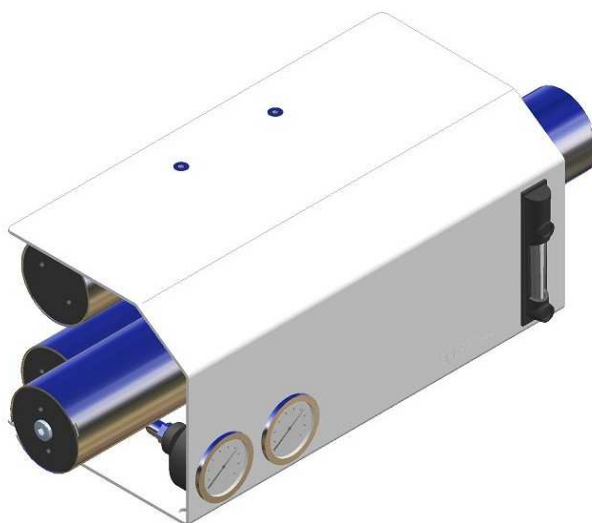


eco-sistems

ECO-SISTEMS WATERMAKERS S.L.

Owner's Manual

SPLASH-30 STANDARD *(12/24V DC)*



Version: 140604

Reference: 45004012

Eco-Sistems Watermakers, S.L.

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SPLASH-30 STANDARD 12/24V DC



TUBE Ø6X4 BLUE



HOSE 1/2 BLUE



HOSE CLEAR BRAID Ø20



MOTOR PUMP 12/24 V DC SET



THREE WAYS VALVE



MAIN BLOCK



10 -HOSE CLAMP Ø12/22



4 - HOSE CLAMP Ø16/27



CONNECTOR Ø6 TUBE X
1/4 BSP PLASTIC



ADAPTER 1/2 BSP X
3/4 BARB PVC



2-ADAPTER 1/2 BSP X
1/2 BARB PVC



FILTER WRENCH



ELECTRONIC
CONTROL PANEL



SEA STRAINER SET



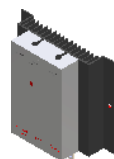
LOW PRESSURE FILTER SET



FWF FILTER SET



MANUAL



POWER BOX

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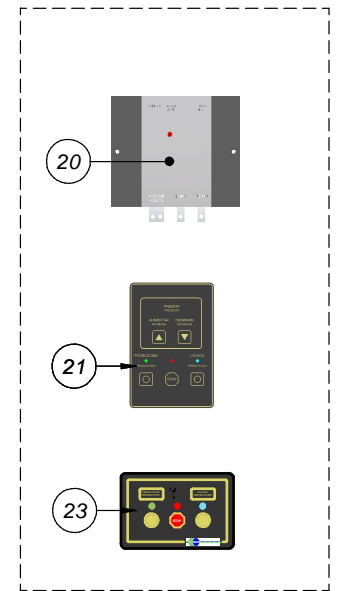
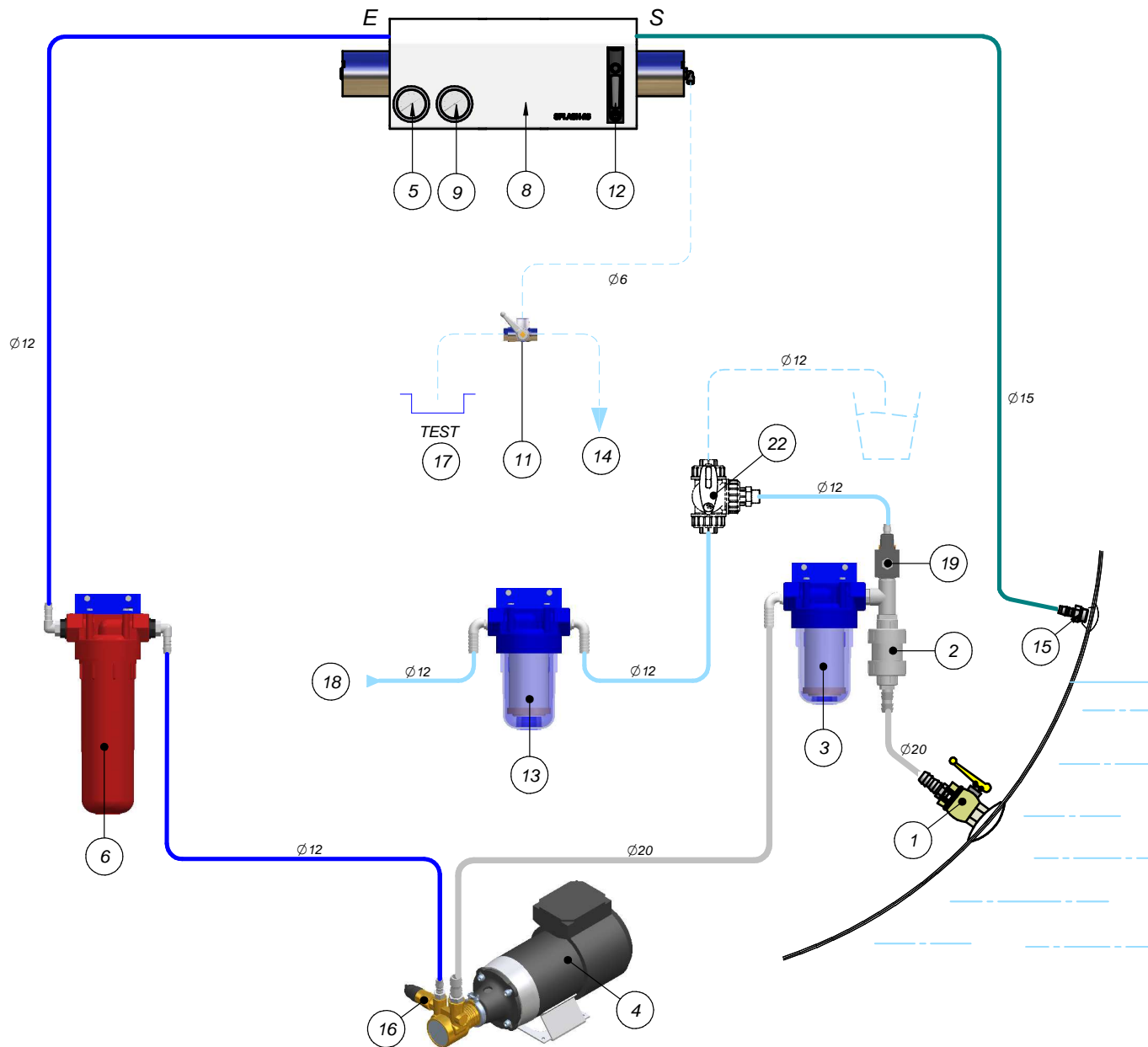
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CHAPTER I

**INTALLATION, OPERATION,
AND MAINTENANCE**

SPLASH-30 STANDARD 12-24V DC



CONNECTION SEE PAGE 6

SYSTEM COMPONENTS

SPLASH-25 12-24 V DC

1. - Seacock valve to uptake the sea water.
2. - PRODUCTION/FLUSHING Three Way Valve.
3. - Protection pre-filter. (Washable mesh filter).
4. - Low pressure booster pump. 12/24V DC motor.
5. - Low Pressure Gauge.
6. - 5 microns filter container.
8. – “INTEGRAL CERAMIC” High pressure pump with energy saving system.
Energy recovering.
9. - High Pressure Gauge.
11. - (OPTIONAL) Three ways valve for the produced water.
12. - Produced Water Flow meter.
13. - Anti Cl carbon filter.
14. - Produced water output to the tank.
15. - Brine discharge thru-hull.
16. – Pressure switch.
17. - Direct produced water output. (TEST)
18. – Boat fresh water input.
19. - FLUSHING Solenoid Valve.
20. - Power Box.
21. - DIGITAL Control Panel.
22. – (OPTIONAL) Three way valve for wintering.
23. - (OPTIONAL) Remote Control Panel.

I.1. Installation. (See diagram Chapter I Page 1 and 2)

To assemble the unit you will need to have the following inlet and outlet connections ready:

- Sea cock valve (1) with a minimum nominal pitch of ½” Gas for sea water intake, which should be sited as low as possible on the bottom of the hull in order to prevent possible cavitation problems due to air suction.
- ½” Gas female thread through-hull fitting (15) for connecting the internal blue tube Ø12 that drains rejected water into the sea.
- ¼” Gas female thread inlet in the main tank (14) for the intake of fresh water produced.
- Ball valve installed in the water line pressure out of the boat with female R ½ "Gas for water intake (18) Wash System.
- Options: Three way valve (22) for winter storage, valve (11) for a direct take of the produced fresh water.

WARNING

It is very important to place the sea strainer (3) as close as possible to the motor pump (4), and both of them below the waterline and check that a least a minimum 7 litres/ minute flow is supplied to feed the motor pump (4), to prevent the pump from cavitation due to pressure falls.

The rest of the components of the unit can be located at a higher level, provided that they do not exceed a distance of 4 or 5 metres. In longer distances, pressure drop increases significantly, increasing the power consumption.

The membrane is normally delivered assembled inside the high-pressure container. If it has not been factory-installed, see assembly instructions in Chapter IV.

After all components have been put in place and fixed, the unit will be ready for hydraulic and electrical connection, which will be covered in the following sections.

I.2. Hydraulic connections.

The connection between the various components will be done with the tubes supplied with the unit, as shown in the diagram in Chapter I Page 1 and 2.

The two suction sections between the points described below are made using the transparent tube Ø20 (transparent with metallic reinforcement)

- Lower check valve inlet (2) and sea cock valve (1).
- Sea Strainer outlet (3) and pump inlet (4).

The remaining seawater circuit sections are made with blue tube Ø12. **It is a special tube, developed to work with pressures up to 20 bar, it is not recommended to replace it with other tubes with similar features.**

Proceed to make the connections as indicated below:

- Pump outlet (4) to the 5 micron pre-filter inlet (6).
- 5 micron Pre-filter outlet (6) to the inlet elbow (E) at the pressure amplifier pump(8).
- Outlet elbow (S) at the pressure amplifier pump (8) to the brine outlet (15).

The mentioned elbows, marked as E and S, are located in the upper part of the pressure amplifier pump (8).

Connect the flow-meter (12) output upper elbow to the main tank intake by using the polyamide Ø6 pipe. (Previously remove the protection cup of the elbow).

A three ways valve (11) can be inserted in the produced fresh water pipe to provide a direct take. Sometimes it could be useful to have a direct taken water tap in the kitchen and avoid water to pass through the tank. (This valve must not interrupt the water flow in any of its positions)

As a general rule, the tube sections should be as short and as straight as possible to avoid unnecessary pressure drop, and the connections should be completely airtight so that air does not enter the circuit during water suction.

I.3. Electronic Control Panel

The electronic Control Panel (21), shown in the diagram of Page 1 Chapter I, consists of two push buttons that permit increase or decrease the speed of the feed pump motor (4) and three buttons equipped with indicator lights that allow the complete control of the system.

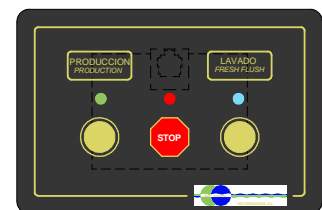
- The first button, from left to right, is marked with the word PRODUCCION/PRODUCTION and it is equipped with a green LED light. Pushing on it starts the system.
- The central button, is marked with the word STOP and it is equipped with a red LED light. It stops the system.
- The third button, from left to right, is marked with the word LAVADO/FRESH FLUSH and it is equipped with a blue LED light. It starts the timed Fresh Water Flush cycle.



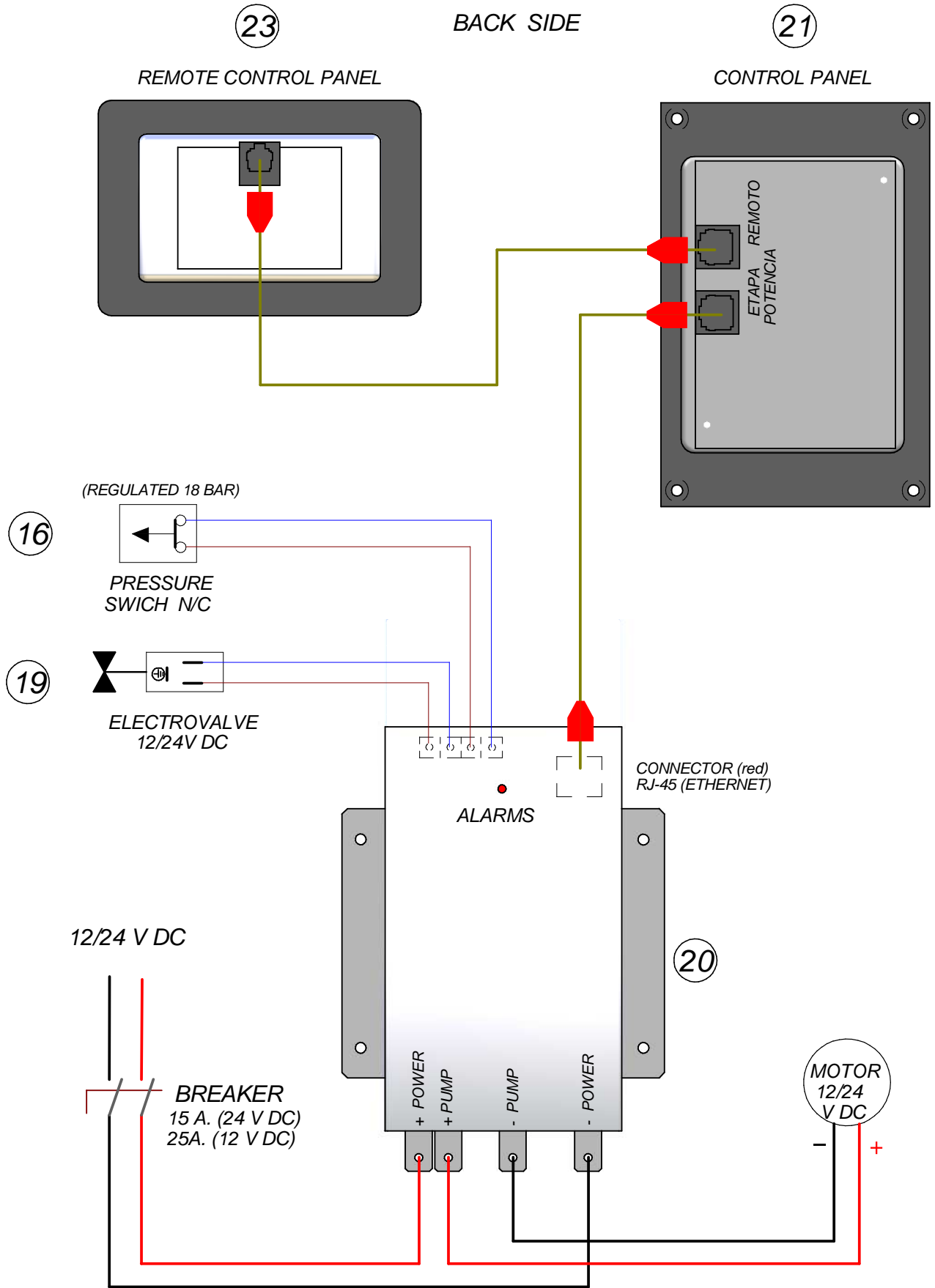
For a proper operation, the system doesn't allow the change from the Production function to the Flush function without pressing the STOP button. The flushing time is programmed for periods of 2 minutes were the booster (feeding) pump is turning at the 60% of the normal production r.p.m.'s.

Remote Control Panel. (Optional)

The remote control panel (23) shown in THE DIAGRAM ON Chapter I Page 1, consists of three buttons with corresponding a corresponding three light indicators that permits the complete system operation from a remote site in the boat through the 10 meters connection cable.



- The button marked as PRODUCCION and with the green LED on the top, starts the system.
- The button marked as STOP and with the red LED on the top, stops the system.
- The button marked as FRESH FLUSH with blue LED on the top is used to start the automatic FRESH FLUSH system.



INTEGRAL S-30 12/24V DC

I.4. Electrical Connection.

The system is equipped with a motor for the low-pressure pump 12V DC 200 rated watts at 1500 rpm or 24V DC 300 rated watts at 1500 rpm. It must be connected up using moisture shielded cable with a cross-section that is appropriate for the distance between the batteries and the motor. Te recommended cables are the following:

Batteries / Power Box Dist.	12 v DC Wire square	24 v DC
From 0 to 5 meters	10 mm ²	6 mm ²
From 6 to 12 meters	16 mm ²	10 mm ²
Circuit Breaker	25 Amp	15Amp

These sections are appropriate to prevent voltage losses greater than 1.6% of the rated voltage (0.2 V in 12 V DC).

A distance of more than 3 meters between the power box and the electric motor in the low pressure pump can never been exceed. For longer distances than the ones provided in this table, please contact the manufacturer.

- Connect the two wires from the breaker with the corresponding power box terminals marked as power supply (20) as indicated in scheme (Chapter I Page 6). Connect the solenoid valve coil (19) and the switch (16), with the corresponding power box terminals (20), and connect motor-pump terminals (4) with the ones marked as “Pump” in the power box.
- Connect the control panel (21) and the power supply (20), using the 6 meter hose with red connectors RJ-45 (Ethernet) at both ends, taking care to connect in the plug at the rear face labeled as ETAPA POTENCIA. The remote control pannel (23) OPTIONAL must be connected with the 10 meters to the plug labeled as REMOTO.
- Make sure the rotation direction in the pump is correct, which is marked by the water inlet and the outlet, if it doesn't, reverse the polarity on the motor connection.(Chapter I Page 6)

As a general rule, the electricity grid circuit should be suitably protected, taking care to oversize the connection cables to avoid voltage drops, besides an unnecessary power consumption.

ELECTRONIC 12/24 V DC CONTROL PANEL ADJUSTS

(Recommended for experts only)

FLUSH WATER FLOW ADJUST

- Switch the system on while pressing the LAVADO/FRESH FLUSH button in the control panel until the blue led gets on.
- After this, each keypress of the ▲ button will increase the pump speed in one unit, and, every keypress of the ▼ button will decrease it in the same way.
- Once reached the wanted flush water flow press the Stop button, the red led will get on, after release it the led will flash, it means the water flows has been adjusted.
- Switch off the system and switch it on again to return to the normal function of the system.

HOUR METER READING

- Switch the system on while pressing the Stop button in the control panel.
- Both green and red leds will flash a few times.
- Each green flash is equivalent to 400 working hours and each red flash is equivalent to 25 working hours. The total reading of working hours of the system is given by the sum of all green and red flashes.
- The maximum count will be 8 green flashes and 3 red flashes, which makes a 3275 hour reading, from that moment the hour meter gets self-restarted, starting a new reading cycle.
- The green led will flash 5 times when the system reaches 2.000 hours working, which means the pump maintenance must be performed.
- Switch off the system and switch it on again to return to the normal function of the system.

12V DC FALL DOWN ALARM.

- The system will stop if the power supply voltage drops below the 10 V DC and RED led will blink at 3 times per second.

ALARMS AND PROTECTION OF THE 12/24 V DC POWER BOX

- There is a 3 Amp fuse, it can be found under cover
- If the aluminum radiator exceeds the 65 temperature degrees the red led located in the control panel will flash, then the power box will cut the power supplied to the motor pump and the power box, the fan will still working. To restore the original system conditions proceed to switch off and on the unit.
- If the maximum pressure is exceeded the red led will remain on. To restore the original system conditions proceed to switch off and on the unit.

Both excessive temperature and pressure failure will caused by failure in the system, for that reason the first thing to do will be finding the cause of the problem.

I.5. First Start Up.

- Check all connections have been properly made and the voltage at the terminals is the right one.
- Check the Sea Cock Valve (1) is opened. In case the optional valve (11) is not installed, its connection to the main tank will be removed.
- Ensure there is pressure in the boat fresh water circuit.
- Switch on the system by pressing the “**PRODUCCION**” button and check that the rotation direction of the pump is correct, gradually increase the pump motor speed with the “▲” button making sure not to exceed the 50Kg/cm² high pressure (green zone) indicated on the high pressure pump gauge (9).
- Check that pressure in the control panel pressure gauge (5) lies between approximately 9 and 11 kg/cm², and does not exceed 14 kg/cm² under any circumstances (red zone).
- The high pressure, indicated on the high pressure pump gauge (9), will gradually rise until stabilizing at approximately 45-50 kg/cm².
- In the first few minutes, some air bubbles will be observed in the panel control flow meter (12). Those bubbles come from the interior of the membrane and other system elements, causing some irregularities in the first high pressure work cycles. They usually go away without purging the circuit.
- Approximately 10 minutes after the start-up, the “test tank” (17) should contain about 5 liter water produced (0.5 l/m), which determines that the production rate is correct, press STOP to stop the feed pump, and after that, by pressing the FLUSH button the system will activate the electro-valve (19) and the pump will work at slower speed for about 2 minutes, stopping automatically once finished the flushing.

By that time, a significant reduction in both high and low pressure will be noticed, due to the fact that the fresh water will have reached the membranes. This operation **must be repeated twice at least**, to clean the new membranes and eliminate the membrane preservative that may have accumulated inside them. During the flushing, the pressurized fresh water system in the boat must be “ON”, providing approximately 10 liters per minute flow.

I.6. Start-up

- Before starting up the system make sure the sea cock valve (1) is completely open.
- Ensure there is pressure in the boat fresh water circuit.
- Start the motor and check that the pressure in the low pressure gauge (5) lies between approximately 9 and 11 kg/cm², and does not exceed 14 kg/cm² under any circumstances (red zone).
- High pressure will gradually rise until stabilizing at approximately 45-50 kg/cm². There may be some differences depending on the temperature and salinity of the water.

I.7. Switching off the unit.

Before switching off the unit, the system must be cleaned to prevent compaction of the membranes due to the biological fouling in it, and proceed as follows:

- Press STOP to stop the low pressure motor pump.
- Press LAVADO/ FLUSH and the system will run the flushing system.
- At this point the unit will take fresh water from the pressurized fresh water system in the boat. The low pressure pump must be ON, providing approximately 10 liters per minute flow.
- For a proper cleaning of the membranes, the feed pump will work for 2 minutes timed period, and it will be done approximately at 60% of its normal performance.

- The high pressure will fall to around 20-30 kg/cm². This significant decrease in high pressure means that the seawater contained in the membranes has been cleaned out and replaced by fresh water. Changing the salinity and pH of the water in the membrane prevents the biological fouling in the membrane for a maximum period of 90 days. For longer periods see **Chapter II, Storage and Cleaning.**
- **As a safety measure keep closed the sea cock valve (1) when the system is switched off.**

I.8. Maintenance of the unit.

- Regularly check the status of the Sea Strainer (3) and clean the mesh when needed.
- Replace the 5 micron filter with a new cartridge at the beginning of each season or every three months in case of continuous service.
- Change the charcoal cartridge at least once a year.
- When the pressure indicated in the high-pressure gauge (9) exceeds 65 kg/cm² (with a water temperature between 18°C and 25°C), the membrane should be replaced by a new one.

CHAPTER II

STORAGE AND CLEANING

VERY IMPORTANT

**REMEMBER THAT FOR A LONGER LIFE
OF YOUR MEMBRANE, YOU MUST
CLEAN THE SYSTEM WITH FRESH
WATER
AFTER EVERY USAGE**

II.1. System storage.

PREVENTION OF CHEMICAL ATTACKS ON THE SYSTEM

Do not use for storage purposes or expose the unit to hydrogen peroxide, chloramine, chloramine-T, N-chloroisocyanide, chlorine dioxide, hypochlorite, chlorine, iodine, bromine, bromide, phenolic disinfectants or any other chemical element. The use of unauthorised chemical elements or the abuse of authorised ones will invalidate any warranty.

TEMPERATURE:

Never expose the membrane to storage temperatures higher than 50°C or lower than 0°C. Never store the membrane vessel in direct sunlight. Freezing temperatures will result in mechanical damage to the system due to the expansion of air on freezing. This will cause irreversible damage to the membrane.

DRYING OUT:

You should never let the membrane to get dry. If the membrane dries out, up to a 30% of the production flow will be lost. This will cause irreversible damage to the membrane. The membrane must always be kept damp.

BIOLOGICAL DIRT:

Protect the membrane from biological dirt. Up to the 40% of the production flow will be lost if the membrane becomes polluted with biological slime. Some production, but not all, can be recovered following a thorough cleaning.

CHEMICAL DIRT:

Protect the membrane from chemical attacks or dirt. Be careful when using the system in ports that may be polluted with chemical products, oil or fuel. Chemical attack is not covered by the warranty.

STORAGE: The inside of the membrane, which is dark and damp, is an excellent place for microorganisms to reproduce. When the membrane is used, tested or operated intermittently, it is exposed to microorganisms. Up to 50% of production flow can be lost if the membrane is not stored correctly.

II.2. Shutting down for a short period of time.

“Shutting down for a short period of time” means the unit will not be used for a period between one day and three months. An excellent and inexpensive way to protect the system and the membrane is set out in the “**I.6 Switching off the unit**” section which guarantees protection against the biological fouling in the membranes. As manufacturers, we recommend that **immediately after** using the system you always wash it with freshwater from the “Main Tank”, sent through the carbon filter (13), in order to eliminate any trace of chlorine that might exist in the tank fresh water.

II.3. Shutting down for a long period of time.

(Recommended Only to Experts)

A long period of time or prolonged shutdown means when the unit will not be used for four months or more. In this case the unit must first be rinsed with chlorine-free fresh water, and then stored with a chemical protector. This product inhibits bacteria growth while maintaining a high circulation flow and salt rejection in the membrane.

Follow these instructions carefully:

1. Before switching off the unit: make sure you have enough water in the boat’s main tank and also fill up another container with 5 litres of additional water that will be used to dissolve the preservative.
2. Switch off the low-pressure motor pump and change the position of the three-way valve to **FRESH FLUSH**. **Remember that every time a flush is performed, the pressurized water system must be “on”**. Restart the motor pump so that it suctions the water from the boat’s tank. During this period of time, about 1 to 2 minutes, there will be a significant loss of high pressure before it stabilises at 20/30 kg/cm². This indicates that the unit has been cleaned yet. Switch off the motor pump.

3. Dissolve 30/40 grams of chemical protector (sodium metabisulfite) in 5 litres of water you set aside in a different container and suction this solution using the auxiliary valve (22).
4. Close the Sea Cock Valve (1), Start up the system by pressing **LAVADO/FRESH FLUSH**, and press **STOP** just before the chemical protector and water solution from the tank runs out. This means the entire circuit will contain this protecting solution.
Do not forget to shut off the sea cock valve as a security measure.
5. When the unit is to be turned on once again, the valve (1) must set to the open position. Proceed as described in **I.5 FIRST START-UP** (Chapter I Page 10).

Warning: sodium metabisulfite is a caustic product that may cause serious irritation to the skin and mucus membranes. Take due precautions before handling, do not touch it directly and always work in well-ventilated spaces.

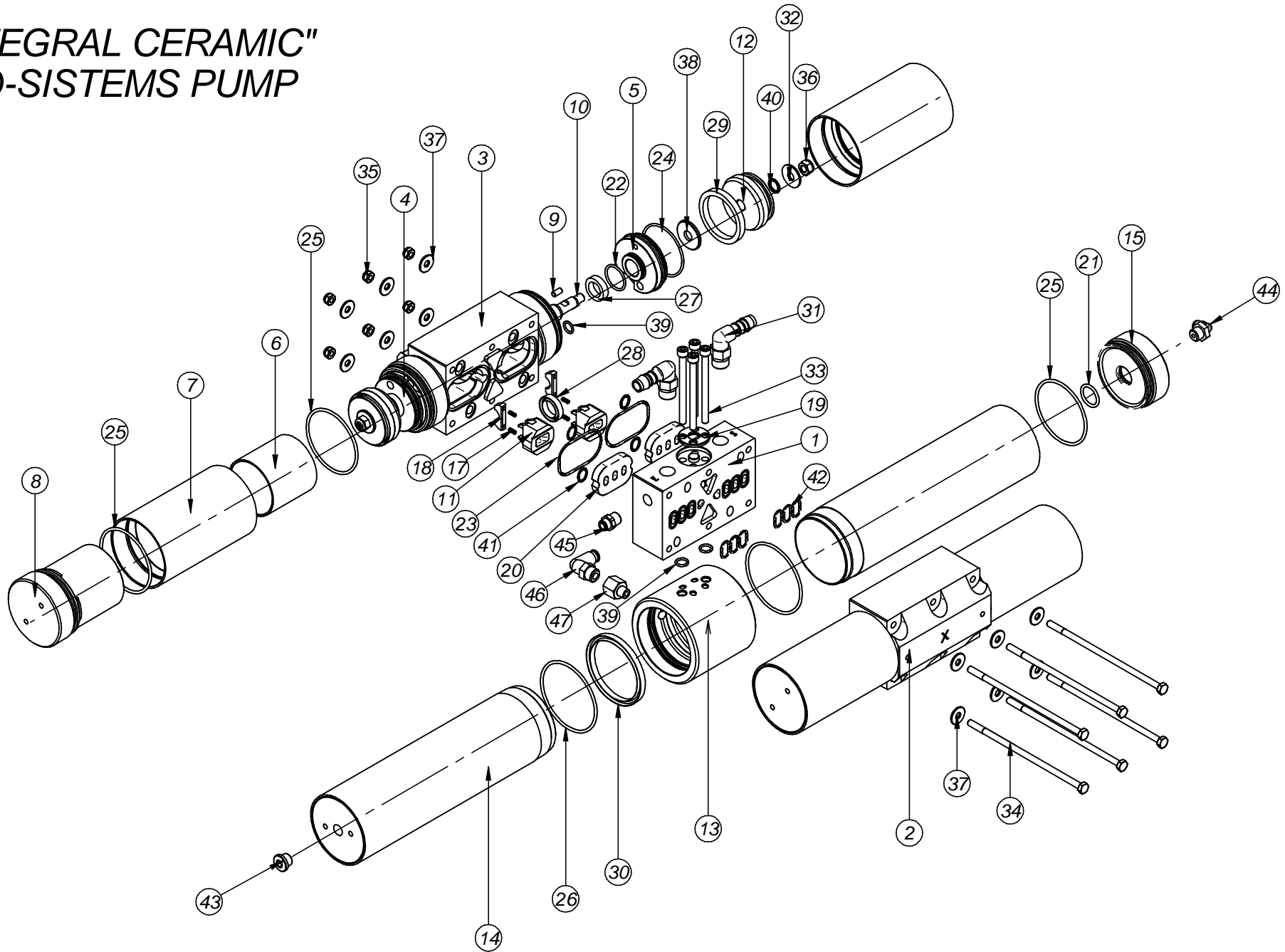
CHAPTER III

**DRAWINGS, AND EXPLODED VIEWS.
“INTEGRAL CERAMIC”
ECO-SYSTEMS PUMP**

“INTEGRAL CERAMIC” ECO-SISTEMS PUMP

Re. no.	Position	Name	Quantity
44022012	1	Direct distributor plate	1
44021022	2	Manifold X	1
44021032	3	Manifold Z	1
44021042	4	Manifold lid R18	2
44021052	5	Manifold lid R22	2
44021062	6	Inner liner Ø55	4
44021072	7	Outer cylinder	4
44021083	8	Cylinder cap Ø55	4
43850510	9	Spindle Ø5x10 mm A-4	4
44021101	10	Rod Ø16 M8	2
44022072	11	Slide	4
44021122	12	Plunger Ø55	4
44022020	13	Membrane container body	1
44022031	14	Membrane vessel	2
44022041	15	Membrane vessel cap	2
44406130	17	Spring ø 3 x 12 x 0.3 mm MONEL	8
44022081	18	Spring guide stop	4
44022060	19	Manifold flat washer	1
44022092	20	Base intermediate plate (CERAMIC)	4
43911852	21	O-ring Ø18.72x2.62	2
43912340	22	O-ring Ø23x2	4
43914140	23	O-ring Ø48x2	4
43914140	24	O-ring Ø51x2	4
43916352	25	O-ring Ø63.17x2.62	10
43916952	26	O-ring Ø69.52x2.62	2
43941600	27	Seal Ø16x24x6.3	4
43941800	28	Seal Ø18x26x6.3	2
43944500	29	Seal Ø45x55x6	4
43946300	30	Seal Ø63x73x6	1
43590380	31	Elbow R3/8 BSPx1/2 barb PVC	2
43822080	32	Flat washer DIN-9021 Ø8 A4	4
43801380	33	Allen screw DIN-912 M6x80 A4	4
43802315	34	Screw DIN 931 M6x150 A4	6
43812060	35	Self-locking nut M8 A4	6
43812080	36	Self-locking nut M10 A4	4
43822060	37	Flat washer DIN-9021 Ø6 A4	12
43822100	38	Flat washer DIN-9021 Ø10 A4	4
43910935	39	O-ring Ø9.25x1.78	6
43911041	40	O-ring Ø10.5x2	4
43911035	41	O-ring Ø10.8x2.78	8
43911235	42	O-ring Ø12.42x1.78	12
43710220	43	Cap ¼”	1
43580620	44	Elbow barbed fitting Ø 6 mm tube	1
43570620	45	Connector Ø6 tube x 1/4BSP plastic	1
43586620	46	Elbow barbed fitting Ø 1/4”tube	1
43690120	47	Reduction M1/8”-H1/4”	1

"INTEGRAL CERAMIC" ECO-SISTEMS PUMP



CHAPTER IV

FILTERS AND MEMBRANE REPLACEMENT

IV.1. Replacing the filter.

When changing the filter cartridge make sure you have closed the seawater inlet sea cock valve before unscrewing the bowl filter, that enables you to remove the old cartridge and replace it with a new one which has the same specifications: 9 ¾ long, 5 micron calibrated filter. Pleated polypropylene. We do not recommend cord or extruded filters.

Once changed, screw the bowl filter back on and re-open the seawater inlet sea cock valve. Warning: use the filter wrench to close it.

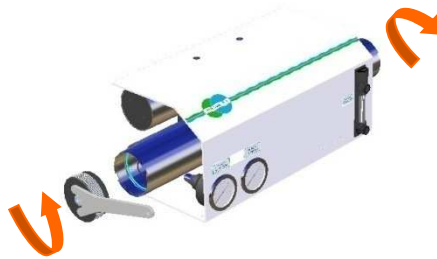
To replace the active carbon cartridge (13), disconnect the boat pressurized fresh water system, open a tab to not leave any residual pressure in the circuit. Replace the active carbon cartridge and connect the boat pressurized fresh water system again.

IV.2. Membrane Replacement.

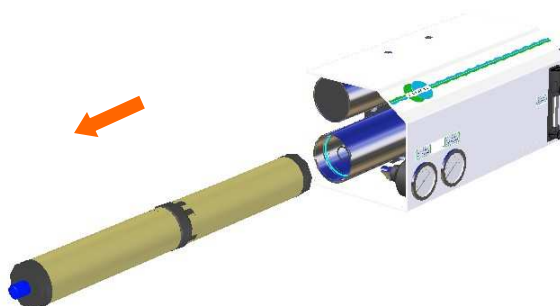
Follow these instructions to change the membrane:

Before handling the unit, make sure there is no pressure in the circuit. If the pressure gauge indicates there is some, wait until it disappears.

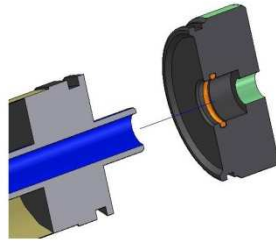
- Disconnect the osmotic water outlet tube and remove the caps by unscrewing them with the help of a special tool (nail key).



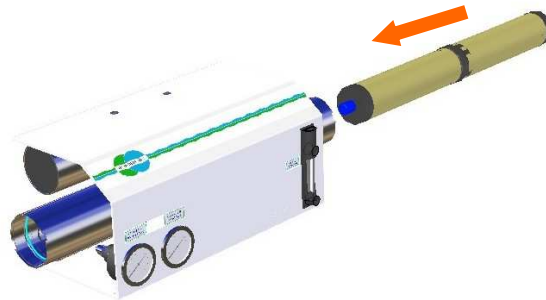
- After removing the caps, take the membrane out of the vessel. This should always be done on the left-hand side looking at the pump on the pressure gauge side, to avoid damaging the lips of the central collar, giving it a few light taps with a nylon mallet on the opposite side.



- Once the membrane has been removed, clean the inside of the container with chlorine-free water. This will remove dirt and the water will act as a lubricant for inserting the new membrane.
- Take the new membrane out of its packaging (the packaging is usually an airtight plastic bag).
- Check that the membrane permeation tube fits properly into the O-rings inside the sealing caps.



- Put the membrane in the container via the side opposite to the one from which the old membrane was removed. Make sure it is centred so that the central collar is on the membrane ferrule.



- Roscar los tapones de cierre que habíamos sacado anteriormente y vuelva a poner el tubo de agua osmotizada.

To restart the unit,, proceed as in Chapter I section 5 **FIRST START-UP**
FOLLOW ALL THE STEPS SET OUT IN THAT SECTION CAREFULLY .