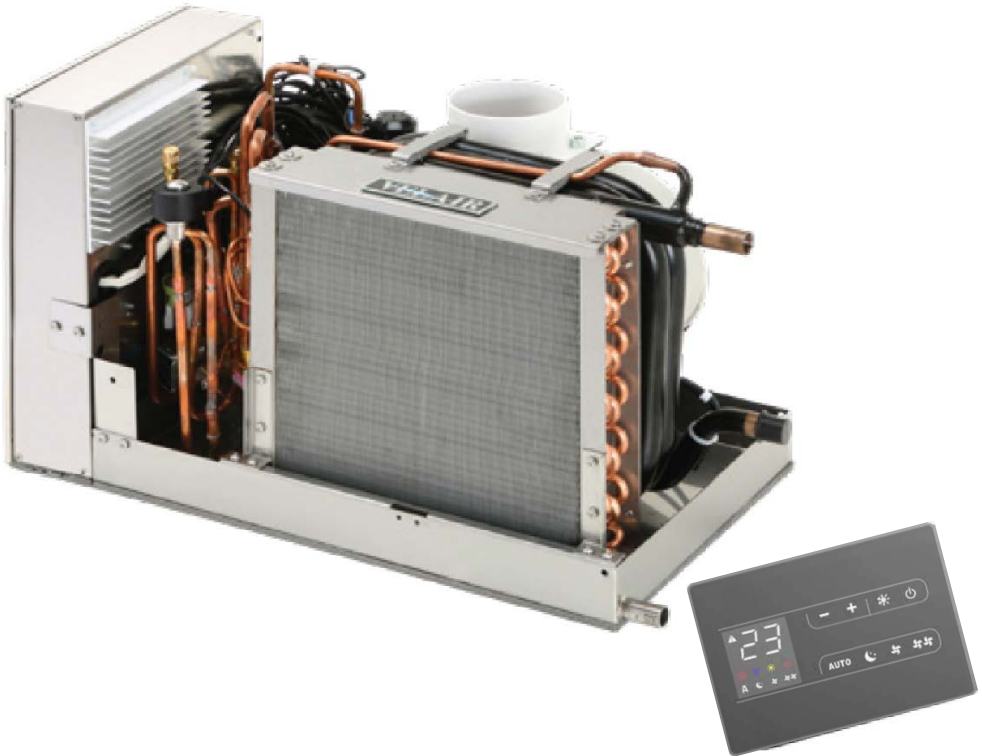
UFLEX
a world of marine equipment

VELAIR

2025 TECHNICAL DETAILS

Self Contained air conditioning unit

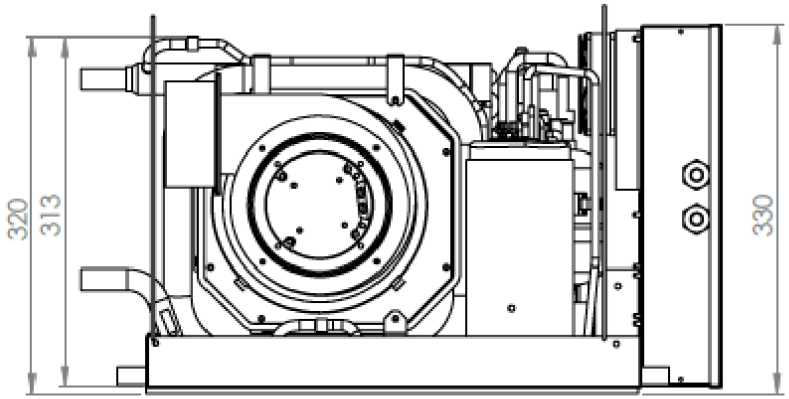


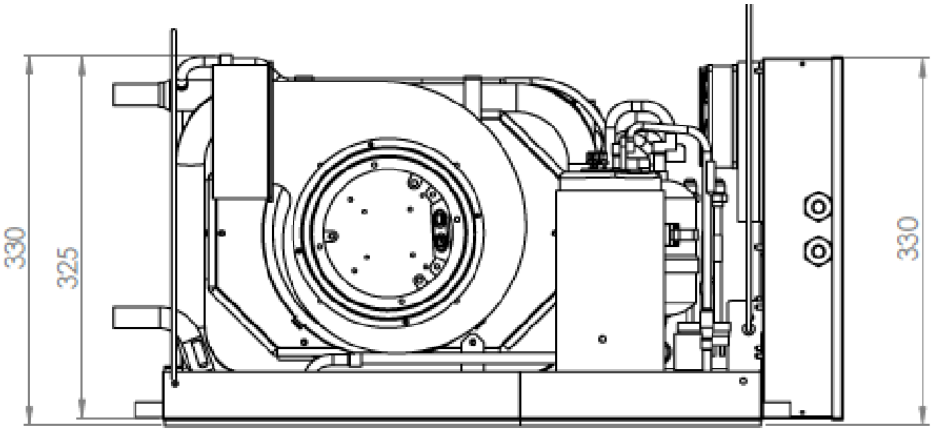
THE RANGE

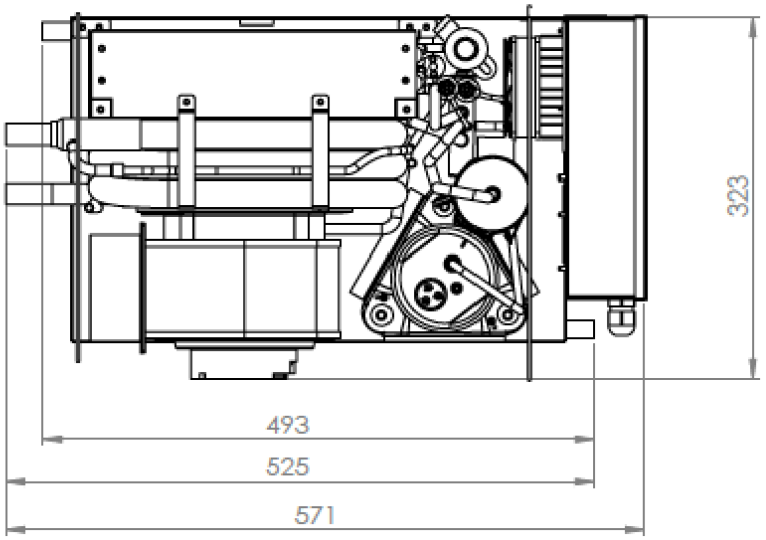
Model	Compact i10 VSD SMART	Compact i16 VSD SMART	Compact i21 VSD
230V/1ph/50-60Hz version Part No.	24831GW	24832JW	24765WW
115V/1ph/50-60Hz version Part No.	24831GU	24832JU	-
Cooling capacity range	4.000 - 10.000 BTU	6.000 - 16.000 BTU	7.000 - 21.000 BTU
Heat pump	Yes	Yes	Yes
Maximum input power cooling	0,64 Kw / 2,9 A	0,93 Kw / 4,1 A	1,35 Kw / 6,1 A
Input power ECO mode	0,21 Kw / 0,95 A	0,31 Kw / 1,35 A	0,46 Kw / 2,1 A
Min. seawater flow	12 l/min	15 l/min	20 l/min
Seawater IN / OUT	Ø 19 mm (0.75)	Ø 19 mm (0.75)	Ø 16 mm (0.63)
Maximum air flow	400 m^3/h	550 m^3/h	800 m^3/h
Air exit duct (for max capacity)	1 x Ø 100 mm - 1 x Ø 3.9"	1 x Ø 125 mm - 1 x Ø 4.9"	3 x Ø 152 mm - 3 x Ø 6"
Min.opening for return air grill	400 cm^2	600 cm^2	800 cm^2
Min.opening for supply air grill	250 cm^2	300 cm^2	400 cm^2
Refrigerant	R32	R32	R410A
Control panel cable length	8 m	8 m	8 m
Width - including electrical box	571 mm - 22.5"	650 mm - 25.6"	730 mm - 28.7"
Height	320 mm - 12.6"	330 mm - 13"	445 mm - 17.5"
Depth	323 mm - 12.7"	355 mm - 14"	322 mm - 12.7"
Weight	25 kg - 55.1 lbs	28 kg - 61.7 lbs	40 kg - 88.2 lbs
Working limits: SW winter mode	> +5°C/+41°F	> +5°C/+41°F	> +5°C/+41°F
Working limits: SW summer mode	< +40°C/+104°F	< +40°C/+104°F	< +40°C/+104°F

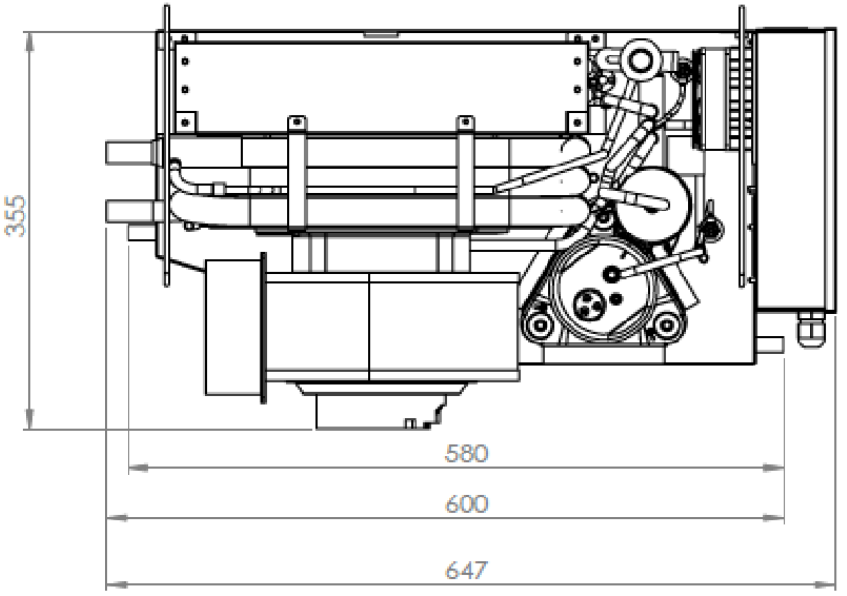
Model - Part No.	Compact 7- 20379UW
Cooling capacity	7.000 BTU/h
Heat pump	Yes
Maximum input power cooling	0,66 Kw
Cooling power consumption	3,0 A
Starting	12 A
Min. seawater flow	8 l/min
Seawater IN / OUT	Ø 16 mm (0.63)
Maximum air flow	350 m^3/h
Air exit duct (for max capacity)	2 x Ø 100 mm - 2 x Ø 4"
Minimum opening for return air grill	360 cm^2
Min.opening for supply air grill	150 cm^2
Refrigerant	R410A
Control panel cable length	8 m
115V/1ph/60Hz Version	Available
Width	433 mm - 17"
Height	280 mm - 11"
Depth	260 mm - 10.2"
Weight	23 kg - 50.7 lbs
Working limits: SW winter mode	> +5°C/+41°F
Working limits: SW summer mode	< +40°C/+104°F

NEW MODELS i10 AND i16 SMART



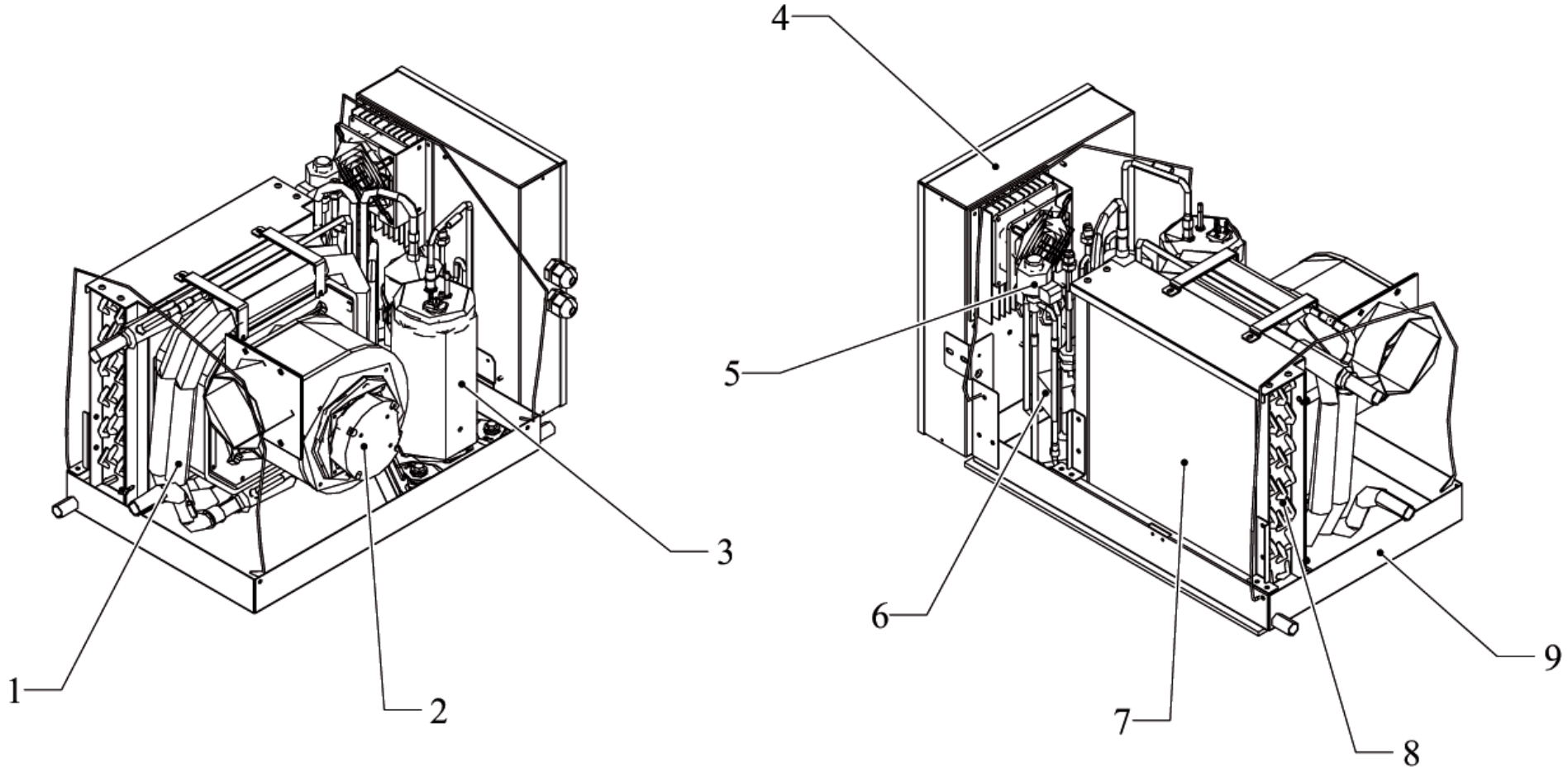






ELEMENTS OF THE UNIT

1.	Sea-side heat exchanger
2.	Fan
3.	Inverter driven rotary compressor
4.	Electrical panel
5.	Electronic expansion valve
6.	4-way valve
7.	Air filter
8.	Room-side heat exchanger
9.	Condensate collection tray



PECULIARITY

VSD INVERTER DRIVEN SELF-CONTAINED AIR CONDITIONING SYSTEMS REVERSE CYCLE FUNCTION

Features

- Heat pump reverse cycle operation
- 0,5°C temperature fluctuation
- Compressor noise and vibrations almost zero
- No current peaks during start-up
- Overall reduction of electricity consumption
- Constant Flow technology fan (i10 and i16 only)
- Twin Rotary compressors
- Constant temperature of the air flow
- Increase in component lifetime
- New wall touch display
- WIFI: remote control via smartphone
- Designed and manufactured in Italy

Self-contained-VSD air conditioners provides the best of the existing technology: compressor with brushless DC motor and inverter that constantly controls speed and delivered cooling power (**Variable Speed Drive**); reverse blade brushless fan; electronic expansion valve.

- Constant Flow technology fan (i10 and i16 only)
- Twin Rotary compressors

Available in three sizes: **10.000**, **16.000** and **21.000** BTU/h max output.

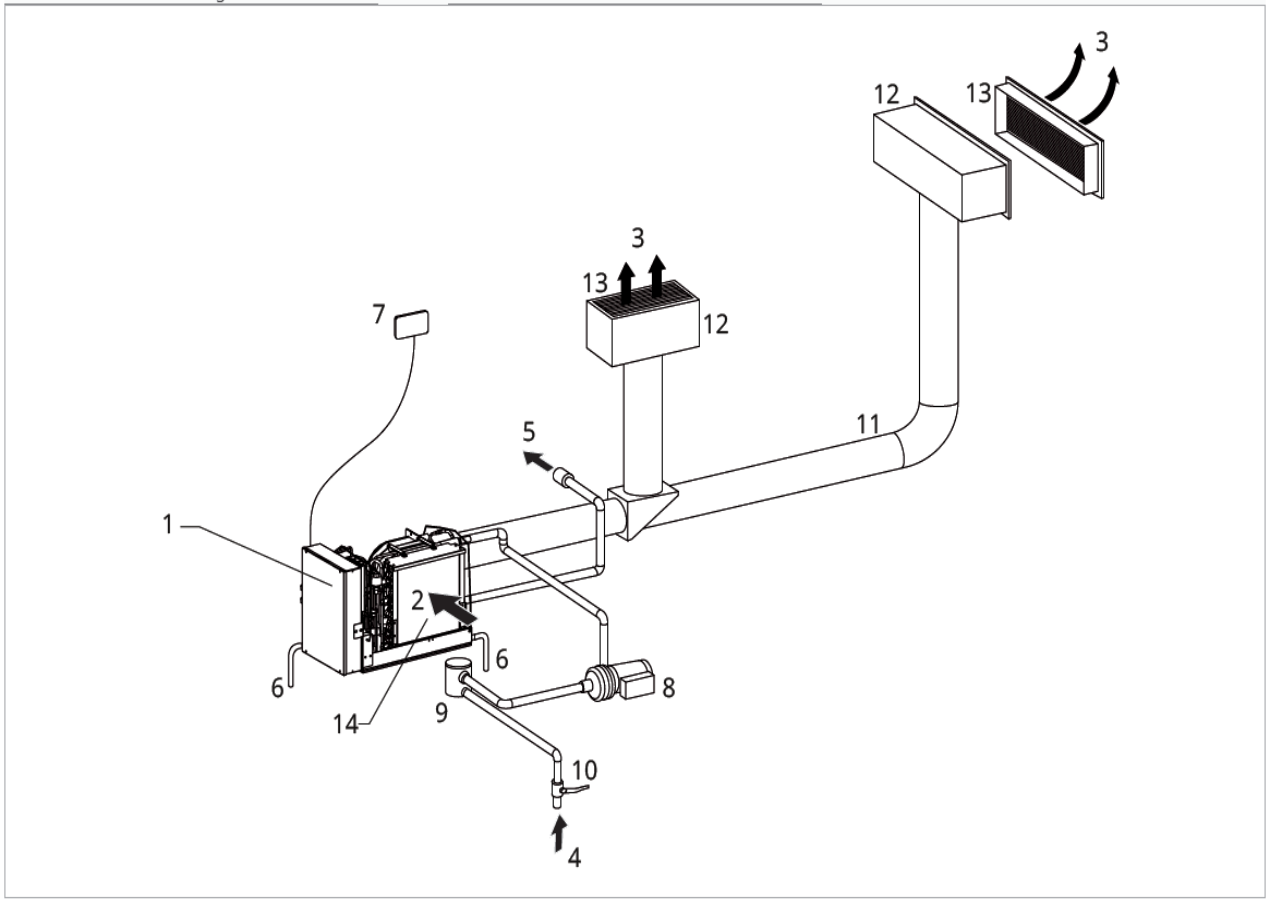
The compressor continuously changes its running speed depending from ambient and set temperature. The compressor operates at maximum power to cool rapidly the cabins, but reaching the set temperature, it reduces the power and electric consumption. In this way it maintains the optimal comfort level with the minimum consumption. The inverter works between 20 and 100 Hz.
Self-contained-VSD VELAIR units meet EMC 2004/108/EC directives.

VARIABLE SPEED DRIVE

APP VELAIR

INSTALLATION

1.	Unit	**6.**	Condensate drain	**11.**	Distribution channel
2.	Air inlet	**7.**	Control Panel	**12.**	Air distribution plenum
3.	Air delivery	**8.**	Pump	**13.**	Grids
4.	Sea water inlet	**9.**	Sea-side filter	**14.**	Air-side filter
5.	Sea water discharge	**10.**	Ball valve		



Before installing the air conditioner, it is essential to carry out a calculation of the summer (and winter in the case of models with heat pump) thermal loads for the room concerned. The more this calculation is correct, the more the product will fully fulfill its function. For the calculation, refer directly to the regulations in force.

As far as possible, however, try to limit the higher thematic loads with the following precautions:

- On large windows exposed to the sun, there should be internal curtains or better external masks (Venetian blinds, verandas, reflective films, etc.).
- The conditioned room must remain closed for as long as possible.
- Avoid switching on halogen type headlights with high consumption or other electrical appliances that absorb a lot of energy (ovens, steam irons, cooking plates, etc.).

Before connecting the pipes, make sure that they do not contain stones, sand, rust, scraps or other foreign objects which could damage or cause malfunctions to the appliance.

To achieve optimal installation and operation, carefully follow the instructions provided in the installation manual.

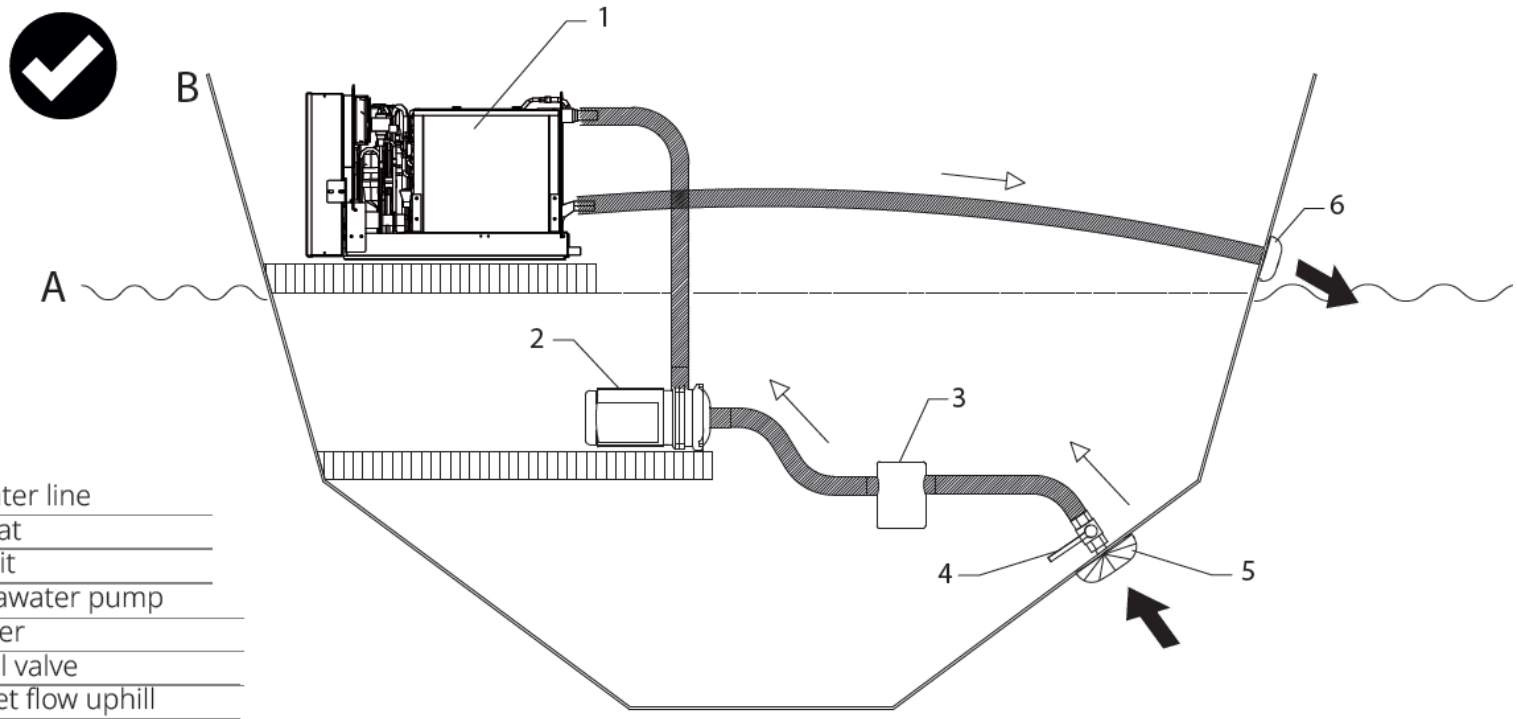
Some parts of the appliance produce heat during operation. The installation site must therefore ensure adequate ventilation and good heat dissipation.

IMPORTANT! The appliance must be installed in a protected area, so that accessibility is only possible by removing the protections using a tool.

Below is a brief guide on connecting the unit to a sea water circuit and draining condensates.
The minimum nominal diameter of the connecting pipes must be 1/2 ".

CORRECT INSTALLATION OF THE SYSTEM

The flow of water must rise upwards at the entrance and go downwards at the exit.



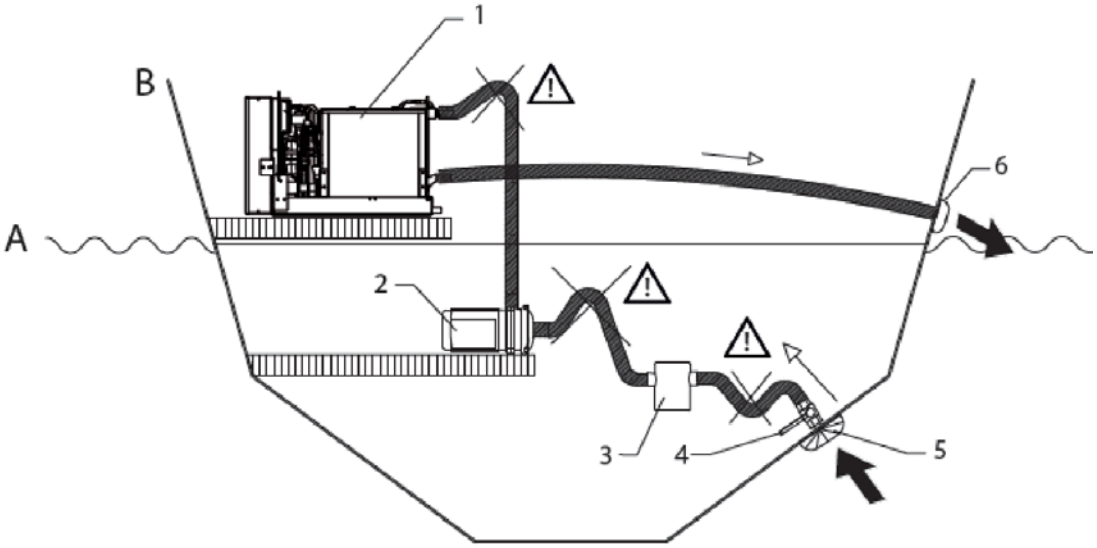
A	Water line
B	Boat
1.	Unit
2.	Seawater pump
3.	Filter
4.	Ball valve
5.	Inlet flow uphill
6.	Output flow

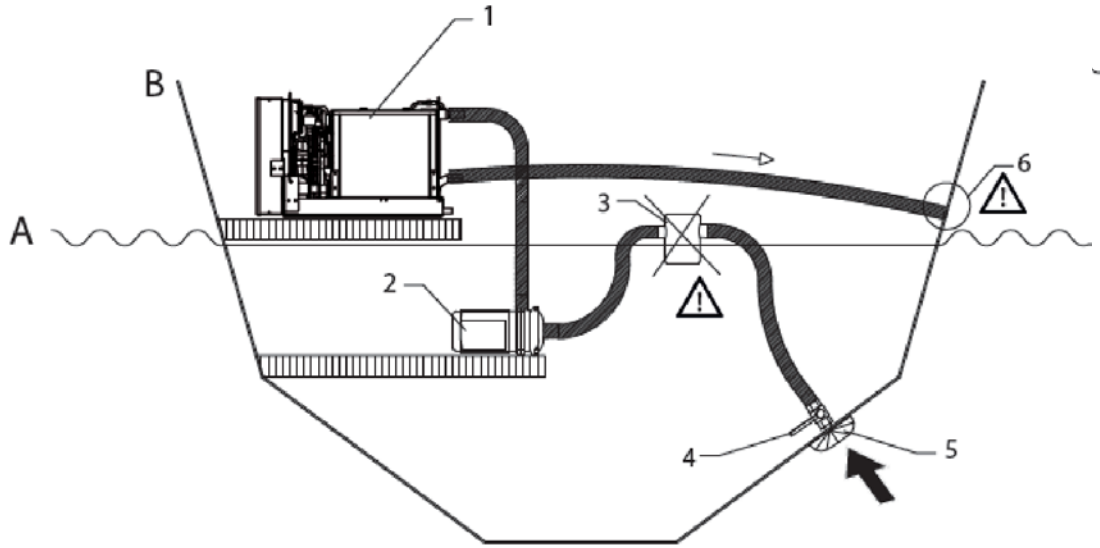
Installation of the electric sea water pump

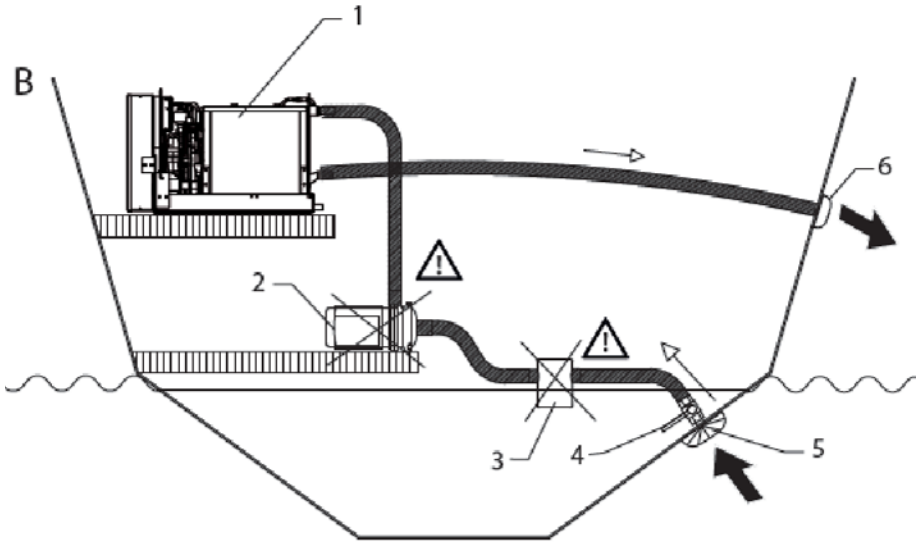
The electric sea water pump is necessary to circulate the quantity of water required by the heat exchanger. This pump is normally of the centrifugal type and not of the self-priming type;
therefore it must be mounted so that it is always at least 20 cm below the water line. The electric pump should be fixed between soundproofing blocks and, if possible, in a soundproofed environment.
It is necessary to provide a seawater filter between the seawater inlets and the electric pump, to protect it from any external material. The lack of this seawater filter voids the pump and unit warranty.
The seawater circuit must be installed by following an uphill path: from the inlet of sea water, through the filter, to the inlet of the condensing unit.
The seawater drain must be installed as close as possible to the water level line to reduce noise and to be able to visually check the flow / outlet of the circuit water.

EXAMPLES OF WRONG SYSTEM INSTALLATION:

the pipes must not have siphons, elbows or high points that can trap the air;
the filter must be below the pump;
the pump and filter must be below the waterline.

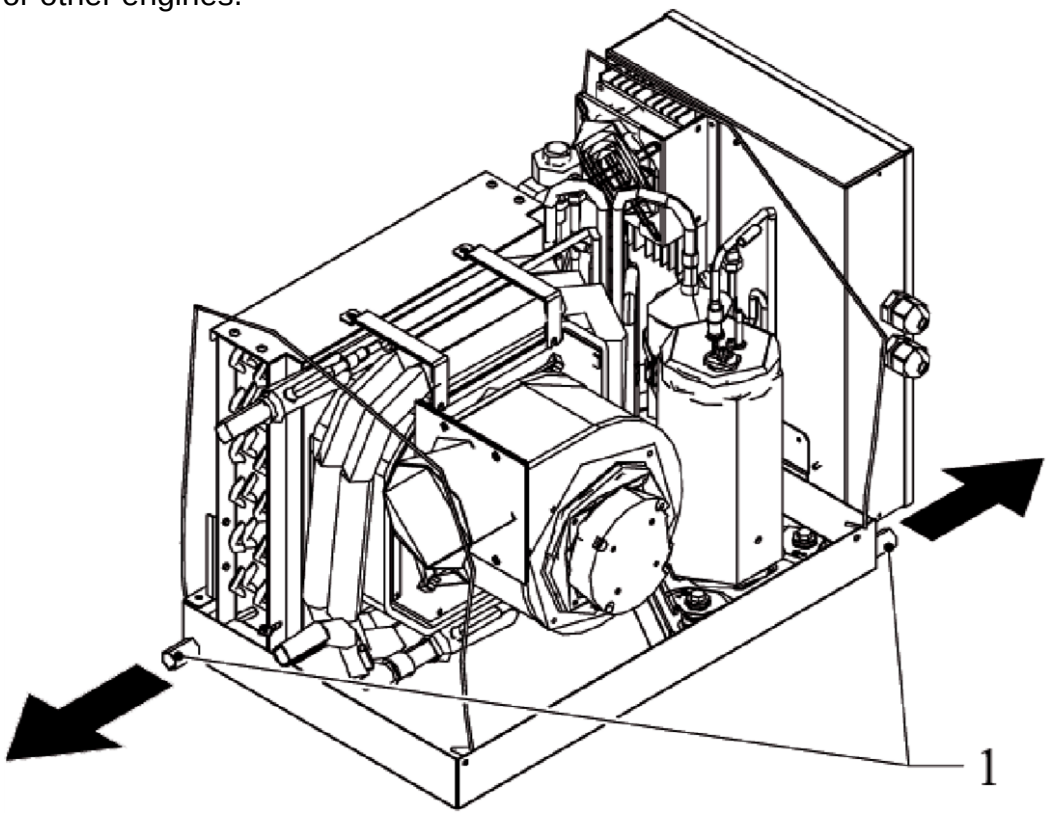






CONDENSATION DRAIN PREPARATION

This appliance is complete with a tray for collecting the condensation produced during operation, which must be channelled to a suitable place for drainage.
The size and positioning of the drainage tube are shown below:
The condensate must be discharged in the bilge or in a special tank;
If the line flows into a container (e.g. a tank), do not close the container hermetically and avoid immersing the draining pipe into the water;
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;
When connecting the condensation drain, be careful not to squeeze the rubber duct;
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.



	i10 VSD SMART	i16 VSD SMART
Diameter of fittings	14* mm	14 mm

The unit is equipped with two drainage outlets. Use both outlets for faster drainage.

⚠ Use plastic drainage pipes.

⚠ Avoid pipes made of metallic material.

⚠ Make sure all joints are sealed to prevent leakage of water.

If using a tank for collecting the condensation:

⚠ Avoid the hermetic closure of the container.

⚠ Prevent the end of the drainage tube from falling below the water level.

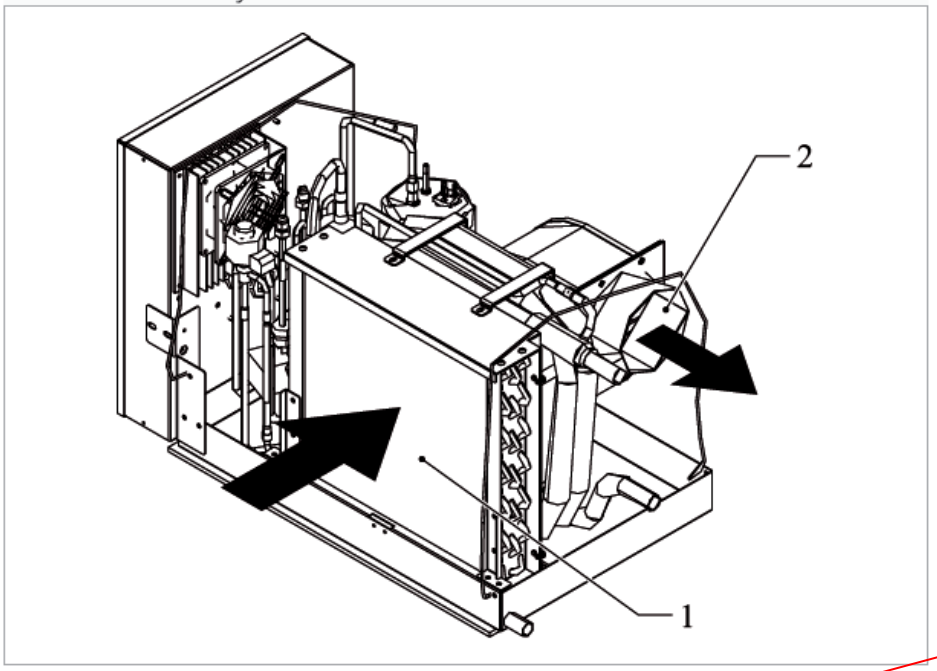
* It was requested to standardize the size of the exhaust of the two versions during the course of July '23.We will let you know when the change goes into production.

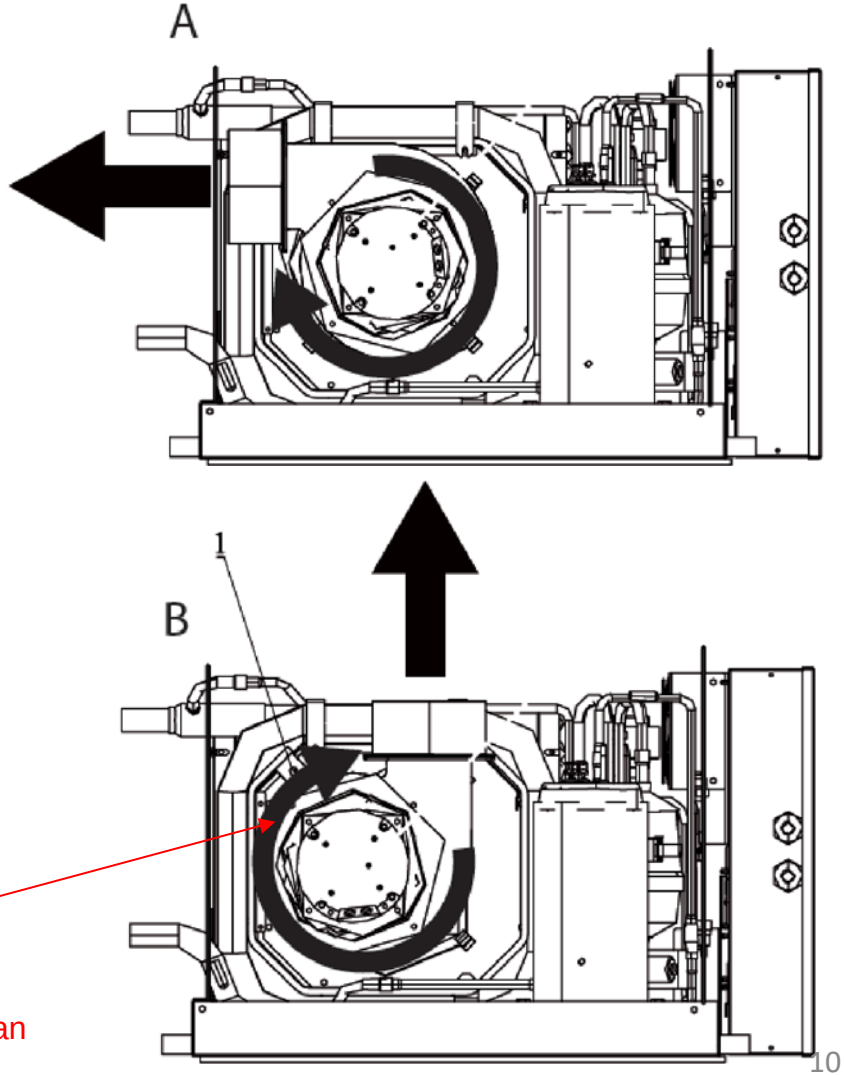
CONNECTION OF THE AERATION DUCTS

The choice and sizing of the aeraulic connections are the responsibility of the designer, who must operate according to the rules of good practice and current regulations.
The aeraulic pipes connecting to the appliance must be suitably sized for the effective air flow required by the system during operation.

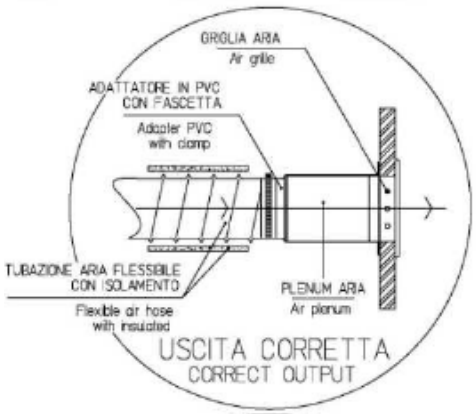
	i10 VSD SMART	i16 VSD SMART
Diameter of fittings	100 mm	120 mm

1. Air intake
2. Air delivery

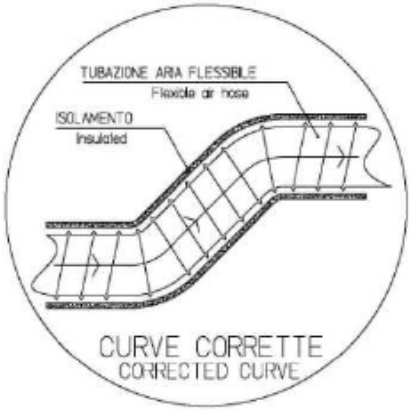


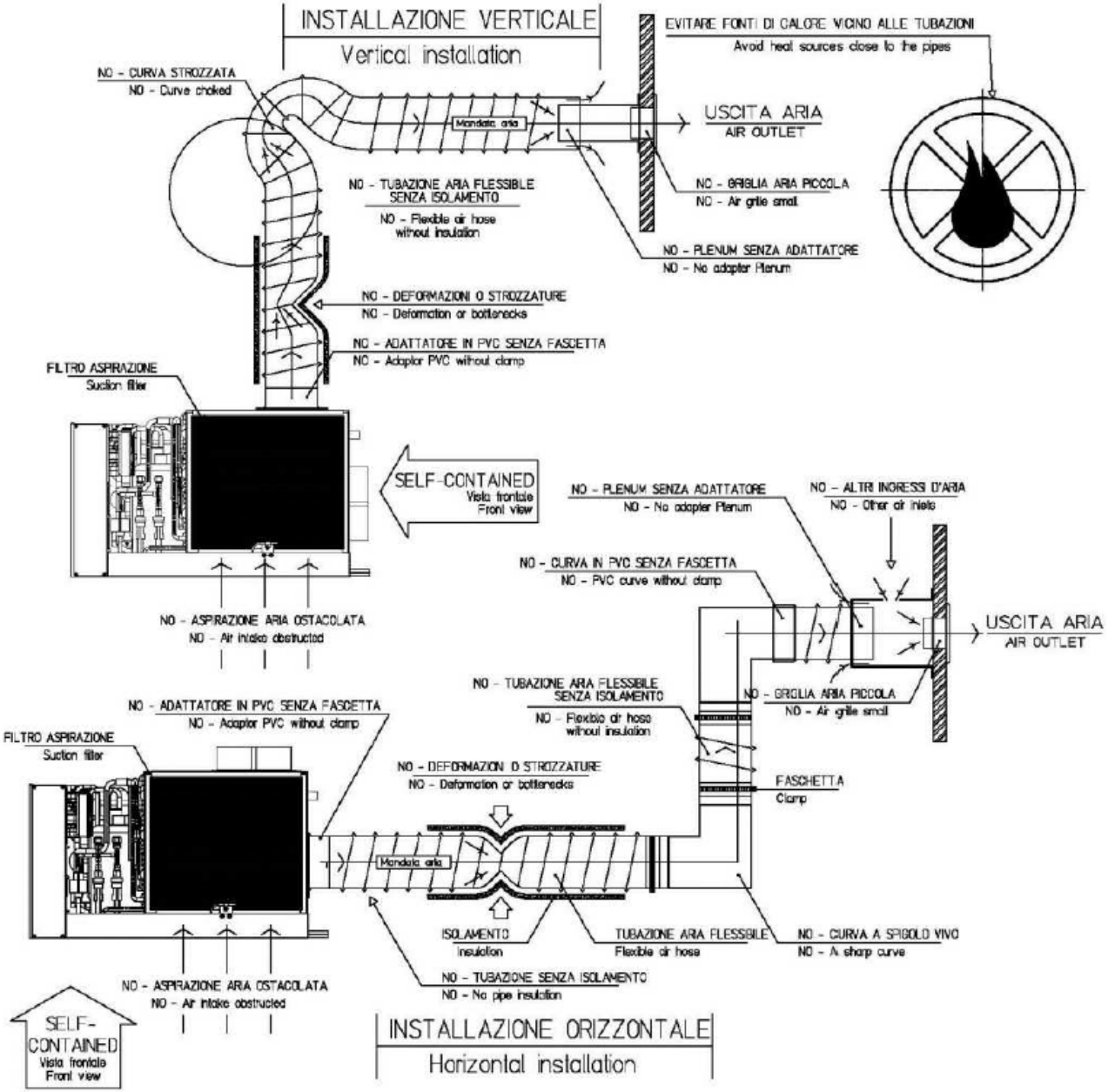


Air delivery rotation
By loosening the bolt (M8) it is possible to rotate the fan from position A to B.

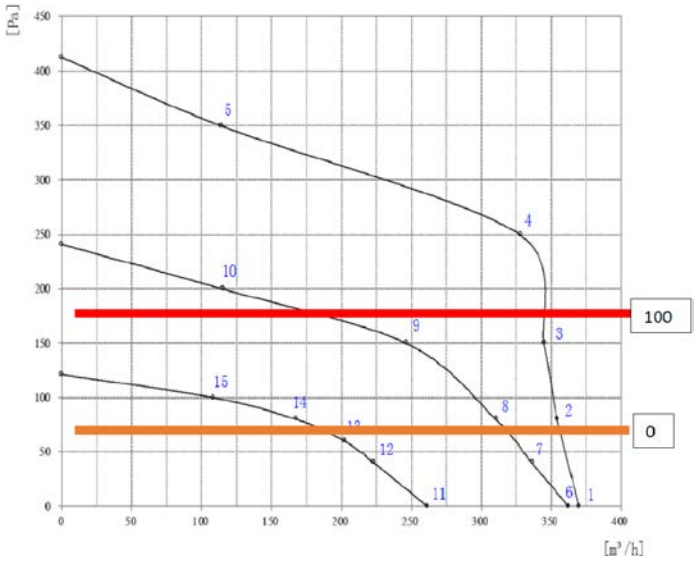

GRIGLIA ARIA
Air grille
ADATTATORE IN PVC CON FASCETTA
Adapter PVC with clamp
TUBAZIONE ARIA FLESSIBILE CON ISOLAMENTO
Flexible air hose with insulated
PLENUM ARIA
Air plenum
USCITA CORRETTA
CORRECT OUTPUT


TUBAZIONE ARIA FLESSIBILE
Flexible air hose
ISOLAMENTO
Insulated
CURVA CORRETTA
CORRECTED CURVE

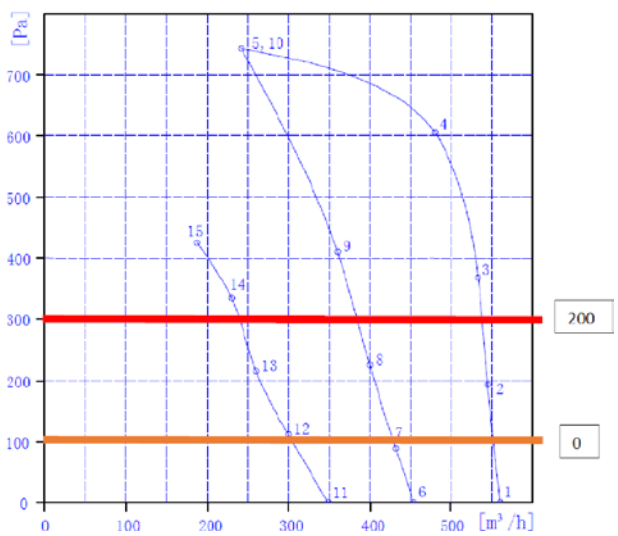

TUBAZIONE ARIA FLESSIBILE
Flexible air hose
ISOLAMENTO
Insulated
CURVE CORRETTE
CORRECTED CURVE


INSTALLAZIONE VERTICALE
Vertical installation
EVITARE FONTI DI CALORE VICINO ALLE TUBAZIONI
Avoid heat sources close to the pipes
NO - CURVA STROZZATA
NO - Curve choked
Mandata aria
USCITA ARIA
AIR OUTLET
NO - TUBAZIONE ARIA FLESSIBILE SENZA ISOLAMENTO
NO - Flexible air hose without insulation
NO - GRIGLIA ARIA PICCOLA
NO - Air grille small
NO - PLENUM SENZA ADATTATORE
NO - No adapter Plenum
NO - DEFORMAZIONI O STROZZATURE
NO - Deformation or bottlenecks
NO - ADATTATORE IN PVC SENZA FASCETTA
NO - Adaptor PVC without clamp
FILTRO ASPIRAZIONE
Suction filter
SELF-CONTAINED
Vista frontale
Front view
NO - ASPIRAZIONE ARIA OSTACOLATA
NO - Air intake obstructed
NO - PLENUM SENZA ADATTATORE
NO - No adapter Plenum
NO - ALTRI INGRESSI D'ARIA
NO - Other air inlets
NO - CURVA IN PVC SENZA FASCETTA
NO - PVC curve without clamp
USCITA ARIA
AIR OUTLET
NO - TUBAZIONE ARIA FLESSIBILE SENZA ISOLAMENTO
NO - Flexible air hose without insulation
NO - GRIGLIA ARIA PICCOLA
NO - Air grille small
NO - ADATTATORE IN PVC SENZA FASCETTA
NO - Adaptor PVC without clamp
FILTRO ASPIRAZIONE
Suction filter
NO - DEFORMAZIONI O STROZZATURE
NO - Deformation or bottlenecks
FASCHETTA
Clamp
Mandata aria
ISOLAMENTO
Insulation
TUBAZIONE ARIA FLESSIBILE
Flexible air hose
NO - CURVA A SPIGOLO VIVO
NO - A sharp curve
NO - TUBAZIONE SENZA ISOLAMENTO
NO - No pipe insulation
NO - ASPIRAZIONE ARIA OSTACOLATA
NO - Air intake obstructed
SELF-CONTAINED
Vista frontale
Front view
INSTALLAZIONE ORIZZONTALE
Horizontal installation

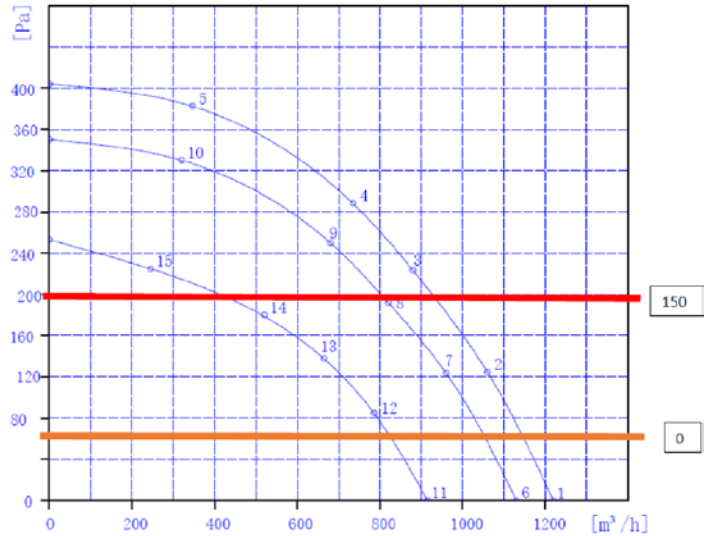
i10 VSD SMART



i16 VSD SMART



i21 VSD



OPERATING LIMITS

The unit works properly under the following conditions:

- Cooling mode in summer: 15 °C <sea water temperature <40 °C
- Heating mode in Winter: 5 °C <sea water temperature <20 °C

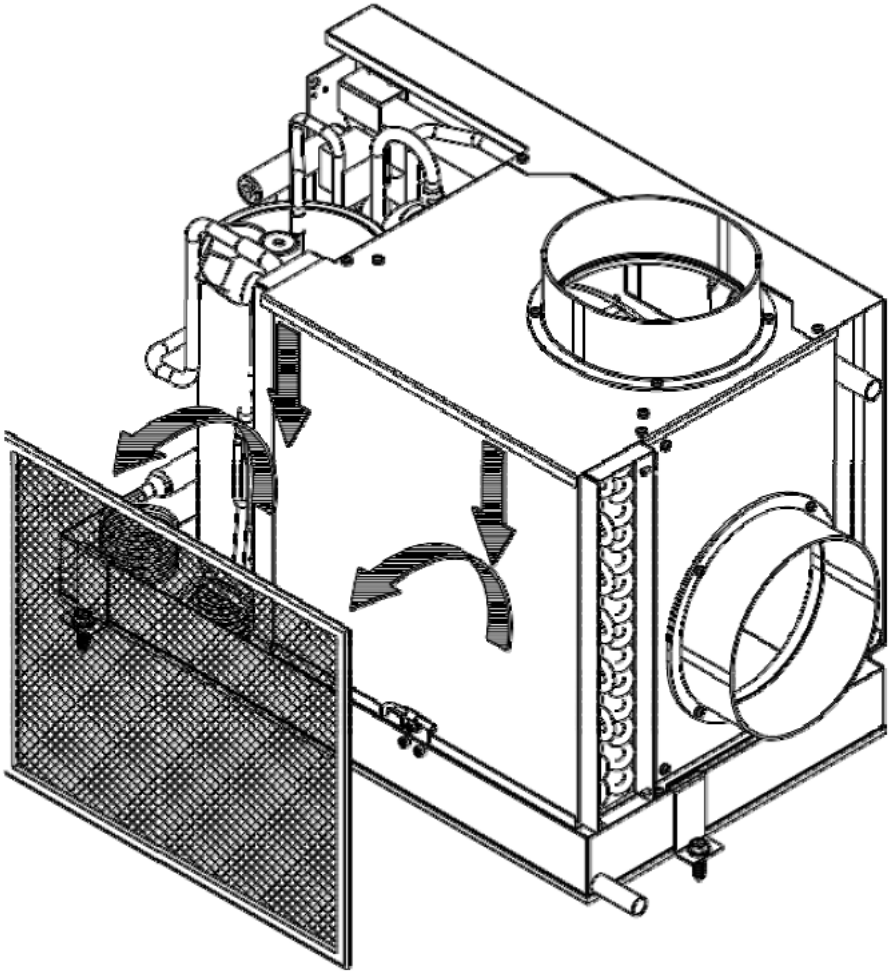
If the operating conditions of the unit are outside these limits, contact Uflex before proceeding with the installation, in order to agree on an appropriate solution.

Localized situations: in certain regions, during certain periods of time, an important concentration of jellyfish or algae can be found. This situation can quickly block the filters, water pumps and exchangers, and cause blockages and sometimes damage to the devices. In this case, contact an Uflex center for assistance. Any possible modification to the system (compact, pumps, filters, etc.) that could solve the problem must be approved by Uflex, otherwise the warranty will lapse.

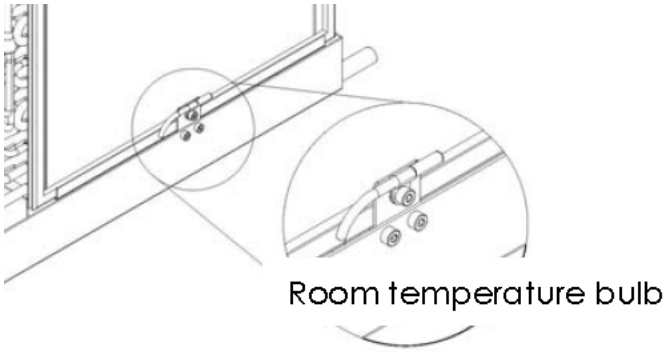
The non-self-priming sea pump: for any damage caused by dry running of the pump, the warranty will lapse. If there is a risk of the pump not being triggered, due to the sea conditions in relation to the type of boat and its speed, the air conditioning system and the pumps must be turned off. If the flow of seawater into the heat exchanger is significantly reduced, the compressor may be damaged.

AIR FILTER

The air conditioner sucks the air through an air / gas exchanger equipped with slightly inclined fins. To protect it from dust, there is a filter before the exchanger itself. The filter must be easily accessible, to facilitate normal cleaning and / or replacement operations.



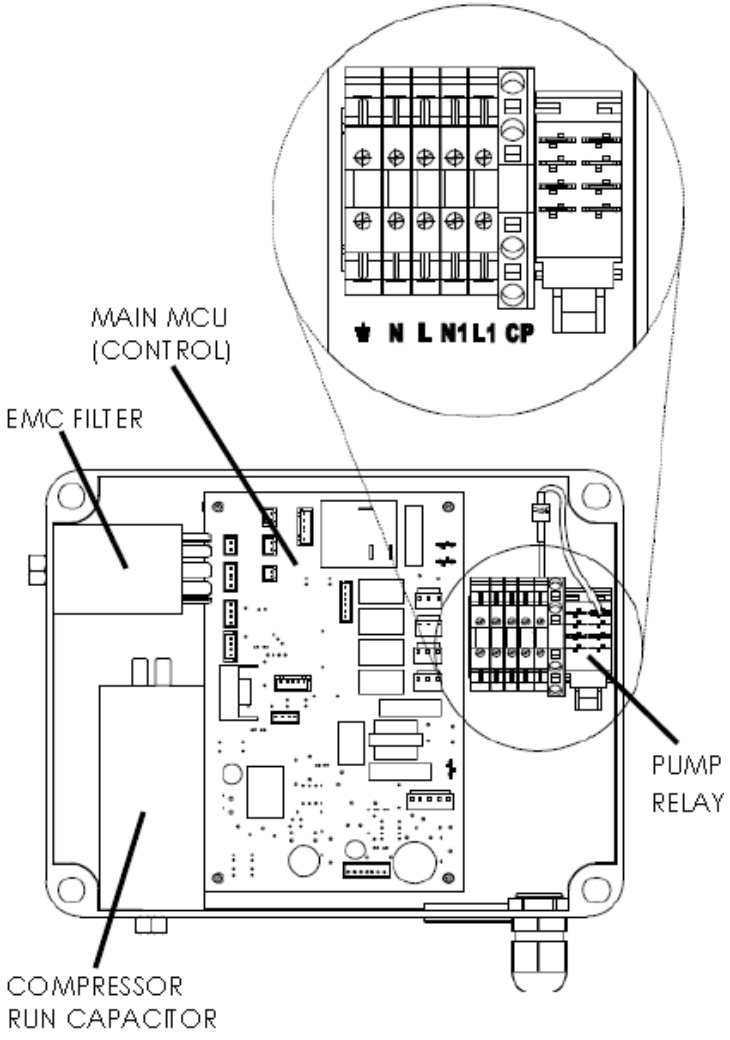
The room temperature sensor is fixed to the drain pan by means of a bracket, and placed near the air intake.
Take care not to damage it during the filter disassembly and reassembly operations.



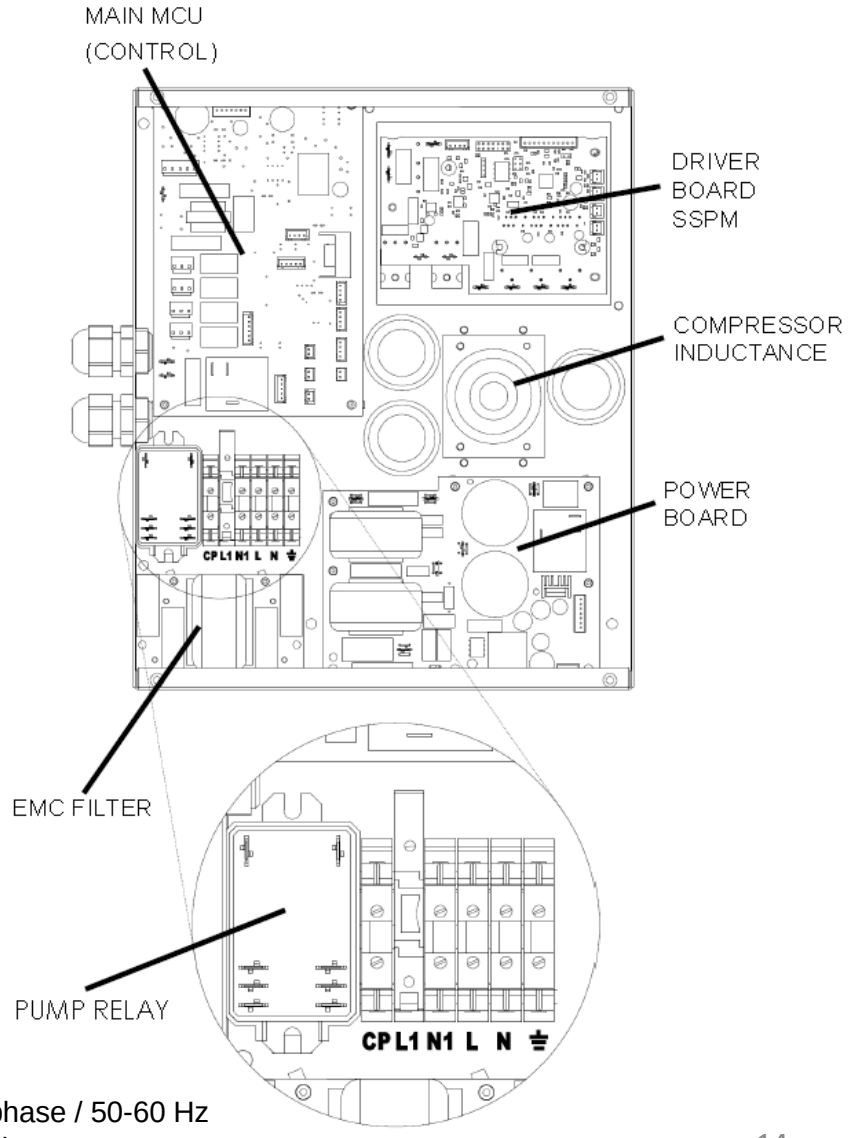
It is preferable to use the probe remotely, taking advantage of the 5m cable supplied, if the unit is installed in an environment with a different temperature to that detected by the control panel.

ELECTRICAL CONNECTIONS

ON/OFF version 7



Inverter version i10-i16-i21



TERMINAL:

N, L - Voltage line 115/230 VAC / single phase / 50-60 Hz
N1, L1 - Sea water pump output (Fuse 5A)
CP - Remote Activation (digital input)

CP presence contact input connection

When the CP contact is opened (connected to a clean, non-live contact) the device goes into stand-by and **Gr** is shown on the display. Through this contact it is possible to connect an external device that inhibits the operation of the appliance such as: window opening contact, remote on / off, infrared presence sensor, enabling badge etc.

Important: in case of connection of two or more units in parallel, the CP inputs of each unit must be kept separate (via a relay).

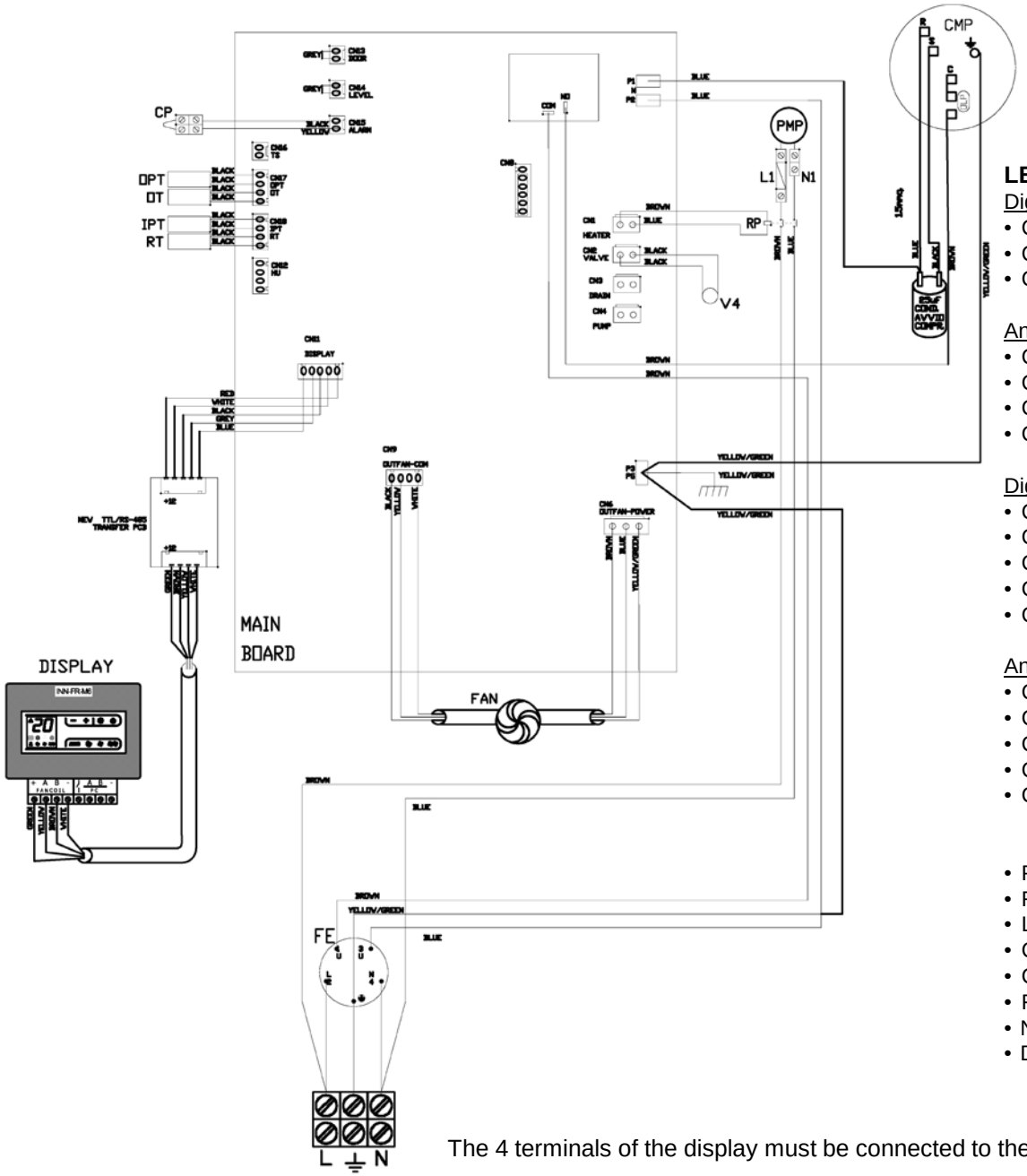
In the event of a power failure, the appliance restarts with the same settings if no action is performed in the first 7 seconds after the power supply returns.
If the timer function was active, the power failure time is not counted.

The electrical box is supplied already mounted on the unit.
However, in case of little space during installation, it can be detached from the unit (by unscrewing 3 screws) and fixed elsewhere at a maximum distance of 0.6m in a suitably ventilated space.

Unicast function on M6 wall control activation (**Necessary to communicate with TRANSFER PCB**)

1. Long press standby to enter the first level menu
2. Enter the second level menu with long season pressure
3. Scroll to SL (“slave”), and select with standby
4. Change number from 1 to >1, where number is the Modbus address of the slave whose status to read.
5. **The transfer PCB has address 2 by default.**

WIRING DIAGRAM MOD.7 ON/OFF WI-FI wall control



Solution used since early 2023

LEGEND

Digital inputs:
- CN13-Door-
- CN14-Level-
- CN15-Alarm-Presence contact for CP terminals

Analog inputs:
- CN17-OT-Seawater outlet probe. NTC 5.28kΩ at 25°C.
- CN17-OPT-Water exchanger condensation probe. NTC 5.28kΩ at 25°C.
- CN18-IPT-Air coil evaporation probe. NTC 5.28kΩ at 25°C.
- CN18-RT-Room temperature probe for air inlet. NTC 5.28kΩ at 25°C (10 meters).

Digital outputs:
- CN1-Valve-Sea water pump outlet (230VAC / 5A)
- CN2-Valve-4-way reversing valve, enabled in inv. (230VAC / 5A)
- CN3-
- CN4-
- CN6-Outfan_power-230VAC fan power supply

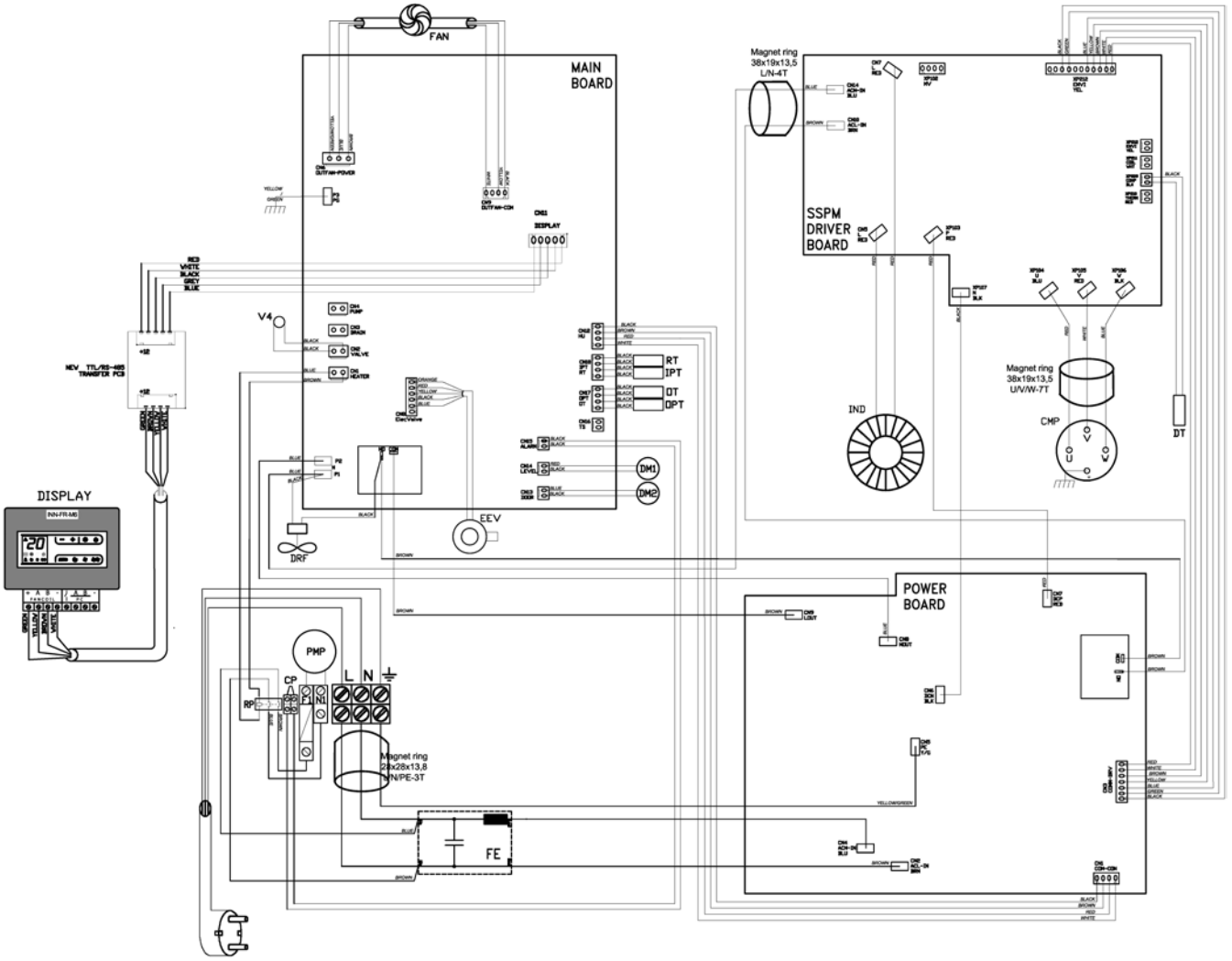
Analog outputs:
- CN7-Infan-
- CN8-ElecValve-
- CN9-Outfan_con-Pilot control of 0-10V fan signal
- CN10-StepMotor-
- CN11-Display-Wall display connection

- PMP-Sea water pump
- RP-Relay for sea water pump
- L1-Sea water pump fuse (5A)
- CMP-Compressor
- C1 - Compressor starting capacitor
- FE-EMC filter
- NEW TTL/RS485 TRANFSFER PCB-N540183A converter
- DISPLAY-Wall control interface

The 4 terminals of the display must be connected to the PCB using the cable supplied with the unit.

WIRING DIAGRAM MOD.i10-i16-i21 INVERTER wall control WIFI

Solution used since early 2023



LEGEND

Digital inputs:
- CN13-Door-DM2 Low pressure switch (3,5-6bar)
- CN14-Level-DM1 High pressure switch (39-28bar)
- CN15-Alarm-Presence contact for CP terminals

Analog inputs:
- CN17-OT-Seawater outlet probe. NTC 5.28kΩ at 25°C.
- CN17-OPT-Water exchanger condensation probe. NTC 5.28kΩ
- CN18-IPT-Air coil evaporation probe. NTC 5.28kΩ
- CN18-RT-Room temperature probe. NTC 5.28kΩ (10 meters)
- XP209-COMP- Compressed exhaust probe NTC 58kΩ at 25°C

Digital outputs:
- CN1-Valve-Sea water pump outlet (230VAC / 5A)
- CN2-Valve-4-way reversing valve, enabled in inv. (230VAC / 5A)
- CN3-
- CN4-
- CN6-Outfan_power-230VAC fan power supply

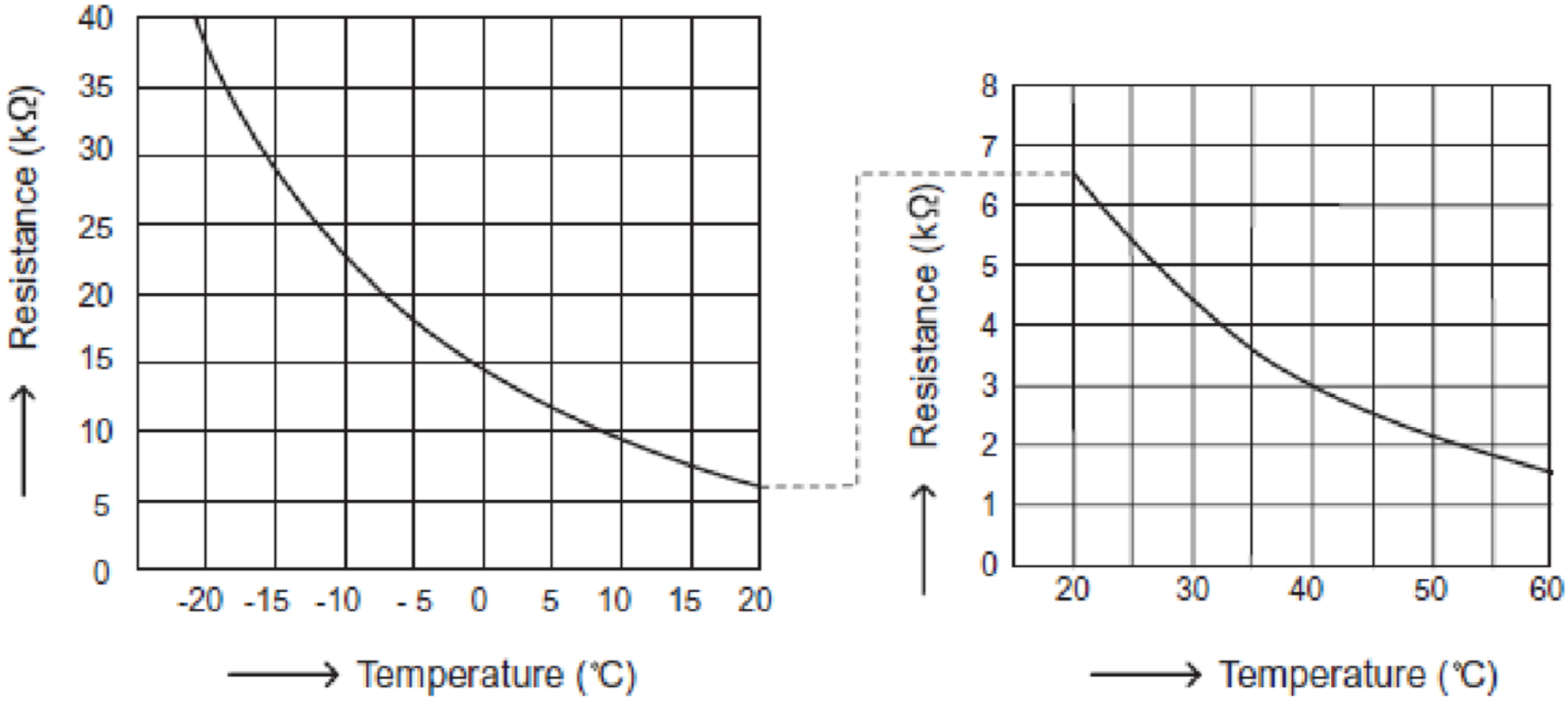
Analog outputs:
- CN7-Infan-
- CN8-ElecValve-EEV
- CN9-Outfan_con-Pilot control of 0-10V fan signal
- CN10-StepMotor-
- CN11-Display-Display connection

- PMP-Sea water pump
- RP-Relay for sea water pump
- F1-Sea water pump fuse (5A)
- IND-Compressor inductance
- CMP-DC inverter compressor
- FE-EMC filter
- DRF-Compressor driver cooling fan
- NEW TTL/RS485 TRANFSFER PCB-N540183A converter
- DISPLAY-Wall control interface

The 4 terminals of the display must be connected to the PCB using the cable supplied with the unit.

TEMPERATURE PROBES FEATURE

Ohm / temperature characteristic of the NTC probes 5.28kΩ at 25 ° C



OPERATING MODES

Cooling only operation

Using this mode, the appliance dehumidifies and cools the environment. It is possible to set the setpoint between 18 and 30 ° C.
If at least 3 minutes have elapsed since the compressor was turned off and the room temperature ≥ setpoint + 1 ° C, the seawater pump is started, after 30 seconds the compressor starts and the situation persists until the room temperature drops below setpoint - 1 ° C. At that point the compressor and after 30 seconds the sea water pump stops (after a minimum operating time of 3 minutes) while the fan remains active.

Heating only operation

By setting this mode, the appliance heats the room. It is possible to set the setpoint between 18 and 30 ° C.
If at least 3 minutes have elapsed since the compressor was turned off and the ambient temperature ≤ setpoint - 1 ° C, the seawater pump is started and after 30 seconds the compressor.
The upper fan starts instead at super-minimum speed only when the temperature detected by the IPT evaporation probe (located on the coil) exceeds 30 ° C or within a maximum time of 2 minutes. It goes to minimum speed when this temperature exceeds 34 ° C and starts operating regularly based on the actual setting (manual or automatic) when it exceeds 42 ° C.
When the room temperature ≥ setpoint + 1 ° C the compressor stops (if it has operated for at least 3 minutes), the sea water pump still runs for 30 seconds while the fan remains active at the minimum speed until the temperature detected by the probe evaporation drops below 30 ° C or for a maximum time of 30 seconds.
When the heating / cooling switch occurs, the 4-way valve is switched 5 seconds before the compressor starts and switched back 2 minutes after it is turned off.

Night function

With the appliance on and the cooling or heating mode selected, pressing the button allows you to perform multiple functions aimed at maximizing the silence of the appliance, saving electricity and regulating the well-being at night.
In this mode the fan operation is set to the minimum speed.

This function should be activated immediately before falling asleep:

- In cooling, the set temperature set is increased by 1 ° C after one hour and by a further ° C after 2. After the second hour, the setting of the temperature set is not further altered. After another 6 hours, the appliance is turned off.
- In heating, the set temperature set is decreased by 2 ° C after one hour and by another 2 ° C after 2. After the second hour, the setting of the temperature set is not further altered. After another 6 hours, the appliance is turned off.

This function is not available for operation in dehumidification only, ventilation only and economic automatic and can be excluded at any time (ideally upon awakening) by pressing the button again.
In the event of simultaneous setting of the Timer function, the appliance will switch off after the set time has elapsed.

Auto fan speed adjustment

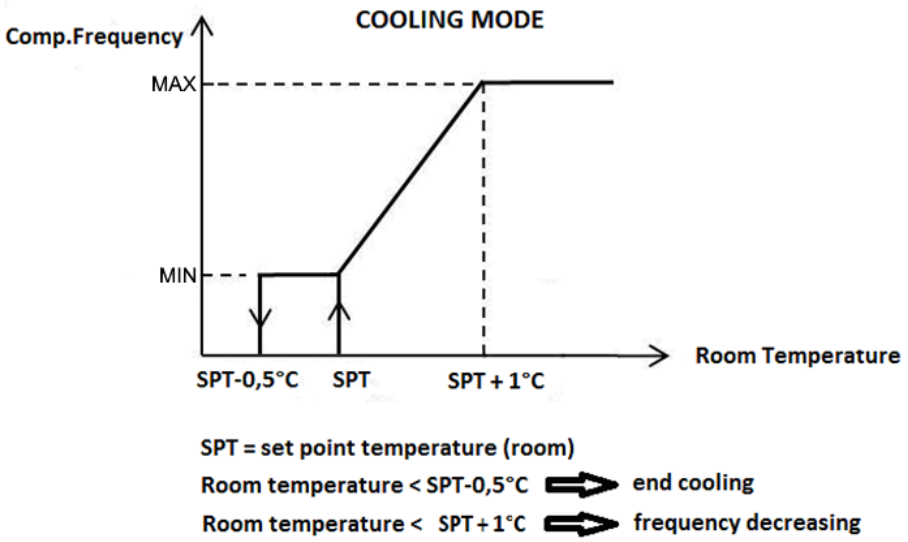
By pressing this button several times the speed changes in the following sequence: Minimum, Average, Maximum and Automatic.
By setting the Automatic choice, the on-board microprocessor automatically adjusts the speed, keeping it all the higher the greater the difference between the detected room temperature and the set temperature. The speed is always automatically reduced as the room temperature approaches

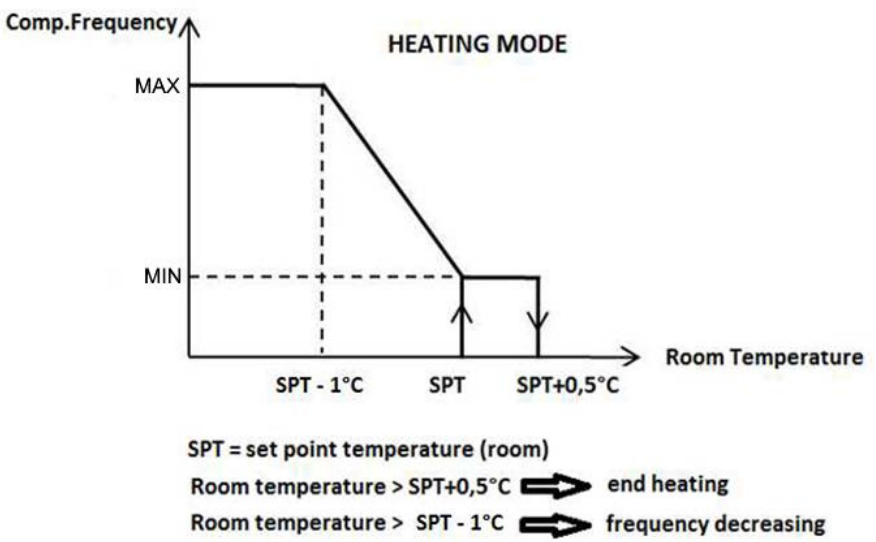
△T	| Troom-Tset | >3°C/5.4°F	1°C/1.8°F< | Troom-Tset | ≤3°C/5.4°F	| Troom-Tset|≤1°C
fan speed	high	medium	low

In night function speed control is not possible as the appliance can only operate at low speed.

Power regulation of the inverter models

By pressing this button sequentially it is possible to set the power supplied by the appliance to the settings: Minimum, Medium, Maximum and Automatic. The higher the power set, the higher the output of the appliance, but the lower its silence.
By setting the Automatic choice, the on-board microprocessor automatically regulates the power, keeping it all the higher the greater the difference between the room temperature and the set one.
In dehumidification and night mode, power control is not possible as the appliance can only operate at minimum.





WALL CONTROL OPERATION WITH WIFI

Solution used since early 2019

From the remote control you can select the ON / OFF mode, the air conditioning / heating mode, change the temperature set point (in the adjustment range from 16 to 31°C, with a resolution of 0.5 °C), select the mode operating times (min, med, max, auto), eventual alarms and make some settings.

The required set point and the real room temperature are shown on the thermostat display. After a period of 20 seconds from the last action, the panel brightness is reduced and the room temperature is displayed. When any key is pressed, maximum brightness is restored.

Any statuses and alarms are also shown on the display by using 8 specific symbols:

A	Automatic operation
	Medium ventilation speed
	Maximum ventilation speed
	Minimum ventilation speed
	Heating on

	Cooling on
	Alarm indicator (solid light)
	Panel off indicator

The various functions are set using 8 backlit keys:

+	Temp + is for increasing the set temperature
−	Temp - is for decreasing the set temperature
	Heating / Cooling: for changing the operation mode between heating and cooling
AUTO	Sets the regulation ventilation speed between a minimum and maximum value to an entirely automatic mode

	Minimum speed operation: limits ventilation speed to a contained level and the set temperature is adjusted automatically.
	Maximum speed operation: Allows for the maximum ventilation speed to be set
	ON/Stand-By: for activating the device or for putting it in stand-by.
	Medium speed: limits ventilation speed to a more contained value

Activation

To activate the device

Key	Operation	Display
⏻	Press the ON Stand-by key	From off to on
AUTO ☾ ✣ ✣✣	Select one of the 4 operating modes by pressing the relative key.	✣ ☾ A ✣✣

Heating / air conditioning operating mode setting

Key	Operation	Display
☀/❄	Keep the Heating / Cooling key pressed for approx. 2 seconds to change the mode between heating and cooling, which is indicated by the 2 symbols that appear if heating or cooling is active.	☀ ❄
	When heating, the symbol displays when the set point is higher than ambient temperature, both are off when the set point is lower.	☀
	Whencooling, thesymboldisplayswhenthesetpointislowerthanambient temperature, both are off when the set point is higher.	❄

Stand-by

Key	Operation	Display
⏻	Press and hold the ON Stand-By key for approx. 2 seconds. No illuminated signals on the display at all means that the system is in stand-by (no operation).	Off

Temperature selection

Key	Operation	Display
+ −	Set the required room temperature using the two increase/decrease keys to set the temperature value on the 3-digit display.	20.5

The adjustment range is from 16 to 31°C in intervals of 0.5°C.

The controller is very precise - set it to the required value an wait for the controller to regulate itself according to the actual room temperature detected.

Automatic speed operation

Key	Operation	Display
AUTO	Press and hold the AUTO key. The function being activated is indicated by the relevant symbol appearing on the display.	A

Ventilation speed adjustment is carried out automatically between the minimum and maximum values, according to the distance of the actual room temperature from the set point, according to a PI-type algorithm.

Medium fan speed operation

Key	Operation	Display
✣	Press and hold the medium speed key. The function being activated is indicated by the relevant symbol appearing on the display.	✣

Ventilation speed is limited to a contained medium value.

Minimum fan speed operation

Key	Operation	Display
☾	Press and hold the minimum speed operation key. The function being activated is indicated by the relevant symbol appearing on thedisplay.	☾

By selecting this mode, ventilation speed is limited to a minimum level and the set temperature is adjusted automatically, as follows:

- decreases by 1°C after one hour and byanother degree after two hours in heating mode;
- increases by 1°C after one hour and by another degree after two hours in cooling mode;

Operation at maximum ventilation speed

Key	Operation	Display
✣✣	Press and hold the Max Operation key. The function being activated is indicated by the relevant symbol appearing on thedisplay.	✣✣

In this operation mode, the maximum possible power level is activated whether heating orcooling.
Once the desired room temperature is reached, we recommend selecting one of the other 3 operation modes for increased comfort and sound levels.

Key lock

Key	Operation	Display
+ −	By pressing both the + and - keys for 3 seconds, all keys are locked locally, and this is indicated by "bL" appearing on the display. All actions are disabled to the user and whenever any key is pressed, "LOC" will appear. To unlock the keys, repeat the sequence.	bL

Room temperature probe offset adjustment

By using this function, the value displayed can be adjusted in a range from -9 to +12 K in intervals of 0.1°C.
Use this adjustment with care, and only after having actually detected a discrepancy compared with the actual room temperature using a reliabledevice!

Key	Operation	Display
−	With the display off, press and hold the - key for 5 seconds to access the menu which allows adjustment (using the + and - keys) of the AIR probe offset displayed, from -9 to +12 K in 0.1 Kintervals. After 20 seconds from the last action, the panel switches off and the setting is stored.	00.0

Selection °C /°F

Key	Operation	Display
☀/❄	By holding the button down for 10 seconds with the panel off, you enter the menu that allows you to select the adjustment scale between ° C and ° F. C is displayed, press the key again to switch to F and wait. All temperature adjustments (setpoint and room temperature reading) are changed. By repeating the sequence it is possible to invert the selection.	C-F

Wifi menu

Through this function it is possible to deactivate, reactivate and reset the wifi module.

Key	Operation	Display
✣✣	Press and hold the button for 10 seconds. When "On" appears on the display, press the key again to select the other functions "rSt" (to completely reset the module settings) or "OFF" (to deactivate the WI-FI module functions). If you do not touch anything for 10 seconds, the last selection remains stored.	On-rSt-OFF

To access the settings menu
- with the display off, hold down ⏻ for 10 seconds
  The device turns on and the temperature appears.
- keep pressed until the indication Ad appears

To navigate in the menu
- use the icons − +

To select a menu item and to confirm the changes made
- press the key ⏻ for about 2 seconds
  During the modification the symbol flashes to remind you that you are in the setup menu.
  Confirming the change takes you to the next item.

To exit the menu
- press the icon ⏻ for 10 seconds
- or wait 30 seconds the automatic shutdown

⚠ After 30 seconds from the last action the control goes out and the settings is memorized.

Menu items

Ad: Modbus address (**not used**)
uu: Wifi
Ub: Adjust buzzer volume
br: Adjust the brightness
di: Digital input (**not used**)
UC: UV lamp options (**not used**)
hb: Not used
Ab: Not used
rH: Radiant module (MZS) in Heating (**not used**)
rC: Radiant module (MZS) in Cooling (**not used**)
rb: Reset modbus (**not used**)
Fr: Factory reset
ot: Offset probe T
oh: Not used
Sc: Scale (°C/°F)
rE: Not used

Enable or disable Wifi

To enable or disable Wifi
- select uu
- select "YS" to enable wifi
- select "rs" to reset the settings
- select "no" to disable wifi
  By default wifi is enabled.

⚠ This function can only be used for controls with integrated WiFi (EFA649 - EFB649).

Adjusting buzzer volume

To change the volume
- select ub
- increase or decrease the value with the icons − +
  The volume setting range is from 00 (min) to 03 (max).

⚠ The volume changes after confirm the modification.

Adjust the brightness of the display

To adjust the brightness of the display
- select br
- increase or decrease the value with the icons − +
  The brightness setting range is from 00 to 01.

⚠ The display brightness changes after confirm the modification.

⚠ You can also reduce the brightness of the display through the keys of the control. With the display off, hold down + for about 20 seconds, the message "01" will appear. Press − to decrease the brightness to "00". Wait 30 seconds for the correct setting to be checked.

Factory reset

To reset the control to factory settings
- select Fr
- select "YS" to reset the settings
- select "no" to keep the current settings

Probe T regulation offset (room temperature probe)

To adjust the probe T
- select ot
- increase or decrease the value with the icons − +
  The setting range is from -9 to 12.

⚠ Use this adjustment carefully.

⚠ This adjustment must be carried out only after having found actual deviations from the room temperature using a reliable tool.

⚠ Adjust the value within a range of -9 °C to +12 °C, in steps of 0,1 °C.

⚠ After 30 seconds from the last action the control goes out and the settings is memorized.

Scale

To change the temperature unit of measure
- select Sc
- select °C o °F
  By default the temperature unit of measure is ° C.

ELECTRONIC BOARD MANAGEMENT ALGORITHMS

The electronics automatically perform some actions to prevent malfunctions:

Overtemperature protection in heating mode

Until the end of 2018 on the ON / OFF versions, if the temperature detected by the IPT evaporation probe (located on the coil) ≥ 54 ° C, the fan is forced to the maximum speed until the next compressor shutdown. Then a rule has been inserted in the software that controls the fan speed based on the condensation temperature measured by IPT:
Tcoil (IPT) > 54°C, +100 RPM
Tcoil (IPT) > 57°C, +200 RPM
Tcoil (IPT) > 58°C, +300 RPM
Tcoil (IPT) > 59°C, +400 RPM
Tcoil (IPT) > 60°C, +500 RPM
Tcoil (IPT) > 61°C, +600 RPM
Normal operation is restored when Tcoil (IPT) <52 ° C
When Tcoil (IPT)> 62 ° C the compressor stops and restarts after 3 minutes only if Tcoil (IPT) <52 ° C.

On the **Inverter versions**
If Tcoil (IPT)> 44 ° C, the rate of increase of the frequency is limited to 1Hz / 5s.
When Tcoil (IPT)> 47 ° C, the unit avoids raising the compressor frequency.
When Tcoil (IPT)> 50 ° C, the frequency is decreased by 1Hz / 1s.
When Tcoil (IPT) ≥ 52 ° C for at least 10s, the unit is stopped. After 60 seconds if Tcoil (IPT) <52 ° C the compressor restarts.

Antifreeze function in cooling and dehumidification mode

In the **ON / OFF versions**, if the compressor has been running for 4 minutes and the temperature detected by the IPT evaporation probe (located on the coil) drops below 0 ° C for 20 seconds, the compressor and the seawater pump are stopped while the fan top is kept running.
After 3 minutes if the evaporator probe temperature (IPT)> 7 ° C the compressor and pump are restarted.

On the **Inverter versions**
If Tcoil (IPT) <9 ° C, the rate of increase of the frequency is limited to 1Hz / 30s.
When Tcoil (IPT) <7 ° C, the unit avoids raising the compressor frequency.
When Tcoil (IPT) <4 ° C, the frequency is decreased by 1Hz / 1s.
When Tcoil (IPT) ≤ 0 ° C for at least 120s, the unit is stopped. After 60 seconds if Tcoil (IPT) <0 ° C the compressor restarts.

Low temperature protection of sea water

When Texcoil (OPT) <-6 ° C the appliance is stopped and restarts only after Texcoil (OPT)> 2 ° C.
For Inverter versions only, when Texcoil (OPT) <-2 ° C the thermostatic valve EEV is opened.

Overload protection in cooling

For the ON / OFF versions if Texcoil (OPT)> 54 ° C the internal fan is forced to the minimum speed maintained until the compressor switches off.

On the Inverter versions
If Texcoil (OPT)> 51 ° C, the rate of increase of the frequency is limited to 1Hz / 5s.
When Texcoil (OPT)> 55 ° C, the unit avoids raising the compressor frequency.
When Texcoil (OPT)> 58 ° C, the frequency is decreased by 1Hz / 1s.
When Texcoil (OPT) ≥ 62 ° C for at least 10s, the unit is stopped. After 60 seconds if Tcoil <62 ° C the compressor restarts.

Compressor delays

The restart delay from shutdown and the minimum operating time (unless alarms appear, manual shutdown or function change) are 3 minutes.

Auto-restart function

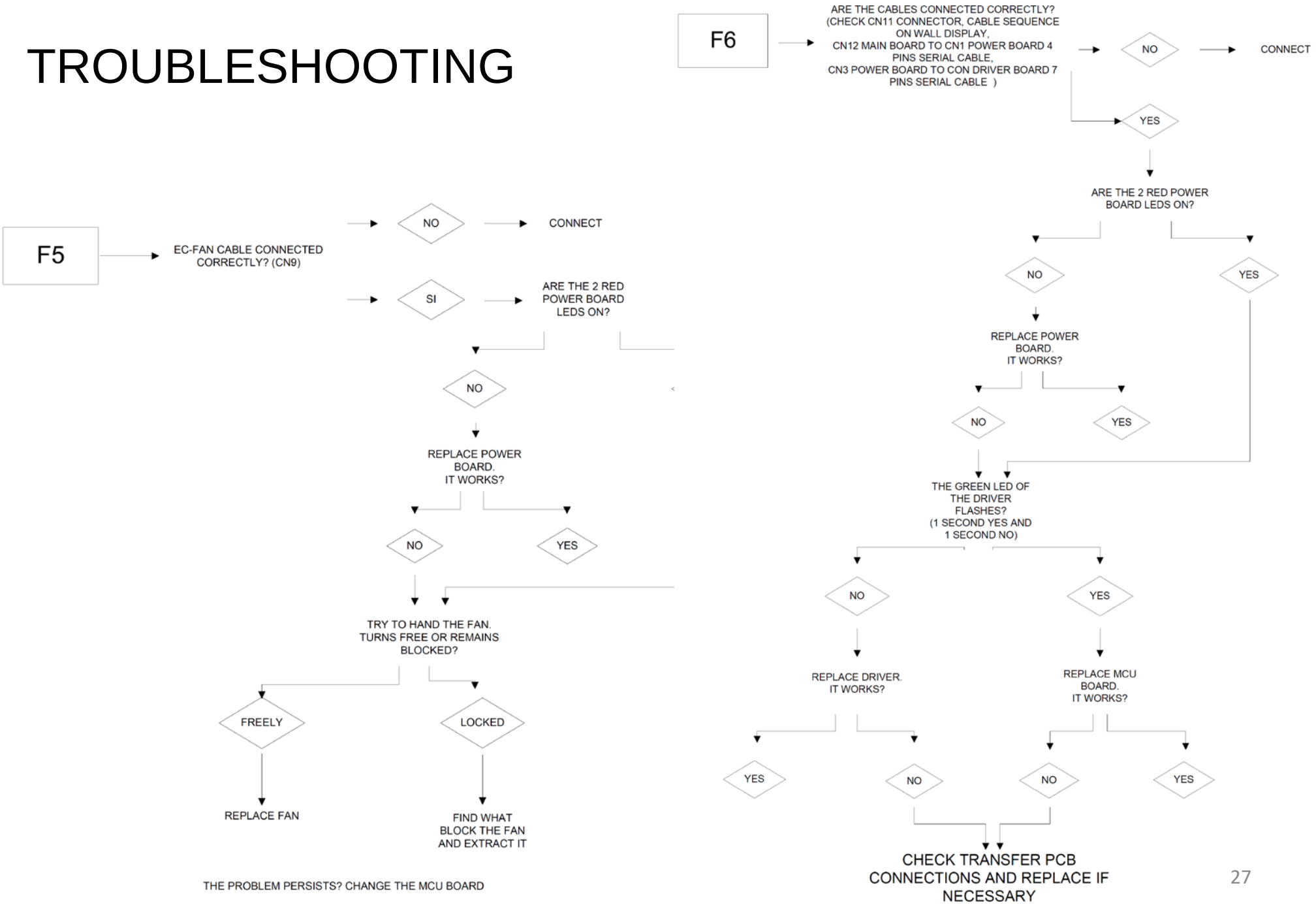
In the event of a power failure due to a sudden black-out at restart, the unit will return to the same execution mode, the fan speed, temperature set, deflector position, timer setting function.
If the timer function was active when blackout occurs, the blackout time will not - of course - be taken into account.
If before the blackout the compressor was active, when the voltage returns, it will start with a 3 minute delay. If, on the other hand, the compressor was off, this delay will not be performed.

TROUBLESHOOTING TABLE WITH DISPLAY 2023

If the conditioner blocks because of an alarm (see following table), please communicate to the assistance centre the code on the display to facilitate interventions.

Alarm	Alarm displayed on App	Description	Remedies
⚠ Flashing light	E8	Faulty probe	Switch off and restart the unit. If the problem persists, call the Technical Service Centre.
E2 ⚠	E2	Lack of communication between controller and main PCB	Switch off and restart the unit. If the problem persists, call the Technical Service Centre.
F2 ⚠	OF	Low water temperature on source side	The alarm can be caused by: • poor seawater circulation • a too low water temperature (< 5 °C) If the problem persists, call the Technical Service Centre.
F3 ⚠	E7	High-pressure switch alarm	In Cooling operation, the alarm may be caused by obstructions in the seawater circuit or a malfunction of the seawater pump: • check visually the seawater discharge overboard • if the flow is weak, check and clean all parts involved In Heating operation, the alarm may be caused by an air outlet flow that is too low: • check that all ducts are not clogged • check the air intake filter • clean the filter before restarting the unit
F4 ⚠	E7	Low-pressure switch alarm	The alarm is due to a refrigerant leak. Please check the refrigeration circuit for leaks. If the problem persists, call the Technical Service Centre.
F5 ⚠	E5	Faulty fan motor	Switch off and restart the unit. If the problem persists, call the Technical Service Centre.
F6 ⚠	E6	Lack of communication between main PCB and inverter driver	
Gr	CP	Open CP contact	Close contact (window, remote on-off, etc.)

TROUBLESHOOTING



TROUBLESHOOTING

Phenomenon	Cause			Check Item	Action
Insufficient cooling capacity	Excessively low suction pressure	Gas leakage or shortage of refrigerant		Measure superheat with pressure gauges or de-superheating by supervising tool	Recharge the unit after repairing the gas leakage
		Insufficient air flow		Check for clogged air filter	Clean the air filter
				Check for dirty internal heat exchanger	Clean the heat exchanger using compressed air blowing from the inlet of the unit to the outlet (opposite direction of natural air flow).
				Check for obstructions and/or excessive bending of the ducts	Remove obstructions and/or excessive bending of the ducts
				Check for obstructions of the outlet grids	Remove obstructions of the outlet grids
				Check fan speed	Check the MCU board
					Replace the Fan motor
		Failure or malfunction of the electronic expansion valve		Check for clogging ?	Remove the clogging or replace the electronic expansion valve
	Excessively high discharge pressure	Insufficient seawater flow		Check for clogged seawater filter	Clean or replace the seawater filter
				Check for obstructions on the thru-hull fitting and/or the overboard discharge	Remove obstructions on the thru-hull fitting and/or the overboard discharge
				Check for pump correct operation	Replace the pump
		Insufficient heat exchange on seawater side		Check for dirty seawater heat exchanger	Clean the seawater heat exchanger
		Excessively refrigerant charge		Excessive valve opening	Recharge the unit with the nominal refrigerant charge after the vacuum pumping
	Excessively high discharge pressure		Non condensate gas in cycle	Check each temperature and pressure	Recharge the unit with the nominal refrigerant charge after the vacuum pumping
			Failure or malfunction of the electronic expansion valve	Check for clogging	Remove the clogging or replace the electronic expansion valve
			Malfunction or internal leakage of the 4-way valve	Check the temperatures at the inlet and outlet of the 4-way valve	Replace the 4-way valve
	Malfunction of the compressor		Wear or breakage of internal part of the compressor	Check for abnormal sound and/or vibration from inside the compressor	Replace the compressor
			Malfunction of the compressor driver	Check voltage from the SSPM to the compressor	Replace the SSPM board

Phenomenon	Cause			Check Item	Action
Insufficient heating capacity	Excessively low suction pressure	Gas leakage or shortage of refrigerant		Measure superheat	Recharge the unit after repairing the gas leakage
		Failure or malfunction of the electronic expansion valve		Check for clogging	Remove the clogging or replace the electronic expansion valve
		Insufficient seawater flow		Check for clogged seawater filter	Clean or replace the seawater filter
				Check for obstructions on the thru-hull fitting and/or the overboard discharge	Remove obstructions on the thru-hull fitting and/or the overboard discharge
				Check for pump correct operation	Replace the pump
		Seawater temperature too low (outside operation limits)		Check for seawater temperature	Stop the unit
		Insufficient heat exchange on seawater side		Check for dirty seawater heat exchanger	Clean the seawater heat exchanger, see par.7.8.14
	Excessively high discharge pressure		Insufficient air flow	Check for clogged air filter	Clean the air filter
				Check for dirty internal heat exchanger	Clean the heat exchanger using compressed air blowing from the inlet of the unit to the outlet (opposite direction of natural air flow).
				Check for obstructions and/or excessive bending of the ducts	Remove obstructions and/or excessive bending of the ducts
			Insufficient air flow	Check for obstructions of the outlet grids	Remove obstructions of the outlet grids
				Correct fan speed	Check the MCU board, see par.7.8.5
					Replace the Fan motor
			Excessively charged refrigerant	Excessive valve opening	Recharge the unit with the nominal refrigerant charge after the vacuum pumping
			Non condensate gas in cycle	Check each temperature and pressure	Recharge the unit with the nominal refrigerant charge after the vacuum pumping
			Malfunction or internal leakage of the 4-way valve	Check the temperatures at the inlet and outlet of the 4-way valve	Replace the 4-way valve
	Excessively high suction pressure		Malfunction or internal leakage of the 4-way valve	Check the temperatures at the inlet and outlet of the 4-way valve	Replace the 4-way valve
	Malfunction of the compressor		Wear or breakage of internal part of the compressor	Check for abnormal sound and/or vibration from inside the compressor	Replace the compressor
			Malfunction of the compressor driver	Check voltage from the SSPM to the compressor, refer to table 1	Replace the SSPM board

Phenomenon	Cause		Check Item	Action
Cooling or heating process with abnormal sound	Foreign particles inside the fan casing		Visually inspect it	Remove the foreign particles
	Abnormal sound from the compressor	Faulty installation	Check that every part is tightly fixed	Tightly fix each part
		Liquid refrigerant compression	Check suction superheating, check discharge and coil temperature sensors	Replace the electronic expansion valve or temperature sensors
		Wear or breakage of internal part of the compressor	Check for abnormal sound and/or vibration from inside the compressor	Replace the compressor
	Abnormal sound from the unit		Check that every part is tightly fixed	Tightly fix each part
Pump not running	Supply power interrupted (Faulty Main MCU board or pump relay, broken fuse)		Check input voltage at pump relay coil (approx. 230VAC or 115VAC), refer to par. 7.8.13.	Replace relay CN1 on Main MCU board or Replace Main MCU board
			Check output voltage from pump relay (approx.. 230VAC or 115VAC), refer to par. 7.8.13.	Replace relay
			Check fuse integrity	Replace fuse after checking and solving the overcurrent problem.
Pump always running	Faulty pump relay		Check output voltage from pump relay (0VAC), refer to par. 7.8.13.	Replace relay
Display not working	Faulty connection		Check connecting cable and connectors	Replace connecting cable
	Faulty display		Check connecting cable and connectors	Replace display
Cooling or heating despite the thermostat is active	The room temperature detection probe is positioned near the air intake and could in some cases detect a value different from that displayed on the thermostat.		Check if the unit is installed in a room with poor air circulation	Lower (in cooling) or raise (in heating) the setpoint or remotely use the probe using the supplied 5m cable.