

Installation and Operating Instructions



Water treatment system for pH, chlorine and ORP



Technical Data

WATERFRIEND *exclusiv*

Nominal voltage	1/N/PE 230V/50Hz
Metering pump chlorine	0 bis 10 l / h
Metering pump pH-	0 bis 10 l / h
Metering pump pH+ (option)	0 bis 10 l / h
Metering pump flocculation (option)	
Protection class	IP 20
Housing size	625 x 390 x 130
Humidity	0 to 95%, non condensing
Ambient temperature	0 to 40 °C
Measuring water pressure	max. 2 bar
Measuring water flow rate	0,5 l/min.



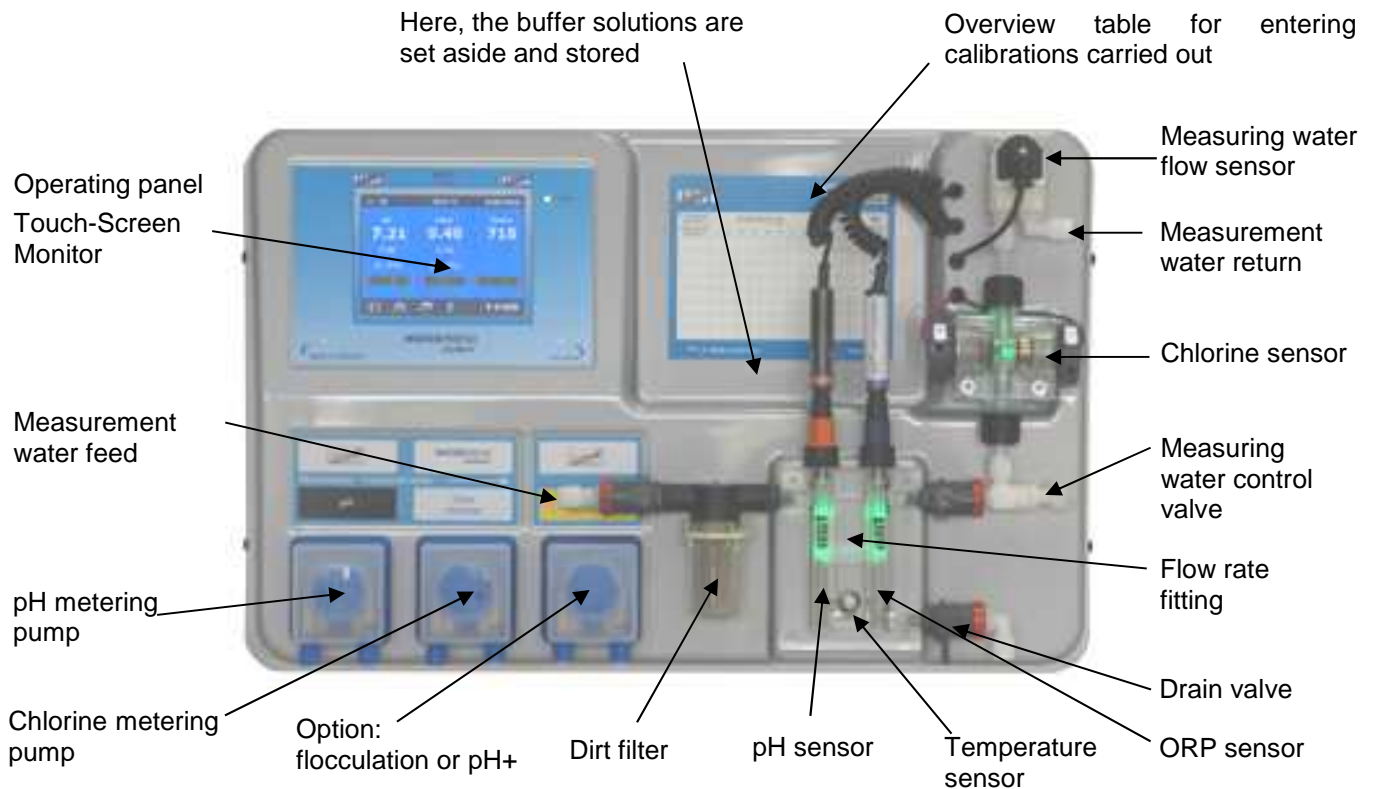
Made by **OST**

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General



Safety information

Installation and operating manual

This operating manual contains important information which must be observed during installation, operation and maintenance of the metering unit. For this reason, it is imperative that this operating manual is read by the fitter and the responsible specialist personnel or equipment owner before installation and initial start-up. It must be continuously available at the device installation location.

Caution

The metering liquids used are corrosive or highly flammable. The two pressure hose ends at the hose pumps must never be hanging freely, otherwise corrosive or highly flammable liquids can be discharged.

Canister

The canisters containing the metering liquids must be placed in **tsi** interception troughs. They may never be placed directly underneath the controller. Gas-emitting chemicals can cause damage to the sensitive controller.

Personnel qualification

The personnel who will be operating, maintaining, inspecting and installing the device must have appropriate qualifications for this work. The plant operator must precisely define the areas of responsibility, responsibilities and monitoring of the personnel. If the personal does not have the required knowledge, they must be trained and instructed. This can be carried out by the manufacturer or supplier on behalf of the owner if required. Furthermore, the owner must ensure that the contents of this operating manual have been understood by his personnel in all respects.

Installation

You have purchased a high-quality measuring, regulating and metering device with the nsi WATERFRIEND. The device is a precise and sensitive system which needs to be handled carefully at all times.

Please handle the protective cover carefully as well. It may not be allowed to fall down or come into contact with chemicals. The protective cover should be cleaned using a soft cloth and a little water if necessary.

All regulations and provisions applicable to the place of installation must be observed during installation.

The swimming pool must be constructed such that a possible technical malfunction, power failure or a defective metering system may not cause any consequential loss.

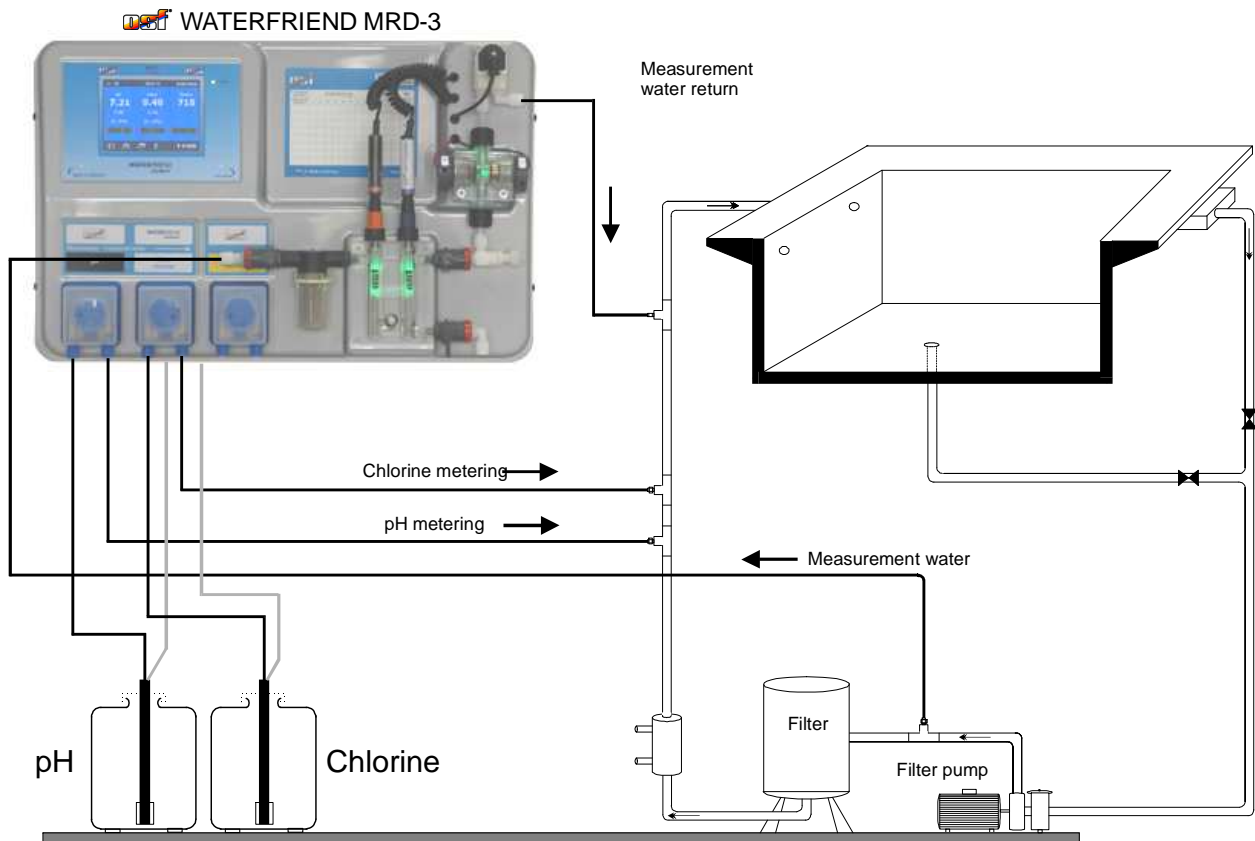
Mounting

The bottom housing section is fixed vertically and permanently to a solid wall with suitable load-bearing capacity. Please ensure that the measuring cells are vertical after this has been carried out. The installation location must be protected against dust and water in order to guarantee correct and proper functioning of the device. The surrounding temperature must be between -0°C und $+ 40^{\circ}\text{C}$ and should be kept as constant as possible. Humidity at the installation site may not exceed 95%, and no condensation may take place. Please avoid direct heat or sun irradiation onto the device.

Installation in the water circuit

Please observe all valid safety regulations when carrying out installation work, and ensure that this is carried out carefully. Disconnect the measuring, regulation and metering device and all other electrical consumers such as filter pumps and heaters from the power supply.

Schematic



Measurement water pump

The dosing "WATERFRIEND" requires a continuous supply of sample water with a water amount of 0.3 to 1.0 liters per minute. When using filter pumps with variable displacement or in unfavorable pressure conditions of the eventual use of a sample water pump must be checked.

General informational installation in the water circuit

- Before carrying out initial start-up, ensure that the injection valves open and close reliably.
- All hoses must be routed free of kinks.
- Avoid routing hoses over sharp edges.
- Connect all hoses carefully and check to ensure that they are tightly fitted to their connections.
- Avoid unnecessarily long hose lengths.
- Hoses may not be routed directly over pipes carrying heat or over other devices.

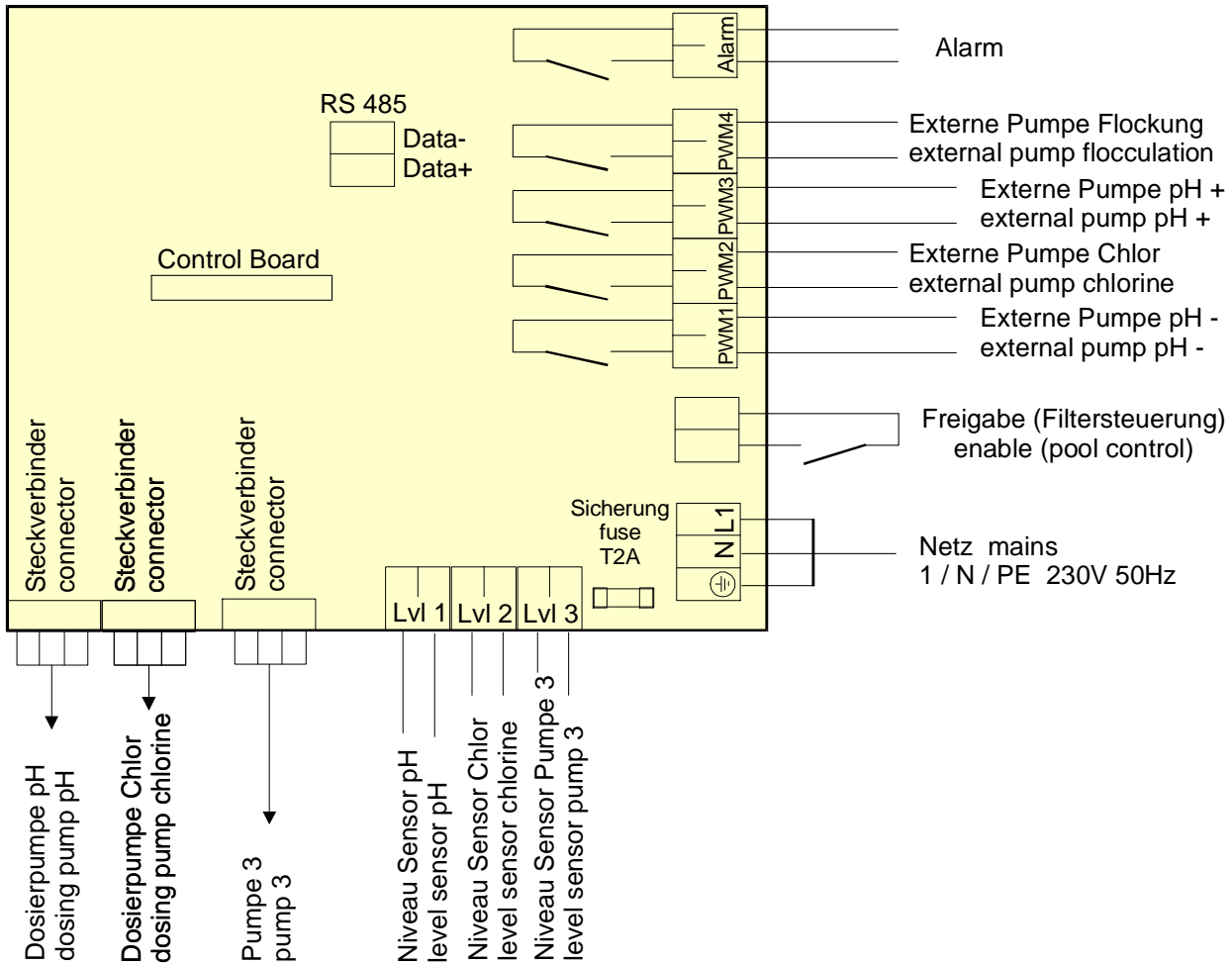
Electrical connection

The controller must be mounted protected against moisture in accordance with its protection class. The device must be powered via a multi-pole main switch with a contact opening width of at least 3mm and a residual current circuit breaker with $I_{FN} \leq 30\text{mA}$. **The device must be isolated before opening the housing. Electrical power supply connections, in addition to alignment and service work, may only be carried out by approved electricians. The attached circuit diagrams and all applicable safety regulations must be observed.**

Low-voltage cables

Low-voltage cables may not be routed together with three-phase or alternating current cables in one cable duct. Routing of low-voltage cables in the vicinity of three-phase or alternating current cables should generally be avoided.

Wiring diagram



Alarm

An external acoustic or optical alarm can be connected to these terminals. These terminals can also be used for connection to group error messaging systems. The terminals can be loaded with maximum 230V 1A.

External pumps

These connecting terminals are control contacts for external metering pumps. The terminals can be loaded with maximum 230V 1A.

Enabling

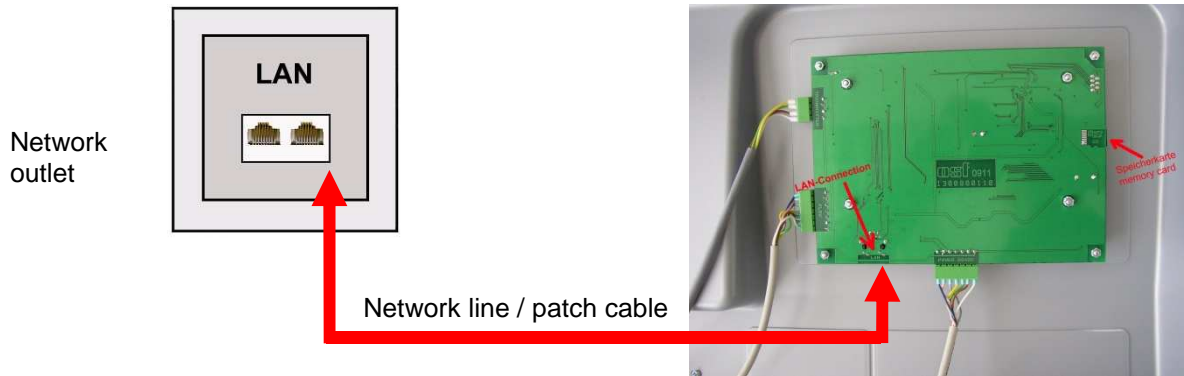
At these terminals the dosing enable signal of the filter control system must be connected. The opening of the floating contact within the filter control interrupts the dosing. The filter control must ensure by this signal that dosing will only be enabled when there is sufficient water flow at the injection point.

RS-485

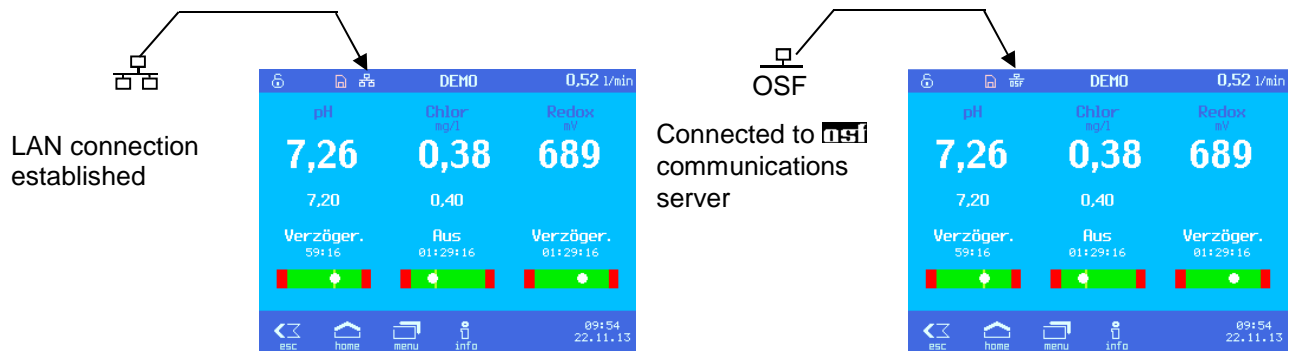
These terminals are used for connection to the **nsi** Euromatik.net or the **nsi** Pool-Control-TOUCH filter control unit. A screened, twisted, 2-core cable (twisted pair) with a cross-section of at least 0.22 mm² is required for the connection. (e.g. Li2YCY(TP) 2 x 0.22 mm²). Screening improves the electromagnetic compatibility (EMC). The cable length of the complete bus-system may not exceed 1200 m. The polarity (DATA+ and DATA) should be observed.

Connecting to the computer network

Connection to the Internet is carried out by the **nsi** communication server. The WATERFRIEND MRD-3 is connected using a standard Ethernet patch cable into the network wall outlet, the powerline adapter, the wireless LAN access point or other suitable facilities.



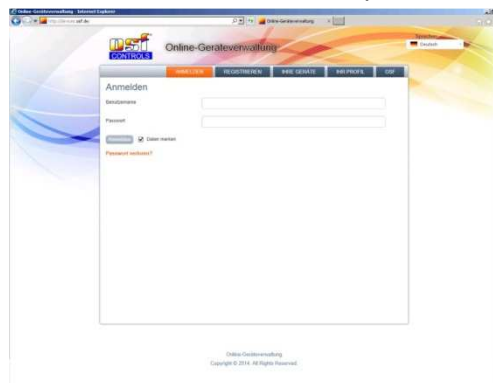
After the WATERFRIEND was connected to an active network outlet, the power supply can be turned on. The web server in WATERFRIEND now searches autonomously for the communication server and logs on to the database.



If the "OSF" icon in the monitor is visible (see chart), the WATERFRIEND has logged on to the nsi communication server.

Using the nsi-communication server

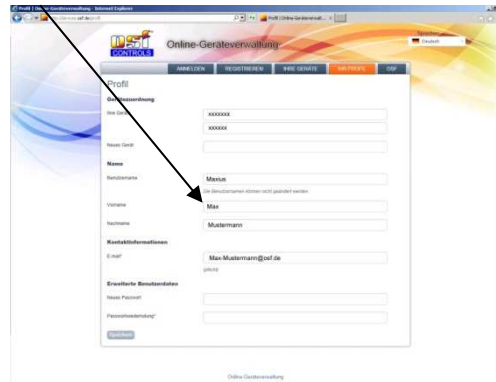
You can reach the nsi-communication server at the address <http://devices.osf.de>



As a new user, you must register first:



After registering, you can log in and then add a new device to your user profile by entering the device ID of the dosing control in the appropriate field:

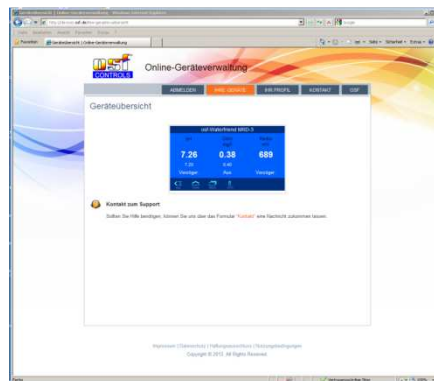


The DEVICE ID of your device is shown on the device information page on the control panel of the device.

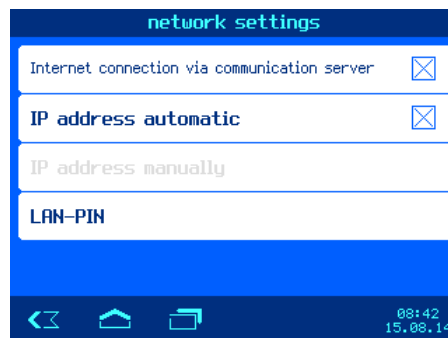
Read device ID on the display of the dosing control



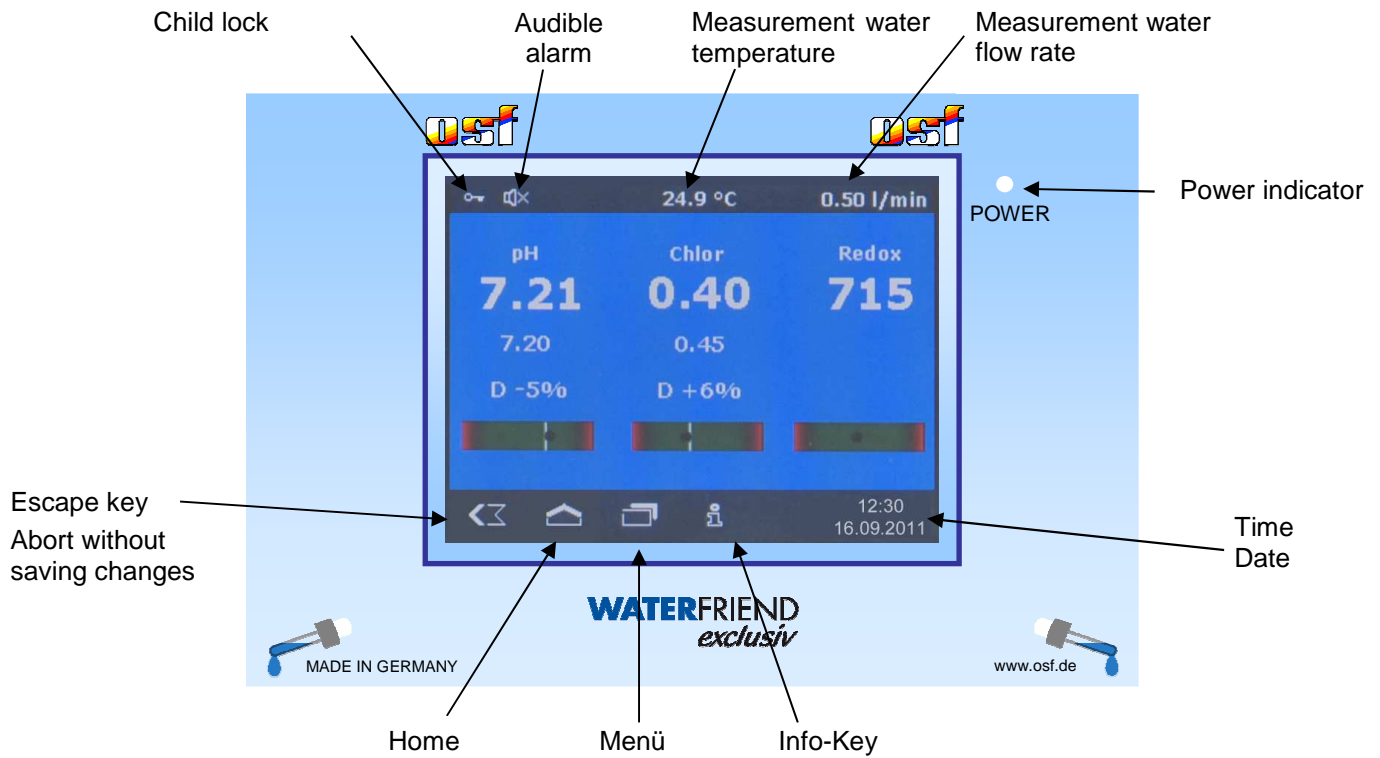
After that, your device will appear in your device overview and can be operated using the communication server:



For the use of the communication server, the Internet connection via the communication server must be enabled (Factory setting).



Touchpanel



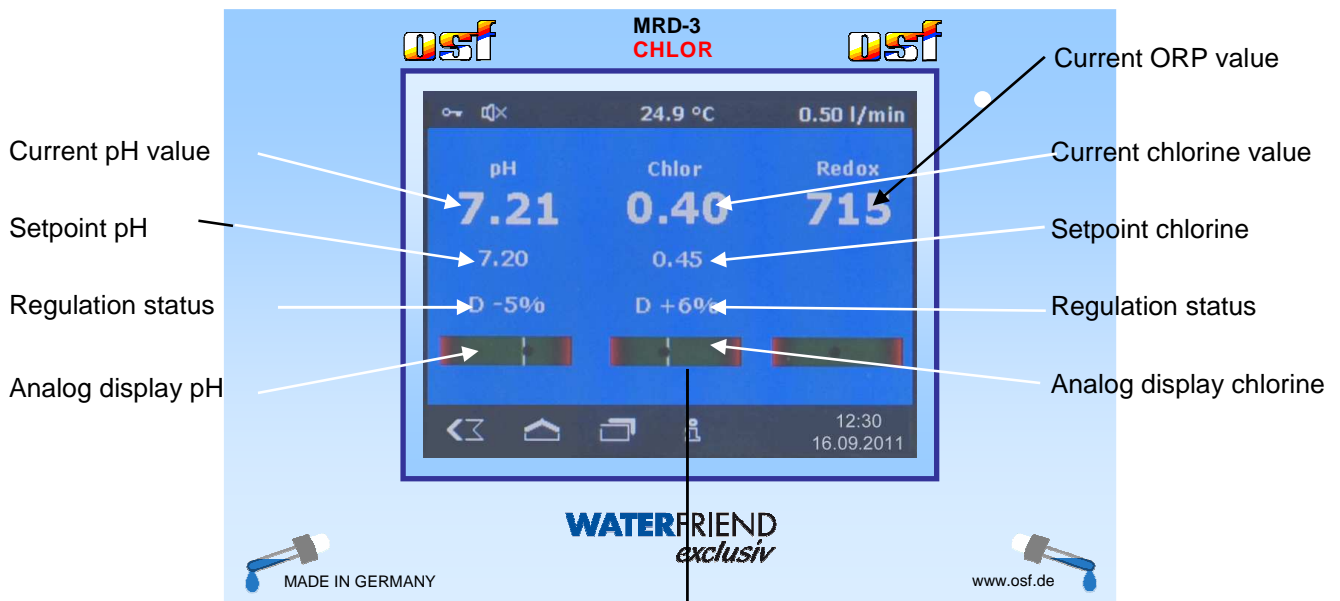
Temperature

The displayed temperature is the measurement water temperature within the flow fittings. This can deviate from the actual water temperature in the swimming pool depending on the pipeline routing and surrounding temperatures.

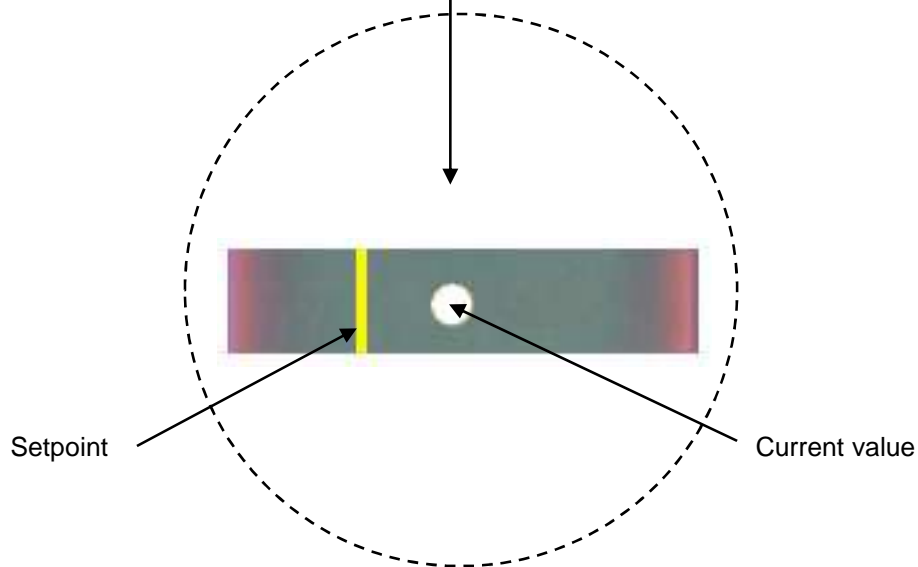
Measurement water flow quantity

Quantity of water flowing through the fittings. The chlorine regulation only works with a flow rate in the range between 0,3 and 1,0 l/min.

Display



Analog display



Initial setup

Select language



Set date and time

By pressing the keys **+** resp. **-**. The current time and date can be set. The settings have to be saved by pressing the **OK** key.



Adjust the flow rate of the measurement water

1. Read the current flow rate on the display.
2. Using the measuring water flow control valve, adjust the flow rate to 0,5 l/min. At flow rates below 0.3 l/min or above 1.0 l/min an exact measurement of the chlorine concentration is not possible, and the automatic chlorine dosing is inhibited.



Calibrate the sensors

Turn on automatic dosing



In order to achieve good water quality, it is useful to operate the metering system a few days without automatic dosage before the calibration is performed. Otherwise, the calibration must be repeated after a few days.

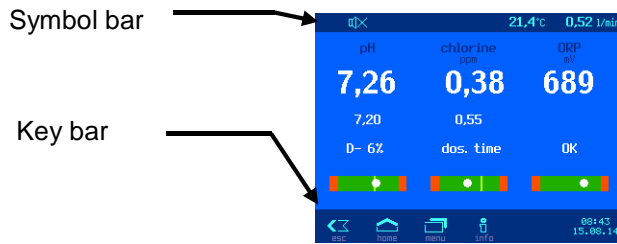
Set delivery performance of metering pumps

The speed control of the metering pumps allows adjustment of the flow to the pool size. For the calculation of the flow following rule of thumb can be used:

$$\frac{\text{Pool volume in m}^3}{100} = \text{delivery rate in l/h}$$

The result of this calculation, however, is a guide only. The system characteristic values of the swimming pool, for example filter pump output, pipe lengths, temperature, usage behavior, etc. are not included in the formula.

Operation

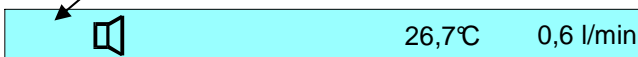


Child lock

This symbol shows the status of the child lock.

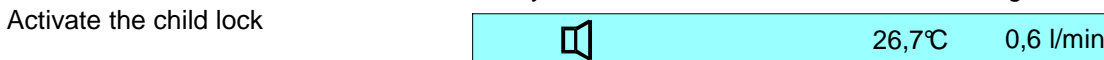
OFF (no symbol)

ON

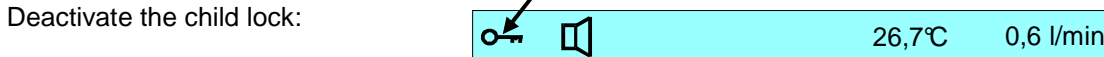


On delivery, the child lock is switched off.

Activate the child lock Briefly touch this area on the screen with a finger



Deactivate the child lock: Press the key symbol 5 seconds with a finger



When the child lock is active, all keys are locked!

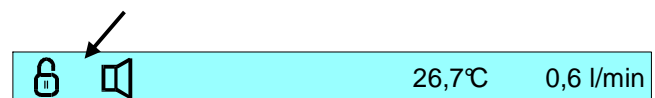
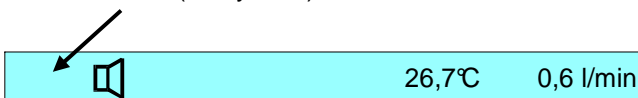
Professional mode (expert level)

The WATERFRIEND provides protection against unwanted adjustment of important operating parameters.

On delivery this protection function is activated. All functions shown in gray on the display are then locked.

Protection ON (no symbol)

Protection OFF

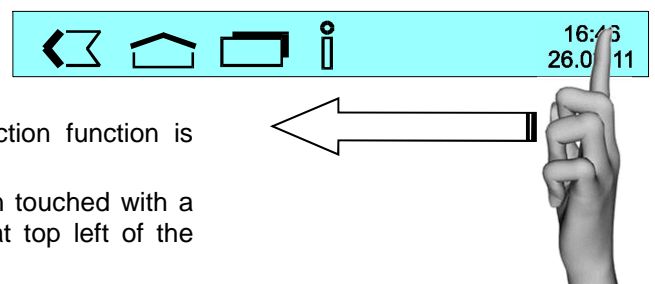


To turn off protection function, the key line is touched with a finger and swept from right to left.

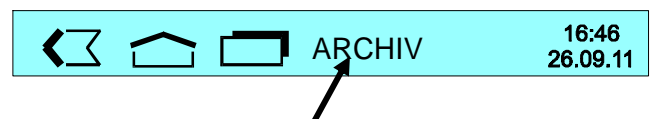
(Note icon at top left of the symbol line)

One hour after the last touch of a button, the protection function is automatically turned on again.

To activate the protection function, the key line is again touched with a finger and swept from right to left. (Note the icon at top left of the symbol line).



In professional mode statistics are stored on different menu pages. By pressing the corresponding symbol, these statistics can be viewed.



pH regulation

In this menu you can adjust various settings of the pH control.

Switching pH regulation on or off

Procedure:

Press the  key

1. Select **pH settings**
2. Select **Operating mode**
3. Select **Operation mode OFF** or **Operation mode Auto**



The selected setting is stored automatically.

Factory setting: Operation mode AUTO

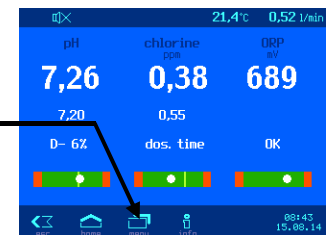
Setting the pH target value

There is a setting facility for the required pH value in the menu.

Procedure:




Press the  key

1. Select **pH settings**
2. Select **Setpoint**




The current setpoint is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.

- b) Keyboard

The setpoint can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 7,2

Range: Between lower alarm limit and upper alarm limit

Setting the lower pH alarm

There is a setting facility for the required alarm limit value in the menu.




Procedure:

1. Select **pH settings**
2. Select **lower alarm**


Press the  key

The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 6,0 Range: from 3,0 to regulation target value (setpoint)

Setting the upper pH alarm

There is a setting facility for the required alarm limit value in the menu.




Procedure:

1. Select **pH settings**
2. Select **upper alarm**


Press the  key

The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 8,0 Range: from regulation target value to 9,99

Calibrating the pH electrode



Calibration should only be performed by an expert and is only accessible in Expert Mode.

Once the sensors have been connected, every input must be calibrated during initial start-up. Calibration is necessary even if an electrode is replaced by a new one. The WATERFRIEND checks the calibration procedures for plausibility during the process (slope and offset). Non-calibrated and "badly" calibrated measurement inputs are displayed in plain text.

Time delays occur due to the electrode start-up times when the device is switched on.

The use-by date must be observed for the buffer solutions. The solutions must always be stored in a cool, dark place. Buffer solutions may not be soiled during use. For this reason, electrodes may not be immersed in different buffer solutions successively without cleaning them with distilled water first. It is also important not to rub the electrodes with a cloth, because this causes static charging and incorrect measurements. The necessary OSI buffer solutions for pH 4, pH 7 and for ORP 468mV and OSI spare electrodes are available from the OSI "WATERFRIEND" metering unit supplier.

The electrodes must be free of impurities, oils and fats etc before they are inserted in the flow fittings. Furthermore, the diaphragms (small spots at the probe point) must be free of coatings, soiling and crystallisation deposits. Do not touch the glass body with your hands to avoid impurities.

The calibration is carried out as a 2-point calibration with 2 buffer solutions. These buffer solutions must be free of impurities and fresh.

During the calibration, the measured electrode value and the pH values for the buffer solutions set are shown in the display. You can use these displayed values to ascertain the quality of the electrode during the calibration.

Calibrating the upper value (pH 7)

Procedure:

1. Select **pH settings**
2. Select **Calibration**

Press the  key



In the first stage, the upper point (pH 7) is calibrated. To do this, the pH electrode is immersed in a buffer solution of pH 7. The current values for the pH electrode are then shown in the display. When the value in the display does not change any more, you can either

select end calibration	Single-point calibration (pH): The calibration is complete. The offset value is accepted and stored
or	
select to 2. point	Two-point calibration (pH): Continue to calibration of lower value (pH 4)

Calibrating the lower value (pH 4)

In the second stage, the lower point (pH 4) is calibrated. To do this, the pH electrode (which must have been cleaned in distilled water first) is immersed in a buffer solution of pH 4. The current values for the pH electrode are then shown in the display. When the value in the display does not change any more, press **end calibration** to store the new offset and slope values of the sensor.

Caution: It is also important not to rub the electrode with a cloth, because this causes static charging and incorrect measurements.

Once calibration is complete, the slope and offset of the electrode are shown in the display.

If the offset difference falls below a value of $\pm 60\text{mV}$, the calibration cannot be correctly completed. The display shows the message **Big divergence**.

The slope must be in a range between 45.0 and 65.0 mV. If not, the calibration cannot be correctly completed. The display shows the message **Big divergence**.

If the electrode values are outside specific tolerances, a message is shown to alert you to this fact. If this is the case, the electrode should be replaced as soon as possible.

pH calibration errors

If the calibration was not able to be completed and the **Big divergence** is shown in the display, the following causes are possible:

- The pH electrode (combination electrode) is worn. The electrode service life is limited depending on the water quality and its care.
- You have mixed up the buffer solution sequence (1st pH 7, 2nd pH 4). This sequence must be strictly observed.
- You used the same buffer solution twice. Correct calibration can only be carried out with two different buffer solutions.

- You used the wrong buffer solutions. It is imperative that pH 4 and pH 7 are used. Calibration is not possible if other buffer solutions are used.
- The buffer solutions are used up or contaminated. In this case, use new buffer solutions.
- The electrode was connected to the wrong transmitter. The pH electrode must be connected to the black transmitter.
- The electrical connection between electrode and transmitter, or that between transmitter and controller, is damaged.

pH power on delay





This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

The controller only starts up after a delay period once the power supply has been provided and once external enable has been switched on (e.g. filter control unit). This power-on delay is necessary because a period specific to the overall system elapses once the filter pumps have been switched on before the completely mixed water reaches the sensors. This mixing process is mainly dependent on the pool size, the dimensions of the filter pump, the pipe length and the filter itself.

The delay period can, if required, be adapted to the actual pool size.

Procedure:




1. Select **pH settings**
2. Press the key  in the key bar
3. Select **Start delay**

Press the  key




The current value is shown on the left side of the display.

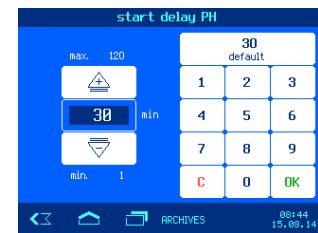
To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.

- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 30 minutes Range: 1 to 120 minutes

Setting the maximum pH metering time





This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

The metering time limit is a safety function and prevents dangerous overdosing in cases of breakdown. Attention! The higher the maximum dosing time is set, the more acid can be released in an uncontrolled manner in case of any damage of the dosing tube.

The metering time must be adapted to the actual pool size.

Procedure:

1. Select **pH settings**
2. Press the key  in the key bar
3. Select **Maximum dosage time**




Press the  key



The current value is shown on the left side of the display.

To adjust this value, the following two options are available:


a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.



b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.

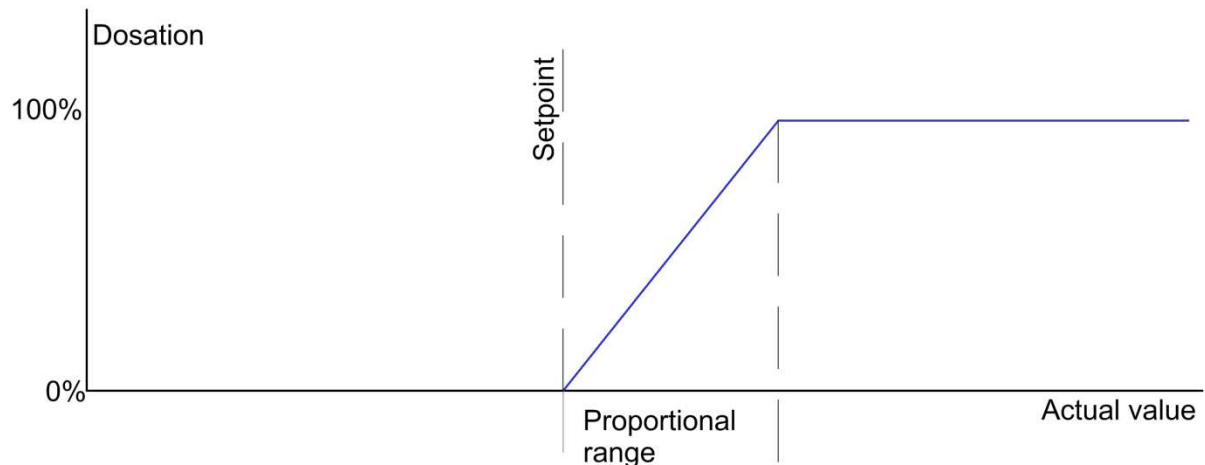
Factory setting: 60 minutes Range: 1 to 300 minutes

Setting the pH proportional range






This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

The controller offers the facility for setting the regulation proportional range in order to adapt the WATERFRIEND to the requirements of the specific swimming pool. This value influences the delivery quantity by optimising the pulse-width modulation. This means that the duty cycle is modulated at constant frequency. The numeric value specifies the regulating conductance. At a deviation of the measured actual value from the desired value, which is greater than the P range, the metering pump operates with maximum power. If the actual value approaches the target value inside the proportional range, the metering performance decreases proportionally. This means that the pump is working at reduced power.



Increasing the p-range leads to a slower approach to the target value with less overshoot.

Procedure:

1. Select 
2. Press the key  in the key bar
3. Select 




Press the  key

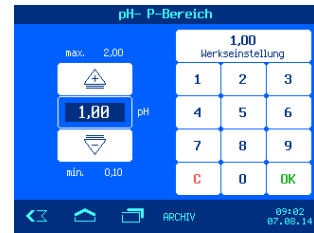


The current value is shown on the left side of the display.

To adjust this value, the following two options are available:


a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.



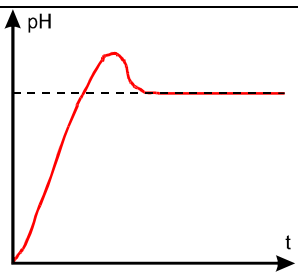
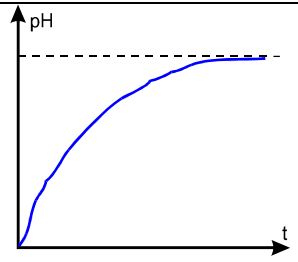
b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.

Factory setting: 1,00 Range: 0,1 to 2,0


Impact of the proportional range

Adjustment	Benefits	Disadvantages	Diagram
Small P-range	Fast, accurate control	When switching on an overshoot can occur	
Wide P-range	No overshoot	Slow control, small deviations between desired and actual values possible	

pH metering pump flow rate

The integrated speed control for the metering pumps enables optimum adaptation of the regulation to the pool size.

Procedure:

1. Select **pH settings**
2. Press the key  in the key bar
3. Select **Capacity dosing pump**




Press the  key



The current value is shown on the left side of the display.


To adjust this value, the following two options are available:

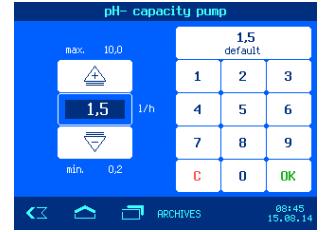
a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.

b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.



Factory setting: 1,5 l/h Range: 0,2 to 10,0 l/h

Chlorine regulation

In this menu you can adjust various settings of the chlorine control.

Switching chlorine regulation off or on

Procedure:

1. Select **Chlorine settings**
2. Select **Operating mode**
3. Select **Operation mode OFF** or **Operation mode Auto**

Press the  key



The selected setting is stored automatically.

Factory setting: Operation mode AUTO

Setting the chlorine target value

There is a setting facility for the desired chlorine value in the menu.

Procedure:

1. Select **Chlorine settings**
2. Select **Setpoint**




Press the  key



The current value is shown on the left side of the display.


To adjust this value, the following two options are available:

a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.

b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.



Factory setting: 0,45

Range: between the lower and the upper alarm limit

Setting the lower chlorine alarm

There is a setting facility for the required alarm limit value in the menu.




Procedure:

Press the  key


1. Select **Chlorine settings**
2. Select **lower alarm**

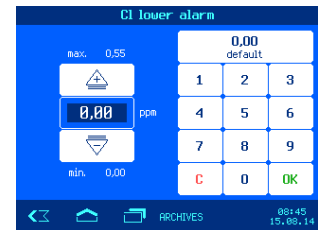
The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 0,1

Range: from 0,01 to chlorine target value (setpoint)

Setting the upper ORP alarm

There is a setting facility for the required alarm limit value in the menu.




Procedure:

Press the  key


1. Select **Chlorine settings**
2. Select **upper alarm**

The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 0,8

Range: from chlorine target value to 9,99

Calibrating the chlorine sensor



Calibration should only be performed by an expert and is only accessible in Expert Mode.

Once the sensors have been connected, every input must be calibrated during initial start-up. Calibration is necessary even if an electrode is replaced by a new one. The WATERFRIEND checks the calibration procedures for plausibility during the process (slope and offset). Non-calibrated and "badly" calibrated measurement inputs are displayed in plain text.

Time delays occur due to the electrode start-up times when the device is switched on.



The calibration is carried out as a one-point calibration with a reference measurement. The reference measurement is done using a photometer. This photometer is a portable instrument and is not supplied with the metering system "MRD WATERFRIEND-3".

For a successful calibration, the pH value must be in the normal range. Otherwise, the calibration of the chlorine sensor is not possible.

Preparations:

1. Adjust the measurement water flow rate to 0,5 l/min using the measuring water control valve
2. Take a sample of the pool water from the drain valve in the flow rate fitting
3. Determine the chlorine content of the water sample with the photometer

Procedure of calibration:

1. Select **Chlorine settings**
2. Select **Calibration**
3. Select **Photometer value**.
4. By pressing the arrow keys  or , or with the keyboard on the right side of the display, the measured value is entered.
5. Press the **OK** key to confirm the photometer value.
6. Finally press the key **end calibration** to store the new calibration data and finish the calibration.

Press the  key



The calibration is complete, the display returns to the default display.

Chlorine calibration errors

If the calibration can not be completed and the key is **end calibration** grayed out, the pH or the sample water flow rate probably is not in the regular region. The values are then displayed in red.

Power-on delay of chlorine regulation




This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

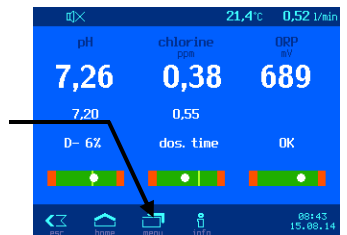
The controller only starts up after a delay period once the power supply has been provided and once external enable has been switched on (e.g. filter control unit). This power-on delay is necessary because a period specific to the overall system elapses once the filter pumps have been switched on before the completely mixed water reaches the sensors. This mixing process is mainly dependent on the pool size, the dimensions of the filter pump, the pipe length and the filter itself.

The delay period can, if required, be adapted to the actual pool size.

Procedure:

1. Select **Chlorine settings**
2. Press the key  in the key bar
3. Select **Start delay**




Press the  key



The current value is shown on the left side of the display.

To adjust this value, the following two options are available:


a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.



b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.

Factory setting: 60 minutes Range: 1 to 120 minutes

Setting the maximum chlorine metering time




This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

The dosing time is a safety feature and prevents dangerous overdosing in case of failure. Attention! The larger the maximum dosing time is set, the more chlorine solution can be released in an uncontrolled manner in case of any damage to the dosing tube!

The metering time must be adapted to the actual pool size.

Procedure:

1. Select **Chlorine settings**
2. Press the key  in the key bar
3. Select **Maximum dosage time**




Press the  key



The current value is shown on the left side of the display.


To adjust this value, the following two options are available:

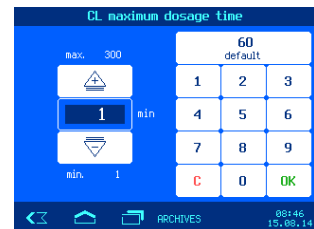
a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.

b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.



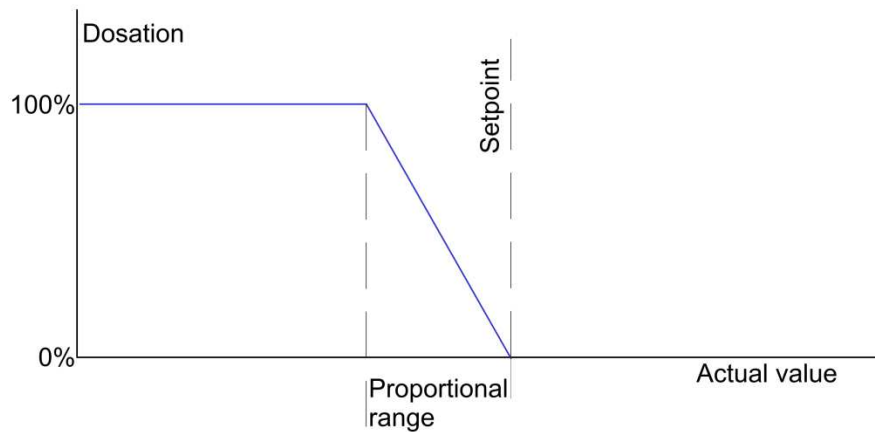
Factory setting: 60 minutes Range: 1 to 300 minutes

Setting the chlorine proportional range



This setting should only be adjusted by a professional, and is only accessible in Expert Mode.


The controller offers the facility for setting the regulation proportional range in order to adapt the WATERFRIEND to the requirements of the specific swimming pool. This value influences the delivery quantity by optimising the pulse-width modulation. This means that the duty cycle is modulated at constant frequency. The numeric value specifies the regulating conductance. At a deviation of the measured actual value from the desired value, which is greater than the P range, the metering pump operates with maximum power. If the actual value approaches the target value inside the proportional range, the metering performance decreases proportionally. This means that the pump is working at reduced power.



Increasing the p-range leads to a slower approach to the target value with less overshoot.

Procedure:




Press the  key

1. Select **Chlorine settings**
2. Press the key  in the key bar
3. Select **P-range**




The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

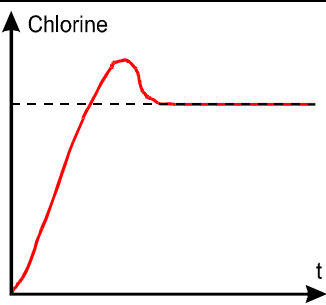
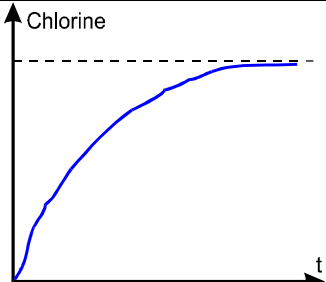
The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 0,5 Range: 0,05 to 1,0

Impact of the proportional range


Adjustment	Benefits	Disadvantages	Diagram
Narrow P-range	Fast, accurate control	When switching on, an overshoot can occur	
Wide P-Range	No overshoot	Slow control, small deviations between desired and actual values possible	

Chlorine metering pump flow rate

The integrated speed control for the metering pumps enables optimum adaptation of the regulation to the pool size.




Procedure:

Press the  key


1. Select **Chlorine settings**
2. Press the key  in the key bar
3. Select **Capacity chlorine pump**

The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 1,5 l/h Range: 0,2 to 10,0 l/h

ORP display

In this menu you can adjust various settings of the ORP supervision.

Setting the lower ORP alarm

There is a setting facility for the required alarm limit value in the menu.




Procedure:

Press the  key


1. Select **ORP settings**
2. Select **lower alarm**

The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 400 mV Range: 300 to 700 mV

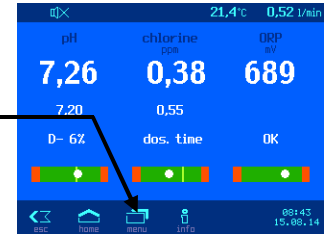
Setting the upper ORP alarm

There is a setting facility for the required alarm limit value in the menu.

Procedure:




Press the  key

1. Select **ORP settings**
2. Select **upper alarm**




The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 800 mV Range: 700 to 999 mV

Setting the ORP power on delay



This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

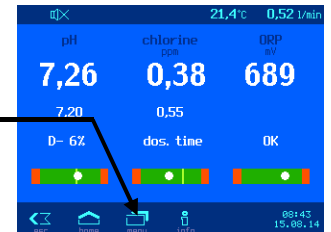
The controller only starts up after a delay period once the power supply has been provided and once external enable has been switched on (e.g. filter control unit). This power-on delay is necessary because a period specific to the overall system elapses once the filter pumps have been switched on before the completely mixed water reaches the sensors. This mixing process is mainly dependent on the pool size, the dimensions of the filter pump, the pipe length and the filter itself.

The delay period can, if required, be adapted to the actual pool size.

Procedure:




Press the  key

1. Select **ORP settings**
2. Select **Start delay**




The current value is shown on the left side of the display.

To adjust this value, the following two options are available:

- a) PLUS / MINUS keys
 - By pressing the arrow keys  or , the value can be modified stepwise.
 - Press  to store the new setting.
- b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

 - enter the desired value
 - Press  to store the new setting.



Factory setting: 60 minutes Range: 1 to 120 minutes

Calibrating the ORP electrode



Calibration should only be performed by an expert and is only accessible in Expert Mode.

Once the sensors have been connected, every input must be calibrated during initial start-up. Calibration is necessary even if an electrode is replaced by a new one. The WATERFRIEND checks the calibration procedures for plausibility during the process (slope and offset). Non-calibrated and "badly" calibrated measurement inputs are displayed in plain text.

Time delays occur due to the electrode start-up times when the device is switched on.

The use-by date must be observed for the buffer solutions. The solutions must always be stored in a cool, dark place. Buffer solutions may not be soiled during use. For this reason, electrodes may not be immersed in different buffer solutions successively without cleaning them with distilled water first. It is also important not to rub the electrodes with a cloth, because this causes static charging and incorrect measurements. The necessary ISI buffer solutions for pH 4, pH 7 and for ORP 468mV and ISI spare electrodes are available from the ISI "WATERFRIEND" metering unit supplier.

The electrodes must be free of impurities, oils and fats etc before they are inserted in the flow fittings. Furthermore, the diaphragms (small spots at the probe point) must be free of coatings, soiling and crystallisation deposits. Do not touch the glass body with your hands to avoid impurities.

The ORP potential is measured using the ORP electrode. This electrode measures the voltage which is present in the water due to oxidising and reducing ions.

The calibration is carried out as a 1-point calibration with a 468mV buffer solution. This buffer solution must be free of impurities and fresh.

During the calibration, the measured electrode voltage value and the ORP value of the buffer solution are shown in the display. You can use these displayed values to ascertain the quality of the electrode during the calibration.

Procedure:

1. Select **ORP settings**
2. Select **Calibration**

Press the  key



The ORP electrode is immersed in the 468mV buffer solution. The current value for the ORP electrode is then shown in the display. **The discrepancy between the displayed value and the buffer solution value (468mV) should not exceed $\pm 10\%$. If there is a large discrepancy or extended reaction time, the electrode should be replaced as soon as possible.**

When the value in the display does not change any more, the new offset has to be stored by pressing the key **end calibration**.

The calibration is complete, the display returns to the default display.

ORP calibration errors

If the calibration was not able to be completed or the discrepancy is larger than 10%, the following causes are possible:

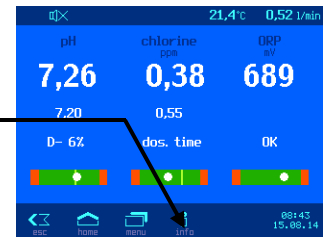
- The ORP electrode (combination electrode) is worn. The electrode service life is limited depending on the water quality and its care.
- You used the wrong buffer solution. It is imperative that 468mV is used. Calibration is not possible if other buffer solutions are used.
- The buffer solution is used up or contaminated. In this case, use a new buffer solution.
- The electrode was connected to the wrong transmitter. The pH electrode must be connected to the white transmitter.
- The electrical connection between electrode and transmitter, or that between transmitter and controller, is damaged.

Info and alarm display

The WATERFRIEND offers the possibility of status information and error messages on one page view.

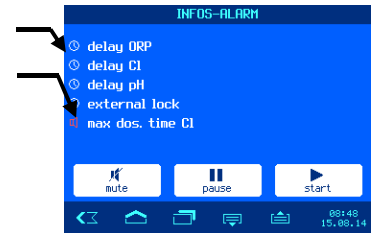
Procedure:

Press the  key




Displays:

Status information
Error message



Acknowledgement of alarm messages

The acoustic fault signal can be switched off by pressing the  button.

If the controller has stopped operation due to an error, it can be restarted after resolving the error by pressing the  button.

Automatic operation can be temporarily interrupted with the  key.

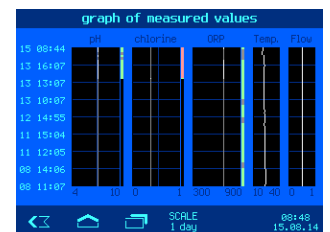
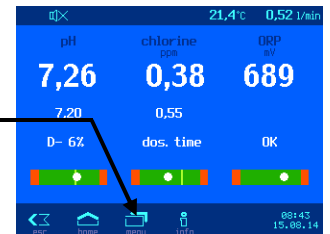
Graph of measured values


The WATERFRIEND provides the ability to display the stored measured values graphically.

Procedure:

Press the  key

Select Graph of measurements




The time range of the values displayed can be switched by pressing the  button.





Operating protocol

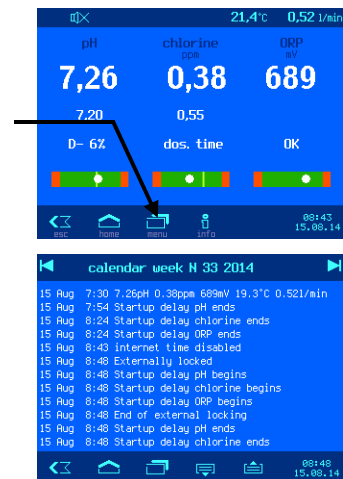
The WATERFRIEND offers the opportunity to view the saved log in short form on the display.

Procedure:

Select **Protocol of events**

Press the  key

Using the keys  and , the calendar week to be displayed can be selected. The keys  and  can be used to flip the log pages.




Manual operation

The WATERFRIEND provides the ability to manually turn on the metering pumps to vent the dosing tubes or perform a shock chlorination.

Procedure:

Select **Hand dosage**

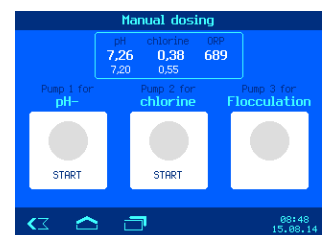
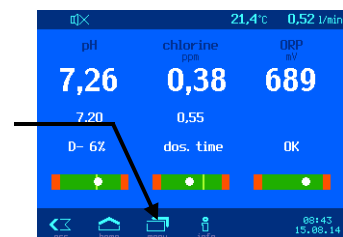
Press the  key

Venting the dosing tubes

Shock chlorination

By pressing the appropriate button each dosing pump can be switched on and off. The respective status indicator is to be observed. The maximum duration is limited to 60 seconds. After this time, the pump will automatically turn off. The remaining time is shown on the display (in seconds).

The third pump (option) can only be controlled in manual mode when it is configured for pH +.




Flocculation (Option)

The WATERFRIEND offers the optional ability to perform automatic flocculant dosage with a third metering pump.

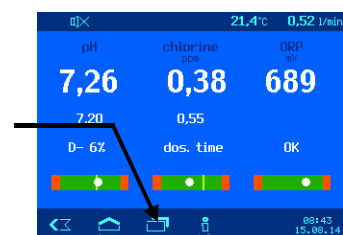
Setting the capacity of the flocculation pump

Procedure:

1. Select **Flocculation settings**
2. Select **capacity flocculation pump**




Press the  key

The current value is shown on the left side of the display.



To adjust this value, the following two options are available:


a) PLUS / MINUS keys

- By pressing the arrow keys  or , the value can be modified stepwise.
- Press  to store the new setting.



b) Keyboard

The value can also be set directly by using the keyboard on the right side of the display:

- enter the desired value
- Press  to store the new setting.

Factory setting: 5 ml/h Range: 2 to 250 ml/h

Switching the flocculation off or on

Procedure:

1. Select **Flocculation settings**
2. Select **Flocculation OFF** or **Flocculation ON**

Press the  key



The selected setting is stored automatically.


Factory setting: OFF

Venting the flocculation tube

This function makes it possible to vent the flocculant hose with an increased output of 1l / h.

Procedure:

1. Select **Flocculation settings**
2. Select **Fill hose 1l/h** **START** or **STOP**

Press the  key



The maximum duration is limited to 60 seconds. After this time, the pump will automatically turn off. The remaining time is shown on the display (in seconds).

Settings for the service technician

In the menu **Service Functions** the dosing control can be configured for the particular application.

Settings for the real time clock


For the built-in real time clock different operating modes can be set.

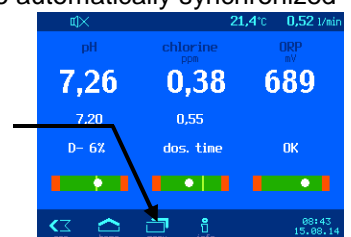
Automatic Internet time

If the WATERFRIEND has an active Internet connection, the built-in clock can be automatically synchronized with the Internet.

Procedure:

1. Select **Service functions**
2. Select **time & date**
3. Select automatic internet time **ON** or **OFF**

Press the  key



Factory setting: automatic internet time ON

Time zone

If the WATERFRIEND the built-in clock automatically synchronized with the Internet, the local time zone must be selected with this function.

Procedure:

1. Select **Service functions**
2. Select **time & date**
3. Select **time zone**
4. Select the appropriate local time zone.

Press the  key



Factory setting: GMT+1h, Central europe

Manual time setting

If the built-in clock is not automatically synchronized with the Internet, it must be set manually with this function.

Procedure:

1. Select **Service functions**
2. Select **time & date**
3. Select **Manual time setting**
4. Use the keys **+** and **-** to set time and date, and then confirm with **OK**.

Press the  key




Automatic daylight saving time

The WATERFRIEND can automatically switch to summer time.

Procedure:

1. Select **Service functions**
2. Select **time & date**
3. Select **daylight saving time automatic ON** oder **OFF**

Press the  key



Factory setting: Automatic daylight saving time ON

Audible alarm

The output of acoustic alarms can be enabled or disabled with this function.

Procedure:

1. Select **Service functions**
2. Select **Audible Alarm**
3. Select **ON** oder **OFF**

Press the  key



Factory setting: Audible Alarm ON

Alarm settings

For each of the alarm conditions you can set individually using this function, what type of alarm messages to be generated respectively.

Procedure:

1. Select **Service functions**
2. Select **Alarm set**
3. Select the appropriate alarm

Press the  key



For each alarm type you can select whether an audible alarm is generated (🔊), an e-mail will be sent (✉), or the centralized alarm contact is activated (📞).

Restore factory settings

With this function, all user programmable parameters are reset to the factory settings.



This function should only be used by a professional, and is only accessible in Expert Mode.

Procedure:

1. Select **Service functions**
2. Select **Factory settings**
3. Answer **YES** or **NO** to the confirmation query.

Press the  key




Setting for network operation

For operation in the network (LAN or Internet), various parameters need to be set.

Using the nsi-communication server

For a simplified access to the device from the Internet the nsi-communication server can be used.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **network settings**
4. Activate or deactivate the function **Internet connection via communication server**.

Press the  key




Factory setting: Internet connection via communication server active

Automatic IP address configuration (DHCP)

For a simplified connection of the device to the local network automatic IP configuration via DHCP can be used.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **network settings**
4. Activate or deactivate the function **IP address automatic**.

Press the  key




Factory setting: DHCP active

Manual IP address configuration

If the IP addresses are not configured automatically via DHCP, they can be set manually with this function.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **network settings**
4. Set the IP addresses required for the local network manually using the function **IP address manually**.


Press the  key



PIN-Numbers

With this function, the PIN numbers for the operation of the device via the network interface can be set.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **network settings**
4. Use the **LAN-PIN** function to set the desired PIN numbers (4 digits) for users and service technicians (Expert Mode). The Service PIN can only be changed in expert mode. If the PIN is set to 0000, the control can be operated over the LAN interface without a PIN authorization.

Press the  key




Factory setting: LAN-Pin=1234, Service-PIN=5678

Language selection

For the indications on the display several languages can be selected.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **Language**
4. Select the desired language.


Press the  key



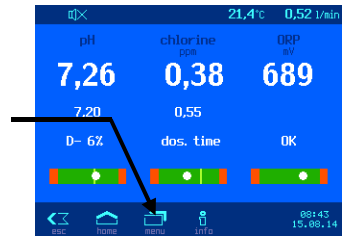
Operating hours counter

With this function, the total hours of operation of the device, and the operating hours of the individual sensors since the last calibration can be displayed.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **Operating hours**


Press the  key



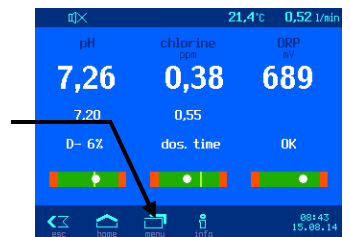
Device informations

With this function, information on the network connection and the installed application software can be retrieved.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **About dosage system**

Press the  key



Configuration of the metering pumps

With this function, the function of the pH pump and the optional third pump can be configured.




This setting should only be adjusted by a professional, and is only accessible in Expert Mode.

Raise pH <=> lower pH

In order to adapt the WATERFRIEND to the requirements of the swimming pool, the control offers the possibility of switching the function of the pH pump between the modes raise pH or lower pH.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Select **Configuration of dosage systems**
4. Select **1. Pump**
5. Select **pH down** or **pH up**.
6. To save the configuration changes, press the **Save** button and answer the following security prompt with **YES**

Press the  key



Note: When changing between pH-lowering and pH-elevating chemicals the suction lance, the metering tube and the injection valve must be rinsed with water and thoroughly cleaned.

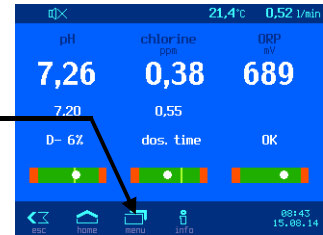
Factory setting: pH down


Function of the third metering pump (option)

The optional third dosing pump can either be used as flocculation pump or for raising the pH for a bidirectional control of pH.

Procedure:

Press the  key

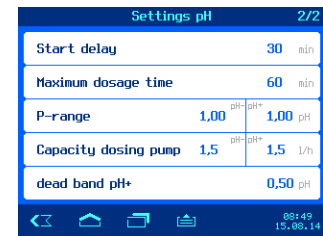


1. Select **Service functions**
2. Press the key  in the key bar
3. Select **Configuration of dosage systems**
4. Select **3. Pump**
5. Select **3rd pump disabled** or **3rd pump for flocculation** or **3rd pump for pH+**.
6. To save the configuration changes, press the **Save** button and answer the following security prompt with **YES**

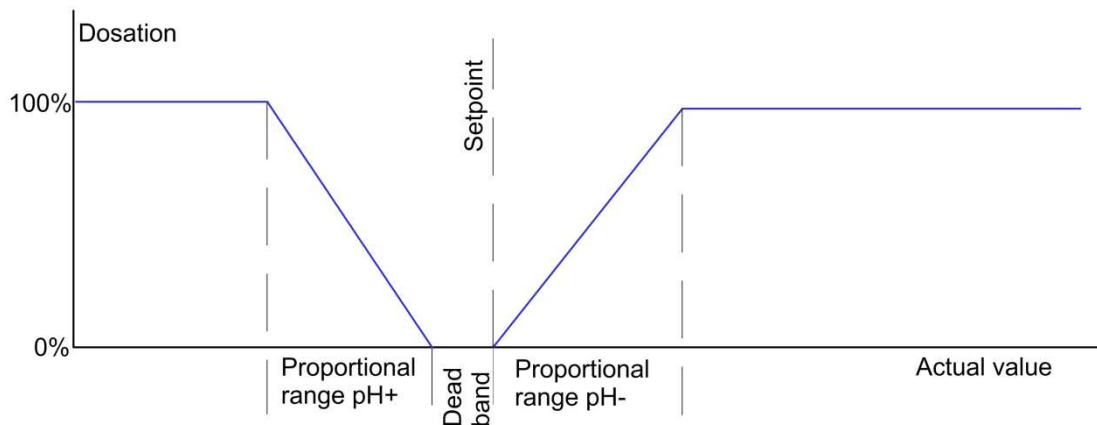
Factory setting: 3rd pump disabled

Bidirectional control for pH (pH+ and pH-)

If the third pump is configured for the function raise pH to implement a bidirectional control of the pH value, the setting menu for the parameters of the pH control is extended:



- The values for the proportional range and the pump output can be set separately for both pumps.
- You can specify a dead band for the pH+ pump, in which neither of the two metering pumps is active

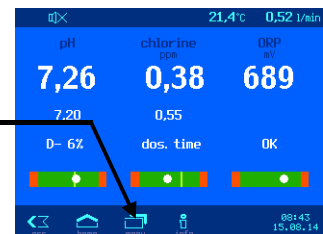




Touchscreen calibration

This feature allows the touch screen of the controller to be calibrated.

Procedure:

Press the  key








1. Select **Service functions**
2. Press the key  in the key bar
3. Press the key  in the key bar once again
4. Select **Touchscreen calibration** and follow the instructions on the screen

Calibration of the temperature sensor

With this feature, the temperature sensor in the flow cell can be calibrated.

Procedure:

1. Select **Service functions**
2. Press the key  in the key bar
3. Press the key  in the key bar once again
4. Select **Temperature korrektion**.
5. By pressing the arrow keys  or , or with the keyboard on the right of the display, the actual temperature value measured with a thermometer is entered. For confirmation, press the  button!

Press the  key



Additional settings via the LAN interface

The embedded Web server provides additional settings that affect Internet communication.

To change these settings, the web server must be opened in the web browser on your computer.

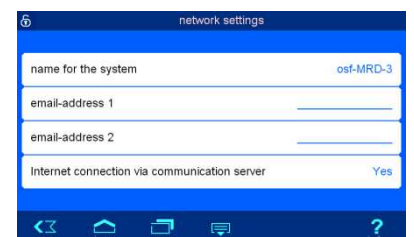
After that, you need to log in by clicking on the key icon and entering the LAN PIN or the service PIN:

Key icon for login



After login, you can go to the page "**Menu** -> **Service functions** -> **Network Settings**" and, enter a name for the device. This name appears in future network accesses in the title bar of the web browser, and also appears in the subject line of any emails sent.

You can also specify two recipients for error message emails.



Maintenance

Service work may only be carried out on de-pressurised, voltage-free equipment which has been protected against unauthorised switching on.

The metering unit should be serviced by specialist personnel at regular intervals.

6-monthly service

Sealtightness

Check all connections for sealtightness at regular intervals.

Dirt filter

The filter screen should be checked for soiling and accumulations at regular intervals. The filter screen must be cleaned or replaced if necessary.

Injection valves

The injection valves should be checked for soiling and accumulations at regular intervals. They should be cleaned if necessary.

pH electrode

The electrode function is checked at regular intervals using the two buffer solutions (pH7 and pH4). If there are any noticeable variations, the electrode should be calibrated or replaced (see above in manual, "Calibrating pH electrode").

ORP electrode

The electrode function is checked at regular intervals using buffer solution 468mV. If there are any noticeable variations, the electrode should be calibrated or replaced (see above in manual, "Calibrating ORP electrode").

Metering pumps



Protect yourself against the metering media, wear appropriate protective clothing.

Once the pump has cooled down, check the hose for any possible damage. The pump hose must be circular and may not show any signs of leakage or damage. Any damaged hoses must be replaced.

Annual service

Replacing ORP and pH electrodes

The electrodes should be replaced at intervals of one year (see above in manual, "Calibrating electrodes").

Replacing the metering hose



Protect yourself against the metering media, wear appropriate protective clothing.

The metering hoses should be replaced at intervals of one year.

Decommissioning

If the metering unit will not be used for long periods, for example during the winter, the following measures are necessary.

Electrodes

Take the electrodes out of the flow fitting and insert them in the case in which they were delivered.

Flow fitting

Empty the flow fitting.

Metering pumps

Rinse out the metering hoses thoroughly with hot water. Empty the metering hoses and remove them from the metering pumps.

Wear parts

The following components are wear parts for which no guarantee can be provided:

- electrodes (combination electrodes)
- metering pump hoses
- buffer solutions

We hope you have a lot of enjoyment and relaxation in your swimming pool

osi Hansjürgen Meier
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Shipment of the dosing system



WATERFRIEND



Declaration of non-objection

If you have to return a **WATERFRIEND**, you must send this form, filled out, back with every return device.

Type:

Serial number:

We hereby guarantee that we have professionally cleaned the device before shipping. It is free of corrosive substances and other chemical substances which could cause a health hazard. This means that there are no hazards caused by residual contamination. This form has been correctly and completely filled out and the device has been shipped in accordance with the statutory requirements.

If the manufacturer has to carry out cleaning work, all costs incurred will be invoiced.

Please fill out legibly:

Company:

Road: Postcode, town

Country: Telephone:

E-mail: Fax:.....

Surname: First name:.....

Date:

Signature: Stamp:

Detach this page and use it for the return shipment!

osf Hansjürgen Meier · Elektrotechnik und Elektronik GmbH & Co KG

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