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## INSTRUCTION MANUAL

Air Conditioning System

**SELF-CONTAINED UNIT** (Art. SCU07VFD-  
SCU10VFD – SCU12VFD - SCU16VFD)  
INVERTER BLDC Technology





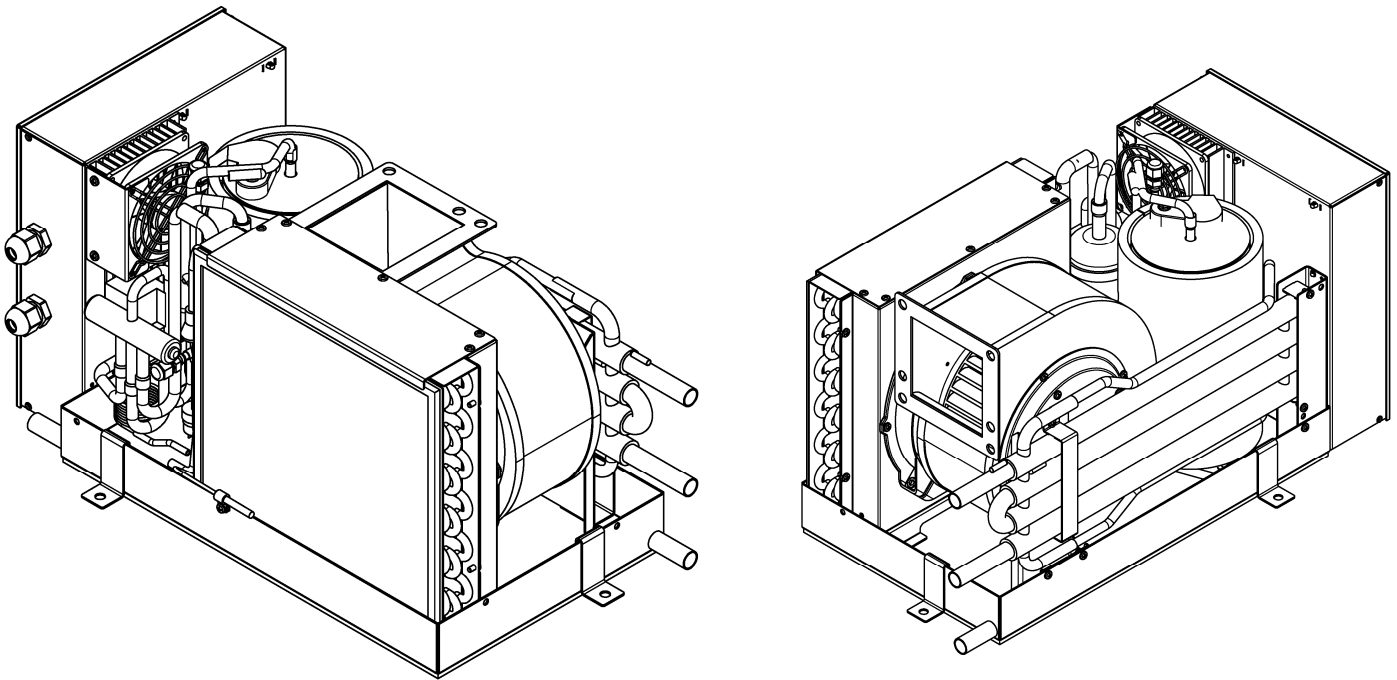
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We would like first of all to thank you for deciding to grant your preference to our product. We are sure you will be satisfied because it represents the best technology of boat air conditioning. By implementing the suggestions that are contained in this manual, thanks to the product that you have purchased, you can enjoy high thermal comfort with a great energy saving.

Document is confidential by law and may not be copied or transferred to any third party without the express permission of the manufacturer. The manufacturer reserves the right to make changes at any time to their models, without prejudice to the essential features described in this manual.



## 1.0 INTRODUCTION

This manual has been prepared with the aim to give you all the explanations to be able to properly install the unit "**INVERTER BLDC SELF-CONTAINED UNIT**" and to better manage the device. Improper installation procedures can result in unsatisfactory performance and / or premature failure of this air conditioning unit. We invite you to read it carefully before operating the product. If there are any statements or procedures described in this manual, that you do not understand, contact FRIGOMAR for assistance:

Phone: +39 (0) 185 384 888

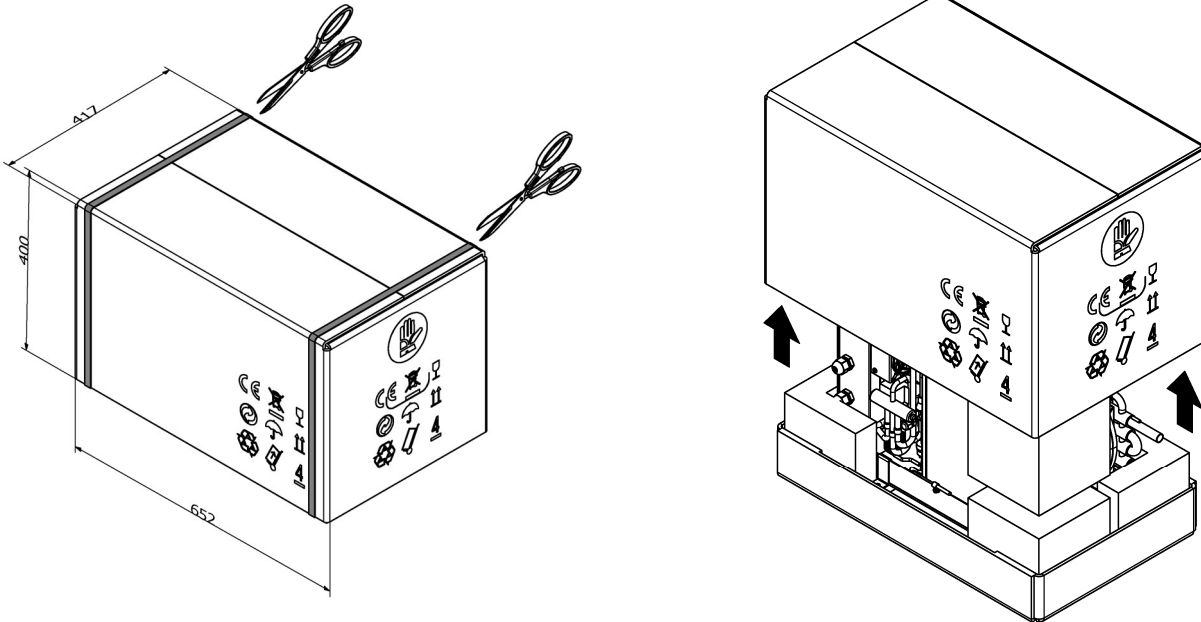
E-mail: [tecnico@frigomar.com](mailto:tecnico@frigomar.com)

Keep the manual in a dry location to prevent deterioration, for at least 10 years for any future reference. In the interest of product improvement, specifications and design of the SELF-CONTAINED UNIT will be subject to change without giving notice.

**NOTE:** This unit complies with European directives for EMC 2004/108 / CE.

## 2.0 PACKAGING AND IDENTIFICATION

The packaging is made of suitable materials to protect the machine from the stress of transport and handling.



All units are delivered complete and in perfect condition, however, to control the quality of transport services, check the following:

- Upon receipt check if the box is damaged, if that is the case, accept the goods with reservations and keep photographic evidence of any damage found.
- Unpack and check the presence of the individual components.
- Check that all components have not been damaged during transport.

**IMPORTANT!** Lift the unit by the upper dedicated handles avoiding to catch it in sensitive parts such as tubing and air adapters.

When the load is lifted off the ground stay away from below and surrounding area.

During transport operations respect the symbols on package and avoid to place in a vertical position the product. In fact, the refrigerator compressor is mounted on vibration dampers, and there may be a shift of the compressor or piping connecting outside their seats.

Each product is identified by a label as below:

 <b>FRIGOMAR</b> EXCLUSIVE MARINE REFRIGERATION & AIR CONDITIONING SYSTEMS		Frigomar S.r.l. Via Vittorio Veneto, 112 Loc. Rivarola 16042 Carasco (GE)		
Type: <b>SELF CONTAINED INVERTER BLDC XX</b>				
MOD: <b>SCUXXVFD</b>	Serial number <b>XXXXXXXXXX</b>			
Voltage <b>XXXVAC/1/50-60Hz</b>	Max input power <b>XXX W</b>	Max current <b>X.X A</b>		Contains fluorinated greenhouse gases covered by the Kyoto protocol
Max sea water flow <b>X.Xm3/h</b>	Min sea water flow <b>X.Xm3/h</b>	Refrigerant R410A <b>X.XX Kg</b>		

Not dispose of, abandon or leave within the reach of children packaging materials (cardboard, staples, plastic bags, etc..) as it can be a potential source of danger.

### 3.0 UNIT DESCRIPTION

#### Brushless DC Inverter Technology

This technology is applied to control the speed of the compressor allowing continuous adjustment of the temperature, in contrast to traditional air conditioning systems where the temperature is controlled by a compressor that can run only at full speed or complete stop.

The system is equipped with a "Brushless DC" variable speed compressor and relative inverter regulator able to change and control the motor speed.

The elimination of intermittent (ON / OFF) cycles allows to increase considerably the energy efficiency, the lifespan of components and increasing the on-board comfort without temperature and relative humidity fluctuations.

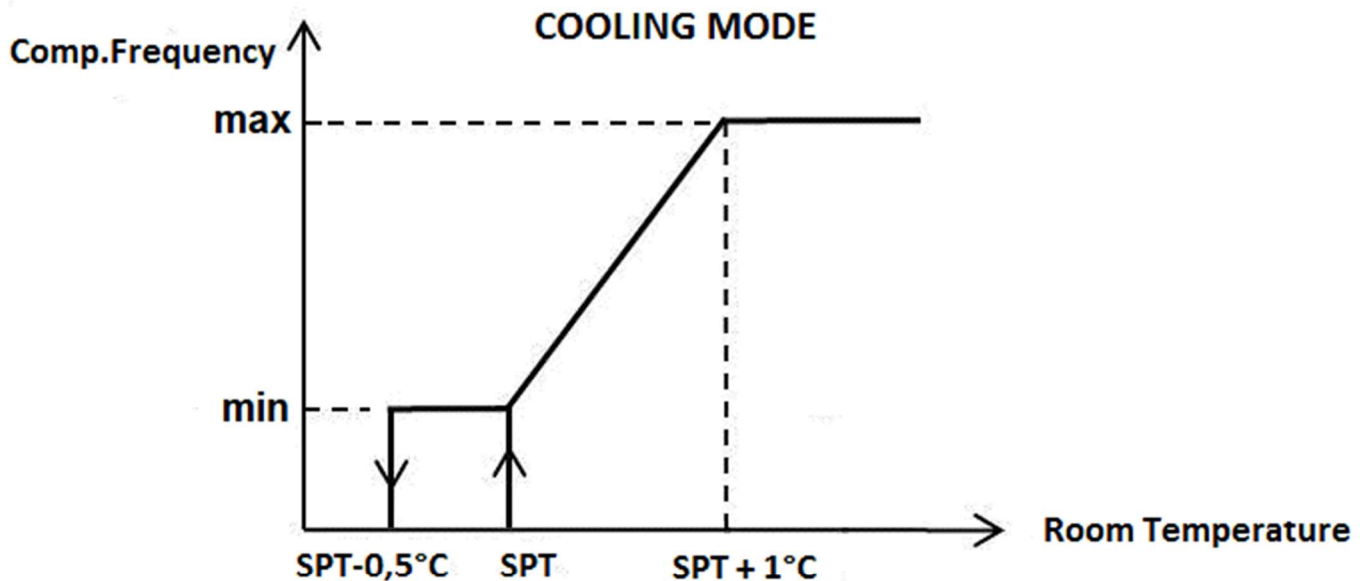
By using unit INVERTER "Brushless DC" it is possible install on board a smaller power generator than the one necessary for operating a traditional ON/OFF air conditioning.

#### Energy Saving (40-50% reduction in electrical demand )

As the air temperature approaches the set point value, the inverter control regulates the capacity by varying smoothly the compressor frequency in order to maintain stable thermal conditions . Thanks to the variable speed operation and the use of "Brushless DC" motor the efficiency is much higher than ON-OFF systems, which must continuously stop and start to maintain the temperature.

In terms of seasonal energy efficiency there is a reduction in electricity consumption by 40-50% compared to traditional air conditioning systems.

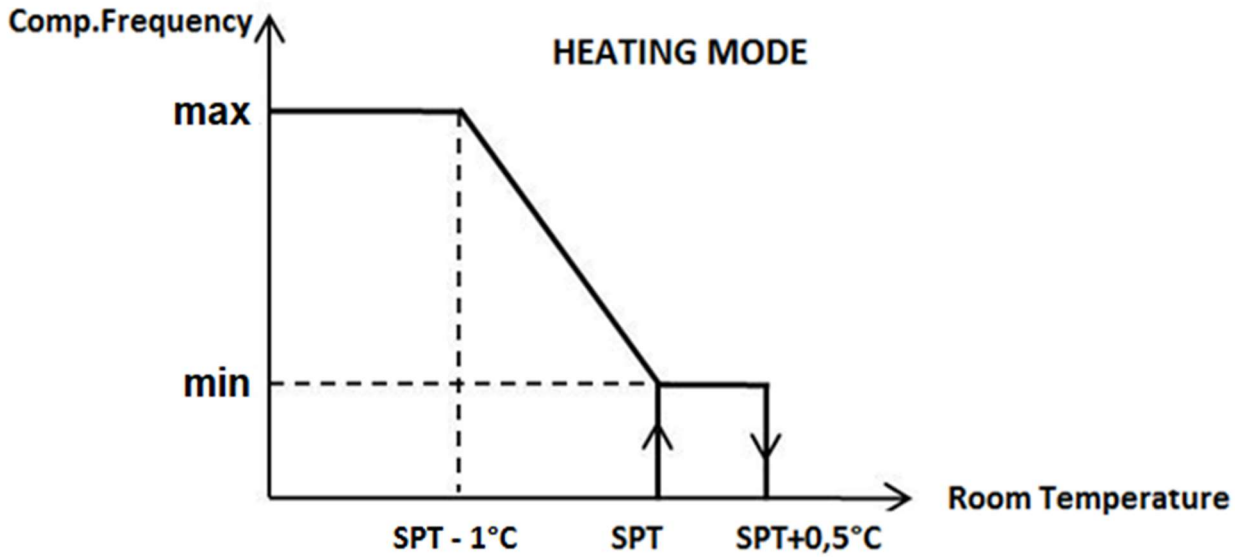
The following diagrams give an idea of the operation logic (PID) of this variable speed system.



**SPT = set point temperature (room)**

**Room temperature < SPT-0,5°C** ➡ end cooling

**Room temperature < SPT+ 1°C** ➡ frequency decreasing



**SPT = set point temperature (room)**

Room temperature > SPT+0,5°C ➡ end heating

Room temperature > SPT - 1°C ➡ frequency decreasing

#### **Progressive start (no current peaks)**

The starting ramp begins at very low frequency (18 Hz) allowing to eliminate peak current at start-up.

#### **Powerful operation**

The compressor accelerates to up to 90 HZ (max cooling/heating capacity) after the starting phase, in order to reach very quickly the room temperature set point.

#### **Comfort**

The INVERTER air conditioner continuously adjusts the compressor capacity, adapting to changes in the thermal load, and it allows to keep the air temperature stable, always near the Set Point value, without sharp fluctuations.

Thanks to the "Brushless DC " motor and to the sound-absorbing insulation silence is guaranteed during operation.

#### **ECO mode (depending on fan speed selected)**

The air conditioner INVERTER can vary its capacity during operation, while the traditional system can only operate with a fixed capacity. By selecting the minimum fan speed, the compressor will automatically switch to low frequency thus reducing considerably the electrical power consumption. That can be useful for the energy balance in case other electrical appliances are being used simultaneously.

## 4.0 GENERAL NOTICES

### 4.1.1 SAFETY MEASURES

This instruction manual is an integral part of the appliance and therefore must be kept with care and must ALWAYS accompany the appliance even in case of its sale to another owner or user or to a transfer to another plant. In case it is damaged or lost, request another copy from the Technical Service of the area.

During all operations on the device it is necessary to observe the precautions specified in this manual and on the labels attached to the appliance, as well as all the precautions suggested by common sense, and the safety regulations currents at the place of installation.

Please read this manual carefully before proceeding with any operation (installation, maintenance, use) and follow scrupulously the instructions contained in the individual chapters. Failing to comply with the instructions contained in this manual and use the appliance outside the operating limits specified will void the warranty.

Make known these instructions to all staff interested at the machine.

The manufacturer assumes no responsibility for damage to people or property arising from the failure to compliance with the rules contained in this booklet.

In case of replacement of parts, use only original spare parts.

You should always use personal protective elements to perform actions on the devices.

The installation and maintenance of air conditioning equipment may be dangerous because within these devices there are pressurized refrigerant gas and electrical devices. Therefore the installation, initial start-up and subsequent maintenance must be carried out by authorized and qualified personnel only.

In case of leakage of refrigerant fluid, it is mandatory to ventilate the room, considering also that refrigerant fluid when exposed to flame produces toxic gas.

When refilling the system, after eventual leakage and repair, be sure that inside the refrigerant circuit does not enter any substance, such as air, other than the specified refrigerant (R410A). The presence of air or other foreign substances in the circuit of refrigerant may cause an abnormal increase of pressure or breakage, resulting in personal injury.

In the case of water spills from sweater circuit, switch off immediately compressor and seawater pump and shut off Manual Valves in order to stop the seawater flow.

During the cold period if the unit is not in use, drain all the hydraulic circuits connected to the unit, as well as seawater condenser to prevent them from freezing.

Some parts of the appliance produce heat during operation. The room installation must ensure adequate ventilation and proper heat dissipation.

### 4.1.2 PROHIBITIONS

We remember that the use of products that use electricity and water involves the observance of some basic safety rules such as:

- It is forbidden the use by children and unassisted disabled people.
- Do not touch the appliance when barefoot or with wet or damp parts of the body.

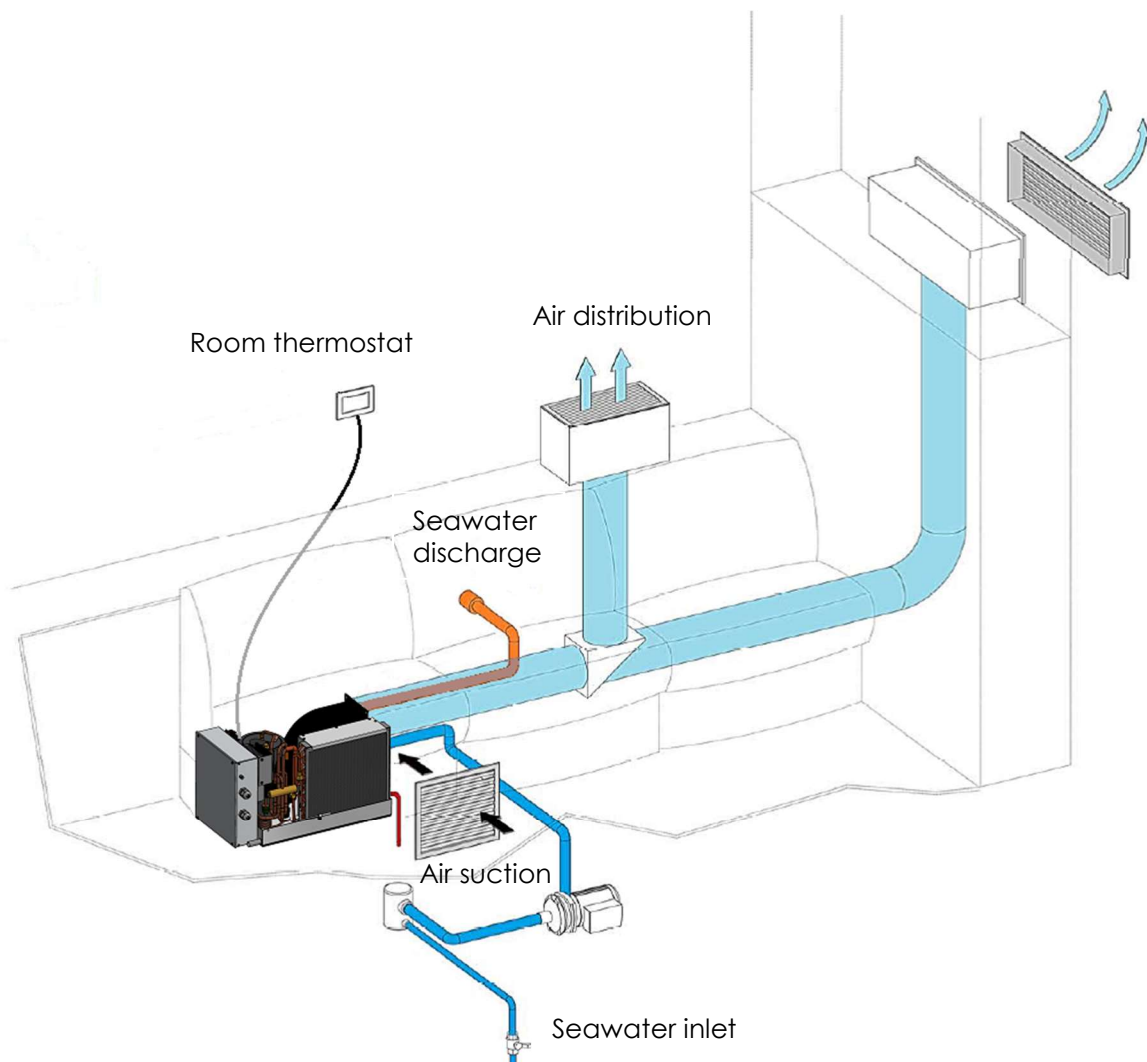


- It is prohibited any operation before disconnecting the unit from the mains supply by moving the power switch to "off".
- Do not modify safety devices or adjustment without permission and instructions from the manufacturer.
- Do not pull, detach or twist the electrical cables coming from the appliance, even if it is disconnected from the mains power supply.
- It is forbidden to open the access panels to the internal parts of the unit without having first disconnected the unit from the mains by putting the system power switch to "OFF position".
- Do not dispose, abandon or leave within the reach of children the packaging material because it can be a potential source of danger.
- It is forbidden to use refrigerant and water pipes for grounding the unit.
- It is forbidden to disperse R-410A into atmosphere: R410A is a fluorinated greenhouse gas, referred to in the Kyoto's Protocol, with a Global Warming Potential (GWP) = 1975.

#### 4.1.3 RESPONSIBILITY

FRIGOMAR S.r.l. disclaims any liability for damage to people, animals or property resulting from the installation, use or maintenance improper of the product, or due to failure of compliance with standards and directives mentioned in this manual.

## 5.0 INSTALLATION







Selection and installation of components are left to the responsibility of the installer who must operate according to the rules of good technique and the legislation in force.

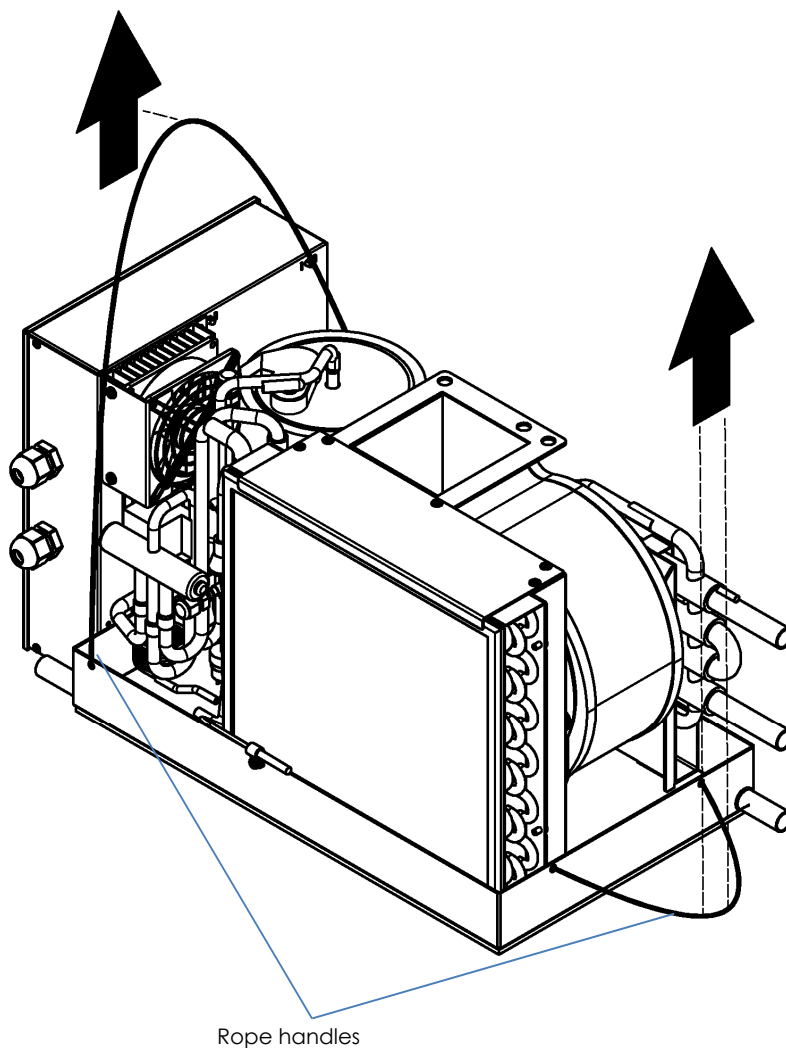
Before connecting the pipes make sure that these do not contain stones, sand, rust, scale or other foreign objects that could cause damage or failure to the system.

To achieve a successful installation and optimum operating performance, carefully follow the instructions provided in this manual.

The failure to apply the rules indicated, which may cause malfunction of the appliance, raise the manufacturer from any form of guarantee and liability for damage caused to people, animals or things.

**IMPORTANT!** The appliance must be installed in a protected area and in such a way that the accessibility to the unit is possible only by removing the protection by means of a tool.

**IMPORTANT!** The appliance must be installed in such a way as to facilitate maintenance, rope handles for the machine's easy movement can be removed after the installation, always taking care not to lift the unit from sensitive parts such as tubing and air adapters.



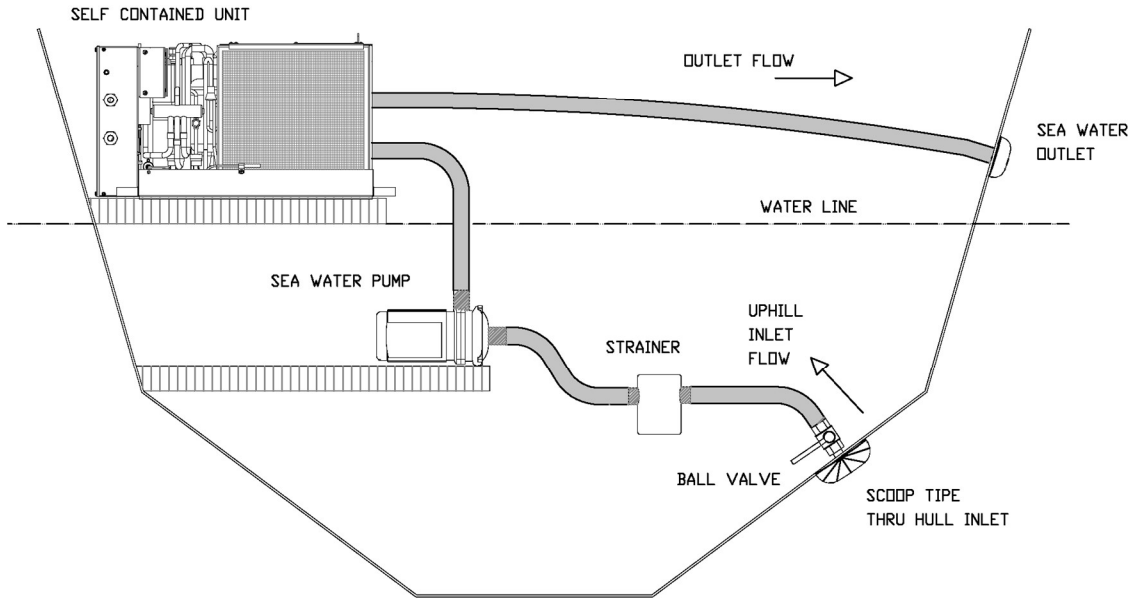


**5.1.1 HYDRAULIC CONNECTIONS**

The following is a summary of how to install the unit on a sea water circuit and condensate drain:  
CORRECT SYSTEM INSTALLATION

**CORRECT**

STEADY UPWARDFLOW FRO INLET TO UNIT THEN DOWNWARD TO OUTLET, HOSES DOUBLE CLAMPED

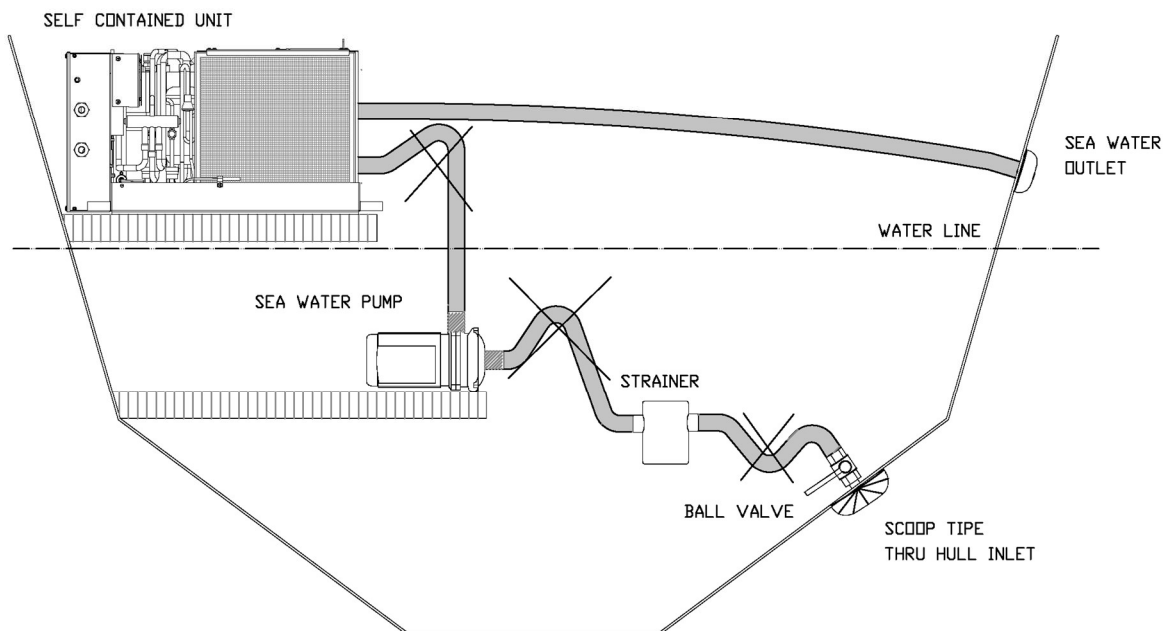


The minimum nominal diameter of the connecting pipes should be 1/2 ".

WRONG SYSTEM INSTALLATION EXAMPLES:

**WRONG**

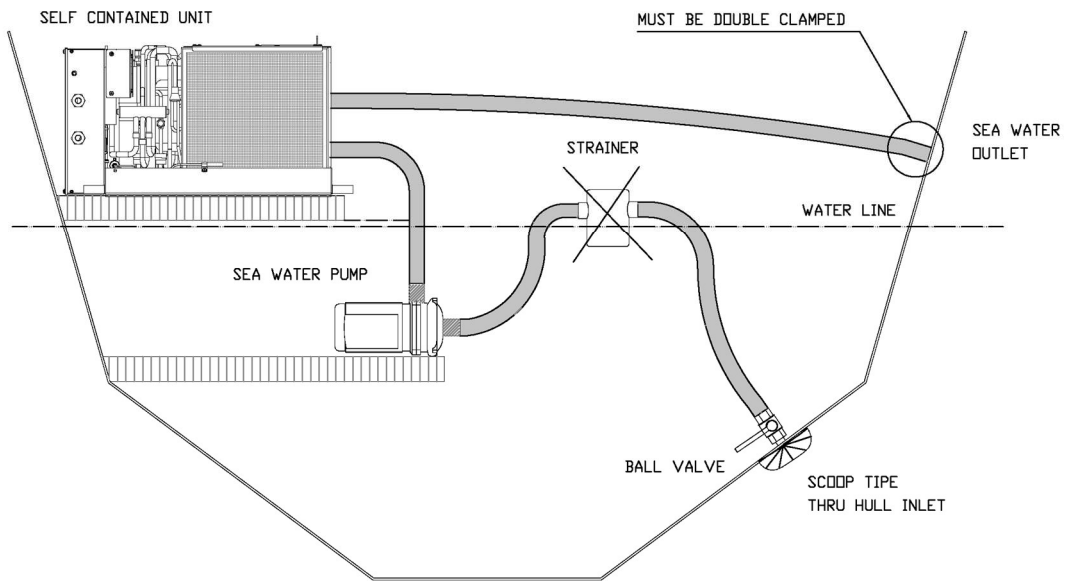
HOSES MUST NO HAVE KNIKS, LOOPPS OR HIGH SPOTS WHERE AIR CAN BE TRAPPED





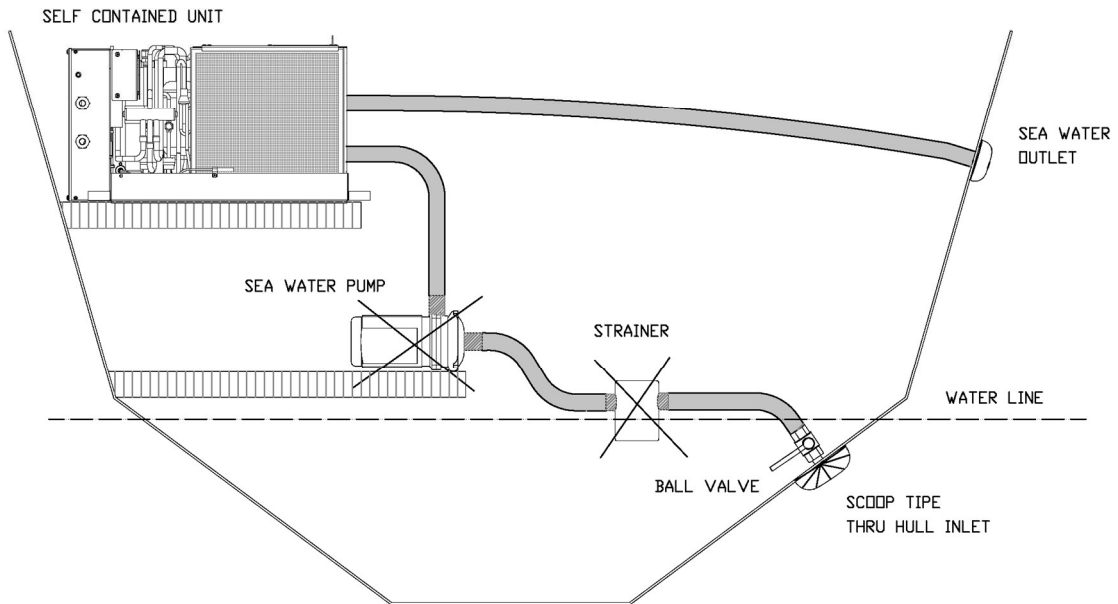
# WRONG

STRAINER MUST BE BELOW PUMP, HOSES MUST BE DOUBLE CLAMPED



# WRONG

PUMP AND STRAINER MUST BE BELOW WATER LINE



## SEA WATER CIRCUIT

### Installing seawater electric-pump

The sea water electric-pump is needed to circulate the amount of water required in the heat exchanger. This pump is normally centrifugal type and not self-priming type, so it must be mounted so that it is always at least 20 cm below the waterline. The electric-pump should be fixed through silent blocks possibly in a sound insulated environment.



**IMPORTANT!** Turn off the air conditioning always when the sea is very rough in order to avoid pump unpriming.

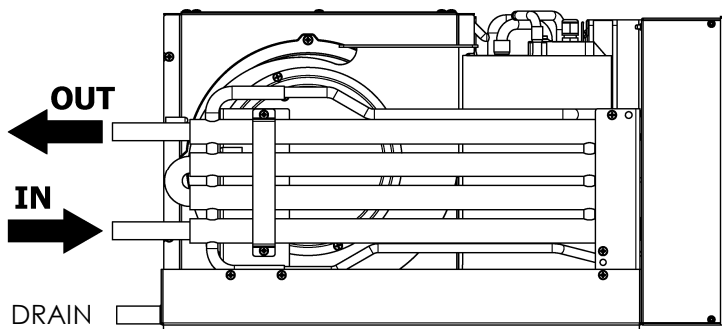
It is required a sea water filter between the sea water intake and electric-pump, in order to protect it from any foreign matter. Failure to install a sea water filter void the warranty of the pump and the unit.

Seawater circuit must be installed with a slope upwards: from the seawater intake, through the filter at the pump inlet to the condenser unit compact entrance.

The unit overboard discharge must be installed as close as possible to the waterline to reduce noise and to be able to check visually the flow / output of the water circuit running.

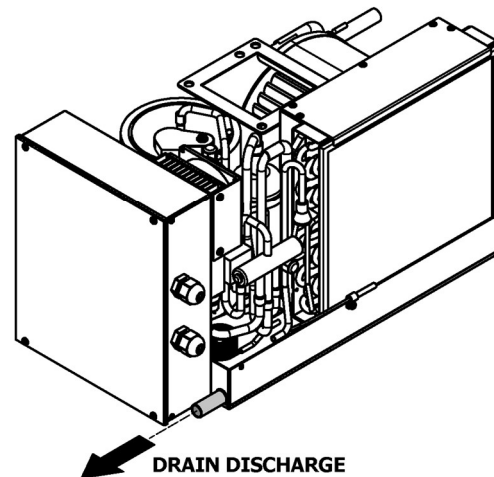
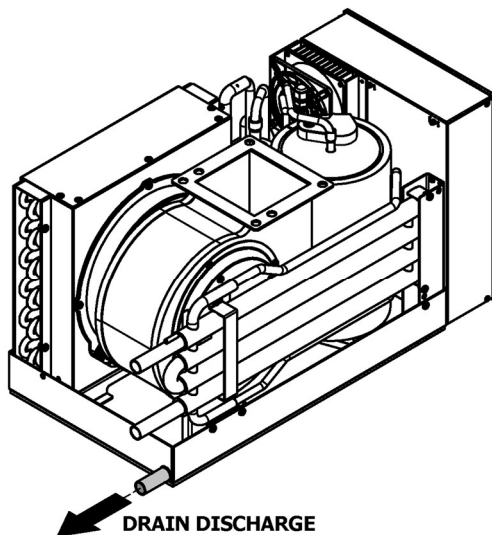
### Self-contained installation

Connect the self-contained heat exchanger unit in the following manner:



**NOTE:** to allow the maintenance or repair operations it is essential that each hydraulic connection is provided with the respective shut off valve.

The air treatment involves the separation of condensate water from humidity of air treated. This condensate must be discharged in the bilge or in a special tank. Since while operating the air conditioner sucks and then creates a slight vacuum in the environment, the drain pipe that goes directly or in the bilge or in a tank, it could suck it up and bring unpleasant smells into the cabin. To avoid this, it is appropriate to make a trap for blocking the air.

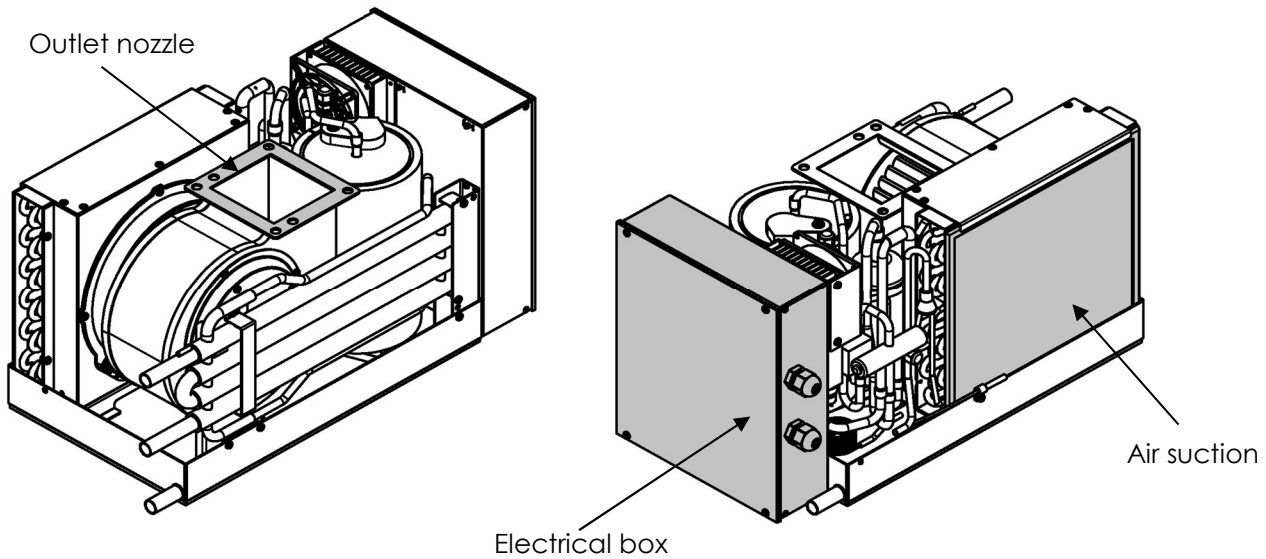


**NOTE:** The direct discharge at side is not recommended because of sucking bad smells from the outside caused by the exhaust gas of its own or other engines.

Each self-contained unit has two outlets, and it is recommended to use both in order to evacuate quickly the water from the drain pan.



### 5.1.2 AIR DUCTS CONNECTION



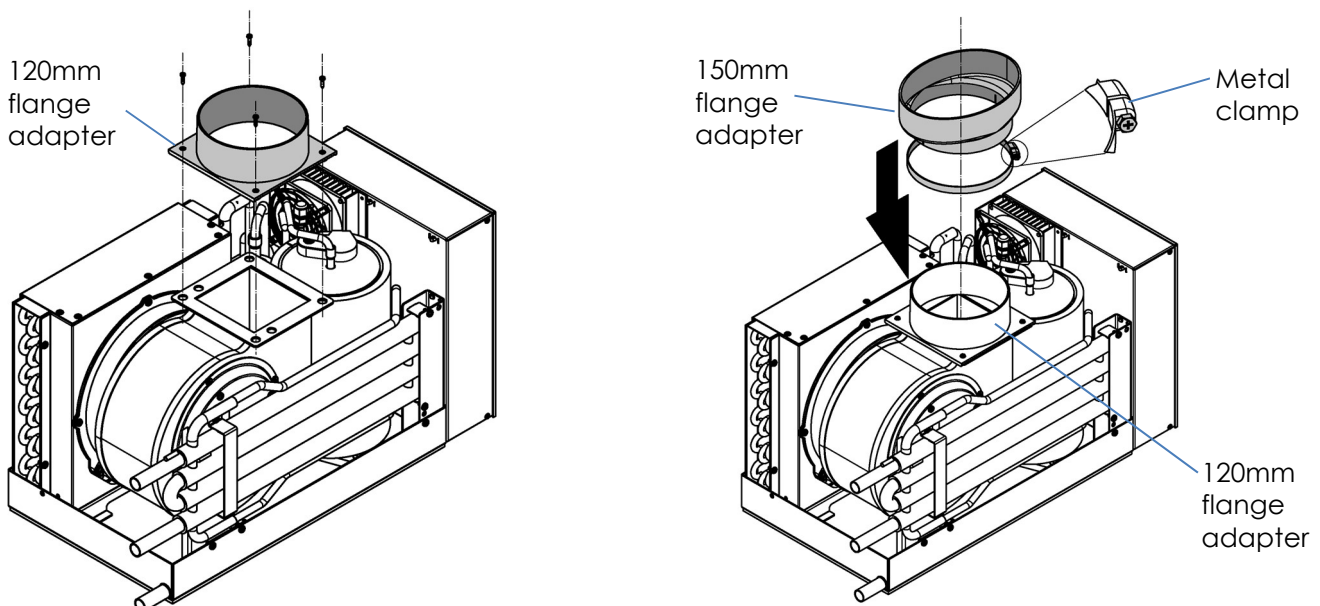
**IMPORTANT!** The diameter of the duct should not be less than the diameter of the outlet nozzle.

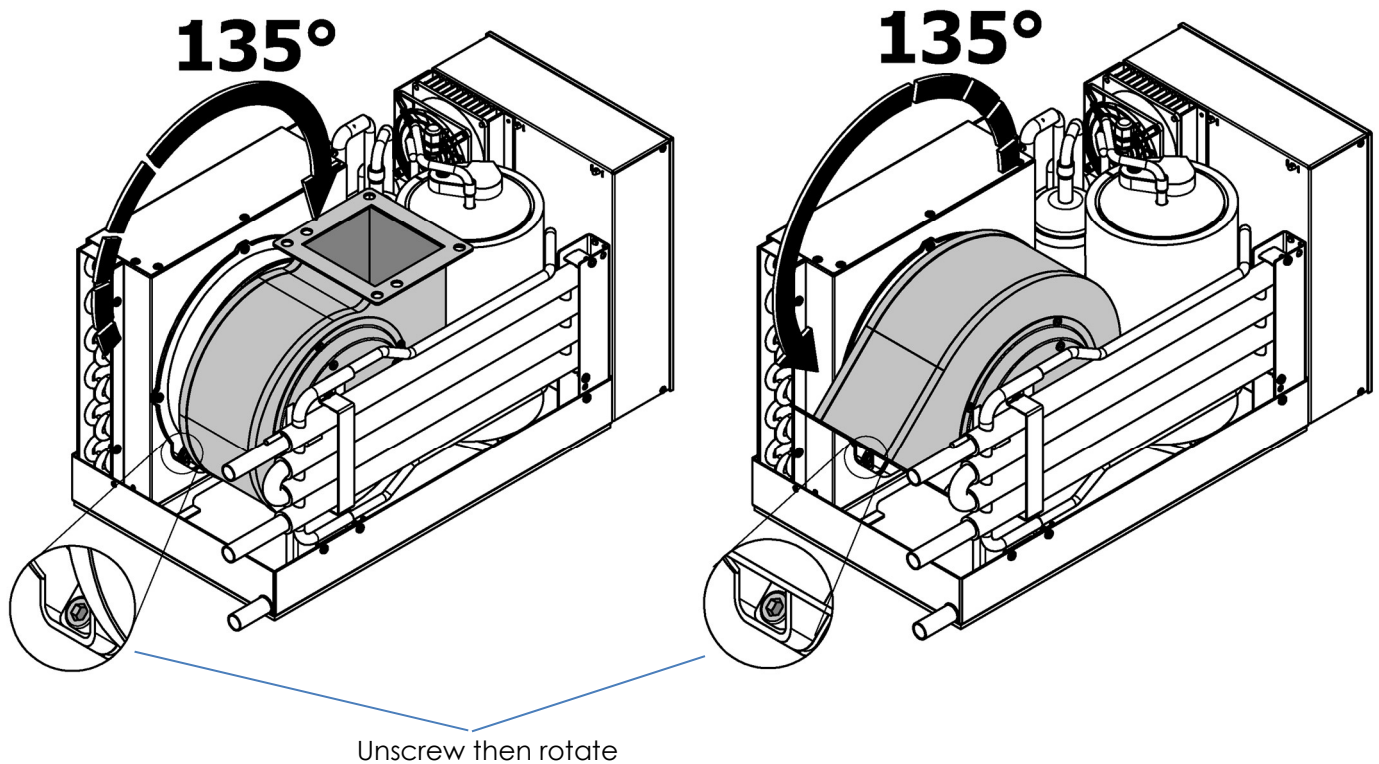
- SELF CONTAINED ART SCU07VFD (up to 7.000 BTU/h) ducts diameter 120 mm / 152 mm
- SELF CONTAINED ART SCU10VFD (up to 10.000 BTU/h) ducts diameter 120 mm / 152 mm
- SELF CONTAINED ART SCU12VFD (up to 12.000 BTU/h) ducts diameter 152 mm
- SELF CONTAINED ART SCU16VFD (up to 16.000 BTU/h) ducts diameter 152 mm

The standard machine's configuration provides the fan outlet flange (rectangular 135x125mm form) as air delivery duct. Are available as optionals two models of flange adapters for ducts Ø120mm and Ø152mm.

#### 120 mm / 150 mm flange adapters (optional)

In order to connect the Ø120mm ducts, it is possible to use a circular adapter (with external diameter 120mm) to be fixed by means of appropriate screws directly on the fan outlet flange.  
 For Ø152mm ducts, after installing the Ø120mm adapter flange, can be fitted over it an additional diameter expansion adapter (oval shape), which must be fixed by a metal clamp.  
 For its right installation, to facilitate the fan movement it is important that the narrowest axes of the oval shape is perpendicular to the sea condensation coil.





#### **Fan rotation**

To make easier the duct installation operations, the fan can be rotated from standard vertical position for at least 135° (see figure above). To release the rotation it is necessary to loosen the screw of the fan support flange. After defining the correct position of the fan it is required to lock it again with its screw.

#### **Air distribution**

The system need a correct air flow in order to work efficiently. It is therefore important to get the correct distribution without bottlenecks, by maintaining the original nozzle diameter and not exceeding the recommended length of pipes of 3m.

The air ducts should be insulated type and must be well stretched to allow a good air flow.

#### **Suction**

The ambient air is sucked through one or more grids of appropriate size. The grid dimensions should respect the suction area of the unit.



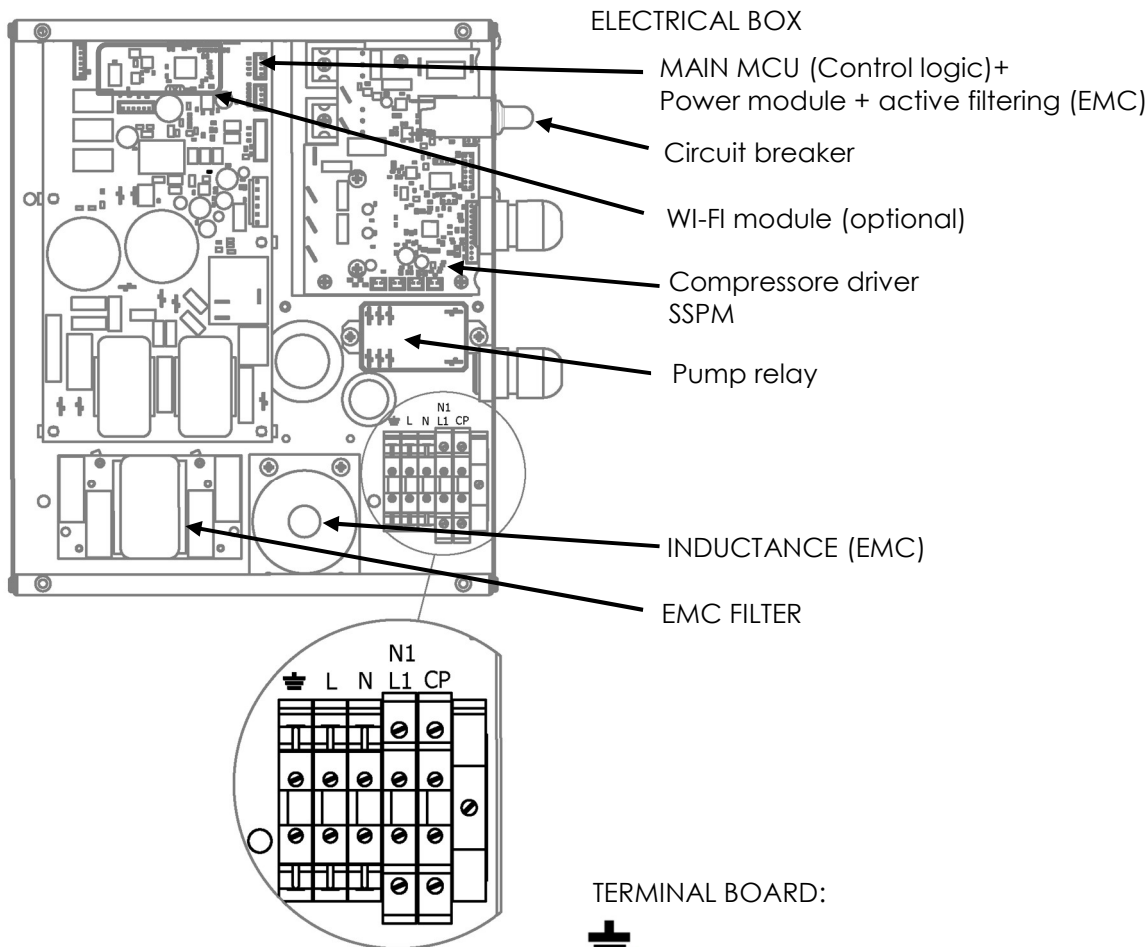
### 5.1.3 ELECTRICAL CONNECTION

#### Warning

It is important that the electrical system is done according to the rules, respecting the data provided in chapter Technical data and it shall be properly grounded.

#### FIXING

The electrical box is delivered fixed on the self-contained unit, however in case of limited space during installation it can be detached (by 3 screws) and fixed elsewhere at a max distance of 1m. It must be installed inside a space provided with suitable ventilation.



**CP** : contact for remote compressor activation, when closed the unit works normally and can be managed via thermostat display, when CP is open the unit goes into stand-by and cannot be activated by thermostat display, SB is shown on the display to indicate this condition.

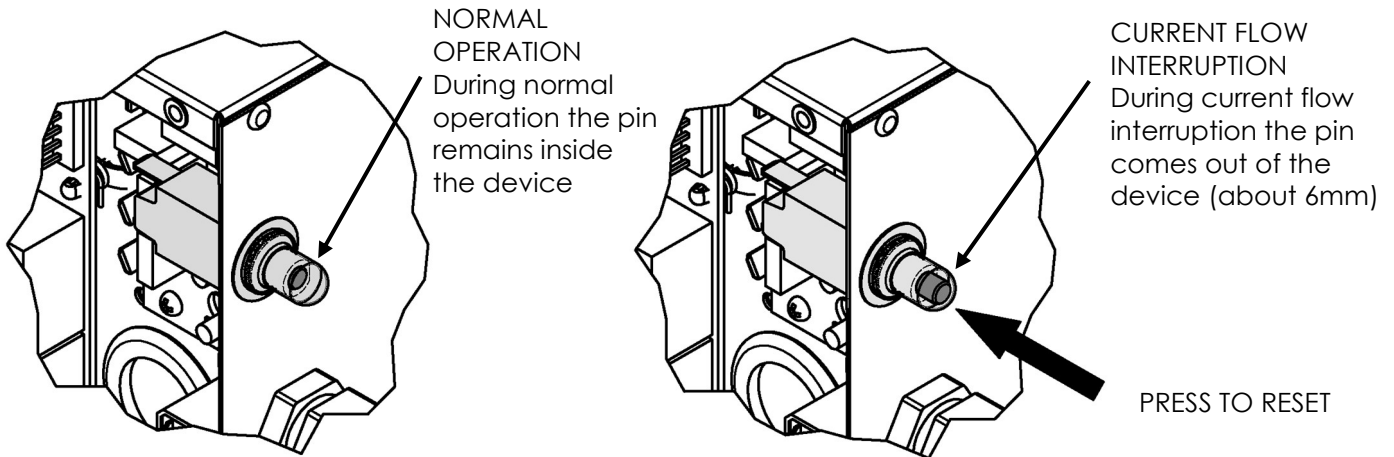
**Important:** in case of connecting two or more units in parallel the CP digital inputs of each unit must be kept separated.





### 5.1.4 CIRCUIT BREAKER

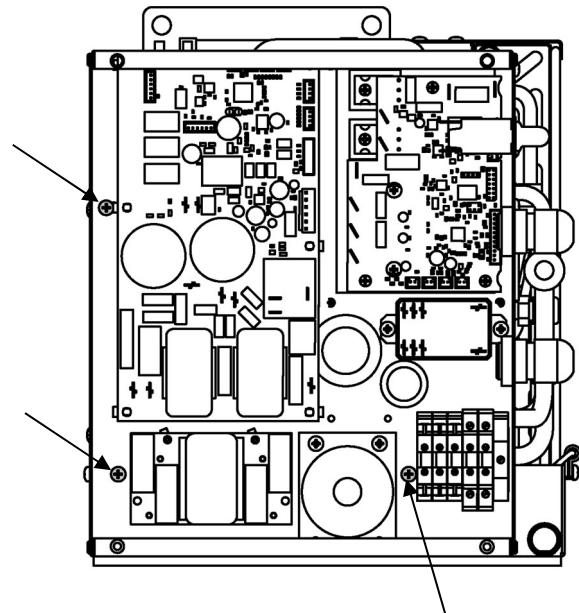
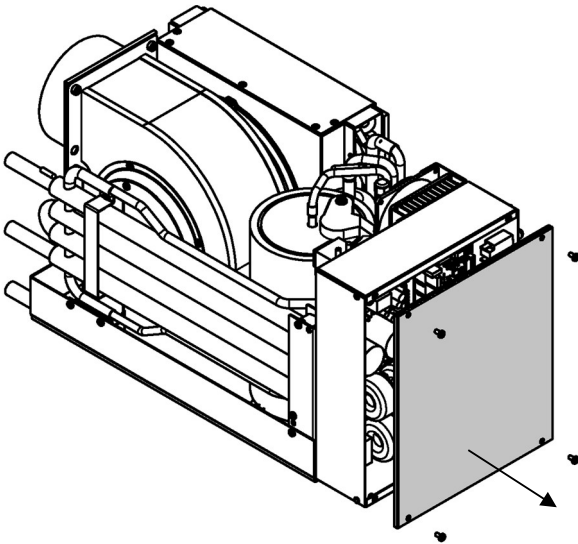
This device protect the electrical circuit from damage caused by excess current from an overload or short circuit. Its basic function is to interrupt current flow after a fault is detected. It can be reset manually through the pin (see images below) to resume normal operations. Before the reset it is very IMPORTANT to know the causes of the device intervention and to have completely solved them.



### 5.1.5 ELECTRICAL BOX REMOTIZATION

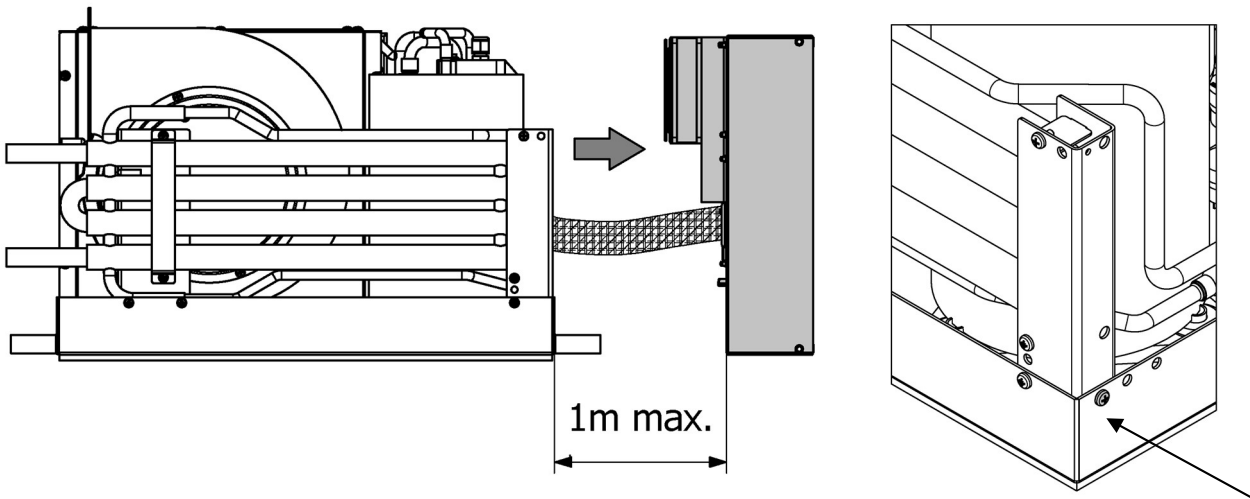
It is possible to remote the electrical box by following these steps:

1. Remove the electric box metal cover
2. Unscrew the 3 electrical box fixing screws





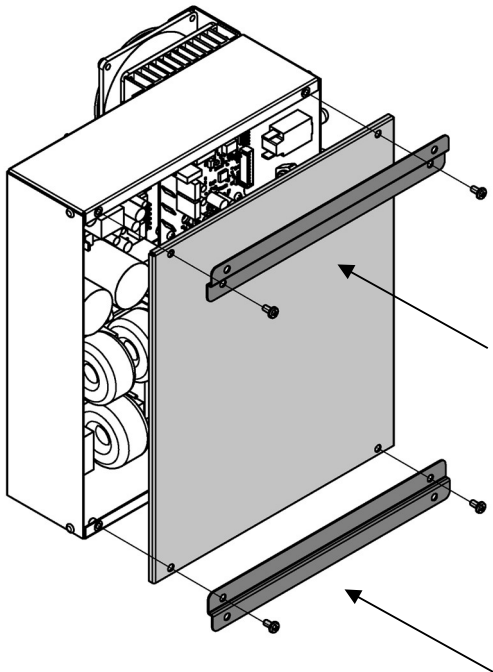
3. The electrical box can be moved far from the self-contained for max.1m



4. Replace this screw

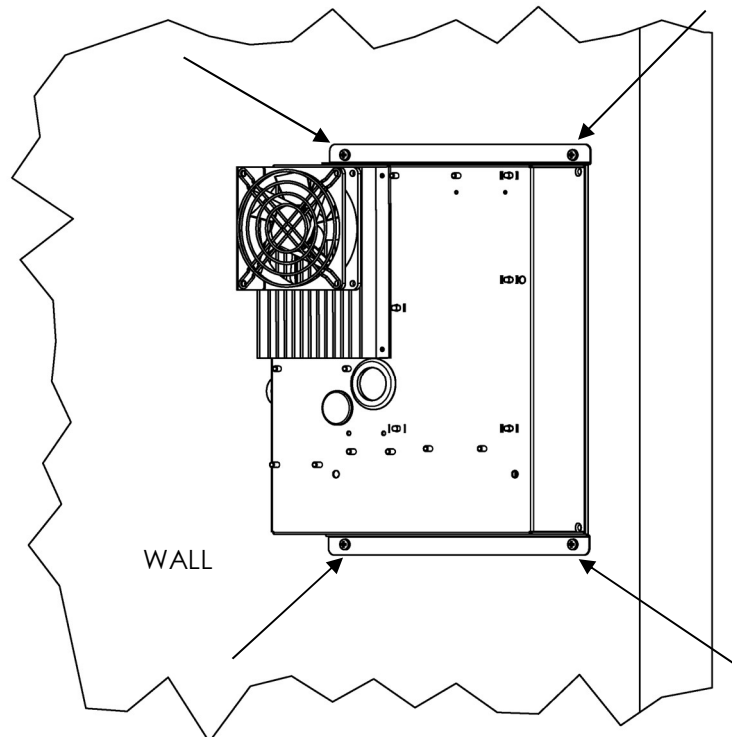
### 5.1.6 ELECTRICAL BOX WALL HANGING (OPTIONAL)

To hang the electrical box on the wall it is necessary to have the appropriate (optional) wall fixing brackets. These brackets must always be assembled in pairs: one in the upper and one in the lower edge of the electrical box cover, fixed by the 4 screws for fixing the cover.



The holes on the two folds that protrude (up and down) from the electrical box must be used to fix the electrical box assembly to the wall using 4 screws not supplied.

To open the box just repeat these operations in reverse





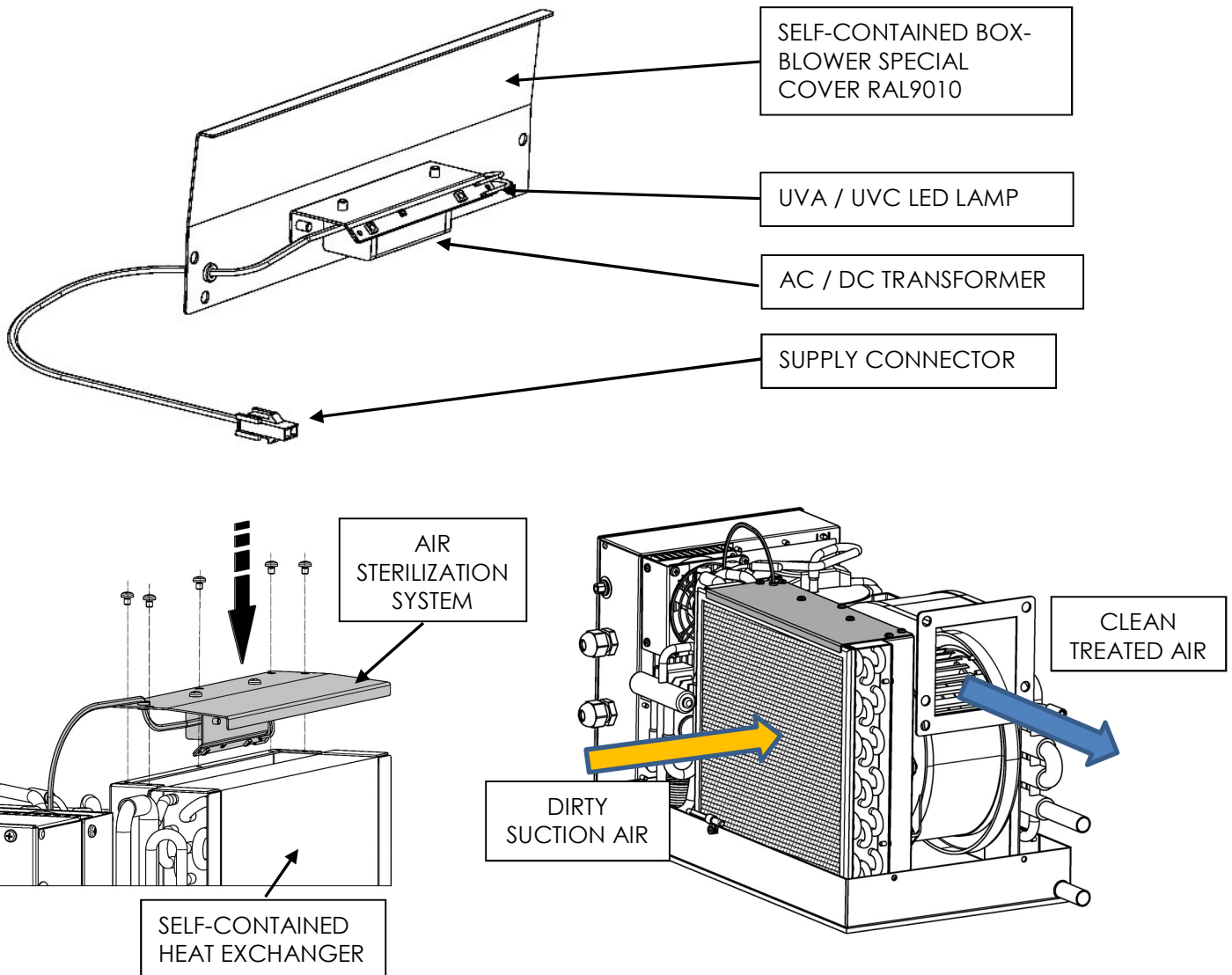
**5.1.7 AIR STERILIZATION SYSTEM UVA/UVC (OPTIONAL)**

This device is constituted by an UVA/UVC led lamp capable of emitting germicidal radiation. These radiations deactivates bacteria, viruses, and other microbes by attacking their DNA. UV light is able to penetrate the cells of microorganisms and disrupt the structure of the DNA molecules. The position of this device in the Self-contained unit allows the disinfection of the treated air and prevents the bacteria that nesting between the fins of the heat exchanger.

Once installed the device works automatically

This LED lamp can last up to 50000 hours and after 20000 can show a 10% yield drop.

For installation of the device, refer to the appropriate instruction manual.



**WARNING: EYE AND SKIN BURN HAZARD**

Failure to follow this warning could result in personal injury.

Ultraviolet (UV) light is harmful - never look directly at a lit UV lamp without UV protective glasses.

Do not expose your skin directly to the UV light without protection.

Note that the indirect light, the blue glow, is safe.

Turn off the breaker and then unplug the lamp before servicing.

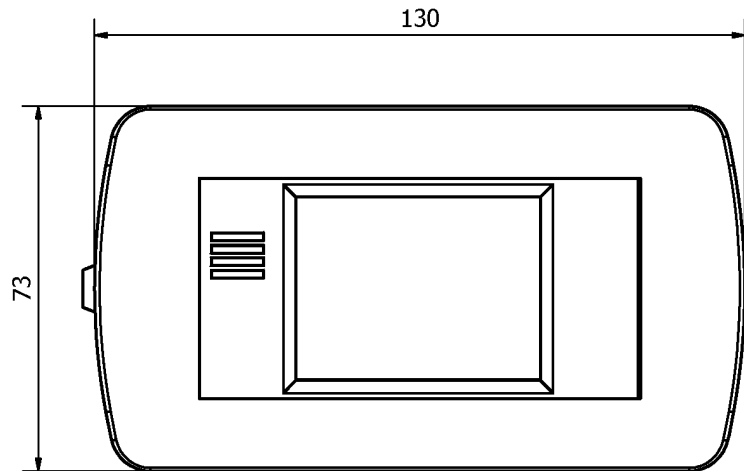


Installation and servicing of this device can be hazardous due to lights and electrical components. Only trained and qualified service personnel should install, repair or service this device.

## 6.0 WALL-MOUNTED TOUCH-SCREEN DISPLAY

The self-contained wall-mounted touch-screen display is inside the machine's package with his connection cable (max 5m) and fixing screws. The display is preassembled on Bticino LN4704 support compatible with in-built wall box 504 and aesthetic cover Bticino and Vimar.

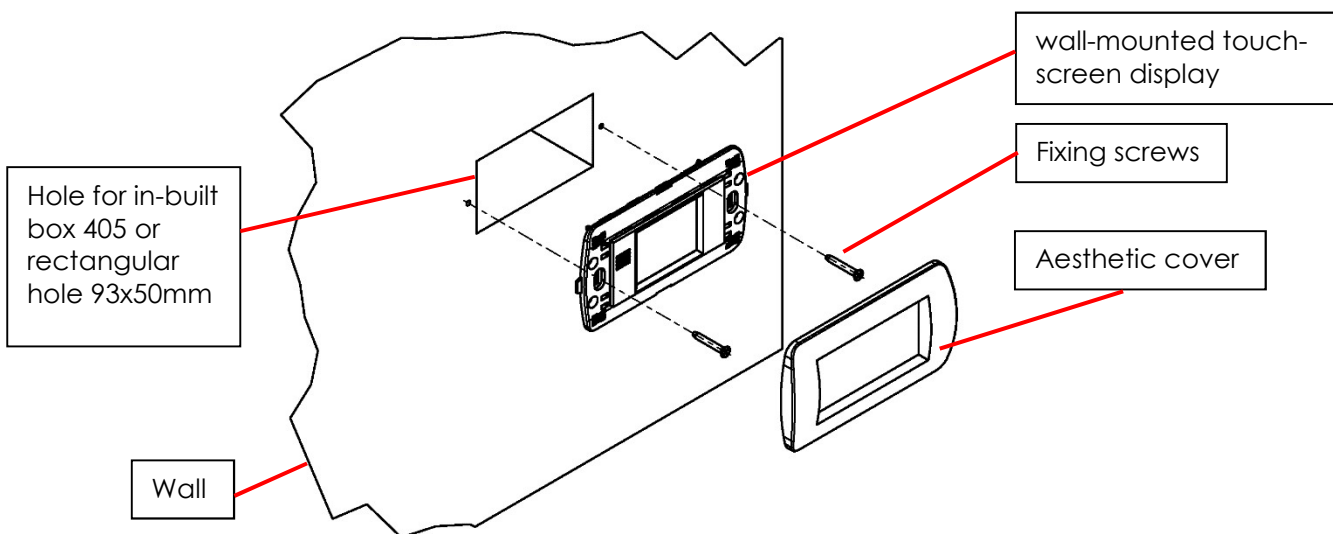
The maximal dimensions of installed display are as below.



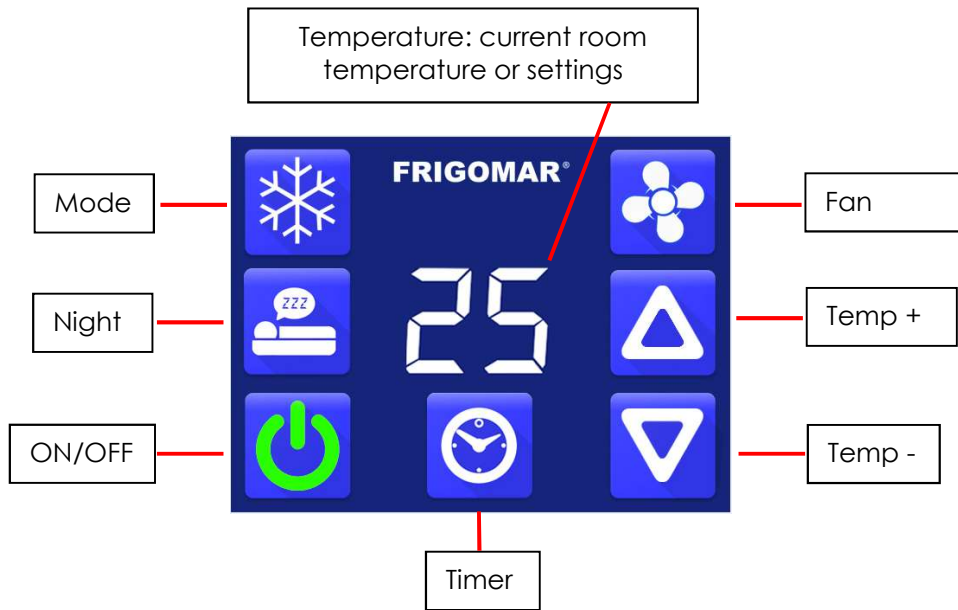
### 6.1.1 INSTALLATION

Install the Self-contained wall-mounted touch-screen display away from doors and/or windows and from heat sources around 1.5m from the floor then proceed with the following operations:

- drill holes in the wall (for in-built box 504 or rectangular min. dimension 93mm x 50mm);
- pass the cable from machine throw the wall and exit from the in-built box (or rectangular hole);
- connect the cable in the connector placed in rear side of display;
- fix the display (from Bticino LN4704 support) to the wall using suitable screws;
- place the aesthetic cover Bticino or Vimar upside the support and around the display;



### 6.1.2 TOUCH SCREEN DESCRIPTION:








When unit is ON, ON/OFF button is green color, pressing ON/OFF button turns into white color and unit stop. Pressing ON/OFF button again, white turns into green and unit switches ON.

At first switch ON the system will start in cooling mode, Auto fan speed, and temperature setting = 23°C, at each subsequent switch ON it will recover the previous setting of mode, fan speed and temperature set.

All the other menus can be set both in ON/OFF situation, back-up light is activated after the first touch, then it is possible to make selections.

**ALARMS DO NOT ACTIVATE BACK-UP LIGHT AUTOMATICALLY, IT WILL BE ACTIVATED ONCE THE SCREEN IS TOUCHED**

#### 6.2.1 MODE:

When unit is ON, mode button can switch in a cycle from cooling mode  (snowflake) to heating mode  (flame), dehumidification mode , automatic mode  "A", fan mode .

The selection of the operating mode cooling / heating /dehumidification/Auto can be done IN 2 DIFFERENT WAYS: from the thermostat panel or via Modbus/Nmea2000(IEC 61162-3).

*If mode button is pressed in off mode continuously for 10s (regardless the current mode displayed) the seawater pump only will be activated and the icon will become yellow, by pressing again the pump will stop and the color will come back to default one.*

#### 6.2.2 AUTO RUNNING MODE:

When set to Auto running mode for first time, the indoor fan will run 20s at low speed to measure the indoor temperature, then decide the running mode accord to the difference between setting temperature  $T_{set}$  and room temperature  $T_{room}$ . Set temperature range 20÷26°C, default setting 23°C

If any temperature sensor failed, unit stops and related alarm code is displayed.

When unit running in Auto mode:

If running in fan mode, the unit will read the difference between room temperature and setting temperature continuously until mode shift condition is satisfied. Unit will shift to required mode immediately. Compressor will run on the step according to indoor fan speed choice.

If running in cooling or heating mode, only after compressor off over 20 minutes, the running mode will be selected again according to temperature difference.

Indoor fan speed can be set freely among auto, low, medium, high.

### 6.2.3 COOLING MODE:

In this mode the setting range is 18°C-30°C.

When  $T_{room} \leq T_{set} - 1^\circ\text{C}$  and compressor running time  $\geq 3$  minutes, compressor will be stopped and seawater pump will be stopped 1 s later. Indoor fan motor keeps running at setting speed.

When  $T_{room} = T_{set}$  compressor will start decreasing frequency 1Hz/30sm, minimum frequency 20Hz, forbidden frequencies will be avoided, if  $T_{room} \geq T_{set} + 1^\circ\text{C}$  frequency will start increasing 1Hz/20s till setting speed is reached.

When  $T_{room} = T_{set} + 1^\circ\text{C}$  and compressor stop time  $\geq 3$  minutes seawater pump starts and compressor starts 5s later. Indoor fan motor will run at the setting speed.

If any temperature sensor failed, unit stops and related alarm code is displayed.

### 6.2.4 DEHUMIDIFICATION MODE:

When set to Dehumidification mode for the first time, the indoor fan will run 60s at low speed to measure the indoor temperature  $T_{amb}$ , dehumidification function will run until  $T_{room} > T_{amb} - 2^\circ\text{C}$ , if  $T_{room} \leq T_{amb} - 2^\circ\text{C}$  unit will run in fan mode minimum speed.

When set to dehumidification mode, indoor fan is forced to run at low speed.

When set to dehumidification mode, compressor will cycle 8min ON at  $F_{deum\_1}$  Hz and 4 min OFF.

### 6.2.5 HEATING MODE:

In heating mode, setting range is 18°C-30°C.





When  $T_{room} \geq T_{set} + 1^\circ\text{C}$  and compressor running time  $\geq 3$  minutes, seawater pump will be stopped 1s later than compressor. Indoor fan motor will run at low speed to blow out the reserved heat, and maximum running 30s.

When  $T_{room} = T_{set}$  compressor will start decreasing frequency 1Hz/30sm, minimum frequency 18Hz, if  $T_{room} \leq T_{set} + 1^\circ\text{C}$  frequency will start increasing 1Hz/20s till setting speed is reached.

When  $T_{room} \leq T_{set} - 1^\circ\text{C}$  and compressor stop time =3minutes, seawater pump starts and compressor starts 5s later Indoor fan motor will run only when the heat exchanger is warm enough.

### 6.3.1 FAN SPEED:

When pressing fan speed button, 4 possible running speeds will be showed in a closed cycle: minimum

speed (minimum fan symbol size) , medium speed (medium fan symbol size) , maximum speed (maximum fan symbol size) , automatic fan speed  (maximum fan symbol with internal "A", to have different symbol from automatic mode).

When selecting automatic fan speed, the fan speed will be regulated according to the difference between  $T_{amb}$  and  $T_{set}$  (minimum speed for  $DT \leq 2^\circ\text{C}$ , medium speed for  $2^\circ\text{C} < DT \leq 4^\circ\text{C}$  and maximum speed for  $DT \geq 4^\circ\text{C}$ , hysteresis =  $1^\circ\text{C}$ ), this is valid only for cooling or heating mode, in dehumidification mode fan is forced to minimum speed.

### 6.4.1 TEMPERATURE SET POINT:

Pressing any of  $\Delta \nabla$  button, the room temperature will shift to setting temperature in flashing.

Pressing any of  $\Delta \nabla$  again, setting temperature will be rising or going down.

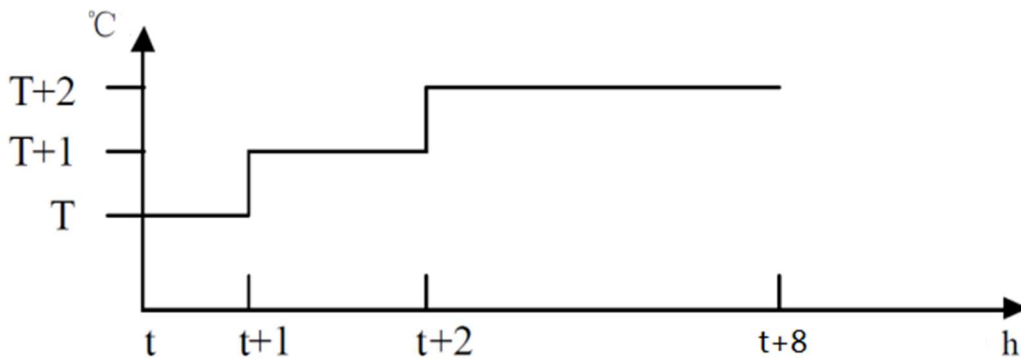
The temperature setting mode will be quit automatically in 5s if no any operation. The number will display the current room temperature, without flashing any more

During temperature setting period, if any other button pressed, the temperature setting situation will be quit immediately.

### 6.5.1 NIGHT MODE:

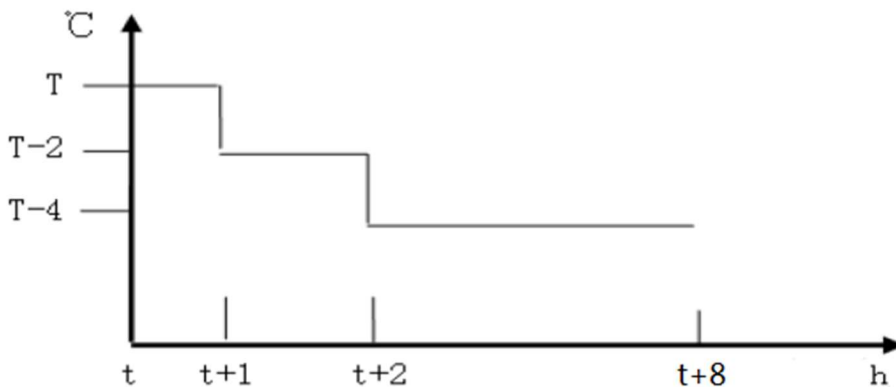
When unit is on, pressing night mode button  on the touch thermostat to enter night mode .

In **cooling** mode if night mode is activated, after 1 hour, setting temperature increase 1°C automatically. After another 1 hour, increase another 1°C (totally 2 °C in 2 hours). Then keep it and unit will stop after running for other 6 hours (totally running for 8 hours).






In **heating** mode: if night mode is activated, after 1 hour, setting temperature decrease 2°C automatically. After another 1 hour, decrease another 2°C (totally 4°C in 2 hours). Then keep it and unit will stop after running for other 6 hours (totally running for 8 hours).

If set the night mode and timer OFF simultaneously, Timer OFF function is with first priority.



Night mode activated, fan speed will shift to low speed.

### 6.6.1 TIMER FUNCTION:

When clock icon  is pressed it turns into active  and the unit enters into timer mode, if icon is pressed again function is released and icon turn back to . Setting time is relative to current time.

When air conditioner is running, Timer OFF can be set by pressing Timer symbol. After timer symbol lightened, relative stop time start to flash in the temperature field, first value is 1 (the unit will stop after 1 h), arrow up and down can be used to set the time to power OFF. Then press the time symbol again to confirm the setting time. Timer function starts.

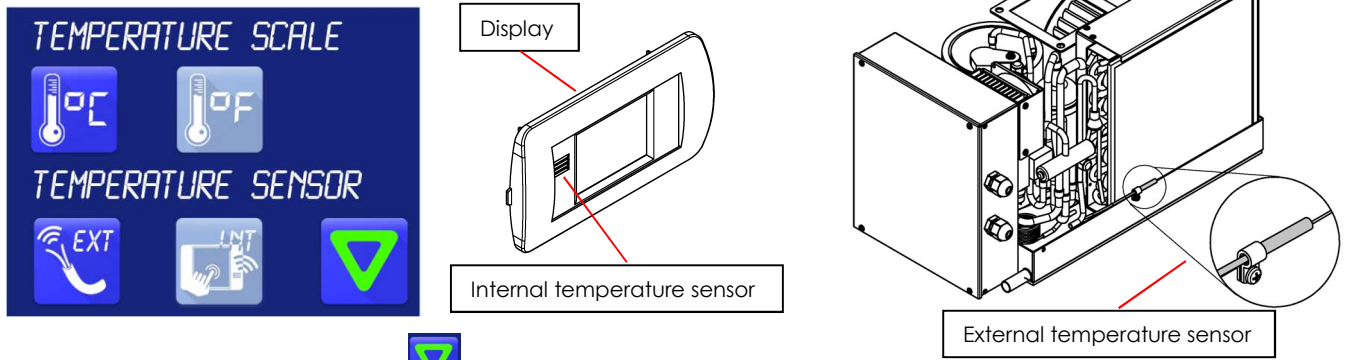
Press the timer symbol again to cancel the setting

When air conditioner is in Off condition, Timer ON can be set by pressing Timer symbol. After timer symbol lightened, relative start time start to flash in the temperature field, first value is 1 (the unit will start after 1 h), arrow up and down can be used to set the time to power ON. Then press the time symbol again to confirm the setting time. Timer function starts.

Press the timer symbol again to cancel the setting

**6.7.1 SETTINGS:**

Pressing the fan button over 5 s, setting window will be displayed as below:  
 The current choice will be highlighted.  
 Temperature unit and sensor choice is available.  
 The selected button will be highlighted after operation.



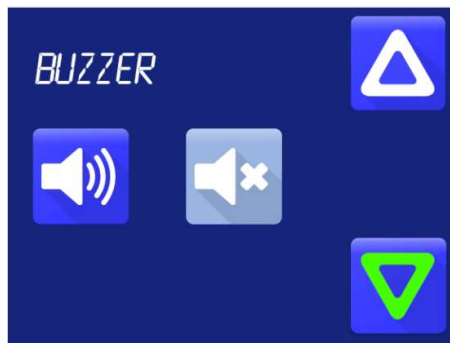
When finish the choice, press to go to ne next page.  
 Once selected the probe, in case it fails, the unit will stop and alarm E1 will be displayed.  
 It will be possible to delete the alarm and restart the unit by replacing the probe or switching to the other probe from the setting page. If switching to the other probe, not replacing the one out of order, the alarm will be deleted and it will appear again only if reselecting the previous one.

**Ltn** (display backlight duration in seconds) value setting with range 10-99, default value=60s:



When finish the choice, press to go to ne next page, press to go to ne previous page.

Buzzer activation page:





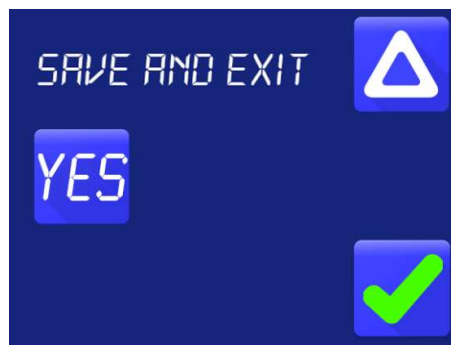
When finish the choice, press to go to ne next page, press to go to ne previous page.



Def (default settings restore) setting and exit page:



The YES button will be highlighted if selected, if no default setting restore is needed it is possible to change window, press  to go next page, press  to go previous page. Exit and save page:



If YES button is selected it will be lighted for 2s and changes become effective and screen come back to main page.

## 7. 0 ALARMS

Alarms codes will be displayed in yellow colour instead of the current temperature, alarm history will be displayed in the service menu (only relative time, last one on top)

### 7.1.1 ALARMS and troubleshooting

E1: Room temperature: sensor failure

E2: Evaporator coil temperature: sensor failure

E3: Water outlet temperature: sensor failure (water outlet temperature)

E4: Condenser temperature: sensor failure

E5: Indoor DC Fan failure

E6: Communication error between Main MCU and room thermostat

E7: Communication error between Main MCU and SSPM

E8: Compressor discharge temperature: sensor failure

LT: Low outdoor coil temperature in heating mode

LP: Low pressure alarm

HP: High pressure alarm

In case of alarm from E1 to E7 please try to switch OFF the unit and then ON again, if the problem persists call a Frigomar authorized service.

HP alarm in cooling mode could be due to obstructed seawater circuit or to the seawater pump not working properly (e.g. thermal load protection). Please check visually the seawater discharge overboard, and in case of poor water flow, check and clean all the involved parts.

In case of HP alarm appears in heating mode, the air flow through the air outlet could be too low. Please check all the ducts are not obstructed somewhere. Also the air suction filter, if dirty, could cause high pressure, provide then to clean it before restarting the unit.

LP alarm is most commonly due to a consistent leakage of refrigerant, check the refrigerating circuit for leakages.

In case of LT alarm, the problem could be due to poor seawater circulation or seawater temperature too low (below 5°C). Please check first the seawater flow as above specified.

## 8. 0 WORKING LIMITS

The unit operates correctly within the following ranges:

· Summer cooling mode: 15°C < sea water temperature < 40°C

· Winter heating mode: 5°C < sea water temperature < 20°C

Should working conditions be out of these ranges, in your particular application, please contact Frigomar before installation in order to find a suitable solution.

- Localized situations: in some regions, it is common to experience a tremendous presence of jellyfish or seaweed concentrated in back bay marinas for some periods of time. This can clog strainers, water pumps and heat exchangers in a little while, causing shut-down faults and sometimes equipment damage. In such particular conditions, please seek the advice of a local Frigomar service representative. Any possible modification to the overall system (self-contained, pumps, strainers, etc.) that could overtake the problem must be approved by Frigomar, otherwise warranty coverage will decline.
- The pump is not self-priming: any damage incurred due to a pump running dry is not covered under warranty. Air conditioning system must be switched off, as well as pumps, whenever there is a risk of pump unpriming, due to particular seawater conditions related to the boat type and its speed. The compressor could be damaged if the seawater flow through the heat exchanger is considerably reduced.

This air conditioning system is designed to work under normal operation conditions. Where failure or malfunctions could lead to an abnormal operating condition that could cause injury or damage to any equipment or other property, additional precautions must be designed into the control system. Other devices (limit or safety control) or systems intended to warn of, or protect against failure or malfunction, must be incorporated into and maintained as part of the system.

## **9.0 WARRANTY TERMS**

### **9.1.1 LIMITED WARRANTY:**

The warranty is given to the purchasers who buy Frigomar-manufactured products and components for their own use.

Frigomar guarantees all these products to be free from defects in materials or workmanship.

Warranty is limited in term of duration as specified in the following sections.

This Limited Warranty is made in place of all other express warranties, obligations, or liabilities on the part of Frigomar. In those instances, in which Frigomar chooses to make a cash refund of the original purchase price, such refund shall affect the cancellation of the contract of sale without reservation of rights on the part of the owner. Such refund shall constitute full and final satisfaction of all claims which the owner has or may have against Frigomar resulting from any actual or alleged breach of warranty, either express or implied.

Frigomar disclaims any liability for either incidental or consequential damages. This includes any damage to another product or products resulting from such a defect. Any implied warranties of merchantability, satisfactory quality or fitness for any purpose is limited to the duration of this limited warranty.

Frigomar does not authorize the dealer or any other person to assume for Frigomar any liability in connection with the warranty, or any liability or expense incurred in the replacement or repair of its products other than those expressly authorized by Frigomar. Frigomar shall not be responsible for any liability or expense except as is specifically authorized in the following sections.

Frigomar reserves the right to improve or modify its products without notice, through changes in design or material without being obligated to incorporate such changes in products of prior manufacture.

### 9.1.2 WARRANTY DURATION:

The Frigomar product's Warranty Coverage Period begins from the date of possession of the boat by the original owner (if OEM installed) or from the date of installation (if the Frigomar product is installed by a dealer). However, the Warranty Coverage Period will not exceed 3 years from date of manufacture. The Warranty is transferable and will carry any remaining Warranty Coverage Period. The Warranty Coverage Period does not restart following any repair or replacement of the Frigomar product.

All Frigomar products bear a data plate showing the product model and serial numbers. The serial number is date-coded. To determine whether any Frigomar product is covered under this Warranty, proceed as follows: Determine the manufacture date of the Frigomar product from the serial number found on the data plate. If you are not familiar with the date code, email or call Frigomar Customer Service in order to obtain the Frigomar products manufacture date.

In some cases, there might be a consistent delay between the date a Frigomar product is manufactured and the date it is put in service. For proof of the date that the Frigomar product was put in service, Frigomar will require a copy of the bill of sale from the Frigomar product installer or a copy of the bill of sale showing the date of delivery from the new boat dealer to the original owner. Therefore, owner should retain a copy of the dated bill of sale as evidence of the date of purchase or date of delivery.

- **Chiller, self-contained units and fan coils:** If any part of the Frigomar unit fails due to a manufacturing defect within 24 months from the date of possession of the boat by the first owner, Frigomar will supply without charge the required replacement part. The service labour will be at Frigomar charge within 12 months from the date of possession of the boat by the first owner, as long as the conditions specified in Section III are fulfilled.

- **Chiller units equipped with 70/30 CuNi condenser:** 5 years warranty with first year parts and labour, second year parts only, third through fifth years, parts-only warranty against erosion/corrosion (except application where big amount of sand are mixed with raw water) on Heat Exchanger resulting in a breach of cooling water into refrigerant circuit. All damaged refrigerant parts will be supplied for replacement. Such warranty is valid as long as clearly written in the Frigomar invoice referring to the product code and its serial number.

- **Pumps:** If any pump fails due to a manufacturing defect within 12 months from the date of original shipment Frigomar will replace or repair the part without charge. The service labour will be at Frigomar charge as long as the conditions specified in Section III are fulfilled.

Pump seals are not covered under warranty.

**Catalogue:** For Catalogue Sales of any product the warranty duration is 1-year for parts from the date of purchase, 6 months for labour from the date of purchase.

**Refitting:** Frigomar chillers installed in conjunction with a control system other than a current Frigomar control or a control system that is outdated carries a 90 days warranty on defective material or workmanship from the date it is put into service. There will be no warranty coverage for operation failures such as control malfunctions, freeze failure and the like. Frigomar Customer Service is available to assist with recommendations on the installation, but Frigomar will not be responsible for any non-Frigomar part.

**After market:** Replacement parts and components: warranty duration is 90 days, parts only

The owner of the product may decide to ship the allegedly defective or malfunctioning product or part to Frigomar at his charge: Frigomar will analyse the defective product and, provided it is covered under warranty, will repair or replace it without charge, taking in charge the return freight with ordinary forwarder (not express or similar). All risks of loss or damage during shipment of the product or parts to Frigomar and back to the owner shall be the responsibility and liability of the owner.

### **9.1.3 WARRANTY CONDITIONS:**

The intervention must be prior authorized by Frigomar Customer Service (tecnico@frigomar.com). All the parts delivered by Frigomar bear a data plate reporting model and serial number: the owner shall give to Frigomar Customer Service all this information related to the faulty parts. Normally the preferred way is to e-mail the data plate photos. Frigomar may also require a copy of the bill of sale from the Frigomar product installer or a copy of the bill of sale showing the date of delivery from the new boat dealer to the original owner, as a proof of the date that the Frigomar product was put in service.

The intervention must be carried out by a local authorized Frigomar service (worldwide service network: <http://www.frigomar.com/en/service-network.html>). In case Frigomar has no one in that particular area, Frigomar will authorize the use of a local service company and Frigomar will work with the local company to assist in any way possible.

Where labour is included for a particular Frigomar product covered under this Limited Warranty, Frigomar is not responsible for additional labour charges associated with the removal, reinstallation, or replacement of any equipment or furnishings beyond the particular covered Frigomar product. This Frigomar Limited Warranty allows up to 1.0 hour for the Servicing Dealer's travel time. Any additional travel time is the owner's sole responsibility.

The labour time necessary to get access to the faulty unit in order to start repairing, will be at owner's charge. Warranty periods begin from the date of possession of the boat by the first owner, but not to exceed 3 years from date of manufacture.

Any unit or replacement part installed due to a warranty failure carries the remainder of the original warranty. Warranty coverage does not start over from the repair/replacement date.

If the intervention onboard is required but the problem is due to improper installation and use, or any cause independent from the supplied equipment, the cost of intervention will be at owner's charge. Installation and application of Frigomar components is not warranted by Frigomar, because Frigomar has no control or authority over the selection, location, application, or installation of these components.

The responsibility of the owner of the equipment includes the following:

1. To operate the equipment according to the manufacturer's instructions.
2. To provide easy accessibility for service.
3. To check and reset circuit breakers and disconnect before calling for service.
4. To keep the units clean and free of dirt, to keep the air filters clean as well as the air heat exchangers.



5. To keep the condenser coil free of sediment and scale.
6. To check monthly and replace (if needed) zinc anodes on seawater condenser (if applied).
7. To keep clean the fan coil water circuit.
8. To pay the charges incurred when any of the above has not been done.
9. To pay for repair or replacement of any material or part other than those within the Frigomar unit.
10. To check any fuses on the circuit board and replace as required.

This warranty shall not apply to:

Failures resulting from improper or faulty installation, installation that does not comply with Frigomar's instructions or otherwise, installation that does not comply with any American Boat and Yacht Council standards, and any damage resulting from such;

Abuse, misuse of equipment, natural disasters, flooding, fire, submerge, any water leakage, or use contrary to instructions;

Items not manufactured by Frigomar;

Transport: product damage as a result of improper return packaging or other freight damage;

Negligent servicing;

Wrong electrical and hydraulic connections;

Power supply not in according to manufacturer's specifications;

Fresh water frosting (chilled water circuit);

Exterior corrosion, electrolysis and galvanism, stray current, seawater erosion;

Water damage, including specifically to the following components: pumps, blowers, logic boards and displays heads;

Additional labour charges associated with the removal, reinstallation, or replacement of any equipment or furnishings beyond the particular covered Frigomar product. The original installer or OEM is responsible for the accessibility of the Frigomar product;

Failures due to improper winterization;

Pumps with cracked heads or pumps that have been run dry, are water damaged or have blown freeze plugs;

The following components: pump seals, UV light bulbs, sea strainer elements, cartridge filter elements, sand & gravel in a multi-media filter, pump packing assemblies, pump valve assemblies, pump crankcase oil, fuses, valve seals and packings, membrane elements and liquid line filter dryers;

Mis-programmed displays;

Logic boards and display heads with water damage;

Environmental and/or recovery fees;

Damages occurring as a result of normal wear or aging;

Replacement of refrigerant with substitute without Frigomar preauthorization;

Welding and Nitrogen Fees.





**FRIGOMAR**  
EXCLUSIVE MARINE REFRIGERATION



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