Operating Instructions Manual

DULCOMETER® DSR
Swimming Pool Controller
Measured variable pH

Please affix device label here!

Please read the operating instructions through completely before commissioning this equipment! · Do not discard!
Any part which has been subject to misuse is excluded from the warranty!

Part no. 987479 **ProMinent Dosiertechnik GmbH · D-69123 Heidelberg · F. R. Germany** BA DM 092 01/02 GB

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Operating Instructions Manual
DULCOMETER® DSR,
measured variable pH

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DSR pH swimming pool controller Identity code

DSRa	W	Housing version
	0	light grey, sticker with ProMinent logo
	1	light grey, sticker without ProMinent logo
	2	blue, sticker with ProMinent logo

	Operating voltage
0	230 V 50/60 Hz
1	115 V 50/60 Hz

	Measured variable
P0	pH

5	0											
		2	0	N	0	1	0					

	Language
D	German
E	English
F	French
N	Dutch
I	Italian
S	Spanish

														1

DSRa	W			P0	5	0	2	0	N	0	1	0		1

1 Instructions for use of manual

Please read through these instructions for use carefully. They will enable you to make the best possible use of this operating instructions manual.

The following sections are highlighted in the text

- Enumerated points

➤ Instructions

Input menus

GUIDELINES

Guidelines are intended to make your work easier.

Safety instructions:

WARNING

Describes a possibly hazardous situation. If the situation is not avoided you will be in grave danger and may lead to serious injury.

CAUTION

Describes a potentially dangerous situation. Non-observance can lead to personal injury or damage to property.

TAKE CARE

Describes a potentially dangerous situation. Non-observance can lead to damage to property.

2 Safety

Correct use

The DSR controller is a microprocessor controller measurement and control device for the measured and control variable pH.

This device is exclusively designed for the:

- measurement of the pH measured variable
- control of the pH control variable
- display of the measured variable

The device may not be used outdoors! It is prohibited to use the device for any other applications or to modify it any way!

WARNING

The device may carry mains voltage (may be live) at the connection terminal when connected to the power supply!

TAKE CARE

- ***The device has no on/off switch. It is ready to operate as soon as it is connected to the power supply.***
- ***The device must be assembled, installed and adjusted by trained and authorised personnel.***
- ***The device must not be used for outdoor applications without further protection (exterior housing, weather protection roof)! The type of enclosure does not permit any standing water on the housing seal and the housing may also be damaged by direct sunlight.***
- ***The device must be calibrated to the pH probe at regular intervals to prevent the possibility of incorrect and dangerous doses!***
- ***In order to prevent overdosing, the voltage supply to the DSR controller and the metering pump should be governed by the voltage supply to the circulating pump, i.e. if the circulating pump is idle, the DSR and dosing pump must also be disconnected from the mains.***

3 Storage/transport

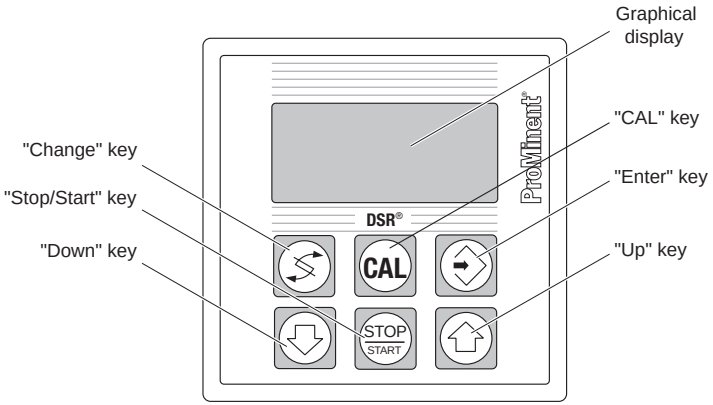
TAKE CARE

- ***Transport and store the device is its original packaging.***
- ***Protect the DMT from damp and the effects of chemicals even when packed.***

Ambient conditions for storage and transport:

Temperature:	-10 °C to +70 °C
Humidity:	< 95 % relative humidity

4 Device overview/control elements



The DULCOMETER® DSR controller graphical display uses the following symbols:

Symbol	Meaning
O	Stop key pressed
Ɛ	Fault
1	pH reference value exceeded 2-point-controller 1 acid metered
1	pH reference value fallen below 2-point-controller 1 alkali metered
◢	Pulse length1* (acid, alkali) controller off
◿	Pulse length1* (acid, alkali) controller on

* controls metering pump or solenoid valve

5 Assembly/installation

5.1 Assembly (mechanical)

The device can be wall or control panel mounted.

5.1.1 Wall mounting

The device can be screwed directly to the wall using the bracket provided.

Assembly materials:

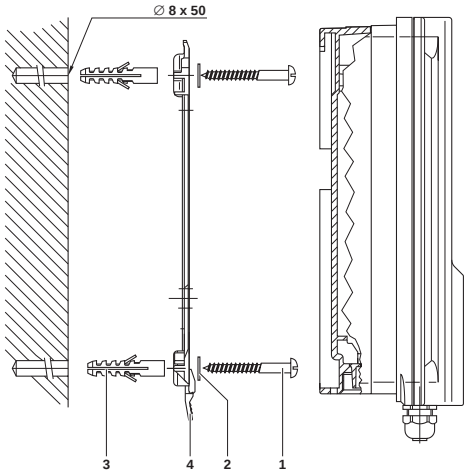
3 off Half-round head screws 5 x 45 mm (1)

3 off Washers 5.3 (2)

3 off Wall plugs Ø 8 mm, plastic (3)

Fasten the device to the wall using the bracket:

- Using the wall bracket (4) as a drilling template mark the positions of the holes.
- Drill holes (using 8 mm drill bit), depth approx. 50 mm
- Insert wall plugs (3)
- Screw on the wall bracket (4) with the screws (1), using washers (2)
- Hang the device in the top of the wall bracket (4), and push upwards until you hear an audible click.



5.1.2 Control panel assembly

The device can also be control panel mounted using the wall-mounting housing.

You require the “panel mounting” assembly kit, part number 792908.

Assembly materials:

1 off 3 mm Ø foam rubber seal

6 off Zinc plated steel holding yokes

6 off PT self tapping screws

TAKE CARE

- ***The control panel must be thick enough to withstand assembly without buckling! (Minimum 2 mm thickness steel; correspondingly thicker if plastic!) Otherwise the device will not conform to enclosure rating IP 54!***
- ***Check the measurements of the drilling/stamping template (please find in appendix)!***

GUIDELINE

Once assembled, the device projects approx. 35 mm from the control panel.

The device is simply installed in its housing onto the control panel. Tensioning is carried out using the holding yokes.

Prepare a mounting aperture beforehand as follows:

TAKE CARE

Allow approx. 120 mm above the device for installation purposes (parking position)

➤ Using the drilling/stamping template, mark the exact location of the device (e.g. with adhesive tape) on the control panel.

➤ Centre-punch the holes for screws through the drilling/stamping template.

➤ If you do not want to punch out the mounting aperture, drill the 4 inner holes using a 12 - 13 mm drill bit.

➤ Pierce out sections using a piercing saw/keyhole saw as on the drilling/stamping template.

CAUTION

Sharp edges can cause injury!

➤ Remove sharp edges.

➤ At the same time insert the profile seal (1) into the groove of the device.

➤ Place the device into the mounting aperture.

➤ Tension the device with the control panel from the rear with the holding yokes (2) and the screws (3) (a second person may be required to assist).

TAKE CARE

➤ ***Check location of seal once more! Enclosure rating IP 54 is only achieved when assembly is carried out correctly!***

5.2 Installation (electrical)

WARNING

- ***Installation may be carried out only by specially trained and appropriately certified personnel!***
- ***Installation may be carried out only once assembly is complete!***
- ***The device must be disconnected from the power during installation and steps taken to ensure power cannot be accidentally reconnected!***
- ***The supply voltage must always be switched off when handling power supply leads!***

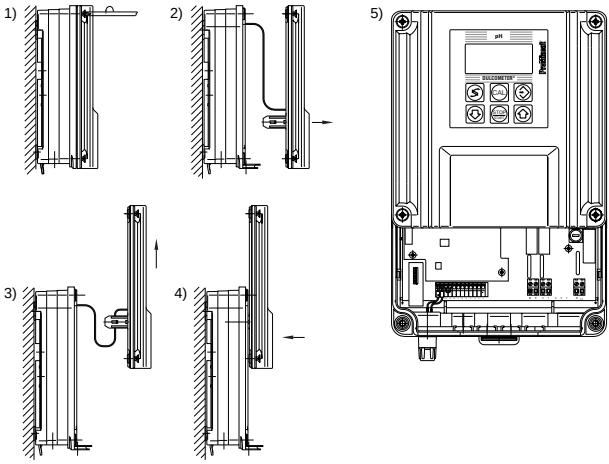
TAKE CARE

Connection changed! The pumps are supplied with power directly by the XR1.

GUIDELINE

Pumps with built-in control should not be controlled via DSR!

The upper section of the device can be inserted using both guide rails into the approx. 100 mm high insert, i.e. the “parking position” (take care that the ribbon cable is not loosened at this point). When In the parking position all fuses and terminals are easily accessible (see fig.).



The following cable apertures can be used when wall-mounting:

5 off PG 11 threaded apertures

4 off 12.5 mm threaded apertures for PG 7 (for Ø 3 - 6.5 mm) lead

TAKE CARE

When installing in a control panel, use only the rear row of threaded apertures (PG 11) as these will be located within the control panel!

Select the corresponding sealing ring in accordance with your lead cross section:

5 off sealing rings, internal Ø 9 mm (for lead Ø 8 - 10 mm)

3 off sealing rings, internal Ø 7 mm (for lead Ø 6 - 8 mm)

3 off sealing rings, internal Ø 5 mm (for lead Ø 4.5 - 6 mm)

5 off sealing rings, internal 2 x Ø 5 mm (for lead Ø 4.5 - 5.3 mm)

2 off sealing rings, internal 2 x Ø 4 mm (for lead Ø 3.5 - 4.3 mm)

2 off sealing rings, internal Ø 4 mm (for lead Ø 3.5 - 5 mm)

5.2.1 Wall mounting

➤ Undo the housing screws.

➤ Remove the front section and place in the parking position.

➤ Break open as many thread holes on the underside of the rear section as required (see figure).

➤ Strip the leads to a suitable length.

TAKE CARE

Attach the wires at a distance of 30 mm from the terminals with cable ties! It must not be possible for live wires to come into contact with low voltage terminals should they come loose!

➤ Push the corresponding threaded connector (1), the collar (2) and a corresponding sealing ring (3) onto the lead, screw into the threaded aperture and tighten. Sufficient cable must be left in the housing to ensure strain can never be exerted on the terminal connection!

➤ Strip the wires approx. 7 mm and fit corresponding crimp connectors.

➤ Connect the wires according to the electrical wiring plan (see appendix). Push the ends of the stranded wires into the terminals up to their insulation!

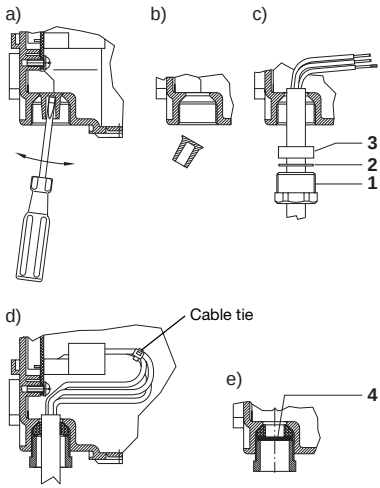
➤ Tighten the locking screws.

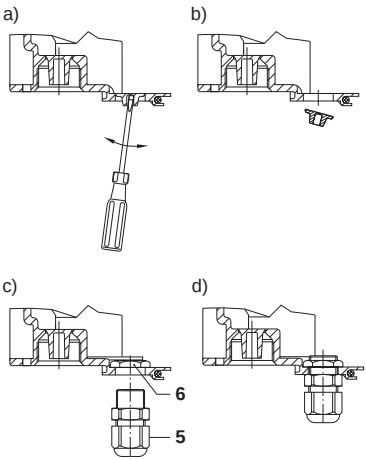
➤ Remove the front section from the parking position and tighten the four screws finger-tight.

GUIDELINE

Always apply crimp connectors when working with bare wires.

Unused opened cable apertures can be closed using the stoppers (4) provided.





5.2.2 Control panel mounting

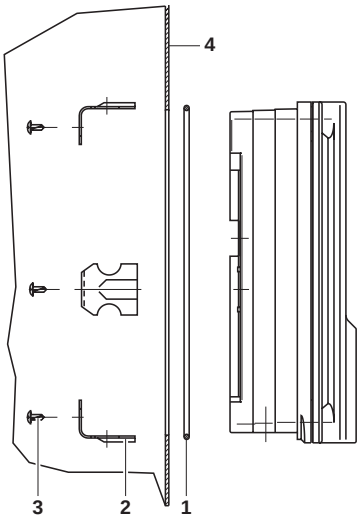
GUIDELINE

When installing in a control panel, use only the back row of threaded apertures (PG 11) as these are located within the control panel!

- ➤ Unscrew the four housing screws.
- ➤ Remove the front section and place into the parking position.
- ➤ Break open as many thread holes on the underside of the rear section as required (see diagram) using a Ø 4.5 mm screwdriver.
- ➤ Strip the leads and fit corresponding crimp connectors.
- ➤ Push the leads through the threaded apertures (behind the control panel; requires second person?)
- ➤ Connect the wires according to the terminal connection plan (see appendix).
- ➤ Remove the front section from the parking position, locate onto the rear section and tighten the four screws finger-tight.

GUIDELINE

In order to relieve stress on the cable it must be fed through a cable duct on the device side.



6 Function description

The DULCOMETER® DSR swimming pool controller is a microprocessor controlled measuring and control device for the measured/control variable pH value. It measures and displays the pH value. If used with corresponding regulating units (e.g. metering pumps) the DSR can perform control functions.

All pre-set values are stored in duplicate in an EEPROM tp protect against power failure. Settings are saved by pressing the enter key as you exit a menu option.

If a fault occurs the DSR displays an error message.

Start/Stop key

The process controller is activated when you press the Start/Stop key.

NOTE

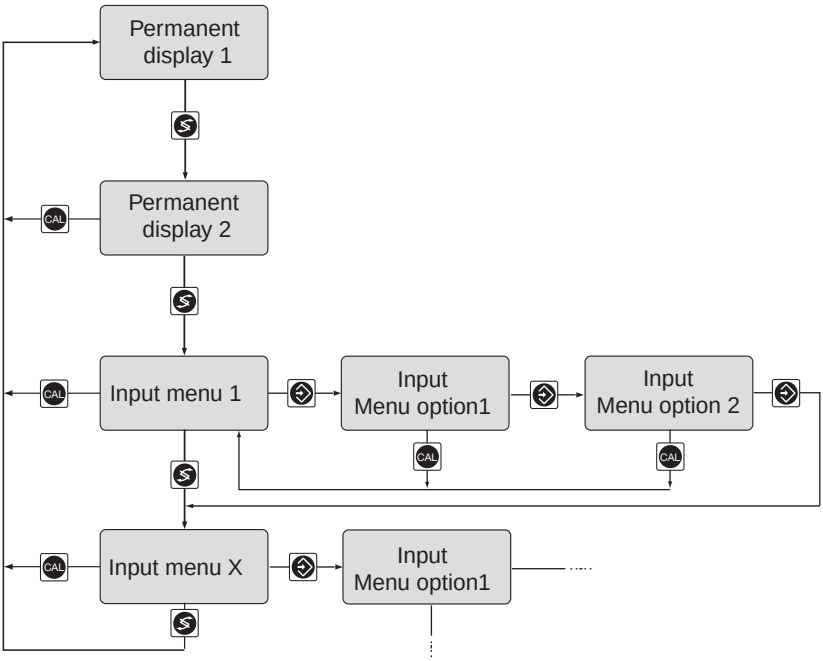
The control process begins after 2 min. (factory setting). Until then it is switched off via the metering delay to prevent overdosing. The metering delay is activated every time the system is switched on at the mains. It is also activated after calibration.

	In the input menus and permanent displays	In the menu options
"Change" key: 	Toggle between the permanent display and input menus. Access menu options (Access code?)	In the menu options
"Enter" key: 	Used to access menu options (Access code?)	Exit a menu option and save values and access an input menu or another menu option
"Up" key: 	Enter access code	Change a value Priming
"Down" key: 	Enter access code	Change a value
"START/STOP": key 	Start/stop the control and metering funktion	Start/stop control and metering
"CAL" key: 	Open the calibration menu Return to permanent display 1	Return to input menu without saving changes.

6.1 Diagram of operating menu

The operating menu consists of

- permanent displays
- input menus
- input menu options



6.2 Negotiating the operating menu

GUIDELINE

- ***You can exit any window of the operating menu by pressing the CAL key. Depending upon where you are in the operating menu you will return either to the permanent display or to the corresponding info display.***
- ***If you do not press any key within 10 minutes, the display will automatically return to permanent display 1 (does not apply to calibration menu).***

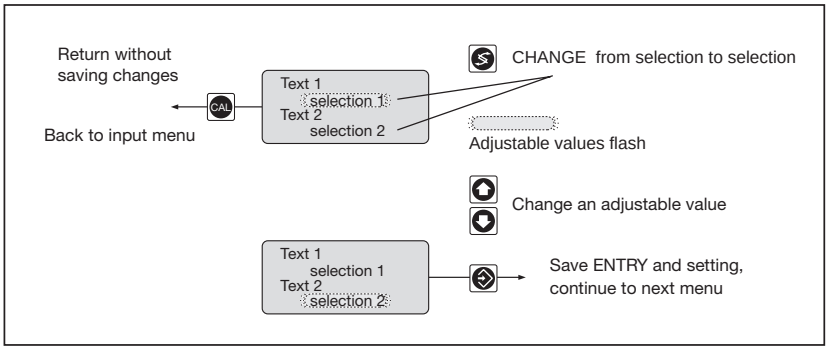
6.2.1 Permanent displays and input menus

The individual windows in the permanent display and the input menus are accessed in turn by pressing the change key. Return to permanent display 1 by pressing the back key. After having scrolled through all windows in turn, you will eventually return to permanent display 1.

6.2.2 Menu options

Without access code

From input menus, menu options are accessed using the enter key. The enter key is also used to exit the menu options and simultaneously save the values selected in the menu option (see figure). If you do not want to save the value, then exit the menu option using the CAL key; you will then return to the input menu.



With access code

Input menu options be accessed by entering the correct access code, if one has been set. Access to the menu options for subsequent input menus can then be gained without an access code. Once you have returned to permanent display 1, access to input menu options may be gained only by re-entering the access code.

6.2.3 Negotiating menu options

Once you have accessed the menu options, you will see words and figures (see figure). Adjustable values flash. You may activate another value using the change key (value options start flashing). You may also return to a previous adjustable value using the change key.

You can change an adjustable value. There are two types of adjustable value, and they are altered in two different ways:

Change word/expression

➤ Press the up or down keys to select word/expression.

Change numerical value

➤ Press the up or down keys. If you press a key briefly once, then the last figure is increased/decreased by 1. If you hold the key down, then the figure will continue to change in the direction selected. If you continue to hold the key down, the figure will change increasingly rapidly.

You can exit a menu option by pressing the enter key or CAL key as in the operating menu.

GUIDELINE

Your settings become effective the moment you press the enter key.

7 Operation and adaptation

There are essentially two menus for the DSR:

- A limited operating menu
- A full operating menu

The device is delivered configured to the limited operating menu. This menu contains all the necessary steps required to commission the device.

These steps are as follows:

- Performing a calibration
- Changing the access code
- Changing the operating language
- Changing the pH reference value

The full operating menu is intended for use by trained personnel and is used to set or change settings (accessible with code number). It also offers the following options:

- Switching the relay function from pulse length to two-point control
- Setting the dosing delay and dosing control times.

An expert can therefore fully adapt the DSR to your process system.

GUIDELINE

Please read the function description section first. This gives instructions on how to negotiate the operating menu and alter values.

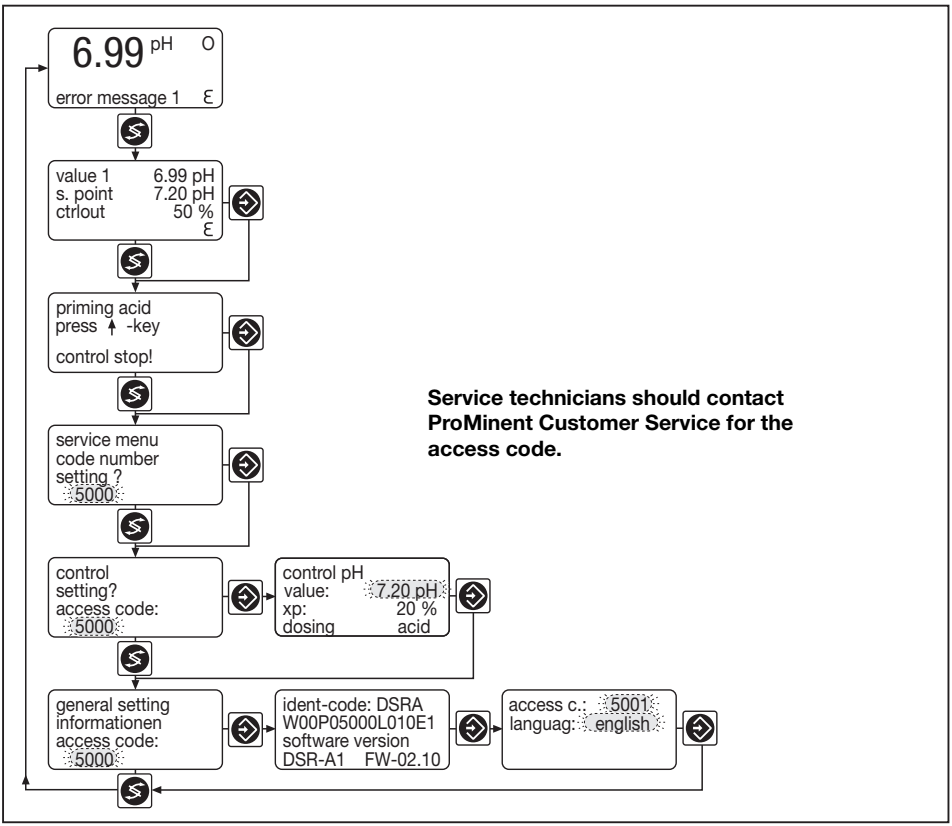
The operating menu comprises permanent displays and input menus with the following functions:

Permanent display 1	Monitoring Calibration
Permanent display 2	Monitoring
Priming (acid/oxide)	Priming of acid or oxide
Service menu	Change to full operating menu
Controller settings	Set pH reference value xp/dosing direction (full operating menu)
Relay settings (full operating menu only)	Set the control type to pulse length or 2 point control
General settings	Set identity code/program version Set dosing delay/dosing control (full operating menu) Set calibration type/pH buffer 2 (full operating menu) Set access code Set language Activate filter/reset (full operating menu)

GUIDELINE

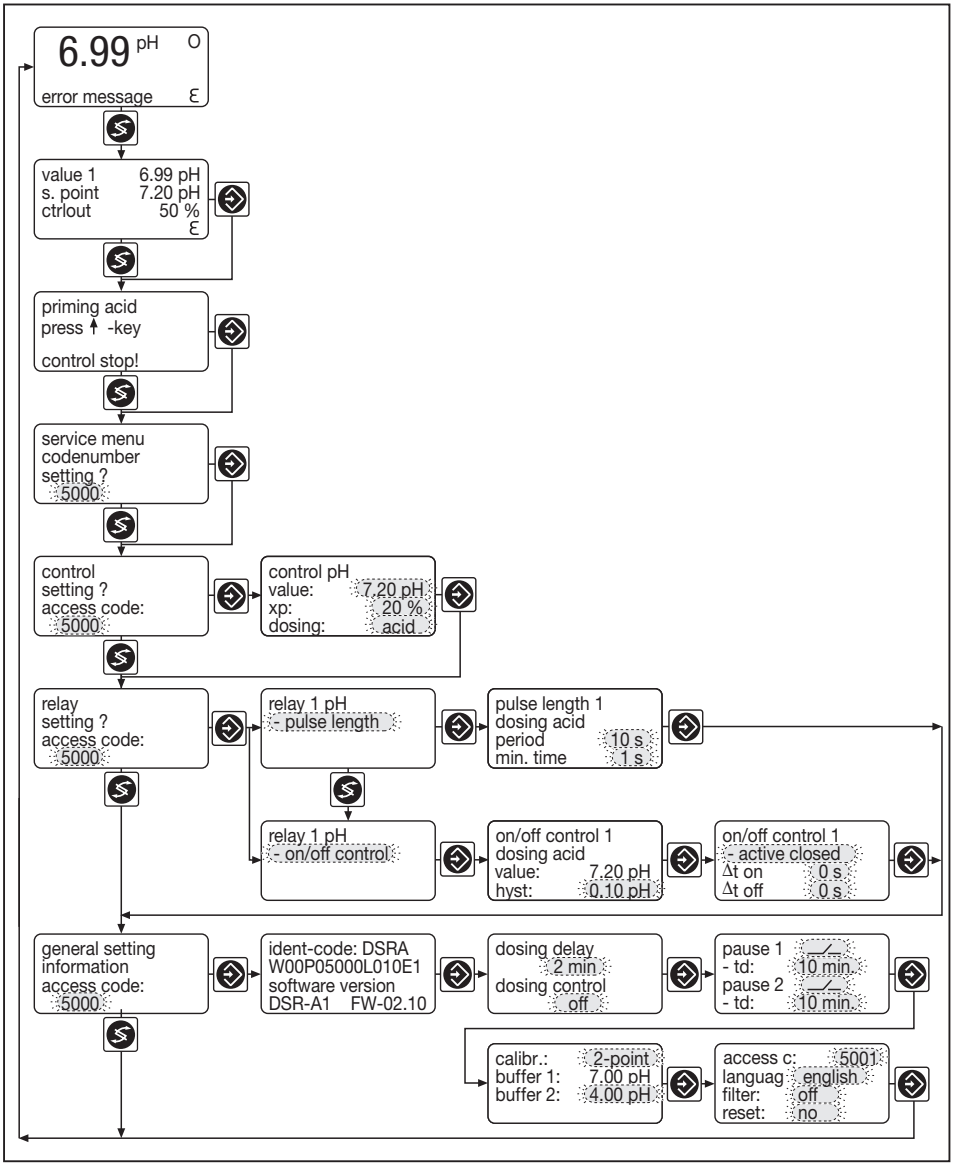
Please read the function description section first in order to learn how to negotiate the operating menu.

Limited operating menu

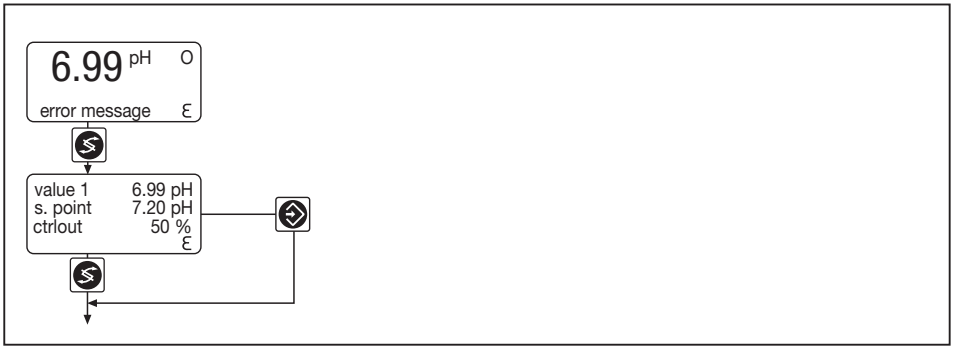


Service technicians should contact ProMinent Customer Service for the access code.

Full operating menu



7.1 Monitoring

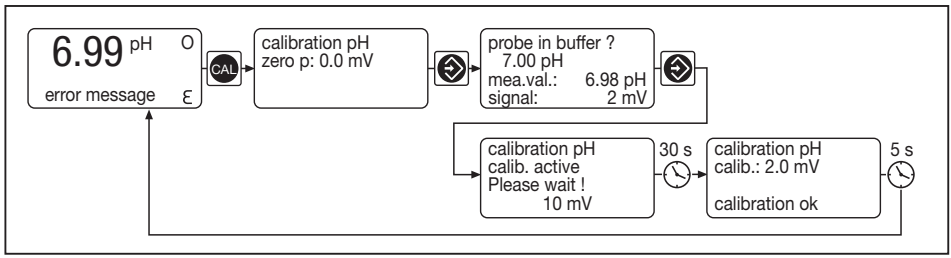


The device function can be monitored via permanent displays 1 and 2.

7.2 Calibration

Explanations to the calibration types you find in “Glossary terms”, chapter 13.
You can select the calibration type in “General settings”, see chapter 7.7.

7.2.1 One point pH calibration



CAUTION

- ***You must calibrate the pH probe regularly during operation, i.e. 24 hours after the first calibration and then once each week.***
- ***The pH probe must be calibrated using only quality buffer solutions! The “Phenol red method” is too imprecise for this calibration!***
- ***Incorrect calibration can lead to incorrect dosage.***

GUIDELINE

Once access to the calibration menu has been confirmed the device stops performing the following pH functions:

- ***Control and metering***
- ***Troubleshooting***

Preparation:

Have pH 7 buffer solution ready. Prepare to dismantle pH probe (see operating instructions manual for the probe and the in-line flow housing).

Calibrating the device:

➤ Press the CAL key in the permanent display: the calibration menu will appear.

➤ Press the enter key: the menu option (“Probe in buffer?”) appears and metering stops.

➤ Dismantle the pH probe in this device state (see operating instructions manual for the probe and the in-line flow housing).

➤ Immerse the pH probe into the pH 7 buffer solution and stir gently.

➤ Press the enter key: the menu option (“Calibration active. Please wait!”) appears.

➤ After 25 sec the message “calibration OK” appears if calibration has been successful.

➤ After 5 sec the display returns to permanent display 1.

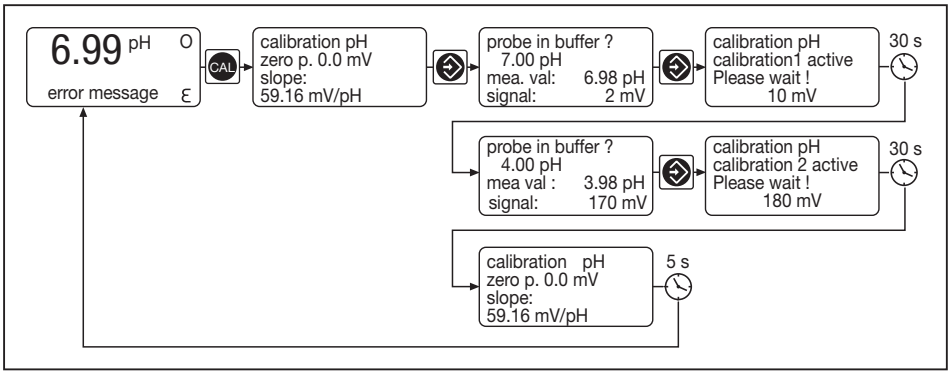
TAKE CARE

- ***Install the pH probe while metering is in delay mode!***
- ***Do not cancel metering delay period using the stop/start key otherwise the pumps will run against a closed isolation valve and could be damaged!***
- ***If the pumps start running, stop with the stop/start key!***

➤ Reassemble the pH probe (see operating instructions manual for the probe and the in-line flow housing).

➤ The device will start to meter once more after the dosing delay period has elapsed.

7.2.2 Two point pH calibration



CAUTION

- ***You must calibrate the pH probe regularly during operation, i.e. 24 hours after the initial calibration and then once each week.***
- ***The pH probe must be calibrated using only quality buffer solutions! The "Phenol red method" is too imprecise for this calibration!***
- ***Incorrect calibration can lead to incorrect dosage.***

Preparation:

Have pH 7 and, e.g. pH 4 buffer solutions ready. Prepare to dismantle pH probe (see operating instructions manual for the probe and the in-line flow housing).

Calibrating the device:

➤ Press the CAL key in the permanent display: the calibration menu will appear.

➤ Press the enter key: the menu option ("Probe in buffer?") appears and metering stops.

➤ In this device mode, dismantle the pH probe (see operating instructions manual for the probe and the in-line flow housing).

➤ Immerse the pH probe into the pH 7 buffer solution and stir gently.

➤ Press the enter key: the menu option ("Calibration active. Please wait!") appears.

➤ Immerse the pH probe into the buffer solution 2 and stir gently.

➤ Press the enter key: the menu option (“Calibration active? Please wait!”) appears.

➤ After 25 sec the message “calibration OK” appears if calibration has been successful.

➤ After 5 sec the display returns to permanent display 1.

TAKE CARE

- ***Reinstall the pH probe while metering is in delay mode!***
- ***Do not cancel metering delay period using the stop/start key otherwise the pumps will run against a closed isolation valve and could be damaged!***
- ***If the pumps start running, stop with the stop/start key!***

➤ Reassemble the pH probe (see operating instructions manual for the probe and the in-line flow housing).

➤ The device will start to meter once more after the dosing delay period has elapsed.

If the zero point and slope values are outside the permitted tolerances after calibration:

- The entire calibration is abandoned and the device operates according to the pre-calibration values.
- A general error message then appears in menu 2 and pH metering stops.

7.3 Priming

You can prime the pH correcting agent (e.g. after changing a tank).

Priming of pH correction agent:

priming acid
press ↑-key
control stop!

To initiate priming of pH correcting agent, access the priming (acid/alkali) input menu using the change key. Press the up key. The controller stops and the pump meters for approx. 30 sec.

This also applies in the event that the stop/start key is pressed or when metering is switched off as the result of an error message.

To stop priming:

➤ Press the up key a second time.

Each time you press the up key, the pump will prime for approx. 30 sec.

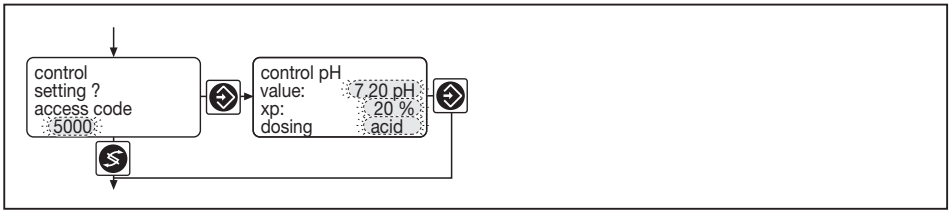
To restart controller:

➤ Go to permanent display 1 and press the stop/start key.

7.4 Service menu

The full operating menu can be accessed when the correct code is entered.

7.5 Setting the controller



This menu is used to set:

- the pH value reference value
- the xp value
- the dosing direction

WARNING

- ***The pH reference value must never be more than 7.5 and never less than 7.0!***
- ***The reference value should only be increased, never decreased!***

Setting the controller:

➤ Enter the access code, if activated, using the arrow keys.

➤ Use the enter key to access control pH menu option.

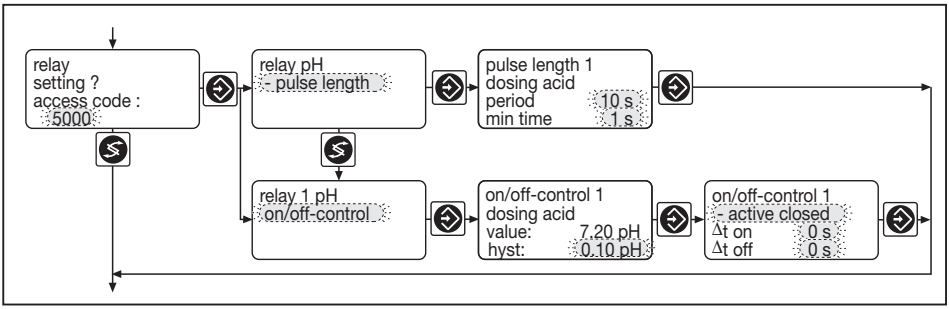
➤ If necessary, alter the pH reference value (flashing) using the arrow keys or select the xp value or the dosing orientation (select using the change key).

➤ Use the enter key to exit the control pH menu option.

GUIDELINE

Once set, the access code will be retained until you next access the permanent display 1.

7.6 Setting the relays



In the relays input menu you can select the control type

Pulse length control:

If you have selected pulse length control you can enter the cycle time and the minimum operating time.

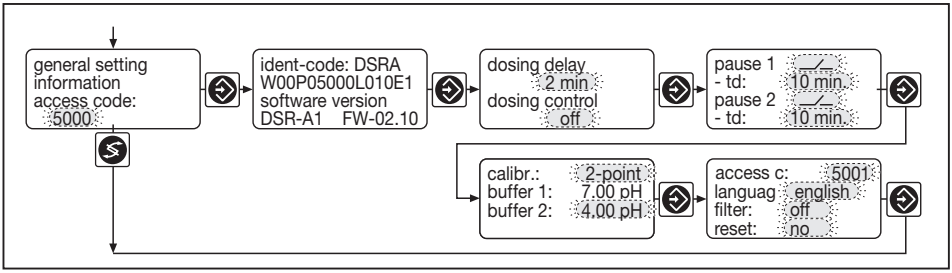
On/off-controller:

If you have selected the on/off-controller you can enter the switching hysteresis.

You can set the active state and the pick-up delay (Δt on) and drop-out delay (Δt off) for each relay.

The relay state is displayed in permanent display 1 with a corresponding symbol.

7.7 General settings



In the general input menu you can:

- Read off the identity code and the software version
- Change the dosing delay
- Change the dosing control time
- Select the calibration type
- Select the pH of the buffer 2
- Activate and set the access code
- Select the operating language
- Switch on filtration
- Reset settings

Identity code menu option

Reading off the identity code and the software version:

➤ Access the identity code menu option using the enter key: here you can read off the identity code and the software version.

➤ Press the enter key twice: permanent display 1 appears.

Dosing delay menu option

Dosing delay

Enter the dosing delay in this option. After connecting to the power supply, dosing and troubleshooting are activated with a delay (= dosing delay). Use the stop/start key to cancel the delay.

Dosing control

Enter the dosing control time under dosing control. If the measured variable has not reached the reference value after this time, dosing and control stops. If the setpoint is reached for more than 1 minute, metering and control are started automatically. Metering and control can be re-started by pressing the start/stop key.

Calibration menu option

The user can choose between 1- and 2-point calibration.

If 2-point calibration is selected buffer 1 and buffer 2 appear in the next two rows. You can only change buffer 2. The buffer value must

vary more than ±1.99 pH from the value of buffer 1! (Otherwise device will stop functioning!)

Selecting access code and language

Activating and setting the access code or selecting the operating language.

An input menu is protectable by an access code. The access code has to be activated:

➤ Press the enter key twice: the access code menu option appears.

➤ If necessary, set the access code using the arrow keys.

➤ If necessary, access language using the change key and set the required operating language using the arrow keys.

➤ Press the enter key: permanent display 1 appears.

GUIDELINE

As a guideline for the user that the access code is deactivated when set to 5000, the 5000 is replaced by the word "off".

Pause 1 and 2

The pause periods are triggered by external digital isolated signals.

If one of the pause inputs is activated, control is stopped and no further faults are output.

The pause periods may be individually set either as actively closed (symbol NO contact) or as actively closed (symbol NC contact).

The time td determines the time after which control is activated again after deactivation of pause.

Ex-works mode is actively closed and td = 10 minutes.

The following signals may e.g. be assigned to the pause inputs:

- isolated contacts in general
- level switch contacts from suction kits
- contact from filter control
- contact of measuring water flow sensors

Filter

Input value filtering can be increased in order to smooth the display.

Reset

A reset can be carried out. During the reset, the data that were stored on delivery to the customer are loaded into the device (see factory settings in the appendix).

8 Operation

GUIDELINE

Please read through the function description section first in order to learn how to negotiate the operating menu and change values.

It must be possible to calibrate and prime during operation. Please refer in this instance to the corresponding “Operation and Adaptation“ sections.

With the stop/start key you can stop the contol (“0“ appears).
This means:
Variable = 0 %

Effects:

- Proportion is cancelled
- Relays switch to idle state

9 Maintenance/repair

Maintenance The device is maintenance-free.

TAKE CARE

Never clean the housing with solvents. Will corrode the surface!

Clean the housing with a cloth dipped in soapy water. Rub dry.

Repair You can only change the fuses.

WARNING

- ***Before opening the housing you must disconnect the entire system (not just the device) from the mains power supply.***
- ***If only the device has been disconnected from the mains, terminal XR1 may be live.***
- ***The fuse must be replaced by an original spare part.***

Fuse: fine fuse 5 x 20 mm 160 mA, 250 V slow-blow
part number 71.20.46

Changing the fuse (see figure next page):

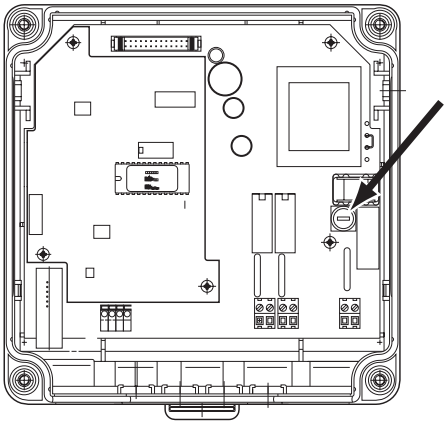
➤ Open the device and place in the ”parking position”.

➤ Open the bayonet fitting of the fuse holder (note arrow).

➤ Replace the fuse.

➤ Close the bayonet fitting of the fuse holder (note arrow).

➤ Close the device and screw together.



10 Troubleshooting

TAKE CARE

- ***If you are requested as a result to dismantle or change the probe, use the operating instructions for the probe and in-line probe housing!***
- ***All faults are indicated in the lower right-hand corner of the display with the symbol "Ɛ". Troubleshooting must begin as soon as the "Ɛ" appears!***

The control stops. This means:
Variable = 0 %

Effects:

- Relays switch to idle state
- Proportion is cancelled

Error messages are found in permanent display 1.

Error message: “check pH input ↓“

Fault: the probe signal is below -500 mV (> pH 14.00)
Cause: the pH probe needs cleaning
Remedy: clean the pH probe and recalibrate

Cause: the pH probe is defective
Remedy: change the pH probe and recalibrate

Cause: the electrode lead is defective
Remedy: check the electrode lead and the plug connection to the pH probe and the connection on the measuring device

Error message: “check pH-input ↑“

Fault: the pH signal is above +500 mV (< pH 0)
Cause: the pH probe needs cleaning
Remedy: clean the pH probe and recalibrate

Cause: the pH probe is defective
Remedy: change the pH probe and recalibrate

Error message: “Stop pH dosing“

Fault: the pH reference value was not reached in the pre-set time period

Cause: the pH probe needs cleaning
Remedy: clean the pH probe, press the stop/start key twice and recalibrate the probe

Cause: the pH probe is defective
Remedy: change the pH probe, press the stop/start key twice and recalibrate the probe

Cause: the acid/alkali metering pump is defective
Remedy: press the stop/start key twice, check the metering pump and completely recommission (excluding probe calibration)
Cause: the chemical storage tank is empty
Remedy: refill the storage tank, press the stop/start key twice and completely re-commission (excluding probe calibration)

Cause: insufficient or interrupted sample water flow
Remedy: open stop valve and start circulating pump

Error message : “pH-calibr. defect“

Fault: the probe could not be calibrated

Cause: the pH probe is defective

Remedy: change the pH probe and recalibrate

Cause: the probe lead is defective

Remedy: connect a new probe lead and recalibrate

Cause: the buffer solution does not comply with the pre-set pH value

Remedy: recalibrate with a new buffer solution

Error message : “control stop !“

Fault: – – –

Cause: The device is switched off

Remedy: Press the stop/start key twice

Error message : “dosing delay“

Fault: – – –

Cause: The device is switched off

Remedy: Press the start/stop key twice

11 Disposal

TAKE CARE

Observe all current locally applicable directives! (e.g. regarding electronic scrap)

12 Technical data

Electrical data

Device:	Protection class II
Supply voltage:	115 V or 230 V AC, corresponding to information on device label
Current consumption:	max. 40 mA at 230 V, AC max. 80 mA at 115 V, AC
Electrical isolation:	3750 V between mains supply voltage and leads with which contact can be made
Measured variable:	pH value: 2.00 ... 12.00
Input resistance:	Glass electrodes: > 5 x 10^{11} Ω Reference elektrode: > 10^{7} Ω
Measurement fault:	max. ±1 % from measurement range
Resolution:	Input/output side 0.01 pH
Display:	Liquid crystal 100 x 32 pixels Character height, measured variable: approx. 14 mm Other characters, height approx. 5 mm
Pause inputs:	Common reference potential and with RS interface but galvanically isolated from the remaining inputs and outputs. Insulation voltage: 500 V
Internal fuses:	5 x 20 mm fine fuse 160 mA, 250 V slow-blow
Power relay output to contact type:	Changeover, suppressed with varistors
Control value output:	Load capacity: 250 V≈, 3 A, 700 VA Contact operating life: >10^{6} switch cycles

Enclosure ratings When installed correctly the following enclosure ratings apply:

- Wall mounted: IP 65
- Panel mounted: IP 54

Compatibility

The device is compatible with all generally available glass probes with a pH 7 meter zero point.

Environmental conditions

Operating temperature:	-5...+50 °C
Storage temperature:	-10...+70 °C
Air humidity:	< 95 % rel. humidity, non-condensing

Dimensions and weight

Dimensions:	wall mounted version 198 x 200 x 76 mm (W x H x D) D_a* = 35 mm D_i* = 38 mm control panel mounted version
Weight:	approx. 1.2 kg approx. 2.0 kg with packaging

*D_a = outside depth, D_i = inside depth

Material information

Housing:	PPE - GF10
Keypad:	Polyester film PET
Housing seal:	Foam rubber CR
Outer seal:	Foam rubber CR
Mounting devices:	Zinc plated steel
M5 screws:	A2

Chemical resistance

The device is resistant to normal ambient conditions in technical plant rooms.

Accessories

	Part no.
• Assembly kit for panel mounting	792908
• Power lead	818446
• Sensor lead	1005672

13 Glossary of terms

pH value

The pH value refers to a measurement for the concentration (activity) of hydrogen ions or, in other words, a measurement for the acidity or alkalinity of water.

The pH value is of great significance in swimming pool water treatment. It affects:

- Disinfection: the disinfecting capacity of chlorine diminishes as pH rises.
- Flocculation: each flocculent has a particular pH range within which it is effective.
- Corrosiveness: as the pH value drops, the water becomes more corrosive towards metallic materials.
- Skin reaction: the acid protection layer on our skin is pH 5.5. Excessive pH values in pool water attack the acid protection layer and lead to skin irritations.

A pH value that is too low encourages the production of tri-chloramines. These cause irritation to the eyes (redness and burning sensation) and mucous membranes (e.g. coughing).

For the reasons mentioned, the pH value in swimming pools should be maintained at between 6.5 and 7.6 (optimum: pH optimum of the flocculent used). In a private pool where flocculents are not normally used, the pH value should be between 7 and 7.2.

The pH measurement is, however, influenced by the following factors:

- Chlorination: all chlorinating products alter the pH value
- The water feed: carbon dioxide (CO_2) which is emitted from the pool water alters the pH value. This effect can be increased by an unsuitable water feed or by air jets, water agitators or similar.

For all these reasons it is necessary to monitor and control the pH value on a continuous basis.

Calibration (of probes)

All pH electrodes deviate from the theoretical values. For this reason it is necessary to carry out a zero point and slope calibration of the probe.

In a one point calibration, this is carried out using pH 7 buffer solution, i.e. zero point calibration.

In case of a two-point calibration, a second value is to be selected to adjust the slope. The second value is dependant upon the actual measurement range (alkaline or acid).

In swimming pools a zero point calibration will suffice. The sensor function can be controlled with a second buffer solution. As the measurement is carried out around the zero point, moderate errors in the slope values are insignificant.

Age and dirt will alter the sensor slope value.

Control variables (Measured variable, actual value)

The control variable is the value to be measured/determined (e.g. pH value, redox value).

Reference value

The reference value is the value which is to be kept constant during the process.

Variable

The variable is the value (e.g. frequency, mA signal) given by the controller to the regulating unit, e.g. a metering pump, in order to adjust the system to the reference value.

Zero point

This refers to the voltage given off by a pH sensor at pH value 7. The zero point of the probe is altered by aging and dirt.

The zero point of pH probes is theoretically 0 mV. In practice good probe function is achieved with a zero point between ±60 mV. New electrodes have a maximum zero point variation of ±30 mV.

Slope/sensitivity

This value is given in mV/pH at 25 °C.

xp value

This value influences the proportional control relationship. Thus, an xp of 10 % at a deviation of 1.4 pH (=10% of pH 14) and/or 100 mV (= 10 % of 1000 mV) gives a variable of 100 %. If the xp value is increased by 20 % the deviation must be double that value in order to achieve a 100 % variable. If the controller is overshot the set xp value must be doubled.

Pulse length

This control signal is used to control small metering pumps and peristaltic pumps, solenoid valves and electrolysis cells.

Pause 1 and 2

The pause periods are triggered by external digital isolated signals.

If one of the pause inputs is activated, control is stopped and no further faults are output.

The pause periods may be individually set either as actively closed (symbol NO contact) or as actively closed (symbol NC contact).

The time td determines the time after which control is activated again after deactivation of pause.

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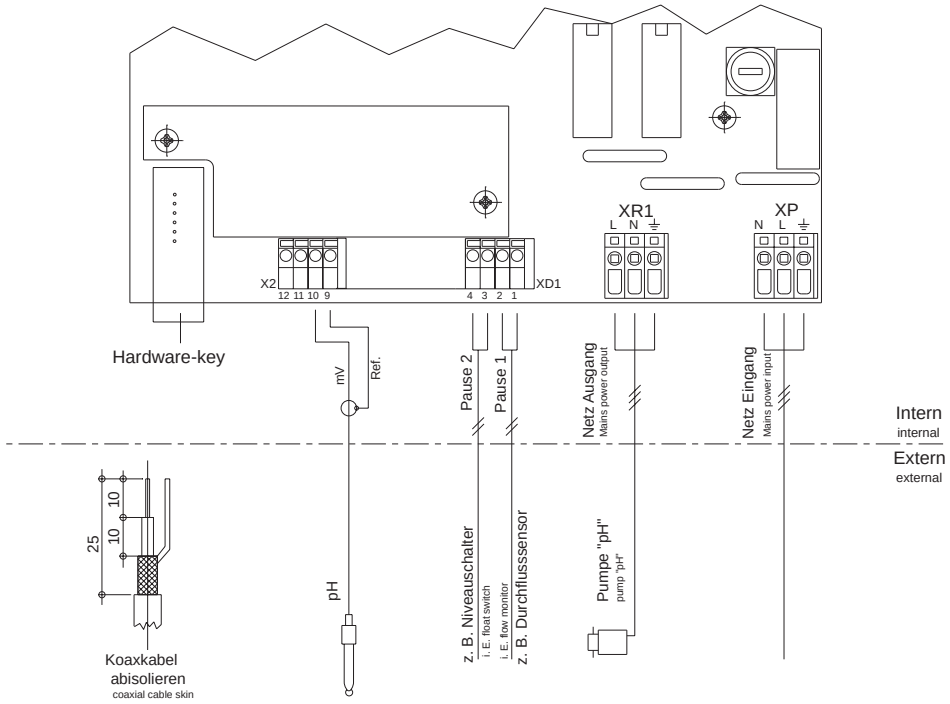
- contact from filter control
- contact of measuring water flow sensors

Index

Adjustable variable	Factory setting	Incremental value/option	Min. value	Max. value	Remark
Access code	5000 (off)	1	0	9999	
Code number	5000	1	0	9999	
Setpoint/value	pH 7,20	pH 0,01	pH 6	pH 10,00	
xp	20 %	1 %	1 %	500 %	100 % corresponds to of pH 14
Dosing direction	acid	acid alcali			
Relay 1 pH	pulse length	2 point controller pulse length			Relay XR 1 pH
Period	10 s	1 s	10 s	9999 s	
Minimum time	1 s	1 s	1 s	period/2	
Hysteresis	pH 0,10	pH 0,01	pH 0,03	pH 1,00	
Switch allocation	N/O	N/O N/C			
Δt on	0 s	1 s	0 s	60 s	
Δt off	0 s	1 s	0 s	60 s	
Dosing delay	2 min	1 min	1 min (off)	30 min	on/off function
Dosing control	off	1 min	1 min (off)	120 min	on/off function
Calibration	1 point	1 point 2 point			
Buffer 2	pH 4,00	pH 0,01	pH 2,00	pH 12,00	
Access code	off (5000)	1	0	9999	
Language	ID code	German English French Dutch Spanish Italien			
Filter	off	1 s	1 s (off)	60 s	on/off function
Reset	no	no yes			
Pause	__/__	__/__			none-operative
td	10 min	1 min	1 min (off)	30 min	on/off function

Connection diagramm



TAKE CARE

Connection changed!
The pumps are supplied with power directly by the XR1.

NOTE

- ***Pumps with built-in control should not be controlled via DSR!***
- ***The components of the device does not in all cases correspond to the above connection diagram or to the plan at the device. The device-specific identification code applies!***

EC Declaration of Conformity

We,

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

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC directives.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Measurement and control system, DULCOMETER***
Product type :	***DSRa ...***
Serial number :	***see type identification plate on device***
Relevant EC regulations :	***EC - low voltage directive (73/23/EEC)*** ***EC - EMC - directive 89/336/EEC subsequently 92/31/EEC***
Harmonised standards used, in particular :	***DIN EN 60335-1, DIN EN 61010-1*** ***DIN EN 50081-1/2, DIN EN 50082-1/2, DIN EN 55011*** ***DIN EN 61000-3-2, DIN EN 61000-3-3, DIN EN 61000-4-2*** ***DIN EN 61000-4-4***
National standards and other technical specifications used, in particular :	***DIN 19226*** ***DIN IEC 38*** ***IEC 61000-3-2, IEC 61000-3-3, IEC 61000-4-2, IEC 61000-4-4*** ***VDE 0838-3-2/3-3, VDE 0847-4-2***
Date/manufacturer's signature :	***12th January 2001***
The undersigned :	*Dr. Rainer V. Dulger, Executive Vice President R&D and Production*

Addresses and delivery information from the manufacturer:

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