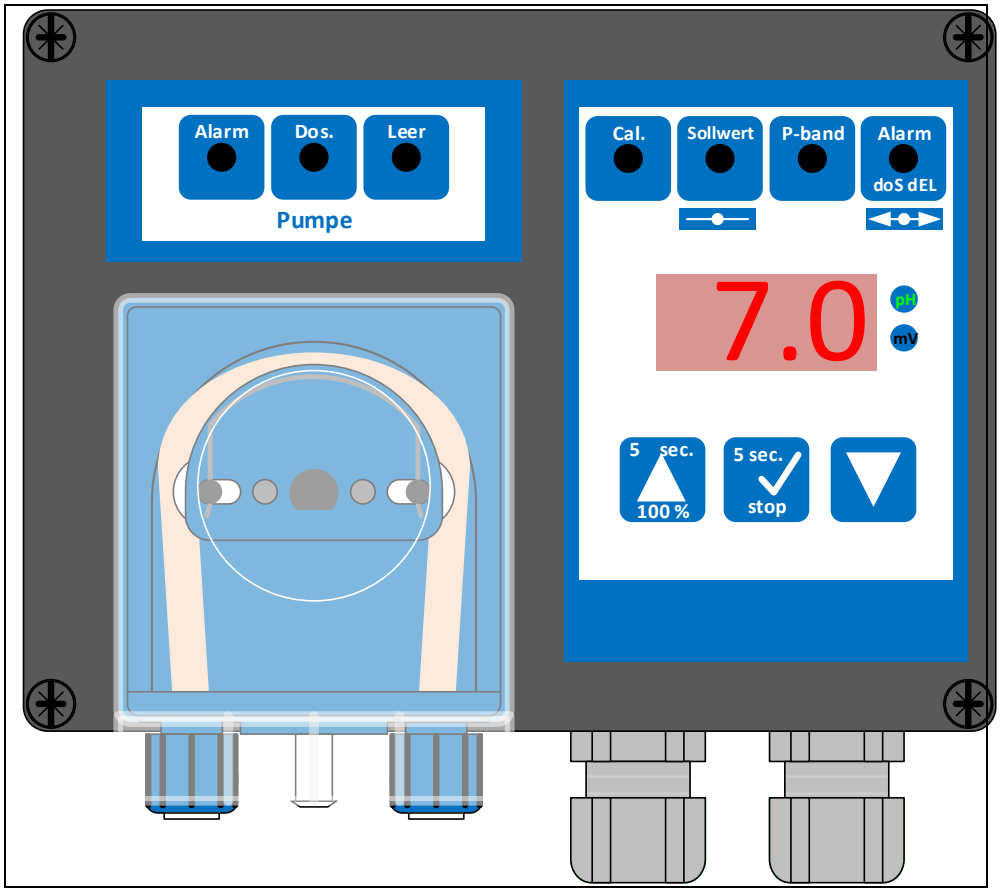
WERNER Dosiertechnik

Operating instructions
Measuring, regulation and dosing technique for pH-value or Redox-voltage

pH/Redox-compact



Measuring, regulation and dosing technique for pH-value regulation and disinfecting dosing

Subject to technical changes

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1. Information regarding these instructions

1.1. Scope of validity

This manual describes the installation, commissioning and operation of the device.

1.2. Target group

Only people instructed in its functions, are authorised to operate the device. Electrical and water connection works may only be done by specialists with the appropriate training.

1.3. Storage of the manual

All instructions of the device as well as of the installed components must be stored directly next to the device, and must be always accessible for the operating staff.

1.4. Further information

Further information about special topics, such as the design of the dosing power or the description of the operating parameters are available at your dealer.

1.5. Symbols used

The following types of safety instructions and general instructions are used in this document:

DANGER!
"DANGER" indicates a safety instruction which no compliance leads directly to **death** or **serious injuries**!

WARNING!
"WARNING" indicates a safety instruction that must be adhered to at the risk of death or **severe injury**!

CAUTION!
"CAUTION" indicates a safety instruction that must be adhered to at the risk of light to **medium injuries**!

ATTENTION!
"ATTENTION" identifies safety instructions that are neglected at the risk of **damage to goods**!

Notice
A notice identifies information whose no compliance may lead to **failures during the operation.**

Hint
A "Hint" characterises information that may help to improve the operation.

2. Safety

2.1. Appropriate use

The device is appropriate for the measurement and the regulation of the pH-value or the Redox-voltage. The dosing of the chemicals is done by means of the installed hose dosing pump.

2.2. Safety instructions

The operation manual must be read before assembly, commissioning and maintenance works. After commissioning, it must be put at the disposal of the operator. In your own interest, follow the safety instructions in this manual.

The use of chemicals must be done with care!

WARNING!
Danger for chemical burns or poisoning!

See the valid safety instructions for the use of chemicals!

- Never mix different chemicals, without knowing their reaction.
- Only use chemicals approved for the pool water treatment.
- During maintenance works, only wear appropriate protection clothes.

More detailed safety information about the used chemicals is available at the supplier of your chemicals.

WARNING!
If the safety instructions are not followed, this can lead to serious injuries or material damage!

3. Device description - scope of delivery

3.1. Device description

The regulation device is appropriate for measuring the pH-value and the Redox-voltage. To change the measuring dimension a jumper must be put on the display board. Therefore, the control casing and the jumper must be opened to change the position of two contacts.

3.2. Scope of delivery

The device is standard supplied with the following accessories.
- Regulator with hose pump in the wall casing
- Suction set with empty message
- Dosing valve
- pH-electrode or Redox- single-rod measuring cell
- Electrode cable 3 m
- Buffer solutions pH7, pH4, (or Redox- test solution) electrode cleaner, distillate water, electrolyte solution

Customer specific or order specific modifications are possible.

3.3. Checking for transport damages

Check the device and accessories immediately after reception as to transport damages and completeness.

3.4. Identification of the device

To order spare parts and to solve problems it is useful to know the serial number of the device. The serial number of the device can be found on the type plate at the right-hand side of the control casing.

4. Assembly

4.1. Choose the assembly place

For an easy operation and later maintenance works an assembly place with free access must be chosen. The assembly place may not be subject to frost and the device may not be exposed to any direct solar radiation.

4.2. Assemble the device at the wall

Chose the assembly height in such a way that the display is situated at eye height. Measure the four perforations at the assembly plate and mark at the wall.

4.3. Power supply

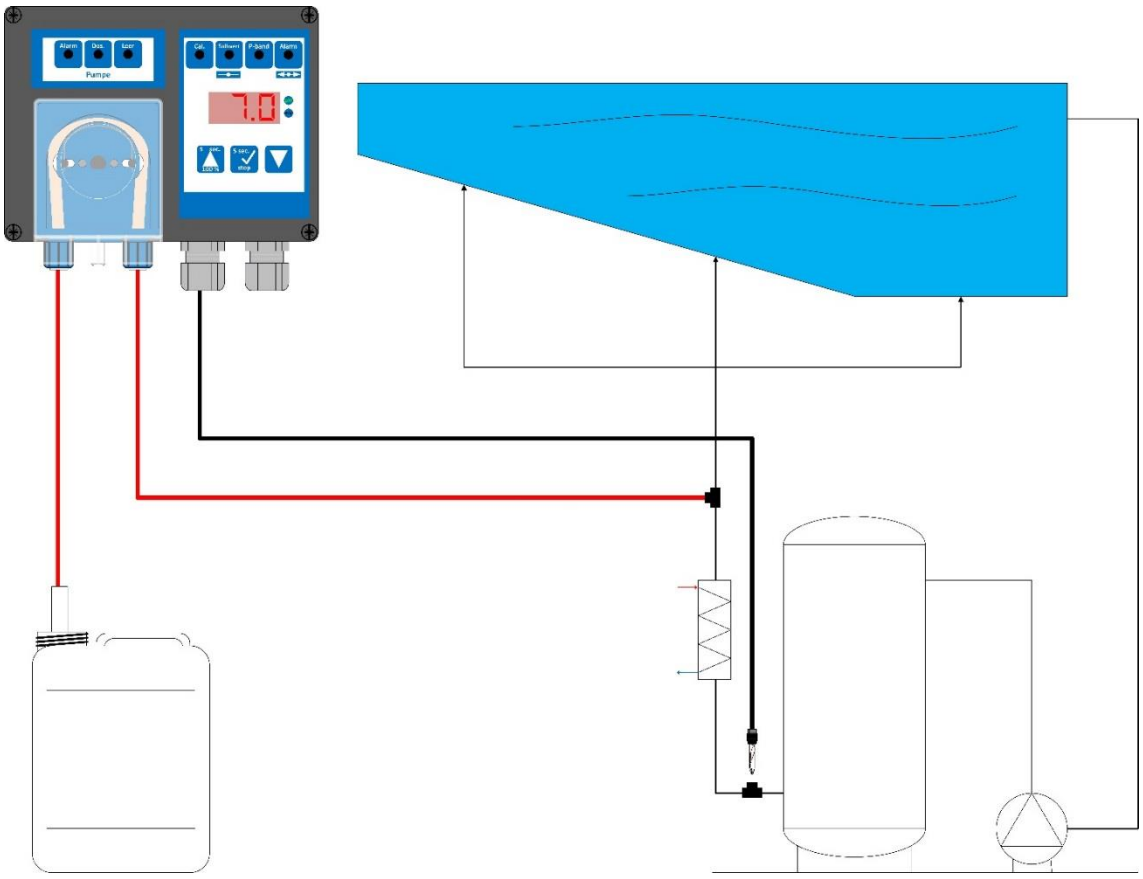
Since the devices do not have a flow rate control, the voltage supply must be locked with the filter system.

4.4. Assembly instructions

Only with “good” pool hydraulics, a satisfying regulation of the both hygiene auxiliary parameters pH-value and Redox-voltage can be achieved. The dosed chemicals must reach all pool areas within a short time. Also in case of charges, concentrations measured at different places must be approximately equal. The measurement water, if possible, must be identical with the pool water and must be taken as soon as possible to the measuring cell. Only in this way changes of the water quality can be registered quickly and can be corrected again.

Only measuring water samples taken directly from the swimming pool will result in satisfactory measuring and control results. When the pool water flows through a overflow channel and a compensating tank (flush water tank), into which fresh water may also be fed.

4.5. Installation scheme

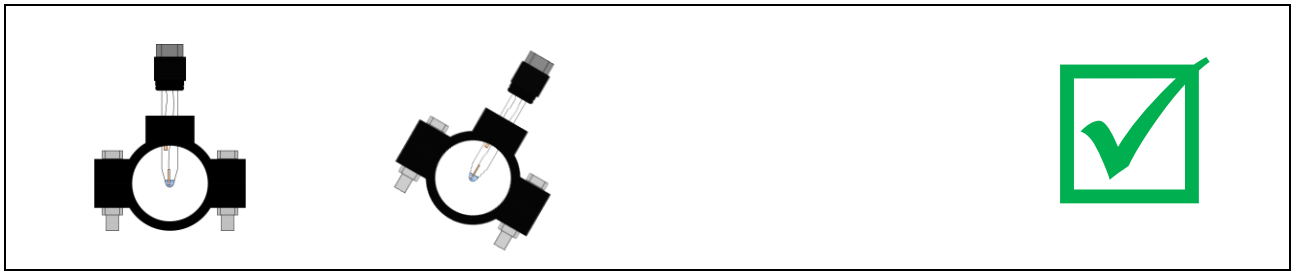


Hint
To be able to take the electrode out without much water loss, shut-off valves are provided.

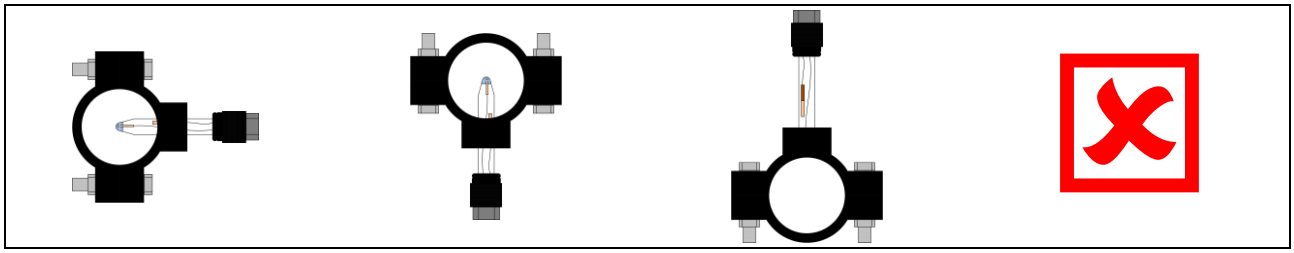
4.6. Install the electrode correctly

The distance between the electrode and the dosing place must be at least 50 cm. The dosing place must be installed always in flush direction behind the electrode. The electrode must be installed vertically from above with a slope of maximum 30° in the horizontal. It must be guaranteed that the electrode is surrounded with the medium that must be measured.
The electrode must always be kept moist.

Correct assembly positions



Incorrect assembly positions



5. Commissioning - Instructions

Before the device can be commissioned, the following measures must be taken.

5.1. Regulation parameters

The device is equipped with readjusted regulation parameters in the plant. Please adapt the regulation parameters to the foreseen use.

5.2. Electrode

Take the electrode out of the packing cardboard and pull the protection cap off. The cap nut of the electrode cable must be loosened with a left rotation of the electrode, and the electrode must be screwed from above into the measurement place. Then the electrode plug must be put again on the electrode, and the cap nut must be fixed.

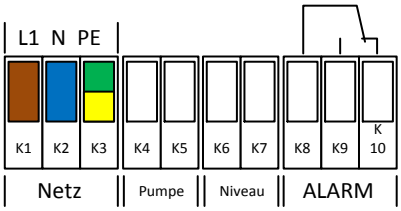
Tipp	**Hint** After a tempering and run-in period of approximately one hour check whether an adjustment of the electrode is necessary. Screw the pH-electrode again out of the measurement place and place in the buffer solution pH7. If the displayed value shows a bigger difference than 0.1 pH, an adjustment must be carried out.

Achtung!	**ATTENTION!** Check whether all screw connections of the measurement water conducts are tight. Check all screws on the device and on both measurement water ball valves ½“. Tighten plastic screws hand-tight only!

6. Electrical connection

Danger!
Mortal danger due to high voltage.
All electrical work on the device may only be performed by trained specialists who consider the valid safety regulations.

6.1. Summary of the connection scheme



All connections have plugs. In case of connection works, check whether the plugs are put in the corresponding connectors.

Mains connection
The mains connection must be connected according to the marking (L1, N, PE).

Pump
The hose dosing pump is already firmly connected.

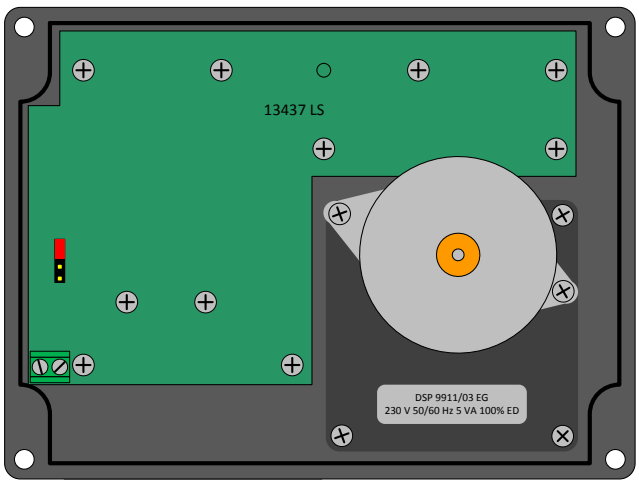
Level
If a suction valve with empty message is used, the empty message must be connected at the terminal level. Polarity does not need to be respected. A closed pump is indicated by the LED empty and stops the dosing pump.

Alarm relay – (P/NO/NC) 3- pin plug
The alarm relay is potential free with a changeover contact.
Depending on the desired functioning, use the **N**ot **O**pener or the **N**ot **C**loser contact. **P** means the medium high contact.

6.2. Fuse

Attention!
The fuse has a nominal current of 2.5 Ampere. Only fuses with this or a lower current may be used!

6.3. Change measurement dimension pH ←→ mV



To change the measurement dimension pH ←→ mV the casing must be opened. At the left side of the console there is a jumper (short-circuit bridge).

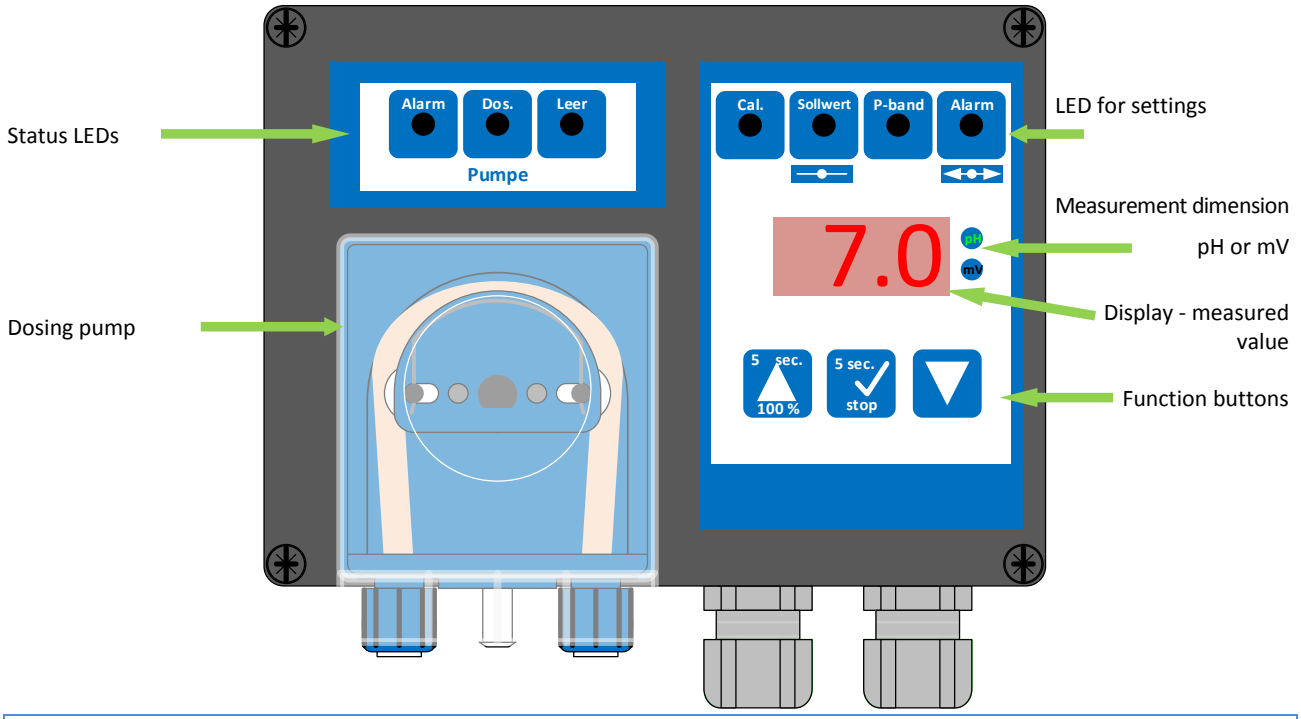
If the jumper is placed on the two pens above, the measurement dimension pH is selected.

If the jumper is placed onto the two lower pens, then the measurement dimension mV is selected.

The illustration by way of example shows the jumper (in red) on the two upper pens, for the measurement dimension pH.

7. Operation of the device

The device has three function buttons and two LED-fields. The left LED-field indicates the status of the device. The right LED-field indicates the active adjustment parameter.



LED Status

Alarm → target value surpassed or not reached with the adjusted alarm hysteresis, limitation of the dosing time has taken place

Dosing outlet controlled (pump is turning)

Chemicals tank empty

LED settings

Regulator for calibration ready

Adjust the target value

Set the P-band (control range)

Set the dosing delay (dEL), dosing time limitation (doS) and alarm high/ low (AL)

Function buttons

Arrow button high → increase value
Activate hand dosing 100% (hold the button pushed during 5 seconds)

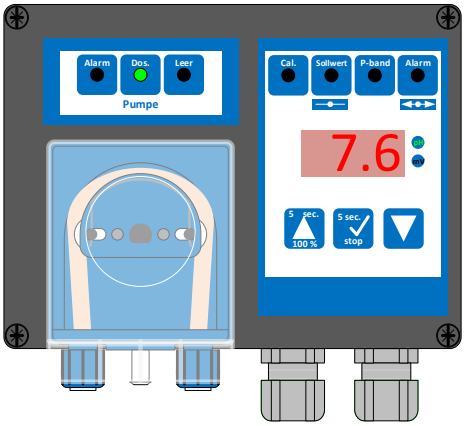
OK button → activate parameter for change and confirm after change
Interrupt hand dosing

Arrow button down → reduce value

7.1. Operating program

Depending on the operation status, the display shows different texts. Now you will find a summary of the most important display texts.

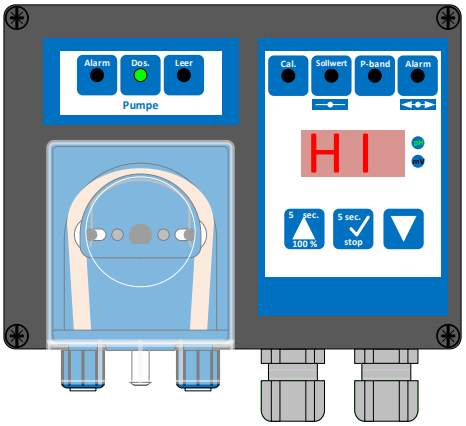
7.1.1 Automatic operating



If the controller is supplied with voltage, it will start with an adjustable dosing delay. The display changes between the real value and **dEL**. During this time, there is no dosing.

- The green LED Dos. Indicates the control of the dosing pump, it is not turning.

7.1.2 Manual dosing



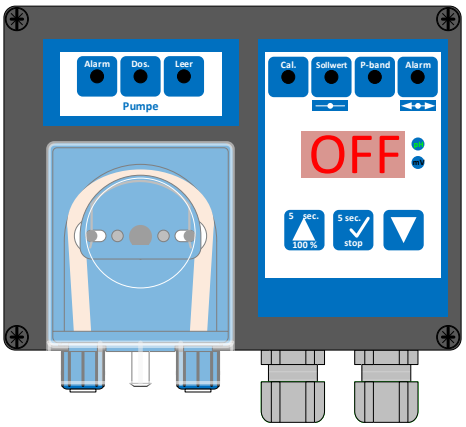
The controller is in the mode hand dosing (**HI**)

- The display changes between the real value and **HI**
- The dosing pump is turning, the left green LED **Dos.** lights up

Activate hand dosing:

- Hold the left arrow button during seconds pushed (the countdown is running)
- To stop, push the OK button (in the middle)

7.1.3 Manual STOP



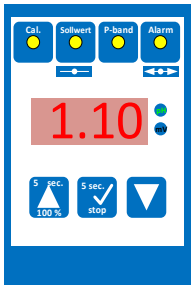
The controller is in the mode manual STOP (**OFF**)

- The display changes between the real value and OFF
- The dosing pump is not turning

Activate the manual STOP:

- Push the middle OK button during 5 seconds (the countdown is running)
- To finish push the OK button again

7.1.4 Ask for the firmware version



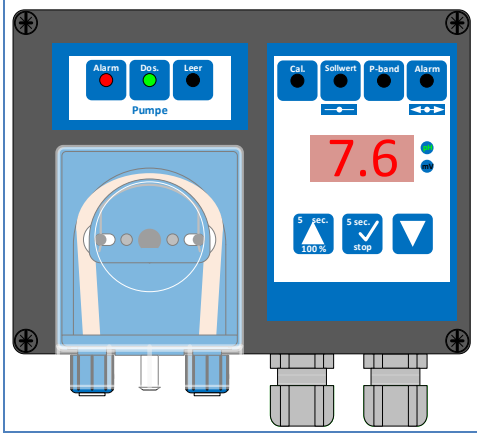
Starting from the firmware version V1.10 the used version can be requested.

Push the OK button in the voltage free area and hold it pushed. Connect the voltage. Now the firmware version is displayed, as long as the OK button is pushed.

7.2. Alarms

The following alarm status can occur.

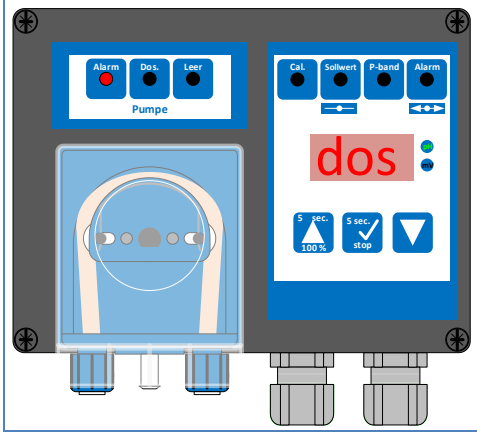
7.2.1 Alarm measure value



The red LED alarm lights up, the alarm relay is controlled.

- If an alarm parameter high or low is surpassed or not reached, this is indicated with the red LED Alarm.
  Depending on the regulation direction (pH-reduce or pH-increase) the dosing pump is also controlled in case of an alarm.
- The dosing pump is running (green LED Dos.)

7.2.2 Alarm dosing time limitation



If the target value plus a hysteresis (0.1 pH or 10 mV) is not reached within the adjusted time (Alarm doS), the dosing is deactivated. The display changes between the real value and **Dos**. The dosing time limitation finishes internally, the time already finished is not visible.

During the alarm message there is no dosing.

Example: Regulation direction pH reduce, target value pH7.2

Real value ≥ 7.3 after the end of the dosing time limitation → alarm
Real value ≤ 7.3 after the end of the dosing time limitation → no alarm

Tipp

Hint
Generally, alarms are automatically deleted if the cause has been solved, or in case of a voltage interruption. For example, when the empty chemicals tank was replaced by a full one, or when the alarm value is again surpassed or not reached.
However, the alarm ***dosing time limitation*** must be always reset manually!

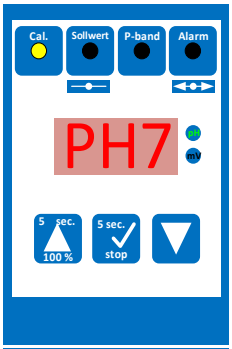
Possible causes for the alarm *dosing time limitation*:

Causes	**Remedy**
- Not enough chemical conveyed into the pool (Pool content too high, very hard water)	- Increase dosing power (use bigger hose set) - Reduce proportional range (P-Band) - Increase dosing time limitation
- Hose set worn	- Replace hose set
- Dosing place clogged (when dosing chlorine)	- Clean dosing place

7.3. Carry out adjustments

The three function buttons are used to adjust the regulation parameters and for the calibration. Adapt the regulation parameters with regard to the foreseen use. Approximately 10 seconds after the last adjustment the controller leaves the adjustment menu and changes automatically into the normal mode.

7.3.1 Settings → Calibration pH



In case of the calibration pH it is a 2-point calibration. Therefore both buffer solutions pH7 and pH4 are required.

Push an arrow button repeatedly until **CAL** appears, the yellow LED **Cal.** lights up

Push the central OK button

The text **PH7** and the yellow LED **Cal.** are blinking

Rinse the pH-electrode and place in the buffer solution pH7

Push the OK button (the countdown is running)

The text **PH4** and the yellow LED **Cal.** are blinking

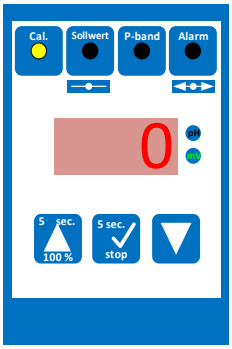
Rinse the pH-electrode and place in the buffer solution pH4

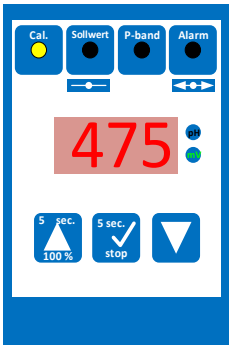
Push the OK button (the countdown is running)

Adjust the displayed value with the arrow buttons to 4.0 (or with the value of the second buffer solution)

To finish, push the OK button

7.3.2 Settings → Calibration *mV*





In case of the calibration mV (Redox) it is a 1-point calibration. For this calibration a Redox- buffer solution, for example 468 mV, is required.

Push an arrow button repeatedly until **CAL** appears, the yellow LED **Cal.** lights up

Push the central OK button

The text **0** and the yellow LED **Cal.** are blinking

Place at the electrode cable a short-circuit plug (alternatively, a wire bridge)

Push the OK button (the countdown is running)

The text **475** and the yellow LED **Cal.** are blinking

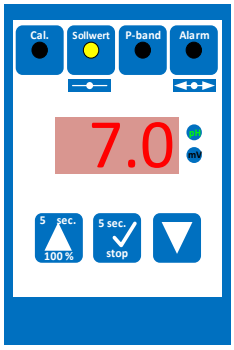
Take away the bridge plug, connect the Redox-single-rod measuring cell and place in the buffer solution

Push the OK button (the countdown is running)

Adjust the displayed value to the used buffer solution.

To finish, push the OK button

7.3.3 Settings pH → *Target value*



Push an arrow button repeatedly until the yellow LED **target value** lights up

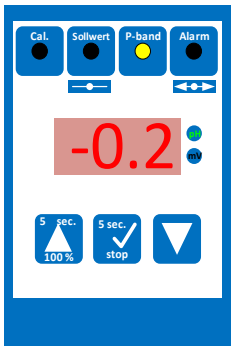
Push the OK button (in the middle)

Adjust the desired value with the arrow buttons

Confirm the value with the OK button

Setting range 1.0 … 14.0

7.3.4 Settings pH → *P-band (proportional range)*



Push an arrow button repeatedly until the yellow LED **P-Band** lights up

Push the OK button (in the middle)

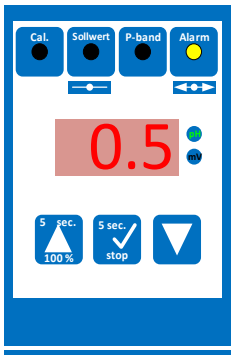
Adjust the desired value with the arrow buttons

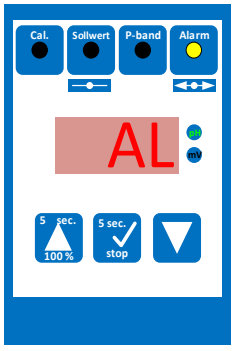
Confirm the value with the OK button

Setting range -7.0 … 7.0

Notice
The controller can be used both for pH-reduction as for pH-increase. If there is no sign before the number P-Band, the increasing function has been chosen. For pH-reduction there must be a minus sign in front!

7.3.5 Settings pH → *Alarm high and low*





Push an arrow button repeatedly until the yellow LED **alarm** lights up

The display changes between the alarm value and the text **AL**

Push the OK button (in the middle)

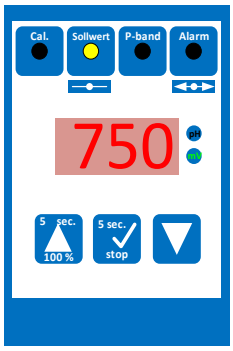
Adjust the desired value with the arrow buttons

Confirm the value with the OK button

Setting range 0.1 … 4.0

The adjusted alarm value is valid for both directions as difference from the target value

7.3.6 Settings mV → *Target value*



Push an arrow button repeatedly until the yellow LED **target value** lights up

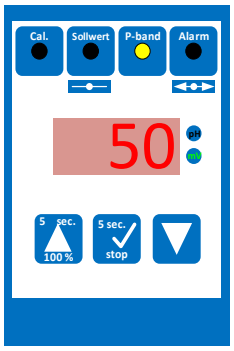
Push the OK button (in the middle)

Adjust the desired value with the arrow buttons

Confirm the value with the OK button

Setting range 10 … 999

7.3.7 Settings mV → *P-band (proportional range)*



Push an arrow button repeatedly until the yellow LED **P-band** lights up

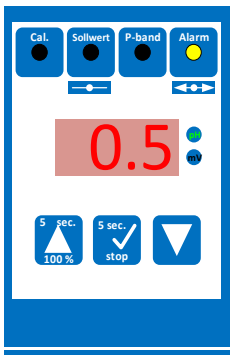
Push the OK button (in the middle)

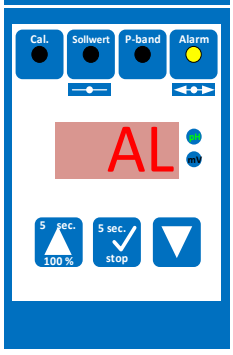
Adjust the desired value with the arrow buttons

Confirm the value with the OK button

Setting range 10 … 500

7.3.8 Settings mV → *Alarm high and low*





Push an arrow button repeatedly until the yellow LED **Alarm** lights up and the text **AL** is blinking

The display changes between the alarm value and the text **AL**

Push the OK button (in the middle)

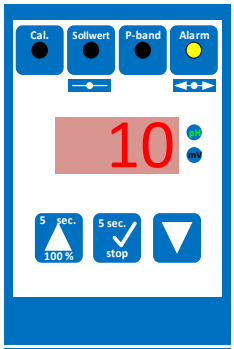
Adjust the desired value with the arrow button

Confirm the value with the OK button

Setting range 50 … 500

The adjusted alarm value is valid for both directions as difference from the target value

7.3.9 Settings → *Alarm dosing time limitation*



Push an arrow button repeatedly until the yellow LED **Alarm** lights up and the text doS blinks

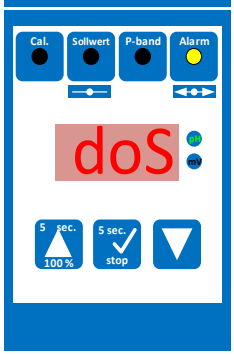
The displays changes between the adjusted time and the text doS

Push the OK button (in the middle)

Adjust the desired value with the arrow buttons

Confirm the value with the OK button

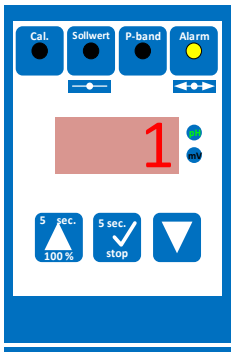
Setting range 0 … 240 minutes (0 = dosing time limitation deactivated)



This menu for the adjustment of the limitation of the dosing time is the same for both measurement dimensions pH and mV.

The adjusted limitation of the dosing time is in minutes. Upon reaching the target value the dosing time limitation is reset

7.3.10 Settings → *Alarm dosing delay*



Push an arrow button repeatedly until the yellow LED **Alarm** lights up and the text dEL blinks

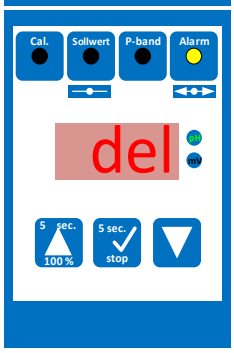
The display changes between the adjusted time and the text dEL

Push the OK button (in the middle)

Adjust the desired value with the arrow buttons

Confirm the value with the OK button

Setting range 0 … 10 minutes (0 = dosing delay deactivated)

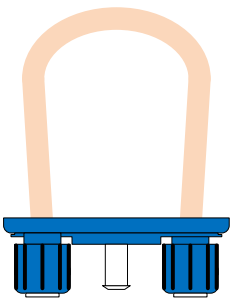


This menu for the adjustment of the dosing delay is the same for both measurement dimensions pH and mV.

During the dosing delay there is no dosing. This function protects against involuntary dosing during the start of the device. Chose the time so high until a stable measurement with current measurement water has been achieved after the start of the device.

dEL means delay

7.4 Adapt the dosing capacity



The dosing power (dosing quantity) must be adapted to the required chemicals. The required chemicals depends of several factors, for example pool content, type of use of the pool, frequencies, … . Use the instructions of the manufacturer of the chemicals as orientation.

When the dosing power is too high, there will be measurement value surpasses. If the dosing power is chosen too low, there will be not enough chemicals (high frequency) when necessary.

To adapt the dosing power, the following hose sets are available.

Hose set 1.6	approx. 120 ml/h	
Hose set 3.2	approx. 500 ml/h	
Hose set 4.8	approx. 1200 ml/h	The hose set 4.8 is used as standard.

8 Maintenance and cleaning

All required maintenance and repair works may only be done by qualified staff. Required spare parts can be bought in specialised shops.
See the safety instructions for the hanlding with chemicals and wear appropriate protection clothes.

The following maintenance works must be carried out.

- Calibrate pH-electrode with a difference of >0.2 pH with regard to the Phenol red measurement.
- Installation parts of the dosing valves must be cleaned or changed each season.
- Change the hose set of the dosing pump each season

8.1 Electrodes

ATTENTION!
During all works at the electrodes, please take care that nor the screw head of the electrode, nor the plug of the electrode cable come into contact with moisture! Already the slightest moisture in the electrode head can lead to a false measuring value, included the preliminary damage of the electrode!
Both, the contacts in the electrode head as well as the contacts of the electrode plug must be shine goldish and may not present any corrosion.

Each single-rod measuring cell (electrode) is a wear part. It is subject to a certain ageing, due to a lot of factors. In the pool water treatment segment the electrodes must work approximately 6 months to 2 years.
A cause for differences as to the measuring value is the soiling of the diaphragm. This soiling can be cleaned generally with the supplied electrode cleaner. Therefore the glass shaft of the electrode is put in the cleaning solution for some minutes.
Depending of the state and the age of the electrode the characteristics of the electrode change. This leads to differences of the measuring value which can be adapted through adjustment.

Notice
After each electrode cleaning or after a changing of the electrode, a calibration must be carried out. After a run-in period the calibration must be checked. The glass dome (sensor part) and the diaphragm may not be touched with the fingers or with cleaning material.

9 Technical data

Dimensions of the control: approx.		**Electrical data:**		**Measuring range and resolution**	
Width:	160 mm	Voltage:	230 V – 50 Hz	pH	pH 0 ... 14
Height:	150 mm	Current:	max. 2.5 A	Resolution	+/- 0.1 pH
Depth:	115 mm	Power:	6 W	mV	0 ... 990 mV
Weight:	1.2 kg/h	ED:	100 %	Resolution	+/- 1 mV

Hose pump Sa:		**Dosing capacities:**	
Backpressure max.	1.5 bar	Hose set 1.6	approx. 120 ml/h
Suction high max.	2 m	Hose set 3.2	approx. 500 ml/h
Hose connection	4 x 1 mm	Hose set 4.8	approx. 1200 ml/h
Speed	approx. 27 rpm		

10 Commissioning protocol

Notice
We recommend to enter the optimised, pool specific parameters into this list.

Settings menu	Factory settings	Setting ranges	Step	During commissioning	Optimised during the operation
Parameter pH					
- Target value	7.0	1.0 to 14.0	0.1		
- P-band	0.20	7.0 to -7,0	0.1		
- Alarm (AL)	0.5	0.1 to 4.0	0.1		
- Dosing time limitation(doS)	10 minutes	(off) 0 to 240	1		
- Dosing delay (dEL)	1 minute	(off) 0 to 60	1		
Parameter mV					
- Target value	750 mV	10 to 999	1		
- P-band	50 mV	10 to 500	1		
- Alarm (AL)	100 mV	50 to 500	1		
- Time monitoring (doS)	10 minutes	(off) 0 to 240	1		
- Dosing delay (dEL)	1 minute	(off) 0 to 60	1		
Fix values					
- Cycle time	20 seconds	----			
- Alarm delay	5 seconds	----			
- Min. dosing time	1 second	----			
- Hysteresis dosing time limitation	0.1 pH or 10 mV	----			

Other comments:

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Date:	Place	Technician	Operator

11 Own notes

Here you have space for notes, such as realised service works or extensions or reconstruction works.

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12 Spare parts list

The following spare parts can be bought at your dealer. However, please indicate for each order the exact product name and the serial number of the device.

Hint
Do not forget that the spare parts list normally only contains spare parts for the standard devices.
Customer specific or order specific special articles are not considered.

With the article numbers in blue colours they are wear parts excluded from the warranty of 2 years!

Dosing technique	**Article number**	**Article**	
	13414	Hose set Sa. 4.8 x 1.6	(standard)
	13413	Hose set Sa. 3.2 x 1.6	
	13412	Hose set Sa. 1.6 x 1.6	
	12703	Hose holder Sa 4.8 complete	(standard)
	13260	Hose holder Sa 3.2 complete	
	13411	Hose holder Sa 1.6 complete	
	13039	Roller carrier Sa blue	
	14140	Pump housing SA blue	
	13633	Safety disk SA blue	
	20743	Union nut with clamping ring Sa	
		Dosing motor Sa DSP 9911/03 EG 230 V 50 Hz	
	12472	Suction set NF d16 x 500 yellow - 2 m cable length	(standard)
	12473	Suction set NF d16 x 500 red - 2 m cable length	(standard)
	24718	Dosing valve 3/8“ - 4 x 1 - Si 9 x 1.5	
	18860	Valve rubber set 9 x 1.5 - 14	
Flow armature	**Article number**		
	10319	Saddle clamp PP d50 x ½“	(standard)
	22296	Electrode holder ½“ external thread – PG13,5	
	24111	Reduction PVC 1/2"external thread x 3/8"internal thread	
Electrodes	**Article number**		
	10933	pH electrode PG13.5 60 mm	(standard)
	18432	Redox electrode PG 13.5 80 mm	(standard)
	15945	Electrolytic solution KCl 3 mol/l – 30 ml for overwintering	
	10383	Buffer solution pH4 50 ml	
	10384	Buffer solution pH7 50 ml	
	10385	Redox test solution +468 mV 50 ml	
	11962	Electrodes cleaner – diaphragm cleaner 50 ml	
	11963	Distilled water 500 ml	
Control/ electronics	**Article number**	**Depending on the version → see text and the serial number electronics**	
	Depending on the version	Power supply pH/mV compact 13438	
	Depending on the version	I/O and operation board pH/mV compact 13437	
	24122	Electrode cable electrode plug double-sided S6/S6 - 3 m	
	26029	Electrode cable electrode plug double-sided S6/S6 - 55 cm	
OPTIONS	**Article number**		
	On request	Suction set NF d16 x 500 - yellow 3 m cable length	(special length)
	On request	Suction set NF d16 x 500 - red 3 m cable length	(special length)