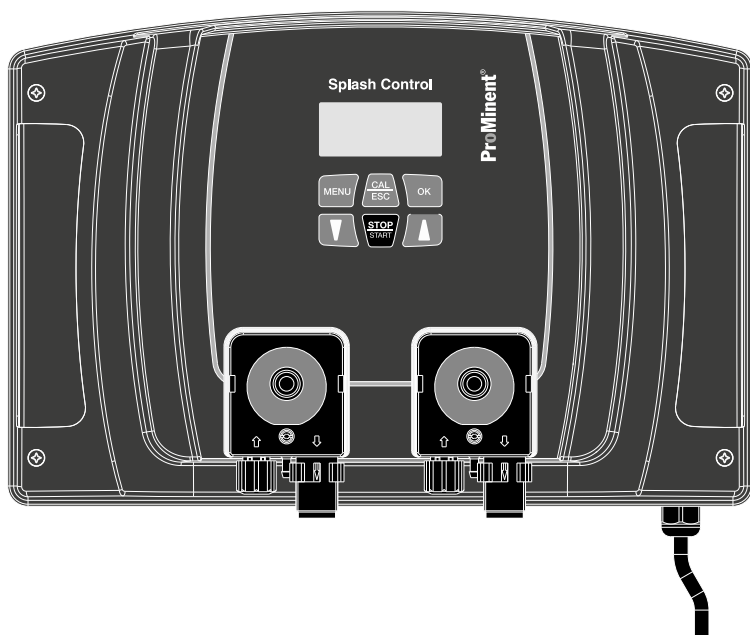


Splash Control

for swimming pool water treatment in private swimming pools



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!
Technical changes reserved.

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. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

Supplementary information

Read the following supplementary information in its entirety!

The following are highlighted separately in the document:

- Enumerated lists
- ➞ Instructions
- ⇒ Results of the instructions

Information



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

Safety information

Safety information are provided with detailed descriptions of the endangering situation, see ⓘ *Chapter 4.2 'Explanation of the safety information' on page 14*

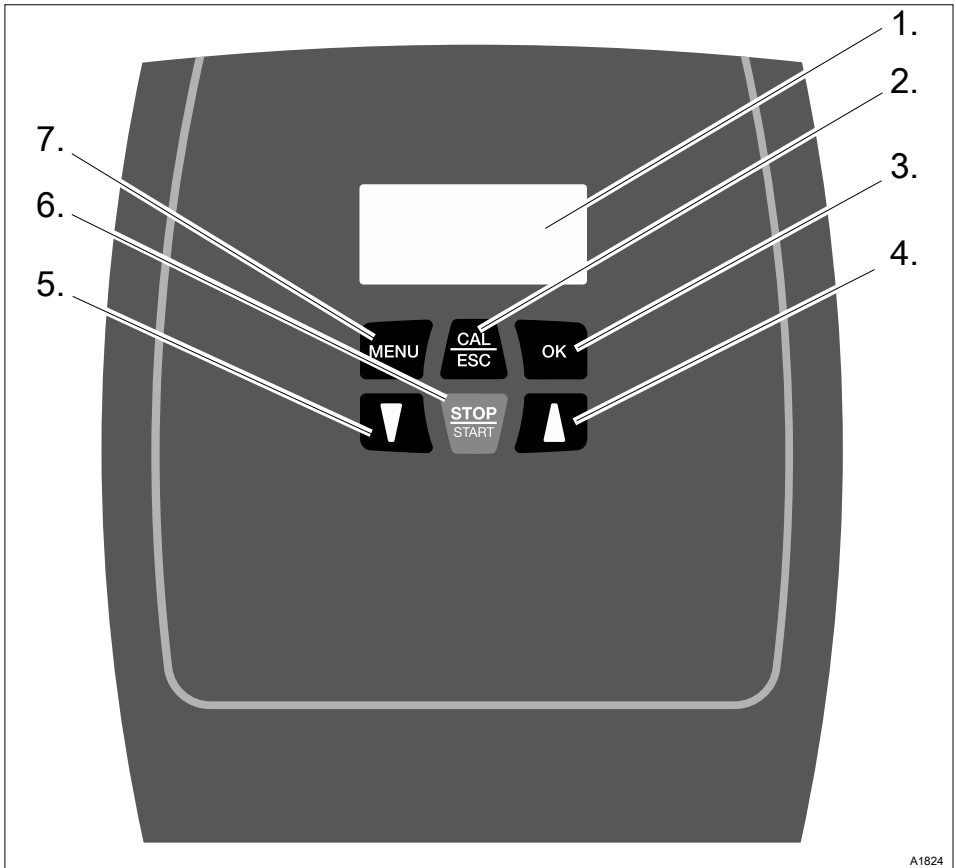
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1 Operating elements



A1824

Fig. 1: Operating elements

- | | |
|------------------|---------------------|
| 1. LCD display | 5. "Down" key |
| 2. [CAL/ESC] key | 6. [Start/Stop] key |
| 3. [OK] key | 7. [Menu] key |
| 4. "Up" key | |

The controller's graphic display uses the following symbols:

Symbol	Meaning
	<i>[Start/Stop]</i> key pressed
	Error
	pH setpoint exceeded 2-point controller 1 Acid metered
	pH setpoint undershot 2-point controller 1 Alkali metered
	ORP setpoint exceeded 2-point controller 2 Oxidant, top
	ORP setpoint undershot 2-point controller 2 Oxidant, bottom
	Pulse length 1* (acid, alkali) Control off
	Pulse length 1* (acid, alkali) Control on
	Pulse length 2* (oxidant) Control off
	Pulse length 2* (oxidant) Control on
* controls metering pump or solenoid valve	

2 Identity code

PPC a	PPCa DULCOMETER Private Pool Control product range			
	Design			
	0	Housing blue, RAL 5003 with ProMinent logo		
	E	Spare part, electrical unit, degree of protection IP20		
	C	Housing, small, blue, RAL 5003 with ProMinent logo		
	X	X = OEM design		
		Type of mounting		
		W	Wall mounting	
			Operating voltage	
		0	230 V 50/60 Hz	
			Cable and plug	
		0	without cable	
		A	with 2.0 m cable; standard European plug	
			Measured variables	
		PR	pH / ORP	
		P0	pH	
		0R	ORP	
			Pump, pH (on left)	
		0	none	3 0216
		1	0204	4 0224
		2	0208	
			Pump, ORP (on right)	
		0	none	3 0216

Identity code

PPC a	PPCa DULCOMETER Private Pool Control product range									
							1	0204	4	0224
							2	0208		
								Hose material		
							0	irrelevant		
							P	PHARMED®		
								Hydraulic connector		
							0	Standard connector 10x4 (dis-charge side)		
							1	Non-standard connector 6x4		
								Hardware extension		
							0	none		
								Accessories		
							0	No accessories		
								Certifications		
							0	CE mark		
							1			
								Documentation language*		
								DE	German	
								EN	English	
								ES	Spanish	
								IT	Italian	
								FR	French	
								*	others on request	

3 About the product

The swimming pool controller is intended for the simultaneous measurement and control of the measured variables pH and ORP. The unit provides basic functions for applications in the treatment of swimming pool water.

Features:

- Integral metering pumps
- Dosing monitor
- Display, illuminated, for the display of measured values and parametrisation/configuration
- Plain text operator navigation in 5 selectable languages
- 4 digital inputs for Pause control and sample water errors, as well as level warning for acid and disinfection supply
- 2 power actuating outputs for control of the metering pump by pulse width modulation (direct switching of the operating voltage)
- Control characteristics: Proportional control for both measured variables
- One control direction can be selected (raise or lower measured value)
- Protective RC circuit to protect the output relays when switching inductive loads, such as motor-driven metering pumps
- Available with or without integral metering pumps

The following components (excluding metering pumps) make up a complete swimming pool measuring and control system:

- 1 Swimming pool controller, type PPCa, identity code
PPCA0W0APR11P90000DE
- 1 DULCOTEST® in-line probe housing, DGMa120T000
- 1 pH sensor, PHES 112 SE, order no. 150702
- 1 ORP sensor, RHES-Pt-SE, order no. 150703
- 2 Cable combinations, coaxial, 2 metres, SN6, pre-assembled, order no.
1024106

Applications:

- Swimming pool water treatment

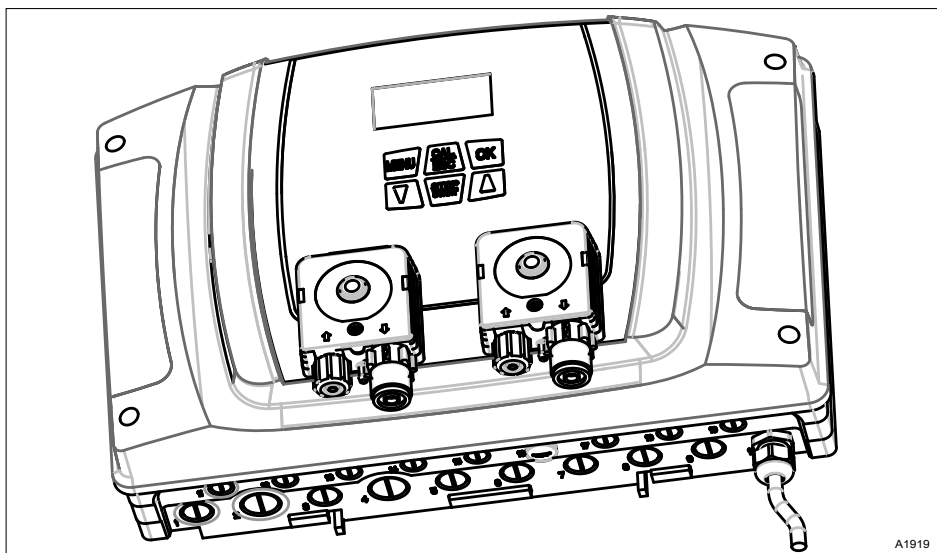


Fig. 2: Swimming pool controller with 2 peristaltic pumps

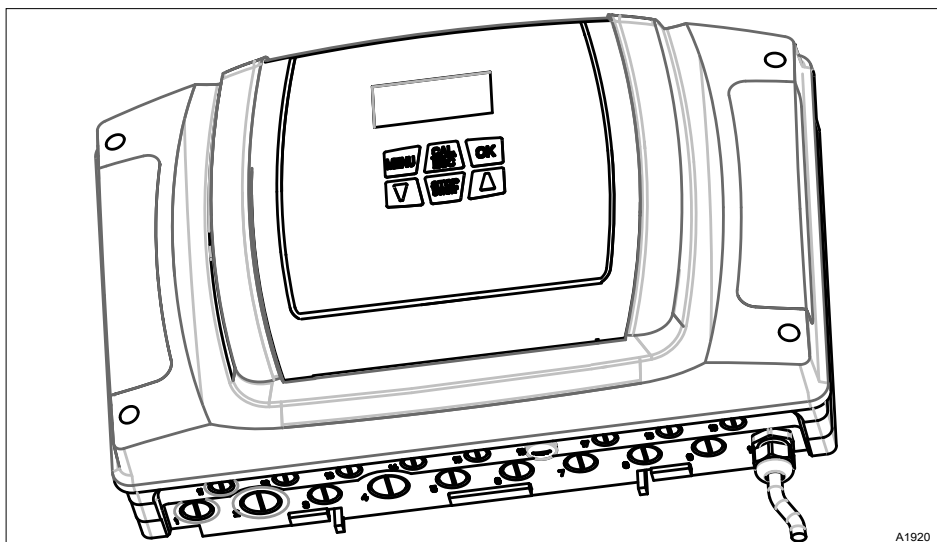


Fig. 3: Swimming pool controller without peristaltic pumps

Components of the peristaltic pump

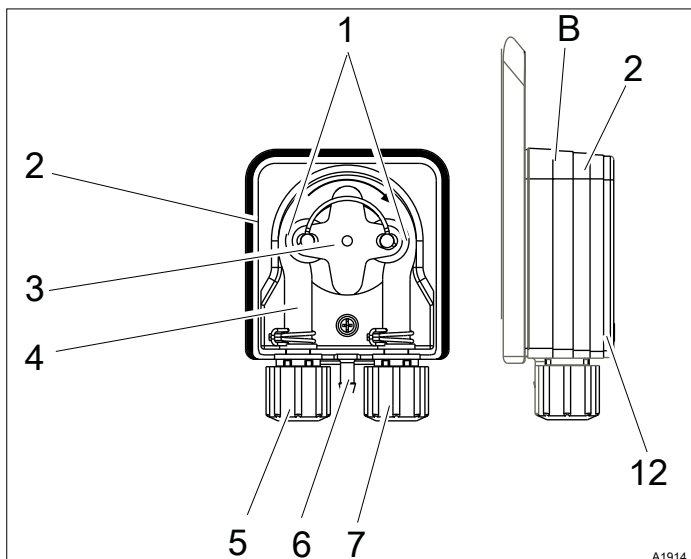


Fig. 5: Components of the peristaltic pump

- | | | | |
|----|---------------------------------|-----|--------------------------------|
| 1. | Rollers with tensioning springs | 6. | Leakage fitting |
| 2. | Dosing head | 7. | Hose connector, discharge side |
| 3. | Rotor | 12. | Transparent cover |
| 4. | Pump hose | B. | Liquid end |
| 5. | Hose connector, suction side | | |

4 Safety and responsibility

4.1 Users' qualifications



WARNING!

Danger of injury with inadequately qualified personnel!

The operator of the plant / device 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

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/her 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 ProMinent or another authorised distribution partner.
Trained qualified personnel	A 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/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.

Training	Definition
Electrician	Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on his/her technical training and experience, as well as knowledge of pertinent standards and regulations. Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations. Electricians must comply with the provisions of the applicable statutory directives on accident prevention.
Customer Service department	Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.



Note for the system operator

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

4.2 Explanation of the safety information

Introduction

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

The safety 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

Danger!

- Denotes an immediate threatening danger. If this 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

Warning!

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



NOTICE!

Nature and source of the danger

Damage to the product or its surroundings

Measure to be taken to avoid this danger

Note!

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



CAUTION!

Nature and source of the danger

Possible consequence: Slight or minor injuries, material damage.

Measure to be taken to avoid this danger

Caution!

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



Type of information

Hints on use and additional information

Source of the information, additional measures

Information!

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

4.3 General safety notes



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 manufacturer 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.



WARNING!

Live parts

Possible consequence: Fatal or very serious injuries

- Measure: Disconnect the mains plug prior to opening the housing
- De-energise damaged or defective units or units that have been tampered with by disconnecting the mains plug
Immediately disconnect the pump from the mains/power supply if the pump housing has been damaged. Only start up the pump again after it has been repaired by authorised personnel.

**WARNING!****Operating error / Unauthorised access**

Possible consequence: Fatal or very serious injuries.

- Measure: Ensure that there can be no unauthorised access to the unit
- Ensure that the unit is only operated by adequately qualified and technically expert personnel
- Please also observe the operating instructions for controllers and fittings and any other units, such as sensors, sample water pumps ...
- The operator is responsible for ensuring that personnel are qualified

**WARNING!****Use of the unit in areas at risk from explosion**

Possible consequence: Fatal or very serious injuries.

Operating the unit in areas at risk from explosion. The unit is not approved to pump media at risk from explosion.

**WARNING!****Pumping flammable media**

Possible consequence: Fatal or very serious injuries.

Pumping flammable media is not permitted. Observe the material safety data sheet for the medium.

**CAUTION!****Securing the unit**

Only operate the unit when fixed to a load-bearing wall or similar.

**CAUTION!****Warning of feed chemical spraying around**

An external metering pump can generate four times its rated pressure. Hydraulic parts may rupture if a discharge line is blocked.

Fit a relief valve in the discharge line.

CAUTION!

Warning of backflow

Metering pumps are not absolutely leak-tight shut-off units.

Use a shut-off valve, a solenoid valve or a vacuum breaker as an absolutely leak-tight shut-off unit.

CAUTION!

Injury to personnel and property / Unit starts immediately

The pump can start pumping as soon as it is connected to the mains voltage.

Only connect the unit to the mains voltage when all installation work has been completed and the pumped chemicals can no longer escape in an uncontrolled manner.

Install an emergency cut-off switch in the pump power supply line or integrate the pump in the system's emergency cut-off management.

CAUTION!

Contact with chemicals

De-pressurise, drain and rinse the hydraulic part of the unit before working on it.

CAUTION!

Operate the unit only with the transparent cover in place

The transparent cover on the liquid end protects you from direct contact with the rotor and from any chemicals that escape in the event of a hose rupturing. The transparent cover also accommodates the roller bearing for the rotor.

IP 65

Ensure that all seals that seal the inside of the housing are sitting correctly. IP 65 protection can only be guaranteed if the seals are fitted correctly.

Observe the general limitations with regard to viscosity limits, chemical resistance and density - refer also to the ProMinent Resistance List (In the product catalogue or at www.prominent.com)!

Information in the event of an emergency

In the event of an electrical accident, disconnect the mains cable from the mains power supply or press the emergency cut-off switch fitted on the side of the system. If feed chemical escapes, switch off the pump by pressing [Stop/Start]. If necessary,

ensure that the hydraulic system around the pump is at atmospheric pressure. Adhere to the material safety data sheet for the feed chemical.

Correct and proper use

! NOTICE!

Correct and proper use

Damage to the product or its surroundings

- The unit is not intended to measure or regulate gaseous or solid media
- Only use the unit in accordance with the technical data and specifications provided in these operating instructions and in the operating instructions for the individual components

! NOTICE!

Correct sensor operation / Run-in period

Damage to the product or its surroundings

- Correct measuring and metering is only possible if the sensor is working perfectly
- It is imperative that the run-in periods for the sensors are adhered to
- The run in periods should be allowed for when planning commissioning
- It may take a whole working day to run-in the sensor
- Please read the operating instructions for the sensor

! NOTICE!

Correct sensor operation

Damage to the product or its surroundings

- Correct measuring and metering is only possible if the sensor is working perfectly
- Check and calibrate the sensor regularly

! NOTICE!

Compensation for control deviations

Damage to the product or its surroundings

- This controller cannot be used in control circuits which require rapid compensation (< 30 s)

4.4 Correct and proper use

! NOTICE!

Compensation for control deviations

Damage to the product or its surroundings

- The controller can be used in processes, which require compensation of > 30 seconds

! NOTICE!

Correct and proper use

The unit is intended to measure and regulate liquid media. The marking of the measured variables is located on the controller and is absolutely binding.

The unit may only be used in accordance with the technical details and specifications provided in this operating manual and in the operating manuals for the individual components (such as, for example, sensors, fittings, calibration devices, metering pumps etc.).

Any other uses or modifications are prohibited.

5 Storage and Transport

Ambient conditions for storage and transport



CAUTION!

- Prior to storage or transport, ensure that the system is free from feed chemical and water
- Flush out the media carrying parts including the hoses using clean pure water
- Store and transport the system in its original packaging.
- Also protect the packaged systems against damp, exposure to chemicals and mechanical effects
- Please also observe the operating instructions for fittings and other units, such as sensors, filters, metering pumps ...

! NOTICE!

If the system is stored as an assembly with other components, then the storage and transport conditions should be appropriate for the component with the least resistance to external influences.

Storage temperature: 0 ... 55 °C

air humidity: < 95% relative air humidity, non-condensing

Humidity: None. Rain and condensation not permitted.

Other: No dust, no direct sunlight.

6 Assembly and installation

Indoors or protective covering

The unit is only intended for use indoors. When using outdoors, provide a protective housing to offer protection against the weather and the sun's rays (UV radiation).

Load-bearing strength of the wall

Ensure that the wall has sufficient load-bearing strength to ensure that the unit can be safely mounted. Fit the wall bracket in position with 4 screws.

- **User qualification, mechanical and hydraulic installation:** trained qualified personnel, see  *Chapter 4.1 'Users' qualifications' on page 13*
- **User qualification, electrical installation:** Electrical technician, see  *Chapter 4.1 'Users' qualifications' on page 13*

The use of external pumps

Provide a relief valve on site when using external pumps.

Different designs of swimming pool controller

2 unit designs are available. With integral peristaltic pumps and without pumps. The swimming pool controller design without pumps is used as a measuring and control unit. If required, external pumps can be connected. The external pumps need to have the following parameters, in order to work correctly with the swimming pool controller:



Technical parameters of external pumps

If the technical parameters described here are not complied with, the swimming pool controller can be damaged and fail to work correctly.

Technical parameters	Value
Output relay, maximum contact load:	2 x 3 amp
Maximum pump capacity class:	50 W

We recommend the use of series DF2a or Alpha pumps.

6.1 Ambient conditions

Permissible ambient temperature:
5 ... 45 °C

Permissible medium temperature:
10 ... 45 °C

Air humidity: < 95% relative air humidity, non-condensing

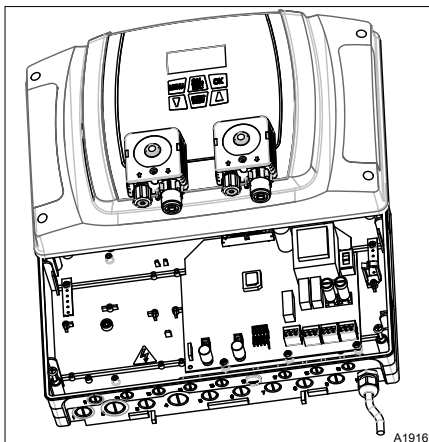
Humidity: None. Rain and condensation not permitted.

Other: No dust, no direct sunlight.

6.2 Parked position of the upper section of the housing

It may be useful to move the upper section of the swimming pool controller housing into what is known as the parked position for various installation operations.

- Unscrew the upper section of the swimming pool controller from the lower section.



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

Fig. 6: Parked position of the upper section of the housing

2. ➔ Place the upper section of the swimming pool controller onto the lower section in such a way that the lower fixing bolts of the upper section are inserted into the lower threaded inserts of the lower section and can be screwed in place.

⇒ The upper section is now in its parked position and you have access to the inner components of the swimming pool controller.

6.3 Wall mounting

Mounting materials (contained in the scope of delivery)

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

Wall mounting

Take the wall bracket out of the housing

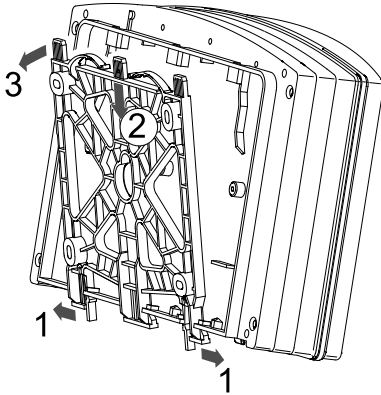


Fig. 7: Removing the wall bracket

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

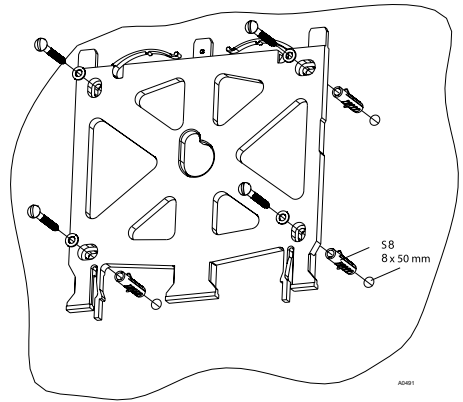


Fig. 8: Fitting the wall bracket

5. ➤ Screw the wall bracket into position using the washers, see Fig. 8

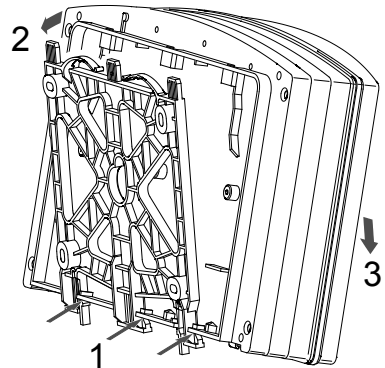


Fig. 9: Fitting the wall bracket

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

6.4 Installing the hose lines (only design with DF2a)

Assembling the suction and discharge lines.



Only use original hoses with the specified hose dimensions 6 x 4 mm or 10 x 4 mm, otherwise the durability of the connection cannot be guaranteed.

Avoid reducing the hose sizes. Ensure that the hose lines used are capable of withstanding twice the operating pressure of the peristaltic pump.

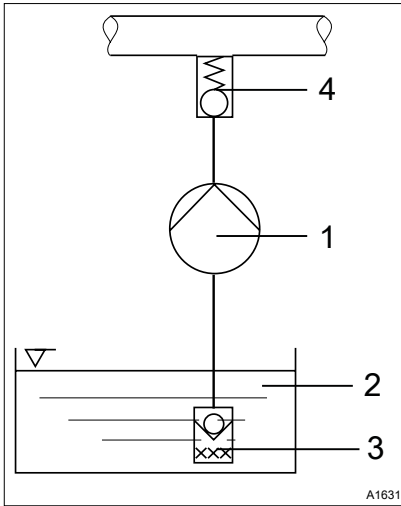


Fig. 10: Installation diagram

1. Peristaltic pump
2. Chemical tank
3. Foot valve or suction lance
4. Injection valve

1. ➔ Cut the end of the hose at right angles.
2. ➔ Unscrew a union nut and slide the union nut over the pump hose.
3. ➔ Push the hose end over the nozzle until it will go no further.
4. ➔ Connect the discharge line to the right hose connector.
5. ➔ Connect the suction line to the left hose connector.

When connecting hose size 10x4, do so using the enclosed mounting kit: 10x4, PCB, order number 1002589

6. ➔ Tighten the union nuts.
7. ➔ Shorten the free end of the suction line so that the foot valve hangs just above the base of the tank. With feed chemicals that can form sediment, ensure that the foot valve is suspended a minimum of 50 mm above the base of the tank.
8. ➔ Lead a hose line (6 x 4) back from the leakage fitting to the storage tank for the respective feed chemical.

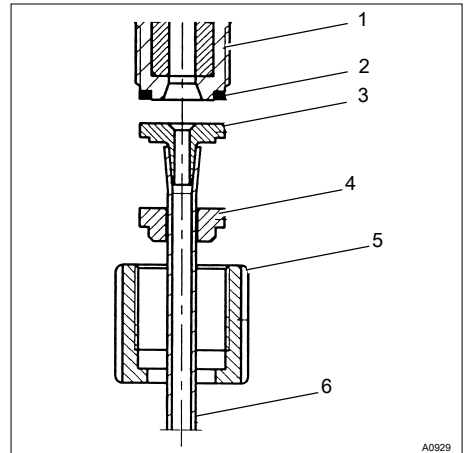


Fig. 11: Connect the hose using the connector kit

1. Valve
2. O-ring
3. Nozzle
4. Clamp ring
5. Union nut
6. Hose

Mounting kit: PPCa suction and feeder assembly, complete

Component	Order number
Marking for acid	1046188
Marking for chlorine	1046189
Metering lip valve , 0.05 bar, R1/2-1/4 10x4	1024697
Woven hose, ø 4/10mm	1002155
Suction lance with level switch and connecting line 2-pin, 3 m, ø50 - 6x4	1022644

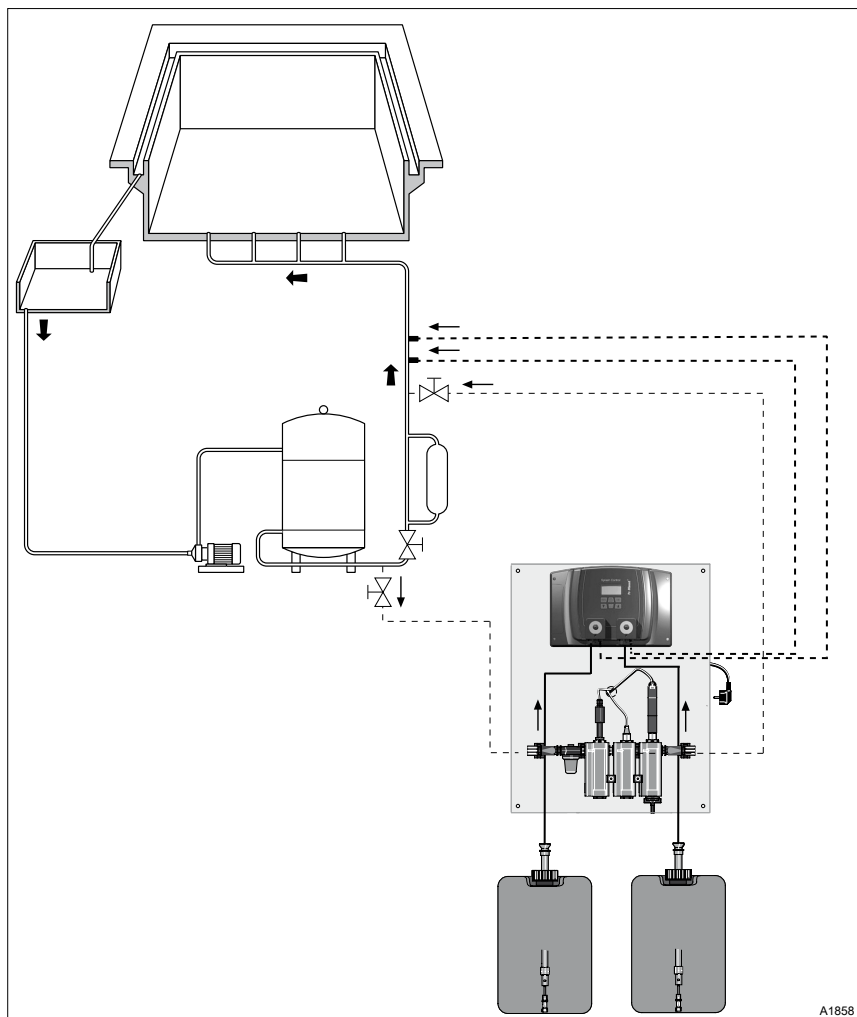


Fig. 13: Outdoor swimming pool: hydraulic connection of the swimming pool controller to the swimming pool installation

Advantage: In-line probe housing cannot become dirty

Disadvantage: Measured values with depletion

6.6 Installation (electrical)

This material for electrical installation is supplied with the swimming pool controller;

Component	Quantity	Order number
Threaded connector M16x1.5	6	1005874
Counter nut, M16x1.5	6	1021015
Multiple sealing insert	2	1022587
Plug	4	140412



WARNING!

Failure of the circulating pumps

In the event that the circulating pumps fails, the control for the corresponding swimming pool has to be stopped. It is not sufficient to use the in-line probe housing's sample water limit contact alone. You need to take appropriate additional measures.

The following are suitable as triggers for the measures:

- the filter control's potential-free contact
- the potential-free contact of the circulating pump's motor protection switch
- a flow monitor in the circulation line

WARNING!

Safe operating status

Take safety precautions on the hardware and software side to ensure that the unit is in a safe operating state in the event of a fault, for example you can use a limit switch, a mechanical lock etc.

During installation, ensure that the unit is not energised.

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

Observe the technical data in these instructions.

1.  Plan which threaded holes are to be broken out (mark the required threaded holes)

CAUTION!

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

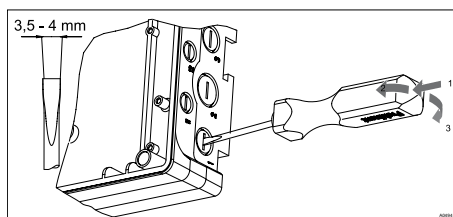


Fig. 14: Breaking out threaded holes

2.  To break out the threaded holes, punch the slit in the middle of the threaded holes using a screwdriver (tip width 3.5 - 4 mm, see Fig. 14) and lever the material out
3.  De-burr the edges

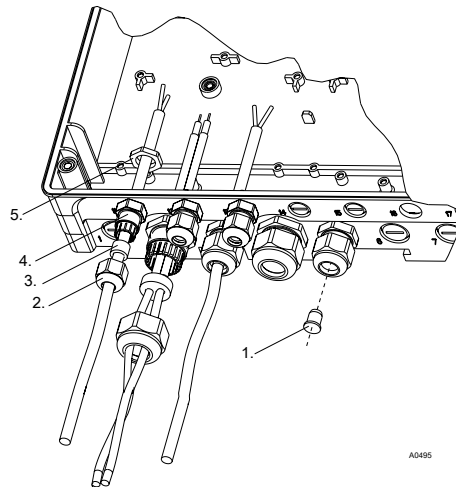


Fig. 15: Fitting the threaded connectors

1. Blanking plug
 2. Union nut
 3. Multiple sealing insert
 4. Threaded connector
 5. Lock nut
4. ➤ Screw in the appropriate threaded connectors (4) using the lock 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. ➤ Tighten the union nuts (2) on the threaded connectors so that they are properly sealed
 8. ➤ Place the front part onto the rear part
 9. ➤ Manually tighten the four housing screws
 10. ➤ Once again check that the seal is seated properly. Protection class IP 65 can only be achieved if it is correctly fitted.

6.7 Terminal diagram



CAUTION!

Maximum length of the coaxial cable: 10 m

Incorrect measured value due to coaxial cable being too long

Possible consequence: Slight or minor injuries. Material damage.

Ensure that the maximum length of the coaxial cable does not exceed 10 m when using ORP or pH sensors. The measuring signal can otherwise be distorted by the effects of interference.

1047777 XHK	AL SPL 001 11/13 EN XE2	XE4	XK1/2		XR1	XP3	XP2	XP1
			DI3 DI1 - +	DI4 DI2 - +	Alarm COM NO NC	Power Pump pH	Power Pump ORP	Power Supply
	pH	ORP	1 2 3 4		1 2 3	N L 	N L 	N L 

A1820

Fig. 16: PPCa terminal diagram

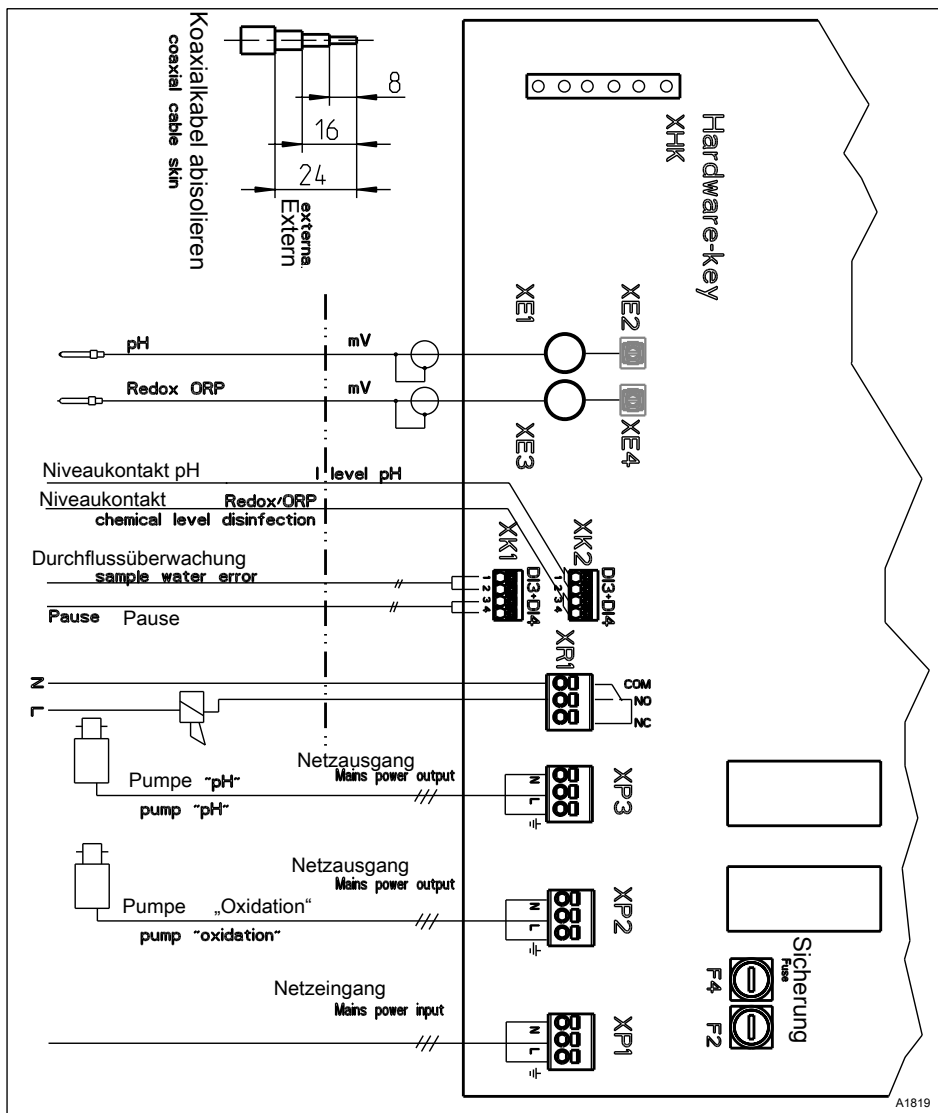


Fig. 17: PPCa terminal diagram

6.8 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

6.9 Electrical fuses

Electrical fuses

Position of the fuse	Function of the fuse	Fuse value	Order number
F2	Protecting the control	0.16 AT	712048
F4	Protecting the pumps	6.3 AT	732379

7 Commissioning

- **User qualification:** trained qualified personnel, see  *Chapter 4.1 'Users' qualifications' on page 13*



WARNING!

Sensor run-in periods

This can result in dangerous incorrect metering

- Correct measuring and metering is only possible if the sensor is working perfectly
- Please read the operating instructions for the sensor
- Calibrate the sensor after commissioning



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.



Only operate the pump after proper installation.

Only operate the pump once the transparent cover has been screwed on.

1. ➤ Disconnect the discharge hose from the hose connector.
2. ➤ Allow the peristaltic pump to run until the pump hose is filled.
3. ➤ Switch off the peristaltic pump after the pump hose has been filled
4. ➤ Re-connect the discharge hose to the hose connector.
5. ➤ Allow the peristaltic pump to run for a short time
 - ⇒ The peristaltic pump is now ready for operation.
6. ➤ Check the threaded connectors and pipe system for leak-tightness

7.1 Priming

You can prime the pH correction fluid or the oxidant, for example, during commissioning or after replacing a storage tank.

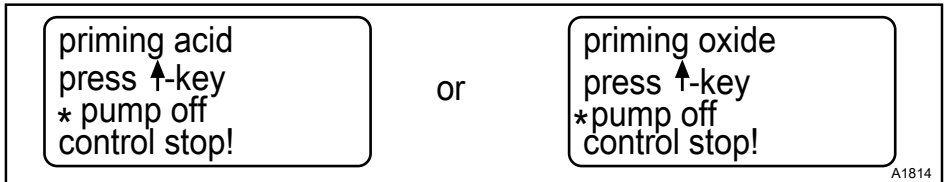


Fig. 18: Priming

1. ➤ To prime the pH correction fluid or the oxidant, press *[Menu]* twice to move to the *[priming acid]* setting menu, or press *[Menu]* three times to move to the *[priming oxide]* setting menu.
2. ➤ Press the UP key.
 - ⇒ The control variable jumps to 100% and the pump pumps for approx. 30 seconds. This also applies in the event that the *[Start/Stop]* key is enabled or that metering is switched off due to a fault message.

Stopping priming

3. ➤ Press the UP key again.
 - ⇒ With each re-priming, the pump primes for approx. 30 seconds.

Re-starting control:

4. ➤ Press *[CAL/ESC]*.
 - ⇒ You are now in continuous display 1.
5. ➤ Press *[Start/Stop]*.
 - ⇒ The control process starts

8 Operating and replacing the storage tank

- **User qualification:** instructed user, see  Chapter 4.1 'Users' qualifications' on page 13

8.1 Replacing the chemical storage tanks



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.



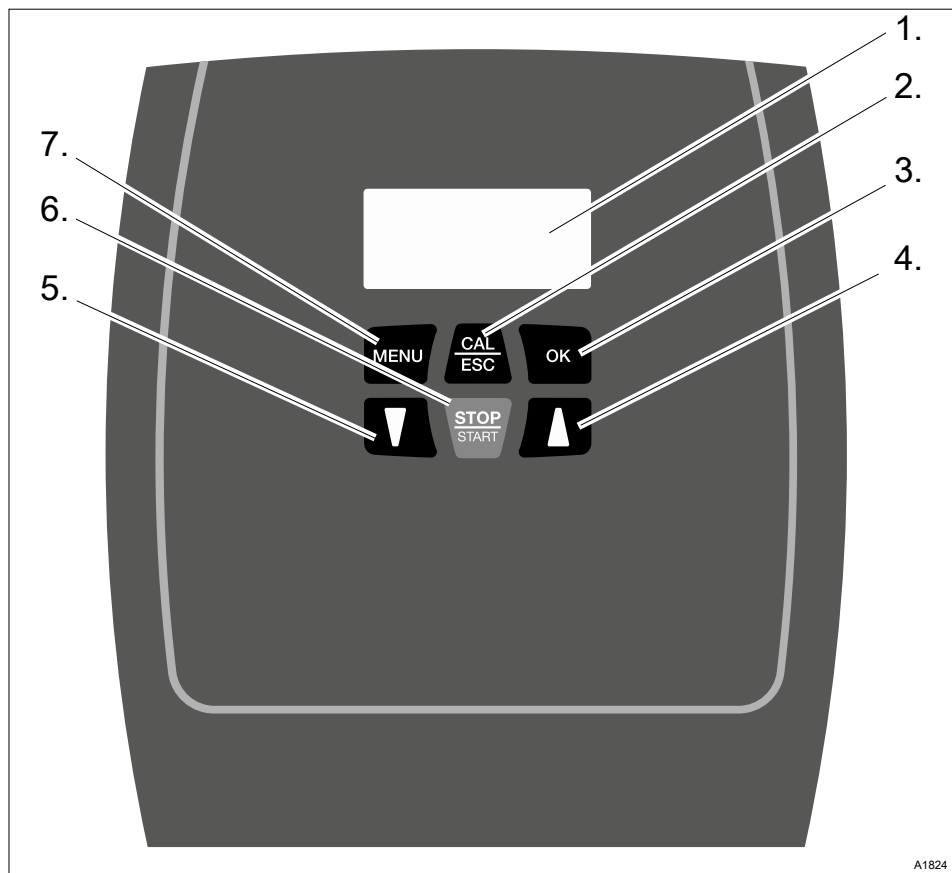
Labelling the chemical storage tanks

Label the connections on the unit, the metering accessories and the chemical storage tanks in such a way that it is impossible to mix up the storage tanks. It is the responsibility of the system operator to attach and maintain the labels. We provide labelling rings for Chlorine (1046189) and Acid (1046188).

- Ensure unrestricted access to the chemical storage tanks to be replaced so that you can work safely and escape routes are free
- Wear protective equipment as outlined in the material safety data sheets for the chemicals used
- First replace one chemical storage tank and complete this task first
- Handle and remove any spilt feed chemical as per the material safety data sheet
- Only then replace the second chemical storage tank, if necessary, and complete this task first
- Handle and remove any spilt feed chemical as per the material safety data sheet

7.  Dispose of the empty chemical storage tanks as per the material safety data sheet

8.2 Operating elements



A1824

Fig. 19: Operating elements

- | | | | |
|----|---------------|----|------------------|
| 1. | LCD display | 5. | "Down" key |
| 2. | [CAL/ESC] key | 6. | [Start/Stop] key |
| 3. | [OK] key | 7. | [Menu] key |
| 4. | "Up" key | | |

The controller's graphic display uses the following symbols:

Symbol	Meaning
	<i>[Start/Stop]</i> key pressed
	Error
	pH setpoint exceeded 2-point controller 1 Acid metered
	pH setpoint undershot 2-point controller 1 Alkali metered
	ORP setpoint exceeded 2-point controller 2 Oxidant, top
	ORP setpoint undershot 2-point controller 2 Oxidant, bottom
	Pulse length 1* (acid, alkali) Control off
	Pulse length 1* (acid, alkali) Control on
	Pulse length 2* (oxidant) Control off
	Pulse length 2* (oxidant) Control on
* controls metering pump or solenoid valve	

8.3 Operating structure

- **User qualification:** instructed user, see  Chapter 4.1 'Users' qualifications' on page 13

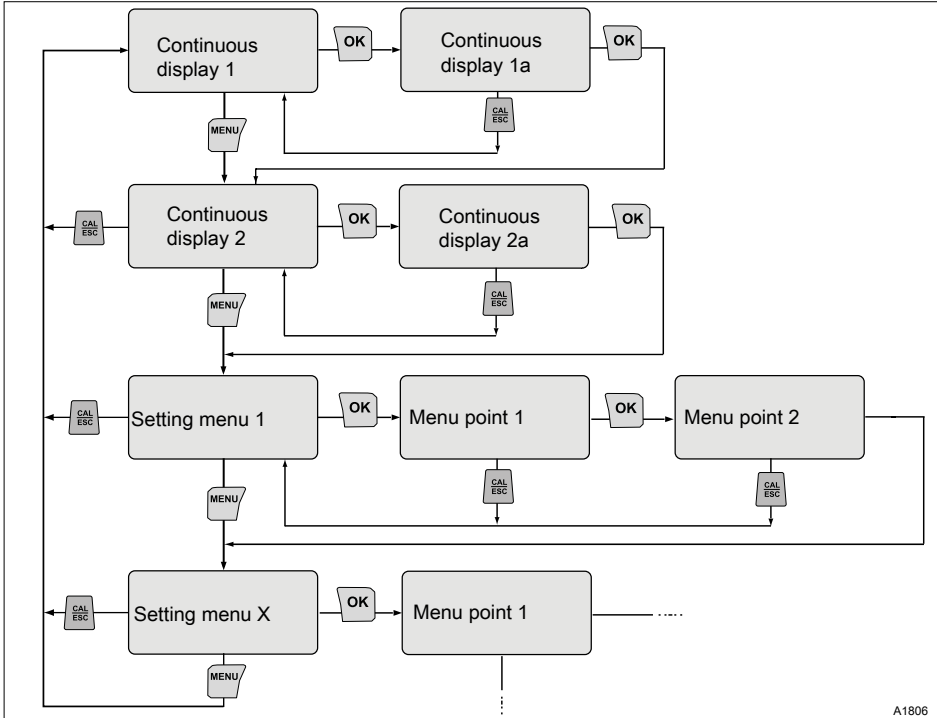


Fig. 20: Operating menu, diagrammatical

The operating menu comprises:

- the continuous displays
- the setting menus
- the menu items in the setting menus

Navigation through the operating menu

- The *[CAL/ESC]* key enables you to move back in every window of the operating menu. You will either return to the continuous display or to the corresponding information display, depending on where you are located in the operating menu.
- If no key is pressed for 10 minutes, the display automatically returns to continuous display 1. This jump back does not apply to the Calibration menu.

Continuous displays and setting menus

Press *[Menu]* to return to the individual windows of the continuous displays and the setting menus. After you have gone through all the windows one at a time, you will return to continuous display 1 after the final window.

Qualified personnel also have the following additional options of:

- Switching the relay function from pulse length to two-point control
- Switching the metering delay time and the metering control time

Operating and adjustment

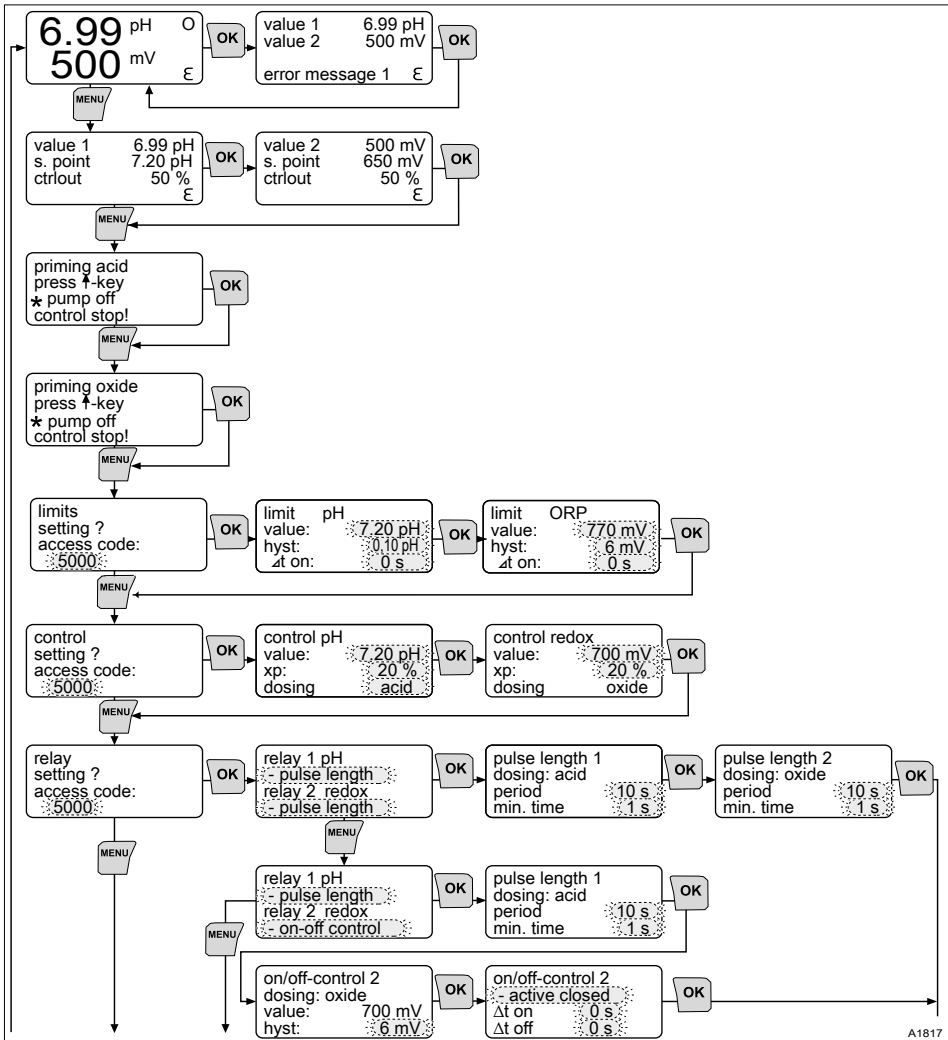
You can perform all the necessary steps needed to commission the unit in the Operating menu.

These steps include:

- Calibrating the unit
- Changing the access code
- Changing the operating language
- Changing the setpoint (pH, ORP)

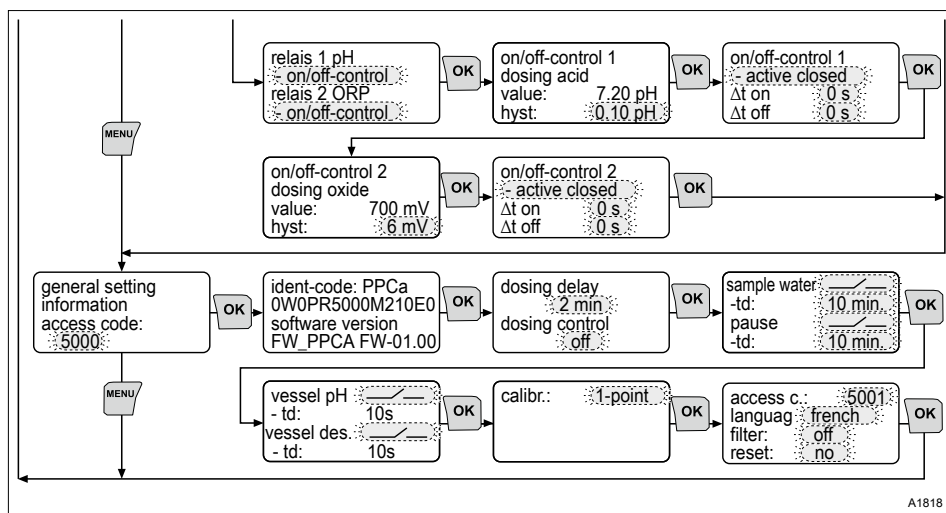
Qualified personnel can make settings / changes (accessible via the *[access c]* access code).

Operating menu



A1817

Fig. 21: Operating menu / Service engineers can obtain the access code [access c] from the Service department.



A1818

Fig. 22: Operating menu / Service engineers can obtain the access code [access c] from the Service department.

The displays individually are as follows:

Continuous display 1:

- The pH-value is shown as a 4-digit number, with two digits after the decimal point. The unit (pH) appears on the right beside the value.
- The ORP value is shown as a 3-digit number.

Continuous display 1a:

- There error messages are displayed beside the measured values.

Continuous display 2: All the pH-relevant variables are displayed

- Measured value
- Setpoint
- Control variable

Continuous display 2a: All the ORP-relevant variables are displayed

- Measured value
- Setpoint
- Control variable

Setting menus: Priming acid [priming acid] / Priming oxidant [priming oxide]

When you press 'UP', metering runs at 100% for approx. 30 seconds. This also applies when [Start/Stop] is pressed or when metering is switched off due to an error message. If the relay function is set to 'Pulse length', then metering starts at 100% frequency after a time delay.

Setting menu: Setting limit values [limits setting]

Enables access to the limit values for pH and ORP.

The access code can be entered. The values displayed in the following menu items can only be adjusted/set when the access code you have entered matches the access code specified in the 'Access code' [access c] in 'General Setting' [general setting]. Once set up, the access code remains enabled until the next entry in the continuous display 1.

Setting menu: Setting the control [control setting]

Enables access to the setting menus for pH and ORP.

The access code can be entered. The values displayed in the following menu items can only be adjusted/set when the access code you have entered matches the access code

specified in the 'Access code' [access c] in 'General Setting' [general setting]. Once set up, the access code remains enabled until the next entry in the continuous display 1.

Menu items 1 and 2 pH control [control pH] and ORP control [control redox]

The control is designed as a P-controller with a 1-way control. Every measured variable is a setpoint and the metering direction (metering: acid or alkali) is assigned. The measured variable is also assigned to the control parameter xp with the 'Pulse length' [pulse length] relay function.

Setting menu: Setting the relay [relais setting]

Enables access to the relay menus for pH and ORP. It can be locked by an access code.

Relay 1 pH menu item [relais1 pH]

- Every measured variable is assigned to a relay.
- Every relay can control an actuator.

Pulse length 1 and Pulse length 2 menu items [*pulse length*]

- These two menu items appear when the function 'Pulse length' [*pulse length*] has been selected in menu item 'Relay 1 pH' [*relais 1 pH*]. You can enter the cycle time and the minimum switching-on time.

Menu items: 2-point controller 1 [*on/off control 1*] and 2-point controller 2 [*on/off control 2*]

These two menu items and their sub-menu items appear when the function '2-point controller' [*on/off control 2*] has been selected in menu item 'Relay 1 pH' [*relais 1 pH*]. You can enter the switching hysteresis here.

Sub-menu points for 2-point controller 1 [*on/off control 1*] and 2-point controller 2 [*on/off control 2*]

You can set the active state and the starting delay (Δt on) and the release delay (Δt off) with each relay.

The status of the relays is displayed in continuous display 1 with the corresponding symbols on the continuous display.

Setting menu: General settings [*general setting*]

The setting menu 'General settings' [*general setting*] can be locked by an access code. The setting menu 'General Settings' [*general setting*] permits access to the menu items with the following information and setting options:

Identity code menu point [*access c*]

- The identity code [*access code*] and the program version [*software version*] are displayed.

Menu item: Metering delay [*dosing delay*]

- You can enter the metering delay here (1 min [off] ... 30 min). After connecting to the mains power supply and calibration, metering and troubleshooting is activated with a delay (= metering delay [*dosing delay*]). You can end the delay by pressing [*Start/Stop*].

Metering control [*dosing control*]

- You can enter the metering control time (1 min [off] ... 120 min) under metering control [*dosing control*]. Metering and control stops if the measured value has not reached the set-point after this metering control time. You can restart metering and control by pressing [*Start/Stop*]. If the setpoint is reached for longer than 1 minute, then metering and control is started automatically.

Sample water [*sample water*] and Pause [*pause*]

The sample water [*sample water*] and Pause [*pause*] processes are triggered by external digital potential-free signals.

If one of the inputs is active, the control is stopped and no further errors are emitted.

The sample water [*sample water*] and Pause [*pause*] processes can be individually set as active closed [*activ closed*] (symbol for "N/O") or as actively open [*activ open*] (symbol for "N/C"). The time '*td*' determines the time after which the control becomes active again after the Pause has been stopped. The delivery status is actively closed [*activ closed*] and '*td*' = 10 minutes.

If a fault occurs, the alarm relay [*XR1*] is activated.

The inputs can be assigned the following signals, for example:

- Potential-free contacts, general
- Level switch contacts of suction assemblies
- Contact from filter control
- Sample water flow sensor contact (e.g. DGMA)

Filter [*filter*]

The filtering of the input values can be increased to steady the display.

Reset [*reset*]

You can reset the unit [*reset*]. Following a reset, the data in the unit is reset to its delivery status.

Menu item: Calibration [*calibr.*]

! NOTICE!

Testing the ORP Sensor

With ORP measured variables, the sensor is not calibrated but tested according to its design

Immerse the ORP sensor in the test tank containing ORP buffer solution (e.g. 465 mV). Permitted deviation ± 40 mV.

- Replace the ORP sensor should the deviation be greater than 40 mV

You can select between one-point and two-point calibration. If you have selected 2-point calibration [*2-point*], then buffer 1 [*buffer 1*] and buffer 2 [*buffer 2*] appears in the next two lines, although you can only set buffer 2. The buffer value has to differ by ± 1.99 pH from the value of buffer 1.

Menu item: Access code [*access c.*]

Use the access code [*access c.*] to secure all setting values against unauthorised intervention. Information to the user that the access code [*5000*] is turned off is given by [*5000*] being replaced by the word 'off' [*off*].

You can also use this setting menu to select languages yourself that can be selected via the identity code. You can also increase filtering of the input values to steady/delay the display. You can also reset all settings, thereby loading the factory settings. To do this, modify 'no' [*no*] to 'yes' [*yes*]. Pressing [*Menu*] starts the factory settings being uploaded.

Calibration [*calibr*]

Two-point pH calibration [*2-point*]

- When the entry is confirmed in the calibration menu, the device stops the following functions for pH and ORP:
 - Control and metering
 - Troubleshooting

Errors that relate to the measured variable pH will be reset during successful calibration. Following calibration, metering, control and troubleshooting restart after elapse of the metering delay (2 min = standard setting).

Menu item: Sensor in buffer?

The unit awaits confirmation that the pH sensor to be calibrated is immersed in buffer 1 and/or buffer 2.

All buffer values are also displayed in abbreviated form.

- Display of the buffer value set
- Display of the buffer value measured
- Display of the voltage measured

Sub-menu items: pH calibration [*calibr*]

- The unit periodically checks the mV value measured
- The next menu item and the transition are selected automatically

Zero point and slope display during calibration

Depending on the number of values determined, the unit performs a slope and/or a zero point calculation.

Only one zero point correction is performed with a measurement of between pH 6 and pH 8.

With two measurements, both the zero point as well as the slope are recalculated.

The values determined in the calibration process are displayed or, if not yet determined, the values currently applicable are displayed. The values are automatically carried over, but this can also be performed prematurely by pressing [*Menu*].

Measured value unsteady during calibration

An error message is emitted if the sensor voltage remains unsteady during the actual calibration process. The calibration process for pH is terminated after approximately 4 seconds. The old zero point and the old slope are retained.

Error messages during calibration

The values are outside the permitted tolerance after calculating the zero point and the slope. The entire calibration process is discarded and the unit operates with the values applicable prior to the calibration process. A general error message is then generated in the continuous display 1a. Metering for the measured value pH is stopped.

8.3.1 Menu items



Effectiveness of entries

Your entries become effective as soon as you press [OK].

Without access code

1. You can move from the associated setting menu to the menu points by pressing [OK].
2. Pressing [OK] exits the menu points again and, at the same time, saves the set variables in the menu point, see Fig. 23.
3. If you do not want to save the set variables, then exit the menu item by pressing [CAL /ESC].
 - ⇒ You will return to the setting menu.

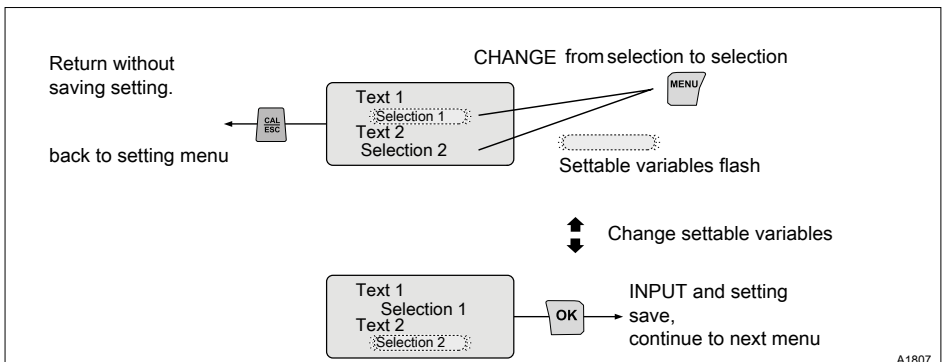


Fig. 23: Functions within the menu items

With access code

1. ➤ If an access code has been set, then you have to enter this access code in the setting menu.
2. ➤ Then you can access the menu points in the setting menu.
3. ➤ You can also access the menu points in the subsequent setting menus without the access code.
4. ➤ The unlocking of the access code is cancelled when you return to continuous display 1.

Navigation within a menu item

1. ➤ You have reached a menu point: You can see words and figures, see Fig. 23
⇒ Flashing elements identify variables that can be set.
2. ➤ You can activate other variables that can be set by pressing *[Menu]*
⇒ Variables that can be set start flashing.
3. ➤ Press *[Menu]* to return to the previous variable that can be set.

You can modify a variable that can be set. There are two types of variables that can be set, which can be modified in two different ways:

Changing words/expressions

1. ➤ Press 'Down' or 'Up'.
⇒ You can select between two words/expressions.

Changing numerical values

2. ➤ Press 'Down' or 'Up'.

If you only press 1x briefly, then the last figure increases one higher or decreases one lower.

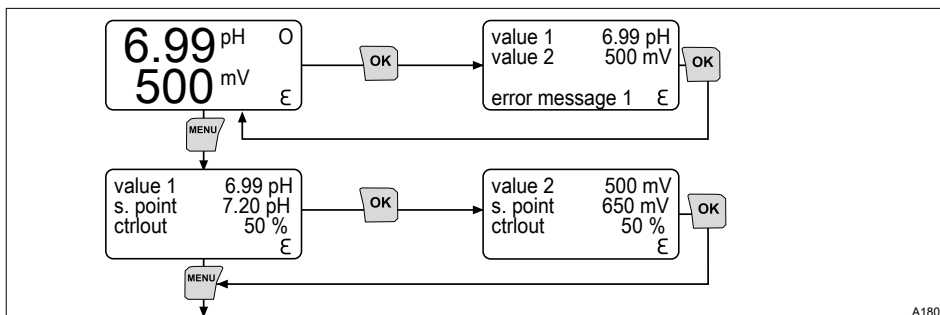
The figure continues to rise or decrease if you hold down the key.

The figure continues to rise or decrease more quickly if you hold down the key for longer.

3. ➤ Press *[OK]* or *[CAL /ESC]*, as in the operating menu, to exit a menu item.

8.3.2 Operating and adjustment

Monitoring



A1809

Fig. 24: Monitoring

You can monitor the function of the unit in continuous displays 1, 1a, 2 and 2a, see Fig. 20.

Operating menu

The operating menu consists of continuous displays and setting menus with the following functions:

Continuous display 1	Monitoring
	Calibration (ORP - Chlorine assignment)
Continuous display 2	Monitoring
Priming (acid, alkali)	Priming of acid or alkali
Priming of oxidant	Priming of oxidant
Service menu	only for service technicians
Setting the control	Setting the pH setpoint
	Setting the ORP setpoint

Operating and replacing the storage tank

General setting

Setting the access code

Setting the language

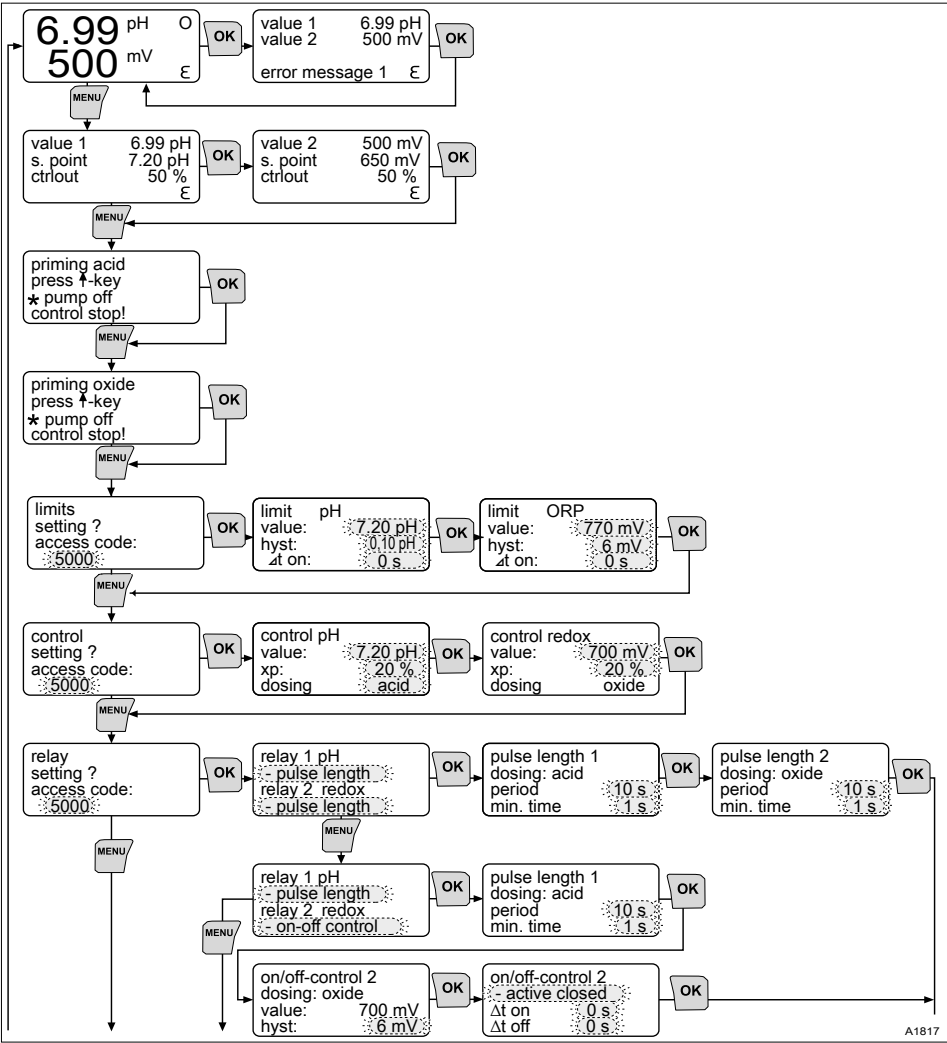


Fig. 25: Operating menu

9 Calibration

9.1 One-point calibration for pH

- **User qualification:** trained user, see  *Chapter 4.1 'Users' qualifications' on page 13*



CAUTION!

You have to regularly calibrate the pH sensor while the system is in operation. Calibration has to be performed:

- During initial calibration of the pH sensor
- Regularly during operation, e.g. 24 hours after initial calibration and then weekly thereafter.
- As the sensor signal changes with time. If calibration is no longer possible even after the pH sensor has been cleaned, then replace the pH sensor.



Correct sensor operation

- *Correct measuring and metering is only possible if the sensor is working perfectly*
- *Refer to the operating instructions for the sensor*
- *Performing 2-point calibration is strongly recommended and is preferable to 1-point calibration*



pH 7 buffer

Only use pH 7 buffer.



Used buffer

Dispose of the used buffer solution. For more information: refer to the material safety data sheet for the buffer solution.

Calibrating the unit

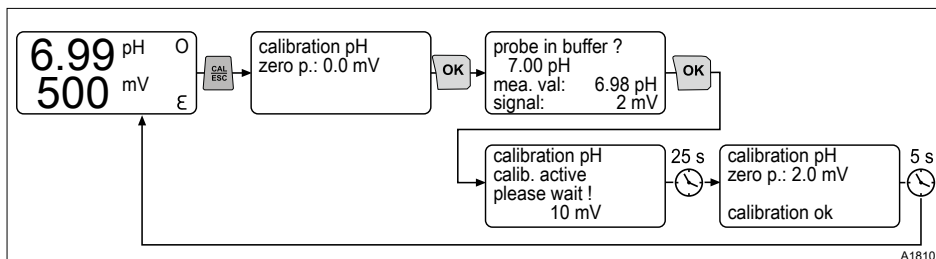


Fig. 26: One-point calibration for pH

Preparation: Obtain pH 7 buffer Prepare to dismantle the pH sensor; refer to the operating instructions for the pH sensor and the in-line probe housing.

! NOTICE!

Press Start/Stop key once

Press the Start/Stop key once ("O" appears) if the unit jumps to continuous display 1 after calibration. Otherwise the pumps can start up before your system is ready for use again. The pumps can be damaged as the pumps are working against a shut-off valve.

1. ➤ Press the CAL key in the continuous display.
 - ⇒ The calibration menu appears.
2. ➤ Press the Enter key.
 - ⇒ The menu item *[probe in buffer]* appears and metering stops.
3. ➤ Dismantle the sensor in this state.
4. ➤ Rinse the pH sensor with distilled water and dab it gently dry
5. ➤ Immerse the pH sensor in pH 7 buffer and press Enter:
 - ⇒ The menu item *[calib. active please wait!]* appears
6. ➤ After 25 seconds *[calibration ok]* appears if calibration has been successful
7. ➤ After 5 seconds the display returns to continuous display 1

8. ➤ Press the Start/Stop key once
⇒ "O" appears.
9. ➤ Re-install the pH sensor; refer to the operating instructions for the pH sensor and the in-line probe housing.
10. ➤ If closed, open the shut-off valves
11. ➤ Press the Start/Stop key once
⇒ The "O" disappears and the pumps start working. Are the shut-off valves open?

If calibration has been unsuccessful, one of these error messages will appear:

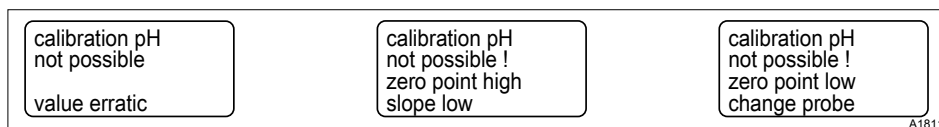


Fig. 27: Error messages



CAUTION!

Do not use the swimming pool until the causes of the fault have been resolved. Bathers could otherwise be put at risk by over- or underdosing.

Make a note of the error message and the values in the continuous display 2 and the continuous display 2a and call the responsible Service department.

9.2 Two-point calibration for pH

- **User qualification:** trained user, see Chapter 4.1 'Users' qualifications' on page 13

**CAUTION!**

You have to regularly calibrate the pH sensor while the system is in operation. That means: 24 hours after initial calibration and then weekly thereafter. Bathers could otherwise be put at risk by over- or underdosing.

***Correct sensor operation***

- *Correct measuring and metering is only possible if the sensor is working perfectly*
- *Refer to the operating instructions for the sensor*
- *Performing of 2-point calibration is strongly recommended and is preferable to 1-point calibration*

***pH 7 and pH 4 buffers***

Only use pH 7 and pH 4 buffers.

***Used buffer***

Dispose of the used buffer solution. For more information: refer to the material safety data sheet for the buffer solution.

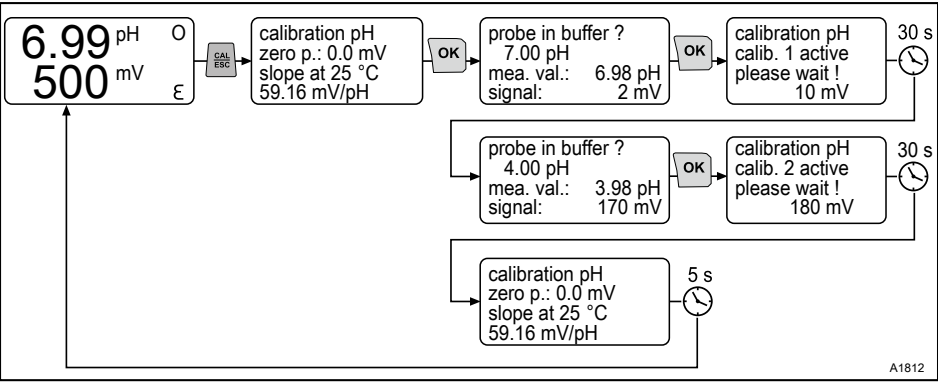


Fig. 28: Two-point calibration for pH

Calibrating the unit

Preparation: Obtain pH 7 and pH 4 buffers. Prepare to dismantle the pH sensor; refer to the operating instructions for the pH sensor and the in-line probe housing.

! NOTICE!

Press the Start/Stop key once

Press the Start/Stop key once ("O" appears) if the unit returns to continuous display 1 after calibration. Otherwise the pumps can start up before your system is ready for use again. The pumps can be damaged as the pumps are working against a shut-off valve.

1. ➤ Press the CAL key in the continuous display
 - ⇒ The calibration menu appears.
2. ➤ Press the Enter key
 - ⇒ The menu item *[probe in buffer]* appears and metering stops.
3. ➤ Dismantle the sensor in this state.
4. ➤ Rinse the pH sensor with distilled water and dab it gently dry
5. ➤ Immerse the pH sensor in pH 7 buffer and press Enter:
 - ⇒ The menu item *[calib. active please wait !]* appears
6. ➤ Immerse the pH sensor in pH 4 buffer and press Enter:
 - ⇒ The menu item *[calib. active please wait !]* appears
7. ➤ After 25 seconds *[calibration ok]* appears if calibration has been successful
8. ➤ After 5 seconds the display returns to continuous display 1
9. ➤ Press the Start/Stop key once
 - ⇒ "O" appears.
10. ➤ Re-install the pH sensor; refer to the operating instructions for the pH sensor and the in-line probe housing.
11. ➤ If closed, open the shut-off valves

12. Press the Start/Stop key once

- ⇒ The "O" disappears and the pumps start working. Are the shut-off valves open?

If calibration has been unsuccessful, one of these error messages will appear:

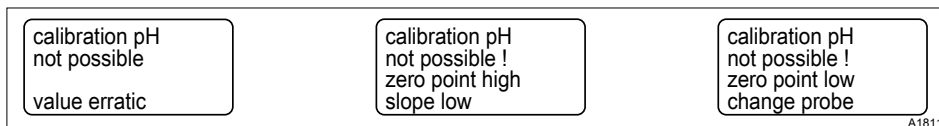


Fig. 29: Error messages



CAUTION!

Do not use the swimming pool until the causes of the fault have been resolved. Bathers could otherwise be put at risk by over- or underdosing.

Make a note of the error message and the values in the continuous display 2 and the continuous display 2a and call the responsible Service department.

10 Setting the control

- **User qualification:** trained user, see ⓘ Chapter 4.1 'Users' qualifications' on page 13

CAUTION!

pH value

Never set the setpoint for the pH higher than pH 7.5 and never lower than pH 7.0, as bathers could otherwise experience chemical burns.



We recommend a pH value of 7.2, as chlorine provides an excellent level of disinfection within this range. Skin tolerance is good at this pH value.

The setpoint for ORP voltage depends on the water quality and is usually in the range of 650 ... 720 mV.



Service only

Only Service should set or adjust any items in this menu. Only adjust something if Service prompt you to do so with a problem.

You can change setpoints for the pH value or ORP voltage in this menu.

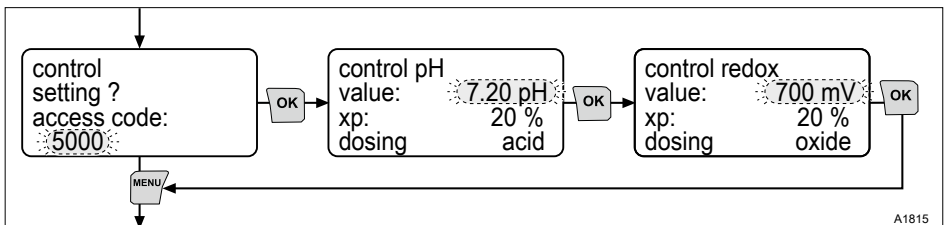


Fig. 30: Setting the control

Setting the control

1. ➤ Press the Change key 5 x in the continuous display 1
⇒ The *[control setting?]* setting menu appears.
2. ➤ Use the arrows to enter the access code if an access code is requested
3. ➤ Use the Enter key to go to the *[control pH]* menu item
4. ➤ Use the arrows to set the pH *[value]* setpoint (flashes)
5. ➤ Use the Enter key to go to the *[control redox]* menu item
6. ➤ Use the arrows to set the ORP *[value]* setpoint (flashes)
7. ➤ Use the Enter key to go to the *[control redox]* menu item

11 General setting

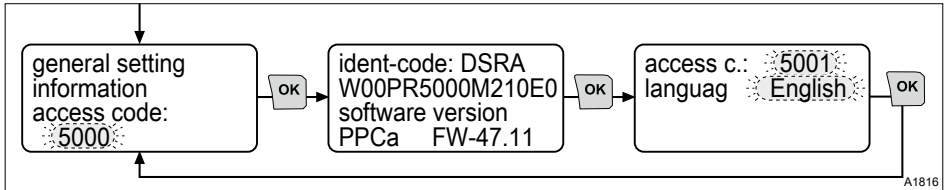


Fig. 31: General setting [general setting]

In the [general setting] setting menu, you can:

- Read the identity code and program version
- Activate and set the access code
- Select the operating language if this operating language is available. The factory setting is English.

Reading the identity code and program version:

1. ➤ Press the Change key 6 x in the continuous display 1
⇒ The *[general setting]* setting menu appears
2. ➤ Use the arrows to enter the access code if an access code is requested
3. ➤ Use the Enter key to go to the *[ident-code]* menu item
⇒ Read the identity code and the program version
4. ➤ Press the Enter key twice
⇒ The continuous display 1 appears.

Activate and set the access code or select the operating language:

5. ➤ Press the Change key 6 x in the continuous display 1
⇒ The *[general setting]* setting menu appears
6. ➤ Use the arrows to enter the access code if an access code is requested
7. ➤ Press the Enter key twice
⇒ The *[access c]* menu item appears.
8. ➤ Use the arrow keys to enter the access code if necessary
9. ➤ Use the Change key to move to *[languag]* and use the arrow keys to set the operating language, if necessary
10. ➤ Press the Enter key
⇒ The continuous display 1 appears.

12 Troubleshooting

- **User qualification:** trained user, see ⓘ Chapter 4.1 'Users' qualifications' on page 13



All errors are displayed on the display with the symbol 'E' at the bottom right.

Start troubleshooting after 'E' has appeared.

If you are then asked to remove or change the sensor, then also use the operating instructions for the sensor and in-line probe housing.

The error texts are in the continuous display 1a.

Error text	Fault	Cause	Remedy
[check pH input ↓ ?]	The pH sensor signal was undershot (pH value < 2.00 pH)	The pH sensor needs to be cleaned.	Clean the pH sensor and recalibrate the pH sensor
		The sensor cable is faulty	Check the sensor cable and the plug-in connection to the pH sensor, as well as the connection to the measuring unit
[check pH input ↑ ?]	The pH sensor signal was exceeded (pH value > approx. pH 14.00)	The pH sensor needs to be cleaned.	Clean the pH sensor and recalibrate the pH sensor
		The pH sensor is faulty	Replace the pH sensor and recalibrate the pH sensor

Troubleshooting

Error text	Fault	Cause	Remedy
<i>[dosing stop pH]</i>	The setpoint for pH was not reached during the metering control time	The pH sensor needs to be cleaned	Clean the pH sensor and recalibrate the pH sensor
		The pH sensor is faulty	Replace the pH sensor and recalibrate the pH sensor
		The metering pump for acid/alkali is faulty	Check the metering pump and then perform a complete commissioning process
		The storage tank for the chemicals is empty	Re-fill the storage tank and then perform a complete commissioning process
<i>[pH calib. defective]</i>	The pH sensor could not be calibrated	The pH sensor is faulty	Replace the pH sensor and recalibrate the pH sensor
		The sensor cable is faulty	Check the sensor cable and the plug-in connection to the pH sensor, as well as the connection to the measuring unit
		The buffer does not have the given pH value	Recalibrate with the correct buffer
<i>[check mV input ↓ ?]</i>	The ORP sensor signal is below 100 mV	The ORP sensor needs to be cleaned	Clean the ORP sensor and recalibrate the ORP sensor

Error text	Fault	Cause	Remedy
		The ORP sensor is faulty	Replace the ORP sensor and recalibrate the ORP sensor
		The sensor cable is faulty	Check the sensor cable and the plug-in connection to the ORP sensor, as well as the connection to the measuring unit
<i>[check mV input ↑ ?]</i>	The ORP sensor signal is above 1000 mV	The ORP sensor needs to be cleaned	Clean the ORP sensor and recalibrate the ORP sensor
		The ORP sensor is faulty	Replace the ORP sensor and recalibrate the ORP sensor
<i>[dosing stop mV]</i>	The mV setpoint was not reached during the set time	The ORP sensor needs to be cleaned	Clean the ORP sensor and recalibrate the ORP sensor
		The ORP sensor is faulty	Replace the ORP sensor and recalibrate the ORP sensor

Troubleshooting

Error text	Fault	Cause	Remedy
		The metering pump for the oxidant/reducing agent is faulty	Check the metering pump and then perform a complete commissioning process
		The storage tank for the chemicals is empty	Re-fill the storage tank and then perform a complete commissioning process

12.1 Troubleshooting

Fault	Cause	Remedy
The peristaltic pump no longer reaches full pump capacity	The pump hose has lost its elasticity	Replace the pump hose, see  <i>Chapter 13.2 'Repair' on page 76</i>
In all other cases, notify your service technician or your ProMinent branch.		

13 Maintenance and repair

Changing the fuses

- **User qualification:** trained user, see  *Chapter 4.1 'Users' qualifications' on page 13*

The controller is maintenance-free and cannot be repaired. Please contact your Service partner for a repair.



WARNING!

Decontamination

Decontaminate the device before repairing the device or sending it for repair. To do so, remove all traces of hazardous substances. Refer to the material safety data sheet for your feed chemical.

You will find the current decontamination declaration to download on our homepage.



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.

WARNING!

Live parts

Possible consequence: Fatal or very serious injuries

- Measure: Disconnect the mains plug prior to opening the housing
- De-energise damaged or defective units, or units that have been tampered with, by disconnecting the mains plug

Immediately disconnect the pump from the mains/power supply if the pump housing has been damaged. Only start up the pump again after it has been repaired by authorised personnel.

You can replace the fuse (2) to protect the control and the fuse (1) to protect the pumps once the bayonet cover for the fuse holder has been opened.

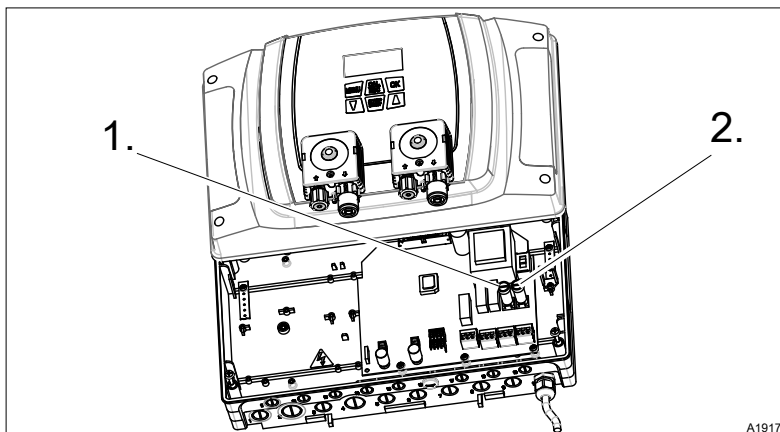


Fig. 32: Changing the fuses

Electrical fuses

Position of the fuse	Function of the fuse	Fuse value	Order number
F2	Protecting the control	0.16 AT	712048
F4	Protecting the pumps	6.3 AT	732379

You can maintain and repair the peristaltic pumps, as described.

13.1 Maintenance

After extended periods of idleness

If the peristaltic pump has not pumped gaseous or adhesive feed chemicals for a longer period of time, checked whether the state of the hoses permits reliable operation.



This can lead to a reduction in pump capacity over time depending on the operating conditions. Therefore replace the pump hose earlier if necessary.

The power end is maintenance-free.

Approx. every six months

Checks:

- Visual control of the liquid end
- Check the pump hose for leak-tightness
- Check the pump connectors for leak-tightness

Shorter maintenance intervals may be necessary depending on the feed chemicals used and operating conditions.

Approx. annually

Replace the pump hose.

13.2 Repair



Ensure that the system is at atmospheric pressure.

Drain the pump hose and thoroughly rinse it with a suitable medium.

Only turn the rotor in a clockwise direction.

Changing the pump hose

1. ➤ Loosen the suction hose and the discharge hose from the hose connectors
2. ➤ Loosen the fixing bolt on the transparent cover and remove the transparent cover
3. ➤ Remove the suction-side hose connector (left) from its mounting
4. ➤ Carefully pull the pump hose out under the rollers
5. ➤



When doing so, ensure that the rounded sides of the hose connectors are pointing towards the unit.

Insert the two hose connectors of the new pump hose into the two mountings.

6. ➤ Briefly switch on the motor. The pump hose moves into the correct position under the rollers
7. ➤ Replace the transparent cover on the housing and screw it into place
8. ➤ Fix the suction hose and the discharge hose to the hose connectors

13.3 Maintaining the sensors

Maintain and clean the sensors as described in the relevant operating instructions for the sensors.

14 Decommissioning and disposal

- **User qualification:** instructed user, see  *Chapter 4.1 'Users' qualifications' on page 13*



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 manufacturer 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.



De-energise the mains cable and ensure that it cannot be switched on again during decommissioning.

Thoroughly clean the housing and especially the pump hose of chemicals and dirt when decommissioning the unit!

1. ➤ Disconnect the unit from the mains power supply
2. ➤ Drain the pump hose and thoroughly rinse it with a suitable medium

Observe storage conditions for temporary decommissioning.

14.1 Disposal of used parts

- **User qualification:** instructed user, see [🔗 Chapter 4.1 'Users' qualifications'](#) on page 13

! NOTICE!

Regulations governing the disposal of used parts

- Note the current national regulations and legal standards which apply in your country

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

You will find the current decontamination declaration to download on our homepage.

15 Technical data

Parameter	Value
Measuring range:	pH: 2.00 ... 12
	ORP: 100 ... 1000 mV
Resolution:	pH: 0.01 pH
	ORP: 1 mV
Input resistance of pH/ORP input:	Glass electrode $> 5 \times 10^{11}$ Ohm
	Reference electrode $> 10^7$ Ohm
Measuring error:	maximum ± 1 % of the measuring range
Control characteristic:	P-control
Control:	Two 1-sided controllers with selectable control direction (raise/lower)
Control output:	2 output relays under operating voltage with pulse length control outputs and protective RC circuit
Electrical connection:	230 V~ ± 10 %
Power consumption:	approx. 14 W
Power consumption	approx. 120 mA (at 230 Volt)
Switching-on duration:	100 %
Galvanic Isolation:	3750 V between the mains line and the accessible lines
	500 V between the measuring circuits
Output relay:	Maximum contact load 2 x 3 amps
	Maximum pump capacity class: 50 W
Alarm relay	Maximum contact load 5 amps
	No ohmic loads

Technical data

Parameter	Value
Display:	Liquid crystal 100 x 32 points
Ambient temperature:	5 ... 45 °C
Degree of protection:	IP 65
Dimensions:	approx. 240 x 360 x 145 mm (H x W x D)

Peristaltic pump data

Pump type	Max. pump capacity* at maximum back pressure			Connector size Ø x Ø	Suction lift**	Priming lift**	Permissible priming pressure on the suction side**
	bar	50 Hz	60 Hz	mm	m	m	bar
		l/h	l/h				
0204	1.5	0.4	0.48	6 x 4, 10 x 4	4	2	0.5
0208	1.5	0.8	0.96	6 x 4, 10 x 4	4	2	0.5
0216	1.5	1.6	1.92	6 x 4, 10 x 4	4	2	0.5
0224	1.5	2.4	2.88	6 x 4, 10 x 4	4	2	0.5

*depending on the back pressure.

** The values were determined with water.

Chemical resistance

The unit is resistant to normal atmospheres in plant rooms.

Resistance to other chemicals, see ProMinent Resistance List (homepage or Product Catalogue).

At 25 °C the pump hose is resistant to:

- Sodium-calcium hypochlorite 12 % (NaOCl) (Tygon® only)
- Hydrochloric acid 38 % (NaOCl) (Tygon® only)
- Sulphuric acid 30 % (H₂SO₄)

UV resistance

- Do not expose the unit to direct UV radiation.

Switching-on duration:

60 % with type 0224 (3 minutes on/2 minutes off)

Precision of pump capacity

The starting precision of the pump capacity is ± 10 %. The pump capacity can fall during operation due to damage to the elasticity of the pump hose.

Material specifications and resistance of the swimming pool controller

Part	Material
Pump hose	PharMed®
Hose connectors	PVC
Dosing head	PPE
Rotor	PA
Transparent cover	PC
Housing	PC/ABS
Housing seal	PUR
Housing screws	A2
Cable threaded connectors	PA/Neoprene®
Membrane keypad	Polyester film

Sound pressure level

Sound pressure level < 70 dB
according to DIN EN 12639

15.1 Spare parts

Component	Order number
Pump hose, PHARMED®	1009480
Transparent cover, DF2a	1007736
Roller bearing in transparent cover	1017985
Rotor	1009478
Union nut	1009968
Adapter G1/4 - M20x1.5	1044908
O-ring for adapter, 4.5 - 3.0, VITON®	1044910
Connector kit, simple, 10 x 4	1002589

Electrical fuses

Position of the fuse	Function of the fuse	Fuse value	Order number
F2	Protecting the control	0.16 AT	712048
F4	Protecting the pumps	6.3 AT	732379

16 Appendix

Dimensions of the swimming pool controller

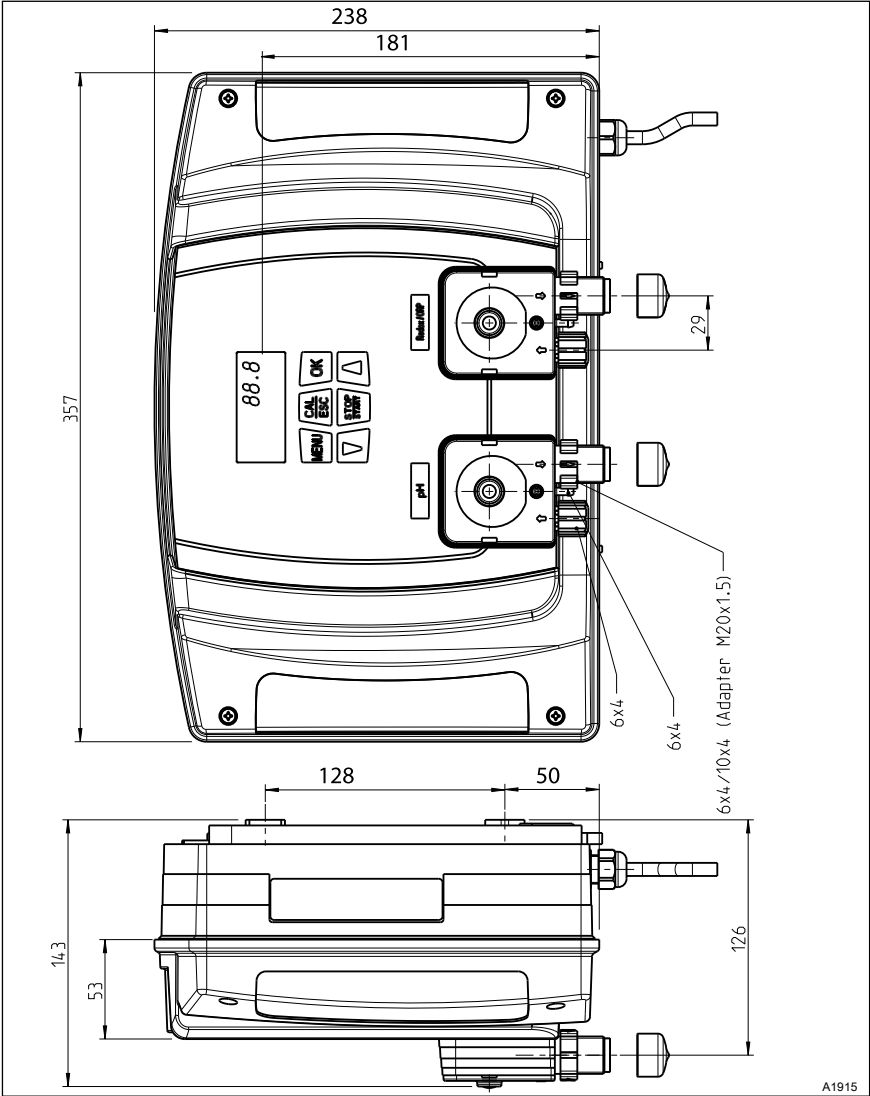


Fig. 33: Dimensions of the swimming pool controller

16.1 EC Declaration of Conformity

Swimming pool controller without pumps

We,

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

hereby declare that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of a modification to the product not agreed with us.

Extract from the EC Declaration of Conformity

Designation of the product:	Splash Control series of measuring and control system
Product type:	PPCa _ _ _ _ _ 0 0
Serial number:	refer to nameplate on the unit
Relevant EC directives:	EC Low Voltage Directive 2006/95/EC EC EMC Directive (2004/108/EC)
Harmonised standards applied, in particular:	EN 61010-1, EN 61326-1 EN 61000-6-2/3
Date:	20.01.2014

You will find the EC Declaration of Conformity to download on our homepage.

Swimming pool controller with pumps

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

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

hereby declare that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of a modification to the product not agreed with us.

Extract from the EC Declaration of Conformity

Designation of the product:	Splash Control series of measuring and metering system
	PPCa _ _ _ _ _ X Y // X ≠ 0 or Y ≠ 0
Serial number:	refer to nameplate on the unit
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) Compliance with the protection targets of the Low Voltage Directive 2006/95/EC according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
Harmonised standards applied, in particular:	EN ISO 12100, EN 809 EN 61010-1, EN 61000-6-2/3
Date:	20.01.2014

You will find the EC Declaration of Conformity to download on our homepage.

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The latest version of the operating instructions is available on our homepage.

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