum % of the metering range for which this relay is to operate. The current value here is 0. Possible setting of 0 ... 100%.

'Maximum metering range 100 %': Enter the value of the requirement as a maximum percentage of the metering range for which this relay is to operate. The current value here is 100. Possible setting of 0 ... 100%.

'Metering range - remain active after': Select this relay operating mode if the metering requirement is outside the range entered. This option is only active if the maximum metering range is less than 100%. If this option is enabled (checkbox ticked), the relay continues metering at 100% outside the programmed range, otherwise the relay stops metering.

'Metering range': The percentage of the metering range corresponds to the percentage proportion of the relay metering requirement. This function can be enabled, for example, if you use 2 relays to meter a single parameter. It is possible to program the first relay for a stop with , for example, active metering of between 30 ... 100 % and the second relay for more powerful metering of between 30 ... 100 %. It is thus possible to use a low flow pump to maintain metering and use a pump with a higher flow for more powerful metering when demand is high.

For a programmed range of 0 ... 50 %, the relay output varies between 0 .. 100 % between these two limits. If the metering requirement is 50%, the relay is set to 100% of its metering capacity.

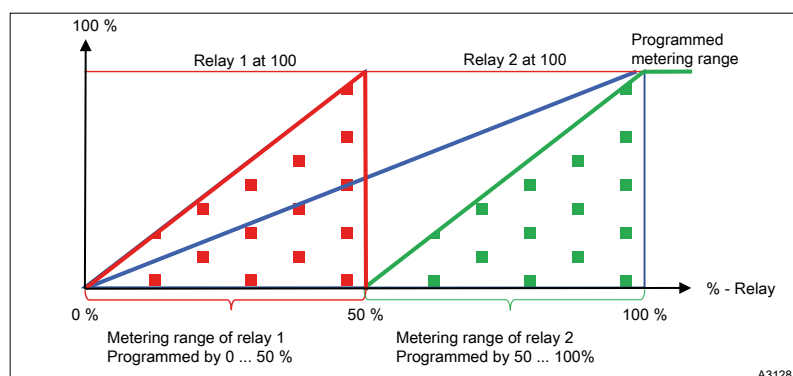


Fig. 88: Example with disabled option to stop metering at relay 1

8.1.3.3 Relay outputs in PFM metering mode [*Pulse Frequency Modulation*]

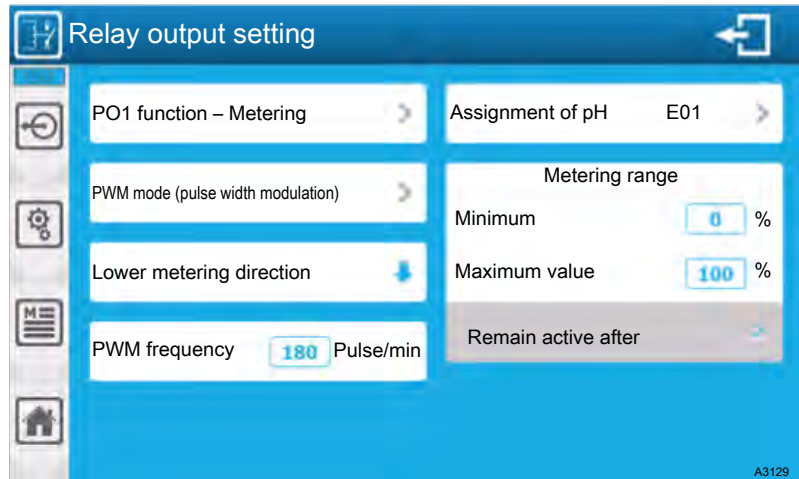


Fig. 89: Relay outputs in PFM metering mode (*Pulse Frequency Modulation*)

'PFM frequency 180 pulses/min.:' Enter the value corresponding to the number of pulses per minute to be generated. The value here is (180).

Possible setting of outputs FO1 and FO2 from 1 ... 180 pulses/min.

Possible setting of outputs RO1 and RO2 from 1 ... 500 pulses/min.

8.1.3.4 Relay outputs in alarm mode

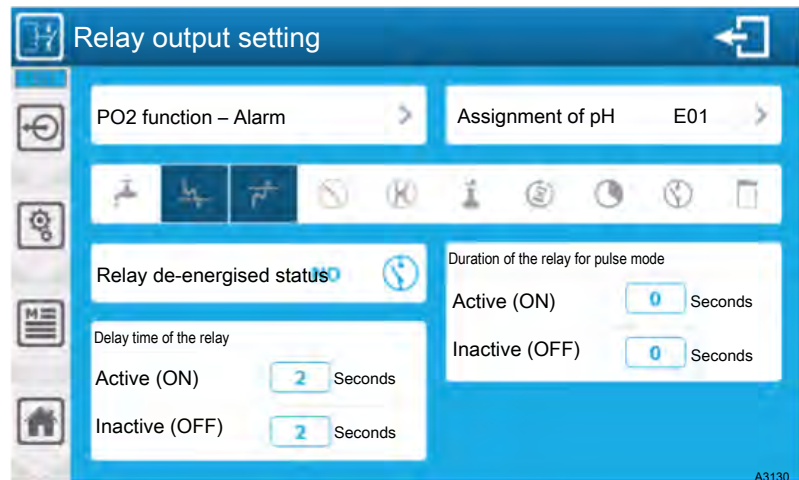


Fig. 90: Relay outputs in alarm mode

8.1.3.5 Relay output in status mode

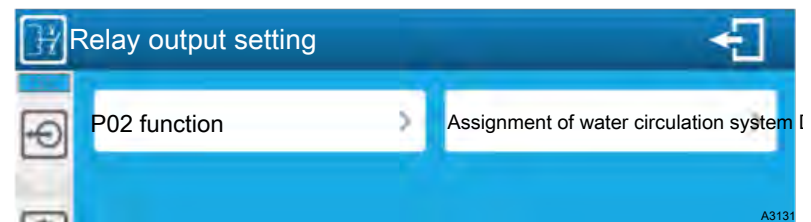


Fig. 91: Relay output in status mode

8.1.3.6 Relay outputs in timer mode

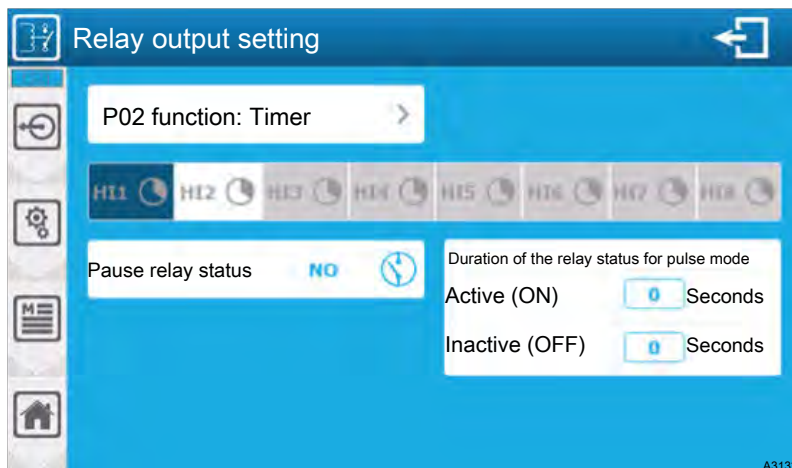


Fig. 92: Relay output in timer mode

8.1.3.7 Outputs 4 ... 20 mA in metering mode

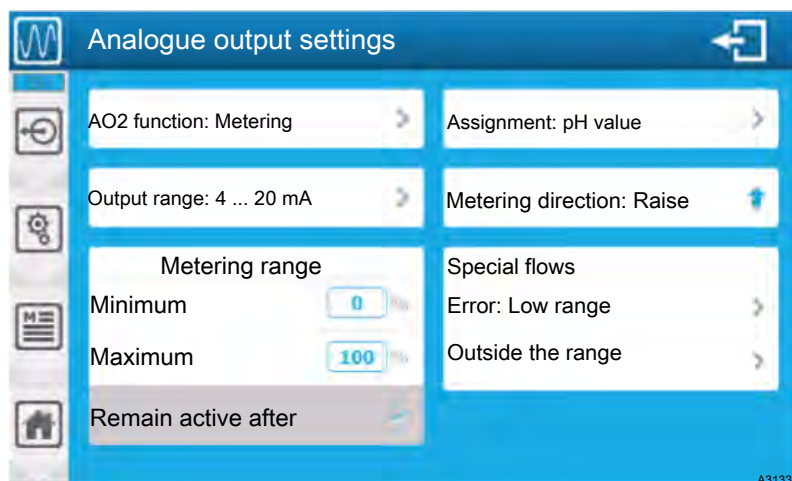


Fig. 93: Outputs 4 ... 20 mA in metering mode

Low range:

- 4 mA range, when the range 4 ... 20 mA has been selected
- 0 mA range, when the range 0 ... 20 mA has been selected.

Outside the 20 mA range: selection of the current pending when the selected operating range at the output has been exceeded. The selection button provides the selected current information (20 mA).

Outside the 20 mA range:

- Maximum - higher than 22 mA
- 20 mA = 20 mA
- 20.8 mA = 20.8 mA

8.1.3.8 Output 4 ... 20 mA in transfer mode

Example showing the creation of a 4 ... 20 mA output in transfer mode.

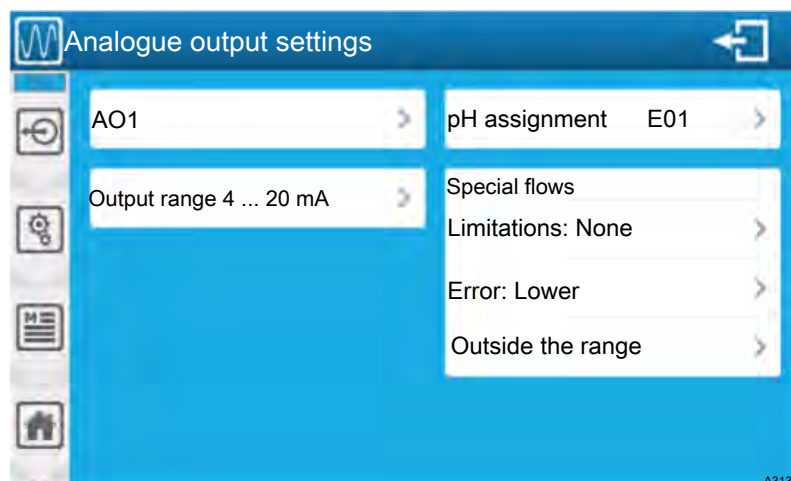


Fig. 94: Output 4 ... 20 mA in transfer mode

8.1.4 Menu: Configuration and installation of the CONDITIONS

The 'CONDITIONS' menu provides access to the configuration of the operating conditions, which are used to control parameter operation.

The screen shows the list of configured parameters and parameters to which conditions can be attached. You can change the configuration of the conditions applied by pressing a parameter in use.

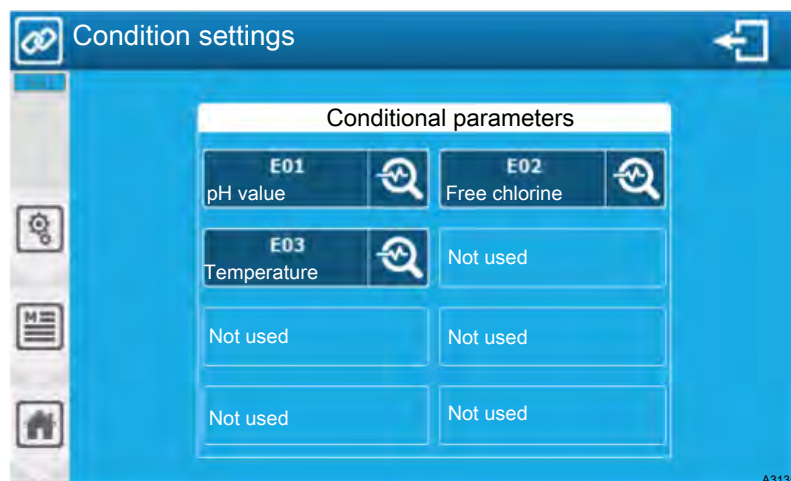


Fig. 95: Menu: Configuration and installation of the CONDITIONS

8.1.4.1 Setting the conditions of a parameter

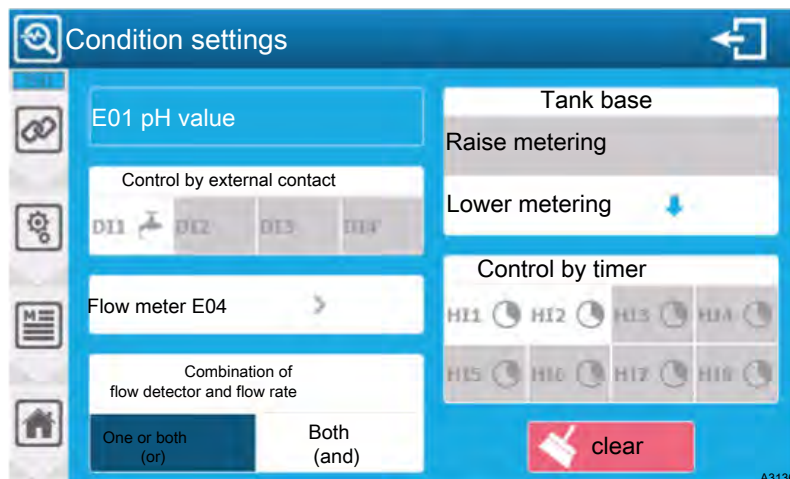


Fig. 96: Setting the conditions of a parameter

'E01, pH value PI1': This is where to find parameter identification for information on the parameter number (E01), type (pH) and associated main sensor input (PI1).

'Control by external contacts:' selection of the contact(s) to be taken into account for control of the parameter. Select "Multiple", and press the contact you want to assign to this parameter. No contact is selected here. Only configured contacts can be selected. Unconfigured contacts appear grey. The contacts are identified by their associated entry number (DIx) and an icon representing their function.

'Flow meter E04': Selection of the flow meter, which is to be linked to the parameter. The selection button provides the selected input information (E04). Press this key to select a flow meter. The list of flow meters depends on the configuration options. If the option "Only adjust flow rates to the parameter" is disabled, the list is filled with flow parameters and flow sensors.

[Combination of flow detector and flow rate]: If you select at least one contact switch and one flow meter, this option is enabled and lets you define which combined information is considered.

One or two (or):

- Active information = parameter in pause
- All inactive information = active parameter

Both (and):

- All active information = parameter in pause
- Inactive information = active parameter

This option is not necessarily available. The option is enabled in the "OPTIONS" of the installation menu.

'Tank bases': to enable this choice, you need the following:

- Configured tank base contact or 4 ... 20 mA volume sensor,
- Relay output or 4 ... 20 mA configured in the metering assigned to the parameter.

You can assign the required tank base depending on the metering direction of the output assigned to the parameter. Here, only one metering relay is assigned to the parameter, with falling metering and (no) tank base is assigned.

'Control by timer': Select the timer(s) to be taken into account. Multiple selection types: press the required timer to select/deselect. A timer is (not) selected here.

Be careful when combining one or more timers, as the function of the parameter is dependent on the time windows. The parameter only functions during the time window.

Save: when a change has been made, the "SAVE" button (disk symbol) appears, which you need to press to save your configuration.

8.1.5 Menu: Setting up communication '*COMMUNICATION*'

See communication programming instructions.

8.1.6 Menu: Configuration and installation of "Factory Reset"

The "Factory Reset" (reset to factory settings) menu lets you reset the controller configuration to a number of pre-set operating options.

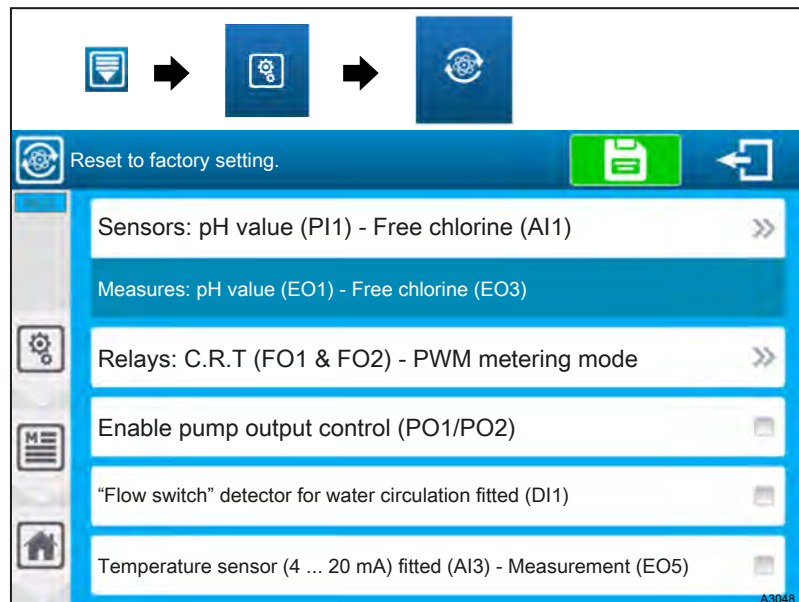


Fig. 97: "Factory Reset" menu

Select the required sensor configuration from a predefined configuration.

Select the required metering relay configuration from a predefined configuration:

Enable pump capacity management: when using C.R.T. or electronic relays for metering it is possible to use the two self-fed relays to feed the pumps. To do so, select this option.

'Flow switch/detector for water circulation fitted (DI1):' If your installation has a water circulation sensor in the bypass fitting, you can check this box to configure the input.

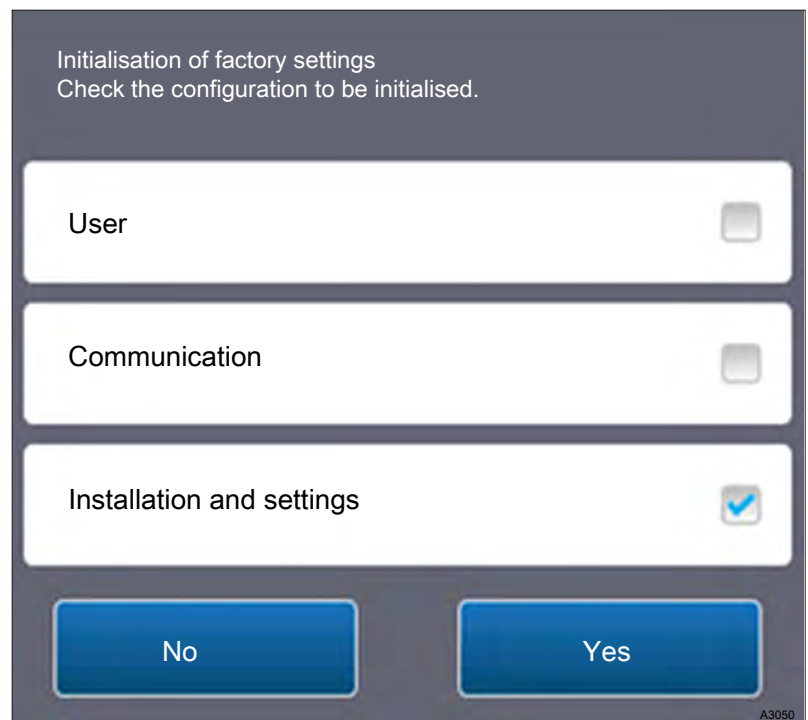


Fig. 98: Press 'Save' to confirm your configuration.

Press SAVE to confirm your configuration. - You can reset or not reset the "User" or "Communication" configurations in addition to the "Installation and settings" section.

If technical support is required or demanded, it is also possible to only reset the communication or the user part by checking the relevant box.

8.2 'SETTINGS' programming screen

The 'SETTINGS' menu provides access to the settings of your configuration. You must have completed the 'INSTALLATION' part before you can undertake 'SETTINGS'.

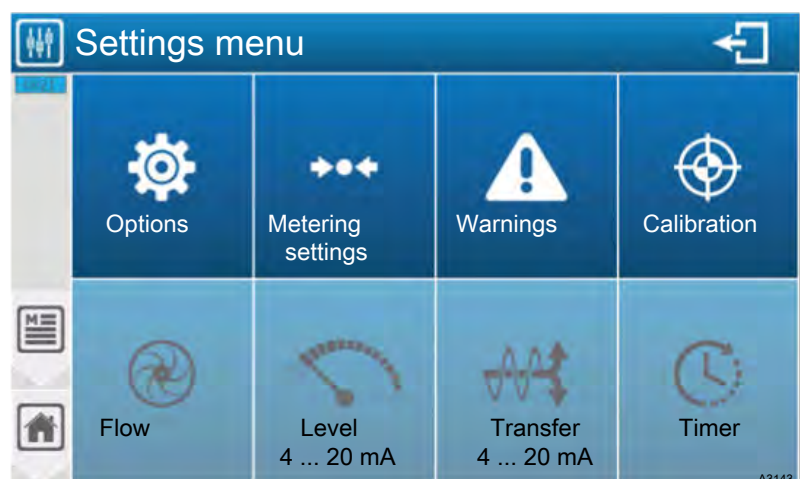


Fig. 99: 'SETTINGS' programming screen

The 'Options' menu of the 'Settings' menu can be locked by the installation program.

8.2.1 'Settings' - 'OPTIONS' menu

The 'OPTIONS' menu lets you access the options available in the installation part.

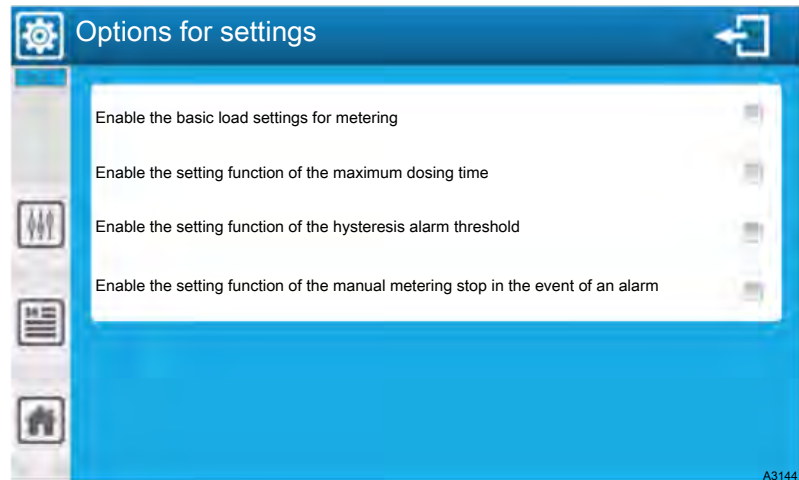


Fig. 100: 'Settings' - 'OPTIONS' menu

'Enable the basic load settings for metering': Enables the manual basic load setting for metering.

'Enable the setting function of the maximum dosing time': Enables manual setting of the maximum dosing time threshold value.

'Enable the setting function of the hysteresis alarm threshold': Enables manual setting of the hysteresis alarm threshold.

'Enable the setting function of the manual metering stop in the event of an alarm': Enables complete manual setting of the metering stop in the event of an alarm.

8.2.2 'Settings' - 'Metering' menu

The 'Metering' menu lets you set the metering operating mode and the setpoint of the parameters.

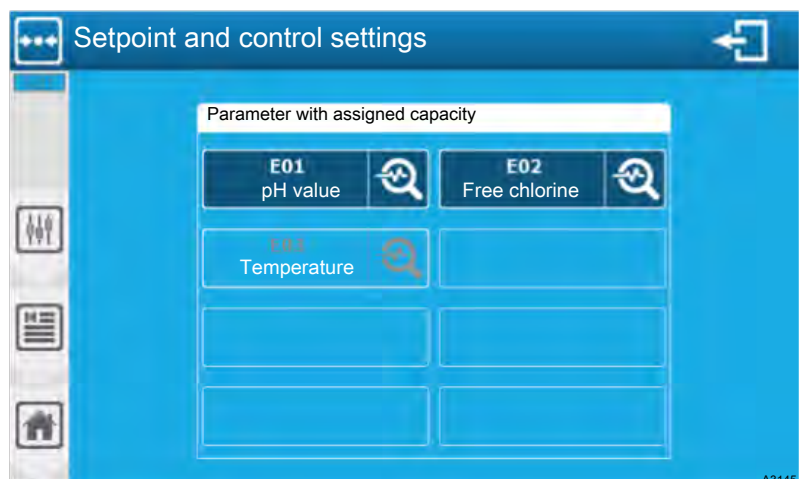


Fig. 101: 'Settings' - 'Metering' menu

The screen shows the configured parameters. You can only configure metering by pressing an active parameter.

8.2.3 'Hysteresis' metering mode

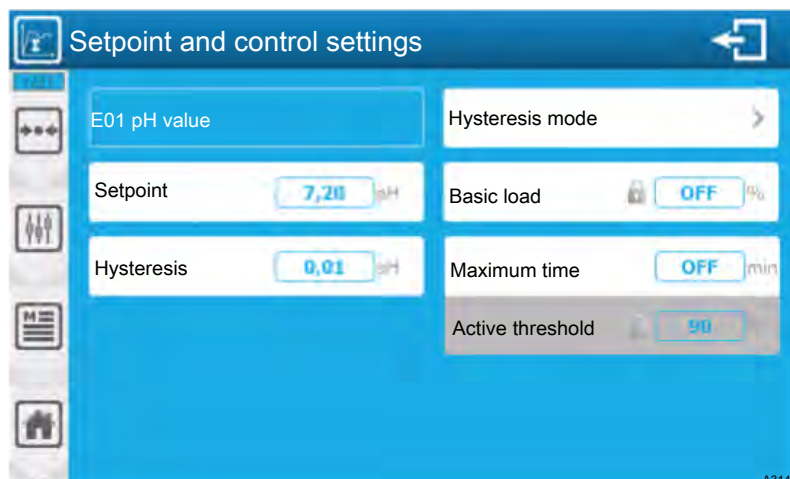


Fig. 102: 'Hysteresis' metering mode

**Basic load**

The basic load is a permanent capacity independent of the metering requirement. This function should be used with great care to avoid overmetering.

If the channel's metering direction is configured in downstream mode, the control's requirement is 100% as soon as the error (measuring setpoint) is greater than the hysteresis value.

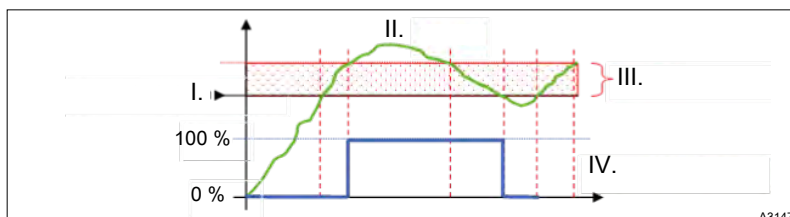


Fig. 103: Metering direction of the channel in downstream mode

- I. Control setpoint
- II. Measure
- III. Hysteresis
- IV. Metering effect

If the channel's metering direction is configured in upstream mode, the control's requirement is 100% as soon as the error (measuring setpoint) is greater than the hysteresis value

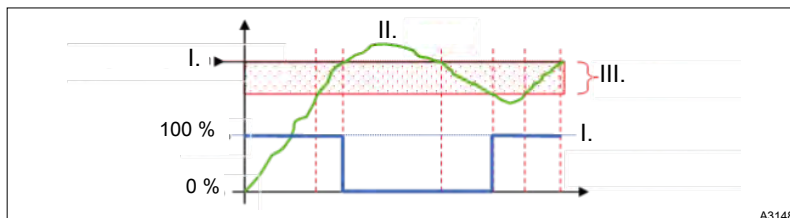


Fig. 104: Metering direction of the channel in upstream mode

- I. Control setpoint
- II. Measure
- III. Hysteresis
- IV. Metering effect

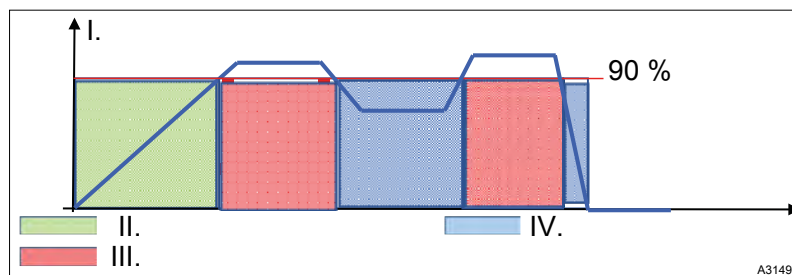


Fig. 105: 'Active threshold' 90 %.

- I. Metering requirement parameter.
- II. No metering time count.
- III. Metering time count.
- IV. Reset time to 0.

'Active threshold' 90 %: Enter the capacity from which the metering time is counted. Here the 'Active threshold' is automatically set to (90) according to the metering mode.

8.2.4 'Threshold value' metering mode

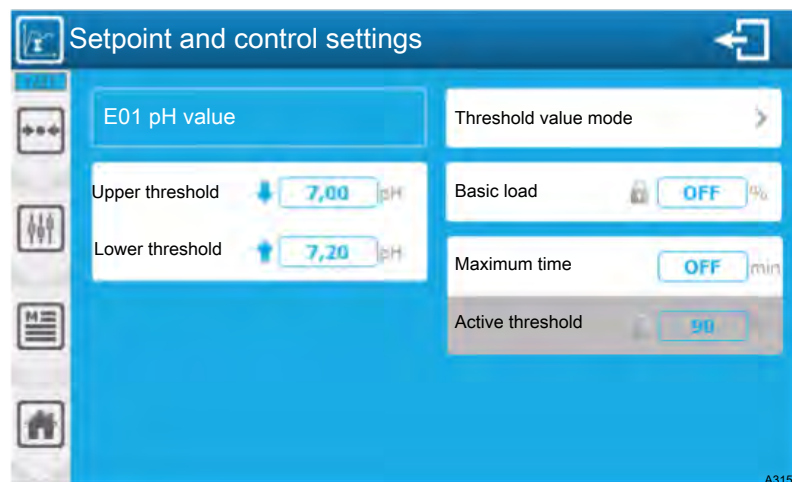


Fig. 106: 'Threshold value' metering mode

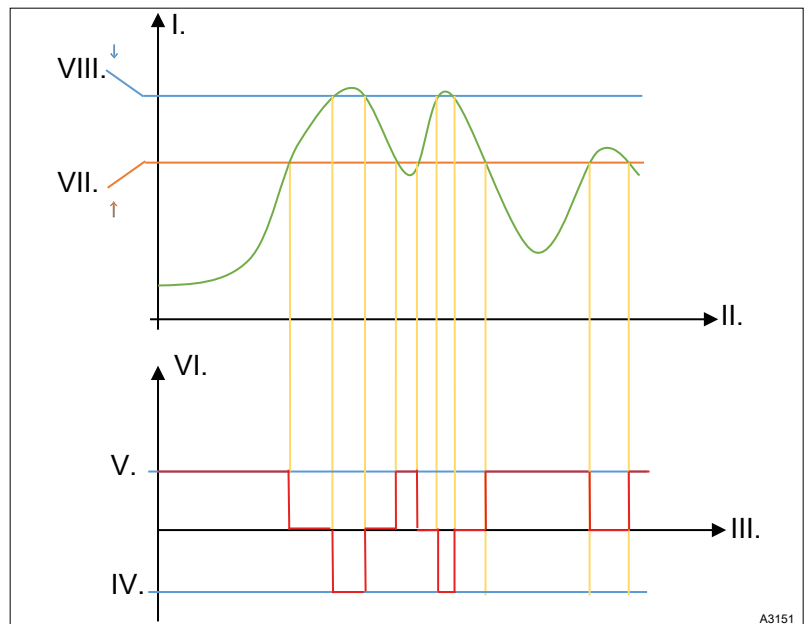


Fig. 107: Metering mode - 'Threshold value'

- I. Measure
- II. Time
- III. Time
- IV. Falling action
- V. Rising action
- VI. Capacity
- VII. Threshold
- VIII. Threshold

8.2.5 'P.I.D.' metering mode

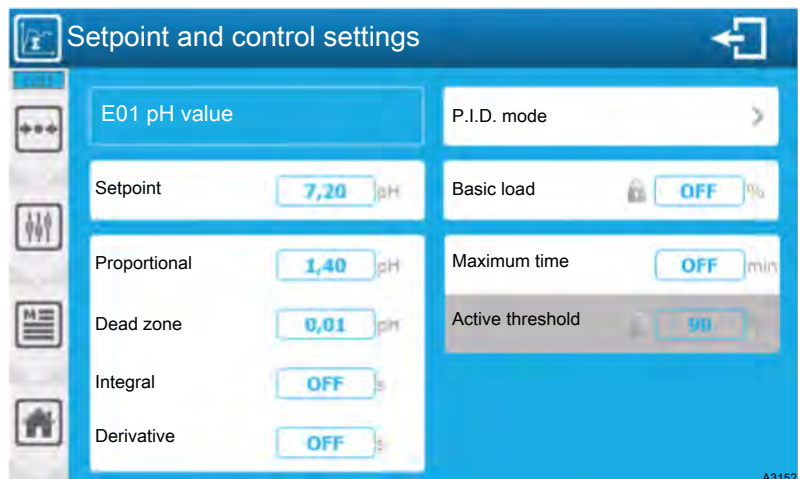


Fig. 108: 'P.I.D.' metering mode

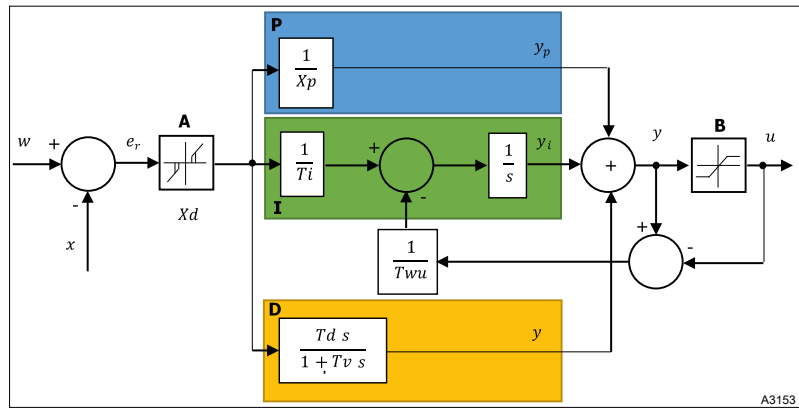


Fig. 109: 'P.I.D.' metering mode

Parameter	Meaning
A	Dead zone
B	Output limit
P	Calculation of the proportion
IC	Calculation of the integral
DC	Calculation of the derivative
Xp	Reciprocal proportional value
Td	Time of the derivative
a	Control setpoint
x	Measured value
e	Control error
y	Control requirement
u	Metering control
Ti	Integral band
Xd	Dead band value around the setpoint
Td	Filter constant
Twu	Anti-saturation

The difference between the setpoint w and the measured value x corresponds to the control error, which is filtered by a dead zone.

The dead zone A eliminates small control errors. The filtered control error is transmitted to the P.I.D. computer, which consists of three components. Proportional (P), Integral (I) and Derivative (D). The integral (in green) also has an anti-saturation system to limit the effect of the integral.

The sum of the three components results in a control requirement Y , which is limited depending on the actuators B you use (-100 % ... 0 %, or 0 % ... +100 %, or -100 % ... +100 %).

If the integral and the derivative are OFF, the metering mode is *[PROPORTIONAL]*.

If only the derivative is OFF, the metering mode is *[PROPORTIONAL INTEGRAL]*.

When all values are entered, the metering mode is *[PROPORTIONAL INTEGRAL DERIVATIVE]*.

8.3 'Settings' - 'ALARMS' menu

The 'ALARMS' menu lets you set the parameter operating mode for the alarms.

The screen shows the configured settings. You can configure the alarms by pressing an active parameter.

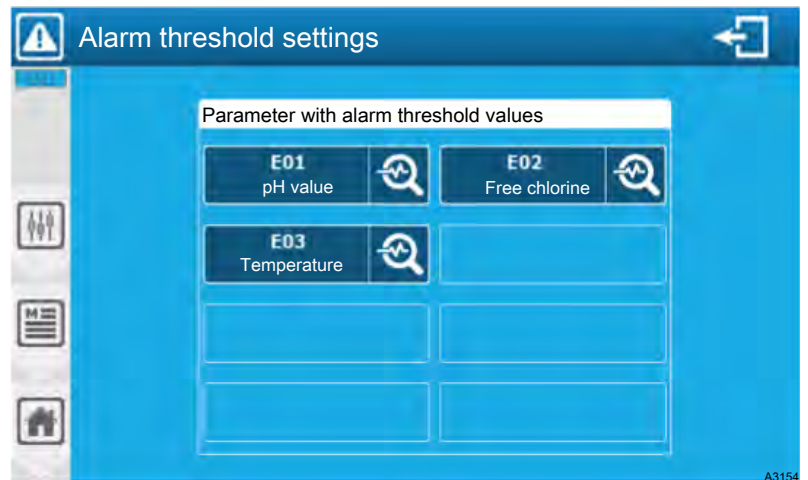


Fig. 110: 'Settings' - 'ALARMS' menu

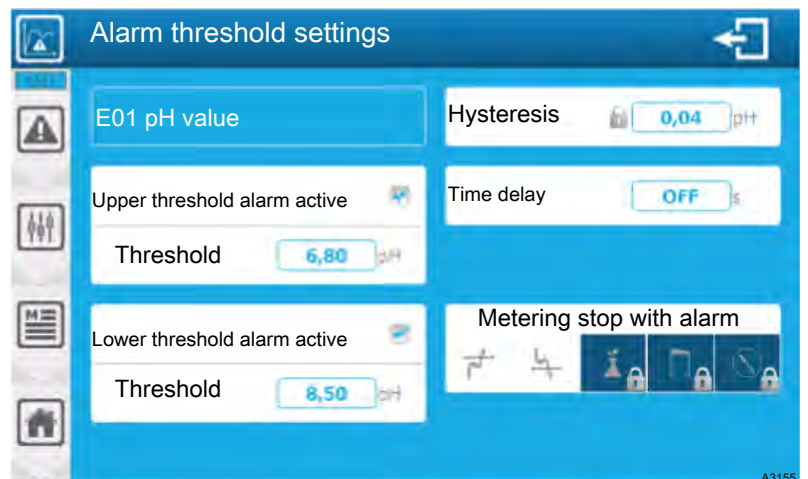


Fig. 111: Setting individual parameters (here E01)

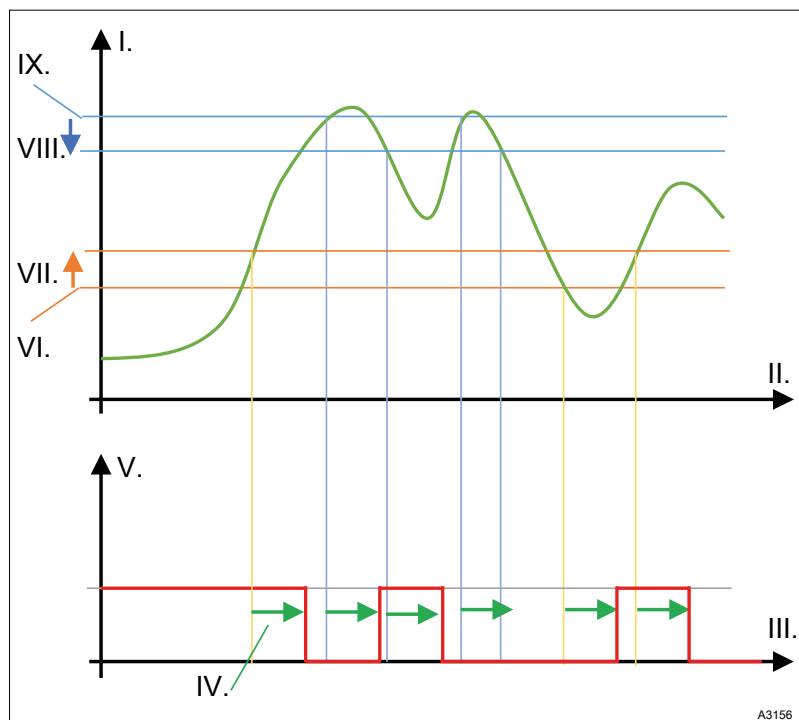


Fig. 112: Control characteristic

- I. Measure
- II. Time
- III. Time
- IV. Time delay
- V. Alarm
- VI. Lower threshold
- VII. Hysteresis
- VIII. Hysteresis
- IX. Upper threshold

Hysteresis: This value specifies a value delta in which the alarm remains active. This permits stable alarms when the measured value oscillates around the value of an alarm threshold.

8.4 'Settings' - 'CALIBRATE' menu

For calibration see: [Chapter 10 'Calibrating sensors'](#) on page 122

8.5 'Settings' - 'FLOW RATE' menu

In the 'FLOW RATE' menu you can set the threshold value for low flow and the levels for dose adjustment.

This menu is only accessible if you have set up a flow sensor in the 'INSTALLATION' part. Otherwise, the menu remains grey.

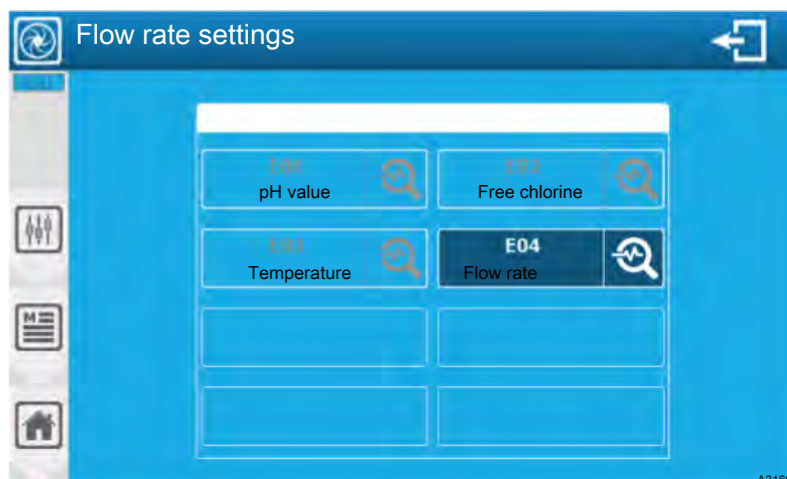


Fig. 113: 'Settings' - 'FLOW RATE' menu

The screen shows the configured parameters for the flow type. You can configure the flow rates by pressing an active parameter.

8.5.1 Standard version

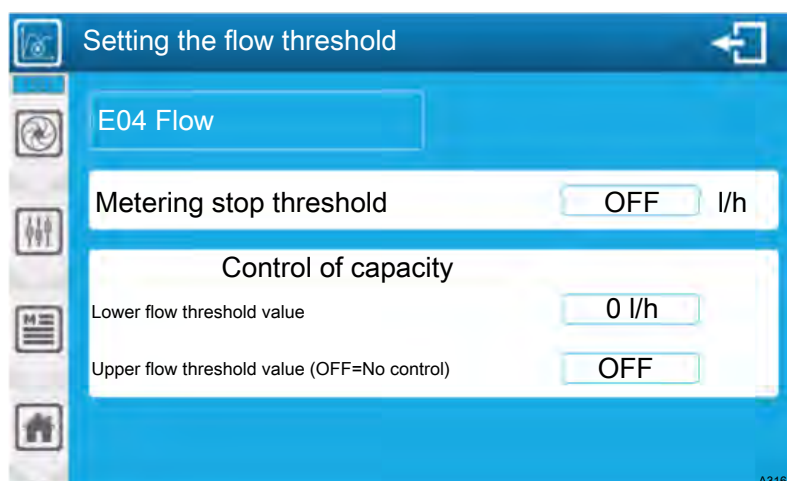


Fig. 114: Setting the flow threshold

'E04 Flow DI2': This is where to find parameter identification for information of the parameter number identification (E04), type (flow) and associated main sensor input (DI2).

'Metering stop threshold OFF': Enter the low flow rate at which the metering of the parameter caused by this flow rate is reduced. The threshold is disabled here; the current value (OFF), metering is not reduced by the flow rate.

'Lower flow threshold value 0 l/h': Enter a low flow level for metering control. This is the actual value (0).

'Upper flow threshold value OFF' (OFF - no control): Enter a high flow rate level for metering control. The control function is disabled here; current value (OFF).

Saving: When a change has been made, the 'SAVE' key (disk symbol) appears, which you need to press to save your configuration.

8.5.2 Version: Sensors and parameters

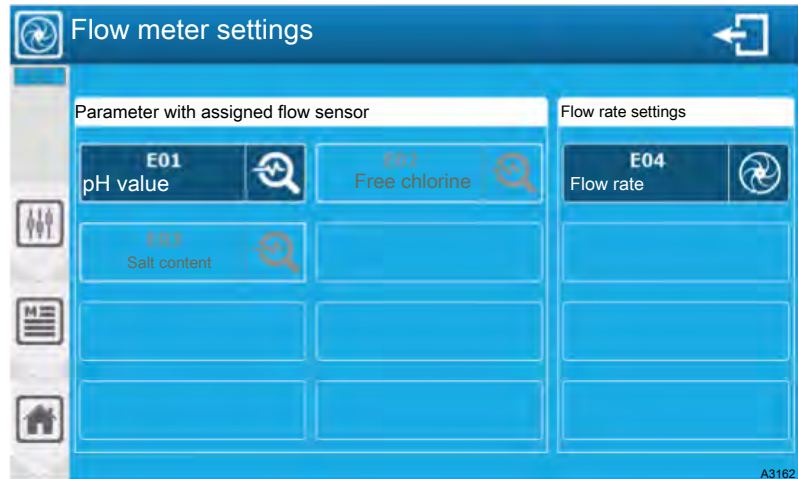


Fig. 115: Flow meter settings

In this example, the pH parameter is influenced by a flow sensor. The flow control threshold setting is specific to the pH parameter. The screen shows the configured parameters and flow parameters. You can configure the active flow rate parameters by pressing the display field.

8.6 Settings menu 'Tank liquid level 4 ... 20 mA'

The 'Tank liquid level 4 ... 20mA' menu enables the lower threshold of the tank volume to be set, which is subject to metering.

This menu is only accessible if you have set up a volume sensor in the installation. Otherwise, the menu remains grey.

8.6.1 Version: Standard

The liquid level is only one parameter. The controller and the setting of the lower threshold value are applied at parameter level and are identical for all parameters controlled by this liquid level.

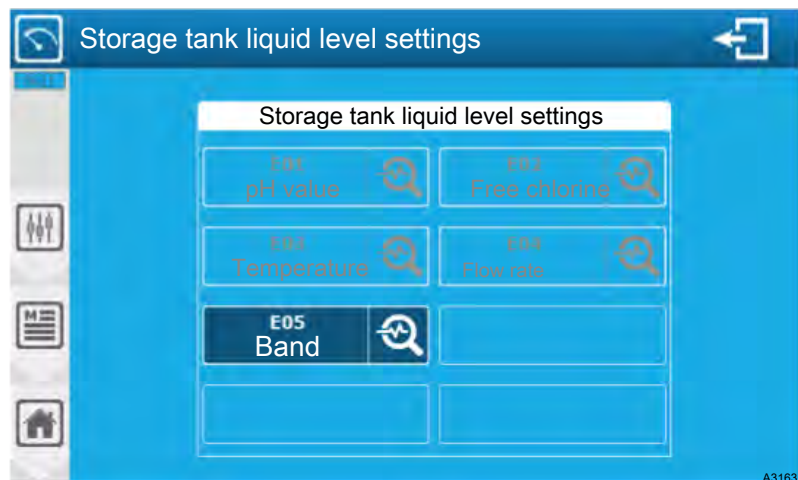


Fig. 116: Liquid level, version: Standard

The screen shows the configured liquid level parameters. You can configure the lower threshold value of the storage tank by pressing an active parameter.

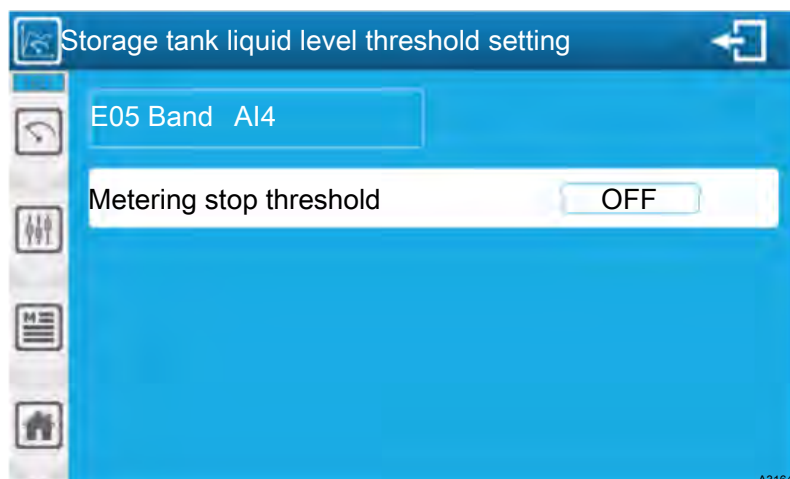


Fig. 117: Setting threshold values

'E05 Band AI4': parameter identification. This is where to find parameter number identification (E05); type (liquid level) and associated sensor input (AI4).

'Metering stop threshold OFF': Enter the lowest liquid level at which the metering of the parameter caused by this liquid level is reduced. The threshold is disabled here; the current value (OFF), metering is not reduced by the liquid level in the tank. Press the display to open the numeric keyboard and enter the required value.

Save: When a change has been made, the 'SAVE' key (disk symbol) appears. Press the display field to save your configuration.

8.6.2 Version: Sensors and parameters

This version is only available if the installation option 'Restrict storage tank liquid level only to the parameter' is disabled.

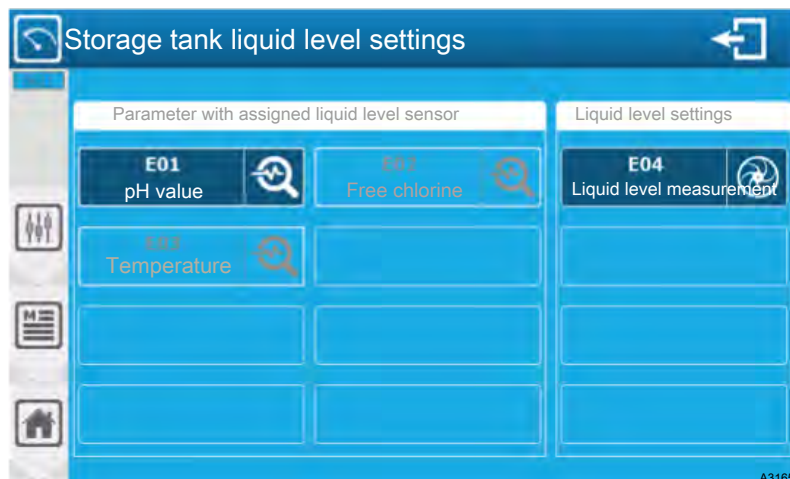


Fig. 118: Version: Sensors and parameters

In this example, the pH parameter is influenced by a flow sensor. The liquid level control threshold setting is specific to the pH parameter. The screen shows the configured parameters and flow parameters.

You can configure the active liquid level parameters by pressing the display field.

8.7 'Settings' - 'TRANSFERS 4 ... 20 mA menu'

The 'TRANSFER' 4 ... 20 mA menu lets you set the lower and upper threshold of the 4 ... 20 mA values.

This menu is only accessible if you have set up a 4 ... 20 mA sensor in the 'INSTALLATION' part. Otherwise, the menu remains grey.



Fig. 119: 'Settings' - 'TRANSFERS 4 ... 20 mA menu'

The screen shows the parameters to which a 4 ... 20mA output is assigned in transfer mode. You can configure the transfer thresholds by pressing an active parameter.

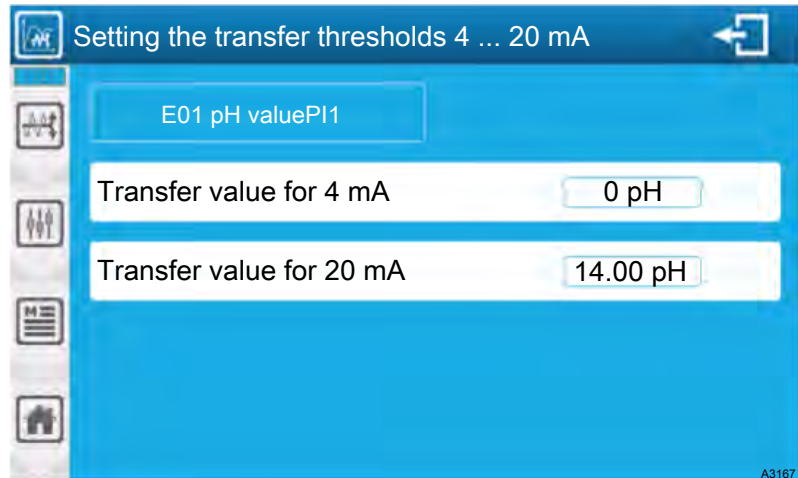


Fig. 120: Transfer thresholds

'E01 pH value P11': This is where to find parameter identification for information of the parameter number identification (E01), type (pH) and associated main sensor input (P11).

'Transfer value for 4 mA=0 pH': Enter the corresponding pH value for 4 mA at the transfer output. The value here is (0).

'Transfer value for 20 mA=14 pH': Enter the corresponding pH value for 20 mA at the transfer output. The value here is (14).

Saving: When a change has been made, the 'SAVE' key (disk symbol) appears, which you can press to save your configuration.

8.8 'Settings' - 'Timer' menu

This menu is not available.

9 'USER' programming screen

- **User qualification, programming screen:** trained user
 ↳ Chapter 2.4 'User qualification' on page 14

The 'USER' menu lets you access the settings of the graphic interface.

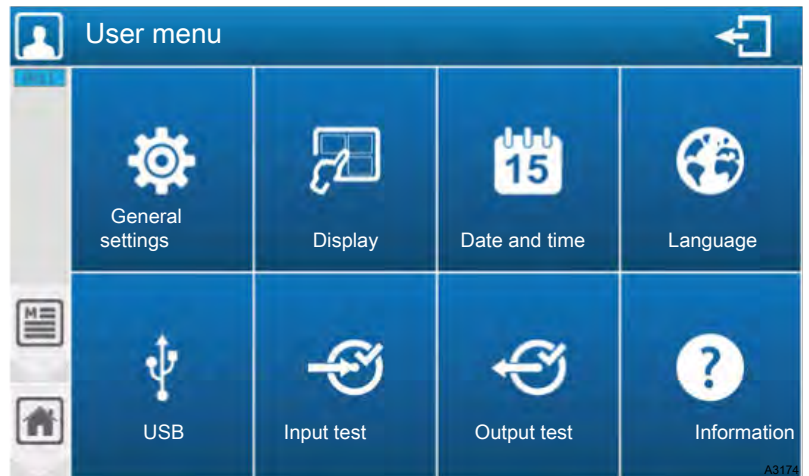


Fig. 121: 'USER' programming screen

9.1 'User' - 'GENERAL SETTINGS' menu

You can access the audio and visual settings of the graphic interface via the 'GENERAL SETTINGS' menu.

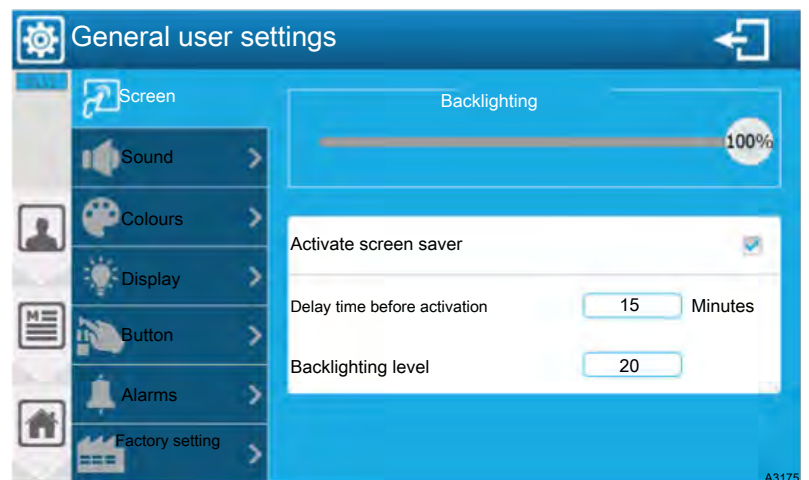


Fig. 122: 'User' - 'GENERAL SETTINGS' menu

You can adjust all the values according to your needs in this menu and its sub-menus. The menus show you all the functions in plain text and logical steps and you can adjust everything to meet your needs, e.g. via virtual sliders, numeric or alphanumeric keyboards.

9.2 'User' - 'DISPLAY' menu

The controller has two display modes: a "small x6" version that displays six parameters per page, and a "large x3" version that displays three parameters per page

9.2.1 Automatic display

The controller has two Automatic display modes: a '*small x6*' version that displays 6 parameters per page, and a '*large x3*' version that displays 3 parameters per page.

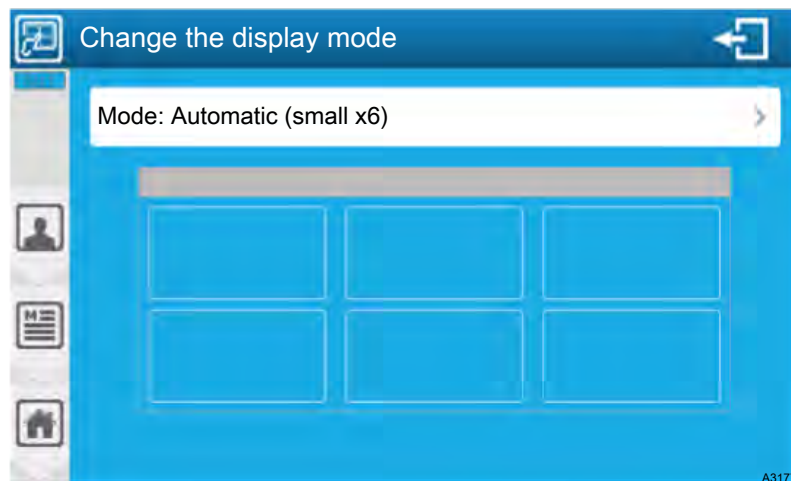


Fig. 123: Automatic display

Mode: Automatic (small x6): selection of the display mode. This button contains the information on the selected mode (Automatic (small x6)).

9.2.2 Manual display

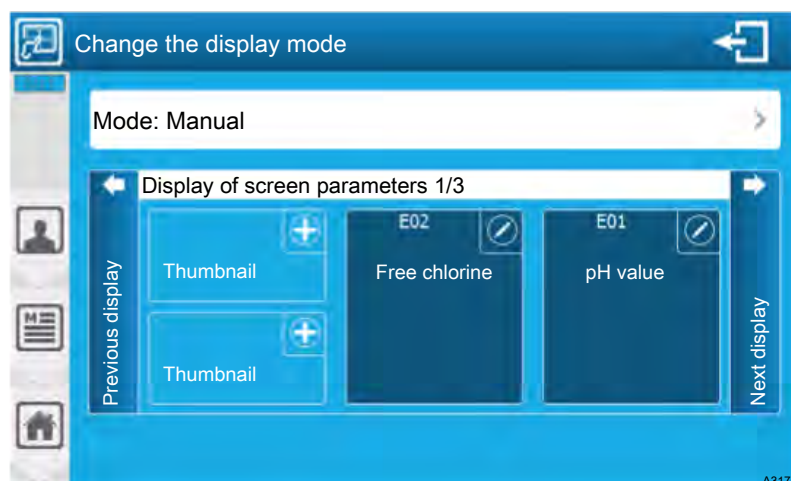


Fig. 124: Manual display

Press the Plus key to open the list of the elements available for display (parameter list & widgets). The English term [*widget*] is a composite word, formed from [*window*] and [*gadget*].

Press Edit (pen) to open the menu below and edit a selected item.

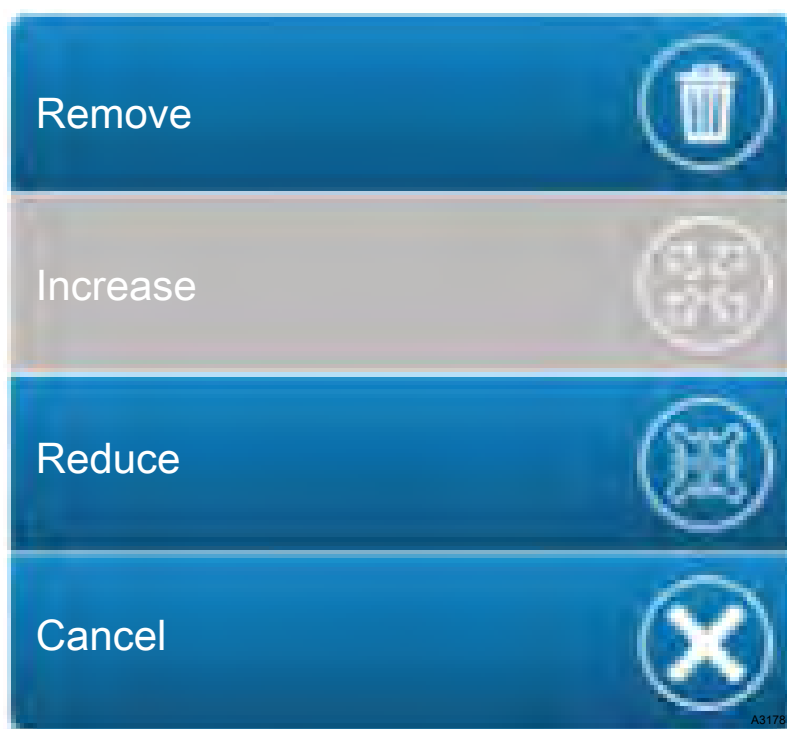


Fig. 125: 'Thumbnails' menu

Remove	Delete the selected thumbnail.
Increase	Enlarge the selected thumbnail.
Reduce	Reduce the selected thumbnail.
Cancel	Close the menu.

9.3 'User' - 'Date and time' menu

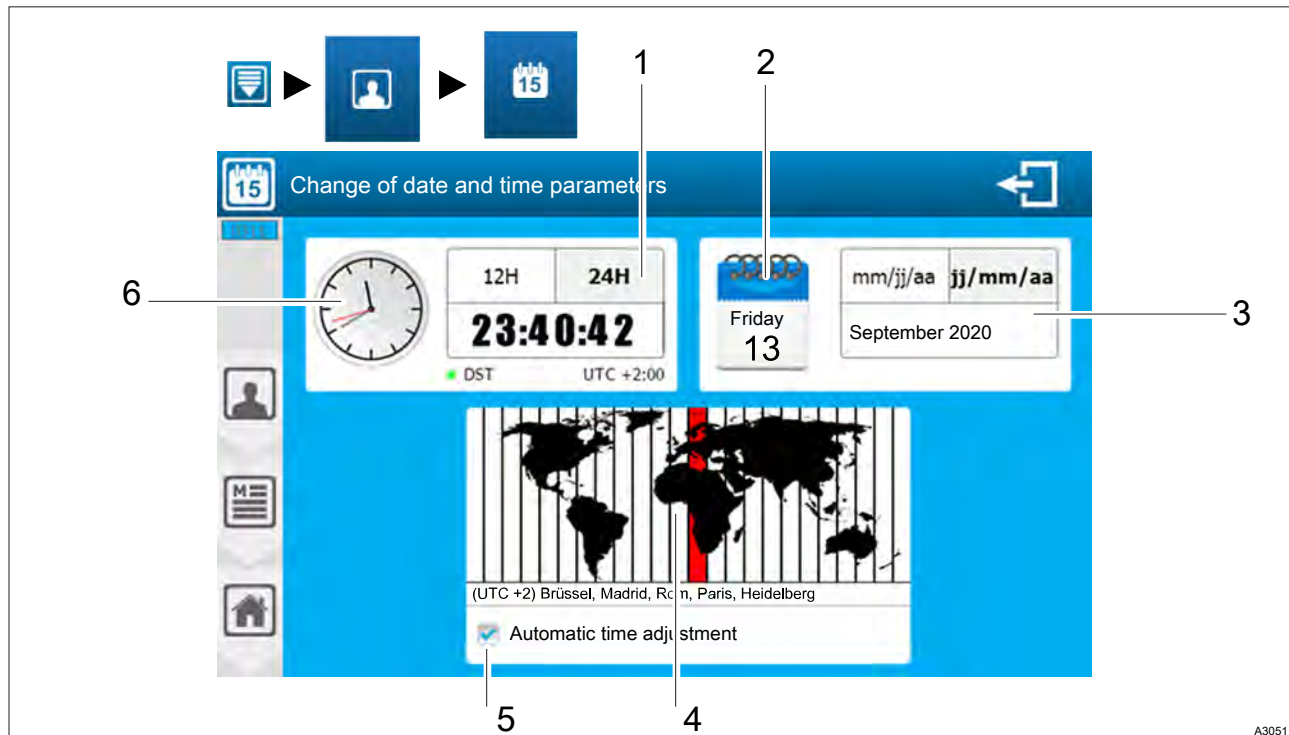


Fig. 126: Menu: Date and time

The 'Date and time' menu lets you access the configuration of date and time parameters.

1. ➤ Press the clock (6) to change the time.
2. ➤ Press the clock (1) to switch between 12 and 24-hour display mode.
3. ➤ Press the calendar (2) to change the date.
4. ➤ Press the date (3) to change the display mode to mm/yy.
5. ➤ Press the map (4) to change the time zone.
Scroll up or down the list by pressing and holding down the key until your required zone is in the centre of the selection. Wait until the display closes automatically to save the new time zone.
6. ➤ If your selected time zone has a summer/winter time control, then your device will change the time automatically. You can cancel this automatic time change by unchecking this box (5).

9.4 'User' - 'Language' menu

The 'User' - 'Language' menu lets you access the language configuration of the controller.



Fig. 127: 'User' - 'Language' menu

9.5 'User' - 'USB' menu

The 'USB' menu lets you update the firmware, or export or import the controller's configuration.

When you are on the main screen and insert a USB stick with an update, a window automatically opens asking if you want to switch to the programming screen.

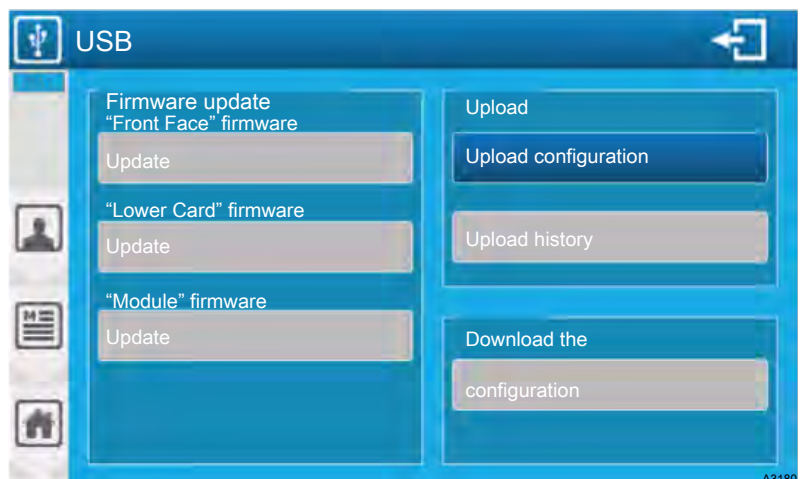


Fig. 128: You need to insert a USB memory stick to access this menu (programming screen).

'Front Face firmware': If firmware is available on the USB stick, the corresponding update key is enabled. Press the key to perform the update.

'Lower Card firmware': If firmware is available on the USB stick, the corresponding update key is enabled. Press the key to perform the update.

'Module firmware': If firmware is available on the USB stick, the corresponding update key is enabled. Press the key to perform the update.

'Upload configuration': Export the complete machine configuration to a binary file on the USB stick. Press the key to export.

'Upload history': Not yet available.

Download *'configuration'*: The button is enabled if a configuration file is available. Press *'Download configuration'*.

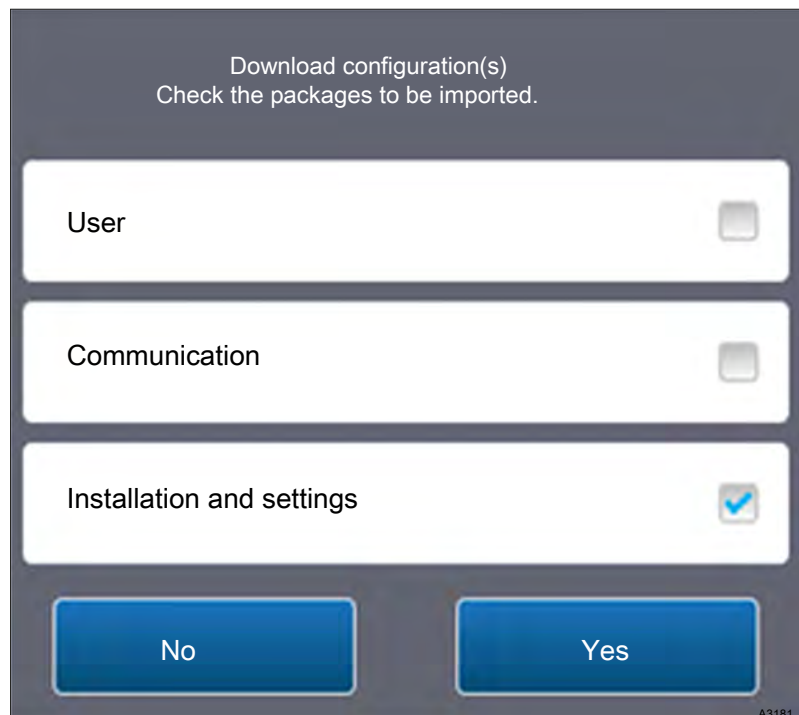


Fig. 129: Selection of the configuration packages

When you are on the main screen and insert a USB stick with an update, a window automatically opens asking if you want to switch to the programming screen.

9.6 'User' - 'INPUTS TEST' menu

The menu lets you set the display of raw and measured data for all selected inputs.



Fig. 130: 'User' - 'INPUTS TEST' menu by way of example

9.7 'User' - 'OUTPUTS TEST' menu

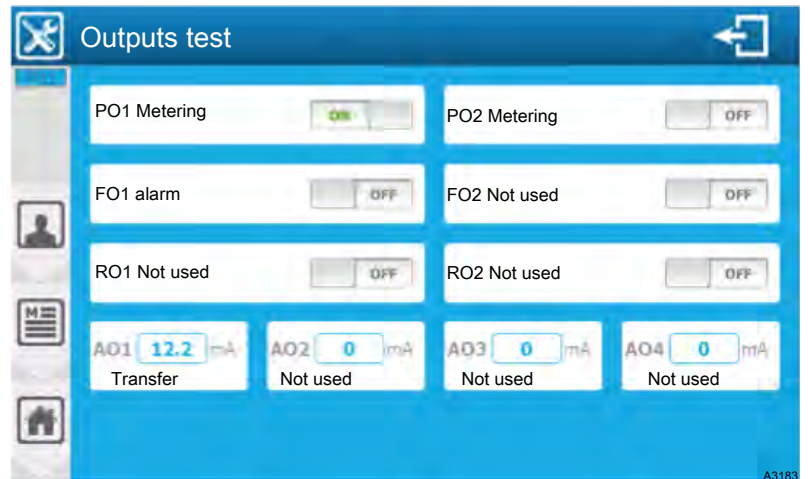


Fig. 131: 'User' - 'OUTPUTS TEST' menu by way of example

'PO1 metering': if the name and function of the affected output are affected, then press the affected display to switch the relay on and off. Each press reverses the state.

'OFF' = Relay output is inactive.

'ON' = Relay output is active.

'AO1 transfer': Enter the name and the affected function of the output, then press the affected display to open the numeric keyboard and enter the required value.

Unaffected outputs can also be tested.

9.8 'User' - 'INFO' menu

In the 'INFO' menu you can view the different versions of the installed modules and the serial number of the device.

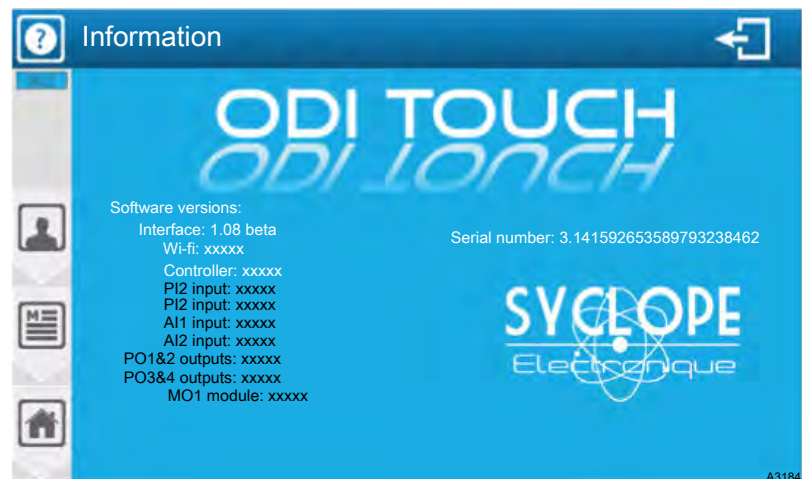


Fig. 132: 'User' - 'INFO' menu

The controller consists of different firmware. It is possible to view the installed modules and their versions on this screen.

Serial number - The serial number of your controller (unique).

If an element is greyed out, it means that the function is not available.

10 Calibrating sensors

- **User qualification, calibration:** instructed user  Chapter 2.4 'User qualification' on page 14

The 'CALIBRATION' menu lets you calibrate the sensors.

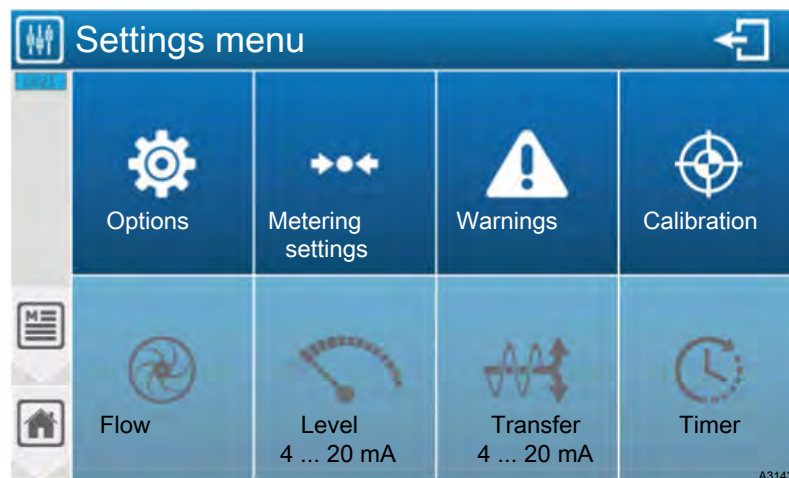


Fig. 133: 'SETTINGS' programming screen

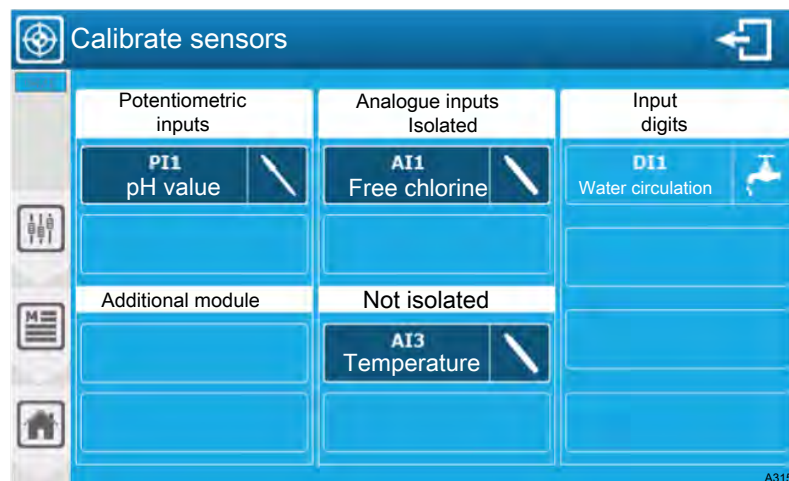


Fig. 134: Calibrating sensors

The screen shows the configured sensors. Press an active sensor to open the calibration screen.

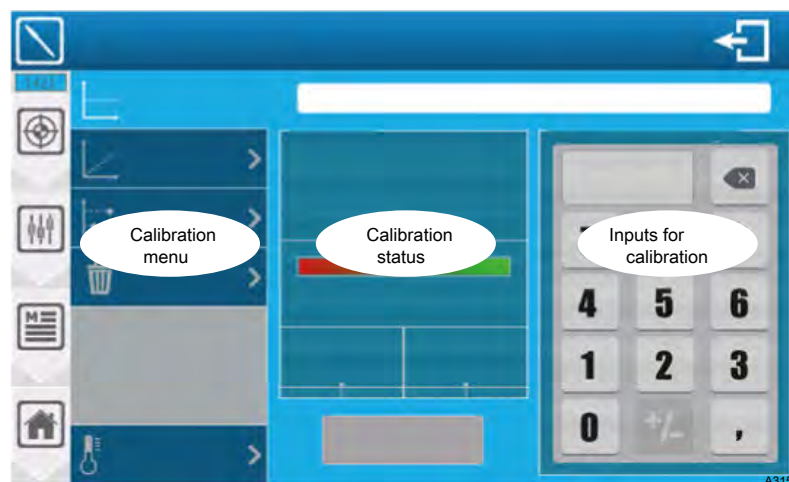


Fig. 135: 'Calibration' menu screen

10.1 Calibration menu



Fig. 136: Calibration menu

The menu does not have the same options depending on the type of sensor being calibrated.

- 2-point calibration is only available for the pH sensor.
- Temperature compensation is only available for the pH sensor.
- ORP sensors do not have slope calibration.
- Flow sensors do not have offset calibration.

10.2 Calibration status

The status screen can change as follows depending on the stability and measured value of the sensor. It is necessary for the measured value to be stable and in a correct range to validate calibration.

- Very unstable sensor (measured value changes quickly)
- Sensor remote or decommissioned (measured and raw signal shows " - - ")
- Sensor is stabilised
- Stabilised sensor
- Authorised calibration

Offset (illustrated by the pH value):

- Shows the status of the sensor offset calibration
- The redder the bar diagram becomes, the closer you are to the calibration limit. This information can indicate the ageing of the sensor.
- The offset is expressed in the unit of the physical sensor input. The minimum and maximum values differ according to the sensor.

Slope (illustrated by the pH value):

- Displays the calibration status of the sensor slope
- The redder the bar diagram becomes, the closer you are to the calibration limit. This information can indicate the ageing of the sensor.
- The slope is expressed as a percentage and can vary between 0 % and 200 %. 100 % represents an uncalibrated slope.

10.3 Inputs for calibration

A keypad that enables you to input the real value you wish to use for calibration.

In the special case of pH calibration with (a) buffer solution(s), the value of the buffer solution must be entered. The same applies to ORP.

This part is also used for the pH temperature compensation value, if necessary, in the special case of the pH value.

The keypad is used in the same way as a normal numeric keypad.

If an incorrect value is entered or the value is outside the scale, the value entered appears red and the "Save" button is disabled.

10.4 Validation messages on calibration status

Confirmation message:

- Before deletion, a confirmation message is displayed before carrying out the process.

Valid calibration messages:

- Calibration has been successfully completed.
- Calibration has been successfully carried out.

Message of incorrect calibration:

- Incorrect offset value. (Offset overflow for sensor permitted)
- Incorrect slope value. (Permitted slope for the sensor has been exceeded)
- Two points too close. (2 points for pH calibration are not far enough apart)

10.5 Offset calibration

1.  Wait until the sensor has stabilised.
2.  Enter the calibration value.
3.  Press 'SAVE'.

10.6 Slope calibration

1.  Wait until the sensor has stabilised.
2.  Enter the calibration value.
3.  Press 'SAVE'.

10.7 Deleting calibration

A confirmation prompt is displayed. There is no analysis of the measured value; deletion can also be performed if the sensor is unstable or missing.

-  Press 'Delete'.

10.8 2-point calibration

2-point calibration is a supported offset and slope calibration and is only available with pH sensors. Calibration is performed with buffer solutions. The process is performed in two steps with two solutions.

Step 1

1. ➤ Place the pH sensor in solution 1 (e.g. pH 7)
2. ➤ Wait until the sensor has stabilised.
3. ➤ The controller automatically enters a value of 7.00 as the calibration value. Enter the value of your solution if your solution has a different value.
4. ➤ Press 'SAVE'.

Step 2

5. ➤ Place the pH sensor in solution 2 (e.g. pH 4)
6. ➤ Wait until the sensor has stabilised.
7. ➤ The controller automatically enters a value of 4.00 as the calibration value. Enter the value of your solution if your solution has a different value.
8. ➤ Press 'SAVE'.

10.9 Temperature compensation (pH)

The temperature has a more or less large influence on the pH value, depending on the pH deviation from 7 and the temperature deviation from 25 °C.

If you calibrate the pH with a pH4 solution at a temperature of 10 °C, the difference between the uncompensated and compensated pH value is around 0.2 pH.

This discrepancy can be corrected with the temperature compensation function.

A symbol appears alongside the measured value in the calibration status area if temperature compensation is enabled.

Type: None

- Selection of the compensation mode: this selection key shows information on the selected mode (e.g. None). Press this key to change the mode information.

Type: Manual

- Selection of the compensation mode: this selection key shows information on the selected mode (e.g. Manual). Press this key to change the mode information.

Unit °C

- Selection of the temperature unit, which you need to enter in the numeric keypad. The selected unit information (°C) can be found on this selection key. Press this key to change the unit information.

Sensor AI3 type

- Selection of the compensation mode: this selection key shows information on the selected mode (sensor) and the corresponding entry (e.g. AI3). Press this key to change the mode information.

Programmed and active compensation: Programmed compensation with a sensor, but the sensor measured value is incorrect. Calibration is not blocked, but compensation is performed at T = 25°C.

11 Maintenance/repair

The device is maintenance-free. Only allow the manufacturer to carry out repairs.

12 Disposal of used parts

- **User qualification:** instructed user, see [Chapter 2.4 'User qualification'](#) on page 14



NOTICE!

Regulations governing the disposal of used parts

- Note the national regulations and legal standards that currently apply in your country

The manufacturer will take back decontaminated used devices providing they are covered by adequate postage.

Decontaminate the device before returning it for repair. To do so, remove all traces of hazardous substances. Refer to the Material Safety Data Sheet for your feed chemical.

A current Declaration of Decontamination is available to download on the ProMinent website.

Sign indicating EU collection system



In accordance with the European Directive 2012/19/EU on waste electrical and electronic equipment, this device features the symbol showing a waste bin with a line through it. The device must not be disposed of along with domestic waste. To return the device, use the return and collection systems available and observe the local legal requirements.

13 Replacement of back-up battery

- **User qualification, installation of the secondary module:** electrical technician ↗ *Chapter 2.4 'User qualification' on page 14*

1. ➤ Disconnect the system from the power supply.

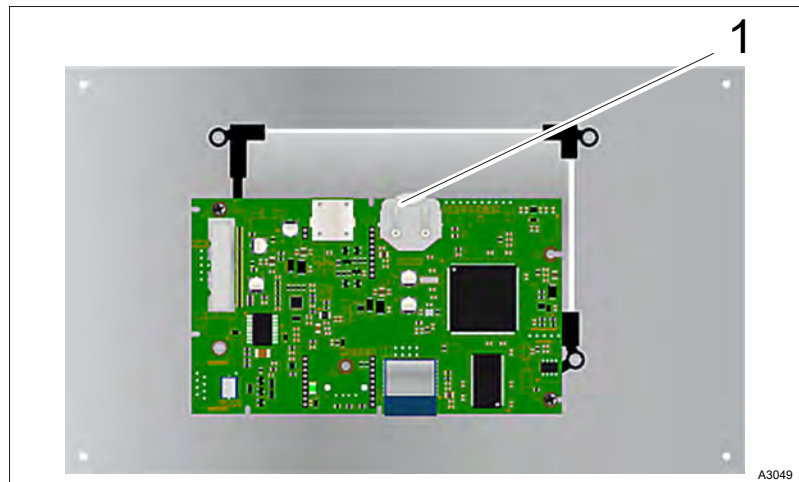


Fig. 137: Button cell battery (1)

2. ➤ Replace the button cell battery (1).

14 Installation of the secondary module

- **User qualification, installation of the secondary module:** electrical technician ↗ *Chapter 2.4 'User qualification' on page 14*

1. ➤ Disconnect the system from the power supply.

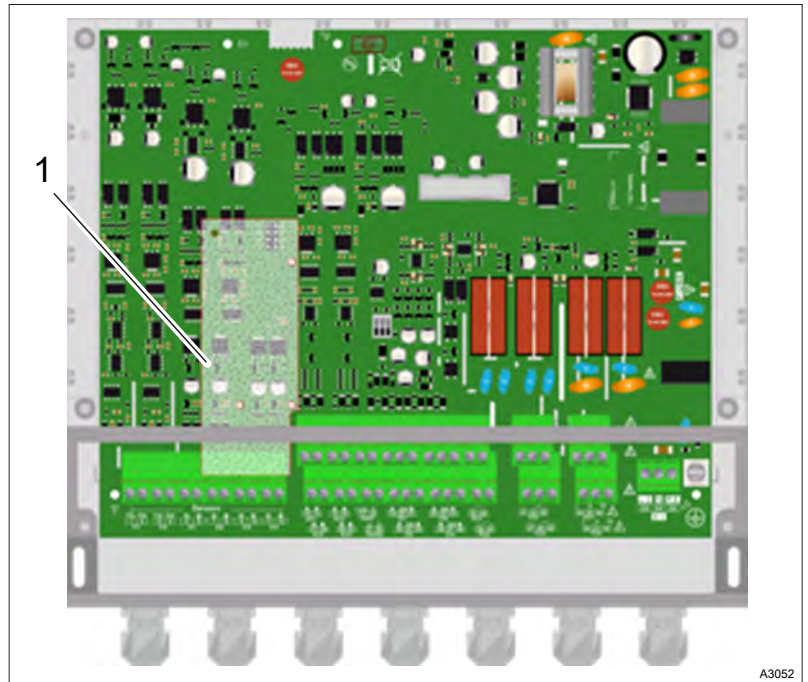


Fig. 138: Position (1) of the secondary module.

2. ➤ Localise the position (1) of the secondary module.
3. ➤ Position the 3 sockets, and then insert the module into the connector on the rear circuit board. Make sure that the sockets are fixed in the holes provided.

15 Technical data

Main features	
Type(s):	Specification(s)
Consumption:	Maximum 12 watts, without metering accessories connected.
Power supply requirements:	90 ... 240 V AC 50/60 Hz
Electrical protection:	Fuses 160 mA. Resetting by power interruption
Operating temperature (°C):	-5 °C ... 45 °C (23 °F ... 113 °F)
Material:	PPE housing, flame-retardant configuration
Dimensions of the housing:	356 X 235 X 105 mm (W X H X D)
Weight:	2.1 kg
Display:	5-inch LCD colour screen, resistive touch
Ambient conditions	
Storage temperature:	-10 °C ... 70 °C (10 °F ... 158 °F)
Air humidity:	Max. 90% non-condensing
Degree of protection:	IP 65
Designation:	CE
Electromagnetic compatibility:	Class B break tests conform to EN61326-1. Class B break tests conform to the standard EN61326-2-6. Class B break tests conform to EN55011. Harmonic tests conform to EN61000-3-2. Harmonic tests conform to EN61000-3-3. Interference immunity tests conform to EN61000-4-2. Interference immunity tests conform to EN61000-4-3. Interference immunity test EN61000-4-4. Interference immunity tests conform to EN61000-4-5. Interference immunity tests conform to EN61000-4-6. Interference immunity tests conform to EN61000-4-8. Interference immunity tests conform to EN61000-4-11.
Standard:	EN 61000 Electromagnetic compatibility (EMC) EN 61326 Electrical equipment for measuring, control and laboratory use for a standard environment (class B for residential use)
Inputs:	
Potentiometric inputs:	2 inputs
4 ... 20 mA inputs:	2 isolated inputs
	2 non-isolated inputs
Digital inputs:	4 inputs
USB inputs:	USB connector on the front of the housing.
Outputs:	
Relay outputs:	2 self-fed relay outputs
Relay outputs:	2 ON/OFF relay outputs

Main features	
Relay outputs:	2 electronic relay outputs
Analogue outputs:	4 no. 0/4 ... 20 mA analogue outputs, max 500 Ω
Power output:	1 no., 12 V power output
Communication connector:	
RS485:	1 no., RS485 communication connector
Ethernet:	1 no. Ethernet output
Protection of metering outputs:	
Internal fuse:	2 no., TR5 3,15 A, 250 V, slow-acting fuses
Buffer battery:	
button cell	Type BR2032

16 CE Declaration

We,

- ProMinent GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg, Germany,

hereby declare that the product specified in the following complies with the relevant basic health and safety rules of the EC/EU Directive, on the basis of its functional concept and design and in the version marketed by us. Any modification to the product not approved by us invalidates this declaration.

Tab. 20: Extract from the EU Declaration of Conformity

Designation of the product:	Controller, swimming pool controller
Serial number:	see nameplate on the device
Relevant EC Directives:	Low Voltage Directive 2014/35/EU EU EMC Directive (2014/30/EU) EU RoHS Directive (2011/65/EU)
Harmonised standards applied, in particular:	EN 61000 Electromagnetic compatibility (EMC) EN 61326 Electrical equipment for measuring, control and laboratory use for a standard environment (class B for residential use)
Place/Date:	Heidelberg, 38.02.2021

The EC Declaration of Conformity is available to download on our homepage.

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