SALT ELECTROLYSIS SYSTEM

EN

PUBLIC EX SERIES

Modbus

Model.

50 EX/(M)(LS)
50/EXT-1(E)/(M)(LS)
50/EXT-2/(M)(LS)

80 EX/(M)(LS)
80/EXT-1(E)/(M)(LS)
80/EXT-2/(M)(LS)

120 EX/(M)(LS)
120/EXT-1(E)/(M)(LS)
120/EXT-2/(M)(LS)

180 EX/(M)(LS)
180/EXT-1(E)/(M)(LS)
180/EXT-2/(M)(LS)

300 EX/(M)(LS)
300/EXT-1/(M)(LS)
300/EXT-2/(M)(LS)

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

50 gr/hr ↔ 600 gr/hr

15000 hr EX / EX M

15000 hr EX LS

pH

ORP

ppm Cl_2

EXT

INSTALLATION AND MAINTENANCE MANUAL

CE

Vers.20190801

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.
- FS-1 flow switch + cable (2 m. / 6.6 ft.).
- pH and ORP sensors (only in systems with pre-installed **EXT-1(E)** control extension).
- Calibration solutions pH 7.0 (green) / pH 4.0 (red)] (only in systems with pre-installed **EXT-1(E)** or **EXT-2** control extension).
- Calibration solution [ORP 470 mV] (only in systems with pre-installed **EXT-1(E)** control extension).
- PE sensor holders (only in systems with pre-installed **EXT-1** control extension).
- FREE CHLORINE Sensor (only in systems with pre-installed **EXT-2** control extension).
- Calibration card ID-CAL (only on computers with pre-installed **EXT-2** control extension).
- Sensor holder panel with inductive flow detector, flow regulation and pre-filter (only in systems with pre-installed **EXT-1(E) or EXT-2** control extension).
- CEE22 (M) connector for dosage pump (only in systems with pre-installed **EXT-1(E)** or **EXT-2** control extension).
- Operation manual.

2. 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.50 EX/EXT-1(E)/EXT-2, MOD.80 EX/EXT-1(E)/EXT-2 and MOD.120 EX/EXT-1(E)/EXT-2) are input rated 230 VAC/50-60 Hz (single-phase). Models (MOD.180 EX/EXT-1(E)/EXT-2, MOD.300 EX/EXT-1(E)/EXT-2 and MOD.600 EX/EXT-1(E)/EXT-2) are input rated 380 VAC /50-60 Hz. (three-phase+neutral). 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.
- Salt electrolysis systems must be installed in well-ventilated dry places They should never be installed in places susceptible to flooding.
- If the pool has automatic cover and the electrolysis system is not informed about its state through the corresponding contact, it is important to drastically reduce the chlorine production while the pool is covered. Otherwise, an excess of chlorine could degrade the pool materials.

3. 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 produce chlorine whenever the pool circulation system (pump and filter) is running.

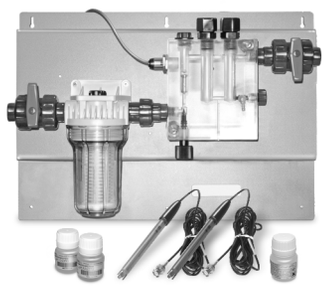
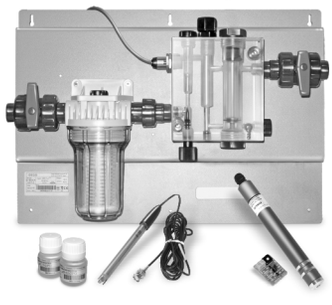
The power supply has several safety devices which are activated in case of a malfunction of the system as well as control of a microcontroller. The salt electrolysis systems have an automatic cleaning system which prevents electrode fouling thereon. In addition, salt electrolysis systems provide integration of two extensions control.

*** MODBUS** - Compatible with additional accessory. Check price list.

POWER SUPPLY AND CELL

DESCRIPTION	MODEL					
	MOD.50 (all versions)	MOD.80 (all versions)	MOD.120 (all versions)	MOD.180 (all versions)	MOD.300 (all versions)	MOD.600 (all versions)
Input voltage	230 VAC / 50-60 Hz.			400 VAC / 50-60 Hz.		
Consumption (Aac)	1.5	2.4	3.9	2.2	3.6	7.2
Output (dc)	25 A	40 A	60 A	90 A	150 A	300 A
Production (g/h)	40 … 50	65 … 80	100 … 120	150 … 180	250 … 300	500 … 600
Line connection						
EX / EX(M)	R 1 ½" (female)	Flange D63		Flange D90		
EX LS	Flange D63	Flange D90		Flange D63	Flange D90	---
Flow switch	Flow sensor (internal) / Flow switch (external) / Inductive (external, optional)					
Salinity / temperature range	EX versions: 3 ... 12 g / l (5-6 g / l, recommended) * M versions (seawater): 35 g./l. LS versions: 1 ... 4 g / l (2 g / l, recommended) * +15 ... +40 °C (25 °C-35 °C, recommended) * * (Outside recommended salinity/temperature range, system production may not reach the 100% of its nominal)					
Minimum flow (m^3/h) Rated pressure (Kg/cm^2)	8 3	14 3	20 3	30 3	50 3	90 3
Electrodes	Titanium coated SELF-CLEANING					
Lifetime (h.)						
EX / EX(M)	12,000 … 15,000 hours (5-6 g/l /seawater salinity)					
EX LS	12,000 … 15,000 hours (@ 2 g/l. salinity)					
Number of electrodes						
EX / EX(M)	8	12	8	12	16	2x15
EX LS	8	12	16	2x10	2x16	---
Cell	Polypropylene					
EX / EX(M)	1	1	1	1	1	2
EX LS	1	1	1	2	2	---
Production control	0 - 100 %					
Reversal polarity	Programmable from control panel: 2/3* hours + test (2 minutes) * Factory default					
External control	Input (voltage-free contact) for external ORP / CHLORINE controller. Input (voltage free contact) for AUTOMATIC COVER.					

CONTROL EXTENSION

MODEL		
EXT-1	EXT-1 E	EXT-2
		

(M): Seawater / (LS): Low salt

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

DESCRIPTION	MODEL					
	MOD.50 EXT-1(E)	MOD.80 EXT-1(E)	MOD.120 EXT-1(E)	MOD.180 EXT-1(E)	MOD.300 EXT-1(E)	MOD.600 EXT-1(E)
Measuring range	0.0 - 9.99 (pH) / 0 - 999 mV (ORP)					
Control range	7.00 - 7.80 (pH) / 600 - 850 mV (ORP)					
Precission	± 0.01 pH / ± 1 mV (ORP)					
Calibration	Automatic, using buffers solutions 7.0 / 4.0 (PH) | 470 mV (ORP)					
Control outputs [pH]	One, for dosing pump connection: 230 VAC / 500 mA maximum					
pH/ORP sensors	Epoxy body, solid electrolyte; pH: blue, range 0-12 pH / ORP: red, range ± 2000 mV					

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

DESCRIPTION	MODEL					
	MOD.50 EXT-2	MOD.80 EXT-2	MOD.120 EXT-2	MOD.180 EXT-2	MOD.300 EXT-2	MOD.600 EXT-2
Measuring range	0.0 - 9.99 (pH) / 0.0 - 5.0 ppm (CHLORINE)					
Control range	7.00 - 7.80 (pH) / 0.25 - 3.5 ppm (CHLORINE)					
Precission	± 0.01 pH / ± 0.1 ppm (CHLORINE)					
Calibration	PH: automatic, using buffers solutions 7.0 / 4.0 (PH) CHLORINE: automatic, using external photometer (DPD method) (not supplied with the unit).					
Control outputs [pH]	One, for dosing pump connection: 230 VAC / 500 mA max. load					
pH sensor	Epoxy body, solid electrolyte; pH: blue, range 0 - 9.99 (Ph)					
CHLORINE sensor	Potentiostatic probe (membrane). Free chlorine type CL0102					

Fig.1 DIAGRAM INSTALLATION ONE CELL, MOD-50, 80,120,180,300 EX / EX (M) AND D-50,80,120 EX LS. ALSO MODELS WITH INTEGRATED **EXT-1**.

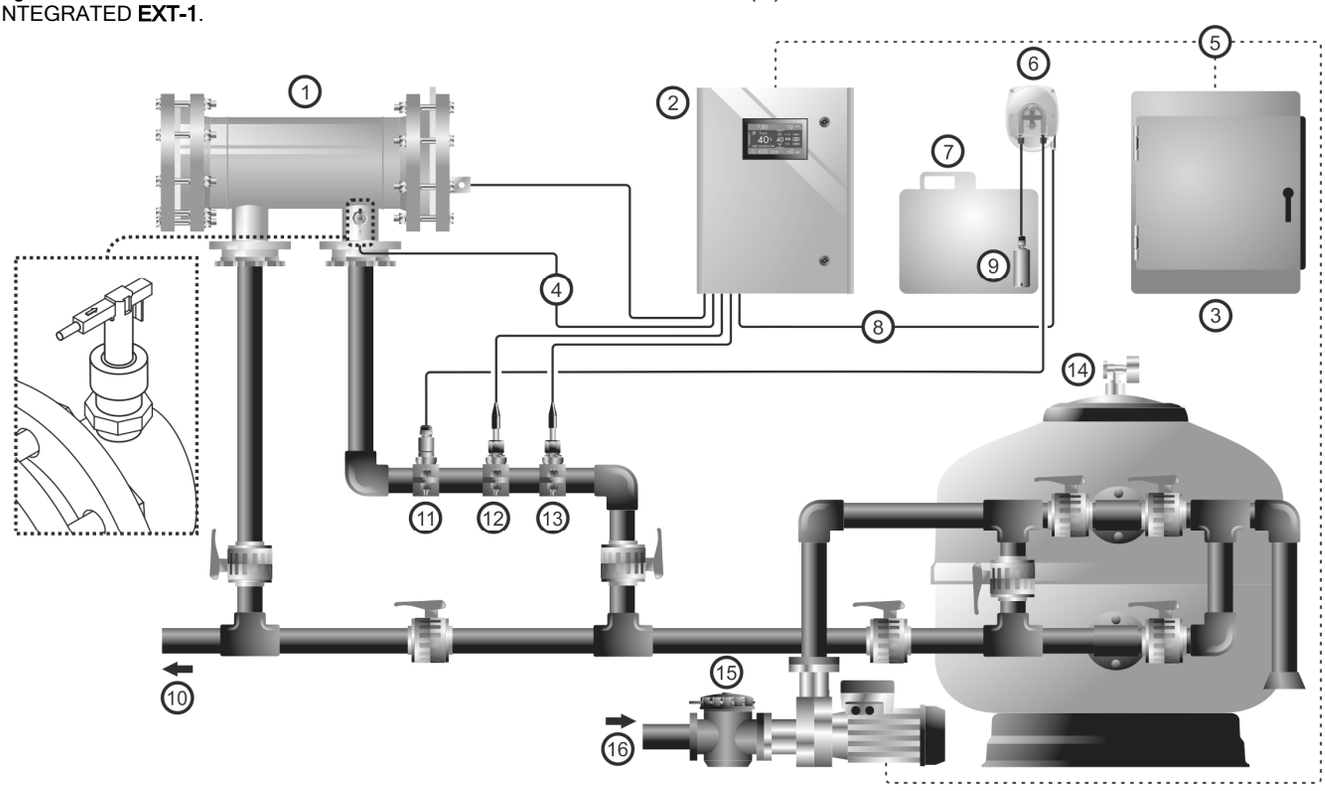
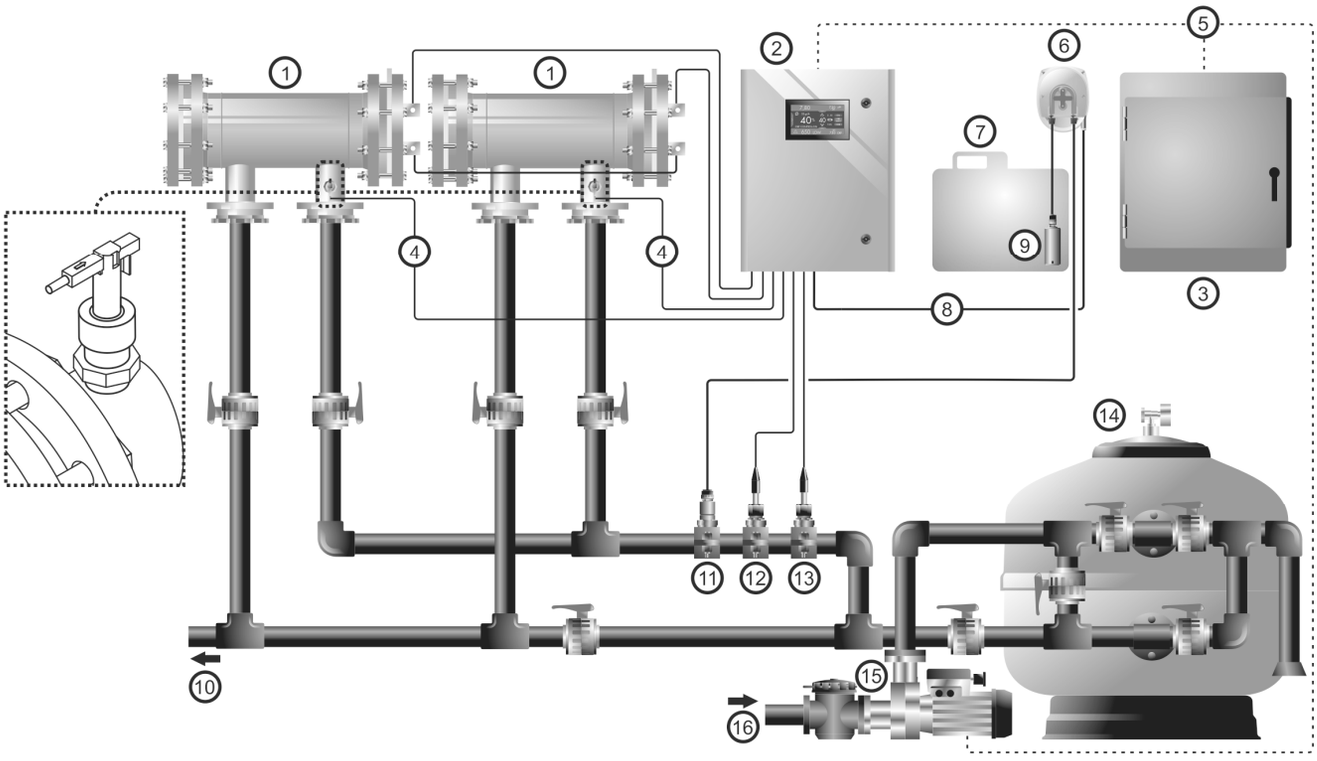


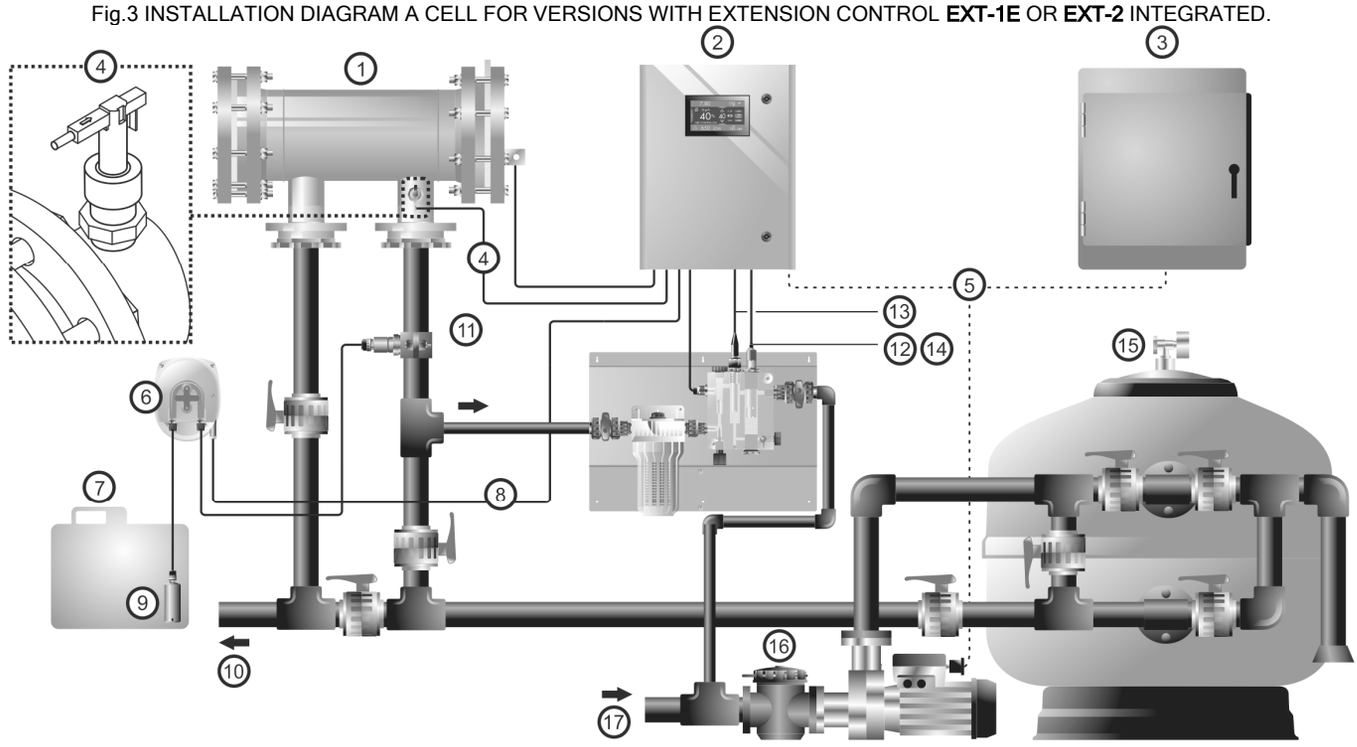
Fig.2 TWO-CELL INSTALLATION DIAGRAM, MOD-600 EX / EX (M), MOD-300 EX LS, MOD-180 EX LS; ALSO MODELS WITH INTEGRATED **EXT-1**.



1) Cell	9) Foot valve filter
2) Power supply	10) Pool return
3) Switchboard	11) Injection valve
4) Flow switch	12) ORP electrode
5) Mains connection 230/380 Vac	13) pH electrode
6) Dosage pump	14) Filter
7) pH-minus tank	15) Pump
8) Pump connection 230 Vac	16) Pool aspiration

WARNING: IN CASE OF INSTALLATION OF ADDITIONAL TREATMENT EQUIPMENT CONSULT THE CORRESPONDING INSTALLATION DIAGRAM.

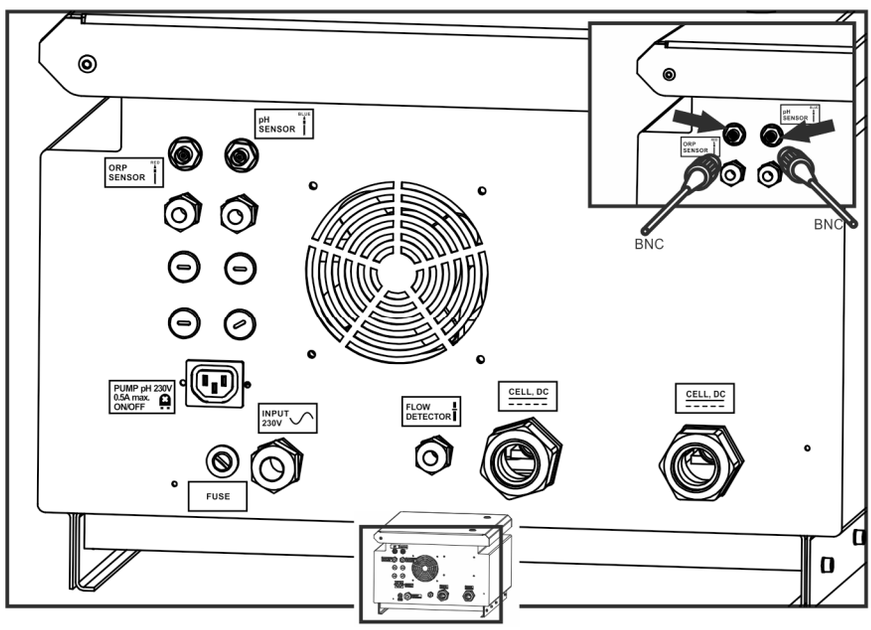
Fig.3 INSTALLATION DIAGRAM A CELL FOR VERSIONS WITH EXTENSION CONTROL **EXT-1E** OR **EXT-2** INTEGRATED.



1) Cell 2) Power supply 3) Switchboard 4) Flow switch 5) Mains connection 230/380 Vac 6) Dosage pump 7) pH-minus tank 8) Pump connection 230 Vac 9) Foot valve filter	10) Pool return 11) Injection valve 12) CHLORINE (ppm) sensor (EXT-2) 13) pH sensor 14) ORP sensor (EXT-1E) 15) Filter 16) Pump 17) Pool aspiration

WARNING: IN CASE OF INSTALLATION OF ADDITIONAL TREATMENT EQUIPMENT CONSULT THE CORRESPONDING INSTALLATION DIAGRAM.

EXAMPLE EXT-1



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 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.**

IMPORTANT: **circuit breaker curve specification should be "D" or "K".**

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:

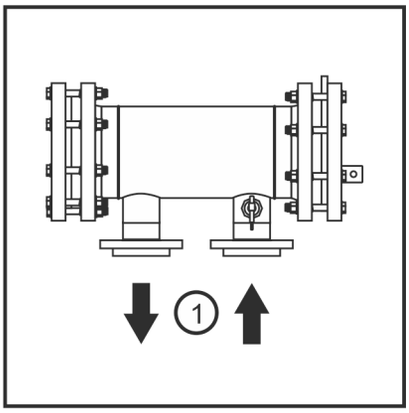


Fig.4

1) Flow

1. Flow direction marked in the cell must be respected. Recirculation system must guarantee the minimum flow stated in the Technical Specifications Table (see pag. 2).

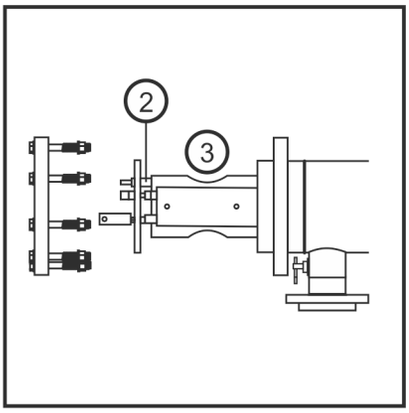


Fig. 5

2) Auxiliary electrode (Flow switch / Gas Detector)

3) Electrodes in parallel to water flow

2. The system flow detector **(2)** (gas detector) activates if there is no recirculation (flow) of water through the cell or if flow is very low, **whenever the cell entry valves are open.** Otherwise it will not work. If electrolysis gases are not properly removed from the electrolysis cell, the generated gas bubbles electrically isolates the auxiliary electrode (electronic flow detection). Therefore at the time of introducing the electrodes inside 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 **(3)**.

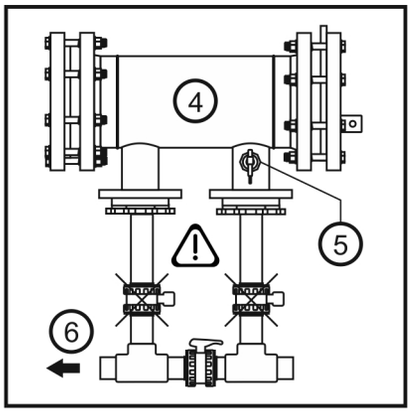


Fig. 6

4) Electrolysis cell

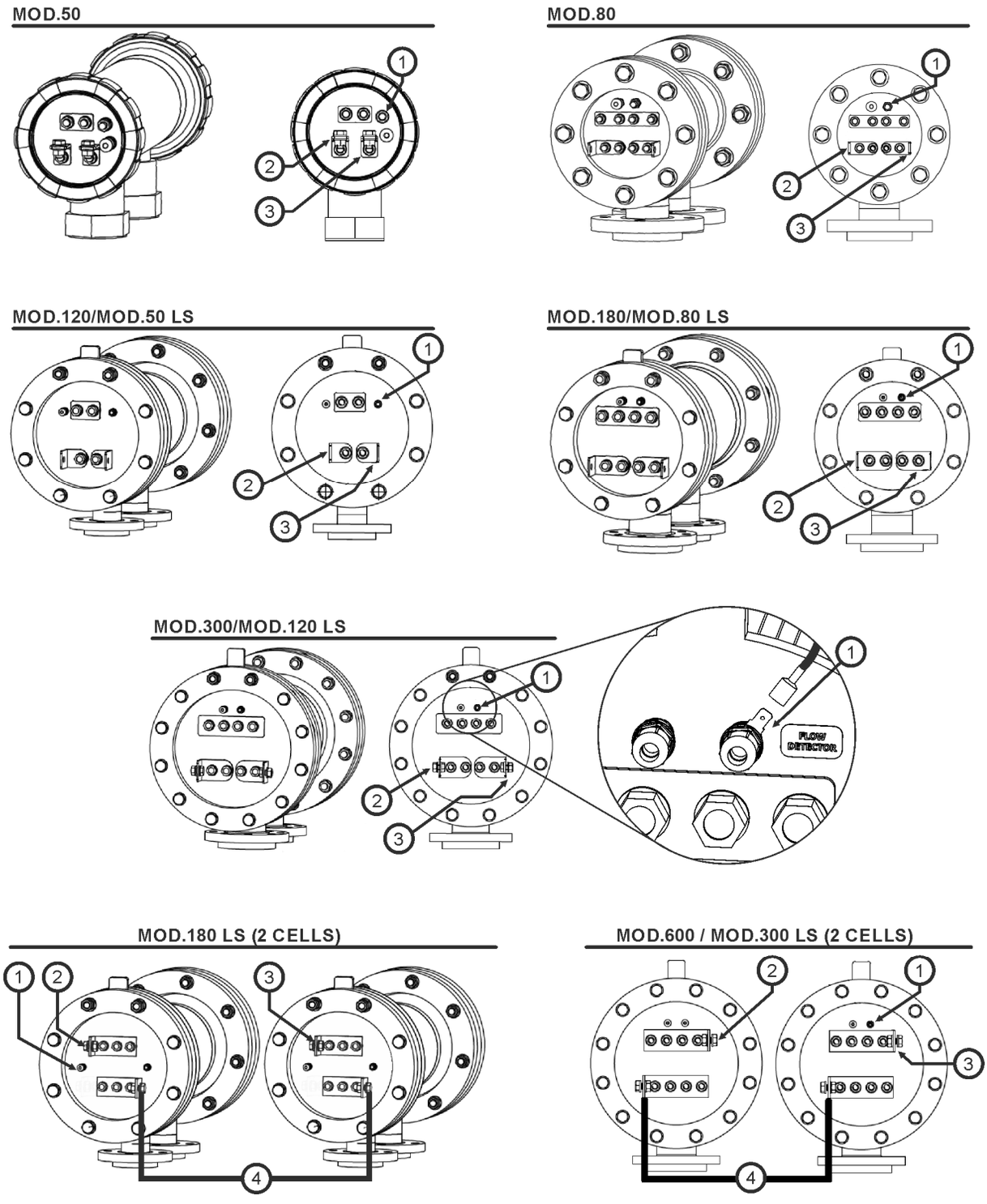
5) Flow switch

6) Pool return

3. WARNING: **a pressure switch or mechanical flow detector palette is additionally supplied with the unit which provides a redundant security in absence of water flow through the cell**. In absence or malfunction of the flow switch supplied with the unit, the internal flow detector (gas detector) will not work correctly if the cell entry valves remain **simultaneously closed**, with the consequent risk of rupture of the cell. Although it is an extremely unusual situation, **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 consult to an authorized manufacturer distributor. The cable connecting the electrolysis cell and the power supply should never exceed the maximum recommended length sec. 9 of this Manual. **It is important** to ensure a solid contact between the wire terminals and the cell contacts using the appropriate tools. Otherwise overheating will occur at the contact area being even able to melt the plastic parts of contact.



① Flow Detector ② Contact 1 ③ Contact 2 ④ Cable bridge between cells

Fig.7

4.4. Installing sensors pH / ORP / ppm / Flow (inductive)

4.4.1 pH EXT-1 & ORP EXT-1 (Fig.1)

- Install the pH and ORP electrode holders in the circuit through ½" saddles (not included with the equipment) (Fig.8)
- Insert the electrodes into their corresponding holders. Next, tighten the holder until the electrode is properly fixed.
- The electrodes must be installed in the holder so that it is guaranteed that the sensor located at their ends are always submerged in the water circulating through the pipe.
- **Install always the electrodes pH/ORP preferably vertically or with a maximum inclination of 40º. (Fig.9).**
- Connect the sensor cables to the corresponding BNC connectors located at the base of the power supply (Fig. 17).

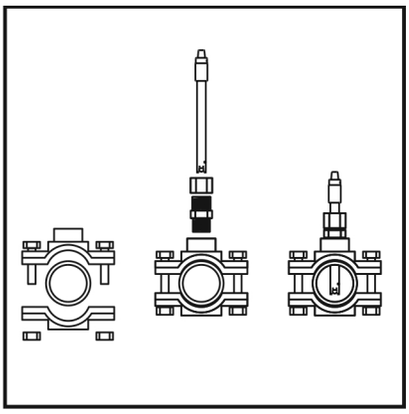


Fig 8.

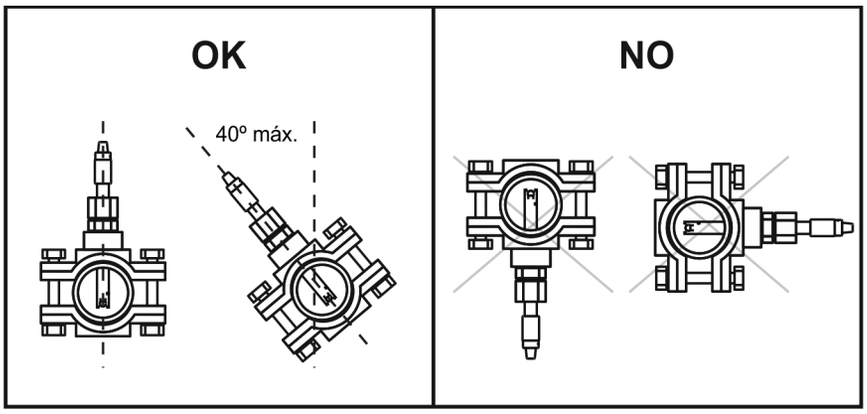


Fig 9.

4.4.2. pH (EXT-1E, EXT-2) & ORP (EXT-1E) (Fig.3)

1. Insert the pH/ORP sensors into their corresponding places 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/ORP sensors provided with the unit to the corresponding BNC connector located in the unit's base.
5. Connect the inductive flow sensor as shown in Fig.10c. (for factory-installed EXT control extensions)

EXT-1 E
pH/ORP

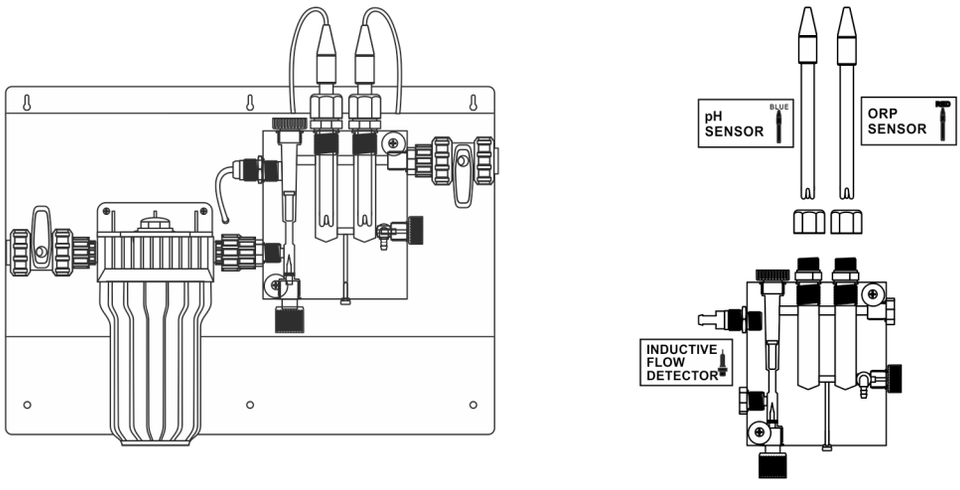


Fig.10a, Ext-1E (Fig 3)

4.4.3 ppm CHLORINE (EXT-2) (Fig.3)

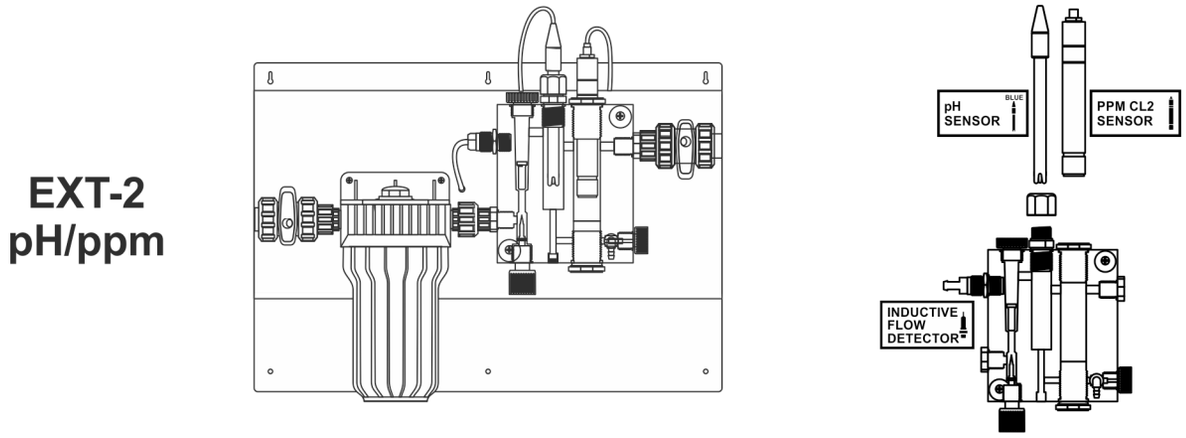
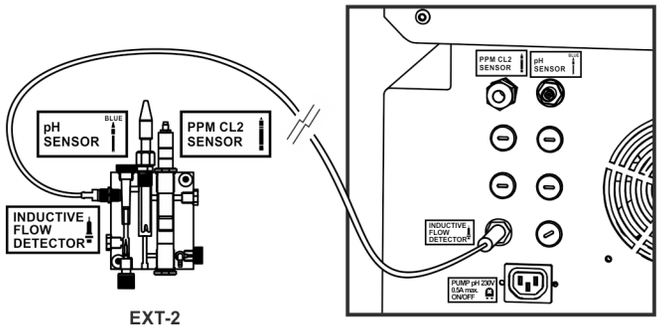


Fig.10b , Ext-2 (Fig 3)



EXAMPLE INDUCTION SENSOR CONNECTION

Fig.10c

4.4.3.1. Assembly of the sensor

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

IMPORTANT: it is mandatory to properly store the probe during non-use periods of the equipment or if the sensor is going to remain without water flow for more than four days.

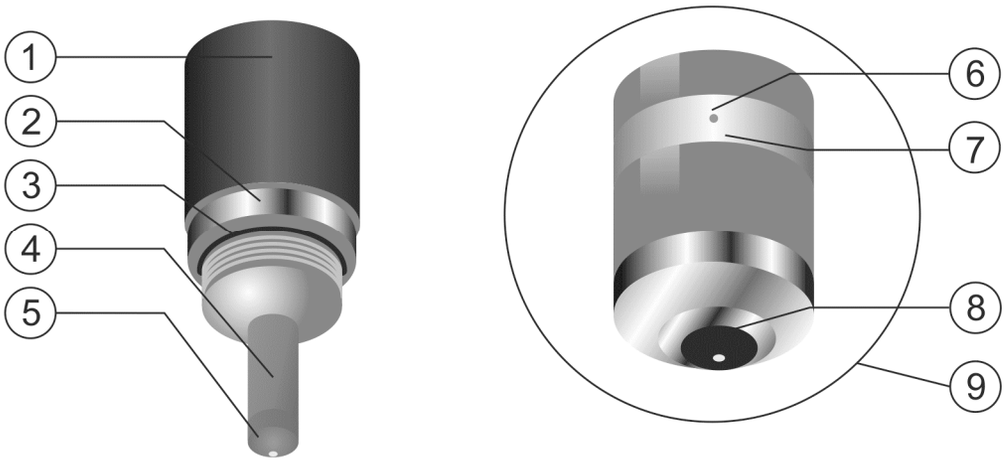


Fig. 11

1. Lift the transparent cover **[7]** of the vent hole **[6]** using a small screwdriver or similar tool and move it aside. This leaves the vent hole **[6]** into the air. This operation is very important because, while the head is unscrewed, the air contained therein can flow freely, thus preventing the membrane from deforming.

2. 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).

3. 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]**.

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.

4.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.

5. 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.

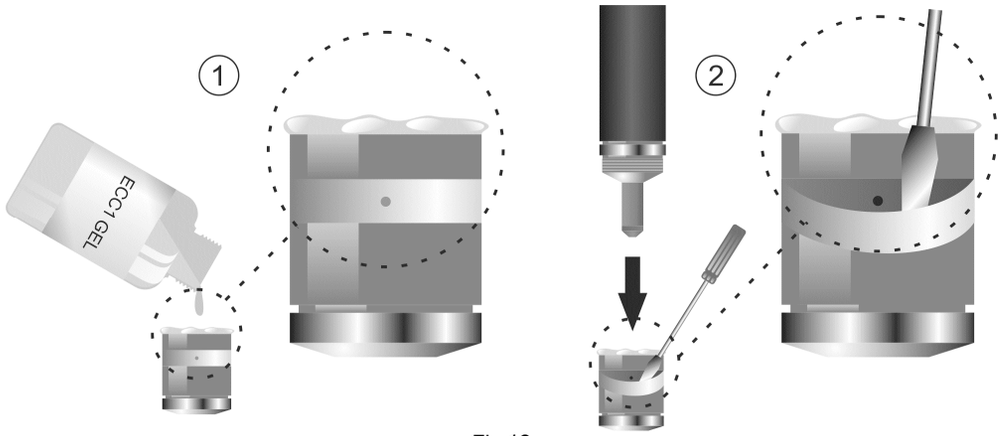
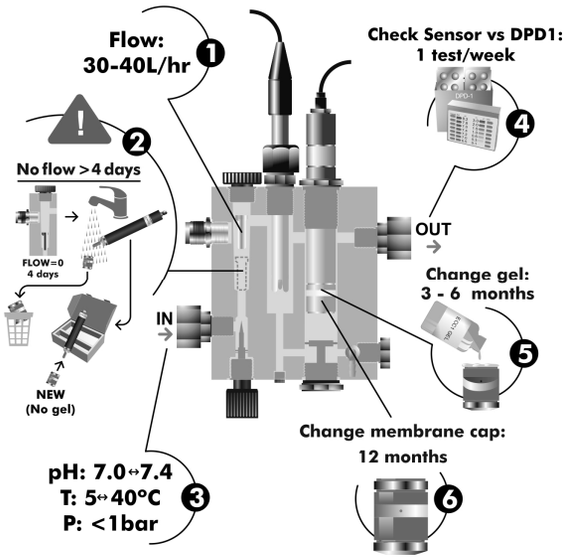


Fig.12



<u>Recommendations:</u>

❶ FLOW: 30 … 40 l/h

❷ No FLOW for more than 4 days → store the sensor with a new membrane (without gel).

❸ pH: 7.0 .. 7.4
Temperature: 5 … 40°C
Pressure: 1 bar max.

❹ Check sensor vs. DPD1: once/week

❺ Change gel: every 3-6 months

❻ Change membrane: every 12 months

4.4.3.2. Installing the CHLORINE (PPM) sensor into the sensor holder

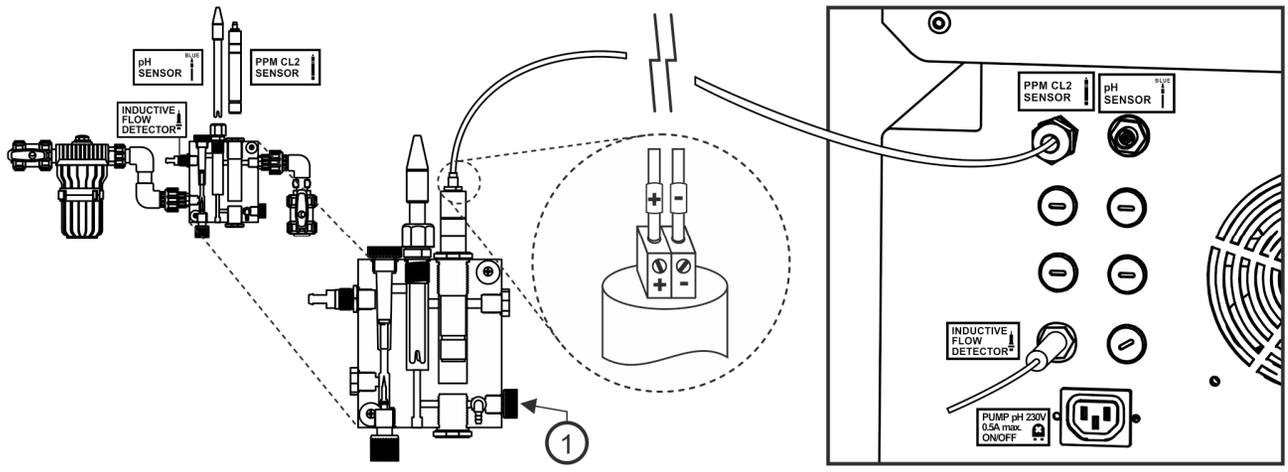
1. Insert the CHLORINE sensor supplied into their corresponding places of the holder. (Fig.13).

2. To that purpose, loosen the connection screw and insert the sensor into the holder.

3. **IMPORTANT:** keep the sampler valve opened to eliminate the resistance of the water inside the probe holder, as otherwise damage may occur in the membrane during the insertion operation.

4. The sensor must be inserted in the connector so as to ensure that the membrane cap on its end is always immersed in the water flowing through the probe holder, and that no bubbles form on the surface of the membrane .

5. Connect the sensor cable at the **bottom of the power supply**, PPM CL2 SENSOR. (Fig.13), respect polarity.



① Sampler valve

Fig.13 EXT-2 (Fig.3)

4.4.3.3. Installing the INDUCTIVE FLOW DETECTOR (EXT-2)

Connect the inductive flow detector to the rectangular connector located on the bottom side of the power supply. (Fig.14.1).

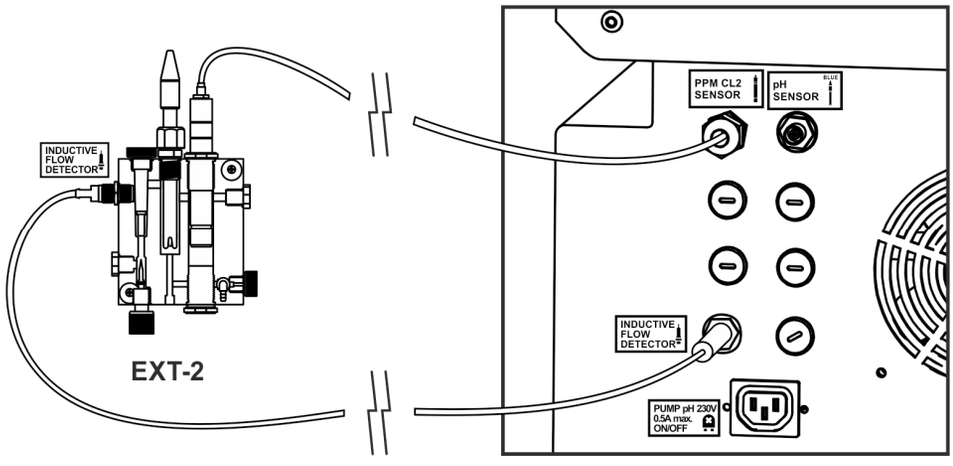


Fig.14.1

Adjust the water flow passing through the sensor holder using the flow regulator **[1]**, so that the float **[2]** reaches the level of the inductive flow detector **[3]**. (Fig.14.2)

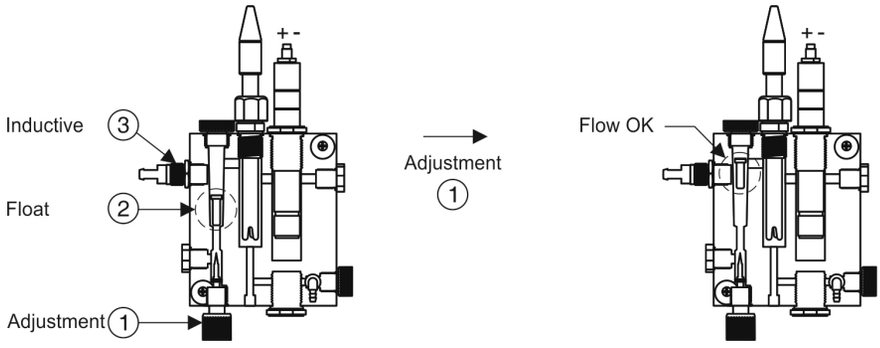


Fig.14.2

4.5. Installation of the included flow detector (Flow switch)

In addition to the internal flow detector (gas detector) installed on all equipment, industrial salt electrolysis systems have an additional flow mechanical detector (flow switch).

1. Install the flow switch in the position indicated in the electrolysis cell (Fig.14.3).

2. There is an arrow symbol on the flow sensor head. Be sure the arrow is parallel to the pipe axis and points in the direction of the water flow.(2)

3. Avoid installing the flow sensor near ferromagnetic objects. These objects can influence the operation of the magnetic device housed therein, and therefore, reduce its reliability.

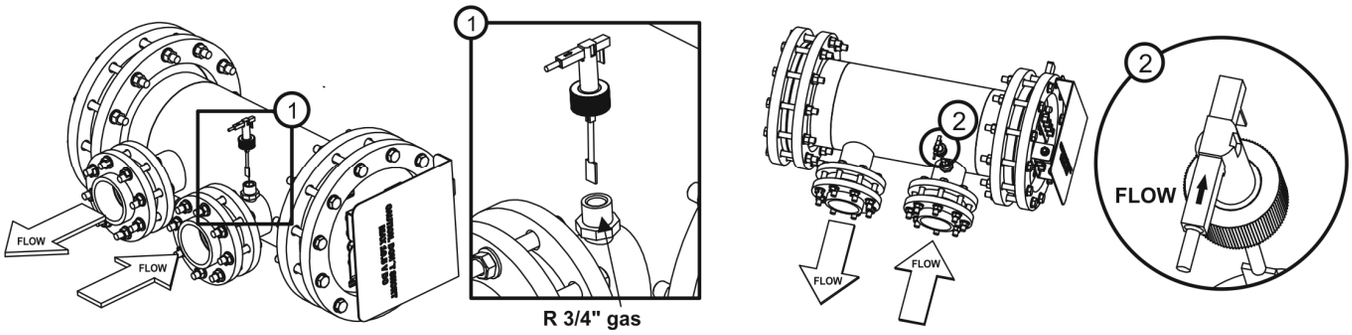
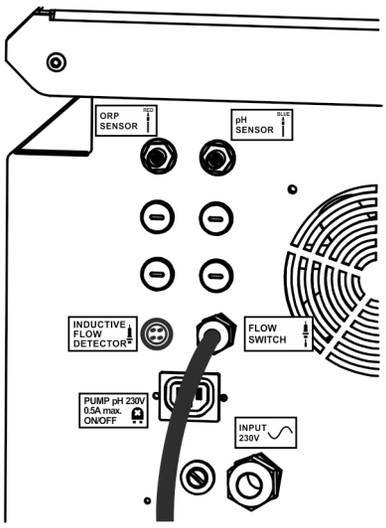
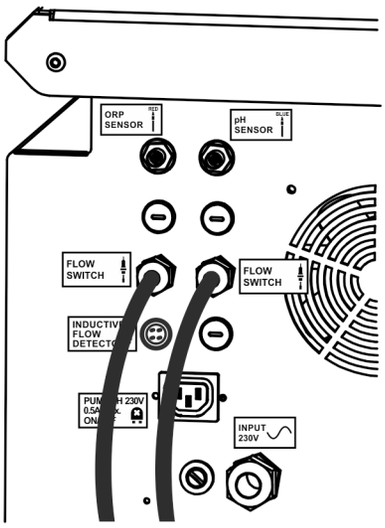


Fig.14.3

1) Cell 2) Power supply 3) Switchboard 4) Flow switch 5) Mains connection 230/380 Vac 6) Dosage pump 7) pH-minus tank 8) Pump connection 230 Vac 9) Foot valve filter	10) Pool return 11) Injection valve 12) ORP electrode 13) pH electrode 14) Filter 15) Pump 16) Pool aspiration

1 Flow switch (1 cell Fig.1,Fig.3)	2 Flow switches (2 cells Fig.2)
	

4.6. Main menu and connection

Salt Electrolysis systems are equipped with a touch control panel located on its front (Fig.15).

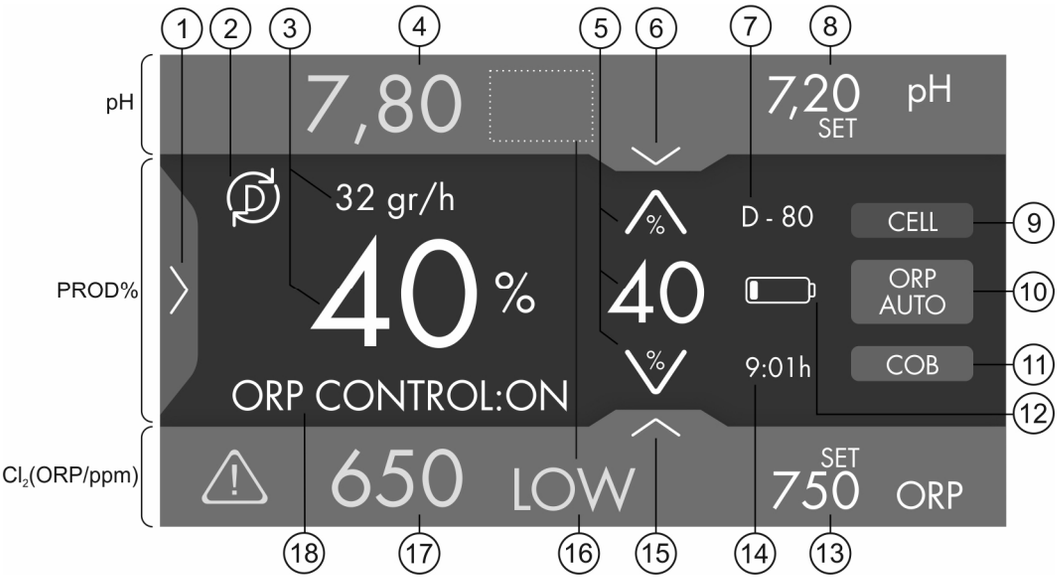
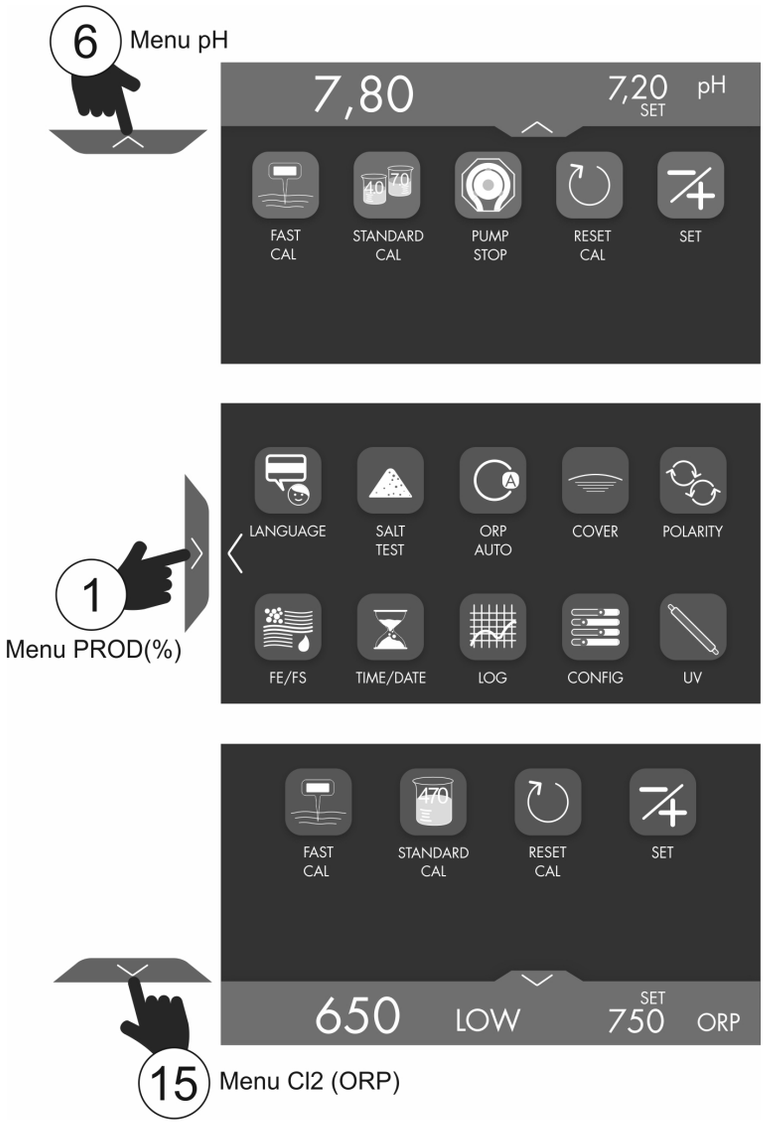


Fig. 15



1. **PROD configuration menu (%)**
2. **Self-cleaning indicator (direct / reverse)**
3. **Production value (% & gr.Cl2 / hr)**
4. **pH value**
5. **Production setpoint (%)**
6. **Menu pH settings**
7. **Equipment model**
8. **Setpoint pH**
9. **Alarm cell passivated**
10. **ORP AUTO**
11. **Cover**
12. **Battery alarm**
13. **Setpoint Cl2 (ORP)**
14. **Time**
15. **Configuration menu Cl2 (ORP)**
16. **Alarms / Info pH and Cl2 (ORP)**
17. **Cl2 Value (ORP)**
18. **Alarms / Production info (%)**

4.6.1. Electronic cards / Inputs

In addition to the basic operations, the Salt Electrolysis System has a series of input-output signals, which allow the connection of additional external controls. These inputs are located in the connector [CN7] of the main circuit of the unit located inside the power supply (Fig.16). On the EXT2, the "24V" plate is installed in a safety box as a protection measure. External connection terminals have been installed in the "BASE" and inside "TERMINAL BLOCK" of the power supply to facilitate the connection.

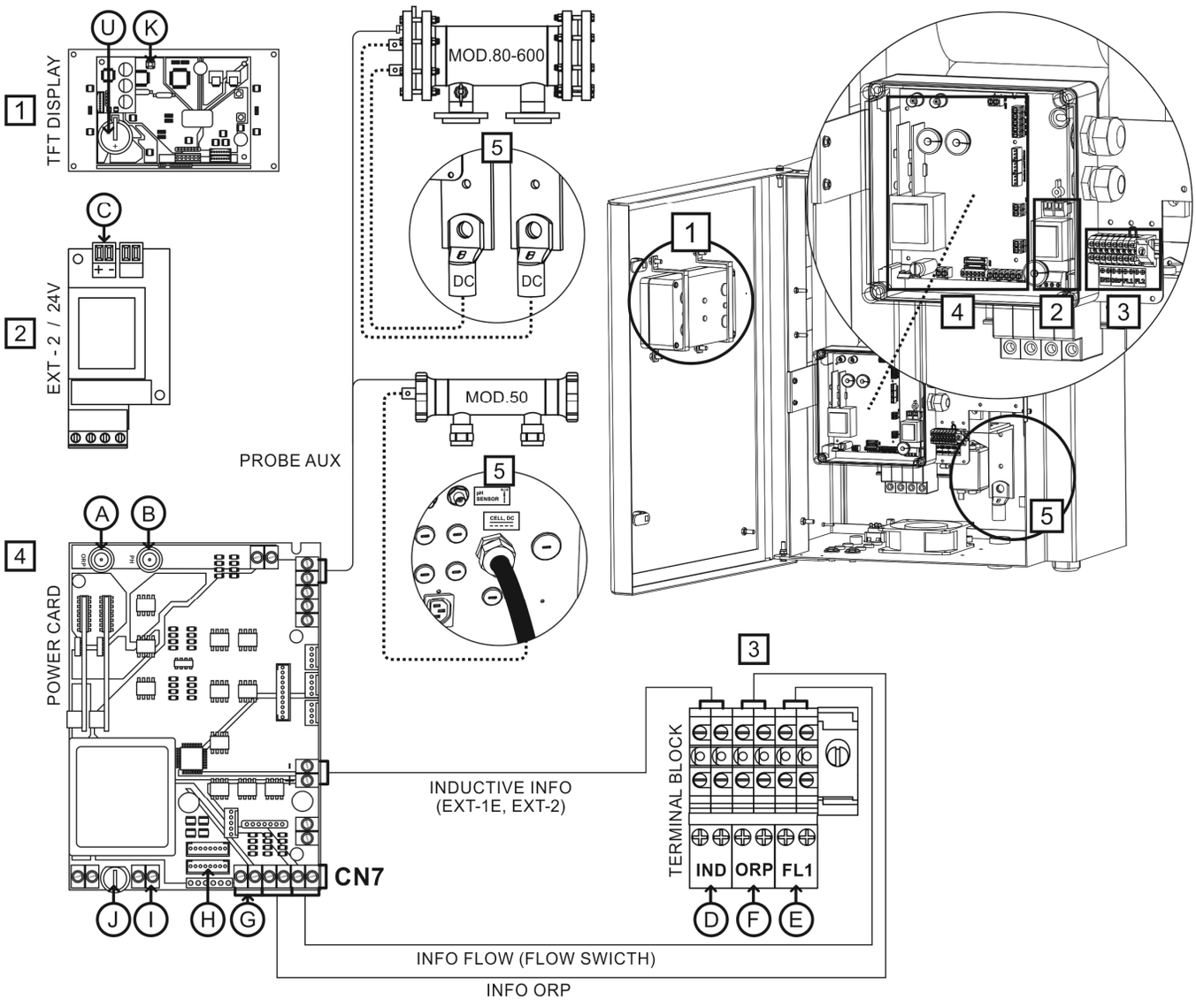


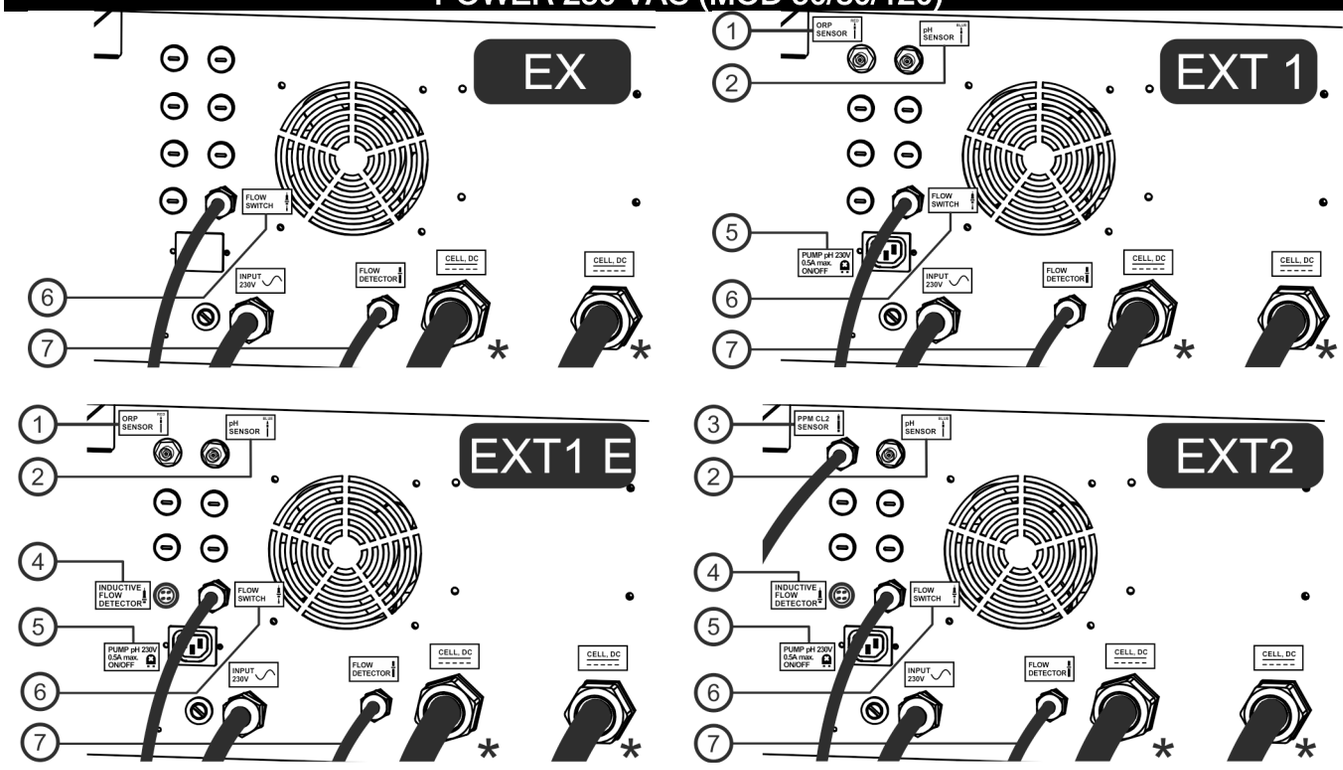
Fig.16

DESCRIPTION OF BOARD TERMINAL BLOCKS AND ELEMENTS

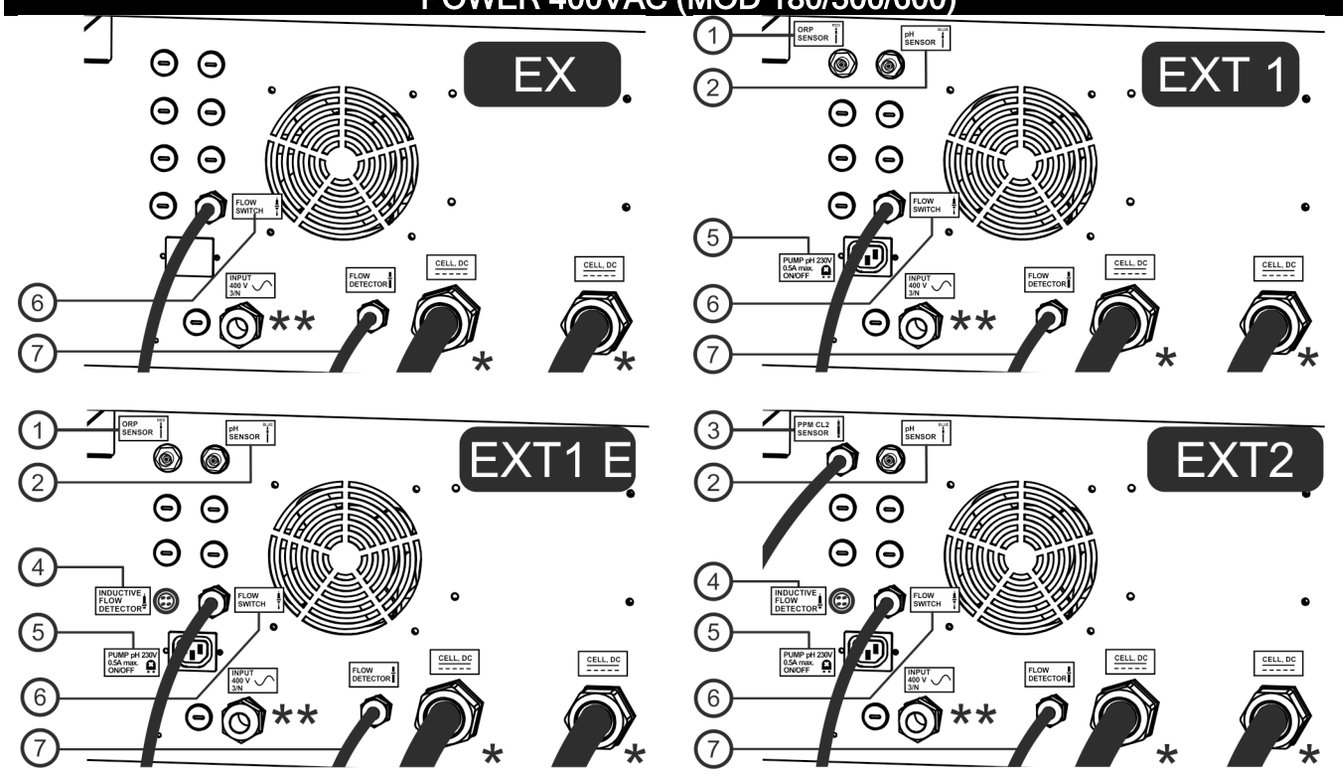
A.ORP ELECTRODE
B.PH ELECTRODE
C.PPM ELECTRODE (Polarity +,-)
D.INDUCTIVE FLOW DETECTOR(Polarity -,+)
E.FLOW SWITCH (Potential-free contact)
F.EXTERNAL ORP CONTROL (Potential-free contact)
G.COVER SIGNAL(Potential-free contact)
H.POOLSTATION CONNECTION
I. PH PUMP CONNECTION (ON/OFF, rated 220 V/0.5 A
J.FUSE (PH PUMP), rated 220 V/0.5 A
K.DISPLAY RESET
U.BATTERY

CONNECTING EXTERNAL INPUTS

POWER 230 VAC (MOD 50/80/120)



POWER 400VAC (MOD 180/300/600)



1. ORP ELECTRODE
2. PH ELECTRODE
3. CHLORINE (PPM) ELECTRODE. Polarity +,-.
4 & 4B. INDUCTIVE FLOW DETECTOR. Polarity -,+.
(connection in case of subsequent installation of EXT1E, EXT2).

5. PH PUMP CONNECTOR (ON/OFF, rated 220V/0.5 A)
6. FLOW SWITCH CONNECTOR.
7. AUXILIARY DETECTOR FLOW / GAS.
* CABLES SUPPLIED, TO INSTALL AT START UP. IN MOD.50 VA INSTALLED.
** CABLES NOT SUPPLIED (400V 3 / N)

Integrated pH / ORP / Chlorine controller (Ext-1 Fig.2, Ext-1E Fig.3, Ext-2 Fig.3)

The integrated pH/ORP controller leaves the factory calibrated and with the following programming parameters.

POINT OF SETPOINT ppm = "1.0 ppm"

POINT OF SETPOINT pH = "7.2"

POINT OF ORIGIN = "750 mV"

Control logic:

Dosing pH OFF→ ON pH> = (SET + 0.20), HYSTERESIS SECONDS.
Dosing pH ON→ OFF pH <= (SET +0.10), HYSTERESIS 1 SECOND.

Electrolysis ON→ OFF mV> = SET, HYSTERESIS 2 MINUTES.
Electrolysis OFF→ ON mV <SET, HYSTERESIS 2 SECONDS.

IMPORTANT: to achieve a correct pH regulation, make sure that the alkalinity of the water is in the recommended optimum range of 80-150 ppm of CaCO3. Use a kit to check the Total Alkalinity level of the water, and adjust it manually if necessary.

Connection of pH / ORP / Chlorine sensors.

Connect the pH, ORP and Chlorine sensors (PPMs) supplied with the unit to the corresponding BNC connectors located on the base of the unit (Fig.17).

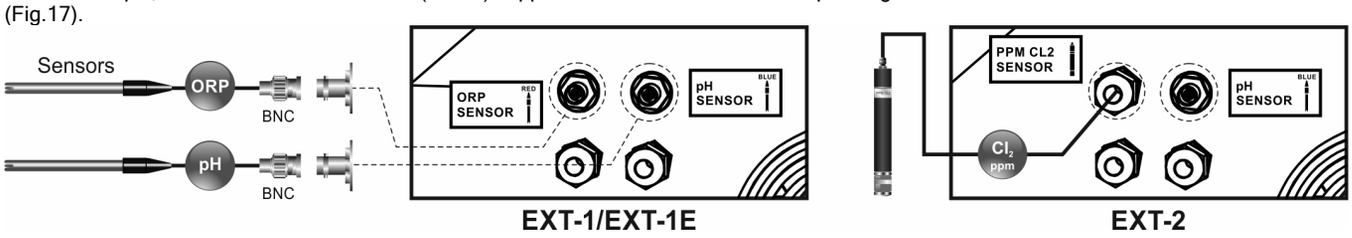
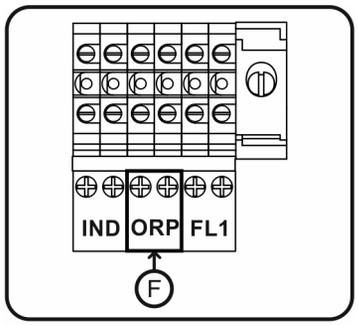
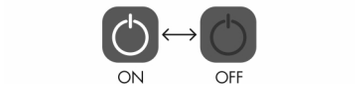


Fig. 17

ORP / PPM EXTERNAL CONTROL (Enabled on EX models), EXT1, EXT1E, EXT2 Disabled: input for potential-free contact. This input can be used to connect an external controller to the electrolysis system (ORP, RESIDUAL CHLORINE, PHOTOMETER, etc.). For this purpose, connect two wires of the potential-free contact, from the external controller to the corresponding input **[F].**

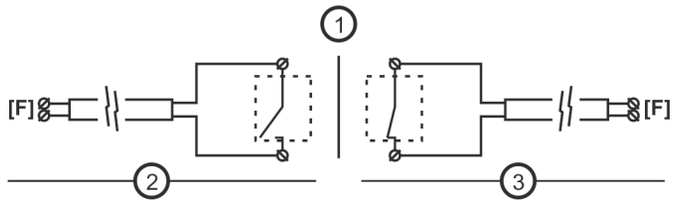




[F] Configuration EX:

Auto = ON
External / internal control enabled.
Production stops when the controller reading is above the setpoint value.

Auto = OFF
External / internal control disabled.
Production does not respond to ORP or Chlorine PPM readings.



① **External Control ORP / PPM.** Set [AUTO] [ON] to enable
② External contact OPEN → Electrolysis system STOPPED.
③ External contact CLOSED → Electrolysis system ON.

IMPORTANT: in the case of equipment with integrated ORP control or integrated PPMs, this input is not operative (Disabled).

Fig.18

Connection of the dosing pump

The systems have a connector on their base for the connection of a dosing pump for controlling the pH of the pool water. The dosing pump can be connected via the CEE22 connector supplied for this purpose together with the equipment (Fig.19).

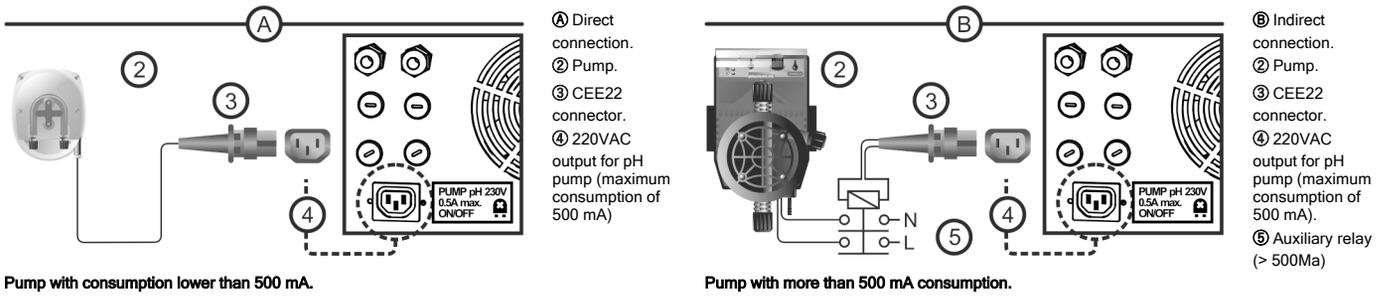
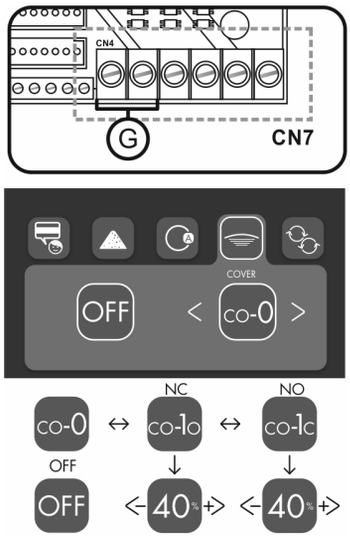


Fig.19

AUTOMATIC COVER CONTROL: input for potential-free contact. This input enables programming reduction of the system output current to a percentage of its nominal value depending on the status of the corresponding contact located at the automatic cover´s electric panel and connected to this input.

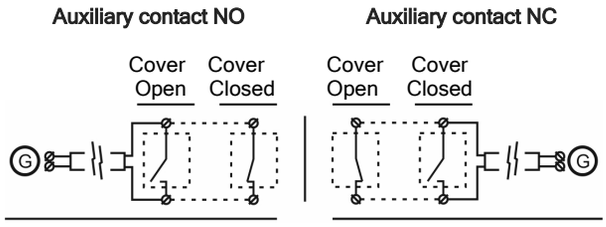


[G] Cover control configuration:

COVERAGE = CO_0 (OFF)
Deactivated

COVERAGE = CO_1O (10 ... .90%)
Active 1O.

COVERAGE = CO_1C (10 ... .90%)
Active 1C.

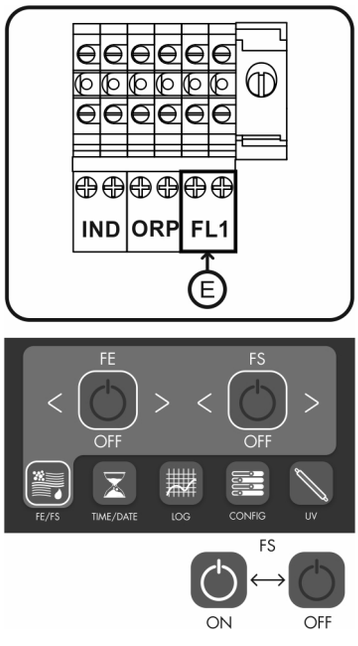


CO = CO_1C
Set **[CO]** to **[co1o]**. Production is reduced with closed auxiliary contact. (Cover closed)

CO = CO_1O
Set **[CO]** to **[co1c]**. Production is reduced with open auxiliary contact. (Cover closed)

Fig.20

EXTERNAL FLOW DETECTOR (FLOW SWITCH): input for potential-free contact. Wire the external flow detector to the corresponding terminals **[E]**. Set **[FS]** parameter to enable or disable this option (enabled by default).

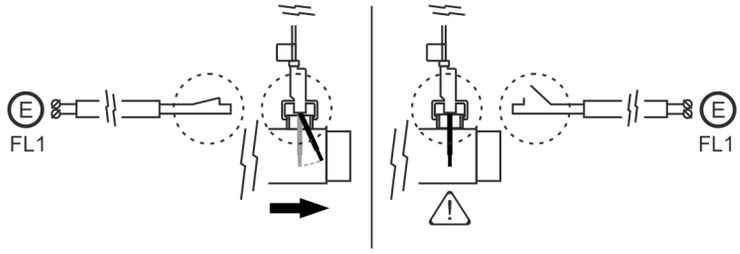


Menu PROD / FE / FS

[E] Configuration:

FS = ON
Enabled

FS = OFF
Disabled

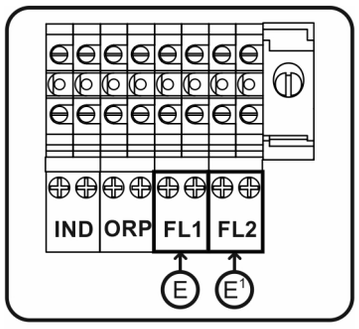


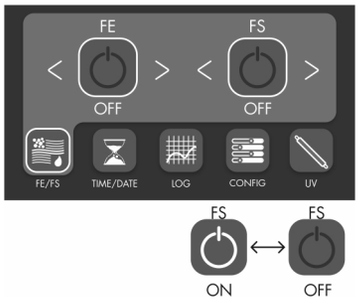
FS:ON
Closed contact flow switch:
Flow OK

FS:ON
Open contact flow switch:
Flow Alarm

Fig.21

DOUBLE EXTERNAL FLOW DETECTOR:
Connect the second flow swicth in position **[E1]**. Only in models with 2 cells.

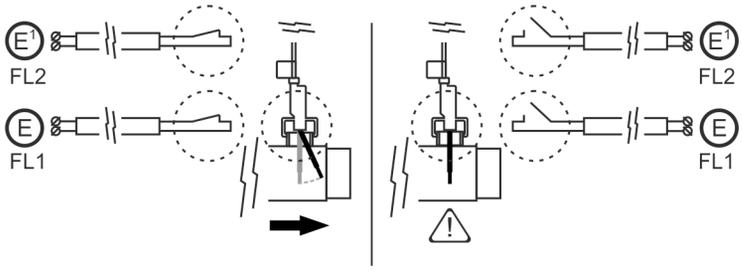




[E1]
Configuración:

FS = ON
Activated

FS = OFF
Desactivated

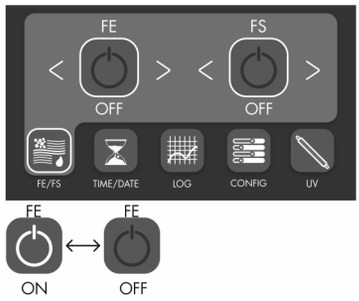


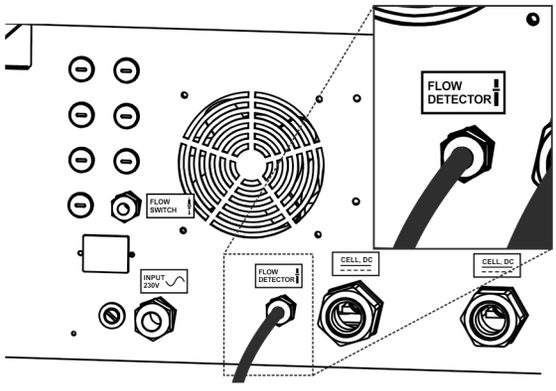
FS:ON
Flow swicth closed contacts:
Flow OK

FS:ON
Flow swicths, one or two open contacts:
Flow Alarm

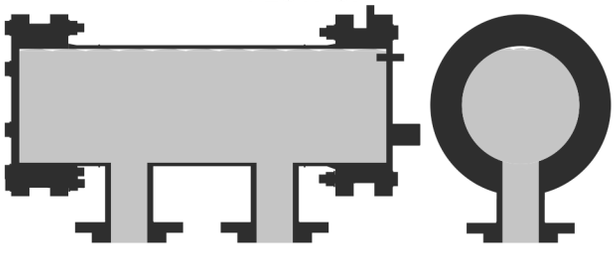
Fig. 22

EXPLICATION SENSOR LEVEL (GAS) / FLOW DETECTOR:

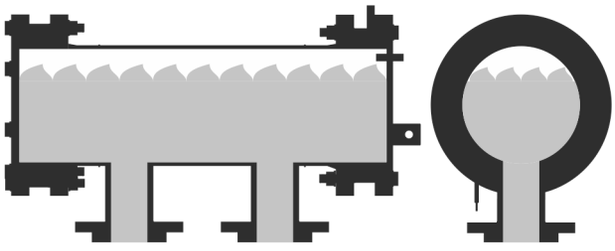




FLOW OK



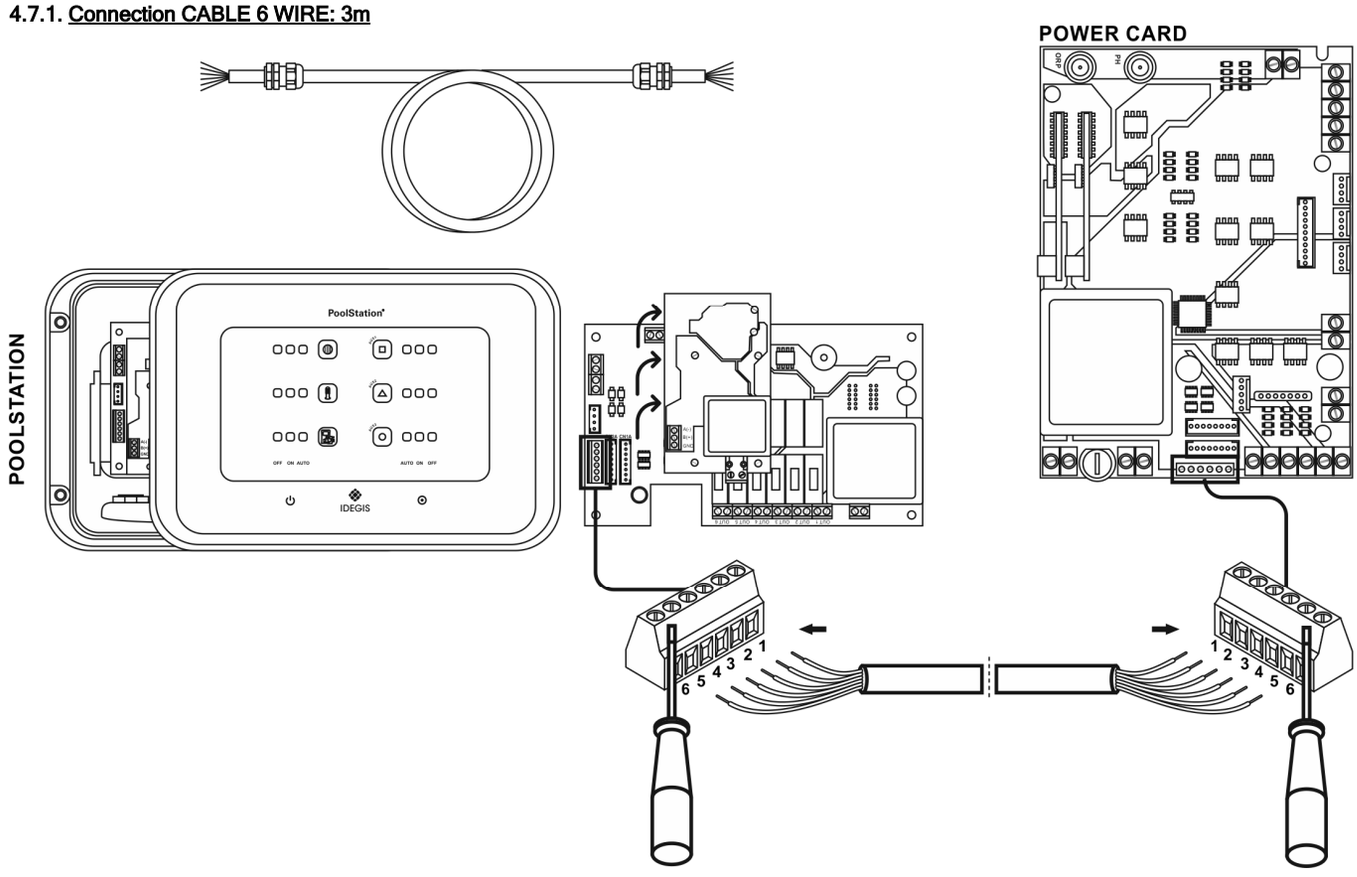
NO FLOW / ALARM



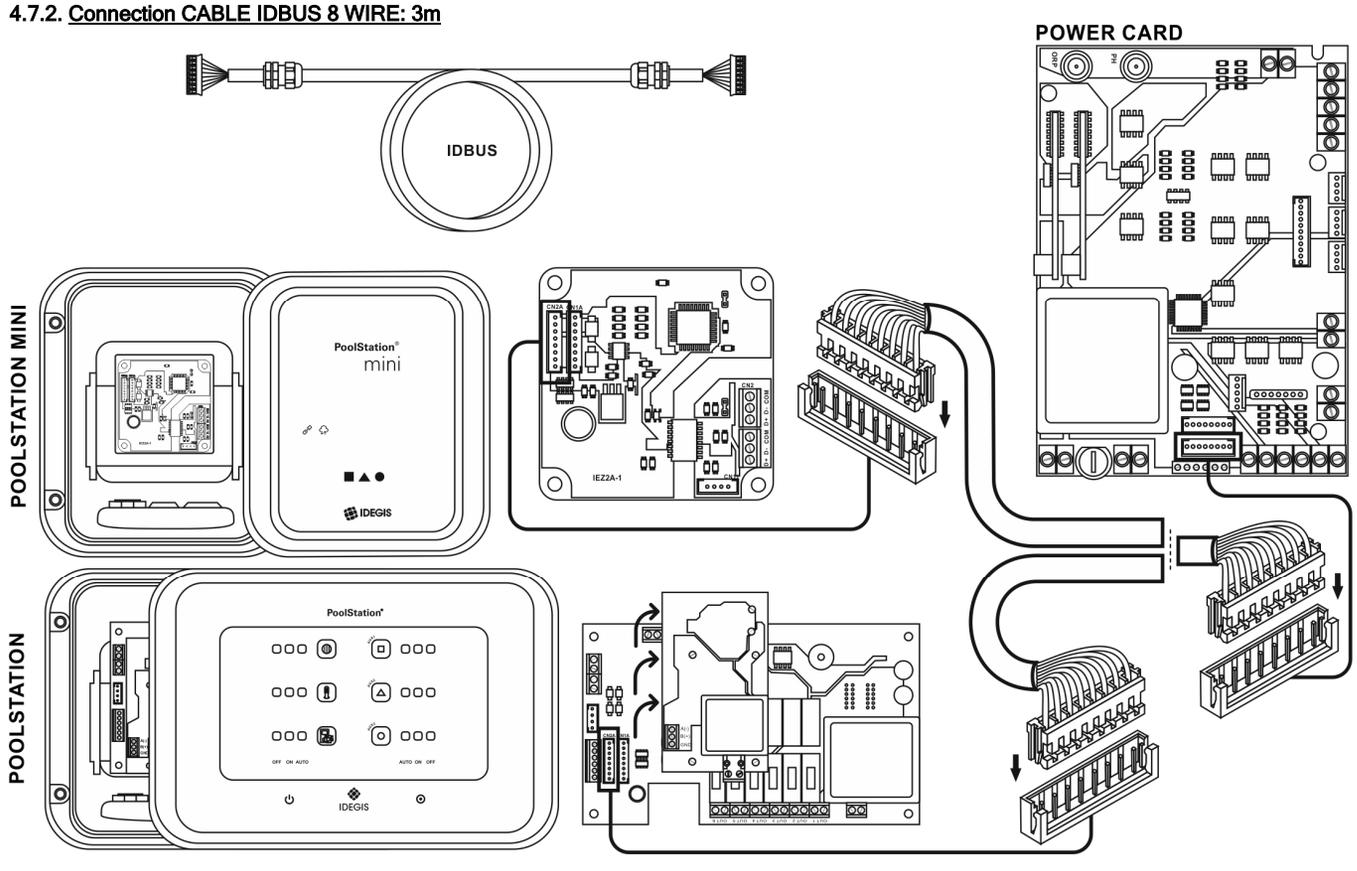
The flow detector system (gas detector) is activated in case there is no recirculation (flow) of water through the cell or that it is very low, **provided that the inlet valves to the cell are open**. If they are closed the system will not work. The evacuation of the electrolysis gas generates a bubble that electrically isolates the auxiliary electrode (electronic detection). Therefore, when introducing the electrodes into the cell, the gas detector (auxiliary electrode) should be located at the top of the cell. The safest layout is the recommended installation diagram. To avoid excessive vibration of the electrodes, they should be placed inside the cell in parallel to the water flow.

4.7. Connection POOLSTATION / POOLSTATION MINI

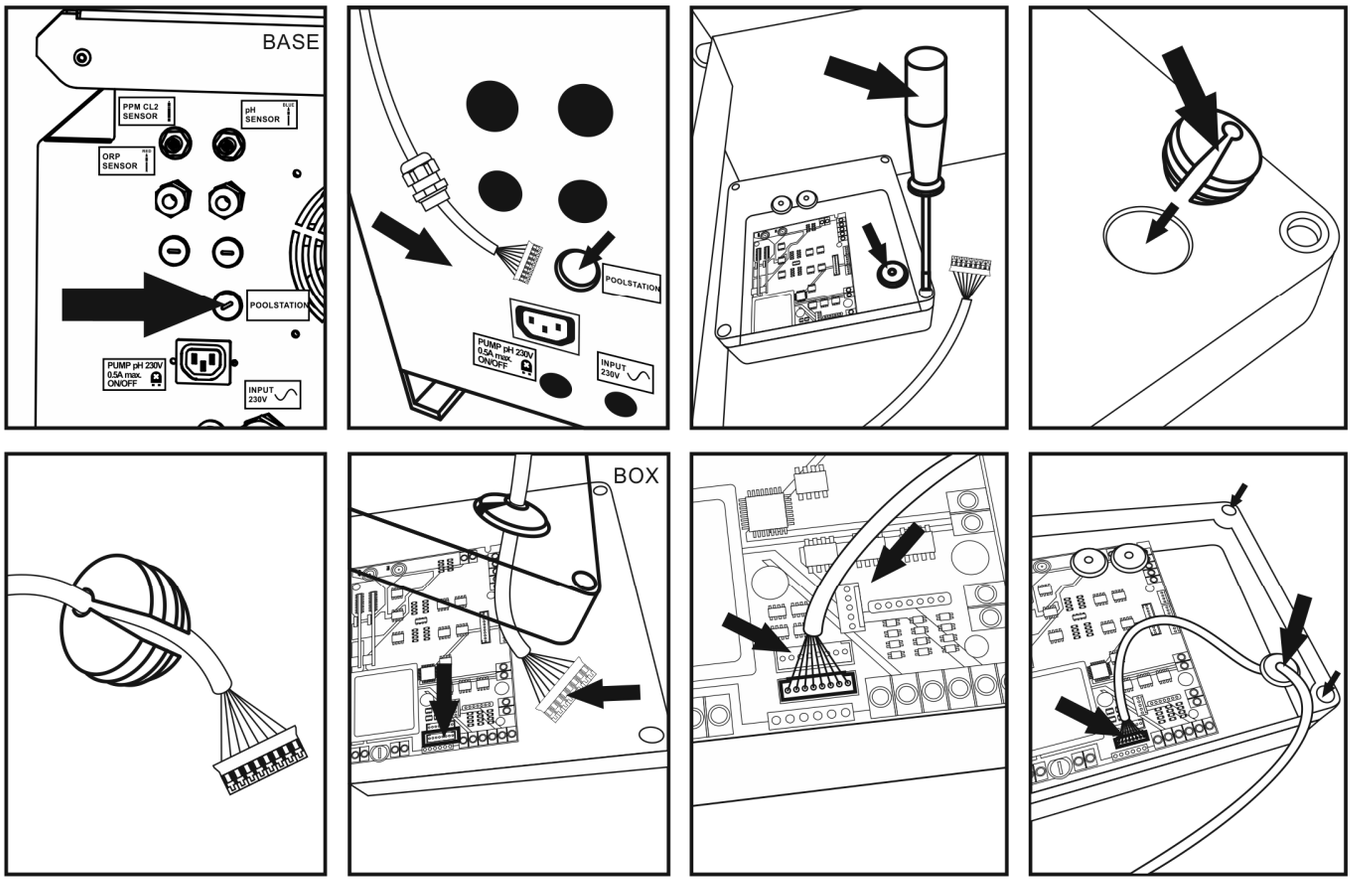
4.7.1. Connection CABLE 6 WIRE: 3m



4.7.2. Connection CABLE IDBUS 8 WIRE: 3m



4.7.3. Installation CABLE PoolStation and PoolStation MINI



4.8. 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. **If the system is version M (seawater) or water already has the necessary salt concentration, continue to Ch.6.**

Although the Electrolysis System can operate within a salinity range of 4-6 g/l, the minimum recommended level of salt, 5-6 g/l, should be maintained adding 5-6 Kg. per m^3 of water if the water did not previously contain salt. In the case of LS models, the range of recommended salinity is 2 g/l. 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.

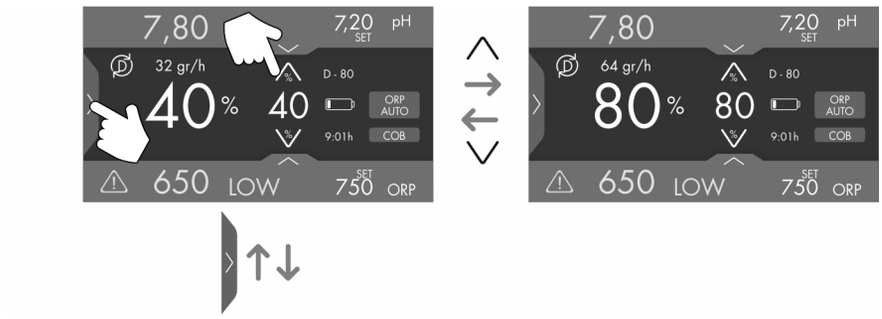
7. In outdoor swimming pools it is advisable to maintain a level of 25-30 g/m^3 of chlorine stabiliser (cyanuric acid) in the waterl. A level of 75 $g./m^3$ should be never exceeded. This will help to stop the chlorine that is in the water from being destroyed by the sun.

5. OPERATION:

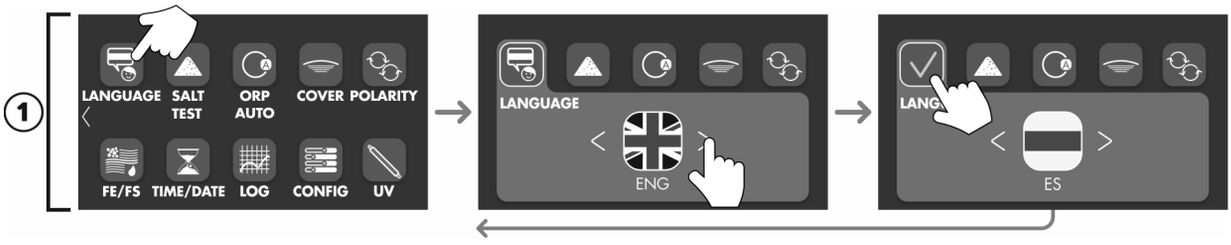
5.1. System configuration menu

To modify the operating parameters of the system, you must enter in the programming mode according to the following flowsheet.

Main menu **Set production**



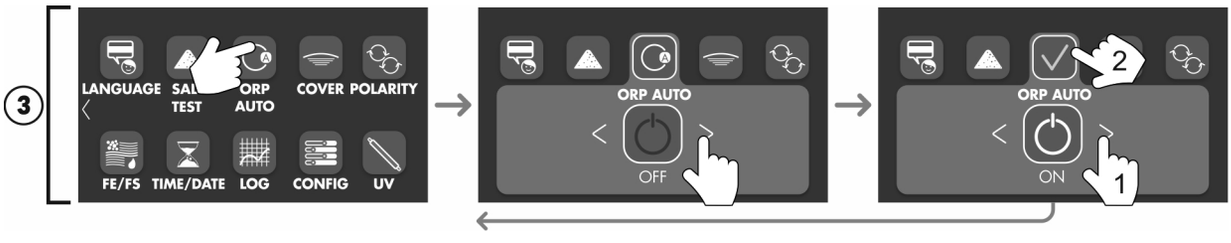
Languages



ES...ENG...FRA...DEU...ITA...POR, 6 available.

Salt Test qualitative information test function

Mode ORP / PPM AUTO (ON) / AUTO (OFF)



ORP / PPM Auto OFF: Manual Control

(I do not stop electrolysis by setpoint or external control, Fig.18)

ORP / PPM Auto ON: Automatic control.

(Stop electrolysis by setpoint or external control, Fig.18)

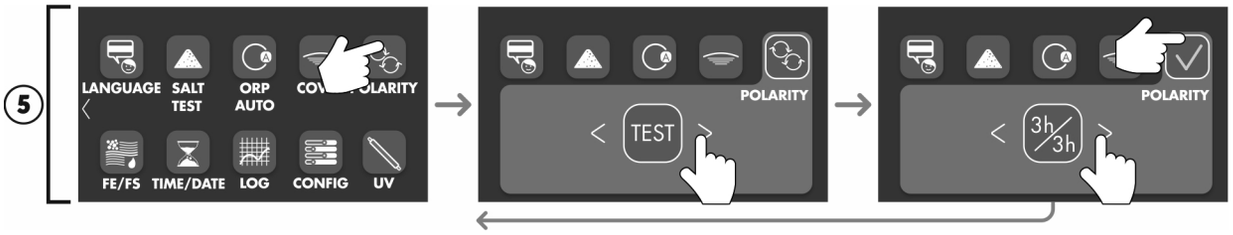
Cover configuration

co-0: deactivated (Fig.20)

co-1o: activated 1o = reduces production with open contact (10 ... 90%)

co-1c: activated 1c = reduces production with closed contact (10..90%).

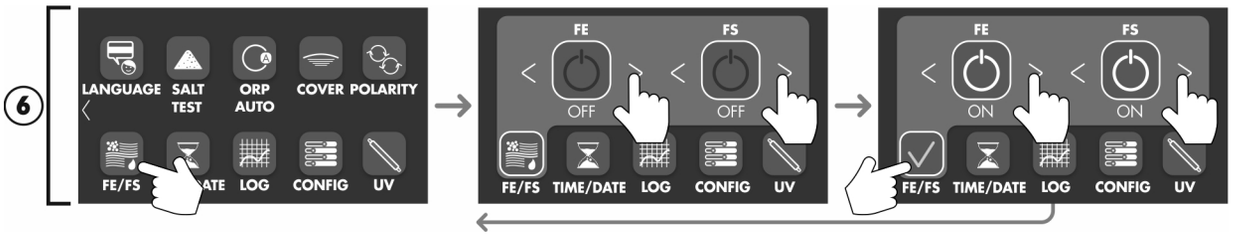
Polarity change



3h / 3h: change every 3 hours (factory value) **2h / 2h:** change every 2 hours.

Test: change every 2 minutes (only for verification for a short period of time, as it could damage the electrodes).

Flow detectors (FE gas and FS flow switch)



Gas detector:

OFF: Disable

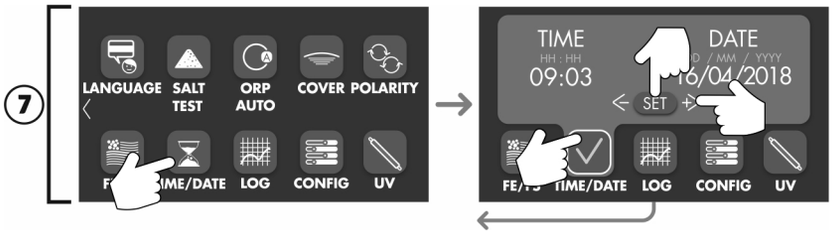
ON: Activated. Gas detector activated (Fig.5) Factory value.

Flow switch:

OFF: Disable.

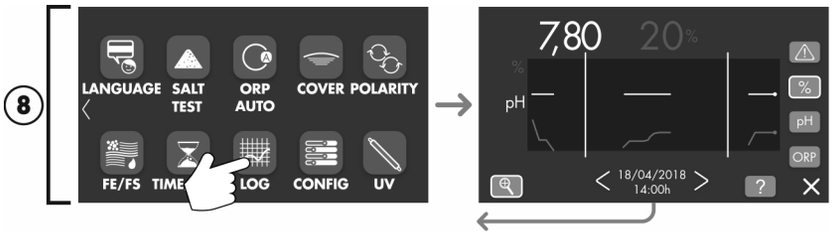
ON: Activated.(Fig.21) Factory value.

Clock: Time / Day / Month / Year



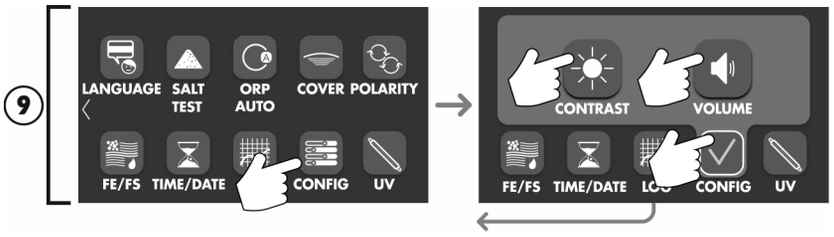
"**TIME:** MINUTES" & "**DAY:** MONTH: YEAR"

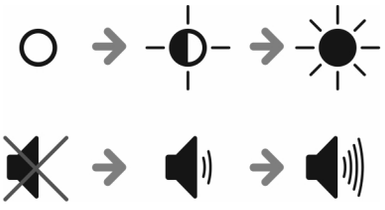
Historical



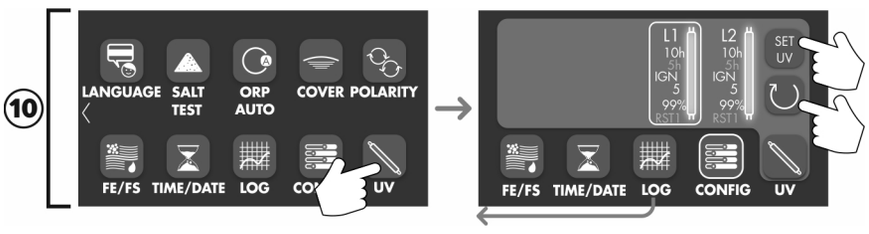
	Information 28 days / 28 hours
⚠	Alarms
%	% Production and Setpoint electrolysis
pH	PH value and Setpoint
ORP	Value ORP and Setpoint

Volume and Contrast





UV (NEOLYSIS)



Lamp 1
Partial hours
Total hours
Nº. Ignitions
% operating hours
Reset
UV SET: UV lamp selection.
RESET PARTIAL HOURS:
Keep pressed until blinking.

5.2. Programming the desired pH value.

Calibration of the PH sensor [EXT-1(E), EXT-2]

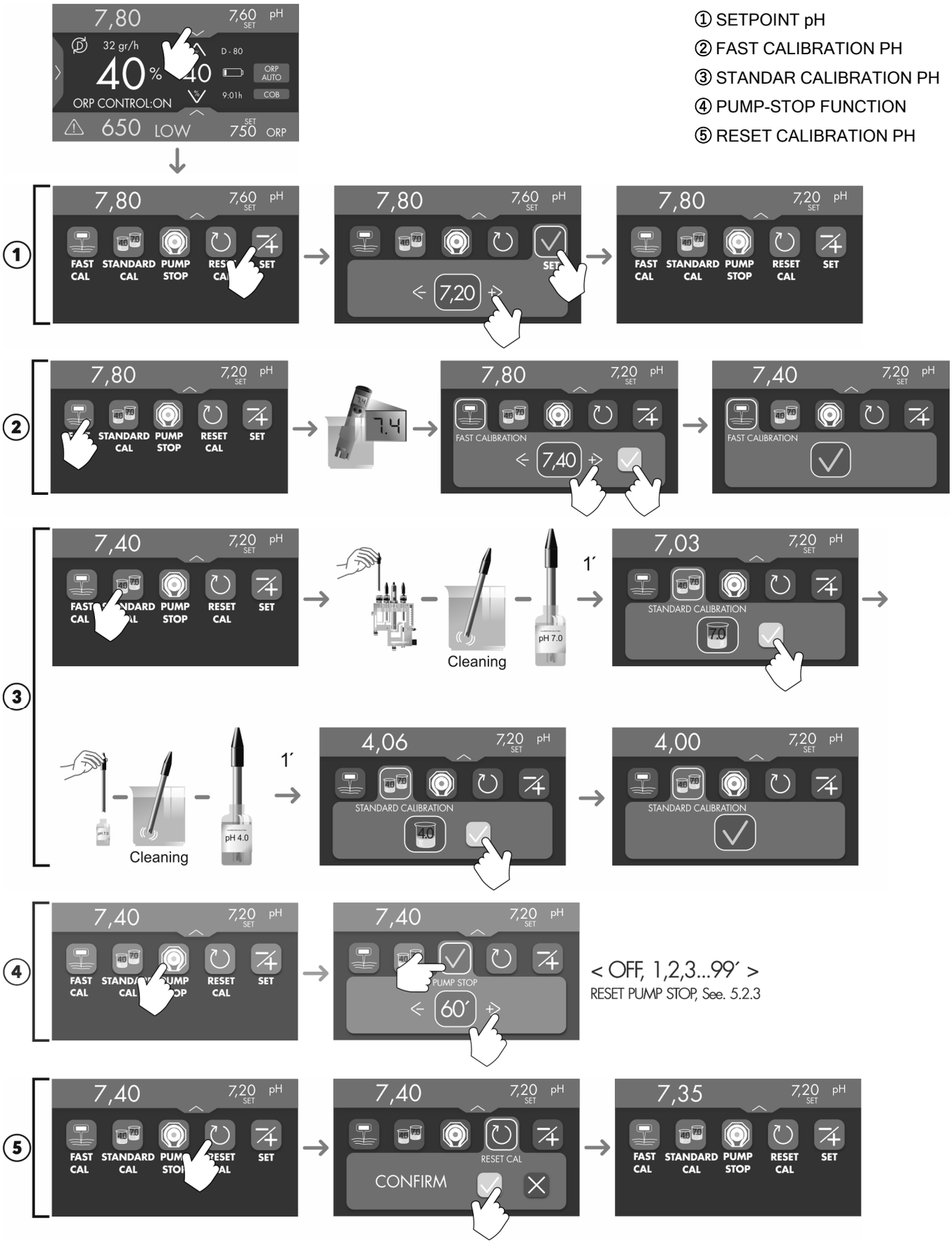


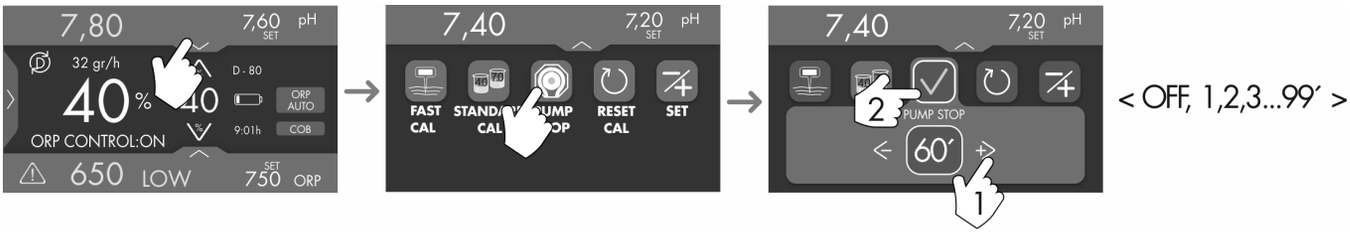
Fig.23

5.2.1.“PUMP-STOP” FUNCTION

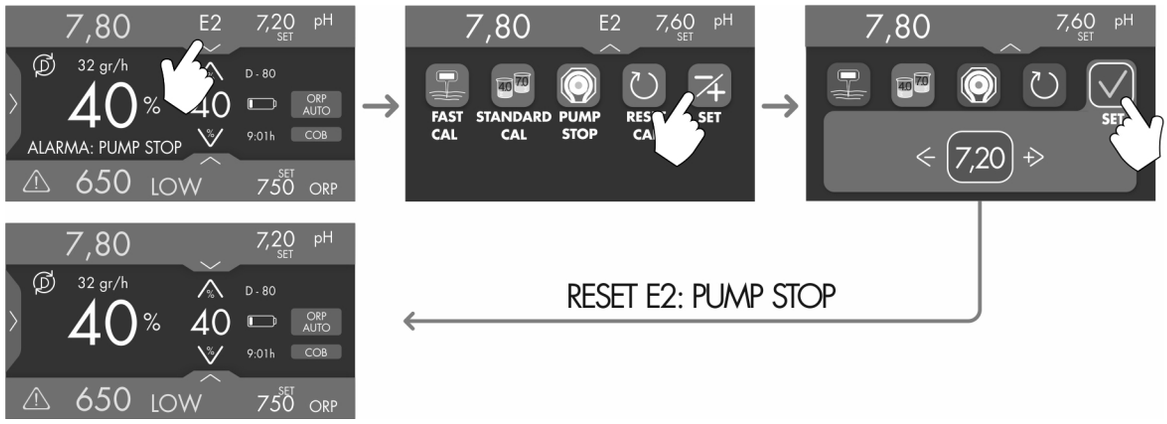
The integrated pH controller has a safety system (PUMP-STOP function) that monitors the pump operation avoiding the following dangerous situations:

- Damage to the pump due to dry running (exhausted pH-minus product).
- Overdosage of pH-minus product (damaged or expired sensor).
- pH regulation problems due to high alkalinity in the water (pool filling, high carbonate levels).

The PUMP-STOP FUNCTION is set at the factory to 60 MINUTES of safety time (PUMP STOP: 60). To modify this value, perform the following procedure:



When the PUMP-STOP FUNCTION is activated (PUMP STOP other than OFF), the system will stop the dosing pump after the programmed time (PUMP STOP between 1 ... 99min) without reaching the pH setpoint value, marking "E2 : PUMP STOP”. The pump is reactivated (RESET) by entering the "pH Programming" menu and pressing (SET):



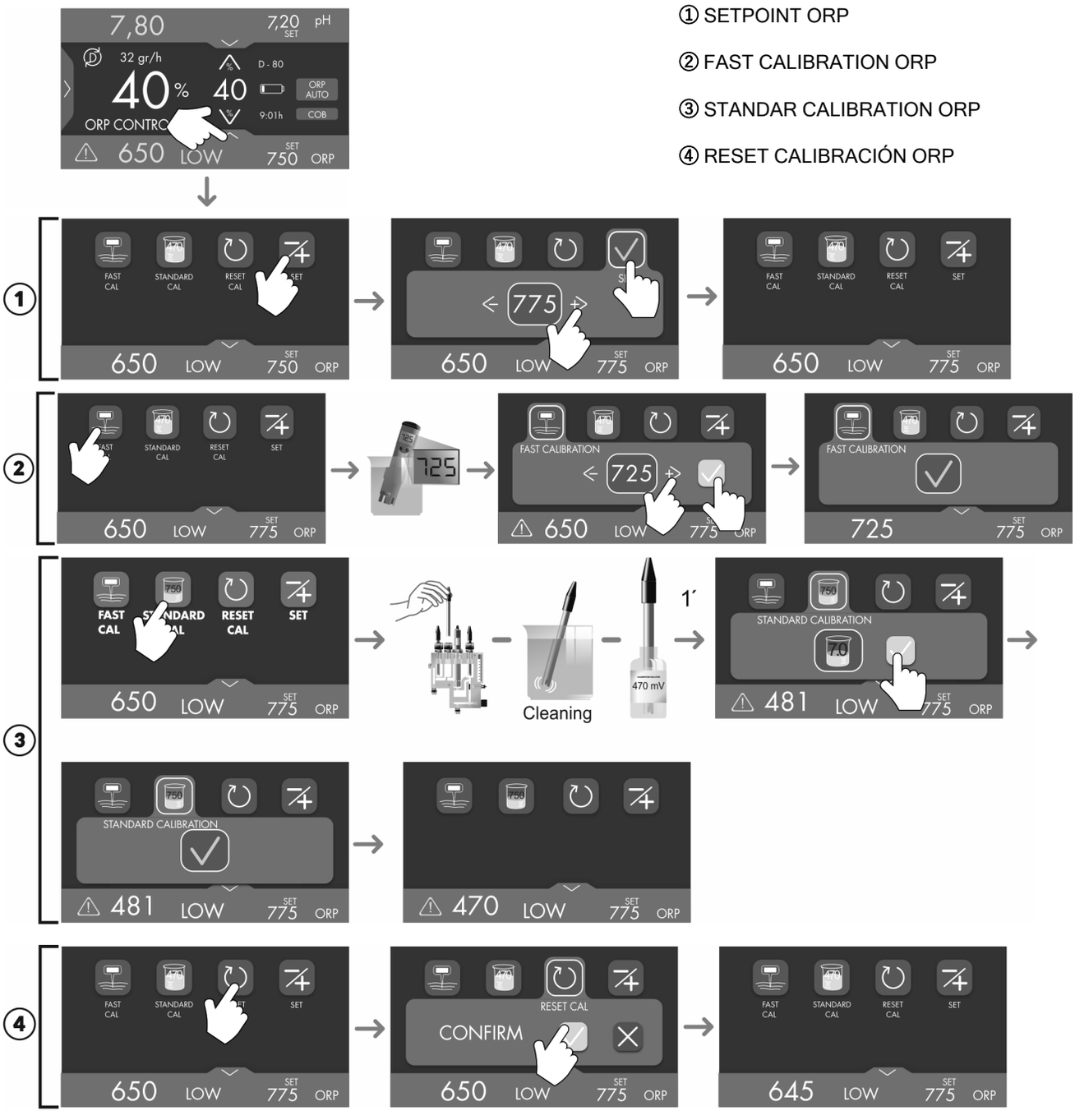
5.3. Programming the desired ORP value. Calibration of the ORP. [EXT-1 (E)]

① SETPOINT ORP

② FAST CALIBRATION ORP

③ STANDAR CALIBRATION ORP

④ RESET CALIBRACIÓN ORP



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 will appear.

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

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

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 set point 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.

5.4. Integrated FREE CHLORINE controller (EXT-2/Fig.3)

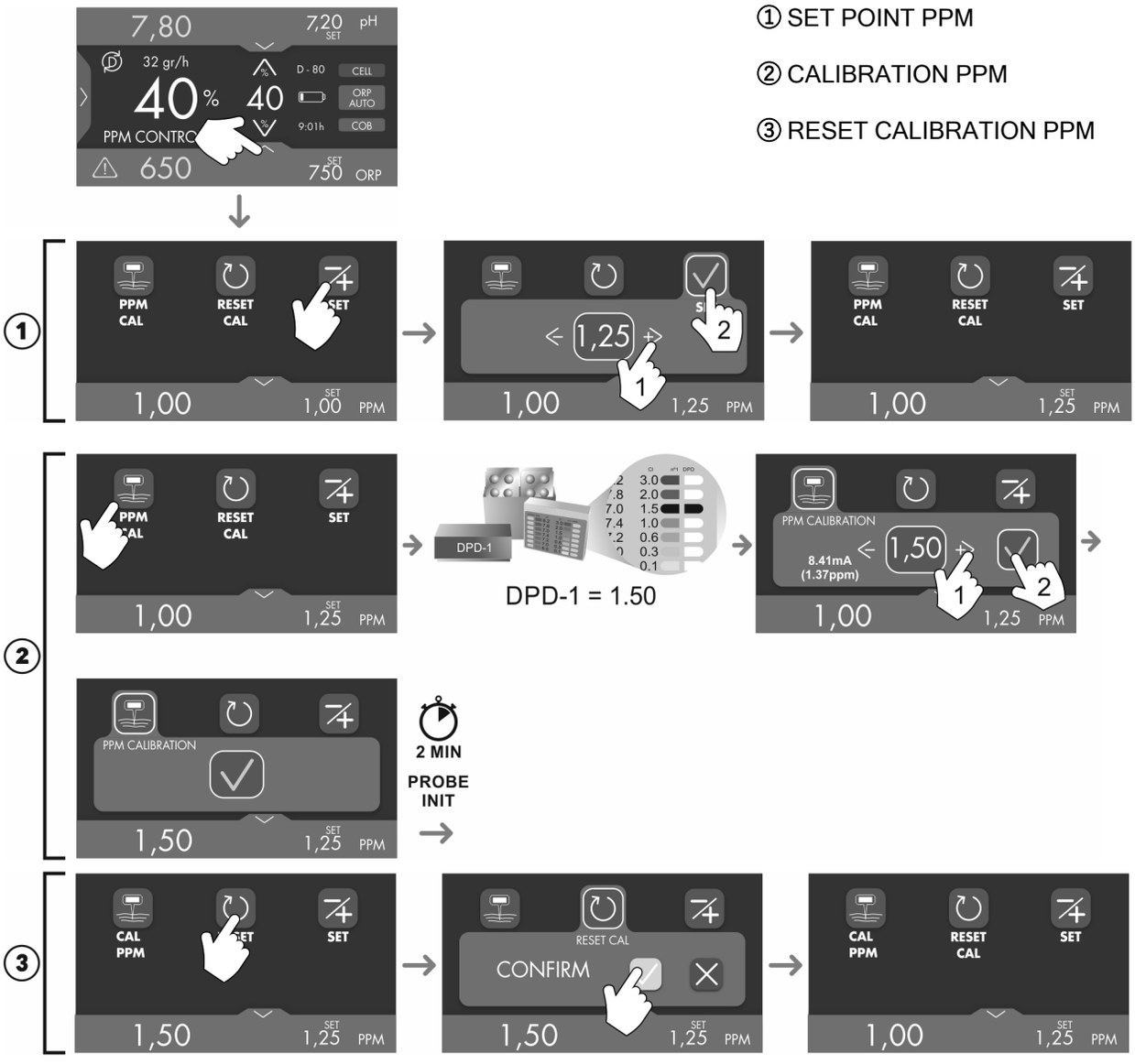
The integrated FREE CHLORINE controller is supplied with the following default programming parameters.

SET POINT = 1.00 ppm
PRODUCT = OXIDANT
HYSTERESIS= 120 seconds.
Control Parameters:
Electrolysis ON→OFF ppm >= SET POINT, HYSTERESIS 2 MINUTES.
Electrolysis OFF→ON ppm < SET POINT, HYSTERESIS 2 SECONDS.

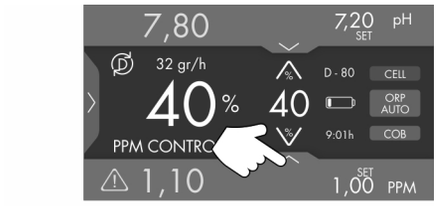
5.4.1. Inicialization

The ppm controller requires 1-2 minutes to reach stabilization after flow alarm or switch-on. The message “INIT PROBE” will be displayed.

5.4.2. Programming CHLORINE (PPM). Calibracition of the sonda.



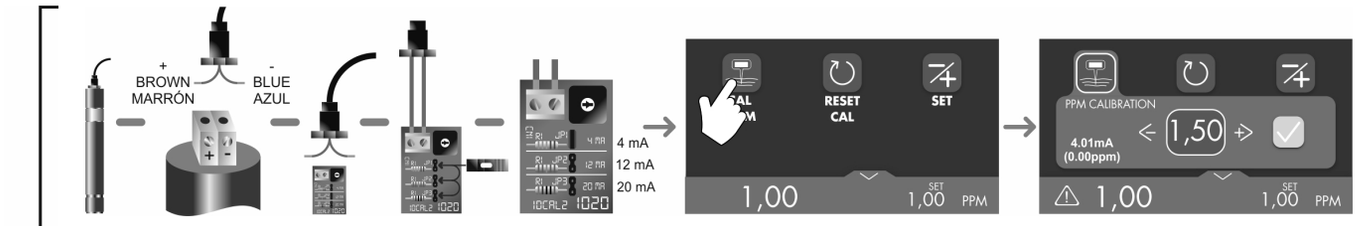
5.4.3. Checking the CHLORINE (ppm) controller with the ID-CAL board.



① CALIBRATION RESET PPM

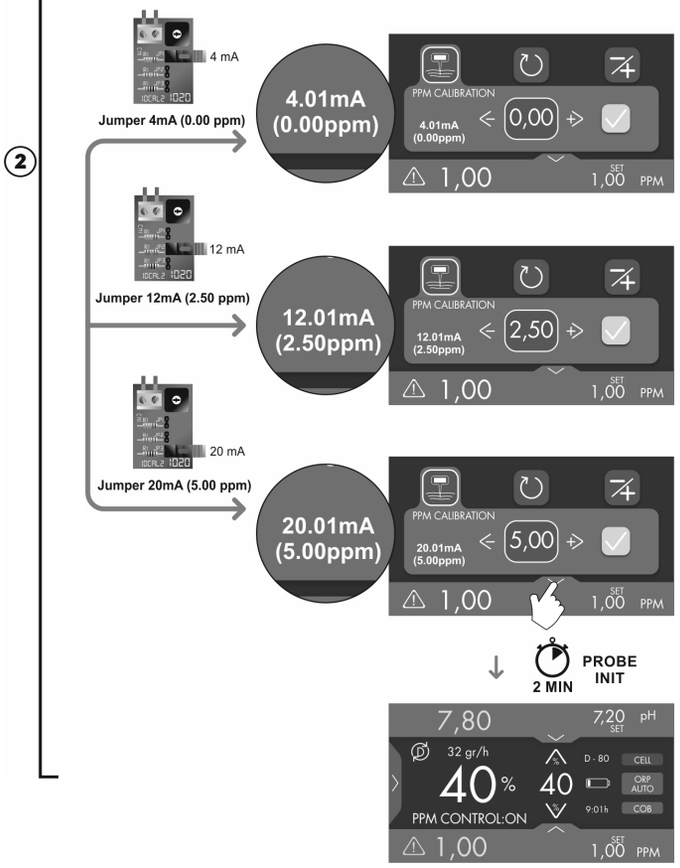
② CHECK WITH IDCAL

4 mA (0.00 ppm) ... 20mA (5.00 ppm)



ID-CAL connect to the unit

Select “PPM Calibration” and press “Return” once you have connected the ID-CAL electronic board to the unit. Check values mA/ppm are within the permissible range when the jumper is set at 4, 12 and 20 mA:



Change jumper to 4mA.

mA= 3.90...4.01

ppm: 0.00...0.10

Change jumper to 12mA.

mA=11.90...12.01

ppm=2.40...2.60

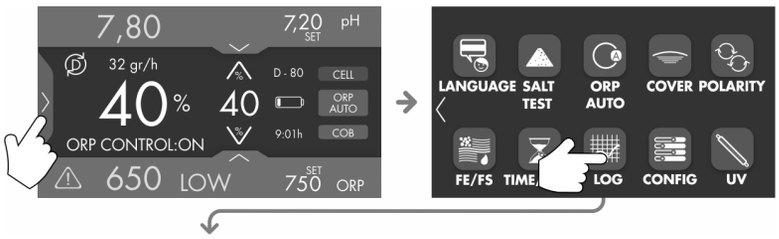
Change jumper to 20mA.

mA= 19.90...20.01

ppm= 4.90...4.10

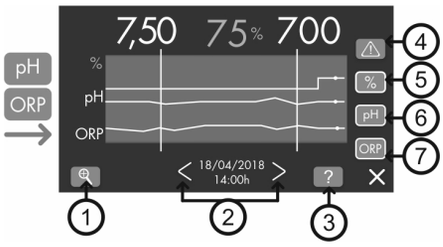
5.5.HISTORICAL:

Using the LOG function we can access the database of the unit to know the values stored on a specific date or the detected alarms.

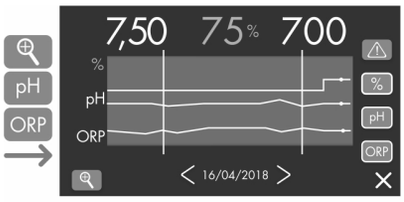


1) View 48 hours / 28 days
2) Backspace <=> Advance hours / day
3) Graphic scale (1 technique)
4) Info Alarms
5) Production
6) pH value
7) ORP/ppm
8) Setpoint
9) Alarm corrected
10) Active alarm
11) Partial hours
12) Total hours
13) Reset partial hours
14) Exit

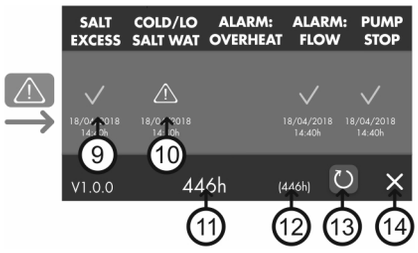
Screen 48 hours and Parameters



Screen 28 Days and Parameters

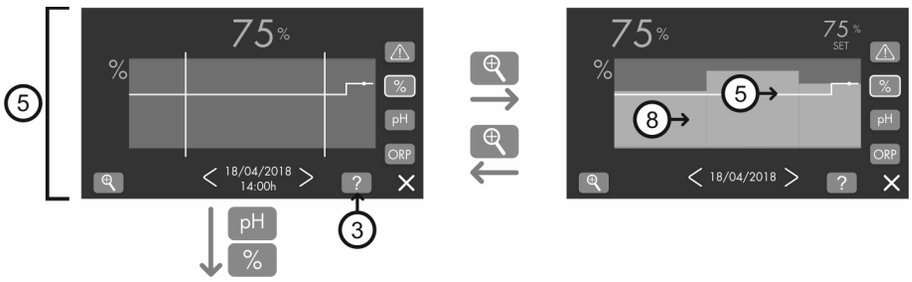


Alarm screen

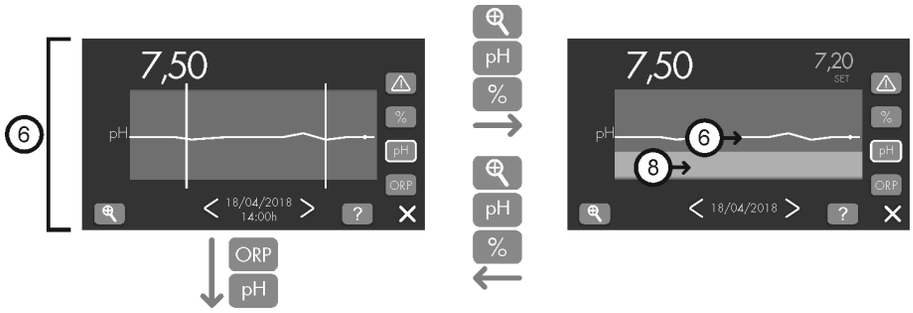


Screen 48 hours & 1 Parameter

Screen 28 Days & 1 Parameter



Production

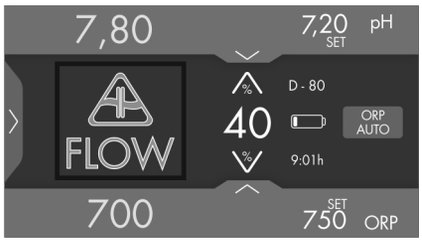


pH

ORP/ppm

5.6. Alarms and System Messages

5.6.1. FLOW ALARM (GAS, FLOW SWITCH OR INDUCTIVE) See.4.6.1.)



GAS: System is supplied with an integrated flow sensor based on detection of gas bubbles inside the electrolysis cell. This sensor allows to detect if there is sufficient water flow to ensure proper system operation. If flow is not enough, system will show **"FLOW"** alarm. See page 18.

IMPORTANT: This sensor does not work if the cell inlet and outlet valves are closed. In this case, if the electrolysis system is running and the valves closed, an overpressure will be caused inside the cell that will cause the cell to break.

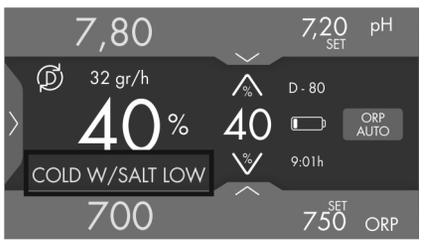
FLOW SWITCH: The system also integrates an extra mechanical flow sensor (flow switch). This sensor must be installed to improve security and it would also be able to detect entry valve closing. See page 17.

INDUCTION: In EXT-1E and EXT-2 systems (see installation diagram, Fig.3) the sensor holder includes an additional flow sensor (inductive sensor) that also stops the electrolysis system in absence of flow.

5.6.2. SALINITY ALARM

This alarm may appear in the following circumstances:

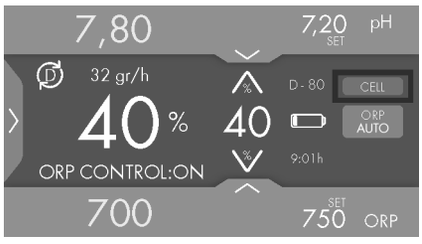
High conductivity: an excess of salt has been added. The message "EXCESS SALT" appears in the message bar of the display.



Low conductivity: cold water or low salt. The message "COLD WATER / SALT LOW" on display message bar also appears.

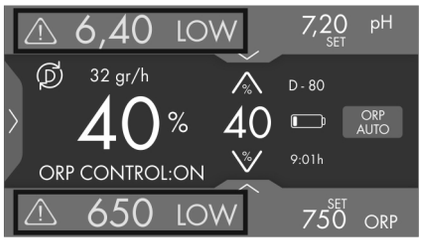
5.6.3. CELL ALARM

The system has an alarm to indicate malfunction in the electrodes of the electrolysis cell. This malfunction will normally be due to the passivation process of the electrodes once the end of their useful life has been reached. However, despite being a self-cleaning system, this malfunction could also be due to the excessive formation of incrustations on the electrodes if the system is operated in waters of high hardness and high pH.



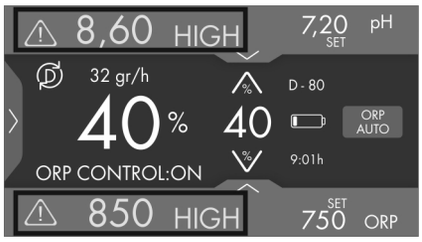
The electrodes are deactivated and it is necessary to replace them, "CELL" appears.See hours electrodes (5.5 Historical).

5.6.4. ALARM PH / ORP / CHLORINE LOW



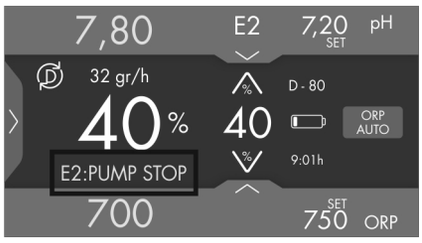
The integrated pH / ORP (mV) / CHLORINE (ppm) controller has an ALARM signal that is activated when an anomalous value outside the range is detected, lower than pH 6.5 / ORP 650 / CHLORINE 0.3.

5.6.5. ALARM PH / ORP / CHLORINE HIGH



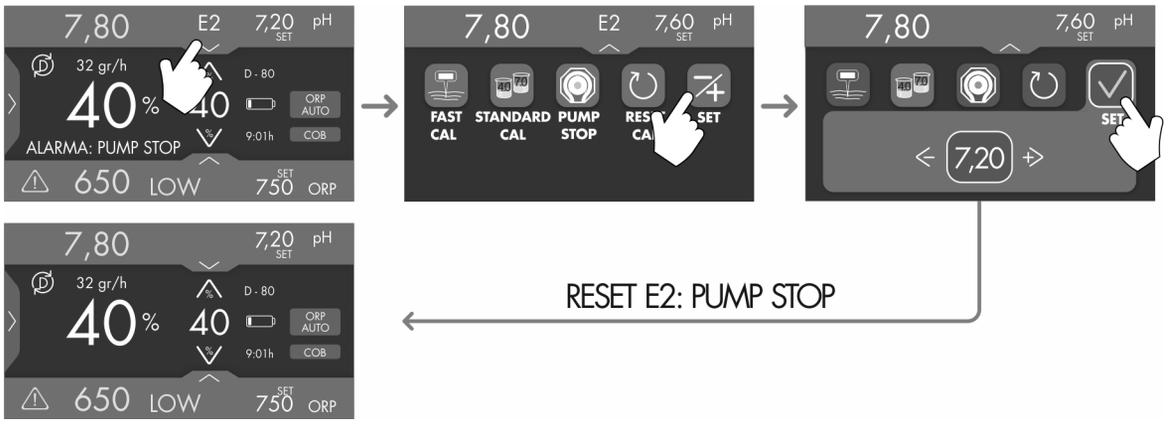
The integrated pH / ORP (mV) / CHLORINE (ppm) controller has an ALARM signal that is activated when an anomalous value outside the range is detected, greater than pH 8.5 / ORP 850 / CHLORINE 3.5. For safety reasons at pH> 8.5 (HIGH) the pH dosage is stopped.

5.6.6. ALARM PUMP-STOP

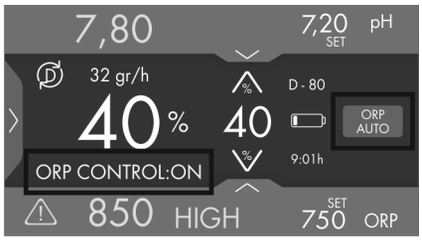


The integrated pH controller has an ALARM signal that activates and stops the pump, when a dosing time exceeding 60 minutes (factory) or programmed (1-99min) is exceeded.

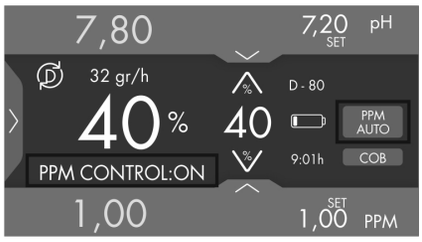
When the alarm set PUMP STOP is activated (stops dosing), entering the "pH Programming" menu and pressing (SET), resets:



5.6.7. SYSTEM MESSAGES

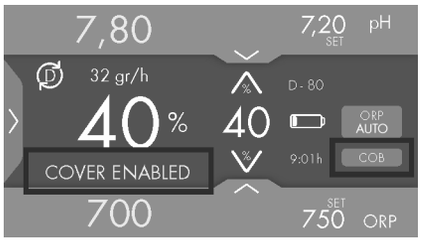


The ORP control has been activated from the system configuration menu.
(Ch.5.1/3)



PPM control has been activated from the system configuration menu.
(Ch.5.1/3)

5.6.8. COVER



The cover control is activated.
(Ch.5.1/4)

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. Unlock and remove the electrode package .
4. 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.
5. 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. EX and EX-M models: prolonged operation of the system at salinities lower than 3 g/l will cause a premature wear of the electrodes.
4. EX-LS models: prolonged operation at salinities of lower than 0.5 gr/l of sodium chloride can cause premature wear of the electrodes.
5. 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

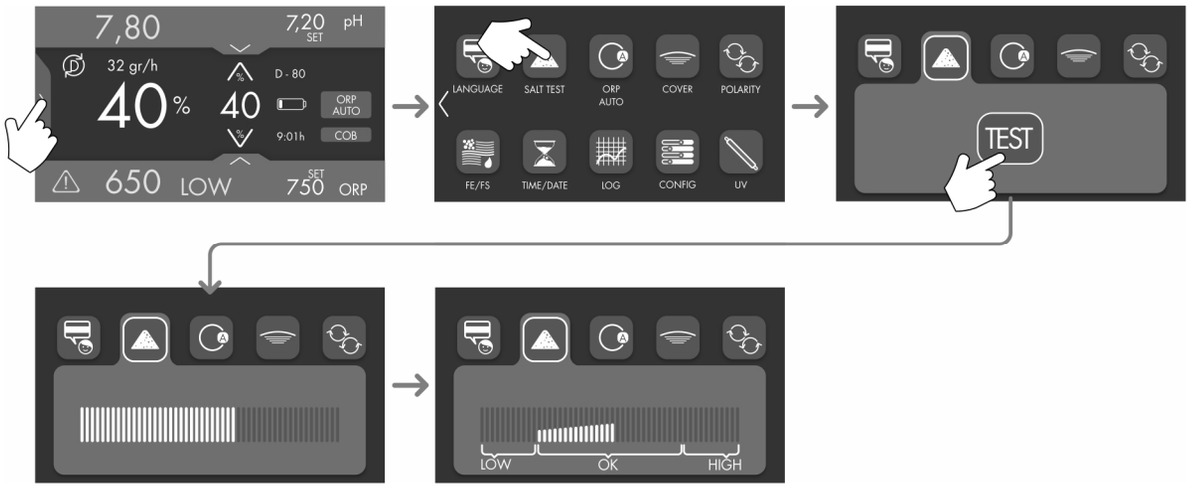
The recommended salt concentration is 5-6 gr/l of sodium chlorine (NaCl). If **"COLD WATER – LOW SALT"** alarm appears in the message bar of the screen, salt addition to the pool may be needed.

If the electrodes are in good condition please proceed as follows:

1. If the water temperature is between 24°C and 30°C, add salt gradually until the disappearance of the alarm.
2. At temperatures below 24°C (cold water), this alarm may appear even if the salinity level is right because a diminution in the water conductivity is interpreted by the system as loss of salinity. In this situation, if the pool is in use, add the necessary salt until the disappearance of the alarm. If the pool is in a non-use period it is advisable to reduce the chlorine production to 50% and also reduce the filtration time. With these actions the alarm will disappear and the electrode lifetime will be maximized.

To allow proper monitoring of the salinity of the water, we recommend using a portable conductivity/temperature meter, or other similar device. The type of salt recommended for use in swimming pools with electrolysis system should not contain any additives (iodide, anti-caking, etc.), and should be suitable for human consumption.

⚠ **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-2

6.3. Calibration of the FREE CHLORINE sensor

The controller has an automatic calibration of the potentiostatic sensor, which require previous knowledge of the free chlorine concentration in the water. That concentration at calibration time should be in the range of 0.01 to 5.00 ppm, although it is not recommended to calibrate with too low chlorine values (< 0.50 ppm) (Ch.5.4).

It is very important to ensure that the chlorine reading at calibration time is stable. For example, it is not possible to correctly calibrate after chlorine powder addition to the pool.

The system will not allow the calibration process if the controller has been connected with water flowing through the sensor holder for less than two minutes, or if the water flow through the sensor holder is too low.

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

ERROR MESSAGES:

E1

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 will appear.

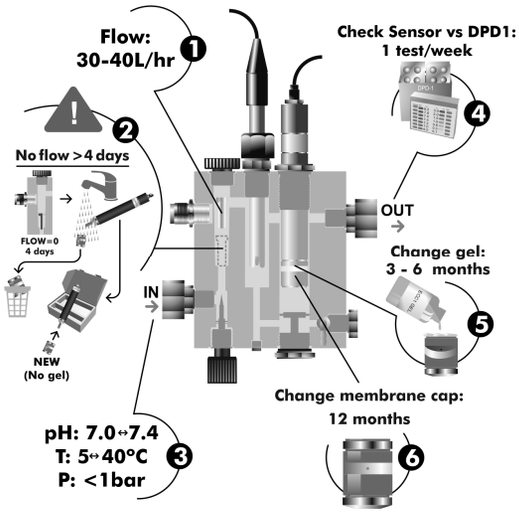
E2

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

E3

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

6.4. Maintenance of the CHLORINE sensor



❶ FLOW: 30 … 40 l/h

❷ No FLOW for more than 4 days → store the sensor with a new membrane (without gel).

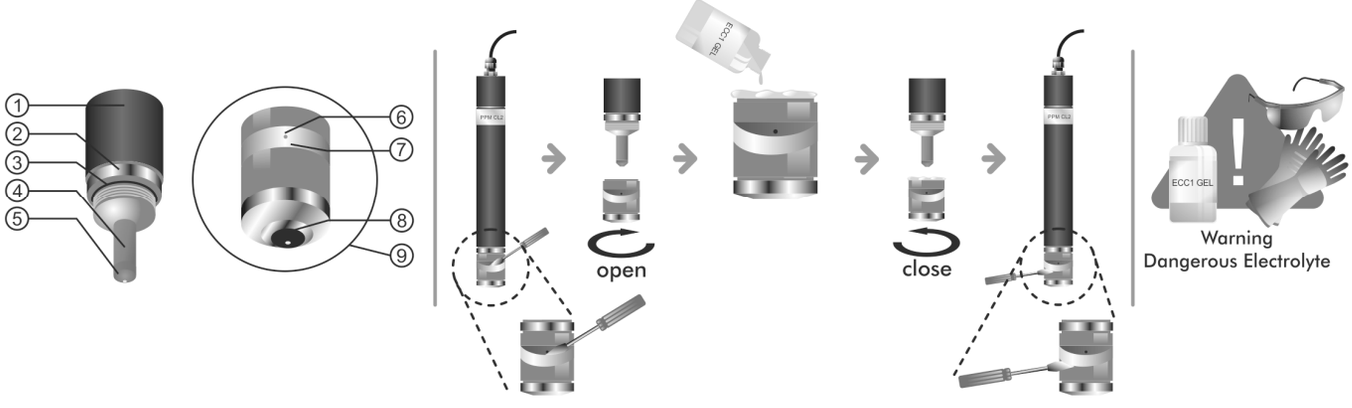
❸ pH: 7.0 .. 7.4
Temperature: 5 … 40°C
Pressure: 1 bar max.

❹ Check sensor vs. DPD1: once/week

❺ Change gel: every 3-6 months

❻ Change membrane: every 12 months

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:



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.
- 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.
- 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 greatly depend 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.

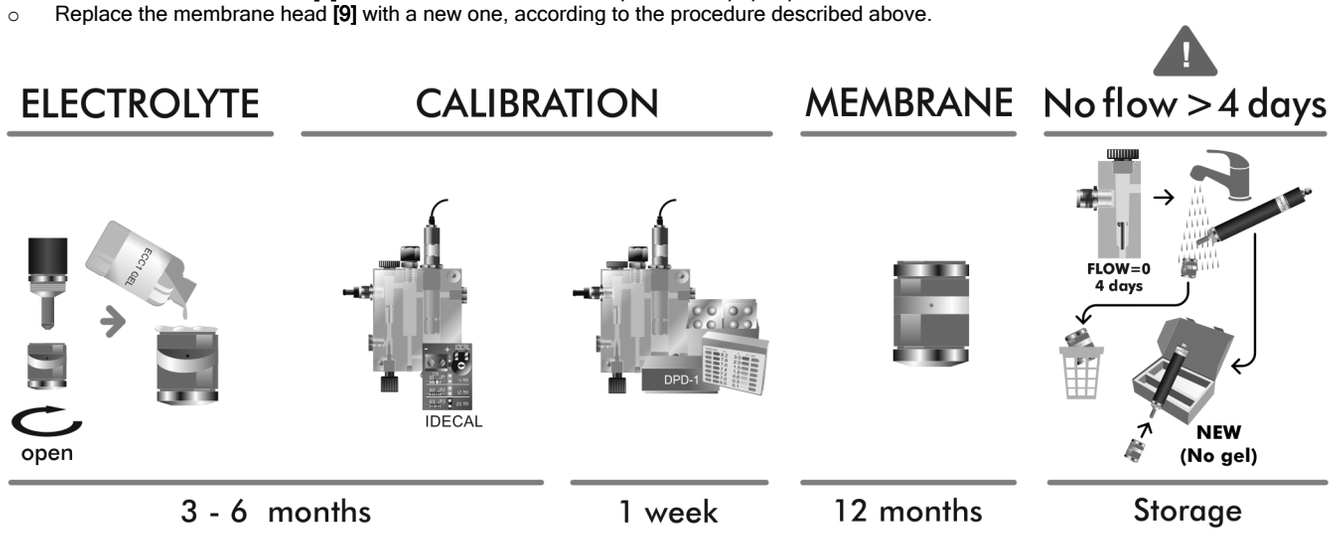
If storage or transport of the sensor is necessary, please proceed as follows:

Procedure for the storage of the sensor:

- It is mandatory to properly store the sensor for non-use periods of the unit or if it is going to be more than 4 days without flow.
- Use a small screwdriver or similar tool to remove the transparent cover **[7]** that protects the bleed hole **[6]**, and move it to one side, so that the bleed hole **[6]** is accessible.
- Unscrew the membrane head **[9]** from the sensor body **[1]**.
- Rinse the active parts of the sensor **[4,5]** with distilled water, removing all traces of electrolyte, and allow to dry.
- 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.



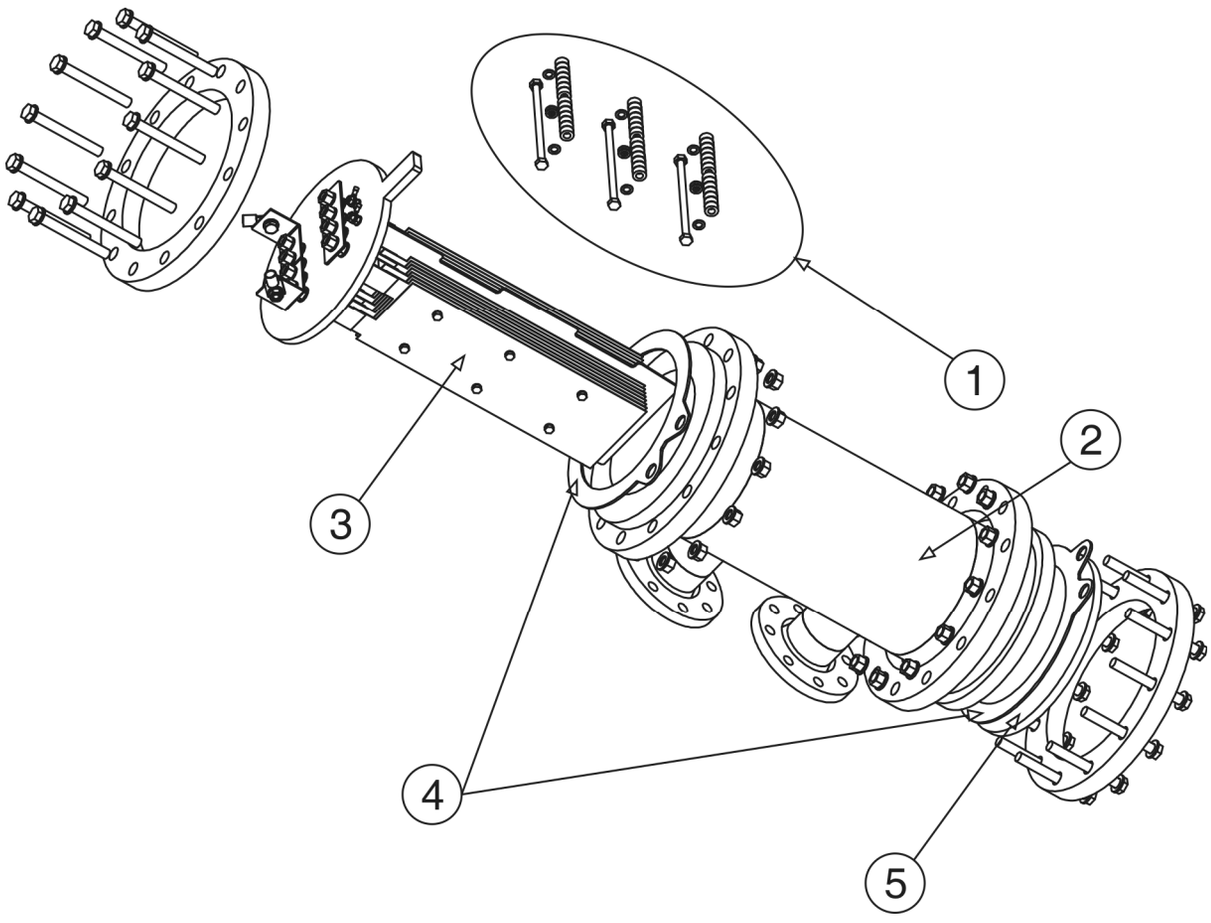
7. TROUBLESHOOTING:

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 the mains in the command box of the pump. Check the estate of the fuse located at the bottom of the power supply or the circuit breaker located inside.
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 electrostatically 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 readings (ppm) too different from the real value	Wrong calibration. Repeat the system calibration according to the procedure described in Ch.5.4. Calibrate the system more frequently.
CHLORINE reading (ppm) too low, not allowing system calibration by DPD.	Deposits have been generated on the sensor electrode. Clean the probe as described in Ch.6.4 Insufficient flow (less than 30 l/h.). Increase the flow turning the regulation valve at the sensor holder.
CHLORINE reading (ppm) too low and unstable	Damaged membrane: the internal gel is contaminated. Change the membrane as described in Ch.6.4. 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 Ch.6.4

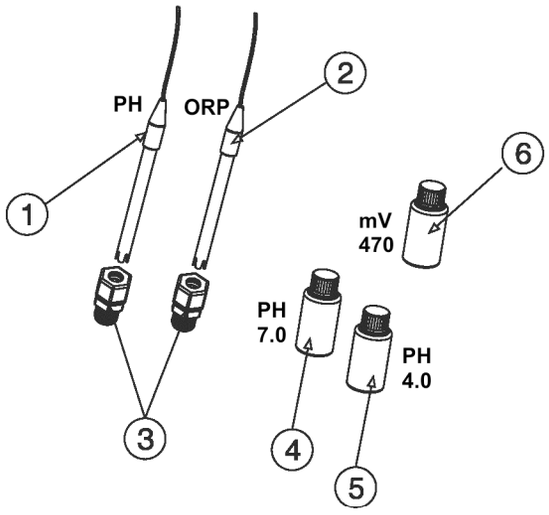
ELECTROLYSIS CELL



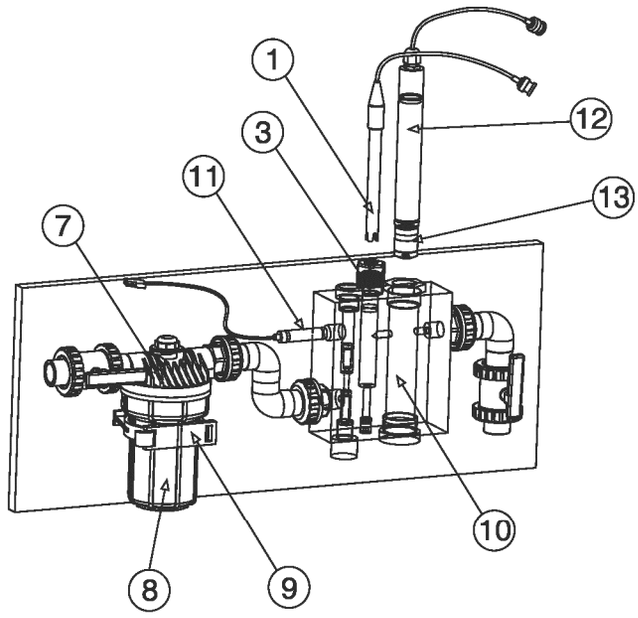
ID	CODE	DESCRIPTION	MOD. 50/50LS		MOD. 80/80LS		MOD. 120/120LS		MOD. 180/180LS		MOD. 300/300LS		MOD. 600
1	R-TORN 12 R-TORN 16	SCREW SET FIX ELECTRODES MOD.80EX(LS) SCREW SET FIX ELECTRODES MOD.100/300EX(LS)[1]	X	X	X	X	X	X	X	X	X	X	X
2	R-144 R-148 R-145 R-146 R-147	ELECTRODE HOLDER CELL MOD.50EX(M) ELECTRODE HOLDER CELL MOD.80EX(M) ELECTRODE HOLDER CELL MOD.120EX(LS)(M) ELECTRODE HOLDER CELL MOD.180EX(LS)(M) ELECTRODE HOLDER CELL MOD.300EX(M)	X	X	X	X	X	X	X	X(X2)	X	X(X2)	X(X2)
3	R-114 R-115 R-116 R-117 R-118 R-119	SELF-CLEANING ELECTRODE MOD.50EX(M)[1] SELF-CLEANING ELECTRODE MOD.80EX(M)[1] SELF-CLEANING ELECTRODE MOD.120EX(M)[1] SELF-CLEANING ELECTRODE MOD.180EX(M)[1] SELF-CLEANING ELECTRODE MOD.300EX(M)[1] SELF-CLEANING ELECTRODE MOD.600EX[1]	X		X		X		X		X		X
4	R-015-08 R-015-20 R-015-21 R-015-22	CELL FLANGE GASKET MOD.50EX(LS)(M) CELL FLANGE GASKET MOD.80EX(LS)(M) CELL FLANGE GASKET MOD.100/180EX(LS)(M) CELL FLANGE GASKET MOD.250/600EX(LS)(M)	X	X	X	X	X	X	X	X	X	X	X
5	DM 134MM DM 158MM DM 267MM DM 320MM	METHACRYL. DISK 134/10 MM MOD.50EX(LS)(M) METHACRYL. DISK 158/10 MM MOD.80EX(LS)(M) METHACRYL. DISK 267/15 MM MOD.120/180EX(LS)(M) METHACRYL. DISK 320/10 MM MOD.300/600EX(LS)(M)	X	X	X	X	X	X	X	X	X	X	X

[1] LS versions: check code

CONTROL EXTENSIONS



EXT-1



EXT-1(E)

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.50/EX/EXT-1/EXT-2 (LS)(M)
230V AC - 50-60 Hz., cable: 3 x 1 mm^2 (leng. 2 m.), 1.5 A
MOD.80/EX/EXT-1/EXT-2 (LS)(M)
230V AC - 50-60 Hz., cable: 3 x 1 mm^2 (leng. 2 m.), 2.4 A
MOD.120/120EX/EXT-1/EXT-2 (LS) (M)
230V AC - 50-60 Hz., cable: 3 x 2.5 mm^2 (leng. 2 m.), 3.9 A
MOD.180/EX/EXT-1/EXT-2 (LS) (M)
380V AC - 50-60 Hz., cable: 5 x 1.5 mm^2 (leng. 2 m.), 2.2 A
MOD.300/EX/EXT-1/EXT-2 (LS) (M)
380V AC - 50-60 Hz., cable: 5 x 4 mm^2 (leng. 2 m.), 3.6 A
MOD.600/EX/EXT-1/EXT-2 (M)
380V AC - 50-60 Hz., cable: 5 x 4 mm^2 (leng. 2 m.), 7.2 A

Fuse

MOD.50/EX/EXT-1/EXT-2 (LS)(M)	5 A (6x32 mm)*
MOD.80/EX/EXT-1/EXT-2 (LS)(M)	7 A (6x32 mm)*
MOD.120/120EX/EXT-1/EXT-2 (LS)(M),	10 A (6x32 mm)*
MOD.180/EX/EXT-1/EXT-2 (LS)(M),	QM K10*
MOD.300/EX/EXT-1/EXT-2 (LS)(M),	QM K20*
MOD.600/EX/EXT-1/EXT-2 (LS)(M),	QM K25*

* **Use always curve D or K circuit breakers.**

Output voltage

MOD.50/EX/EXT-1/EXT-2 (LS)(M)
10VDC, cable: 2 x 10 mm^2 (leng. 2.5 m.) 25 A
7.2VDC (ver. M)
MOD.80/EX/EXT-1/EXT-2 (LS)(M)
10.5VDC, cable: 2 x 25 mm^2 (leng. 2.5 m.) 40 A
7VDC (ver.M)
MOD.120/120EX/EXT-1/EXT-2 (LS) (M)
11.2VDC, cable: 2 x 35 mm^2 (leng. 2.5 m.) 65 A
7.2VDC (ver.M)
MOD.180/EX/EXT-1/EXT-2 (LS) (M)
9VDC, cable: 2 x 70 mm^2 (leng. 2.5 m.) 90 A
6.4VDC (ver.M)
MOD.300/EX/EXT-1/EXT-2 (LS) (M)
9VDC, cable: 2 x 120 mm^2 (leng. 2.5 m.) 150 A
6.2VDC (ver.M)
MOD.600/EX/EXT-1/EXT-2 (LS) (M)
9VDC, cable: 3 x 240 mm^2 (leng. 3 m.) 300 A
6.5VDC (ver.M)

Production

MOD.50/EX/EXT-1/EXT-2 (LS))(M)	50 g./h.
MOD.80/EX/EXT-1/EXT-2 (LS))(M)	80 g./h.
MOD.120/120EX/EXT-1/EXT-2 (LS)(M)	130 g./h.
MOD.180/EX/EXT-1/EXT-2 (LS)(M)	180 g./h.
MOD.300/EX/EXT-1/EXT-2 (LS)(M)	300 g./h.
MOD.600/EX/EXT-1/EXT-2 (M)	600 g./h.

Minimum recirculation flow

MOD.50/EX/EXT-1/EXT-2 (LS)(M)	8 m^3/h.
MOD.80/EX/EXT-1/EXT-2 (LS)(M)	14 m^3/h.
MOD.120/120EX/EXT-1/EXT-2 (LS)(M)	20 m^3/h.
MOD.180/EX/EXT-1/EXT-2 (LS)(M)	30 m^3/h.
MOD.300/EX/EXT-1/EXT-2 (LS)(M)	50 m^3/h.
MOD.600/EX/EXT-1/EXT-2 (M)	100 m^3/h.

Electrode number

MOD.50/EX/EXT-1/EXT-2 (LS)(M)	8
MOD.80/EX/EXT-1/EXT-2 (LS)(M)	12
MOD.120/120EX/EXT-1/EXT-2 (LS)(M)	(16 LS) 8
MOD.180/EX/EXT-1/EXT-2 (LS)(M)	(20 LS) 12
MOD.300/EX/EXT-1/EXT-2 (LS)(M)	(32 LS) 16
MOD.600/EX/EXT-1/EXT-2 (M)	2x15

Net weight

MOD.50/EX/EXT-1/EXT-2 (LS)(M)	38 Kg.
MOD.80/EX/EXT-1/EXT-2 (LS)(M)	55 Kg.
MOD.120/120EX/EXT-1/EXT-2 (LS)(M)	100 Kg.
MOD.180/EX/EXT-1/EXT-2 (LS)(M)	125 Kg.
MOD.300/EX/EXT-1/EXT-2 (LS)(M)	150 Kg.
MOD.600/EX/EXT-1/EXT-2 (M)	250 Kg.

GENERAL FEATURES:

Control system

- Microprocessor.
- Touch screen 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 (9001+9006)

Electrolysis cell
- Polypropylene

EXT-1 | EXT-1(E)

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)

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

EXT-2

pH sensor

Body: plastic (Noryl PPO)
Range 0 -12 pH
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).

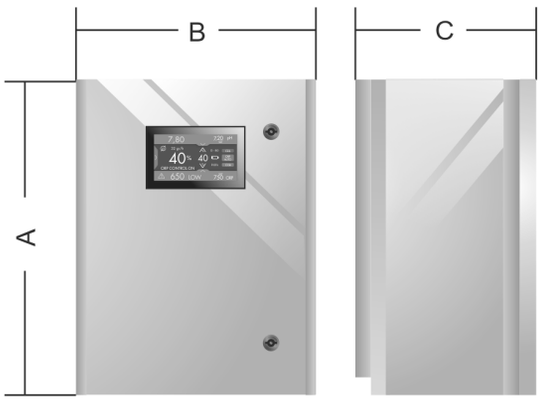
- Electrode holder
- Inductive flow detector
- Flow regulation
- 80-microns cartridge filter

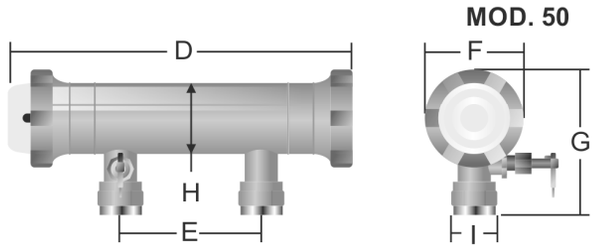
DIMENSIONS:

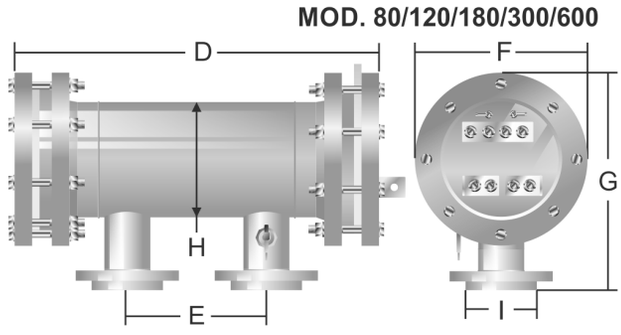
SERIE INDUSTRIAL (EX, M)

m/m

MOD.	A	B	C	D	E	F	G	H	I	Cells
D-50	462	440	249	547	220	153	230	110	R1 1/2	1
D-80	462	440	249	525	175	221	292	125	D63	1
D-120	620	499	356	713	274	340	407	200	D63	1
D-180	620	499	356	713	274	340	425	225	D90	1
D-300	620	499	356	795	274	395	449	250	D90	1
D-600	820	600	450	795	274	395	449	250	D90	2



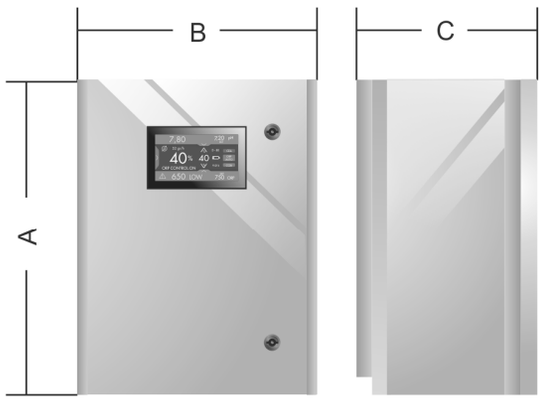


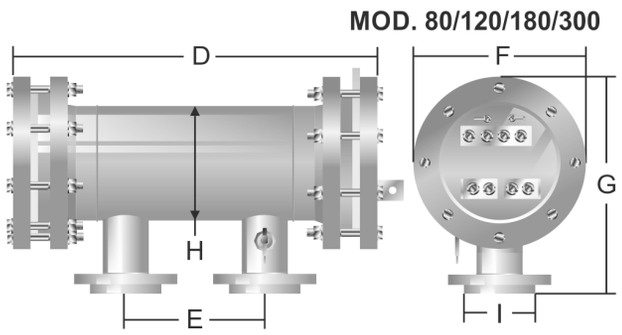


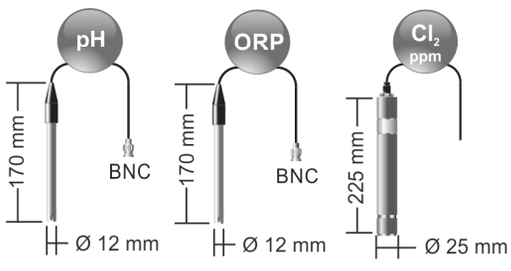
SERIE INDUSTRIAL LS

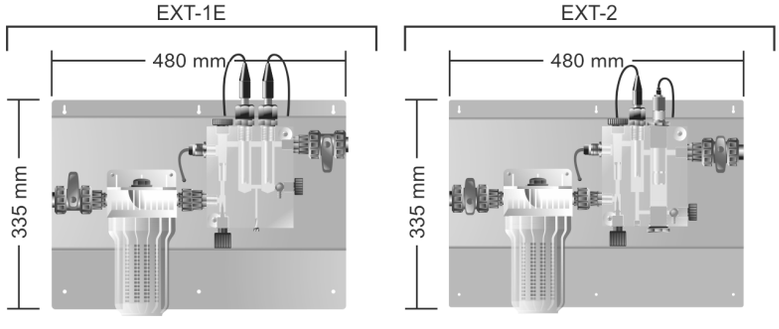
m/m

MOD.	A	B	C	D	E	F	G	H	I	Cells
D-50	462	440	249	713	274	340	407	200	D63	1
D-80	462	440	249	713	274	340	425	225	D90	1
D-120	620	499	356	795	274	395	449	250	D90	1
D-180	620	499	356	713	274	340	407	200	D63	2
D-300	620	499	356	795	274	395	449	250	D90	2









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. The Warranty period will be calculated as of delivery to the purchaser.

10.1.3. EX and EX-M models: the electrode is covered by a 2-YEAR WARRANTY (or 10.000 hours), which is not extendable.

10.1.4. EX-LS models: the electrode is covered by a 2-YEAR WARRANTY (or 6.000 hours), which is not extendable.

10.1.5. 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.

10.1.6. 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.

10.1.7. 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.

10.1.8. 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.

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

10.1.10. 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.

10.1.11. 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.
- EX and EX-M models: continuous operation with salinities below 3 g/l (sodium chloride) and/or temperatures below 15°C (59°F) or above 40°C (104°F).
- EX-LS models: continuous operation with salinities below 0.5 g/l (sodium chloride) and/or temperatures below 15°C (59°F) or above 40°C (104°F).
- Operation with pH above 7.6.
- Use of explicitly unauthorised chemicals.
- Exposure to corrosive environments and/or temperatures below 0°C (32°F) or above 50°C (125°F).

I.D. ELECTROQUIMICA, S.L.

EN	PRODUCTS	***SALT ELECTROLYSIS SYSTEM***
FR	PRODUITS	***SYSTÈME D'ÉLECTROLYSE SALINE***
ES	PRODUCTOS	***SISTEMA DE ELECTROLISIS DE SAL***
IT	PRODOTTI	***SISTEMA D'ELETTROLISI SALINA***
DE	PRODUKTE	***SALZ-ELEKTROLYSE-SYSTEM***
PT	PRODUTOS	***SISTEMA DE ELECTRÓLISE SALINA***

50 EX/(M)(LS)
50/EXT-1(E)/(M)(LS)
50/EXT-2/(M)(LS)

120 EX/(M)(LS)
120/EXT-1(E)/(M)(LS)
120/EXT-2/(M)(LS)

300 EX/(M)(LS)
300/EXT-1/(M)(LS)
300/EXT-2/(M)(LS)

80 EX/(M)(LS)
80/EXT-1(E)/(M)(LS)
80/EXT-2/(M)(LS)

180 EX/(M)(LS)
180/EXT-1(E)/(M)(LS)
180/EXT-2/(M)(LS)

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

DECLARATION EC OF CONFORMITY

The products listed above are in compliance with:

Low Voltage Directive (LVD) 2006/95/EC.
Electromagnetic Compatibility Directive (CEM) 2004/108/EC.
ROHS Directive 2011/65/EC.

DÉCLARATION CE DE CONFORMITÉ

Les produits énumérés ci-dessus sont conformes à:

La Directive des Appareils à Basse Tension (LVD) 2006/95/EC.
La Directive de Compatibilité Électromagnétique (CEM) 2004/108/EC.
La Directive ROHS 2011/65/EC.

DECLARACION CE DE CONFORMIDAD

Los productos arriba enumerados se hallan conformes con:

Directiva de Equipos de Baja Tensión (LVD) 2006/95/EC.
Directiva de Compatibilidad Electromagnética (CEM) 2004/108/EC.
Directiva ROHS 2011/65/EC.

DICHIARAZIONE CE DI CONFORMITÀ

I prodotti di cui sopra adempiono alle seguenti direttive:

Direttiva per gli Apparecchi a Bassa Tensione (LVD) 2006/95EC.
Direttiva di Compatibilità elettromagnetica (CEM) 2004/108/EC.
Direttiva ROHS 2011/65/EC.

KONFORMITÄTSERKLÄRUNG CE

Die oben aufgeführten Produkte sind konform mit:

Richtlinie für Niederspannungsanlagen (LVD) 2006/95/EC.
Richtlinie zur elektromagnetischen Kompatibilität (CEM) 2004/108/EC.
Richtlinie ROHS 2011/65/EC.

DECLARAÇÃO CE DE CONFORMIDADE

Os produttos relacionados acima estão conformes as:

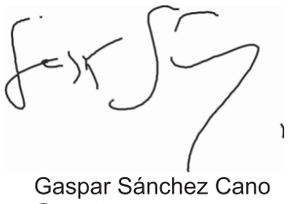
Directiva de Equipamentos de Baixa Tenção (LVD) 2006/95/EC.
Directiva de Compatibilidae Electromagnética (CEM) 2004/108/EC.
Directiva ROHS 2011/65/EC.

EG-VERKLARING VAN OVEREENSTEMMING

De onderstaande producten zijn conform met:

de Laagspanningsrichtlijn 2006/95/EEG
de Richtlijn inzake elektromagnetische compatibiliteit 2004/108/EEG
de Richtlijn ROHS 2011/65/EC.

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



Gaspar Sánchez Cano
Gerente

01-08-2019

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