SALT ELECTROLYSIS SYSTEM
SYSTÈME D'ÉLECTROLYSE SALINE
SISTEMA DE ELECTROLISIS SALINA
SISTEMA PER L'ELETTROLISI DEL SALE
SALZ-ELEKTROLYSE- SYSTEM
SISTEMA DE ELECTRÓLISE SALINA

EN

INDUSTRIAL SYSTEMS

Model. 65/80 EX
65/80/EXT-1(E)
65/80/EXT-2

100/120 EX
100/120/EXT-1(E)
100/120/EXT-2

150/180 EX
150/180/EXT-1(E)
150/180/EXT-2

250/300 EX
250/300/EXT-1
250/300/EXT-2

500/600 EX
500/600/EXT-1(E)
500/600/EXT-2

INSTALLATION AND MAINTENANCE MANUAL
MANUEL D'INSTALLATION ET D'ENTRETIEN
MANUAL DE INSTALACION Y MANTENIMIENTO
MANUALE DI INSTALLAZIONE E MANUTENZIONE
EINBAU-UND BETRIEBSANLEITUNG
MANUAL DE INSTRUÇOES E MANUTENÇAO

CE

ENGLISH

IMPORTANT: The instruction manual you are holding includes essential information on the safety measures to be implemented for installation and start-up. Therefore, the installer as well as the user must read the instructions before beginning installation and start-up. Keep this manual for future reference.

Disposal of waste electrical and electronic domestic systems in the European Union

All the products marked with this symbol indicate that the product shall not be mixed or disposed with your household waste at their end of use. It is responsibility of the user to eliminate this kind of wastes depositing them in a recycling point adapted for the selective disposal of electrical and electronic wastes. The suitable recycling and treatment of these wastes contributes in essential way to the preservation of the Environment and the health of the users. For further information regarding the points of collection of this type of wastes, please contact to the dealer where you acquired the product or to your municipal authority.

For optimum performance of the Salt Electrolysis Systems, we recommend you to follow the instructions given below:

1. CHECK THE CONTENTS OF THE PACK:

You should find the following elements inside the box:

- Power supply
- Electrolysis cell.
- pH & ORP sensors (only in systems with **EXT-1(E)** control extension pre-installed).
- Calibration solutions pH 7.0 (green) / pH 4.0 (red)] (only in systems with **EXT-1(E)** or **EXT-2** control extension pre-installed).
- Calibration solution [ORP 470 mV] (only in systems with **EXT-1(E)** control extension pre-installed).
- PE sensor holders (only in systems with **EXT-1** control extension pre-installed).
- FREE CHLORINE Sensor (only in systems with **EXT-2** control extension pre-installed).
- Sensor holder panel with inductive flow detector, flow regulation and pre-filter (only in systems with **EXT-1(E) or EXT-2** control extension pre-installed).
- CEE22 (M) connector for dosage pump (only in systems with **EXT-1(E)** or **EXT-2** control extension pre-installed).
- Operation manual.

2. GENERAL FEATURES:

When the salt electrolysis system is installed, a quantity of salt must be dissolved into the swimming pool water. This salty water then passes through the electrolysis cell that is located in the plant room. The salt electrolysis system consists of two elements: an electrolysis cell and a power supply. The electrolysis cell contains a quantity of titanium plates (electrodes) and when a weak electrical current is passed through the plates inside the electrolysis cell, there is chlorine production.

Maintaining a level of chlorine in swimming pool water keeps the water sanitised and healthy to swim in. The salt electrolysis system will manufacture chlorine whenever the pool circulation system (pump and filter) is operational.

The power supply is provided with various safety devices, which are activated in case of irregular operation of the system, as well as a microprocessor driven control system.

The salt electrolysis systems have an automatic cleaning system that avoids scale formation on the electrodes. Moreover, two additional Control Extensions can be installed with salt electrolysis systems:

DESCRIPTION	MODEL				
	MOD.65/80 (all versions)	MOD.100/120 (all versions)	MOD.150/180 (all versions)	MOD.250/300 (all versions)	MOD.500/600 (all versions)
Standard working voltage	230 VAC / 50-60 Hz.		380 VAC / 50-60 Hz.		
Output (dc)	40 A	65 A	90 A	150 A	300 A
Production (g/h)	65-80	100-120	150-180	250-300	500-600
Flow detector	Gas detector				
Salinity / Temperature range	4 - 6 g./l. | +15 - 40°C				
Electrodes	SELF-CLEANING coated Titanium Estimated lifetime: 10.000 – 12.000 hours of operation (depending on water quality)				
Production control	0 - 100 %				
Salt level protection	Automatic production protection				
Polarity switch	Programmable from control panel: 2/4 hours + test mode (2 minutes)				
External control	Input for potential free contact for ORP/RESIDUAL CHLORINE control. Input for potential free contact for REMOTE STOP				

EXT-1(E) **CONTROL EXTENSION EXT-1(E) (PH / ORP)**

DESCRIPTION	MODEL				
	MOD.65/80 EXT-1(E)	MOD.100/120 EXT-1(E)	MOD.150/180 EXT-1(E)	MOD.250/300 EXT-1(E)	MOD.500/600 EXT-1(E)
Measure range	0.0 - 9.9 (pH) / 0 - 999 mV (ORP)				
Control range	7.0 - 7.8 (pH) / 650 - 800 mV (ORP)				
Precision	± 0.1 pH / ± 1 mV (ORP)				
Calibration	Automatic, with calibration solutions 7.0 / 4.0 (PH) | 470 mV (ORP)				
Control output [pH]	One output 230 V / 500 mA for dosage pump connection				
PH/ORP Sensors	PPO body, range 0 - 12 (pH) / ± 2000 mV (ORP), solid electrolyte				

EXT-2 **CONTROL EXTENSION EXT-2 (PH / CHLORINE)**

DESCRIPTION	MODEL				
	MOD.65/80 EXT-2	MOD.100/120 EXT-2	MOD.150/180 EXT-2	MOD.250/300 EXT-2	MOD.500/600 EXT-2
pH measure range	0.0 - 9.9 (pH) / 0.0 - 5.0 ppm (CHLORINE)				
pH control range	7.0 - 7.8 (pH) / 0.0 - 5.0 ppm (CHLORINE)				
Precision	± 0.1 pH / ± 0.1 ppm (CHLORINE)				
Calibration	PH: automatic, with calibration solutions 7.0 / 4.0 CHLORINE: automatic, with DPD external photometer (not supplied with the unit.				
Control output [pH]	One output 230 V / 500 mA for dosage pump connection				
PH/ORP sensor	PPO body, range 0 - 12 (pH) / ± 2000 mV (ORP), solid electrolyte				
CHLORINE sensor	Amperometric sensor FREE CHLORONE, CL0102 model				

3. SAFETY WARNINGS AND RECOMMENDATIONS:

- The equipment should be assembled and handled by truly qualified people.
- Current electrical and accident prevention regulations should be followed.
- Under no circumstances will the manufacturer be held responsible for the assembly, installation or start-up, nor any handling or fitting of components unless they are carried out on its premises.
- Salt electrolysis systems (MOD.65/80 EX/EXT-1(E)/EXT-2 and MOD.100/120 EX/EXT-1(E)/EXT-2) operate at 230 VAC/50-60 Hz. Models (MOD.150/180 EX/EXT-1(E)/EXT-2, MOD.250/300 EX/EXT-1(E)/EXT-2 and MOD.500/600 EX/EXT-1(E)/EXT-2) operate at 380 VAC /50-60 Hz. Do not attempt to alter the system to operate at a different voltage.
- Check that all the electrical connectors are well tightened to avoid false contacts and their consequent overheating
- Before installing or replacing any component, disconnect the equipment from the mains, and use exclusively spare parts supplied by the manufacturer
- Taking into account the fact that the equipment produces heat, it must be installed in places with sufficient ventilation. Fan openings should be kept free of any element that could obstruct them. The equipment should not be installed near flammable materials.
- The salt electrolysis systems must be installed in well-ventilated dry places They should never be installed in places susceptible to flooding.
- If the salt electrolysis system has not cover detection system, it is important to reduce its production to the minimum while the pool is covered. Otherwise, an excess of chlorine could degrade the pool materials.

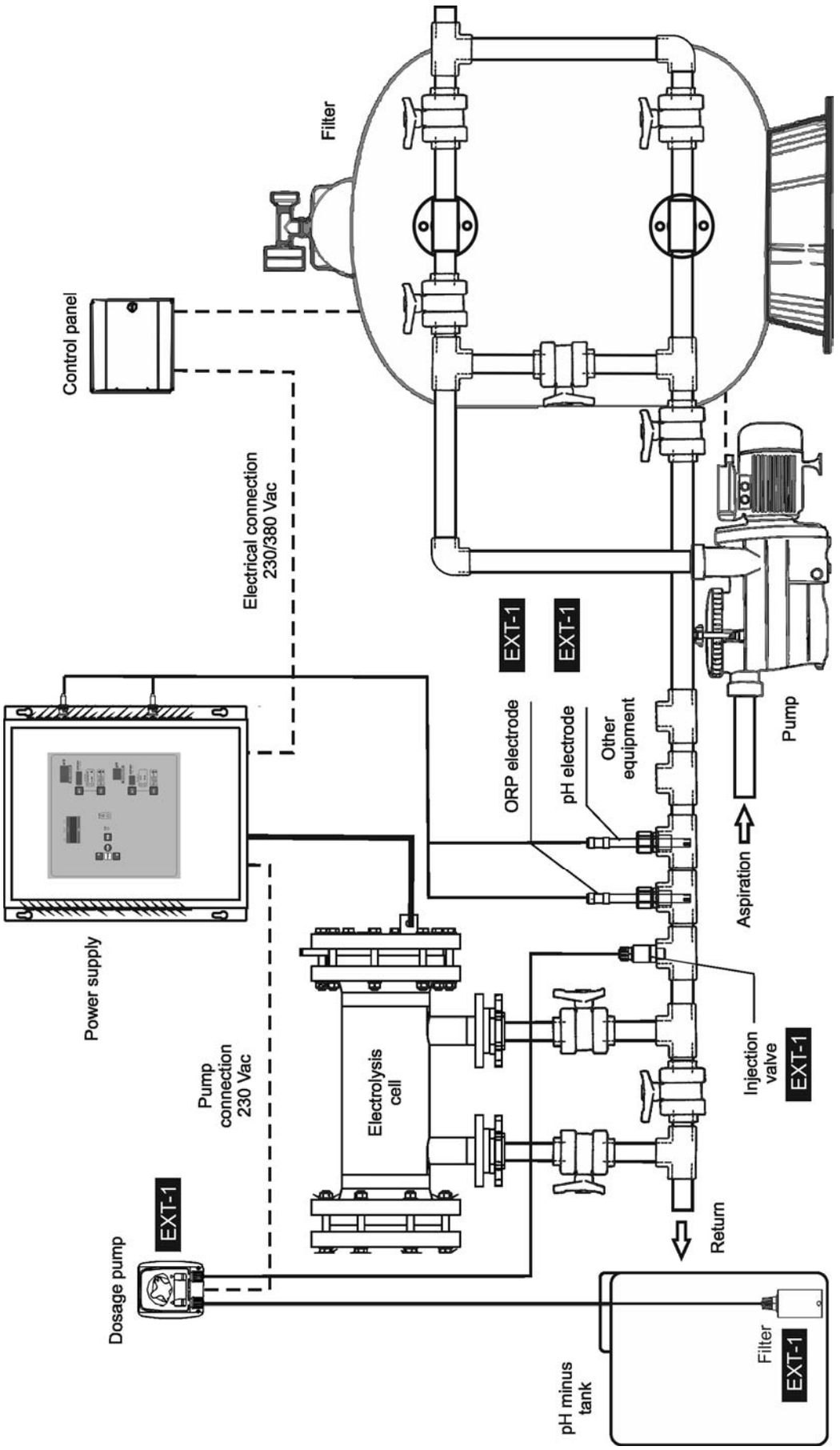


Fig.1 Recommended installation diagram (MOD.65/80/EX … MOD.250/300/EX models, and versions with integrated **EXT-1** Control Extension).

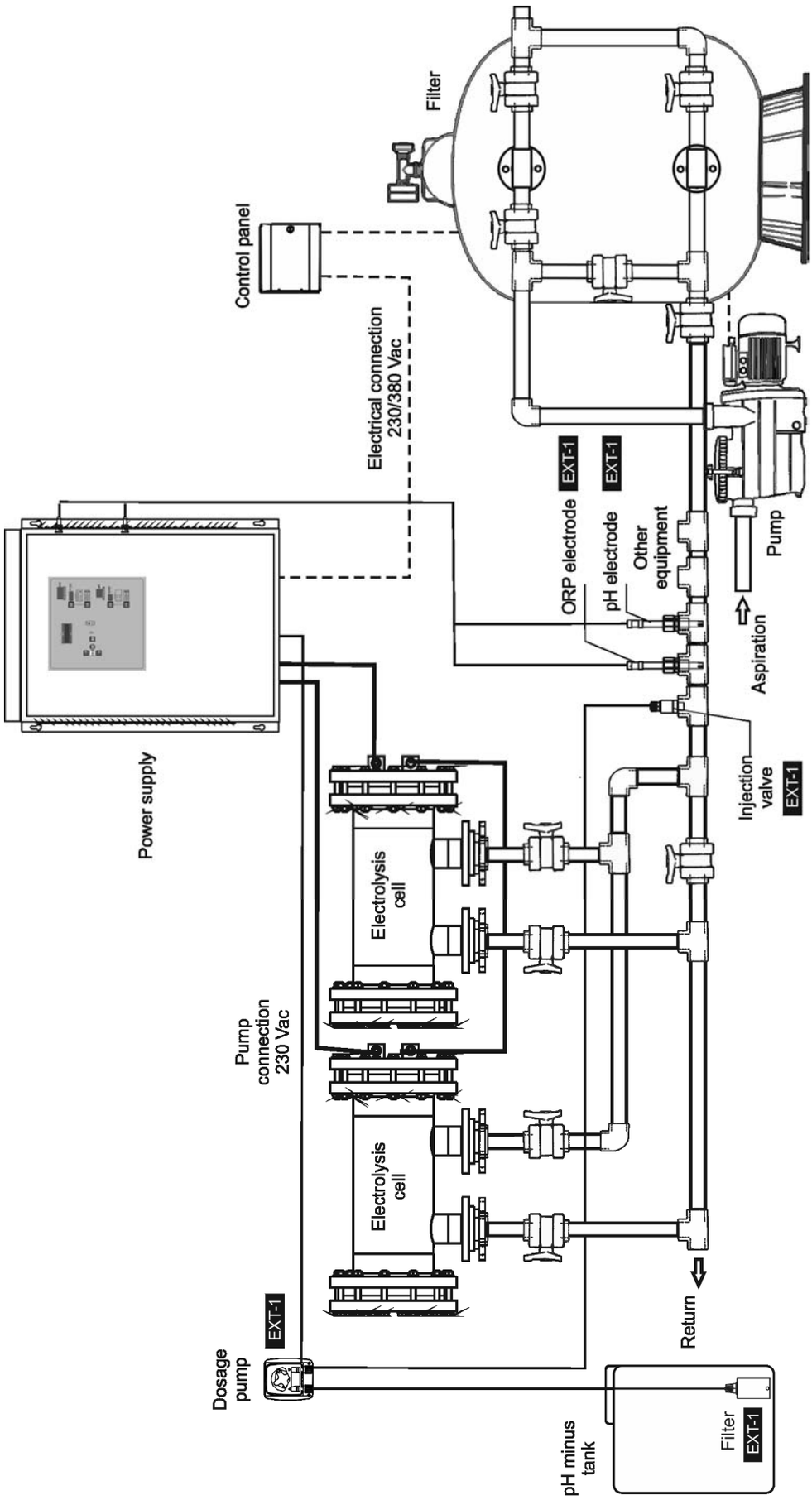


Fig.2 Recommended installation diagram (MOD.500/600/EX model, and version with integrated **EXT-1** control extension).

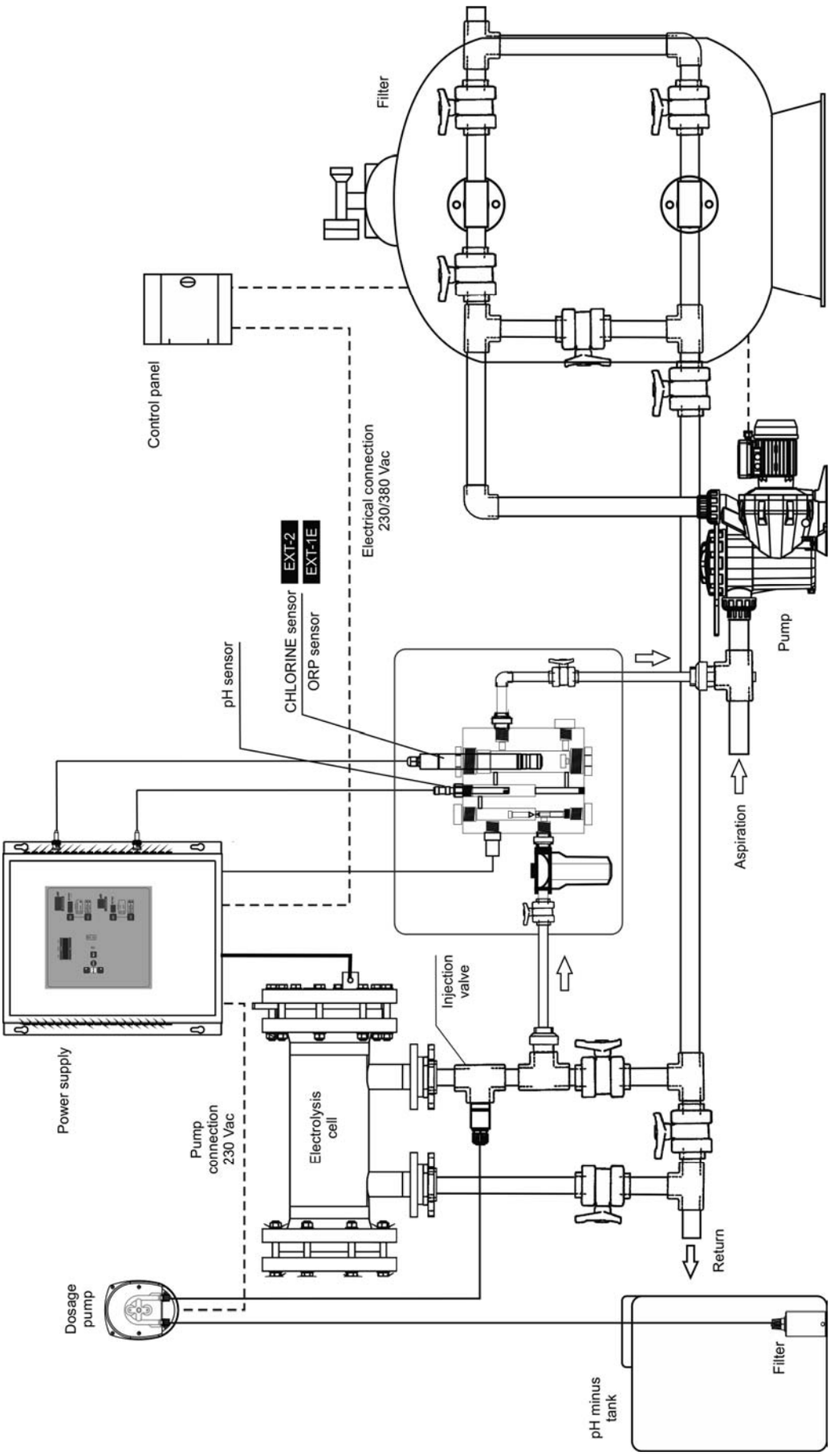


Fig.3 Recommended installation diagram for versions with integrated **EXT-1E** and **EXT-2** control extension.

4. INSTALLATION:

4.1. Installation of the power supply

Always install the POWER SUPPLY of the salt electrolysis system VERTICALLY on a solid and rigid surface (wall) as shown in the recommended installation diagram (Figs. 1-3). In order to guarantee a good state of conservation, the POWER SUPPLY should be installed in a well-ventilated dry place. Due to IP degree of the POWER SUPPLY the salt electrolysis system should not be installed outdoors. The POWER SUPPLY should be installed a bit distant from the electrolysis cell so that it cannot accidentally suffer water splashes.

Beware of corrosive atmosphere formation due to pH decreasing solutions (specially, those ones based on hydrochloric acid "HCl"). Do not install the DOMOTIC Series system near to any stores of these chemicals. We strongly recommend the use of chemicals based on sodium bisulphate or diluted sulphuric acid.

Power supply must be connected to the electrical control box of the pool, **so that the pump and the Electrolysis System are turned on (and off) simultaneously.**

4.2. Installation of the electrolysis cell

The electrolysis cell is made of polypropylene in whose interior the electrodes are placed. The electrolysis cell must be always installed indoors and **after the pool filter**, and after any other equipment that may be present (heat pumps, control systems, etc.).

The installation of the cell should allow easy access to the installed electrodes by the user. It is highly recommended to install the electrolysis cell **HORIZONTALLY** in a place of the pipe that can be easily isolated from the rest of the installation by two valves, so that the tasks of maintenance can be carried out with no need of partial or total draining of the swimming pool.

Where the cell is installed on a by-pass (recommended option), a valve to regulate the flow must be introduced. Prior to installation, please consider the following commentaries might be considered:

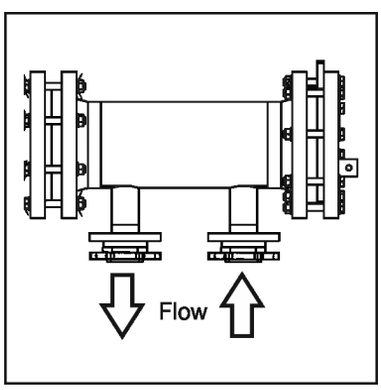


Fig.4

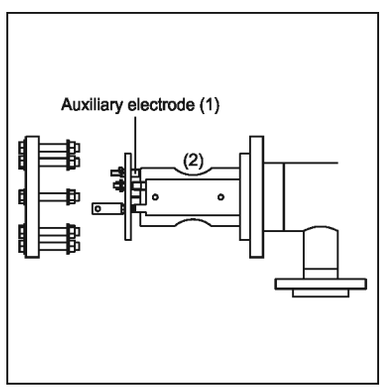


Fig. 5

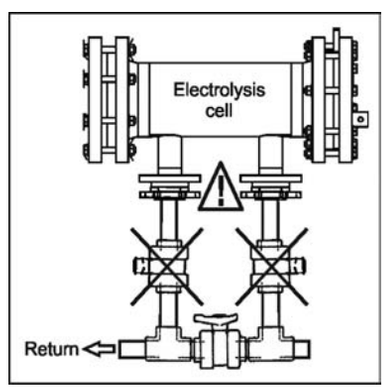


Fig. 6

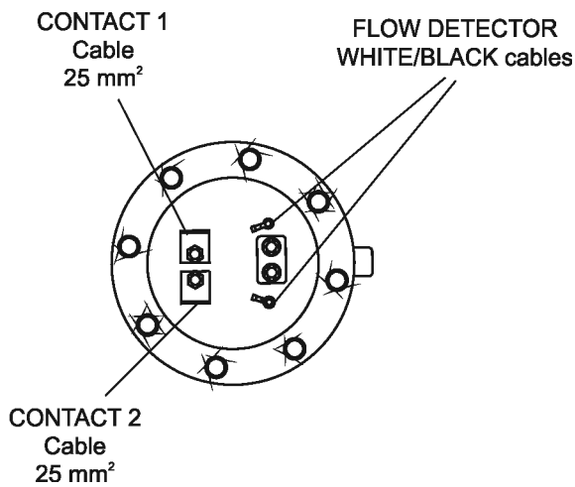
1. Flow direction marked in the cell must be respected. Recirculation system must guarantee minimum flow stated in the Table of Technical Specifications (see Section 9).

2. The system flow detector activates if there is not recirculation (flow) of water through the cell or if flow is very low. If electrolysis gases are not properly removed through the electrolysis cell, the generated gas bubble electrically isolates the auxiliary electrode (electronic detection). Therefore, when locating the electrodes in the cell, the level sensor (auxiliary electrode) will have to be located in the higher area of the cell. The safest orientation is shown in the recommended installation diagram. In order to avoid an excessive vibration of the electrodes, these will have to be arranged inside the cell in parallel to the water flow **(2)**.

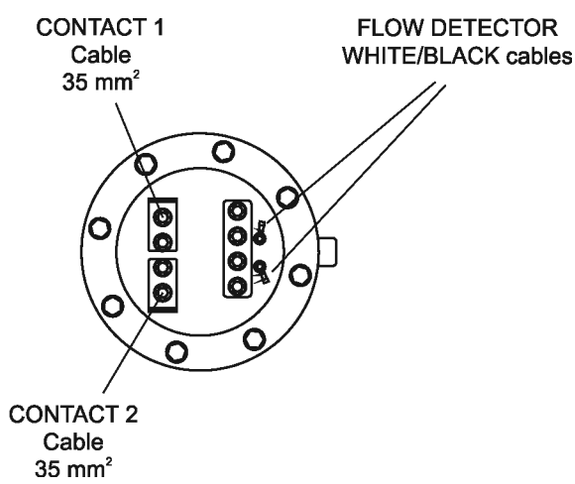
3. **WARNING:** if the in-out valves of the electrolysis cell are closed simultaneously, the flow detector (gas detector) will not work correctly, with the consequent risk of cell breakdown. Although this situation is extremely unusual, **it can be easily avoided once the equipment has been installed, by locking at opened position the return valve to the swimming pool**, so it cannot accidentally be manipulated.

4.3. Electrical connection of the electrolysis cell

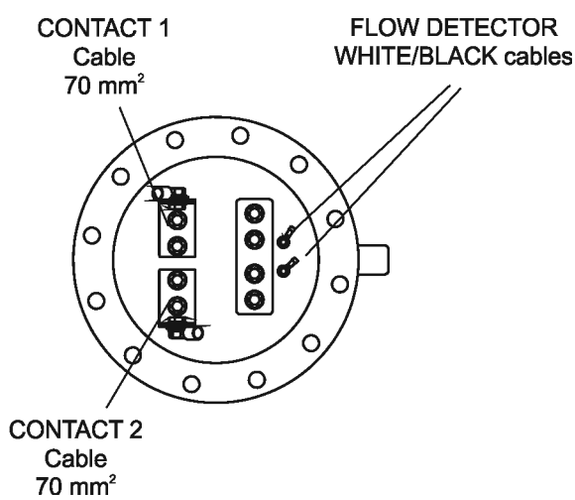
Make the interconnection between the electrolysis cell and the power supply according to the following scheme. Due to relatively high current intensity circulating do not modify or cut either the length or section of the supplied cables without making a previous consultation to an authorized manufacturer distributor. T The cable connecting the electrolysis cell and the power supply should never exceed the maximum length recommended in this Manual (see section 9):



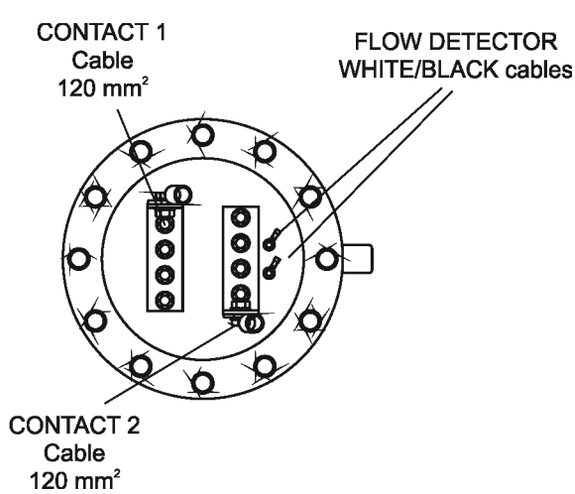
MOD.65/80
(all versions)



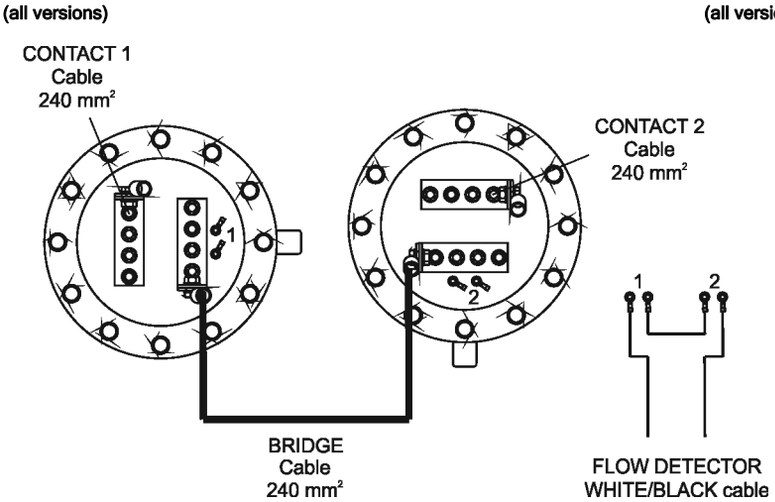
MOD.100/120
(all versions)



MOD.150/180
(all versions)



MOD.250/300
(all versions)



MOD.500/600
(all versions)

Fig.7

EXT-1

4.4. Installation of the pH / ORP sensors

1. Install the pH and ORP electrode holders in the circuit through ½" saddles (not included with the equipment) (Fig. 8)
2. Insert the electrodes into their corresponding holders. Next, tighten the holder until the electrode is properly fixed.
3. The electrodes must be installed in the holder so that it is guaranteed that the sensor located in their ends are always submerged in the water circulating through the pipe.
4. **Install always the electrodes vertically or with a maximum inclination of 40º. (Fig. 9).**
5. Connect the pH / ORP sensor provided with the unit to the corresponding BNC connectors located in the unit's side.

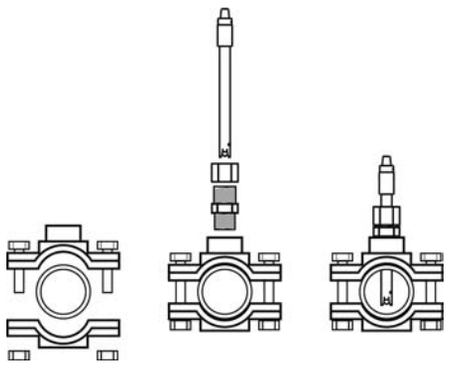


Fig. 8

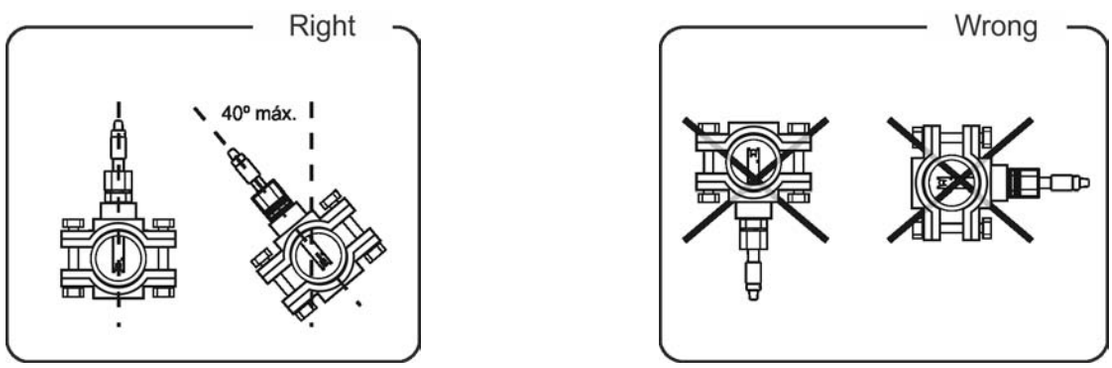


Fig. 9

EXT-1(E) EXT-2

4.5. Installing the sensor holder for the amperometric free chlorine sensor and the inductive flow detector

Install the sensor-holder supplied vertically, on a solid and rigid surface (wall) as shown in the recommended installation diagram (Figs. 1-3).

4.5.1. Installing the PH SENSOR (EXT-1E/ EXT-2) and ORP (EXT-1E)

1. Insert the pH sensor into its corresponding place of the holder. EXT-1E (Fig. 10a) / EXT-2 (Fig. 10b).
2. To that purpose, loosen the connection screws and insert the sensor into the holder.
3. The probe must be installed in the holder so that it is guaranteed that the sensor located in their ends are always submerged in the water circulating through the pipe.
4. Connect the pH sensor provided with the unit to the corresponding BNC connector located in the unit's side.

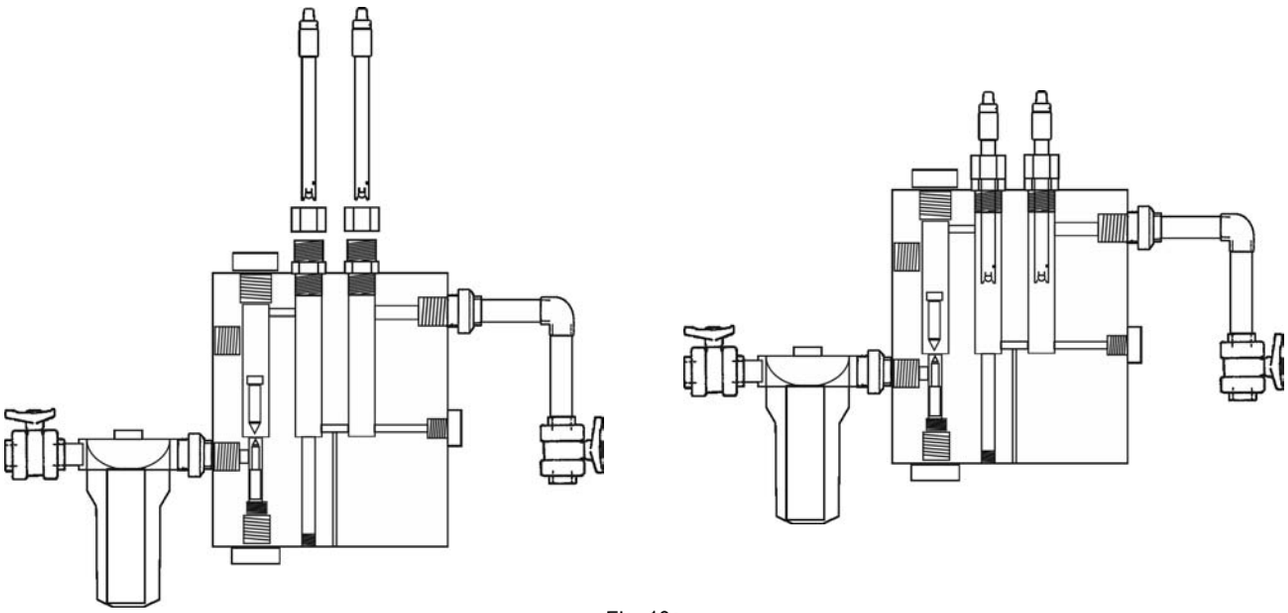


Fig. 10a

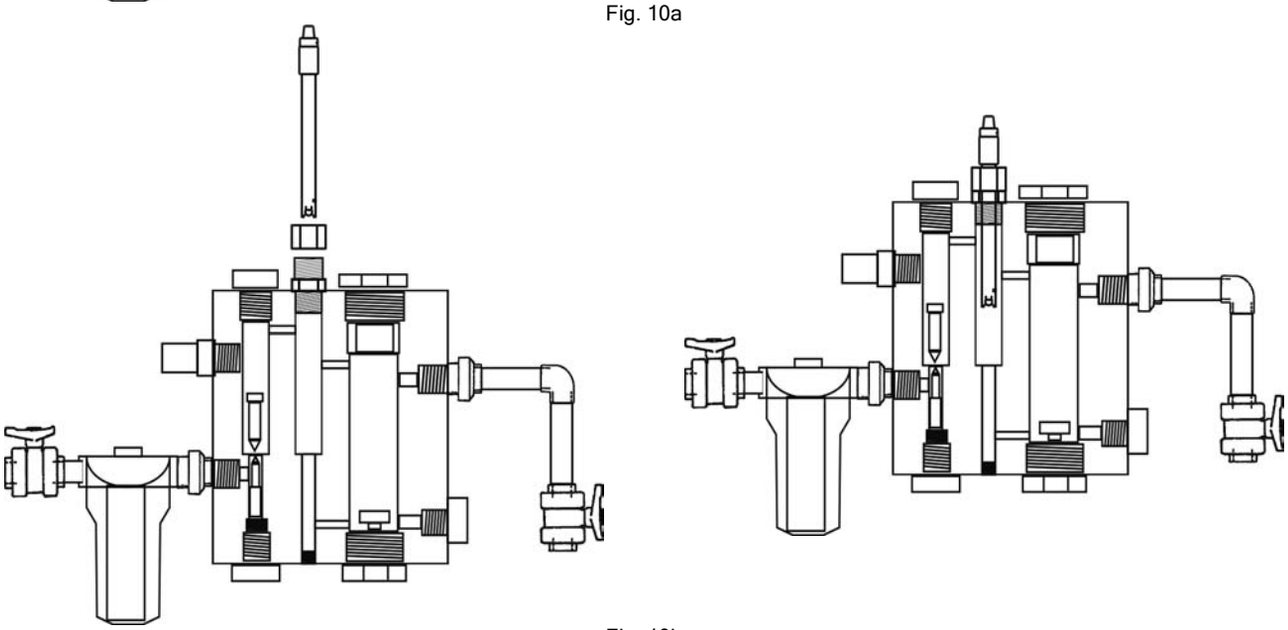


Fig. 10b

4.5.2. Installing the CHLORINE SENSOR (EXT-2)

CL0102 Chlorine sensor is an special sensor to measure the free chlorine concentration in water which contains isocyanuric acid. Moreover, the probe has low dependence of pH-value.

4.5.2.1. Assembly of the sensor

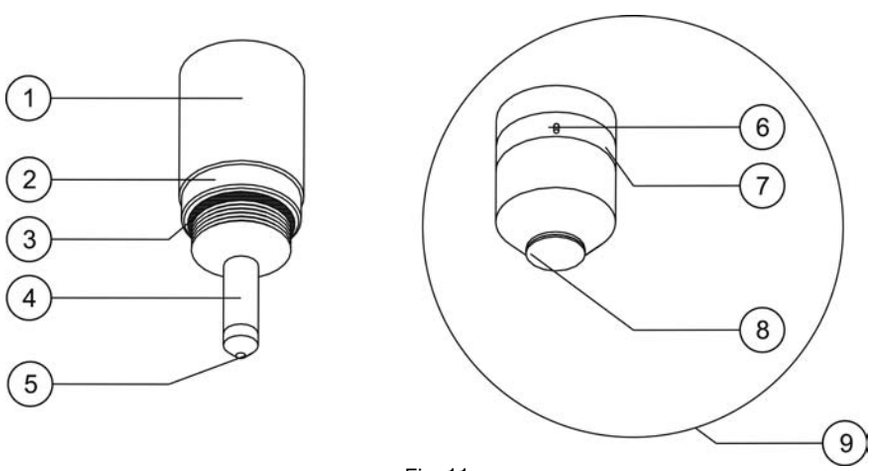


Fig. 11

Electrolyte can escape by the air exit hole [6] during the manipulation of the membrane cap [9]. Due to electrolyte gel is an aggressive liquid, use of gloves and safety glasses are recommended. In case of contact with skin or eyes, rinse immediately with plenty of water all the affected area.

1. Unscrew the rubber ring of the membrane cap **[9]** of the sensor. Put the membrane cap on a clean surface. Fill up the membrane cap to the edge with the enclosed electrolyte EEC1/GEL. Be careful so that there are no bubbles. (Fig. 12-2).

2. Lift up the transparent cover **[7]** of the air exit hole **[6]** using a little screwdriver or similar tool and move it on one side. This operation leave the air exit hole **[6]** free. Keep vertically the membrane cap and screw it firmly onto the electrode shaft. Excess electrolyte will escape through the hole **[6]**. Put the transparent cover **[7]** in its original position, in order to cover the hole **[6]**.

3. The gasket **[3]** presents an initial resistance at the beginning of the screwing, so the watertight is guaranteed. Membrane cap **[9]** must be screwed, until it be next to the electrode shaft **[1]**. When the membrane cap **[9]** is totally screwed, the **electrode [5] never must touch the membrane [8]. Membrane could be damaged and could be unusable.**

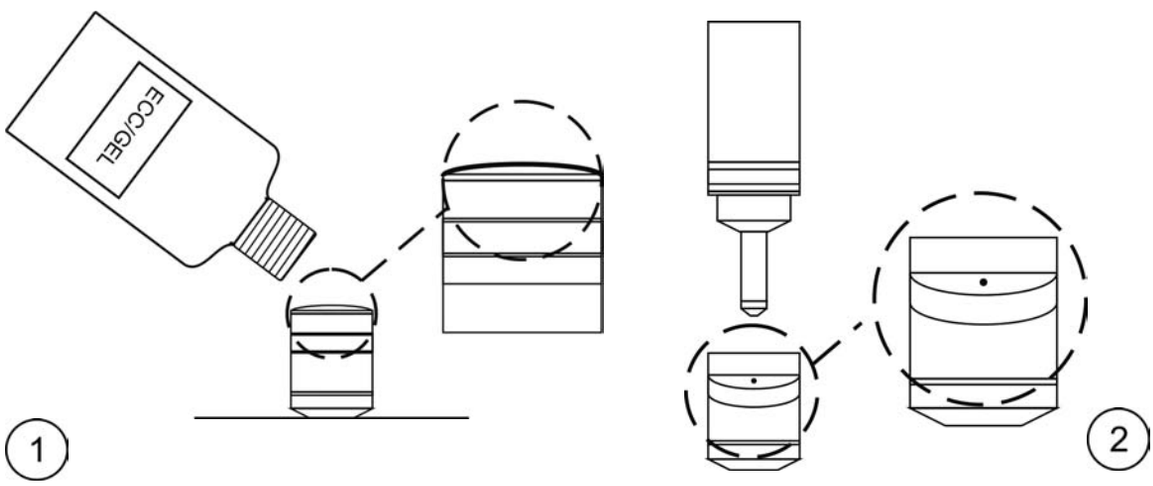


Fig. 12

4.5.2.2. Installing the CHLORINE sensor into the sensor holder

1. Insert the CHLORINE sensor supplied into their corresponding places of the holder. (Fig. 13).
2. To that purpose, loosen the connection screws and insert the sensor into the holder.
3. The sensor must be installed in the holder so that it is guaranteed that the sensor located in its ends are always submerged in the water circulating through the pipe. Be careful so that there are no bubbles on the membrane surface.
4. Connect the sensor provided with the unit to the corresponding BNC connector located in the unit's side.

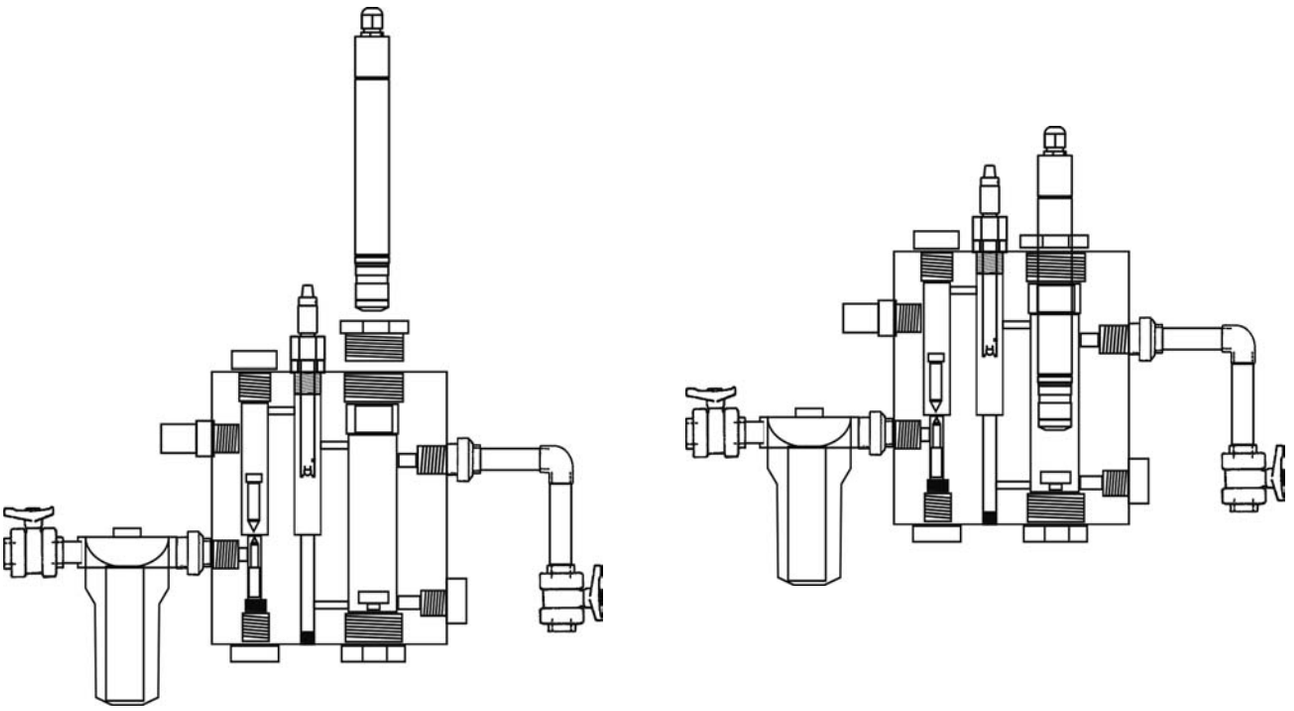


Fig. 13

4.5.3. Installing the INDUCTIVE FLOW DETECTOR (EXT-1E / EXT-2)

Connect the inductive flow detector to the rectangular connector located inside the power supply. (Fig. 14).

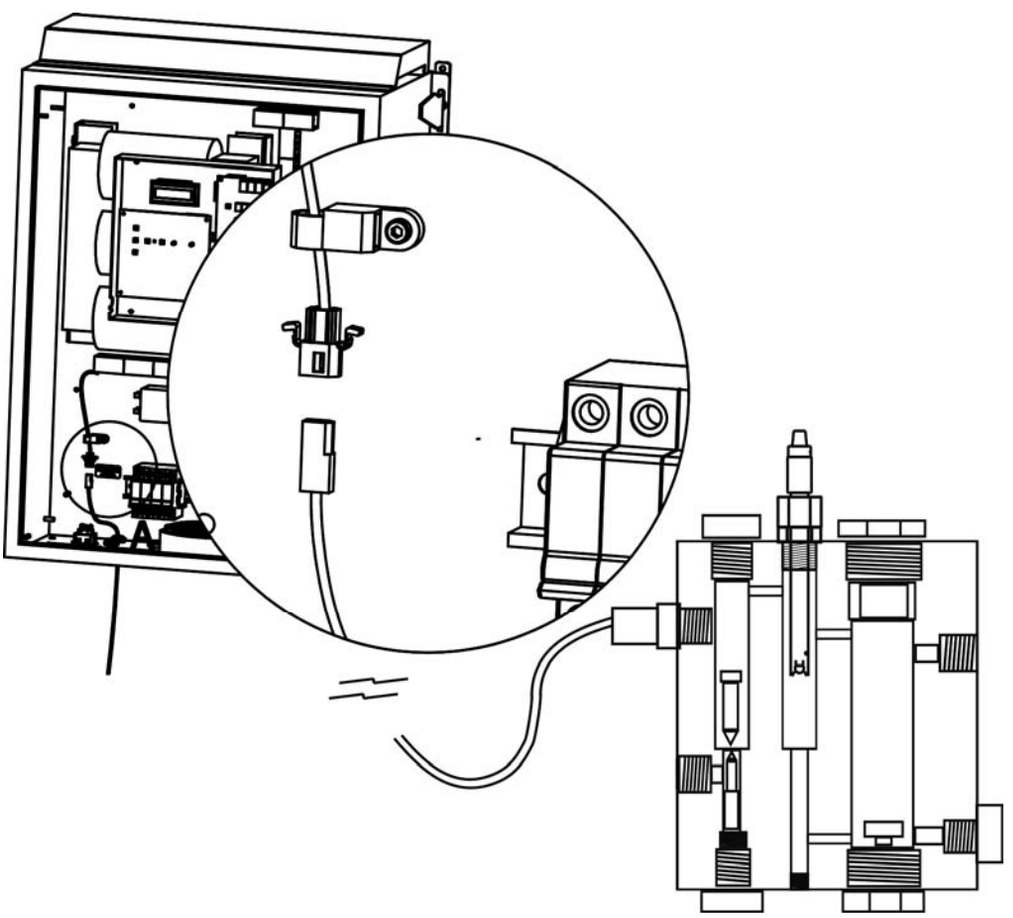


Fig. 14

4.6. Controls and indications

Salt electrolysis systems are equipped with a control panel in the front (Fig. 15).

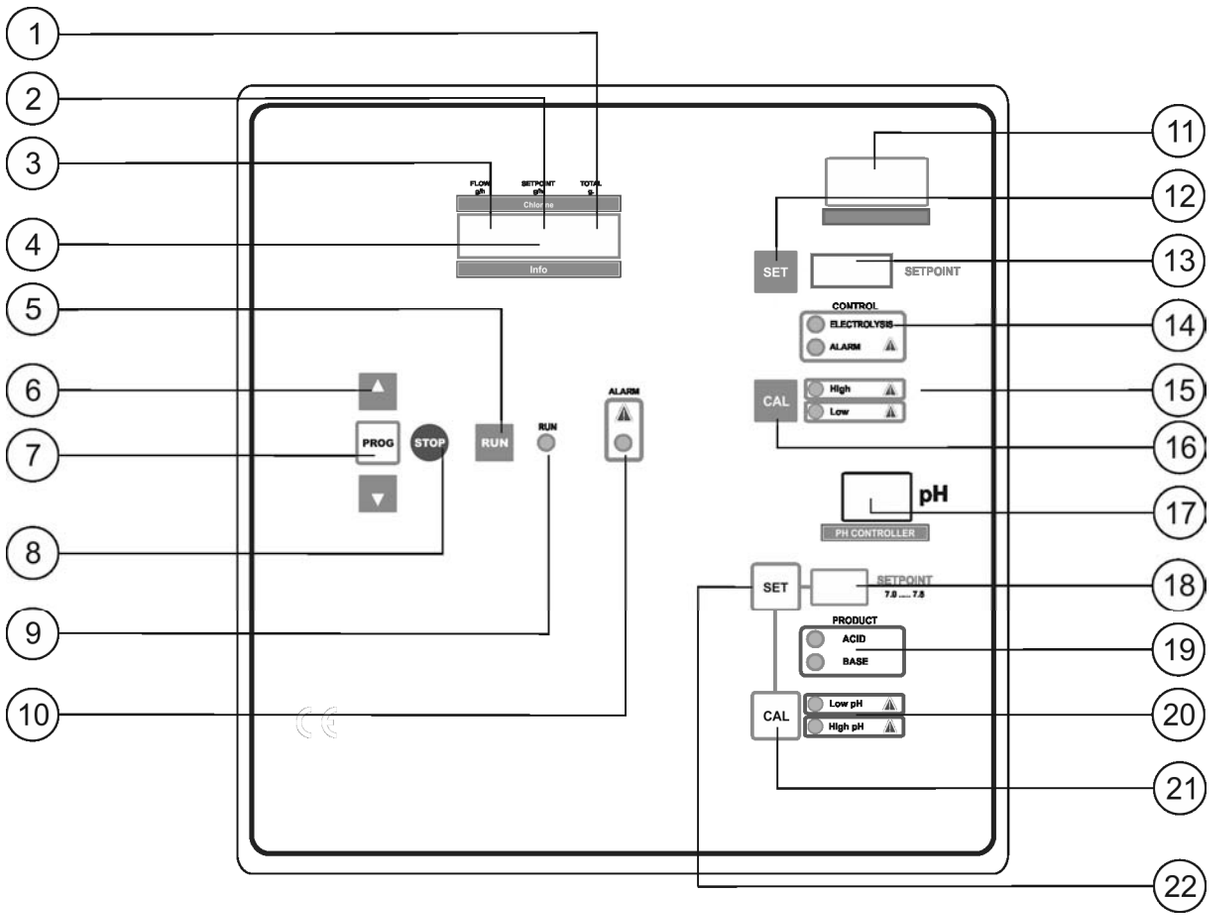


Fig. 15

1. **Total (g):** grams of chlorine generated since the connection of the unit (total count is reseted at 0:00 am).
2. **Set-point:** shows the programmed chlorine production in grams/hour.
3. **Flow (g/h):** shows the chlorine production expressed in grams of chlorine/hour.
4. **System Info:** shows different system information and warnings
5. **Run key:** press this key to RUN the selected program.
6. **Selection keys (▲|▼):** allow to select the different configuration parameters of the system.
7. **Program key (PROG):** press this key to access to program menus
8. **STOP key:** press this key to access to program menus.
9. **RUN Led:** this led lights up when system program is running.
10. **ALARM Led:** this led lights up when the system reaches an ALARM state.
11. **Indicator display of the disinfectant level in the water:**
    EXT-1(E) ORP (mV).
    EXT-2 FREE CHLORINE (ppm).
12. **Key for setpoint programming (disinfectant level)**
    EXT-1(E) ORP
    EXT-2 FREE CHLORINE
13. **Indicator display of the disinfectant level setpoint programming.**
    EXT-1(E) ORP
    EXT-2 FREE CHLORINE
14. **CONTROL LINK:** indicates if ORP/CHLORINE controller is linked to the electrolysis control board.
15. **ALARM display indicator (disinfectant level)**
    EXT-1(E) LOW ORP (< 650 mV) / HIGH(> 850 mV)
    EXT-2 LOW FREE CHLORINE (< 0.3 ppm) / HIGH (> 3.5 ppm)
16. **Disinfectant level CALIBRATION key**
    EXT-1(E) ORP
    EXT-2 FREE CHLORINE
17. **PH VALUE display.**
18. **PH SETPOINT display.**
19. **Indication LED of product being dosed:** selection of the type of product to dose may be done with a jumper located on the control board of the unit. (see Section 5.2.4)
20. **ALARMA display (pH):** HIGH (> 8.5) / LOW (< 6.5).
21. **PH CALIBRATION key**
22. **PH SETPOINT key**

Besides basic operations, the electrolysis system have a series of input-output signals, enabling the connection of additional external controls. They are located on connector **[CN4]** of the power card, inside of the power supply (Fig. 16).

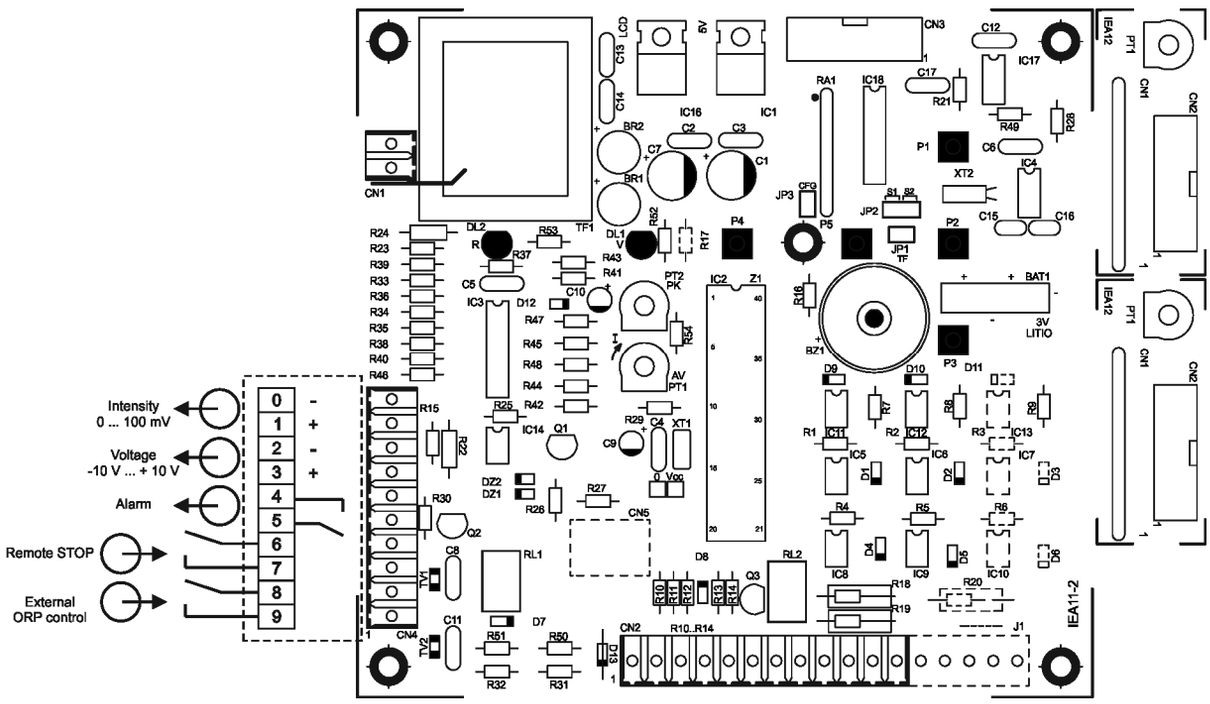


Fig. 16

TERMINALS DESCRIPTION:

0-1 **OUTPUT CURRENT**
Range: 0-60 mVdc
(Not isolated)

2-3 **OUTPUT VOLTAGE**
Range: ± 10 Vdc
(Not isolated)

4-5 **ALARM**
Type: potential free contact
CLOSED when alarm state is reached.

6-7 **REMOTE STOP**
Type: potential-free contact
OPEN: system RUNS
CLOSED: system STOPS

8-9 **EXTERNAL CONTROL**
Type: potential-free contact
OPEN: system STOPS
CLOSED: system RUNS

4.7. Start-up

1. Check that the filter is 100% clean, and ensure that the swimming pool and the installation do not contain copper, iron or algae. Ensure that any heating equipment on the pool is suitable for use in salt water.

2. Ensure that the swimming pool water is balanced, because like that the chlorine produced is used more efficiently and effectively, and ensures that the life of the electrodes is prolonged, as well lower scale build-up in the pool. Water should be maintained within the parameters shown below.

a) pH must be in the range 7.2-7.6

b) Total alkalinity must be in the range 60-120 ppm.

3. Although the Electrolysis System can operate within a salinity range of 4 – 6 g/l, the minimum recommended level of salt, 5 g/l, should be maintained by adding 5 kg per m^3 of water if the water did not previously contain salt. Always use common salt (sodium chloride), without additives like iodides, that is "apt for human consumption". Never add the salt through the electrolysis cell. Add it directly to the swimming pool or into the balance tank.

4. When adding the salt, and in case the swimming pool is going to be used immediately, carry out a treatment with chlorine. An initial dose of 2 g/m^3 of trichloroisocyanuric acid may be added.

5. Prior to starting up the salt chlorinator, disconnect the power supply to the salt chlorinator and run the pump for 24 hours to ensure that the salt is completely dissolved.

6. Next, reconnect the power supply and turn on the salt chlorinator, locating the production level so that free chlorine concentration stays within the recommended range (0.5 - 1.5 ppm).

NOTE: in order to establish the free chlorine level you will need to use a test kit.

7. In outdoor swimming pools it is advisable to maintain a level of 25-30 g/m^3 of chlorine stabiliser (cyanuric acid) in the pool. A level of 75 ppm should be never exceeded. This will help to stop the chlorine that is in the water from being destroyed by the sun.

5. OPERATION:

5.1. Electrolysis System

5.1.1. Initialization

The configuration and operation functions are organized in a structured programming menu. Once the system is powered on, the system will start always in the state previous to disconnection.

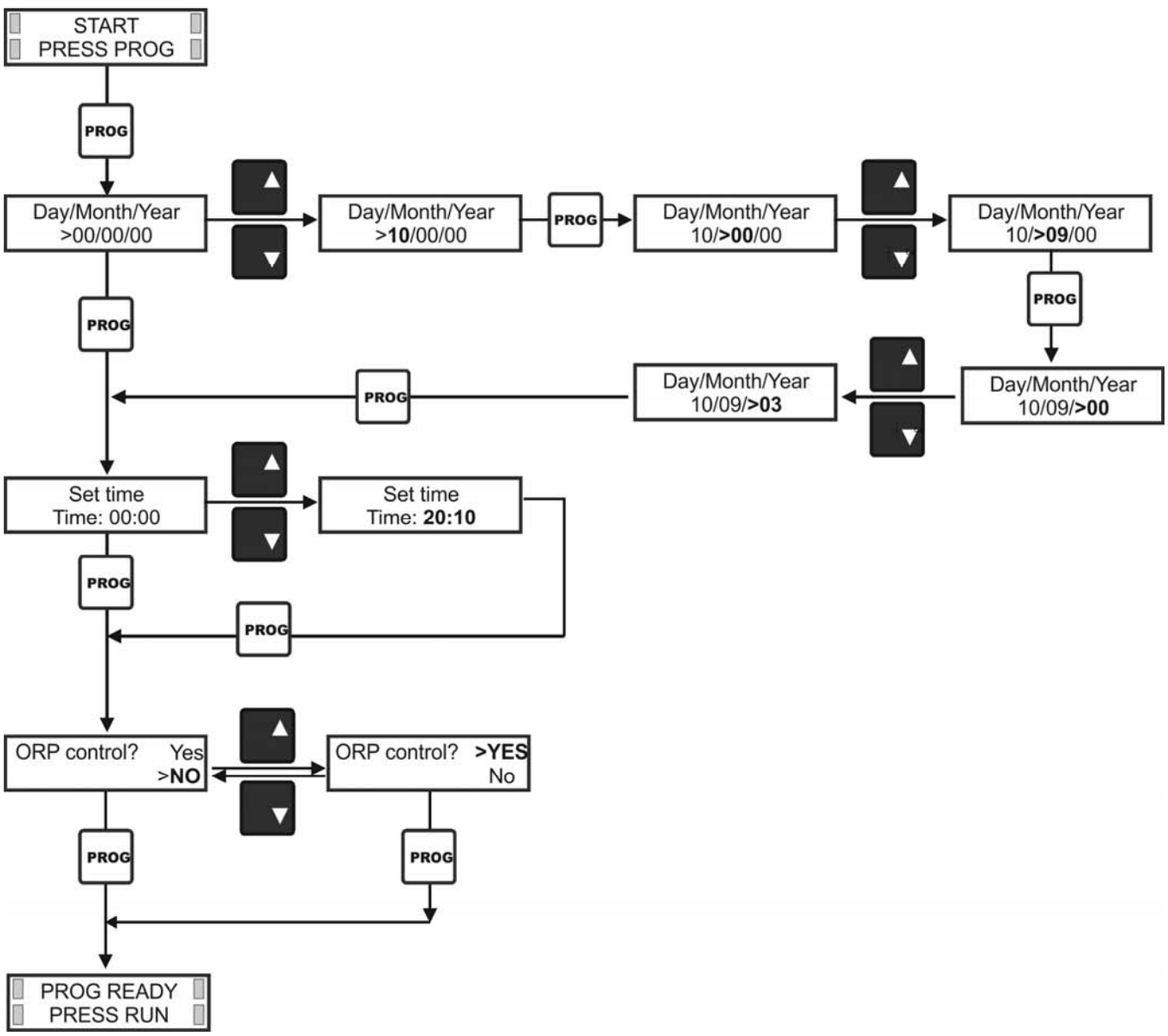


Fig. 17 Flow-sheet for system INITIALIZATION.

IMPORTANT: "ORP control" must be always selected ("YES") if you want to run the electrolysis system with integrated control extension EXT-1(E) or EXT-2 in AUTOMATIC mode.

5.1.2. Programming

System configuration parameters may be modified following the next flow-sheet, when the PROGRAMMING mode is selected.

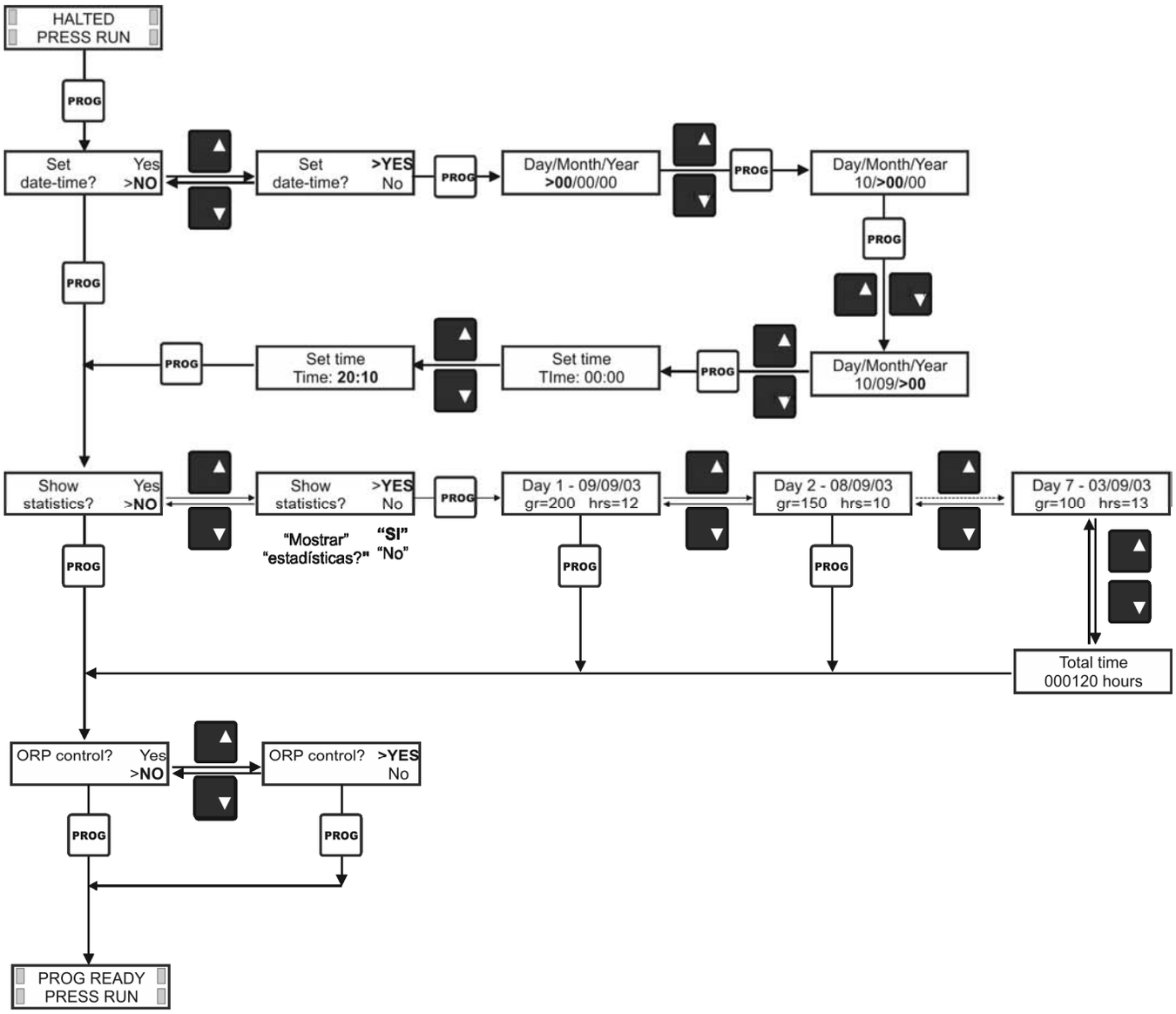


Fig. 18 Flow-sheet for system PROGRAMMING.

IMPORTANT: "ORP control" must be always selected ("YES") if you want to run the electrolysis system with integrated control extension EXT-1(E) or EXT-2 in AUTOMATIC mode.

5.1.3. System operation:

Salt electrolysis system has two operating modes (MANUAL/AUTOMATIC) depending on the selection made in the "ORP control" input line during the programming procedure (see section 5.1.2).

MANUAL MODE: ORP CONTROL NOT ACTIVATED

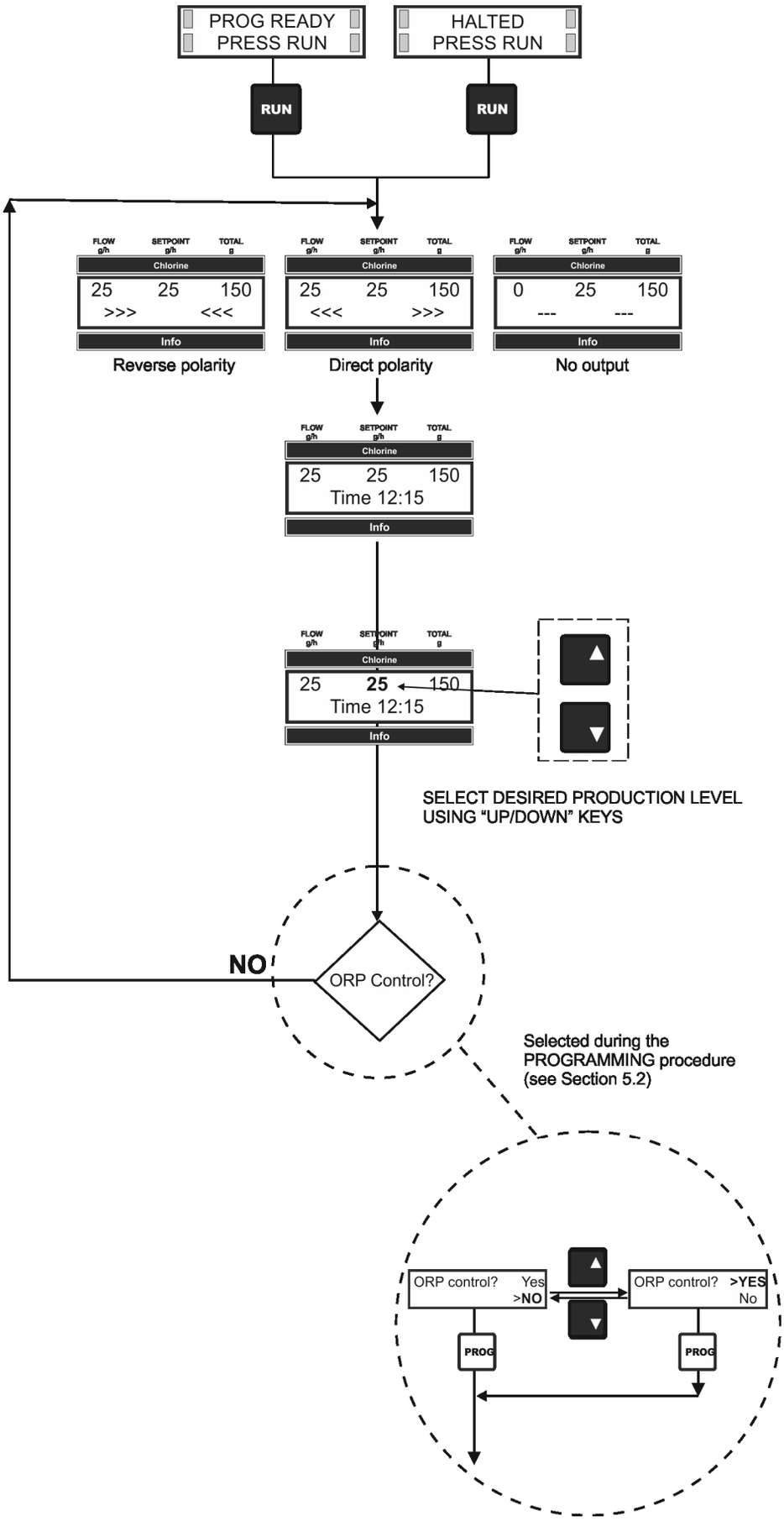


Fig. 19 Flow-sheet for system operation in MANUAL MODE

AUTOMATIC MODE: ORP CONTROL ACTIVATED

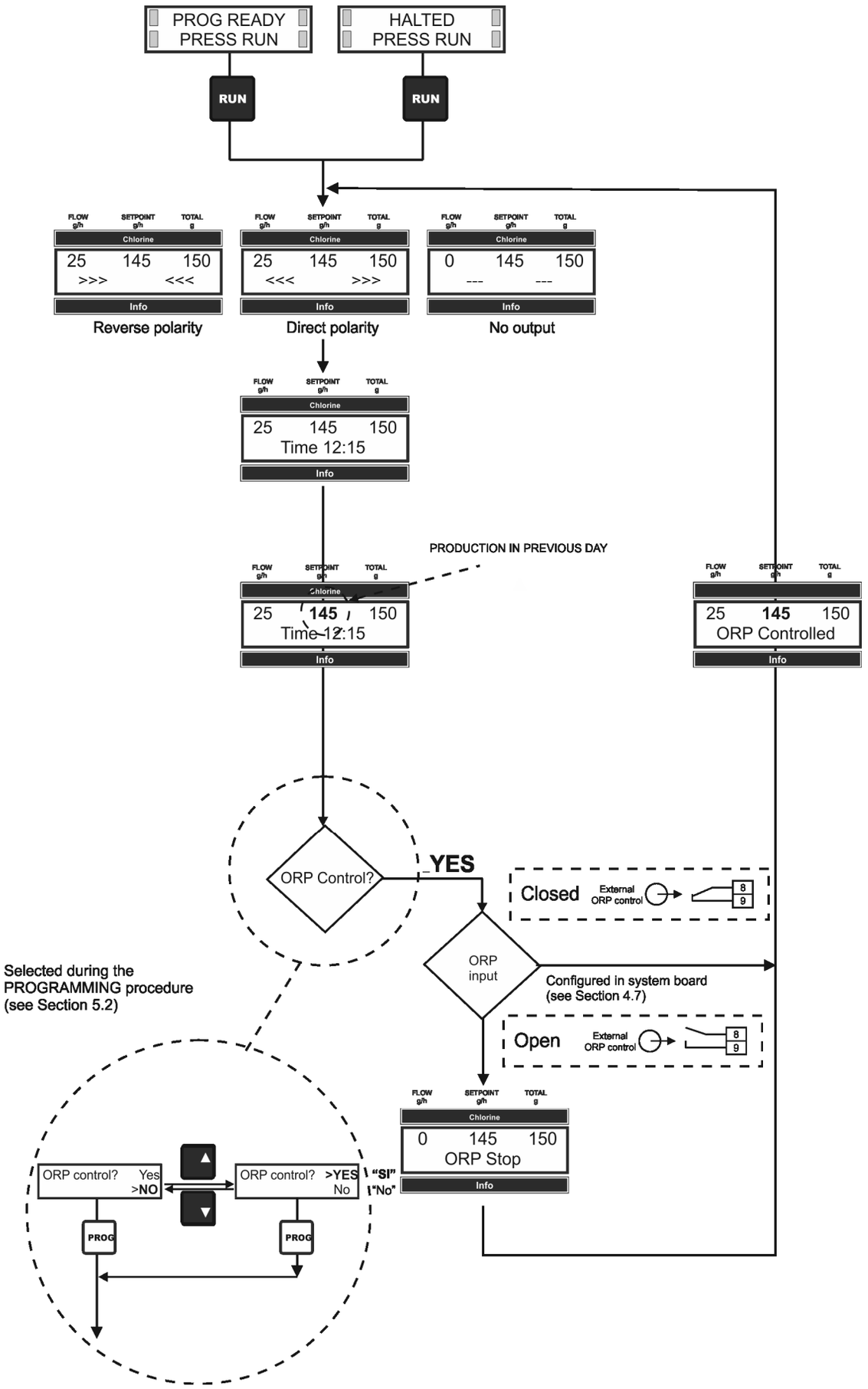


Fig. 20 Flow-sheet for system operation in AUTOMATIC MODE.

EXT-1(E) | EXT-2

5.2. Integrated pH ORP controller

The integrated PH/ORP controller is supplied with the following default programming parameters.

SET POINT pH="7.2"

SET POINT ORP="750 mV"

IMPORTANT: Ii order for the pH to be regulated correctly, the Total Alkalinity of the pool water must be maintained in the range 80-150 ppm. Use a pool water test kit to check the Total Alkalinity and manually adjust if necessary.

5.2.1. CONNECTION OF THE PH / ORP SENSORS

Connect the PH/ORP electrodes to the corresponding BNC connectors in the right side of the unit. (Fig. 21).

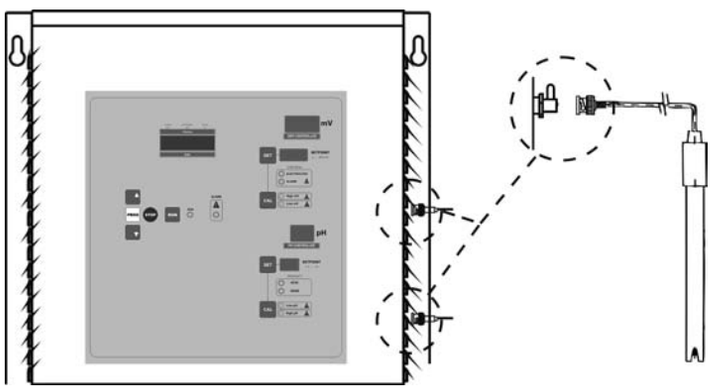


Fig. 21

5.2.2. CONNECTION OF THE DOSAGE PUMP

The electrolysis system have a connector on their base for connecting a dosage pump to control the pH of the water in the pool. The dosage pump can be connected through the CEE22 connector supplied for that purpose with the equipment (Fig. 22).

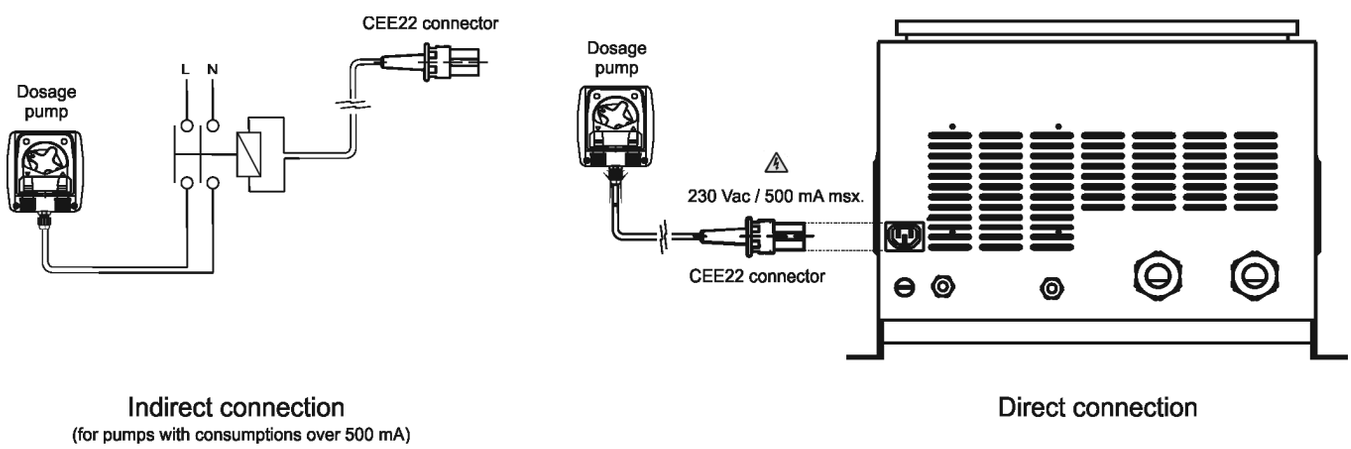


Fig. 22

5.2.3. PROGRAMMING OF PH SETPOINT

Keep the **"SET" [22]** key pressed until the screen **[18]** displays (red colour) the desired pH value within the 7.0 - 7.8 range. Release after selection (Fig. 23)

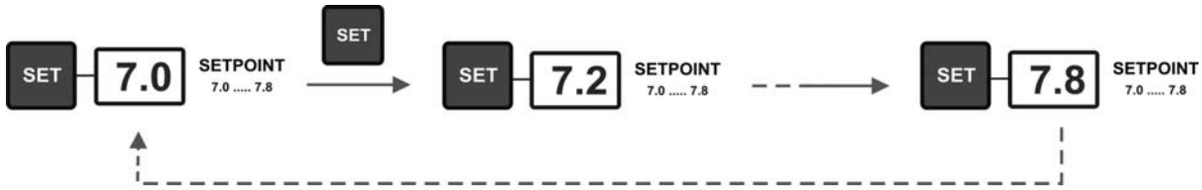


Fig. 23

5.2.4. SELECTION OF THE PRODUCT TO DOSE (ACID or BASE)

The salt electrolysis system with INTEGRATED PH CONTROL has been factory set so that it can be used in the majority of existing pools without the need to modify the internal settings. The system has been set in the factory to dose ACID (pH minus). Should it be required, the control board in the system can be modified on site to dose BASE (pH plus). In order to modify the system, place jumper printed as "J1" in "ACID" position (to decrease pH) or "BASE" (to increase pH) according to the requirements on site (Fig. 24).

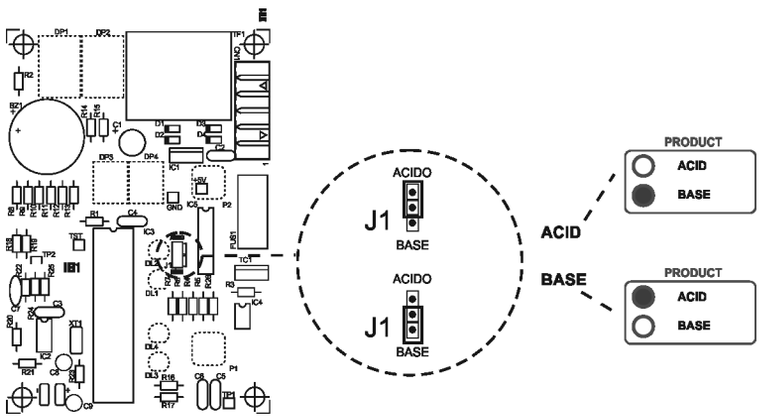


Fig. 24

EXT-1(E)

5.2.5. PROGRAMMING OF ORP SETPOINT

Before programming the desired ORP value in the system the following points should take into consideration:

IMPORTANT:

1. Before connecting the salt electrolysis system, check pH, alkalinity, stabiliser (cyanuric acid) and free chlorine levels are inside the recommended ranges:

   pH: 7.2 -7.6.
   Alkalinity: 80-150 ppm $CaCO_3$.
   Isocyanuric acid : 0 -30 ppm (ideal value: 20-25 ppm).
   Free chlorine: 0.5-1.5 ppm.

2. If the addition of chemical products to the pool was necessary to level any of these parameters, disconnect the electrolysis system and leave the pump recirculating during at least 24 hours to guarantee the perfect dissolution of the added products.
3. The ORP controller uses an ORP (mV) electrode to determine the oxidising power of the water, in other words, its destruction capacity of organic matter and pathogens. It should be clearly understood that **AN ORP SENSOR DOES NOT MEASURE THE CONCENTRATION OF RESIDUAL CHLORINE IN THE WATER, BUT ITS CAPACITY OF TREATMENT**. In summary, higher ORP (mV) values bigger disinfection-treatment grade.
4. If this concept is clear enough, it is easy to understand that two pools with identical levels of residual chlorine in the water, may present ORP values (mV) very different. This fact is due to the oxidising power of the chlorine becomes influenced by other factors, such as pH, stabiliser level (isocyanuric acid), temperature and TDS (total dissolved solids).
5. A good example to illustrate this point is the fact that in a pool without stabiliser (isocyanuric acid) we will need half of residual chlorine that in another with 30 ppm of stabiliser to obtain the same value of ORP (mV). This fact is a consequence of the chlorine stabilisation process by the isocyanuric acid. This product may be added to the water to avoid the fast decomposition of the chlorine due to the action of the sun UV light.
6. In the following table, the behaviour of the ORP value as a function of the variations of the diverse water parameters implied in the water treatment may be observed.

PARAMETER	⇧	⇩
Free Chlorine	+ mV	- mV
Combined Chlorine	- mV	+ mV
pH	- mV	+ mV
Stabilizer (isocyanuric acid)	- mV	+ mV
TDS (total dissolved solids)	- mV	+ mV
Temperature	+ mV	- mV

7. In case it was necessary to add stabiliser to the water, it should be taken into account that its employment in concentrations higher than 30-40 ppm produces a very significant decrease of the ORP values (mV) obtained for a given concentration of free chlorine.
8. The ORP setpoint values will fixed in an individualized way in each installation. Nevertheless, a general working range of 700-800 mV may be fixed, for pH values between 7.2 and 7.8, and stabiliser levels (isocyanuric acid) lower than 30 ppm. The previous table might be taken into account when readjusting the set point values of the controller, as these parameters are being modified with time. If the pH or the stabiliser level rise, lower ORP set point values might be selected to maintain the same free chlorine concentration in the water.

PROCEDURE:

- MANUAL MODE

  To fix the set point in a MANUAL way, maintain pressed the key **"SET"** (the superior display will show "- - -" until it is heard a "beep", then release the key. The first digit of the red display will light. Maintaining the key "**SET"** pressed, fix the wanted value of hundreds. Once fixed, release the **"SET"** key. Repeat this operation with the digits of tenths and units (Fig. 25).

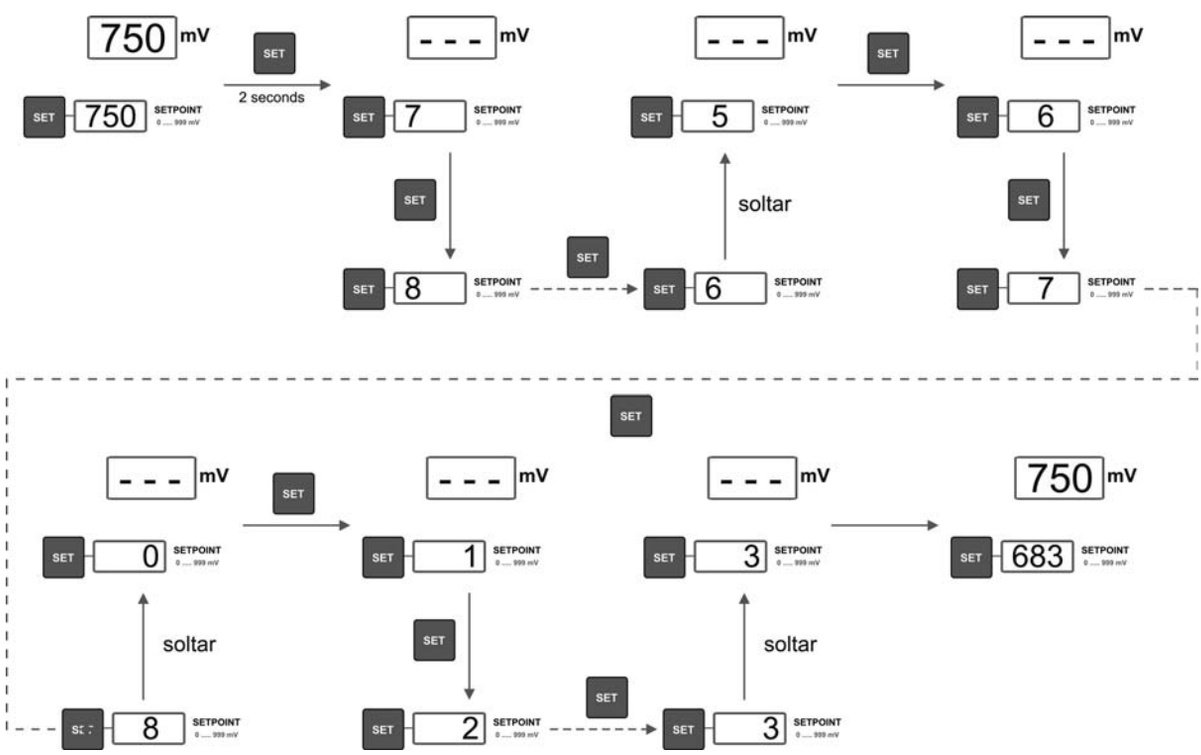


Fig. 25

- AUTOMATIC MODE

  The AUTOMATIC MODE allows to fix quickly the ORP value (mV) currently present in the water as the setpoint value. Maintain the key **"SET"** pressed (the displays will fade). Lapsed some seconds, a "beep" will be heard (the corresponding to the MANUAL MODE programming. DO NOT RELEASE AT THIS POINT). Maintain the key **"SET"** pressed until listen a second "beep." In that moment, release the key **"SET"** and the set point value will be automatically fixed to the ORP value (mV) currently present in the water. (Fig. 26).

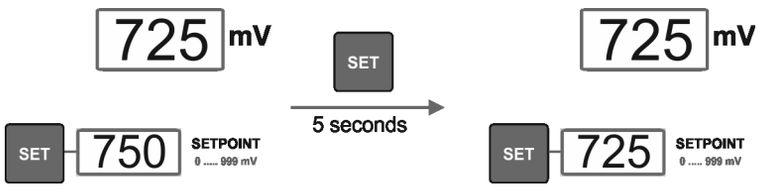


Fig. 26

EXT-2

5.3. Integrated FREE CHLORINE controller

The integrated FREE CHLORINE controller is supplied with the following default programming parameters.

SETPOINT = 1.00 ppm
PRODUCT = OXIDANT
HYSTERESIS= 120 seconds.

5.3.1. Initialization

The system measurement a few minutes to stabilize. While this measure is not stable, do not act on other systems, such as the dosing pump or the electrolysis system. So the system will not operate for a certain time, which is indicated by the message **"Aut"** flashing on the display for setpoint value **[13]**.

5.3.2. Setpoint programming

Hold down the **"SET"** key **[12]** until the desired ppm value appears in the setpoint display (red) **[13]** display. Only ppm values in the range 0.0-3.0 ppm, at 0.25 ppm intervals, may be programmed. (Fig. 27)

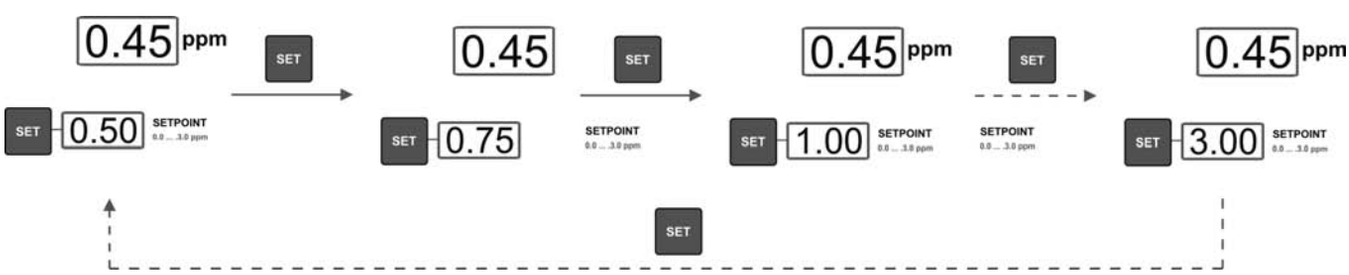


Fig. 27

5.3.3. Flow rate adjustment in the sensor holder

Adjust the water flow passing through the sensor holder with the flow regulator **[1]**, so that the float **[2]** reaches the height of the inductive flow detector **[3]**. (Fig. 28).

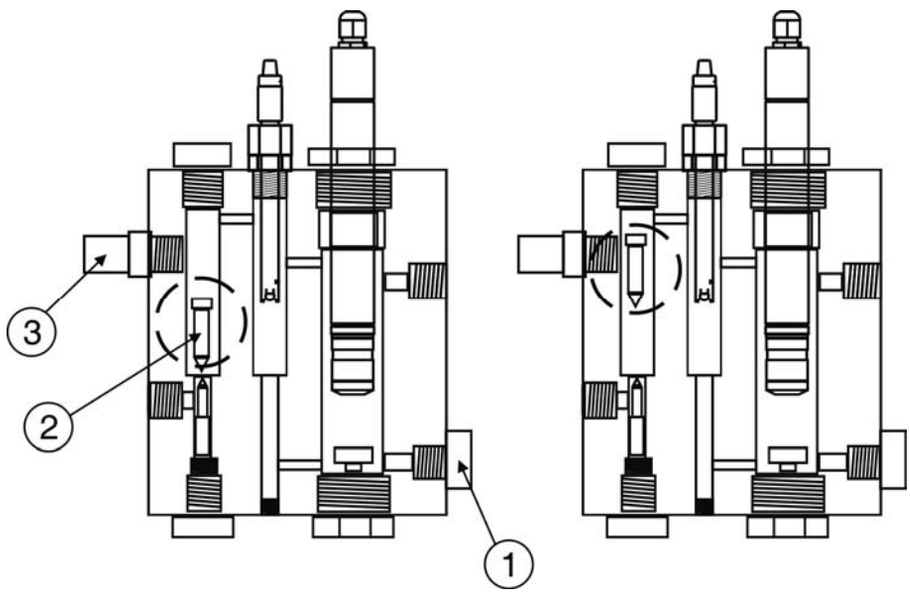
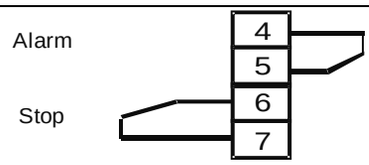
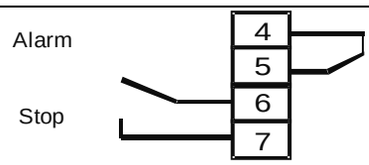
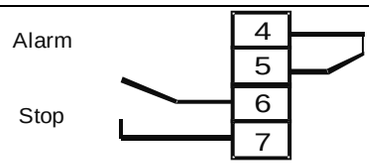
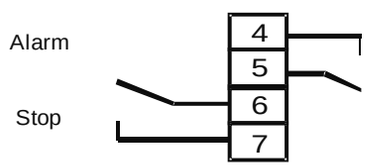
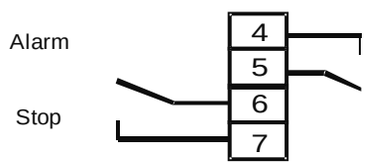
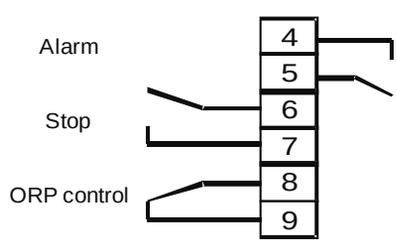
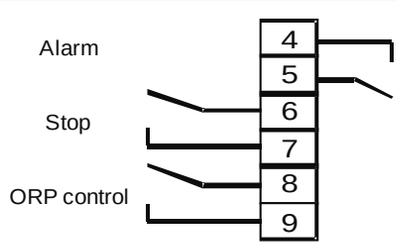


Fig. 28

5.4. Alarms and system messages

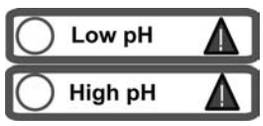
ALARM	DIAGNOSTIC	CONTROL SIGNALS STATE
REMOTE STOP	Remote stop has been activated	
-- ALARM -- NO FLOW	No water flow or insufficient flow **IMPORTANT**: in-out valves of the electrolysis cell must be always open.	
-- ALARM -- OVERHEATED	Overheating of the power supply. Contact to our Technical Assistance Service.	

In all the previous cases, the ALARM led in the control panel **[10] will blink.**

ALARM	DIAGNOSTIC	CONTROL SIGNALS STATE
FLOW g/h SETPOINT g/h TOTAL g Chlorine **20** 25 150 High salt Info	Excess of salt has been added to the swimming pool.	
FLOW g/h SETPOINT g/h TOTAL g Chlorine **15** 25 150 Low salt Info	Salt level and/or temperature in the pool is too low.	
FLOW g/h SETPOINT g/h TOTAL g Chlorine **25** 25 150 ORP control Info	ORP control activated from the system configuration menu. ORP control? >YES No See Section 5.1.2.	
FLOW g/h SETPOINT g/h TOTAL g Chlorine **0** 25 150 ORP Stop Info	System halted by the ORP controller ORP control? >YES No See Section 5.1.2.	

In all the previous cases, the ALARM led in the control panel **[10] will be turned off.**

In the case of control extensions may be monitored alarm the following states:

EXT-1(E) EXT-2		The integrated pH controller has two ALARM LEDs, which are illuminated whenever a pH value outside the range 6.5 - 8.5 is detected. When the controller detects an active alarm, control output to the dosing pump is turned-off.
		EXT-1(E) The integrated ORP controller has two alarm leds that are activated automatically when the readings are outside the prefixed range (650 - 850 mV). For security reasons, the controller turns-off the control output when the upper limit (850 mV) is exceeded. EXT-2 The integrated FREE CHLORINE controller has two ALARM leds, which will light up whenever detect an free chlorine level (ppm) (outside the range 0.3 - 3.5 ppm). For security reasons, the controller switches off the control output when the reading exceeds the upper limit (3.5 ppm).
EXT-2		The system is equipped with a flow sensor that is capable of determining whether there is sufficient water flow in through the sensor holder to ensure the smooth operation of the system. In other case the system will display a flashing **"FLO"** message in the big display (green) **[11]**, and the message **"OFF"** in the small display (red) **[13]**.

6. MAINTENANCE:

6.1. Maintenance of the electrolysis cell

The electrolysis cell must be kept in suitable conditions to ensure a long lifetime. This salt chlorination unit has an automatic electrode cleaning system that helps to prevent scale build-up on the electrode surface. If the salt chlorination system is operated in accordance with these instructions, and in particular if the pool water balance is kept within the recommended parameters, it should not be necessary to manually clean the electrodes. However, if the pool water and the salt chlorination system are not maintained in line with these instructions then it may be necessary to manually clean the electrodes following the procedure outlined below:

1. Cut off the 230 Vac unit's supply.
2. Unscrew the closing nut located at the end where the electrodes are located, and remove the electrode package.
3. Use diluted hydrochloric acid (a part of commercial acid in 10 parts of water), submerging the electrode package in the prepared solution for no more than 10 minutes.
4. NEVER SCRAPE OR SWEEP THE CELL OR THE ELECTRODES.

The electrodes of a salt chlorination system comprise of a titanium sheet coated with a layer of noble metal oxides. The electrolysis processes that take place on their surface produce a progressive wearing down – the electrodes do have a finite life. In order to optimise electrode lifetime, please consider the following aspects:

1. Although all the salt electrolysis units are SELF-CLEANING, a prolonged operation of the system at pH values over 7.6 in waters of high hardness can produce scale formation on the surface of the electrodes. Scaling on the electrodes surface will progressively deteriorate the coating, causing a decrease of lifetime.
2. Manually cleaning/washing the electrodes (as described above) will shorten their life.
3. Prolonged operation of the system at salinities lower than 3 g/l will cause a premature deterioration of the electrodes.
4. Frequent use of copper based algaecides will promote the formation of copper deposits on the electrodes, progressively damaging the coating. Remember that chlorine is the best algaecide.

6.2. Salt additions

If **"LOW SALT"** message appears on system display **[4]**, it is necessary to add salt to the pool. It is possible that the system indicates salt levels below the real ones if the water temperature is less than 20°C or if the electrode package has reached the end of its lifetime. In this case, determine the level of salt in the water and add the amount of salt needed The type of common salt (NaCl) indicated for salt electrolysis should have no additives (anti-clogging agents, iodides) and should be suitable for human consumption. To know the exact level of salt we recommend the use of a portable salinity-temperature meter.

⚠ **IMPORTANT: a sudden failure in the sensors can result in over-dosing of chlorine or pH regulation product. You should take appropriate security measures to foresee this possibility. Keep in mind that high concentrations of free chlorine using DPD colorimetric test will not show any colour, as the DPD reagent degrades when chlorine levels are too high.**

EXT-1(E) | EXT-2

6.3. Calibration of the pH sensor

The recalibration frequency of the unit will have to be determined in each particular application. However, we recommend carrying out it at least once a month during the period of use of the swimming pool. The integrated pH-controller has two calibration modes of the pH-electrode: "FAST" and "STANDARD".

6.3.1. **"FAST"** MODE

"FAST" MODE allows the calibration of the pH-electrode when there are small reading deviations **with no need to extract the sensor from the installation or to use calibration solutions**.

PROCEDURE:

1. Be sure the point of insertion of the pH-sensor is flooded, and the pump is in recirculation.
2. Using a pH-test kit, measure the water pH of the swimming pool.
3. Press the **"CAL" [21]** approx. 5 seconds until the equipment beeps and release the key. The pH **[17]**, screen will blink **"7.0"**.
4. Keep the **"SET" [22]** key pressed until the pH-value previously measured in the water with the pH-test kit appears. Once reached, loosen and press **"CAL" [21]** key. If no error has been detected, the system will have been calibrated.

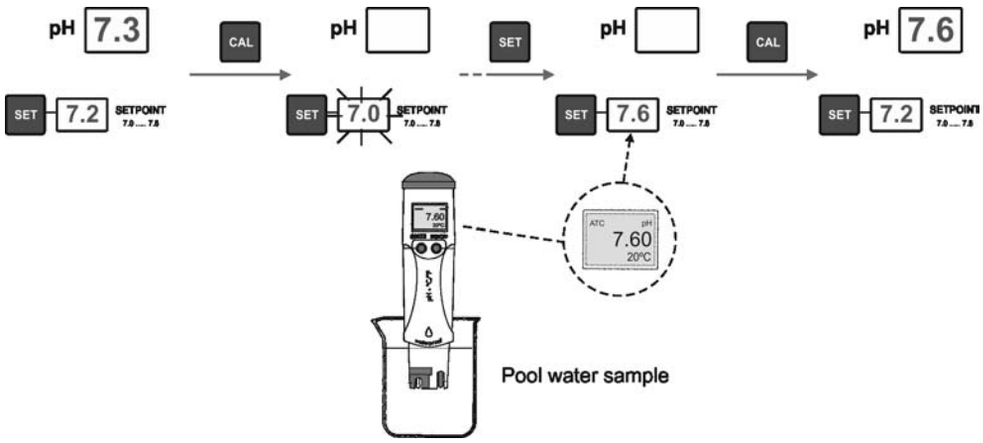


Fig. 29

6.3.2. **"STANDARD"** MODE

"STANDARD" MODE allows the precise calibration of the pH-sensor using two calibration solutions of pH 7.0 and 4.0, however this method requires that the **pH-sensor is removed from the installation**.

PROCEDURE:

IMPORTANT: before closing the by-pass valves, press the STOP key [8] in the control panel.

1. Extract the pH-sensor from the holder and wash it with tap water.
2. Press simultaneously the **"CAL" [21]** and **"SET" [22]** keys for a few seconds, until the green display blinks and indicates "7.0".
3. Shake the electrode smoothly so that any water drops that may be adhered to the plastic body are removed and introduce it to the calibration solution pH=7.0 (green colour). Shake smoothly for a few seconds and press **"CAL" [21]** key. Once the reading has stabilised, indication "4.0" in red display **[17]** will blink.

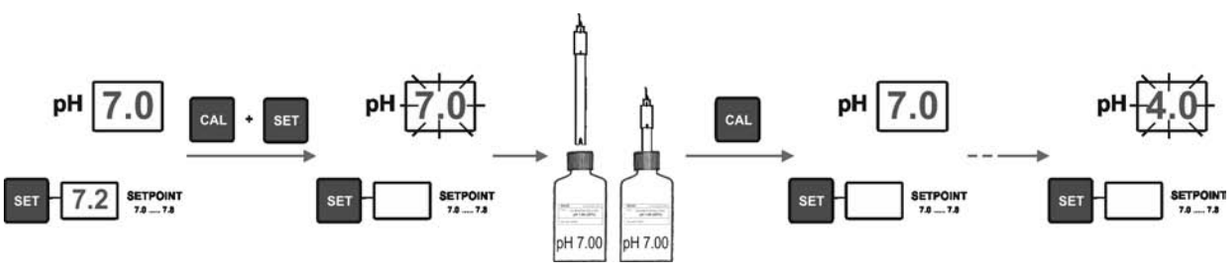


Fig. 30a

4. Remove the sensor from the calibration solution and rinse it with tap water.
5. Shake the sensor smoothly so that any drops of water that may be adhered to the plastic body are removed and introduce it in the calibration solution pH=4.0 (red colour). Shake smoothly for a few seconds and press **"CAL" [21]** key. Once the measurement has stabilised, the pH-controller will automatically leave the calibration mode and will be operative.

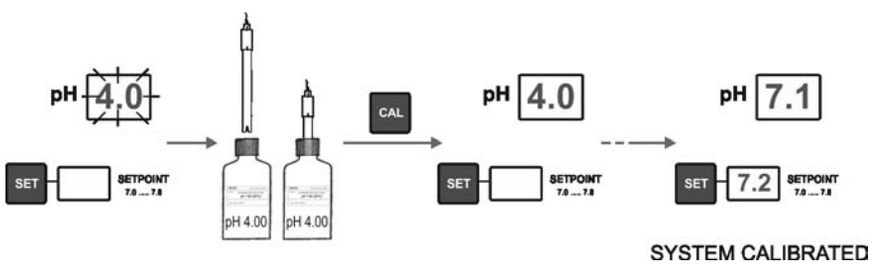


Fig. 30b

ERROR MESSAGES:

If the calibration process is interrupted for whatever reason, the pH-controller will automatically leave the calibration mode if the intervention of the user is not detected in a few seconds. In this case, **"E1"** indication in green display **[17]** will appear.

If the pH value detected during the calibration process is very different from the expected one (e.g., defective electrode, etc.), green display **[17]** will indicate **"E2"**, not allowing calibration.

If the pH measure is unstable during the calibration process, code **"E3"** will appear in the display **[17]**. In addition, the pH-electrode calibration will not be allowed.

EXT-1(E)

6.4. Calibration of the ORP sensor

The calibration frequency of the controller will be determined in each particular application. Nevertheless, we recommend to make it at least, once a month during the use period of the pool. The ORP controller has an automatic calibration system for the ORP electrodes based on the utilisation of a 470 mV reference solution.

PROCEDURE:

IMPORTANT: before closing the by-pass valves, press the STOP key [8] in the control panel.

1. Extract the ORP electrode from the holder and wash it with tap water.
2. Press **"CAL" [16]** key for a few seconds, until the green display **[11]** blinks and indicates **"470"**.
3. Shake the electrode smoothly so that any water drops that may be adhered to the plastic body are removed and introduce it to the calibration solution (470 mV). Shake smoothly for a few seconds and press **"CAL" [16]** key. If the process has concluded satisfactorily, a long "beep" will be listened and the controller will be calibrated and ready to operate.

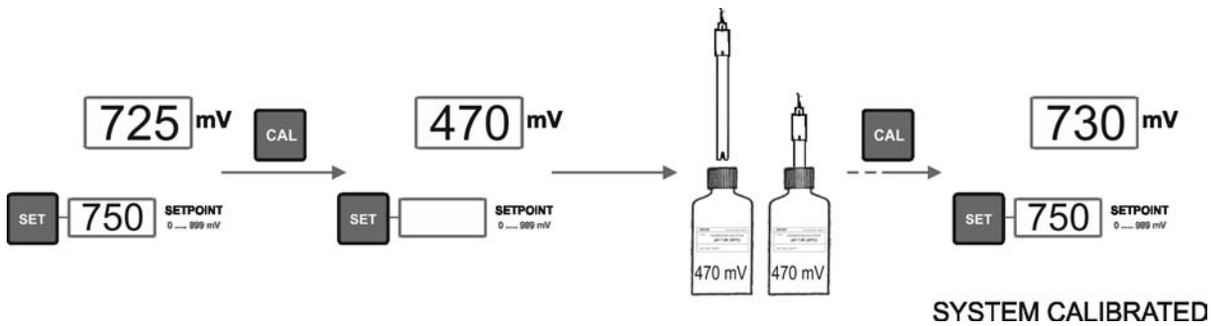


Fig. 31

ERROR MESSAGES:

If the calibration process is interrupted for whatever reason, the controller will automatically leave the calibration mode if the intervention of the user is not detected in a few seconds. In this case, **"E1"** indication in green display **[11]** will appear.

If the ORP value detected during the calibration process is very different from the expected one (e.g., defective electrode, etc.), green display **[11]** will indicate **"E2"**, not allowing calibration.

If the ORP measure is unstable during the calibration process, code **"E3"** will appear in the display **[11]**. In addition, the pH-electrode calibration will not be allowed.

EXT-2

6.5. Calibration of the FREE CHLORINE sensor

The controller has an automatic calibration system for the amperometric sensor, which will require to know the free chlorine concentration. Free chlorine concentration at calibration time must be within the range 0.01 to 5.00 ppm, Calibration with too low chlorine levels (< 0.50 ppm) is not recommended.

It is very important to ensure that the chlorine reading at calibration time is stable. For example, we can not calibrate right after chlorine powder has been added to the pool.

The system will not allow the calibration process if the controller has just been connected or if the water flow in the sensor holder is too low or it has just been restored.

A zero point adjustment is not needed for a sensor whose membrane has been changed. If the analyte is not present in the fluid being measured, the reading will be near zero. The zero point is not affected by changes in flow, conductivity, temperature or pH.

Reference methods for calibration in ISO 7393-2 standard may be found. The DPD photometric method is usually used to perform this calibration (**DPD** = N, N-**D**iethyl-1 ,4-**P**henylene**D**iamine).

PROCEDURE:

1. Wait until the chlorine reading in the green upper display **[11]** is stable.

2. Press and hold the **"CAL" [16]** for a few seconds until you hear a “beep”.

3. Now you must enter the value of free chlorine determined by a DPD analyzer. This can be done digit by digit, starting with the left, using the **"SET" [12]** key to modify the setting.

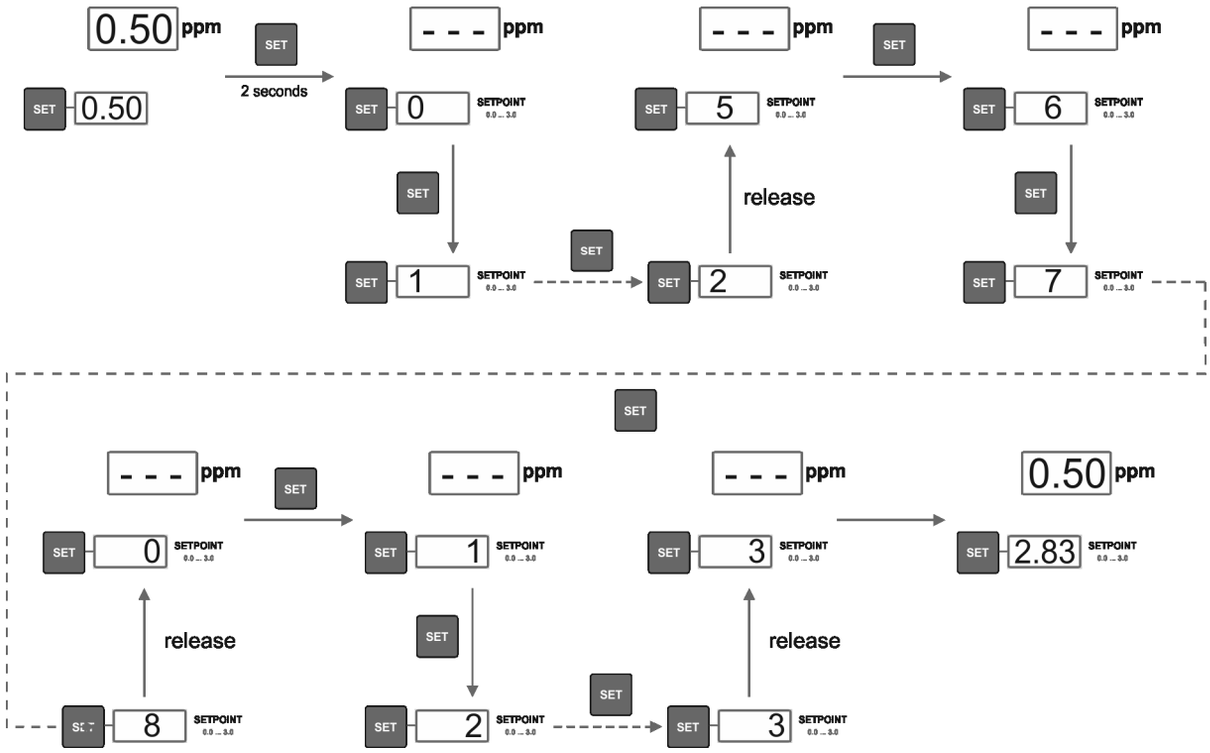


Fig. 32

ERROR MESSAGES:

If the calibration process is interrupted for whatever reason, the controller will automatically leave the calibration mode if the intervention of the user is not detected in a few seconds. In this case, **“E1”** indication in green display **[11]** will appear.

If the FREE CHLORINE value detected during the calibration process is very different from the expected one (e.g., defective electrode, etc.), green display **[11]** will indicate **“E2”**, not allowing calibration.

If the FREE CHLORINE reading is unstable during the calibration process, code **“E3”** will appear in the display **[11]**. In addition, the sensor calibration will not be allowed.

EXT-1(E) | EXT-2

6.6. Maintenance of the pH/ORP sensors

1. Verify that the sensor membrane remains wet all the time.
2. If the sensor is not going to be used for a long period, keep it submerged in a conservation solution at pH=4.0.
3. To clean the sensor of possible dirt, avoid using abrasives that may scratch the sensor surface.
4. **The pH/ORP sensors are a consumable part and it will need to be replaced over a period of time.**

EXT-2

6.7. Maintenance of the CHLORINE sensor

If calibration is not possible, because the reading is very low, then the sensor electrode **[5]** should be sanded with paper supplied in the installation kit (blue paper), and should also proceed to change the membrane and the electrolyte, as described below:

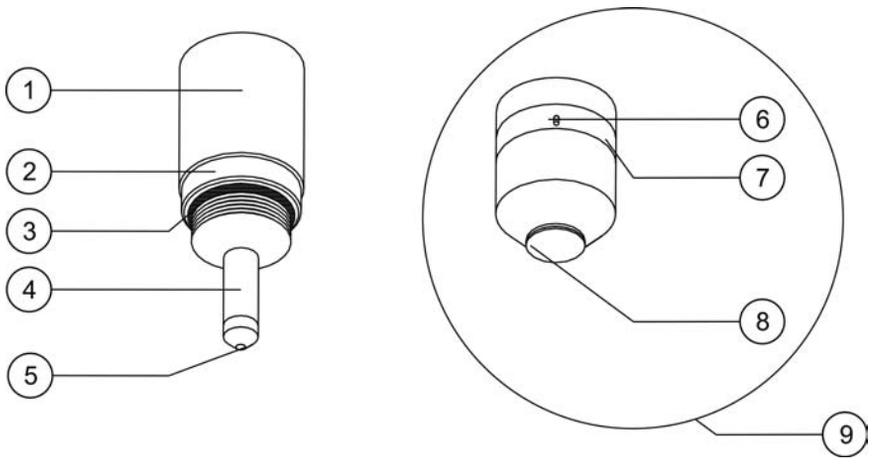


Fig. 33

PROCEDURE:

- Use a small screwdriver or similar tool to remove the transparent cover **[7]** that protects the bleed hole **[6]**, and move to one side (see Figure 12-2), so that the bleed hole **[6]** is accessible.
- Unscrew the head of the membrane **[9]** from the sensor body **[1]**.
  IMPORTANT: never unscrew the head of the membrane **[9]** without having the bleed hole **[6]** open, since the vacuum generated could cause damages in the membrane, leaving it unusable.
- Use the supplied special sandpaper to clean only the sensor electrode **[5]**. To do this, place the special sandpaper on a smooth paper, hold it by one corner, and holding the sensor vertically, drag the tip of the sensor on the sandpaper two or three times.
- Place a new membrane, if necessary.
- Fill the head **[9]** with the electrolyte supplied.
- Move the transparent cover **[6]** to one side (see Figure 12-2).
- Keeping the sensor body **[1]** vertically, screw the head **[9]**, allowing the excess electrolyte be bleed through the drain hole **[6]**.
- Press the transparent cover **[7]** until it snaps into position again and the bleed hole **[6]** is closed.
- Screw the membrane head **[9]** until it is completely screwed.
- The gasket **[3]** offers an initial resistance when the head **[9]** is screwed, which makes a perfect seal.
- When the membrane head **[9]** is completely secured, the sensor electrode **[5]** should not hit on the membrane **[8]**, since this will cause damages in the membrane, leaving it unusable.
- The membrane lifetime will depend greatly on the quality of water, being approximately 1 year used under normal conditions. Should be avoided all the time an intensive contamination of the membrane.
- As a rule, we recommend replacing the electrolyte at least once every three months.
- After changing the membrane and/or the electrolyte, maintain the electrode polarized at least 1 hour before proceeding to re-calibration. Recalibrate again after about 24 hours of operation.

If the storage or transport of the sensor is necessary, please proceed as follows:

Procedure for the storage of the sensor:

1. Use a small screwdriver or similar tool to remove the transparent cover **[7]** that protects the bleed hole **[6]**, and move to one side (see Figure 12-2), so that the bleed hole **[6]** is accessible.
2. Unscrew the membrane head **[9]** from the sensor body **[1]**.
3. Rinse the active parts of the sensor **[4,5]** with distilled water, removing all traces of electrolyte, and allow to dry.
4. Once dry, screw the membrane head **[9]** carefully on the sensor body. The membrane **[8]** must not touch the sensor electrode **[5]**, since this will cause damages in the membrane, leaving it unusable.

Reuse of the sensor

- Clean the sensor electrode **[5]** as described above with the special sandpaper provided.
- Replace the membrane head **[9]** with a new one, according to the procedure described above.

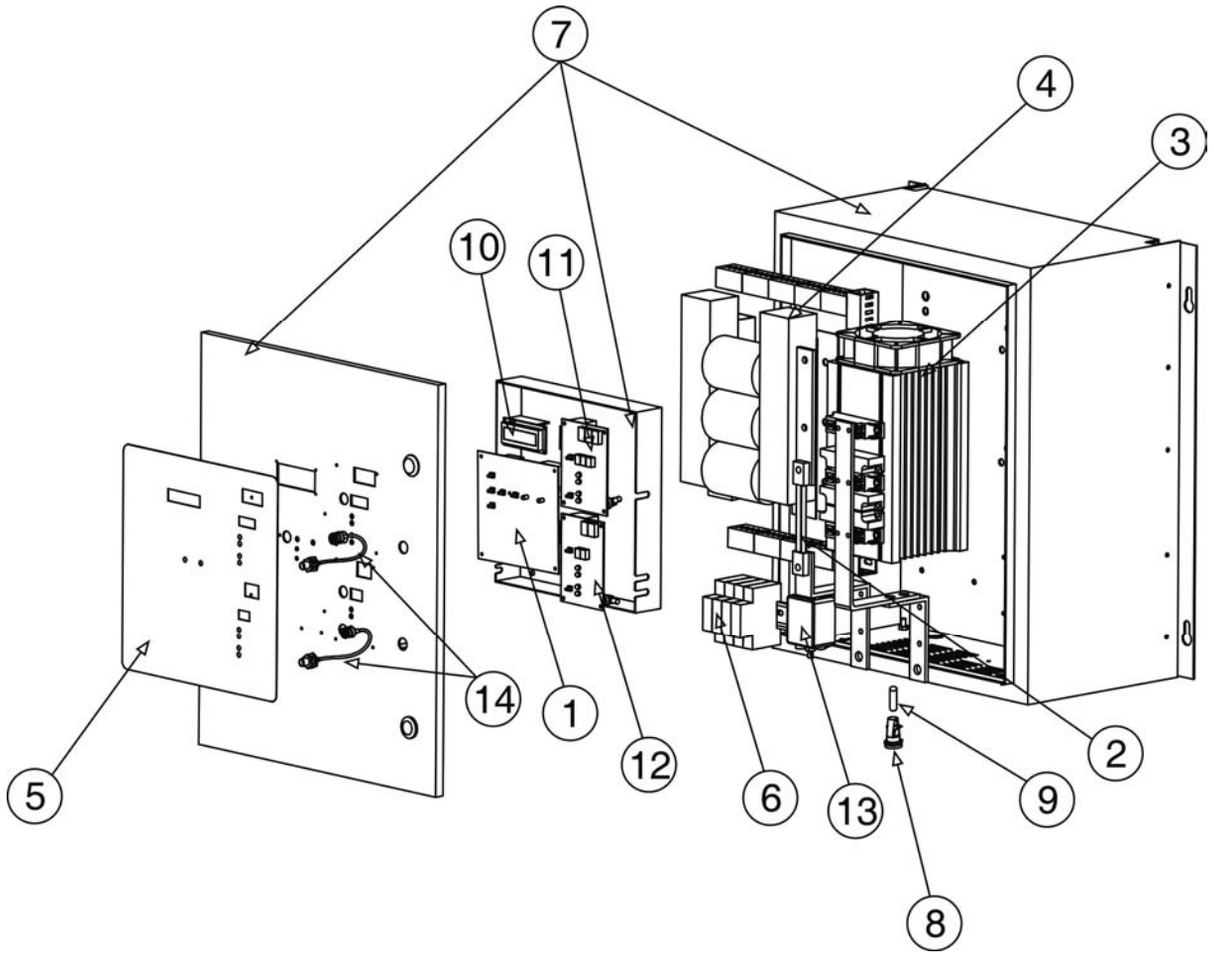
7. TROUBLESHOOTING:

Any action required to solve possible problems in the equipment should always be performed with the equipment disconnected from the mains. Any problem not indicated in the following list should be solved by a qualified technician.

PROBLEM	SOLUTION
Production indicator always indicates "0" at all production levels	Check electrodes. Verify connections between power supply and the electrolysis cell. Check salt concentration.
The power supply is not turned on.	Check the system is properly connected to 230 V/50-60 Hz in the command box of the pump. Check the estate of the fuse located at the bottom of the power supply.
Free chlorine levels in the water are very low.	Check that the system produces chlorine in pool jets. Verify that the water Chemicals parameters (pH, combined chlorine, isocyanuric acid, etc.) are correct. Increase filtering time. Add chlorine stabilizer (cyanuric acid) until a concentration of 25 - 30 g/m^3 is achieved.
pH/ORP controller always show extreme values, or readings are unstable.	The cable of the pH/ORP sensor is damaged. Clean the contacts or replace the cable. The pH/ORP sensor has an air bubble in the membrane area. Hold the sensor in vertical position. Shake it lightly until the bubble moves up. Sensor fault. The connection cable is too long or it is too near to sources of electrical interference (motors, etc.). Replace the sensor. Locate the unit nearer to the sensor.
Impossible calibration of the pH/ORP sensor	Polluted or expired calibration solution. Blocked sensor membrane. Check the membrane is not damaged. Clean the sensor with diluted acid in water, shaking it lightly. Sensor fault. Replace the sensor.
Slow response of the pH/ORP sensor	Sensor electrostatic ally charged. During the calibration phase, the sensors should not be dried with paper or cloth. Clean it exclusively with water and shake it lightly. Insufficient renovation of the analyzed water (no flow through the sample point). Ensure that the tip of the sensor is submerged in the water at the sample point, and that no air bubbles are present.

PROBLEM	SOLUTION
CHLORINE reading (ppm) too different from the real value	Wrong calibration. Repeat the system calibration according to the procedure described in Section 6.5. Calibrate the system more frequently.
CHLORINE reading (ppm) too low not allowing the system calibration by DPD.	Deposits have been generated on the sensor electrode. Clean the probe as described in Section. 6.7 The flow is inadequate (less than 30 l/h.). Increase the flow with the valve of the sensor holder.
CHLORINE reading (ppm) too low and unstable	Damaged membrane: the internal electrolyte is contaminated. Change the membrane as described in Section 6.7. Avoid damages on the membrane. No hit or shake the sensor when the membrane is screwed. Make sure the filter of the sensor holder is in good condition and prevents the passage of particles to the sensor.
Response of the CHLORINE sensor (ppm) too slow	Membrane partially blocked by contaminants. Change the membrane as described in the procedure in page 30.

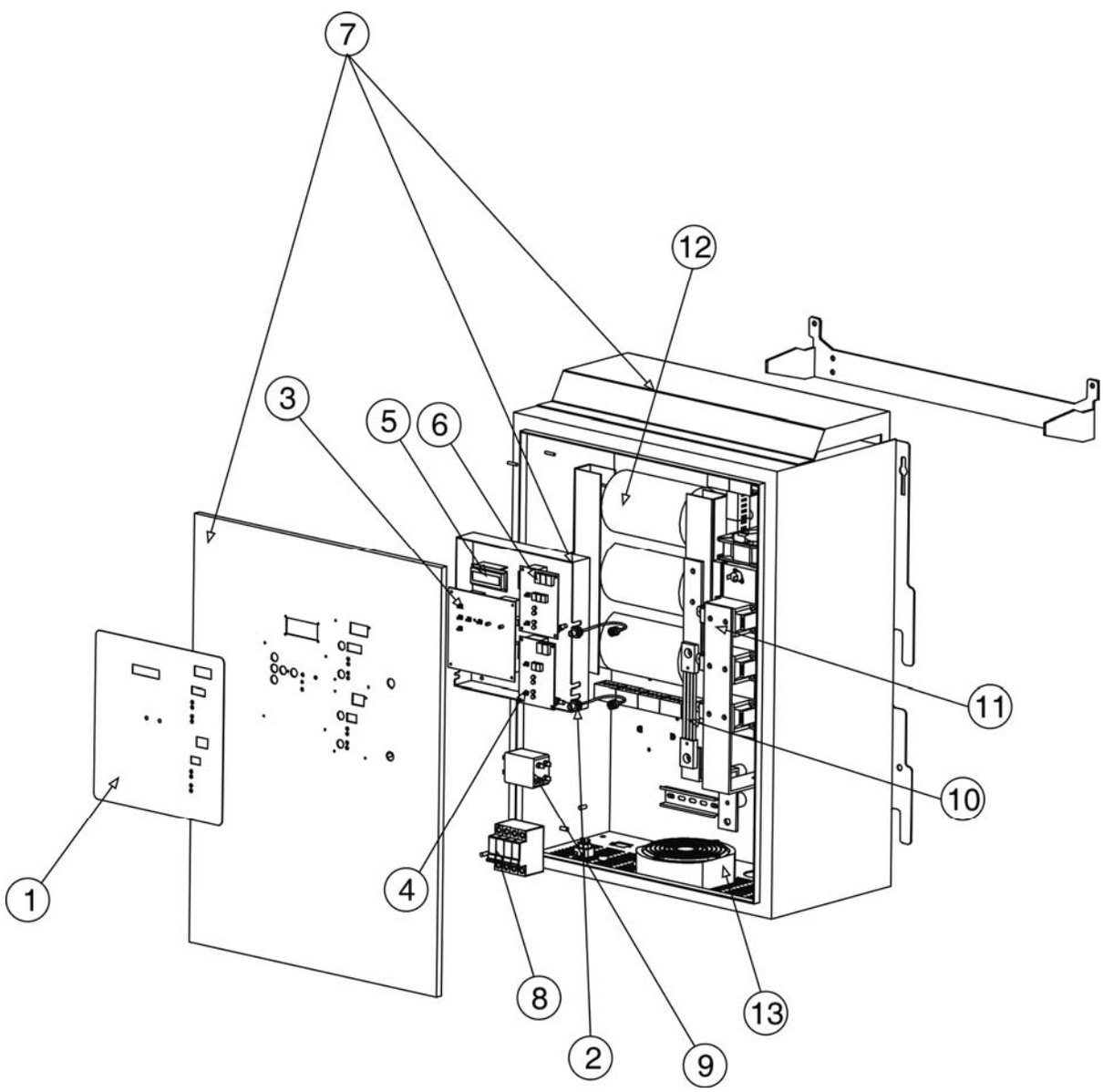
8. COMPONENTS:



POWER SUPPLY

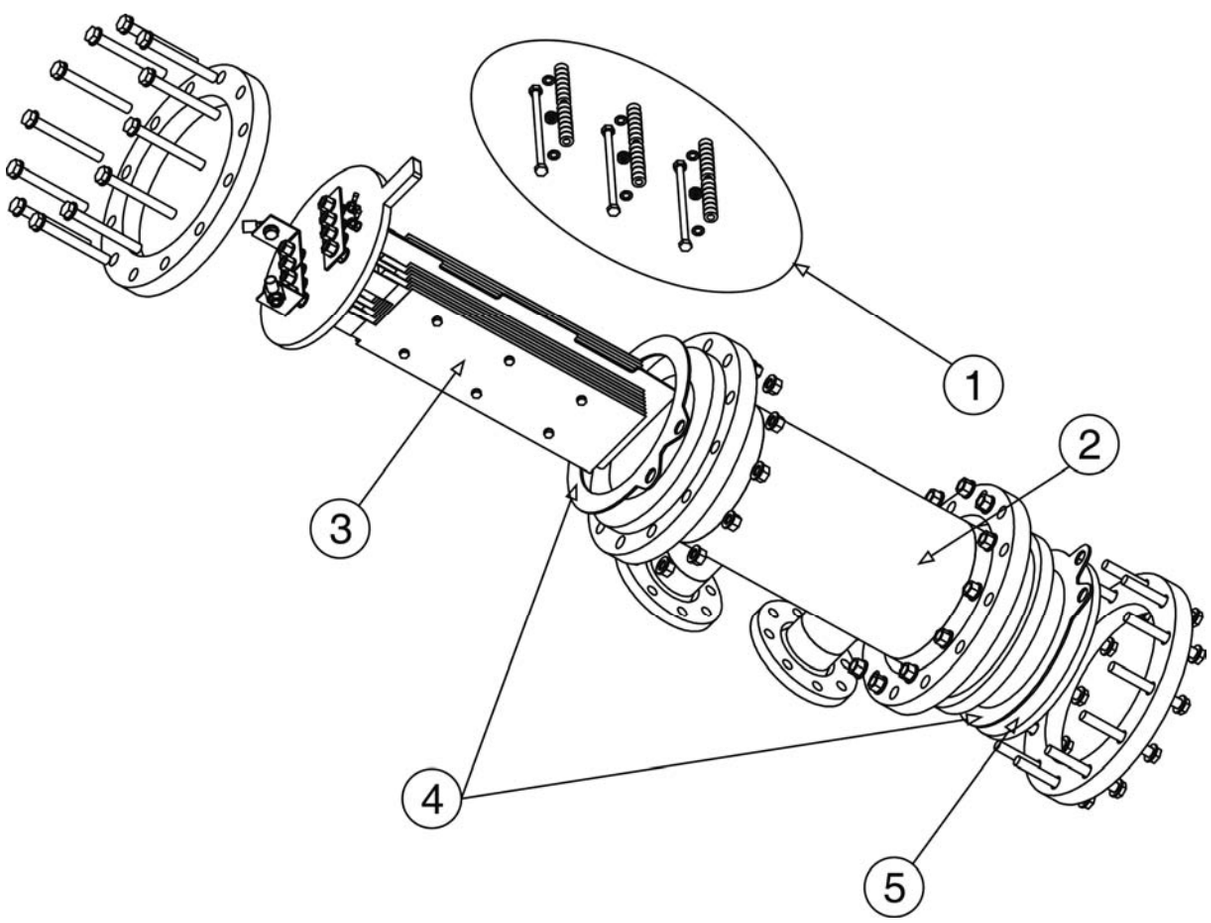
ID	CODE	DESCRIPTION	MOD.65/80			MOD.100/120			Units
			EX	EXT-1 (E)	EXT-2 (E)	EX	EXT-1 (E)	EXT-2 (E)	
1	R-PBA65EX/+	BOARD MOD.65/80 EX	X	X	X				1
1	R-PBA100EX/+	BOARD MOD.100/120 EX				X	X	X	1
2	SHUNT D-65EX/+	SHUNT FOR MOD.65/80 EX	X	X	X				1
2	SHUNT D-100EX/+	SHUNT FOR MOD.100/120 EX				X	X	X	1
3	MDPD 65EX/+	POWER MODULE MOD.65/80 EX	X	X	X				1
3	MDPD 100EX/+	POWER MODULE MOD.100/120 EX				X	X	X	1
4	TRD65EX	TRANSFORMER MOD.65/80 EX	X	X	X				1
4	TRD100EX	TRANSFORMER MOD.100/120 EX				X	X	X	1
5	CARAT EX	KEYPAD EX	X			X			1
5	CARAT EXT-1	KEYPAD EX / EXT-1		X			X		1
5	CARAT EXT-2	KEYPAD EX / EXT-2			X			X	1
7	CAJA EGIS A2 I	BOX MOD.65/250 EX	X	X	X	X	X	X	1
8	PORTAFUSI 6X32	FUSE-HOLDER 6x32	X	X	X	X	X	X	1
9	FUS-6X32T7A	FUSE T 7A (6x32 mm)	X	X	X				1
9	FUS-6X32T10A	FUSE T 10A (6x32 mm)				X	X	X	1
10	DISPLAY EX/+	SYSTEM DISPLAY EX	X	X	X	X	X	X	1
11	R-PBAORP	ORP CONTROL BOARD		X			X		1
11	R-PBACL	CHLORINE CONTROL BOARD			X			X	1
12	R-PBAPH	PH CONTROL BOARD		X	X		X	X	1
13	FILTRO 220V EX+	NET FILTER 230 VAC EX SYSTEMS	X	X	X	X	X	X	1
14	R-LATIG BNC	PROBE-BOARD BNC CABLE		X	X		X	X	2

ID	CODE	DESCRIPTION	MOD.150/180			MOD.250/300			Units
			EX	EXT-1 (E)	EXT-2	EX	EXT-1 (E)	EXT-2	
1	R-PBA150EX/+	BOARD MOD.150/180 EX	X	X	X				1
1	R-PBA250EX/+	BOARD MOD.250/300 EX				X	X	X	1
2	SHUNT D-150EX/+	SHUNT FOR MOD.150/180 EX	X	X	X				1
2	SHUNT D-250EX/+	SHUNT FOR MOD.250/300 EX				X	X	X	1
3	MDPD 150EX/+	POWER MODULE MOD.150/180 EX	X	X	X				1
3	MDPD 250EX/+	POWER MODULE MOD.250/300 EX				X	X	X	1
4	TRD150EX	TRANSFORMER MOD.150/180 EX	X	X	X				1
4	TRD250EX	TRANSFORMER MOD.250/300 EX				X	X	X	1
5	CARAT EX	KEYPAD EX	X			X			1
5	CARAT EXT-1	KEYPAD EX / EXT-1		X			X		1
5	CARAT EXT-2	KEYPAD EX / EXT-2			X			X	1
6	MAGN 6A 150EX	CIRCUIT BREAKER K6 MOD.150/180 EX	X	X	X				1
6	MAGN 10A 250EX	CIRCUIT BREAKER K10 MOD.250/300 E				X	X	X	1
7	CAJA EGIS A2 I	BOX MOD.65/250 EX	X	X	X	X	X	X	1
10	DISPLAY EX/+	SYSTEM DISPLAY EX	X	X	X	X	X	X	1
11	R-PBAORP	ORP CONTROL BOARD		X			X		1
11	R-PBACL	CHLORINE CONTROL BOARD			X			X	1
12	R-PBAPH	PH CONTROL BOARD		X	X		X	X	1
13	FILTRO 380V EX+	NET FILTER 380 VAC EX SYSTEMS	X	X	X	X	X	X	1
14	R-LATIG BNC	PROBE-BOARD BNC CABLE		X	X		X	X	2



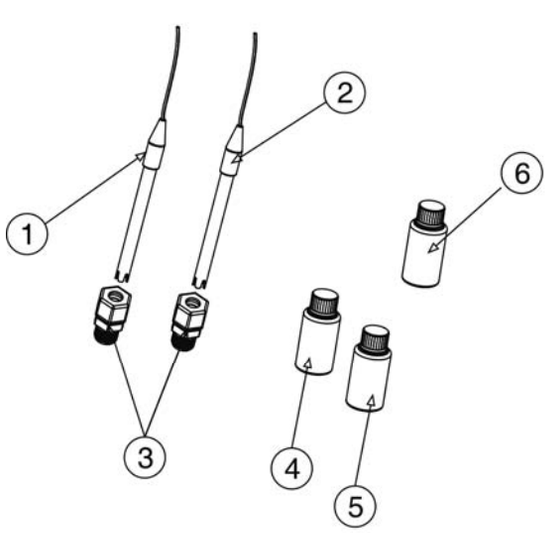
ID	CODE	DESCRIPTION	MOD.500			Units
			EX	EXT-1 (E)	EXT-2	
1	CARAT EX	KEYPAD EX	X			1
1	CARAT EXT-1	KEYPAD EX / EXT-1		X		1
1	CARAT EXT-2	KEYPAD EX / EXT-2			X	1
2	R-LATIG BNC	PROBE-BOARD BNC CABLE		X	X	2
3	R-PBA500EX/+	BOARD MOD.500 EX	X	X	X	1
4	R-PBAPH	PH CONTROL BOARD		X	X	1
5	DISPLAY EX/+	SYSTEM DISPLAY EX	X	X	X	1
6	R-PBAORP	ORP CONTROL BOARD		X		1
6	R-PBACL	CHLORINE CONTROL BOARD			X	1
7	CAJA EGIS D-500 EX	BOX MOD.500 EX	X	X	X	1
8	TERMICO D-500 EX	CIRCUIT BREAKER K20 MOD.500EX	X	X	X	1
9	FILTRO 380V EX+	NET FILTER 380VAC EX SYSTEMS	X	X	X	1
10	SHUNT D-500EX/+	SHUNT FOR MOD.500 EX	X	X	X	1
11	MDPD 500EX/+	POWER MODULE MOD.500 EX	X	X	X	1
12	TRD500EX	TRANSFORMER MOD.500 EX	X	X	X	1
13	VENTILADOR IND	INTERNAL HEATSINK FAN	X	X	X	1

ELECTROLYSIS CELL

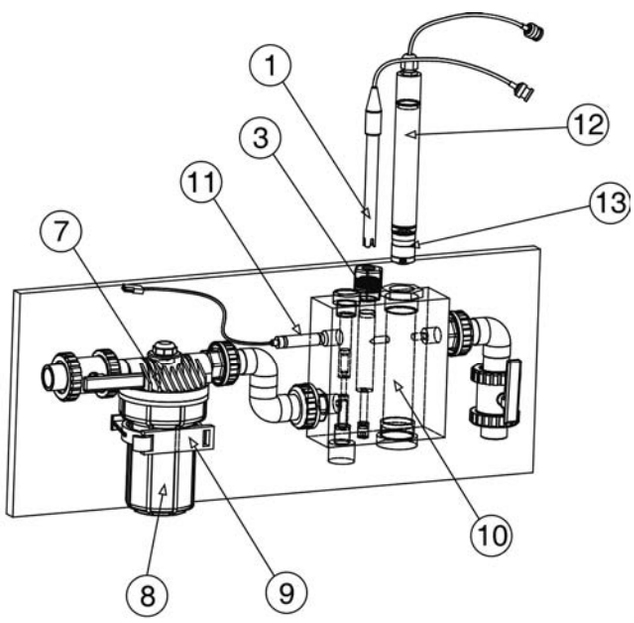


ID	CODE	DESCRIPTION	MOD. 65/80	MOD. 100/120	MOD. 150/180	MOD. 250/300	MOD 500/600	Units
1	R-TORN 12	SCREW SET FIX. ELECTRODES MOD.65/80	X					1
1	R-TORN 16	SCREW SET FIX. ELECTRODES MOD.100/300		X	X	X	X	1
2	R-148	ELECTRODE HOLDER CELL MOD.65/80 EX	X					1
2	R-145	ELECTRODE HOLDER CELL MOD.100/120 EX		X				1
2	R-146	ELECTRODE HOLDER CELL MOD.150/180 EX			X			1
2	R-147	ELECTRODE HOLDER CELL MOD.250/300 EX				X (1)	X (2)	
3	R-115	SELF-CLEANING ELECTRODE MOD.65/80 EX	X					1
3	R-116	SELF-CLEANING ELECTRODE MOD.100/120 EX		X				1
3	R-117	SELF-CLEANING ELECTRODE MOD.150/180 EX			X			1
3	R-118	SELF-CLEANING ELECTRODE MOD.250/300 EX				X		
3	R-119	SELF-CLEANING ELECTRODE MOD.500/600 EX	X				X	
4	R-015-20	CELL FLANGE JOINT MOD.65/80 EX		X	X			2
4	R-015-21	CELL FLANGE JOINT MOD.100/180 EX				X		2
4	R-015-22	CELL FLANGE JOINT MOD.250/600 EX	X				X	2
5	DISCO MET 158MM	METHACRYLATE DISK 158/10 MM MOD.65/80 EX		X	X			1
5	DISCO MET 267MM	METHACRYLATE DISK 267/15 MM MOD.100/180 EX				X		1
5	DISCO MET 320MM	METHACRYLATE DISK 320/10 MM MOD.250/600 EX				X (1)	X (2)	

CONTROL EXTENSIONS



EXT-1



EXT-2

ID	CODE	DESCRIPTION	EXT-1	EXT-1(E)	EXT-2	Units
1	H-035	PH COMBINED ELECTRODE	X	X	X	1
2	RX-02	ORP ELECTRODE	X	X		1
3	R-028	PE SENSOR HOLDER 12MM-1/2”	X (2)	X(2)	X (1)	
4	R-025	BUFFER PH 7.0 125 ML. GREEN	X	X	X	1
5	R-026	BUFFER PH 4.0 125 ML. RED	X	X	X	1
6	R-027	ORP CALIBRATION SOLUTION 470 MV	X	X		1
7	R-033	WASHABLE CARTRIDGE FILTER		X	X	1
8	R-032	80 MICRONS CARTRIDGE		X	X	1
9	ABRAZ 75 PVC	FILTER FASTENING CLAMP		X	X	1
10	PELEC-ORP S/PMON	PH+ORP ELECTRODE HOLDER		X		1
10	PELEC-CL S/PMON	PH+CL ELECTRODE HOLDER			X	1
11	SENSOR PROX	INDUCTIVE FLOW SENSOR		X	X	1
12	RX-02	ORP ELECTRODE		X		1
12	CL.01.02	FREE CHLORINE SENSOR			X	1
13	MEM-CL01+G HOLD	FREE CHLORINE SENSOR MEMBRANE HEAD			X	1

9. TECHNICAL DATA:

TECHNICAL SPECIFICATIONS:

Standard service voltage
MOD.65/80/EX/EXT-1/EXT-2
230V AC / 50-60 Hz., cable: 3 x 1 mm^2 (leng. 2 m.), 3.9 A
MOD.100/120/120EX/EXT-1/EXT-2
230V AC / 50-60 Hz., cable: 3 x 2.5 mm^2 (leng. 2 m.), 5.8 A
MOD.150/180/EX/EXT-1/EXT-2
380V AC – 50-60 Hz., cable: 5 x 1.5 mm^2 (leng. 2 m.), 3.3 A
MOD.250/300/EX/EXT-1/EXT-2
380V AC – 50-60 Hz., cable: 5 x 4 mm^2 (leng. 2 m.), 5.5 A
MOD.500/600/EX/EXT-1/EXT-2
380V AC – 50-60 Hz., cable: 5 x 4 mm^2 (leng. 2 m.), 12 A

Fuse

MOD.65/80/EX/EXT-1/EXT-2,	7 A (6x32 mm)
MOD.100/120/120EX/EXT-1/EXT-2,	10 A (6x32 mm)
MOD.150/180/EX/EXT-1/EXT-2,	QM K6
MOD.250/300/EX/EXT-1/EXT-2,	QM K10
MOD.500/600/EX/EXT-1/EXT-2,	QM K20

Output voltage
MOD.65/80/EX/EXT-1/EXT-2
10VDC, cable: 2 x 25 mm^2 (leng. 2.5 m.) 40 A
MOD.100/120/120EX/EXT-1/EXT-2
10VDC, cable: 2 x 35 mm^2 (leng. 2.5 m.) 65 A
MOD.150/180/EX/EXT-1/EXT-2
10VDC, cable: 2 x 70 mm^2 (leng. 2.5 m.) 90 A
MOD.250/300/EX/EXT-1/EXT-2
10VDC, cable: 2 x 120 mm^2 (leng. 2.5 m.) 150 A
MOD.500/600/EX/EXT-1/EXT-2
10VDC, cable: 3 x 240 mm^2 (leng. 2.5 m.) 300 A

Production

MOD.65/80/EX/EXT-1/EXT-2	80 g./h.
MOD.100/120/120EX/EXT-1/EXT-2	130 g./h.
MOD.150/180/EX/EXT-1/EXT-2	180 g./h.
MOD.250/300/EX/EXT-1/EXT-2	300 g./h.
MOD.500/600/EX/EXT-1/EXT-2	600 g./h.

Minimum recirculation flow

MOD.65/80/EX/EXT-1/EXT-2	14 m^3/h.
MOD.100/120/120EX/EXT-1/EXT-2	20 m^3/h.
MOD.150/180/EX/EXT-1/EXT-2	30 m^3/h.
MOD.250/300/EX/EXT-1/EXT-2	50 m^3/h.
MOD.500/600/EX/EXT-1/EXT-2	90 m^3/h.

Electrode number

MOD.65/80/EX/EXT-1/EXT-2	12
MOD.100/120/120EX/EXT-1/EXT-2	8
MOD.150/180/EX/EXT-1/EXT-2	12
MOD.250/300/EX/EXT-1/EXT-2	16
MOD.500/600/EX/EXT-1/EXT-2	2x16

Net weight

MOD.65/80/EX/EXT-1/EXT-2	80 Kg.
MOD.100/120/120EX/EXT-1/EXT-2	100 Kg.
MOD.150/180/EX/EXT-1/EXT-2	125 Kg.
MOD.250/300/EX/EXT-1/EXT-2	150 Kg.
MOD.500/600/EX/EXT-1/EXT-2	250 Kg.

GENERAL FEATURES:

Control system
- Microprocessor.
- Membrane keypad with control keys and operation indication leds.
- Control I/O: 2 inputs (voltage-free contact) for external ORP/Chlorine controller and remote system shutdown.
- Cell output: production linear control (0-100%).
- Integrated PH/ORP controller (systems with pre-installed **EXT-1(E)** control extension).
- Integrated PH/CHLORINE controller (systems with pre-installed **EXT-2** control extension).

Self-cleaning
Automatic polarity switch

Working temperature
De 0°C (32°F) a +.40°C (104°F)
Cooling: fan

Material
Power supply
- Metal (RAL 5002)

Electrolysis cell
- Polypropylene

EXT-1

pH/ORP sensors
Body: plastic (Noryl PPO)
Range 0 -12 pH / ± 2000 mV (ORP)
Solid electrolyte
pH: blue protector
ORP: red protector
Dim. 12x150 mm

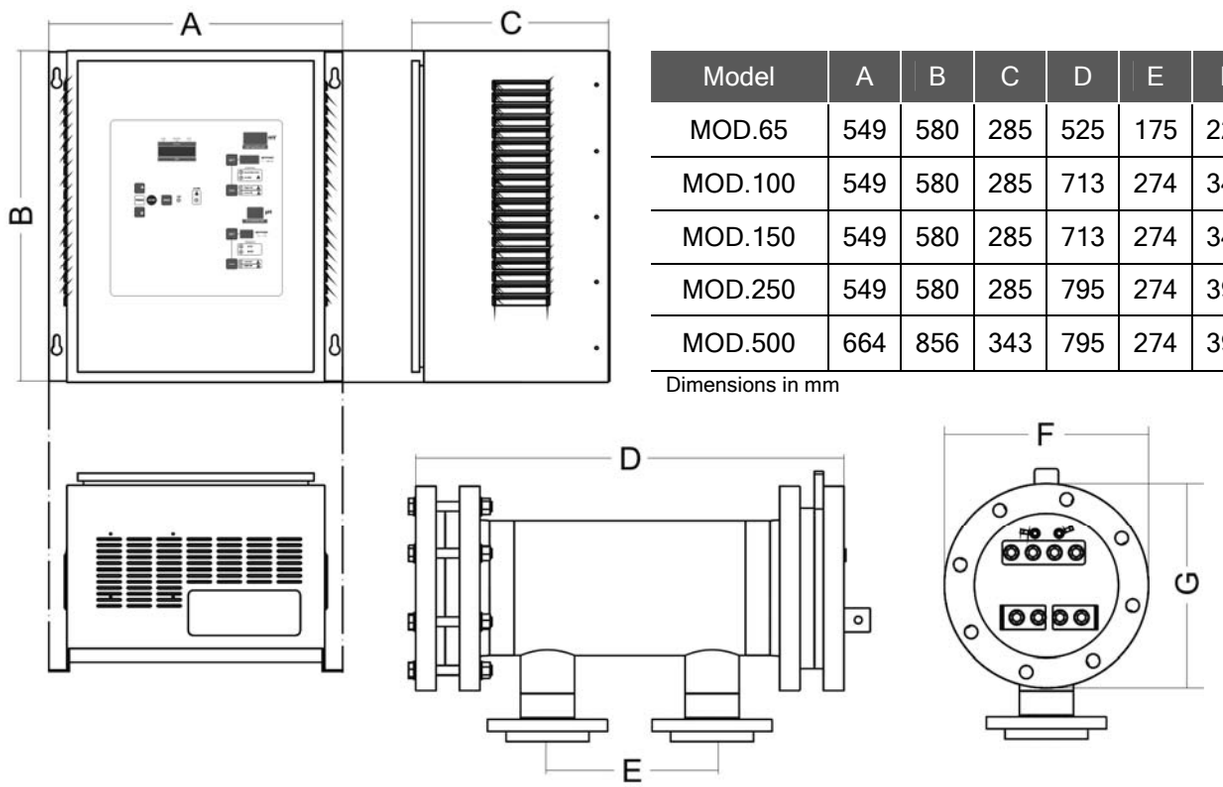
EXT-1(E) EXT-2

- Electrode holder
- Inductive flow detector
- Flow regulation
- 80-microns cartridge filter

pH sensor
Body: plastic (Noryl PPO)
Range 0 -12 pH / ± 2000 mV (ORP)
Solid electrolyte
Blue protector

FREE CHLORINE sensor
Body: PVC
Range: 0-5 ppm
Low pH dependence
Compatible with the presence of isocyanuric acid
Minimum flow: 30-40 l/h.
Maximum pressure: 1 bar
Maximum temperature: 45°C (113°F).

Dimensions



Model	A	B	C	D	E	F	G
MOD.65	549	580	285	525	175	221	292
MOD.100	549	580	285	713	274	340	407
MOD.150	549	580	285	713	274	340	425
MOD.250	549	580	285	795	274	395	449
MOD.500	664	856	343	795	274	395	449

Dimensions in mm

10. WARRANTY CONDITIONS:

10.1. GENERAL ASPECTS

10.1.1. According to these provisions, the seller guarantees that the guaranteed product is in perfect condition upon delivery.

10.1.2. The Total Warranty period is 2 YEARS.

10.1.3. The Warranty period will be calculated as of delivery to the purchaser. The electrode is covered by a 2-YEAR WARRANTY (or 10.000 hours), which is not extendable. The pH /ORP sensors are covered by a 6-MONTH non-renewable warranty. The free chlorine sensor is covered by a warranty of two years, without extensions, with the exception of the membrane.

10.1.4. Should the Product be faulty and the seller is notified during the Guarantee Period, he shall repair or replace the Product at his own cost wherever he sees fit, unless this is either impossible or out of proportion.

10.1.5. When the Product cannot be repaired or replaced, the buyer may request a proportional price reduction or, if the fault is important enough, rescission of the sales contract.

10.1.6. Parts replaced or repaired pursuant to this warranty shall not extend the warranty period of the original Product, although they shall have their own warranty.

10.1.7. For this warranty to be effective, the buyer shall accredit the date of acquisition and delivery of the Product.

10.1.8. When the buyer alleges a fault in the product over six months after its delivery, he shall accredit the original and existence of the alleged fault.

10.1.9. This Warranty Certificate does not limit or prejudge consumer rights pursuant to national legislation.

10.2. SPECIFIC CONDITIONS

10.2.1. For this warranty to be effective, the buyer must closely follow the manufacturer's instructions included in the documentation supplied with the product, as applicable to each product range and model.

10.2.2. Whenever a schedule is defined for the replacement, maintenance or cleaning of certain product parts or components, the warranty shall only be valid when said schedule has been correctly followed.

10.3. LIMITATIONS

10.3.1. This warranty shall only be applicable to sales to consumers, with consumer being defined as a person who purchases the product for other than professional purposes.

10.3.2. No warranty is applicable to normal wear or the product, parts, components and/or fungible or consumable materials (except the electrode).

10.3.3. The warranty does not cover cases in which the product: (i) has been incorrectly treated; (ii) has been inspected, repaired, maintained or handled by an unauthorised person; (iii) has been repaired or maintained with non-original parts, or (iv) has been incorrectly installed or started up.

10.3.4. When a faulty product results from incorrect installation or start-up, this warranty shall only be applicable when the installation or start-up forms part of the product contract of sale and had been performed by the seller or under the seller's responsibility.

10.3.5. Damage or faults due to any of the following causes:

- Bad programming of the system and/or user inadequate calibration of the pH/ORP sensors.
- Operation at salinity values of less than 3 g of sodium chloride per litre and/or temperatures lower than 15°C (59°F) or higher than 40°C (104°F).
- Operation at a pH of more than 7.6.
- Use of explicitly unauthorised chemicals.
- Exposure to corrosive environments and/or temperatures of less than 0°C (32°F) or more than 50°C (125°F).

I.D. ELECTROQUIMICA, S.L.

EN	PRODUCTS	***SALT ELECTROLYSIS SYSTEM***
F	PRODUITS	***SYSTÈME D'ÉLECTROLYSE SALINE***
E	PRODUCTOS	***SISTEMA DE ELECTROLISIS DE SAL***
I	PRODOTTI	***SISTEMA PER L'ELETTROLISI DEL SALE***
D	PRODUKTE	***SALZ-ELEKTROLYSE-SYSTEM***
P	PRODUTOS	***SISTEMA DE ELECTRÓLISE SALINA***

MOD.65/80 EX
MOD.65/80/EXT-1(E)
MOD.65/80/EXT-2

MOD.100/120 EX
MOD.100/120/EXT-1(E)
MOD.100/120/EXT-2

MOD.150/180 EX
MOD.150/180 /EXT-1(E)
MOD.150/180 /EXT-2

MOD.250/300 EX
MOD.250/300/EXT-1(E)
MOD.250/300/EXT-2

MOD.500/600 EX
MOD.500/600/EXT-1(E)
MOD.500/600/EXT-2

DECLARATION EC OF CONFORMITY

The products listed above are in compliance with:
Low Voltage Directive 73/23/EEC and 93/68/EEC.
Electromagnetic Compatibility Directive 89/336/EEC and 92/31/EEC.
European Standard EN 61558-1:1999 and all its modifications.

DÉCLARATION CE DE CONFORMITÉ

Les produits énumérés ci-dessus sont conformes à:
La Directive des Appareils à Basse Tension 73/23/CEE et 93/68/EEC.
La Directive de Compatibilité Électromagnétique 89/336/EEC et 92/31/EEC.
La Réglementation Européenne EN 61558-1:1999 dans toutes ses modifications.

DECLARACION CE DE CONFORMIDAD

Los productos arriba enumerados se hallan conformes con:
Directiva de Equipos de Baja Tensión 73/23/CEE y 93/68/EEC.
Directiva de Compatibilidad Electromagnética 89/336/EEC y 92/31/EEC.
Norma Europea EN 61558-1:1999 en todas sus modificaciones.

DICHIARAZIONE CE DI CONFORMITÀ

I prodotti di cui sopra adempiono alle seguenti direttive:
Direttiva per gli Apparecchi a Bassa Tensione 73/23/CEE e 93/68/EEC.
Direttiva di Compatibilità elettromagnetica 89/336/EEC e 92/31/EEC.
Normativa Europea EN 61558-1:1999 en tutte le sue modifiche.

KONFORMITÄTSERKLÄRUNG CE

Die oben aufgeführten Produkte sind konform mit:
Richtlinie für Niederspannungsanlagen 73/23/CEE und 93/68/EEC.
Richtlinie zur elektromagnetischen Kompatibilität 89/336/EEC und 92/31/EEC.
Europäische Norm EN 61558-1:1999 mit allen Änderungen.

DECLARAÇÃO CE DE CONFORMIDADE

Os produttos relacionados acima estão conformes as:
Directiva de Equipamentos de Baixa Tenção 73/23/CEE e 93/68/EEC.
Directiva de Compatibilidae Electromagnética 89/336/EEC e 92/31/EEC.
Norma Europeia EN 61558-1:1999 e respectivas modificações.

Signature / Qualification:
Signature / Qualification:
Firma / Cargo:
Firma / Qualifica:
Unterschrift / Qualifizierung:
Assinatura / Título:

I.D. ELECTROQUIMICA, S.L.
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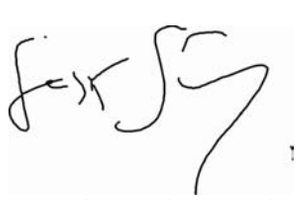

Gaspar Sánchez Cano
Gerente

01-04-2009

Made in EC

MOD80600E100-10

NIF ES-B03731908