

**USER'S MANUAL**  
**INSTALLATION OF A DESSALATOR 440 TO 1.000 LITRES /**  
**HOUR IN 110, 230 OR 400 V**



# **DESSALATOR**

Technical and sales Departments :

Z.I des 3 Moulins – « Euro 92 » – Bât. D – rue des Cistes – 06600 ANTIBES

Tel: (33) (0)4 93 95 04 55

Fax: (33) (0)4 93 95 04 66

Email : [dessalator@wanadoo.fr](mailto:dessalator@wanadoo.fr)

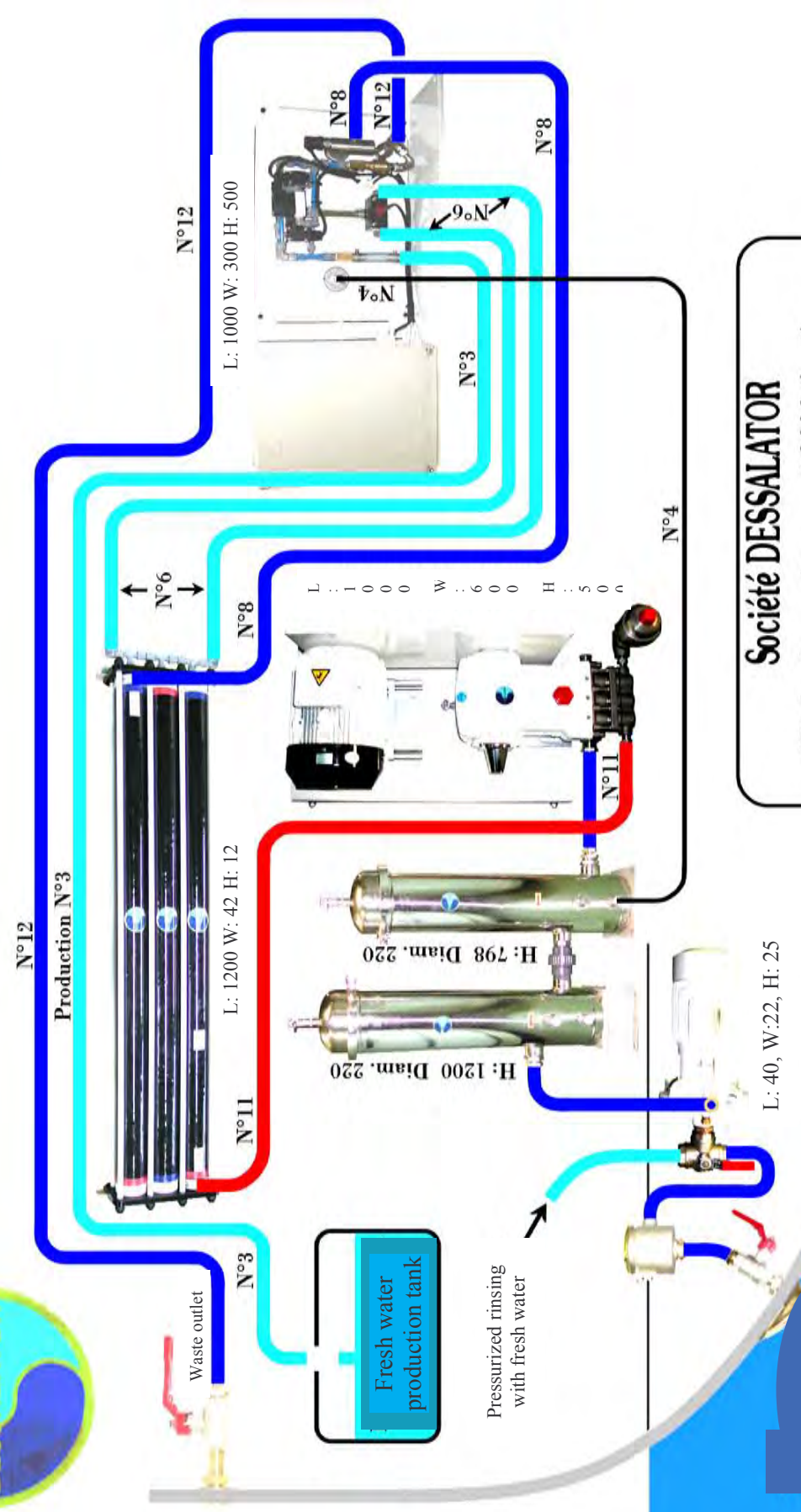
Web site : [www.dessalator.com](http://www.dessalator.com)

# CONTENTS

1. Installation diagrams :	
Integrated control – compact version	page 1
2. Components supplied by DESSALATOR	page 2
3. Installation Instructions :	
3.1 Pre-pump	page 3
3.2 Membranes	page 4
3.3 Control panels	page 5
3.4 Motor unit	page 6
3.5 Connection plan	page 7
3.6 High pressure connectors	page 8
4. Instructions for use	page 9
5. Reverse osmosis principle	page 10
5.1. The membranes	page 11
6. Maintenance :	
6.1 Cleaning the membranes	page 12
6.2 Sterilizing the membranes	page 13
6.3 HP pump	page 13
6.4 Mineralizing	page 13
7. Troubleshooting	page 14



# INSTALLATION DIAGRAM – 400 V WATER MAKER



**Société DESSALATOR**  
 67, Av des anémones 06600 Antibes  
 Tel: 04.93.95.04.55 Fax: 04.93.95.04.66

Strainers on the bow of the boat

## 2. COMPONENTS SUPPLIED ACCORDING TO WATERMAKER TYPE:



### Pre-pump :

Fixed under the waterline it enables water to flow through the pre-filters to the HP motor unit.



### Pre-filters :

- Pre-filter with sand supplied by your care
- Pre filter inox multi cartridges 5 microns 10 inches (x5)

D440 and D660 models : 2 filters

D1000 model : 1 stainless filter + liparit prefilters

### Motor unit:

HP motor, fixed on a frame with silent blocks



Control Panel



HP Motor unit

### Control panel :

The control panel manages the functions of the desalinator.



## DESALINATOR 440 TO 1.000 LITRES / HOUR 3.1 INSTALLATION INSTRUCTIONS

### Pre-pump :

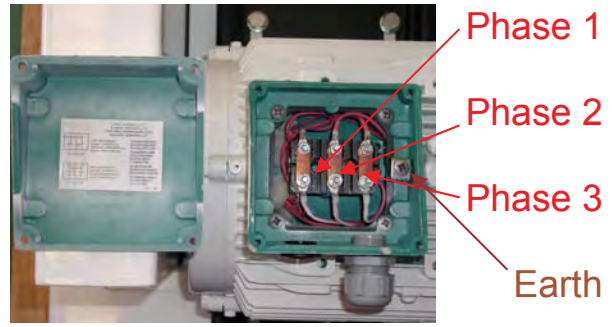
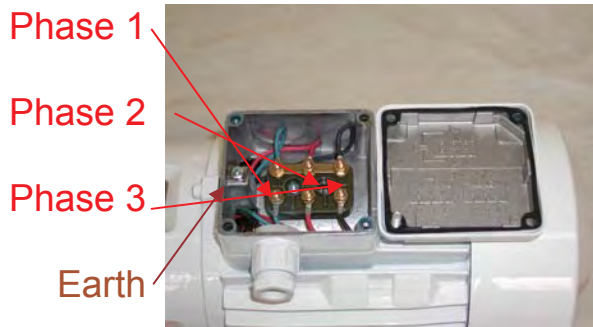


The pre-pump with its rinse valve<sup>3</sup> should be installed as low as possible in the boat and should be easily accessible. The pressure fresh water pipe should be connected to the valve to facilitate rinsing the desalinator. Sea water and electricity connection plan enclosed (page 7).

**THE PUMP SHOULD NOT BE PLACED WHERE THERE IS RISK OF WATER SPRAY.**

Pump cable case 400V  
LP Pump  
(Motor 240 / 400 Three-phase current)  
Caution : check feel rotation

Pump cable case 400V  
HP Pump  
(Motor 400 / 660V)



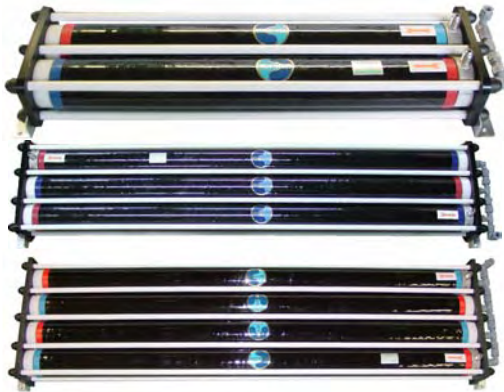
**CAUTION: POWER SUPPLY SHOULD BE SWITCHED OFF BEFORE WORK IS CARRIED OUT.**



## DESALINATOR 440 TO 1.000 LITRES / HOUR

### 3.2 INSTALLATION INSTRUCTIONS

Membrane(s), according to desired water flow:



2 membranes for 440 litres / hour water production.

3 membranes for 660 litres / hour water production.

4 membranes for 1.000 litres / hour water production.

The membranes can be installed either vertically or horizontally. They are mounted using 8mm bolts, in alloy brackets<sup>1</sup>. The number of membranes used depends on the desired water flow. Hose from the HP pump should join the membranes at the red ring<sup>2</sup>. As the hose<sup>3</sup> from the HP pump vibrates, it is preferable that it is installed using an insulating pipe. The HP connectors should be installed strictly in accordance with the connection plan( see page 11). Please apply a little Loctite or nut seal on the two male and female cones, before tightening.



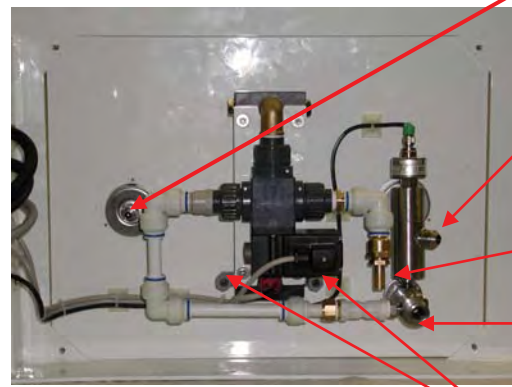
*Recommendation: To facilitate the attachment to the HP stainless steel joints<sup>2</sup>, it is possible to rotate the heads through 90°, by unscrewing the grey production connectors. Remove the nut covers and loosen the 12 nuts maintaining the unit. Then remove the rod to obtain access, and rotate the membrane head using a box wrench to join the stainless steel connector. Reinstall the rod tighten the unit.*

## DESALINATOR 440 TO 1.000 LITRES / HOUR 3.3 INSTALLATION INSTRUCTIONS

Panel photographs :



Front panel



Back panel

All control panels must be mounted on a horizontal surface. Installing the panels close to the watermaker system facilitates the piping and hose connections.

Figures for each connection are follows : (see diagrams page 1, 2 and 3)

- N°8 (blue) : HP piping exiting the membranes.
- N°6 (blue hose 8/10mm diameter) : Production hose exiting the membranes.
- N°3 : Production hose from panel to tanks. A 15mm inner diameter Tricoflex lenght will be required wich should be connected either to the fresh water tanks or to the fresh water tank outlet.
- N°12 : Waste outlet -  $\frac{3}{4}$  diameter
- N°4 : 4mm capillary hose (6m are provided) to be connected to the pre-filter 5 microns.

In case of having a mineralizing cartridge: this one should be connected to the production hose to the tank.

## DESALINATOR 440 TO 1.000 LITRES / HOUR 3.4 INSTALLATION INSTRUCTIONS

### HP motor unit:

There are two water connections to the pump head :

- A  $\frac{3}{4}$  diameter pipe<sup>1</sup> from the pre-filters.
- A HP hose<sup>2</sup> to the 15mm diameter membranes (see installation diagram).
- On the stainless pre-filter, a capillary<sup>3</sup> 3 mm diameter tube (this must be clipped into its connector; to remove it, just push the back ring and remove at the same time. The HP unit should be installed in a horizontal position and must be protected from water spray. Connections are illustrated below:



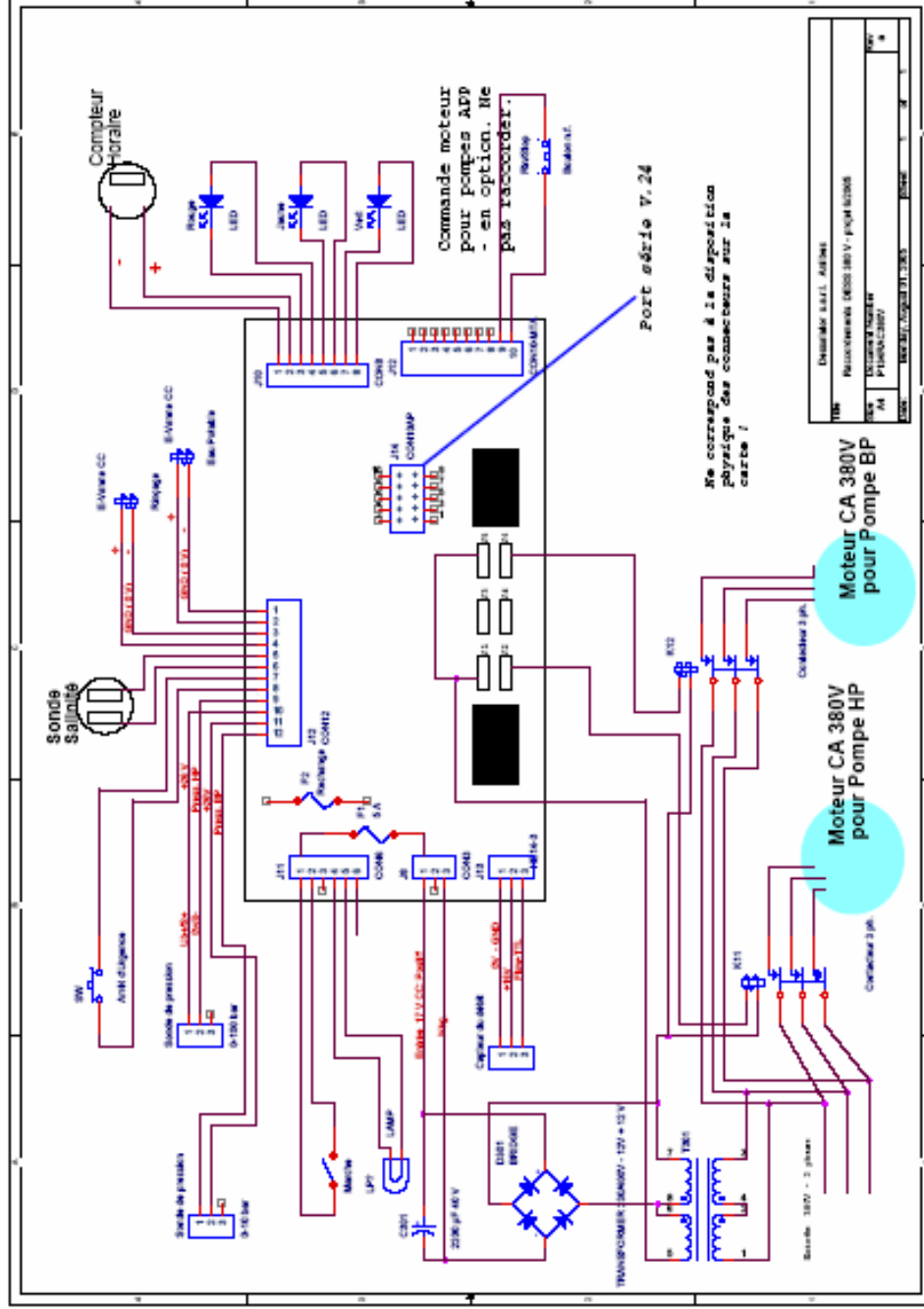
Additional hardware needed for assembly :

- Miscellaneous screws
- Various stainless jubilee clips 10mm, 16mm and 19mm diameter
- Miscellaneous tie wraps
- Insulating piping of 30 mm diameter



# DESALINATOR D440 TO D 1.000 LITRES / HOUR

## 3.5 INSTALLATION INSTRUCTIONS



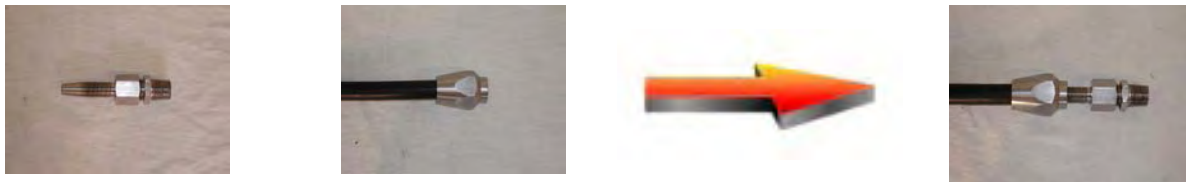
## DESALINATOR 440 TO 1.000 LITRES / HOUR

### 3.6 INSTALLATION INSTRUCTIONS-HP CONNECTORS

1. Screw the stainless union (skirt) anti-clockwise onto the HP pipe. Stop where the inner threading disappears.



2. Insert the steel tapered end-piece into the stainless steel nut, and tighten very firmly on the male tapered union.



3. Lightly grease the tip of the stainless steel cone and screw it perfectly straight into the stainless steel union. Stop letting three threading of the cone appears.

Unscrew the nut of the conical adapter. Blow in the pipe to insure it is not stopped.

Your connector is ready for the hose.

## **DESALINATOR D440 TO D1.000 LITRES / HOUR**

### **4. DIRECTIONS FOR USE**

1. Ensure the valves are open before starting up the desalinator.
2. If the desalinator has not been run for several days, rinse with three-way valve on the pre-pump as for normal rinsing before use. This should be carried out while the desalinator is idle and with the pressure regulator open (fully anti-clockwise). Rinse for two minutes. Purge in the same time stainless steel pre-filters.
3. To start the desalinator, the pressure regulator must be open. Switch on. The low pressure pump will run for two minutes, after which the HP pump will start automatically.
4. Turn the pressure regulator dial to the right, until the HP gauge reading is in the green zone.
5. Fresh water quality and flow into the tank is automatically monitored by the electronics board.
6. If pressure becomes too high the desalinator will cut out and the red indicator will light up. If this occurs, reduce pressure and restart the desalinator.
7. To shut down the desalinator, reduce pressure : The rinsing electro-valve will be activated for two minutes. Then switch off and stop the machine.
8. If the desalinator is not used for extended periods of time, it should be rinsed preferably once a month. If not in use for more than two months, remember to sterilize the membranes (with our special sterilization cartridge) for a storage.

*Note : Fresh water production depends on the temperature of the sea water and on the cleanliness of the pre-filters, together with the right voltage of the generating unit.*

## **DESALINATOR 440 TO 1.000 LITRES /HOUR**

### **5. REVERSE OSMOSIS PRINCIPLE**

#### **What is the reverse osmosis principle used in your desalinating system?**

Sea water is forced at high pressure through the membranes which act as “molecular sieves”, only allowing pure fresh water to pass through. Most dissolved solid particles will not penetrate the membranes. This waste, along with remaining saline solution, will flow on the surface of the membranes and will be rejected. Not all particles dissolved in sea water can be eliminated. The system is designed to reject 99% of the TDS (Totally Dissolved Solids), approximately 2% of the 35.000 ppm / TDS will pass through the membranes.

This guarantees drinking water with a TDS value of 500 (average). Please note that the drinking water produced by your reverse osmosis system is essentially sterile, however, your fresh water storage should be treated periodically with a slight dose of chlorine (or iodine) to ensure it remains consumable. Pay attention not to allow pure chlorine (or a too high dose of chlorine) into the desalination system, as this could damage the device.

#### **How does your desalinator work ?**

Sea water enters the inlet valve which penetrates the hull. The sea water is then routed by the pre-pump through the 25µm pre-filters. The filtered water is forced through the membrane by the HP pump (operating pressure 60 to 65 bars). The pressurized water passes through the surface holes of the membranes depositing the salt and minerals, which are then rejected into the sea with the remaining solution. The now fresh water flows over a detector which measures its salt content: if the desalination achieved is satisfactory, the three-way valve automatically directs the fresh water to the tank. If the salinity values measured by the salinity probe are too high (conductivity >1.000 siemens), the valve will reject the water produced into the sea. The volume of drinking water being treated at any time is monitored by a flowmeter on the control panel. Capacities of drinking water production are given for a 25°C temperature of sea water. Performances are reduced of 2.5 to 5% for one°C of lower temperature.

## **DESALINATOR 440 TO 1.000 LITRES / HOUR**

### **5.1 THE MEMBRANES**

#### **MEMBRANES, DELICATE COMPONENTS**

Reverse osmosis membranes must be carefully maintained as they are the most delicate elements of the reverse osmosis system. We recommend that the maintenance instructions are carefully followed to prevent the membranes from damage and to ensure the guarantee is not invalidated. Maximum production capacity of the desalinator is achieved with sea water temperature of 25°C. The functioning of the membranes will vary depending on the temperature of the sea water and on the sailing area. Output drops by approximately 2,5 to 5% for each degree below 25°C.

#### **Extreme températures :**

The membranes should not be exposed to temperatures below 0°C. Overpressure due to expansion caused by freezing can rupture the membranes and prevent the salt from being filtered out. The membranes must not be exposed to temperatures above 60°C, as high temperatures may also prevent salt from being removed.

#### **Drying out of the membranes :**

The membranes should be permanently immersed in liquid, either sea water before treatment, fresh water provisionally stored or sterilizing liquid, if the desalinator is not used for extended periods of time (Sterilizer is effective for six months and must be replaced after this period of time).

#### **Recommandations for use :**

The various quality and salinity grades of sea water affect both membrane efficiency and the working of the desalinator in Marinas. The system is not recommended for use in muddy or polluted water (briny water, river, Red sea), which can clog and damage the membranes. However, if the desalinator has to be used in such conditions, only run it for very short periods and as soon as clean sea water becomes available clean the membranes and run the system without pressure for 30 minutes with the pressure regulator open.

## **DESALINATOR 440 TO 1.000 L/ HOUR**

### **6.1 MAINTENANCE : Cleaning the membranes**

**CAUTION: IN FREEZING CONDITIONS,  
EMPTY THE GPMETER ON THE CONTROL PANELS,  
DISCONNECTING THE PRODUCTION PIPE AND BLOWING OR  
INJECTING AIR IN THE PIPE.**

#### **CLEANING THE MEMBRANES :**

When should the membranes be cleaned ? On average, after 800 hours working.

Under normal conditions, the membranes may be contaminated by mineral residues or biological matter. These residues reduce both the volume of drinking water produced and the amount of salt filtered out. The membranes should be cleaned whenever the volume of water produced is 10 to 15% lower than initial volume. This volume comparison can be made over the first 24 or 48 hours of operation, or when the detector indicates low quality after the probe has been cleaned. If the drinking water produced falls below the normal working specifications : sea water containing a TDS of 35.000 ppm, sea water temperature of 25°C and pressure of 65 bars in green zone, and if production is not improved by rinsing the membranes, then the membranes have to be replaced.

Please take in consideration that the volume of drinking water produced is dependent on ideal sea water temperature and pressure in system. Therefore if the volume of drinking water produced falls, it does not mean necessarily that the membranes need to be replaced.

#### **Membranes cleaning procedure:**

1. Open the regulator valve fully (turning anti-clockwise).
2. Close the inlet and outlet hull valves.
3. Disconnect the inlet and outlet hoses, and place them in a bucket containing 10 litres of fresh water and the cleaning solution.
4. Run the desalinator without pressure for 10 minutes and then switch off.
5. Repeat three times then rinse with fresh water for at least 15 minutes.
6. Reconnect the hoses.



## DESALINATOR 440 TO 1.000 LITRES /HOUR 6.2 MAINTENANCE

### STERILIZING THE MEMBRANES

#### **When should the membranes be sterilized ?**

Normally, regular monthly rinsing of the membranes may be all that is required to maintain the membranes. If this is not possible, sterilization will be necessary. Sterilizing efficiency doesn't exceed 6 months. Membranes don't be sterilized more than twice a year. Between these two operations membranes must be rinsed with fresh water.

Abusive concentration of sterilizing can corrode membranes' head. Non-observance of these recommendations and the using of others sterilizings cancel all guarantees.

#### **Membranes sterilizing procedure:**

1. Rinse the desalinator with fresh water while placing the three-way valve of the pre-pump on the side of fresh water then unscrewing to the maximum the regulator (5 minutes).
2. Place sterilizing doses in the pre-filter cartridge, then close again the pre-filter and rinse 2 minutes.

### **6.3. High Pressure Pump**

The HP pump is half filled of oil up to the level indicated on the gauge. Normally, the lubrication is made for 500 hours. In case of replacement, use a multigrade oil 20W40 and do not exceed the level located on the oil dipstick.

**Caution :** The scotch tape placed on the red stopper of oil filling of the HP pump is just here for the transport : it must be removed before the use.

### **6.4. Mineralizing**

If a mineralizing is provided, this one have to be placed on the circuit of water sending toward the tanks.

To obtain one dose, use three packets.

**DESALINATOR 440 TO 1.000 LITRES /HOURS**  
**7. TROUBLESHOOTING**

PROBLEM	CAUSE	SOLUTIONS
No reading on the low pressure gauge	<ul style="list-style-type: none"> <li>- Valve closed</li> <li>- Pre-pump impeller stuck</li> <li>- Dirty pre-filters</li> </ul>	<ul style="list-style-type: none"> <li>- Check the valves</li> <li>- Turn the pump fan with a screwdriver or clean the pump body.</li> <li>- Change the filters.</li> </ul>
Noisy HP pump	<ul style="list-style-type: none"> <li>- Reduce water inlet or air inlet in the system</li> <li>- Residues in the pump valves.</li> </ul>	<ul style="list-style-type: none"> <li>- Insure correct size of pipes (diameter), clips and filters secure filters clean.</li> <li>- Open the pump head and clean the 6 valves.</li> </ul>
Variations in speed of the electric motors.	<ul style="list-style-type: none"> <li>- Generating unit too weak</li> <li>- Voltage error</li> <li>- Wrong frequency</li> <li>- Dirty fuel filter.</li> </ul>	<ul style="list-style-type: none"> <li>- Service the generating unit and address adjustments and maintenance.</li> </ul>
Three-way valve	<ul style="list-style-type: none"> <li>- No rinsing</li> <li>- No sea water</li> <li>- Handle incorrectly mounted.</li> </ul>	<ul style="list-style-type: none"> <li>- Fix the handle correctly.</li> </ul>