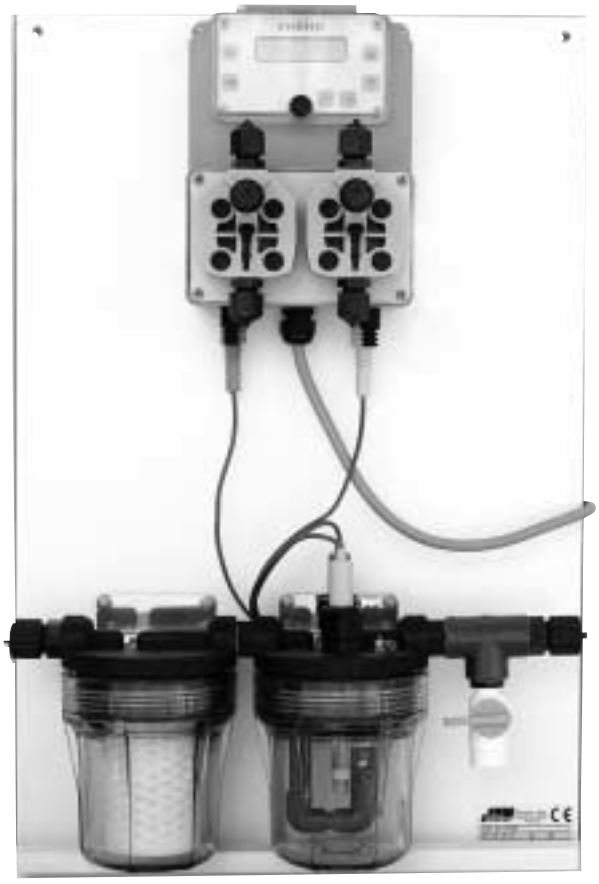
Automatic dosing and regulation system

REGUL SYSTEM



INSTRUCTIONS FOR INSTALLATION AND USE

Thank you for buying a REGUL SYSTEM automatic dosing and regulation station. This is an efficient, powerful and reliable product. Prior to installation and utilisation, the subsequent information must be read carefully. It contains important recommendations as to handling and utilisation. Make sure not to lose this information and hand it to any potential user.

OVERVIEW

FOREWORD

GENERAL

The REGUL SYSTEM dosing station has been designed for the measuring and dosing of chlorine and acid products in private pools and pools for housing areas. All information is indicated on a liquid cristal display. The keyboard serves to enter the data. The regulated parameters are displayed simultaneously. The dosing can be proportional or in the ON/OFF mode. The flow rate of each doser can be regulated separately. If one tank is empty, the tank alarm sensor discontinues the pump operation and a corresponding message will appear on the screen. The two corrugated buttons on the front plate serve to start the pump when used for the first time.

READING SCALE

The dosing station has been designed for a pH range of 0 to 14 with the reading to 0.01 pH precision. For the Redox value, the tension in mV may vary between 0 and 1999 mV, to 1 mV precision. All sensors are subject to a gradual ageing process. The sensitivity wil decrease and the amplification curve must be changed. The data are recorded and displayed during the calibration procedure. The sensitivity range of the dosing station for the pH sensor is 46 to 72 mV/pH with an amplification curve of ± 70 mV and ±200 mVt for the Redox sensor.

ENTRY SIGNALS

The dosing station is equipped with two analogue entries for the constant control of the following values: pH and Redox (mV). Both sections are equipped with an empty tank alarm. The STAND BY entry discontinues the dosing pumps. The metal part of the connectors of the level regulation and the sensors are earthed. A 12 V 10 mA tension is on the contact. Closing the contact activates the entry.

INSTALLATION

PUTTING INTO OPERATION

Mount the assembly plate to a vertical wall in a dry and ventilated place. Make sure not to place them on the dosing products to prevent the dosing station from being damaged in case of a possible gas evasion.

The minimum temperatures depend on the respective dosing products which must be always liquid.

The tanks with the reactive substances must be in the vicinity of the pumps. They must be provided with lids to prevent gas evasion and with holes to make them open to the atmosphere in order to avoid low pressure inside.

The maximum suction height is 1.5 m.

ELECTRICAL CONNECTIONS

The electrical installation must be carried out in accordance with the valid regulations.The REGUL SYSTEM must be connected to a power supply of 220 V (± 10%) + earth. This power power supply must be connected to the filtrations system. To avoid an overload that may cause damage to the dosing station, it must not be connected directly in parallel to the pump.
Use a relay or contactor instead.

CIRCULATION TANK

REGUL SYSTEM uses the two sensors in the circulation tank to retrieve its information.
This tank consists of a filter and a sensor holder. This tank must be connected to the filtration system in accordance with the 3 methods shown in the figures 1-3.
The 2 adaptors and tubes provided for this purpose must be used in any case. The adaptors have a 1/2'' threading and are screwed to a reducing tee or to a clamp saddle.

1. Take the water from the pump water return, (**if possible, prior to filtration, as shown in figure 1**, to ensure realistic pH et mV measuring values).

2. Install the ¼ turn valve at the place where you took the water probe and regulate the water flow at approximately 30 litres/hour.

3. Use the second 1/2" threading to connect the exit of the electrode holder right after the filter.

INJECTORS

Install the two injectors at a place immediately before water entry into the swimming pool.
The two injectors must not be connected to one and the same adaptor, but in a distance of 50 cm from each other. Use the adaptors provided for this purpose to attach the injector to the upper connection of the doser with the rigid tube (opaque). Tighten the fastening screw of tube manually, only.

SUCTION LATERALS

For each doser:
Attach the tank alarm sensor to the suction lateral (fig 4). Use the 6x4 transparent crysta tube to attach the suction lateral to the doser head. Connect the tank alarm sensor to the BNC connector below the dosing pump.
The aspiration tube must be in a vertical position, as short as possible and without bends to prevent air bubble formation. The fastening screw of the hose must be tightened manually. Place the suction lateral in the tank at a distance of several centimeters from the bottom, to prevent the aspiration of deposits.
Connect the 6x4 transparent crystal tube to the adapter of the pump's emptying valve. Insert the other end into the doser tank.
Open the valve and turn on the pump to facilitate the priming (see below).
It is very important to observe the instructions on the doser front plate. Left dosing pump: ACID. Right pump: STERILIZING PRODUCT, CHLORINE. If you have erroneously filled the doser with the wrong product, rinse with water.
Press the button as if to activate the pump, in order to start the doser. Make sure that there are no bubbles in the injection hose.

IMPORTANT REMARK
Warning: Make sur not to confuse the connections for the circulation which allow the passage of light with the injectors which are fitted with spring check valves and which have a double threading 1/2" et 3/8".

fig.4 Assembly of the tank alarm sensor

CONNECTION OF THE CIRCULATION TANK

Fig. 1 - Between the exits of the pump and the filter

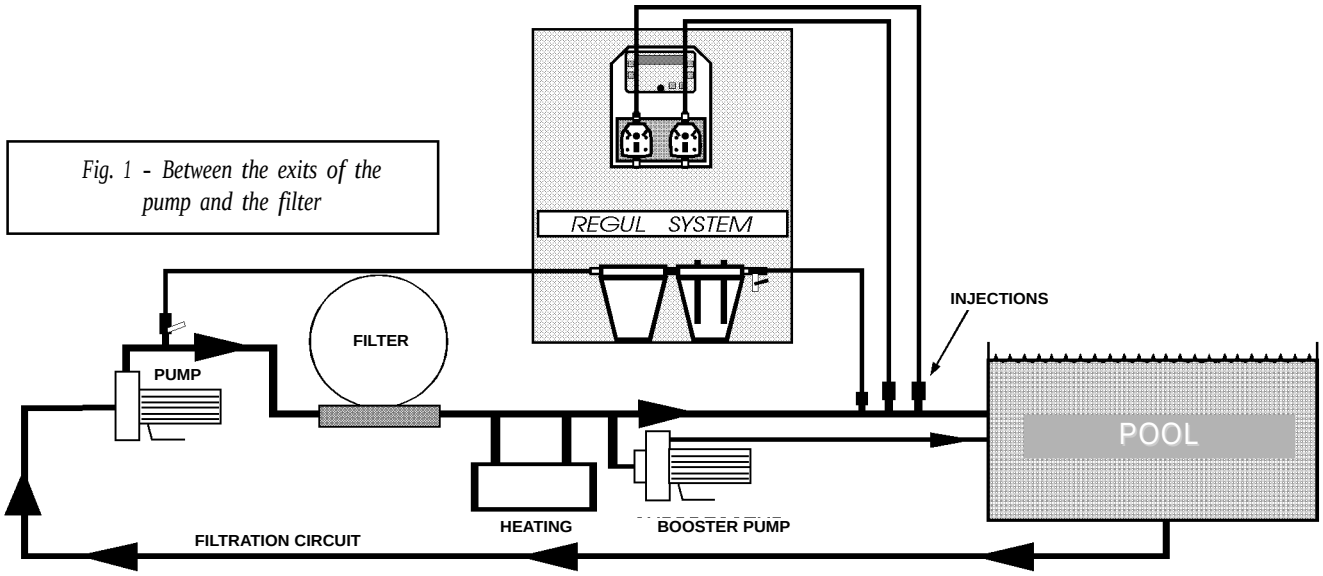


Fig. 2 - In the fitlter exit, before and after heating or after booster pump

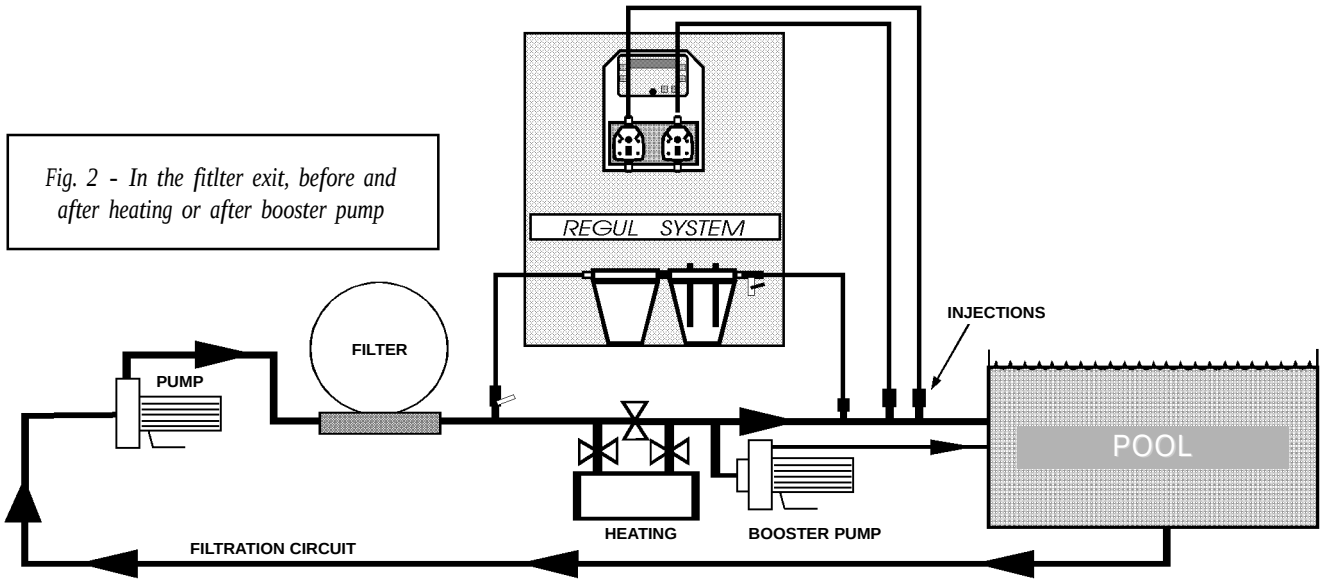
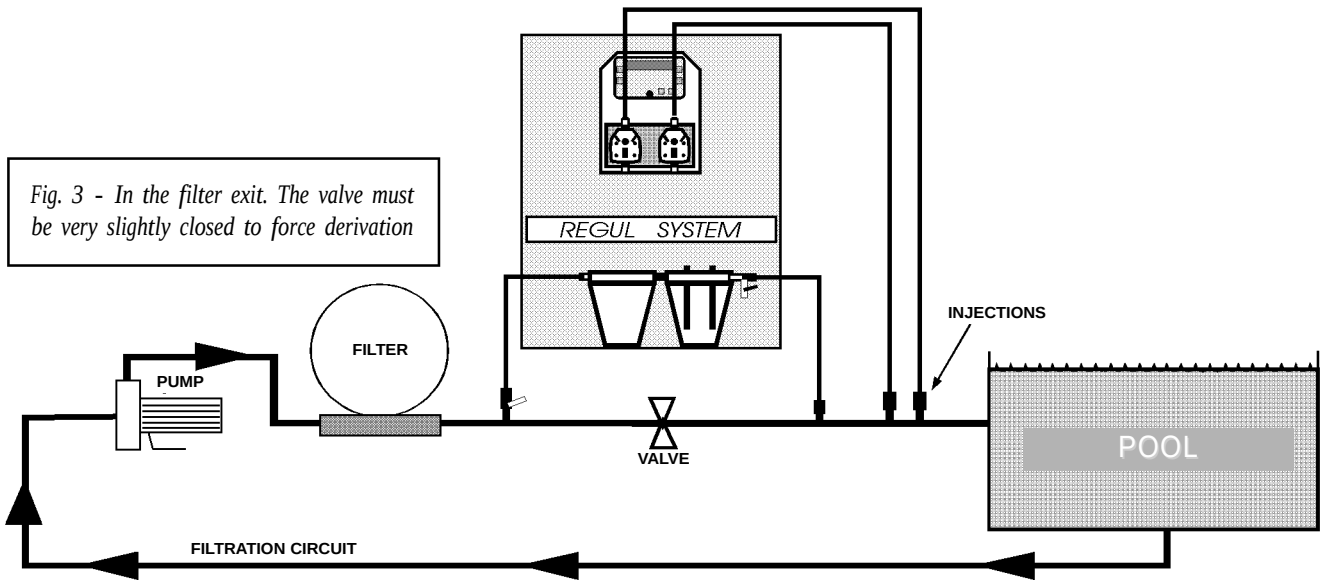
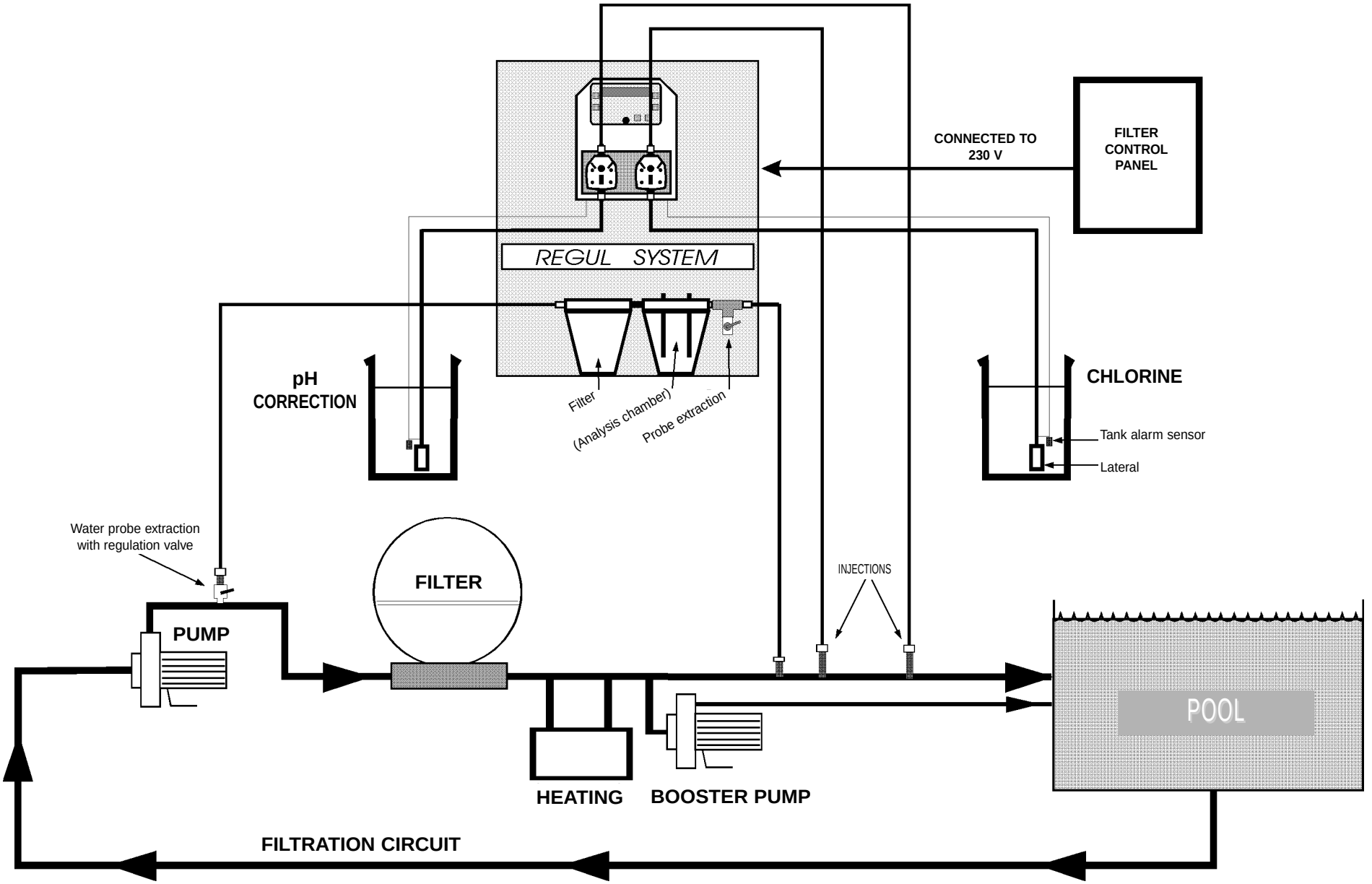


Fig. 3 - In the filter exit. The valve must be very slightly closed to force derivation



INSTALLATION DIAGRAM



PUTTING INTO OPERATION

SENSORS

WARNING
The sensors will deteriorate rapidly, if not preserved in water. Therefore do not remove the sensors from their protective cover, unless you want to start the dosing station or the sensor holder is filled with water.

Install the sensors inside the sensor holder. For this purpose, remove the cover from the end of each sensor prior to insertion into the cable flange. Manually tighten the nuts of the cable flange. Connect the BNC connectors of the sensors below the dosing pumps. Make sure that the each pump ist equipped with the right sensor:

- pH (blue sensor) to the left, to the “pH” BNC connector
- Redox (yellow sensor) to the right, to the “Redox” BNC connector

The "Acid level" and "Chlorine level" BNC connectors must be connected to the tank alarm floaters.

If the station is delivered with the sensors already installed in the circulation tank, make sure to remove the cover or the receptacle filled with water, which serve to protect the sensors.
Turn on the filter and make sure that the water flows freely inside the analysis chamber.

DISPLAY

When starting the dosing station, the following main menu will be shown (Ex) :

Screen 1

7 .24 pH	650 mV
00 %	10 %

The two upper values stand for the water parameters. The percentage % below the pH value indicates the quantity to be injected by the dosing pump. The indicated % value is proportional to the maximum flow rate. The percentage % below the Redox value indicates the proportional Redox regulation time controlled by the Control System.

PASSWORD

Access to the SETUP menu is protected by a four digit password.
The dosing station is delivered without password (0 0 0 0). It may be changed any time.

KEYBOARD

The keyboard consists of 4 arrow keys ◀ ▶ ▲ ▼ , the ESC and ENTER keys. In the main menu (fig. 1), some keys have a double function. For example, if you press the ▲ key for 4 seconds, the dosing station will be shut off and OFF appears on the screen. Repeat the preceding procedure to go back to normal operation.
Hit the ◀ key for the manual operation of the acid product pump. If you press the ▶ key, the manual operation of the chlorine pump will be available. In the programming mode, the REGUL SYSTEM will automatically go back to screen 1, unless
you hit a key.

Special functions

ON/OFF: The dosing station is not equipped with a power supply switch. To shut it off, press the ▲ key for 4 seconds. OFF will be displayed on the screen.
Press the ▲ key for 4 seconds, to turn it on again.

REINITIALIZATION: If you want to erase the memory with all data already entered, calibration and password, you must proceed as follows:
1) Shut off the power supply.
2) Simultaneously press the ▲▼ keys and connect to the power supply again while continuing to press both keys.
3) Release the keys. The following message will be displayed: “CHECKSUN ERROR”. Press any key.
4) Proceed to the setup.

START: This function allows you to simultaneously turn on the two dosing pumps at maximum frequence. The following procedure must be observed:
1) Shut off the power supply.
2) Simultaneously press the following keys ◄ ►.Then connect to the power supply again while continuing to press both keys.
3) Release the keys, the dosing station will remain in this mode, until the power supply will discontinued.

SENSOR CALIBRATION

The sensors must be calibrated during the installation procedure to obtain reliable measuring values. Proceed in the following order: pH and then Redox (mV).

pH section

It takes two steps to calibrate the pH sensor using two buffered solutions.
Proceed only if you have provided for the following:

- The buffered solutions must be available (pH 7 and pH 4).
- Temperature must be known.
- Attach the BNC connector of the pH sensor to the connector provided for this purpose.
- Remove the protective cover of the sensor.
- Clean with water, dry and immerse the sensor in the buffered pH 7 solution.
- The sensor must be stirred and kept submerged.

Press the **ENTER** key in the main menu for 3 seconds. Enter the password, if programmed, and press **ENTER** again. The following will be displayed:

ATTENTION :
THE DOSING STATION WILL QUIT THE PROGRAMMING MODE AND GO BACK TO SCREEN 1 AFTER 90 SECONDS, UNLESS YOU HIT A KEY.

Screen 2

→	Setup parameter

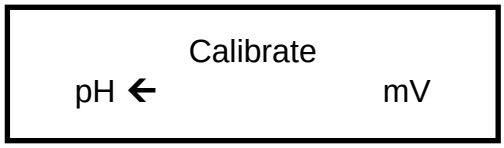
The cursor must remain on " . " SETUP. Then press **ENTER**.

Screen 3

→	Set-Point Calibrate

Use the ▲ ▼ keys to select CALIBRATE. Then press ENTER. The following will be displayed:

Screen 4



To select the pH value press the ◀ ▶ keys. Then press ENTER. The following screen is displayed :

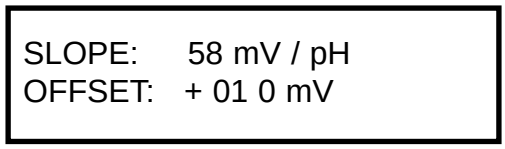
Screen 4.1

The sensor must be immersed in the pH 7 solution, stirred and left submerged. "Reading" stands for the value read by the sensor. Wait until the value has settled. The value below must be entered.
Use the ▲ or ▼ key to enter the value read from the bottle of the buffered solution

Screen 4.2

Remove the sensor from the pH 7 buffered solution, clean with water, dry and immerse it in the pH 4 buffered solution and leave it submerged. Wait till the reading value has settled. Use the ▲ or ▼ key to enter the value read from the bottle of the buffered solution depending on the temperature and press ENTER to store the calibration. If the calibration has been carried out correctly and if the sensor is in good condition, the result will be displayed within a few seconds.

Screen 4.3



If the sensor cannot provide for a reliable value, the following will be displayed:

Screen 4.4

If you quit the calibration mode, screen 4 will appear.

mV section
Before you proceed, the buffered solution must be available. Insert the BNC plug of the Redox sensor to the connector provided for this purpose. Remove the protective cover from the sensor, clean with water, dry and immerse it in the 650 mV buffered solution, stir and leave it submerged. If you quit screen 4, select mV using the following keys ◀ ▶. Then press **ENTER**. The following will be displayed :

Screen 4.5

"Reading" shows the value read by the sensor. Wait for the recorded value to settle. The value below must be entered. Use the ▲ or ▼ key, to enter the value read from the bottle of the buffered solution depending on the temperature and press **ENTER** to store the calibration. If the calibration has been carried out correctly, and if the sensor is in good condition, the following will be displayed within a few seconds:

Screen 4.6

```
OFFSET of mV
CAL  at  -010  mV
```

If the sensor does not provide for a reliable value, the following will be displayed:

Screen 4.7

```
OFFSET of mV
UNCALIBRATED
```

If you quit the calibration mode, screen 4 will appear again.
Press the **ESC** key to go back to the previous page.

START-UP DELAY AND PASSWORD

The main menu is shown (screen 1),

- Press **ENTER** for 3 seconds
- Enter the password, if programmed (when delivered, the password is “0000”)
- Press **ENTER** again to go to screen 2
- Select “Parameter” using the following key ▶. The following will be displayed:

Screen 5

```
DELAY : → 00   MODE  1
NEW PW  :  0   0   0    0
```

Delay : This value indicates how many minutes you have to wait until the dosing station will be started. The delay can be set at 0 to 60 minutes and can be useful when it comes to prevent the dosing pumps from working during the filter backwash.
During that time the dosing station is in the “STANDBY” mode.

Mode 1 : The pH and the Redox values are controlled simultaneously and corrected, if necessary.

Mode 2 : The pH value is controlled first and the Redox value is neglected until the pH cut-in value is obtained.

New Pw : New password.

The area can be changed using the ◀ ▶ keys.
The ▲ ▼ keys serve to enter modifications.
Press the **ENTER** key to confirm the modification. The following will be displayed on the screen for several seconds:

Screen 5.1

```
THE   PASSWORD   IS  :
  >   1   2   3   4   <
```

DETERMINATION OF THE REDOX CUT-IN VALUE

Proceed as follows to determine the Redox cut-in value:
- The pH value must be regulated to obtain the desired value (in general 7.2 - 7.4).
- Calibrate the sensor (see preceding chapter) and turn on the filter.
  The FRH pump must continue working.
- Manually add small doses of chlorine to the water. Use a reliable test kit (DPD) to analyse the pool water after each chorine addition.
- When the analysis shows that the desired free chlorine values has been obtained, the mV value displayed by the FRH pump must be recorded. Store this value as cut-in value.

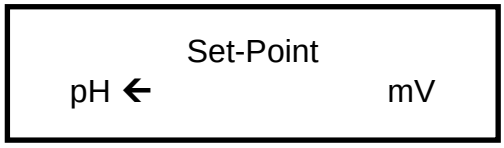
PROGRAMMATION OF THE CUT-IN VALUES

The cut-in values are the threshold values of the dosing pump operation (“set points”).

pH section
Press E**NTER** for 3 seconds to enter the programming mode in the screen 1. Then enter the password if any, press **ENTER**, select Set up and press **ENTER** again, select Set-Point, press **ENTER**, and select pH:

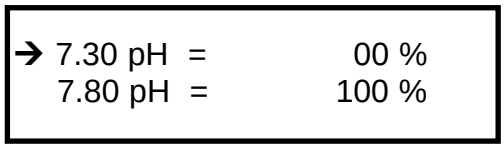
ATTENTION :
IF NO KEY IS PRESSED FOR 90 SECONDS, THE DOSING STATION QUITS THE PROGRAMMING MODE AND GOES BACK TO SCREEN 1.

Screen 6



If you press **ENTER**, the following will be displayed:

Screen 6.1



The cursor indicates the values which can be modified. Use the ▲ ▼ keys to modify the data.

You can switch to other areas pressing the ◀ ▶ keys.
In our example, screen 6.1 shows that the acid dosing pump will be stopped at a pH value of 7.3 or less. If the pH value increases, the pump will be restarted and the flow rate will be adjusted proportionally to reach 100% of the maximum flow rate at 7.8 pH. Should the pH value continue to increase, the pump would continue to work at a maximum flow rate. If the pH range is limited to 7.2 and 7.3, the dosing is still in the proportional mode, but it approaches the ON/OFF mode. If approximately the same pH value is programmed, the station works in the ON/OFF mode. Complete with **ENTER** to save the data. The "SETPOINT SAVED" message will appear on th e screen and the system will go back to screen 6. Press the **ESC** key several times to go back to screen 1.

ON/OFF mode (option) :
You can enter OFF instead of 00 % and ON instead of 100 %, if you do not want to enter the values in % (do not forget to reduce the range, for example: 7.30 = OFF / 7.40 = ON).

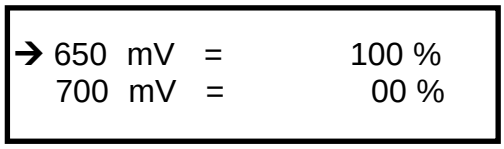
Redox section (mV)
To start the programming in screen 1, press ENTER for 3 seconds, enter the password, if any, press **ENTER**, select Setup and press **ENTER** again, select Set-Point,
press **ENTER** and select mV:

ATTENTION :
IF NO KEY IS PRESSED FOR 90 SECONDS, THE DOSING STATION QUITS THE PROGRAMMING MODE AND GOES BACK TO SCREEN 1.

Screen 6.2

If you press **ENTER**, the following will be displayed:

Screen 6.3



The cursor indicates the values which can be modified. Use the ▲ ▼ keys to modify the data. You can switch to other areas pressing the ◀ ▶ keys.
In our example, screen 6.3 shows that the chlorine pump is stopped at a value of 700 mV or more. If the mV value decreases (decreasing chlorine), the pump will be started and the proportional dosing will be increased, until 100% of the maximum flow rate at 650 mV has been attained. Should the mV value continue to decrease, the pump would continue to work a the maximum flow rate. Complete with **ENTER** to save the data. The "SETPOINT SAVED" message will appear on screen 6. Press **ESC** several times to quit and go back to screen 1.
For your information: 750mV at pH 7.3 equals to a value of 1.5 to 2 mg/l of free chlorine depending on the water quality and conductivity.

ON/OFF mode (Option) :
You can enter OFF instead of 00 % and ON instead of 100 %, if you do not want to enter the values in % (do not forget to reduce the range, for ex.: 690 = ON / 700 = OFF).

RECOMMENDATIONS

Only use the tubes delivered for the connection of the pumps. The use of tubes other than those delivered will cancel all guarantees.
- Suction tube (crystal type) and water return tube (opaque type) : 4 x 6 mm.
- Operating temperature: - 10 / + 60 °C.

If the regulation must be dismanteled to be transported, the doser tanks must be emptied to avoid that any corrosive liquid escapes. Damage to the station due this will cancel all guarantees.

We recommend that you replace the cartridge of the circulaiton tank twice per year.

It is obligatory to connect the pool water entirely to earth, to avoid stray currents.

MAINTENANCE

CLEANING OF THE pH AND REDOX ELECTRODES (mV)
1) Inorganic depostis and incrustations:
Immerse the electrodes in a 3% hydrochloric acid for a period of 5 minutes to dissolve the deposits and incrustations.
2) Organic oil and grease film:
Use a solution of water and detergent to wash the end of the electrode. If this does not help, the porous ceramic diaphragm is probably clogged. Immerse the end of the electrode in a HCl solution at a temperature of 60, 70°C and leave it submerged for approximately 10 minutes. Let the electrode slowly cool down, before you check, whether it is in good working order again. If the sensitivity of the electrode has not improved after this treatment, it needs to be replaced.

STORAGE OF THE pH AND REDOX ELECTODES
For a correct responsiveness, the electrodes must always be immersed. The vial with the protective liquid where the electrodes are immersed is a perfect protection during extended periods of storage. Therefore, do not remove this vial, unless you use the electrode. If the vial with the protective liquid gets lost, you can also immerse the sensor in a pH 4 buffered solution with an addition of 1/100 saturated KCl. You can also use tap water for shorter storage periods. Do not use distilled water. To avoid damage to the electrode, it must not be connected to the BNC connector of the tank alarm sensor.
The pH and Redox electrodes are not covered by a guarantee.

WARNING
Disconnect the power supply before you access the terminal box. The original value must be observed for the replacement of the fuse. Start with the connection to earth. We recommend that you install a differential circuit breaker, sensitivity 300 mA, for additonal protection against electric discharge.

ATTENTION
Prior to installation, check whether the supply voltage is compatible with the voltage of the station. The technical drawings and data are subject to change at any time without prior notice.

TROUBLESHOOTING

TROUBLESHOOTING GUIDE:

If … the pump is not dosing and the screen is turned off:
- Make sure that the pump is under tension.
- Make sure that the tension is compatible with that of the pump.
- Check, whether the fuse is in good working order.
- Replace the control card.

If … the pump is not dosing and "LowLev" is displayed on the screen:
- Make sure that the pump contains a dosing product.
- Check, whether the floater of the level regulator is blocked.
- Remove the incrustation which might clog the floater in the low position.

If … the pump is not dosing and the electro magnet develops pulses:
- Make sure that the filter is not blocked by dirt particles or cristallized matter.
- The pump body contains air. Restart the pump.
- Check, whether the suction and injection devices are cristallized or clogged.
- Make sure that there is no O-ring deformation caused by a chemical product which is not compatible with the O-ring material.

The dosing station is equipped with a 630 mA fuse to protect it against overloads. Shut off the power supply and remove the four screws of the front plate, before you replace the fuse.