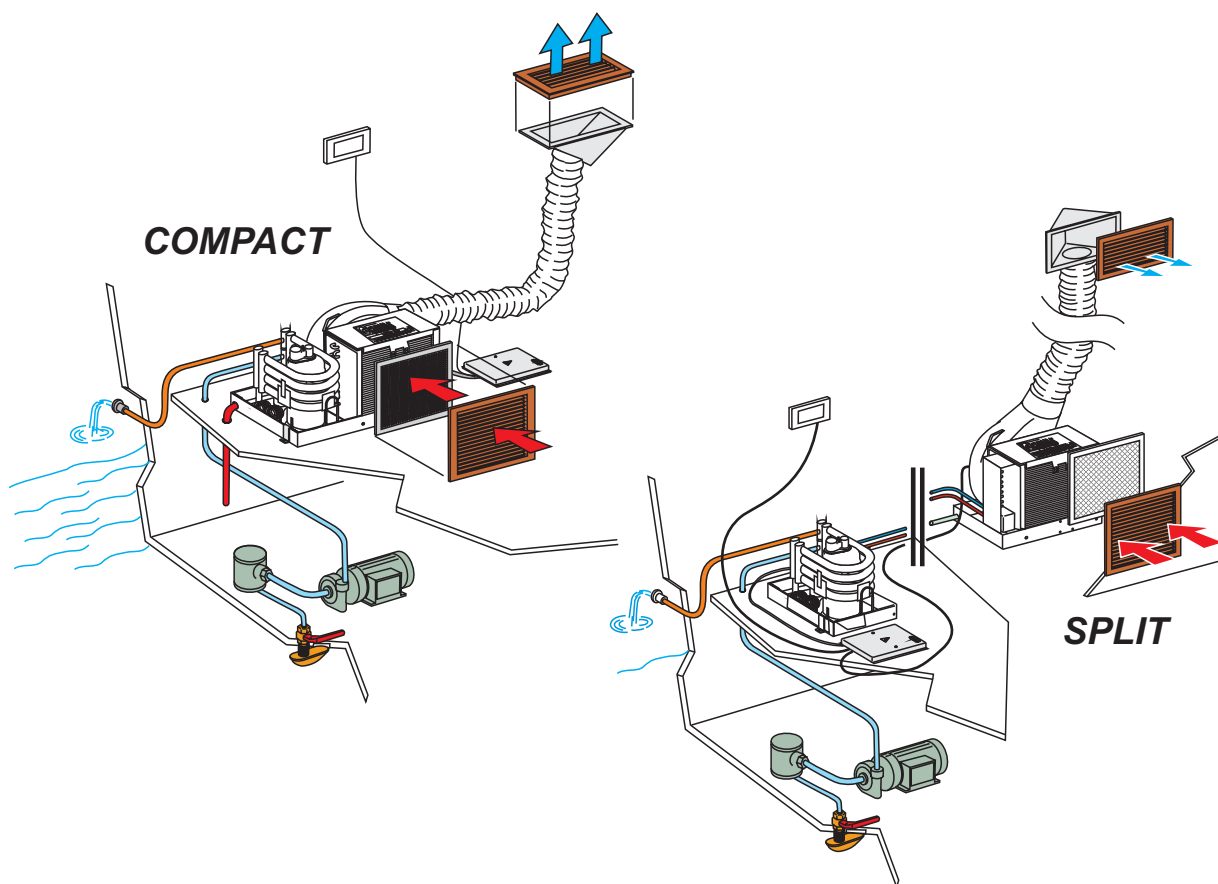




AIR-CONDITIONERS

COMPACT and SPLIT MK3 models

INSTALLATION MANUAL USE & SCHEMATICS



COD. A52XXX 07/01/2013

veco S.p.A.



COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=



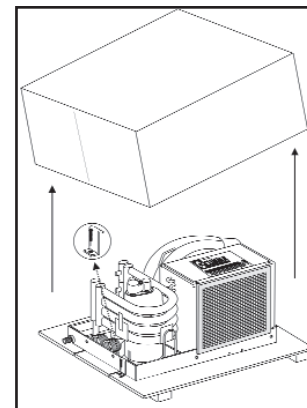
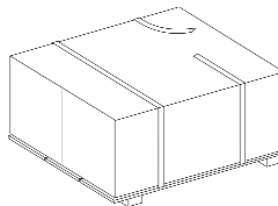
Via Cantore, 6 20833 Giussano (MI) ITALY
Tel. +39 0362.35321 - fax +39 0362.852995
E-mail: info@veco.net

www.climma.it

1.1 - CRATING

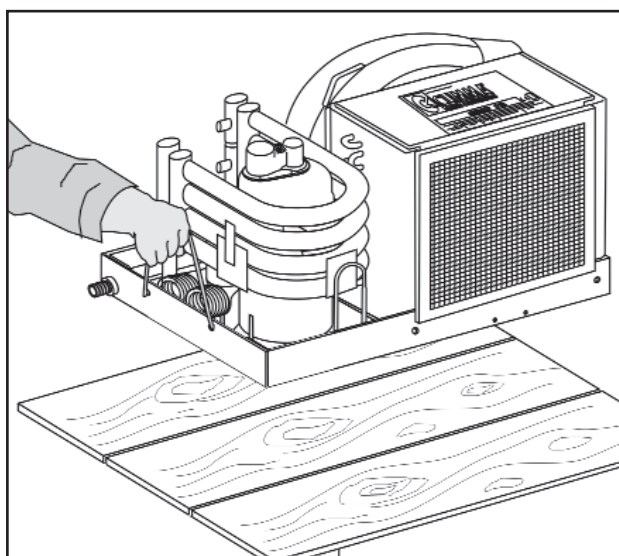
The CLIMMA air-conditioning unit is fastened to a wood plane and crated. Pay attention at opening.

Unhook the unit, unscrewing the provided clamps. Keep them to fasten the unit on the boat.



Raise the unit using the rope handles provided for this purpose. Don't raise it getting hold of fans and pipes, that can suffer damage.

On the unit there is a label that describes its technical specifications.

**NOTE**

Check that the technical specifications, the electrical supply, etc.... on the label correspond to the technical specifications of the boat.



made by **VECO** - Giussano - Italy

CLIMMA®

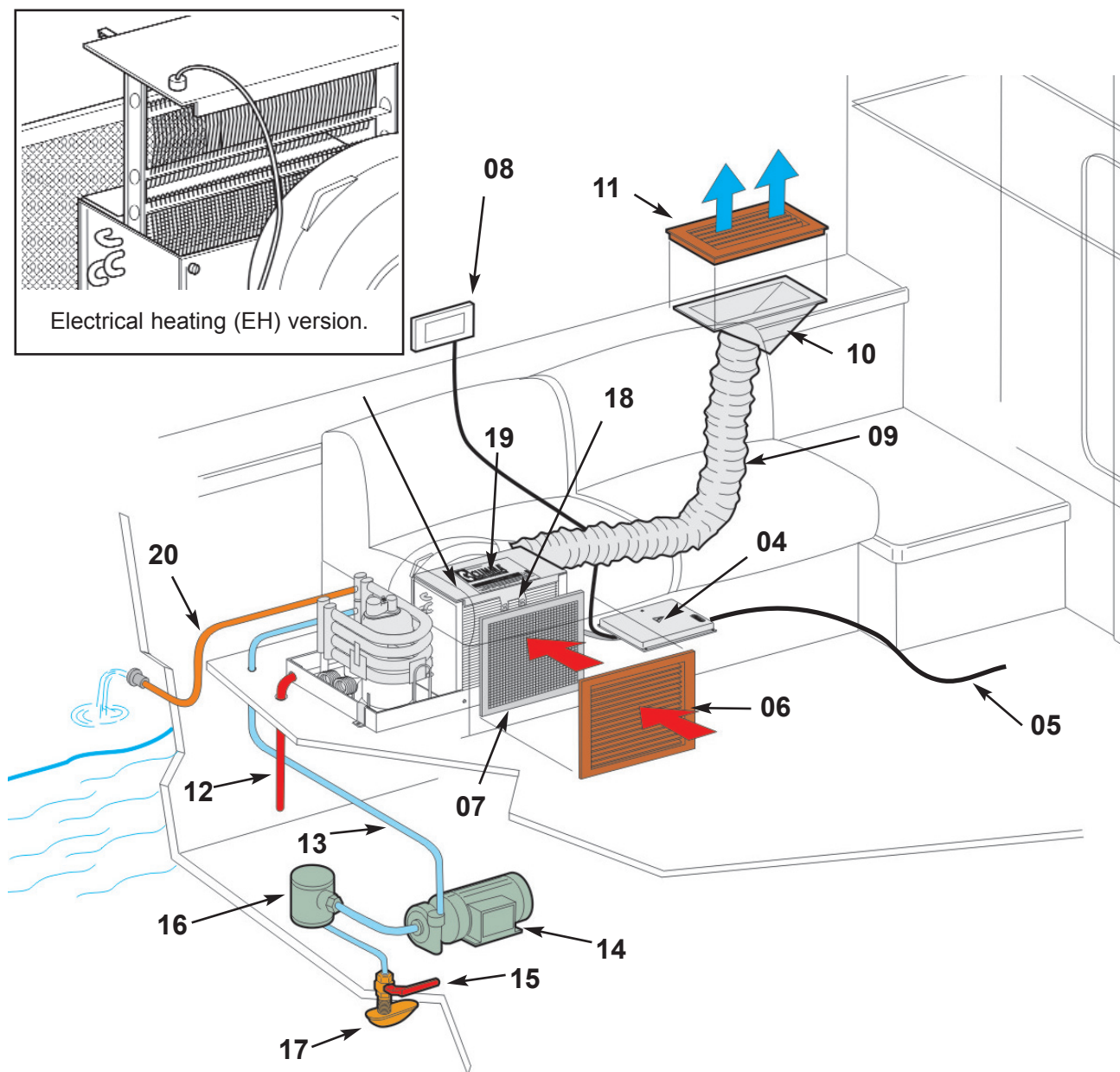
MARINE AIR CONDITIONING

COMPACT 12 RC MK3

MAIN POWER	NOMINAL CAPACITY	HEATER CONSUMPTION	COMPRESSOR RATED CONSUMPTION	FAN CONSUMPTION (MAX SPEED)	REFRIGERANT KIND / CHARGE	COOLING WATER
230/1/50	12'000 Btu/h	5.6A/1300W	3.3 A 737 W	0,8 A 180 W	R407C / 350 g	13 l/min

EXAMPLE OF LABEL

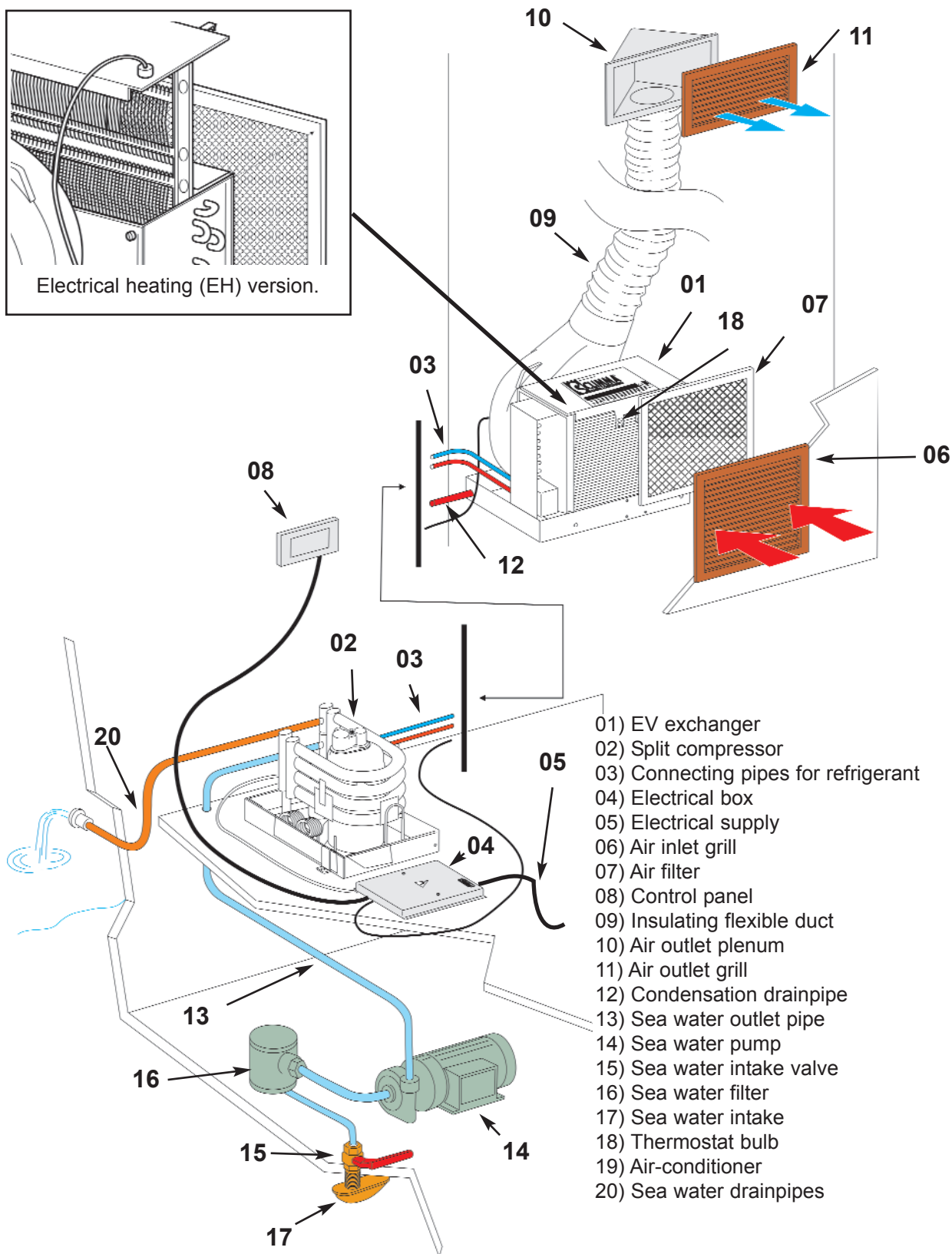
2.1 Installation diagram of the Compact air-conditioner



- 04) Electrical box
- 05) Electrical supply
- 06) Air inlet grill
- 07) Air filter
- 08) Remote control panel
- 09) Insulating flexible duct
- 10) Air outlet plenum
- 11) Air outlet grill
- 12) Condensation drainpipe
- 13) Sea water inlet pipe

- 14) Sea water pump
- 15) Sea water intake valve
- 16) Sea water filter
- 17) Sea water intake
- 18) Thermostat bulb
- 19) Air-conditioner
- 20) Sea water drainpipes

2.2 Installation diagram of the Split air-conditioner with EV



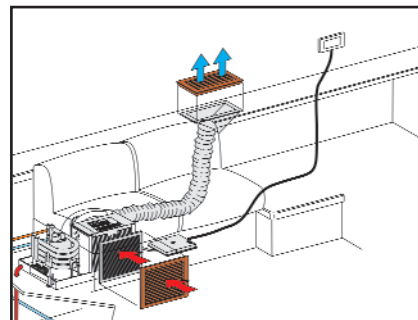
3 INSTALLATION OF THE COMPONENTS**3.1 - FUNCTIONING OF THE AIR-CONDITIONERS**

During the cooling cycle, the refrigerant circuit takes the ambient air away and to make it over the sea water (all models).

It is possible to select the functioning cycle, the desired temperature and the fan speed from a remote control panel that can be installed in the air-conditioned room. For the specific distances, refer to the directions of the remote control panel

When instead the heat mode is required, the refrigerant circuit takes the heat from the sea water and delivers it to the air thru the air/refrigerant heat exchanger (RC models). **In this case the unit cannot be used in heat mode when the sea water temperature falls below 10°C (50°F).**

It is also available upon request, a version of the air conditioners with electrical heating (EH models). In this case the air is heated by electrical resistance and in heat mode the compressor and the sea water pump are not used.

**3.2 - LOCATION - General notes**

Choosing the unit position, it is necessary to consider the following elements:

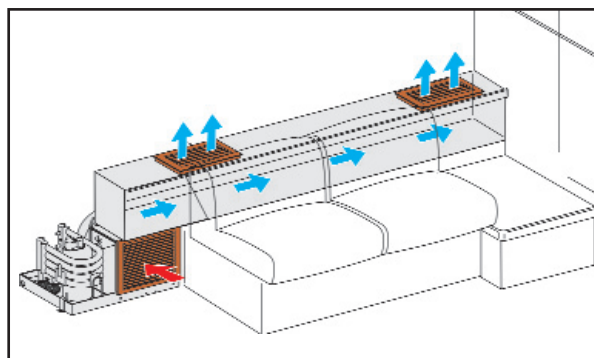
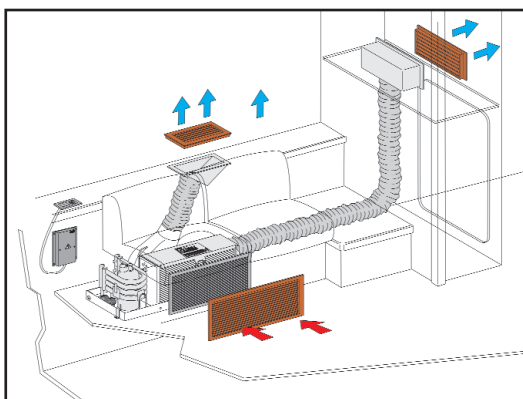
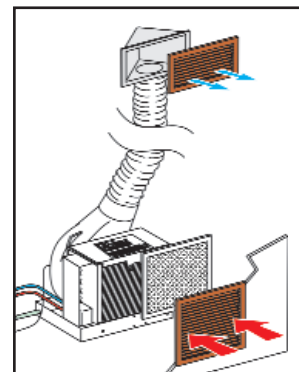
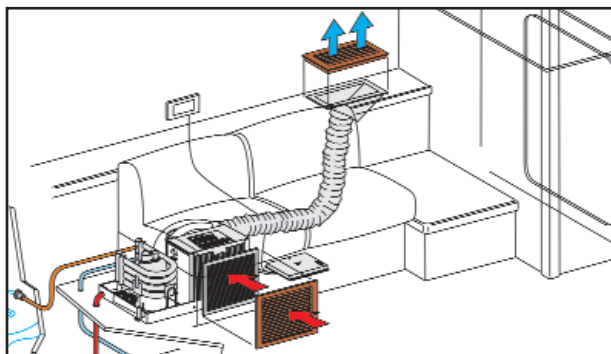
- 1 - the accessibility to the air filter for the cleaning;
- 2 - the necessary space for the fastening of the provided clamps (figure 1.8 - page 8);
- 3 - the connection of the condensation drainpipes (figure 2.8 - page 8);
- 4 - since the fan rotates, it is necessary to choose the best position to connect it to the air duct. Then, block the fan in the chosen position;
- 5 - the passage of the sea water circuit pipes;
- 6 - the passage of the electrical connection wires and the easy access to the electrical box.

Position the pipe-tightening clamps of the water system so that once arranged the unit, it is possible to tighten the screws. Instead of the clamps we suggest to use all stainless steel components.

3 INSTALLATION OF THE COMPONENTS

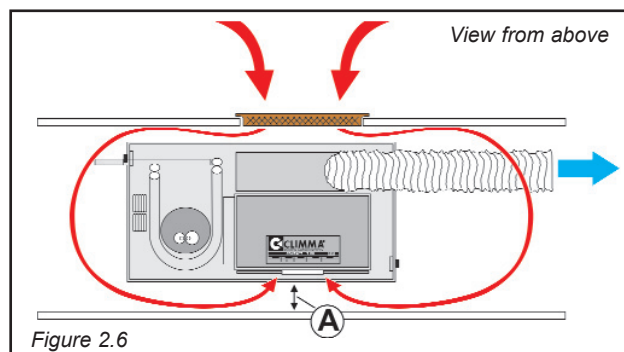
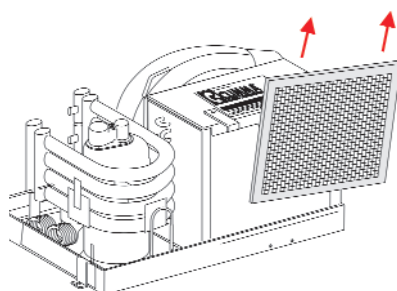
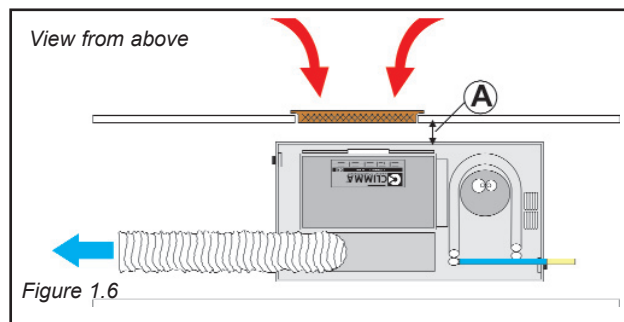
3.3 - LOCATION

A - The units Compact MK3 and Split MK3 (in this case the blower unit) have been designed to treat directly the air of the cabin to be conditioned. Therefore the unit must be installed directly in the cabin to be conditioned.



B.- The conditioned air (from the fan) must be ducted towards one or more grills through flexible pipes or through isolated ducts of suitable section in the boat structure.

C - The exchanger system takes away the ambient air. The side with the filter mustn't be in line with the intake grill, as in the picture 1.6. It can have also a different position (see the picture 2.6). The second solution is the best one thanks to the best sound isolation of the system.

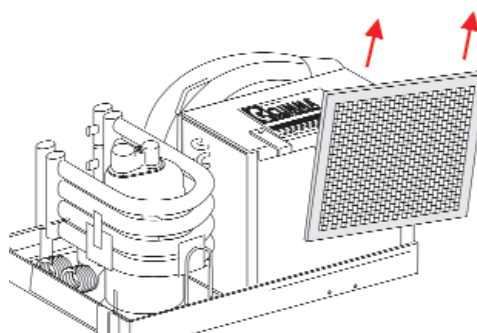
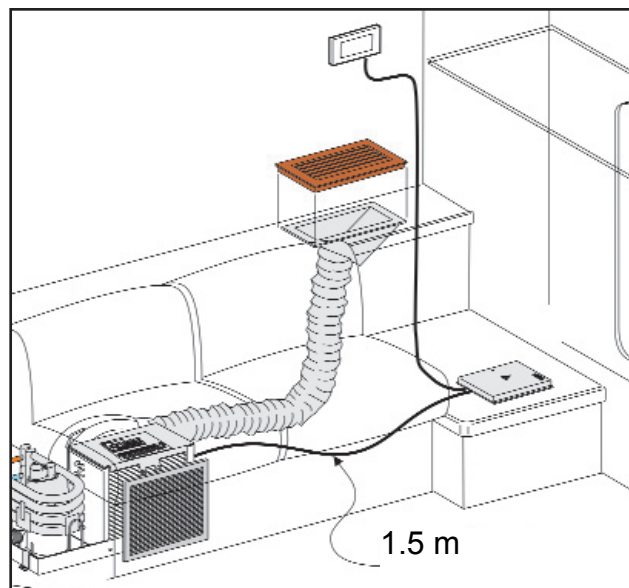


3 INSTALLATION OF THE COMPONENTS

E.- The air-conditioner is connected to the electrical box through cables of different length. So there must be an accessible space (*next to the compressor unit for SPLIT models*) to install the electrical box.

F - The intake air filter must be mounted on the air/refrigerating gas exchanger. This side of the air-conditioner must remain accessible for maintenance

G - The standard cable of the control panel for the connection to the electrical box is 4 m

**3.4 - THERMOSTAT BULB**

The control panel MK3 is equipped with a temperature sensor. In particular installations, if the sensor incorporated in the panel is not sensing the correct temperature, it is possible to connect an optional external probe (cod.MSENS). Connecting the optional sensors excludes automatically the standard sensor of the panel.

3 INSTALLATION OF THE COMPONENTS**3.5 - FASTENING**

The fastening must be executed as indicated.

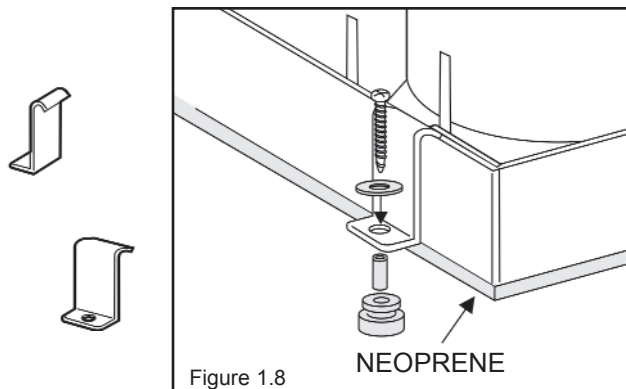
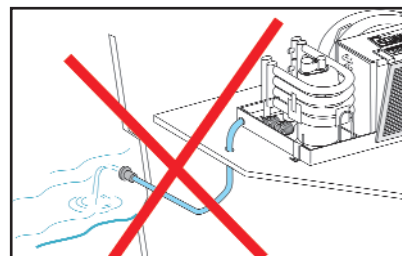


Figure 1.8

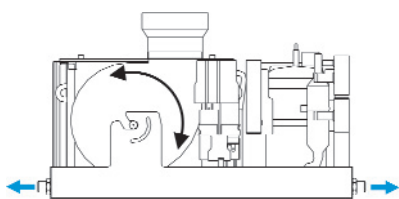
3.6 - CONDENSATE DRAIN

The air-conditioning determines the separation of the condensation water due to the humidity of the conditioned air. This condensation must be discharged in the bilge or in a special tank and then by means of a self-priming pump in the sea.

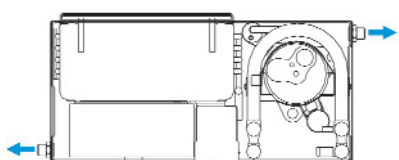


The direct bulkhead outlet is not the best solution: in fact, it can suck up unpleasant smells due to the exhaust emissions of its own or of other engines.

Make reference to the safety regulations of the different countries

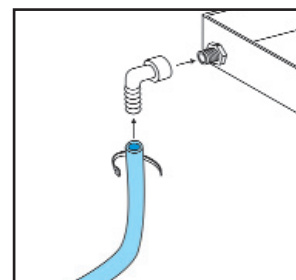


Dis 2.8



Each unit is endowed with two outlets, as you can see in the picture above.

The water condensation outlet pipe must be linked to the rubber-holders of 19 mm on the condensate pan.



If the condensation discharge pipe for exigencies of installation must be long, it is better to use the special "L" connection. You must avoid such an installation as you can see in the picture 1.8 because the condensation water can stop and flow back to the collection basin because of the boat rocking.

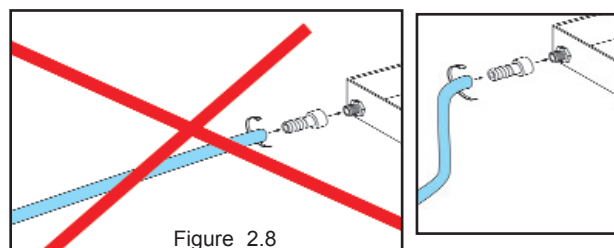


Figure 2.8

3 INSTALLATION OF THE COMPONENTS**3.7 - CONDENSATE DRAIN**

Since during the operating the air-conditioner sucks up and causes a light vacuum in the room, the condensation outlet pipe can suck up from the bilge or the special tank unpleasant smells that can spread in the cabin. To avoid this possibility, it is possible to create a siphon (A) as you can see in the picture 1.9 to stop the air.

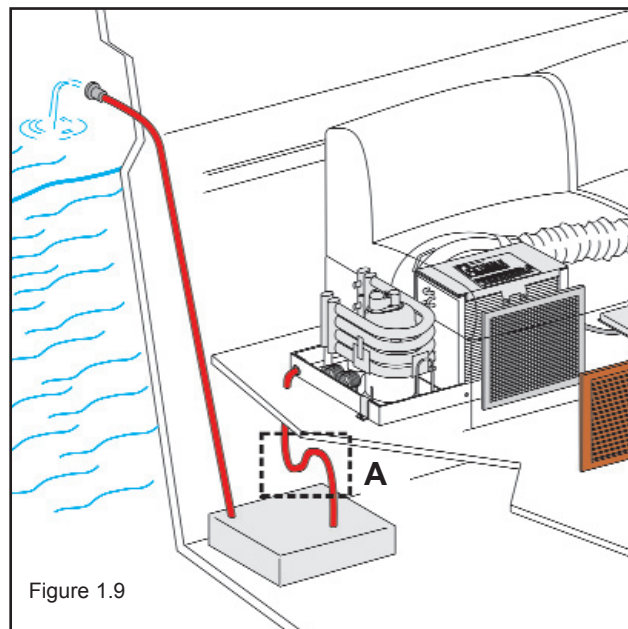
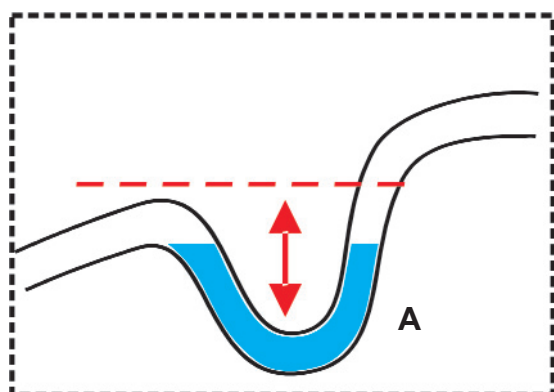
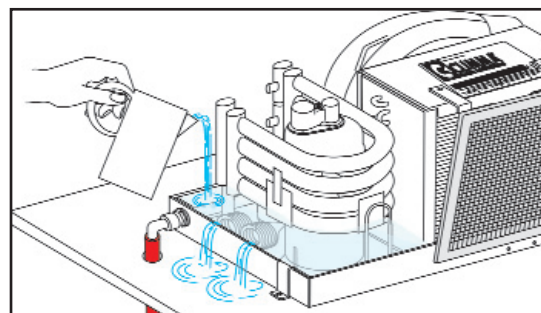
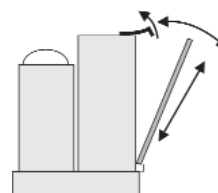
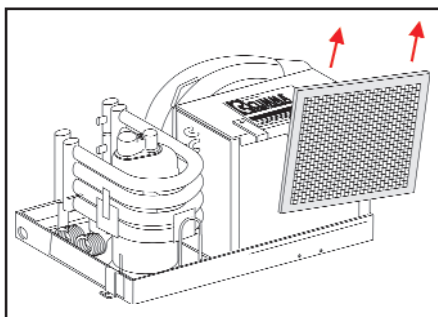
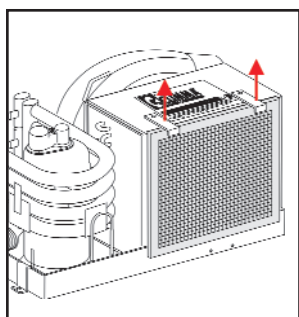
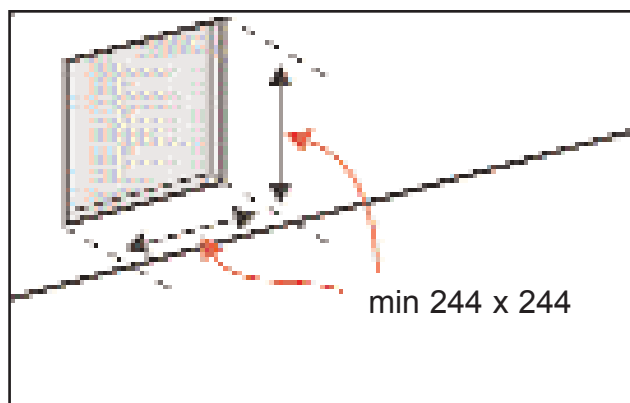


Figure 1.9

To check the actual efficiency of the condensation outlet, pour some water in the pan.

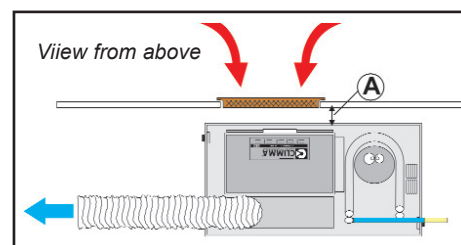
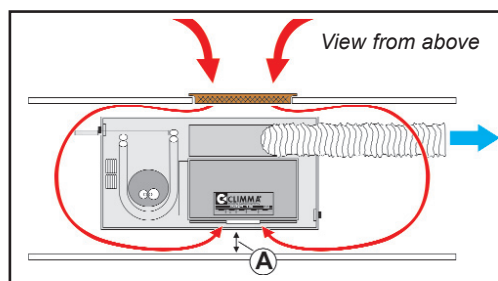
**3.8 - AIR FILTER**

The air-conditioner sucks up the ambient air through an air-refrigerating gas exchanger endowed with many aluminium fins. They would soon become obstructed because of powder and filth. That's why you can mount the air filter directly on the exchanger (as you can see in the picture). The filter must be easily taken off to clean or replace it.

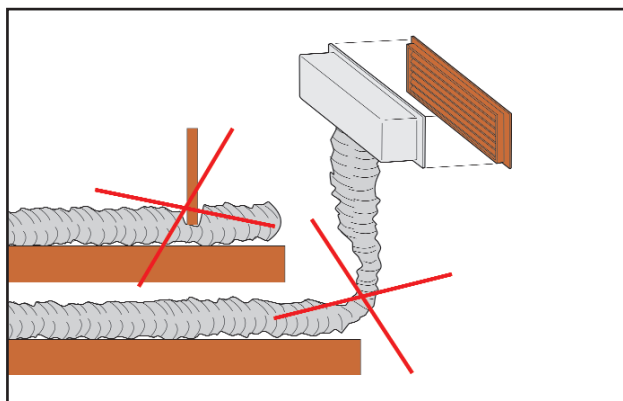
3 INSTALLATION OF THE COMPONENTS**3.9-AIR DISTRIBUTION SYSTEM** (see examples at page 12)**3.9.A - Air intake**

The ambient air is drawn through one or more grills of suitable dimensions. The minimum dimensions are 244x244.

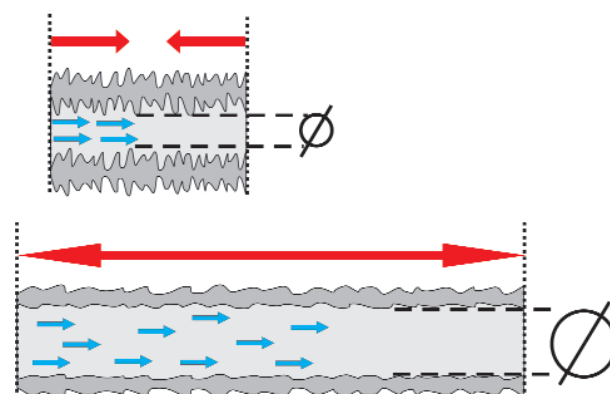
If instead you need to duct the air intake, please contact our customer service.

**3.10.B - Air circulation**

The efficiency of the installation depends on the air volume. So it is important to avoid narrow passages in the air circulation system, keeping the original diameter dimensions and using short pipes.

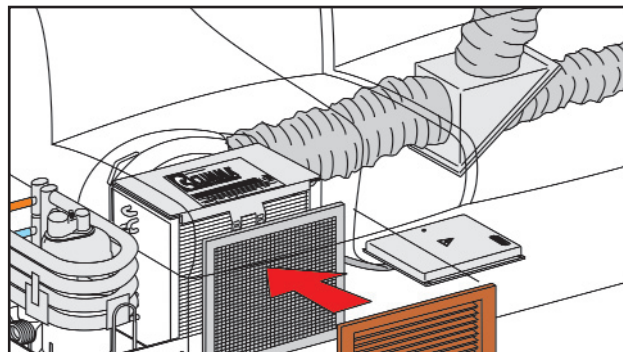
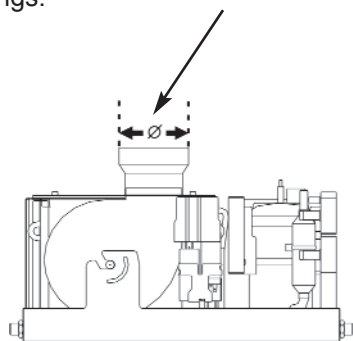
**3.11.B - Air ducts**

The isolated ducts must not be bent so that the air can circulate currently. Cut out the unuseful lenght.

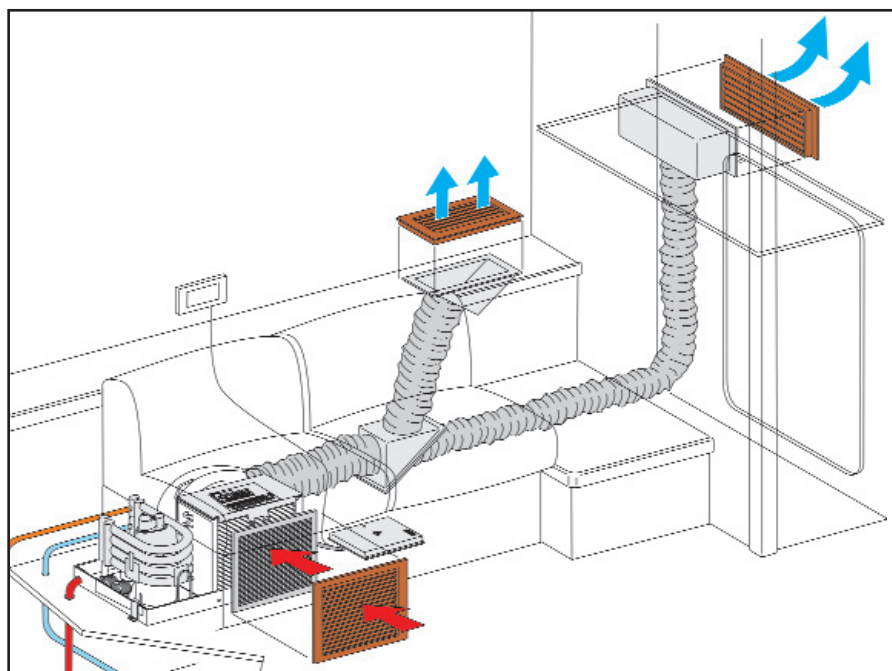
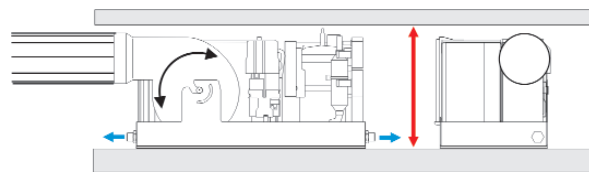


3 INSTALLATION OF THE COMPONENTS**3.12.C - COMPACT - SPLIT MK3**

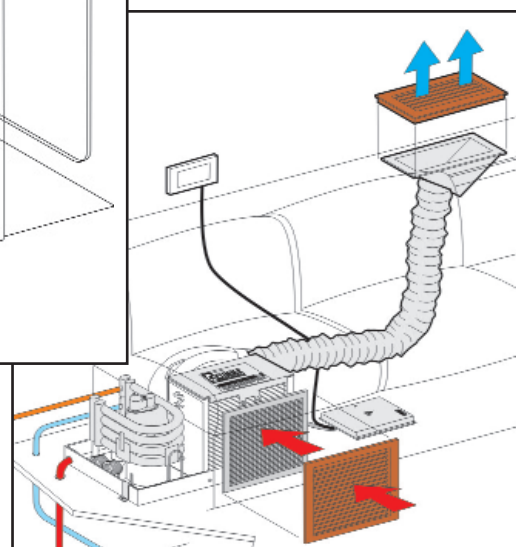
The fan must be linked by means of a duct to the air distribution system, that can be constituted of one or more grills and corresponding plenums. The main duct diameter must not be inferior to the diameter of the fan fittings.

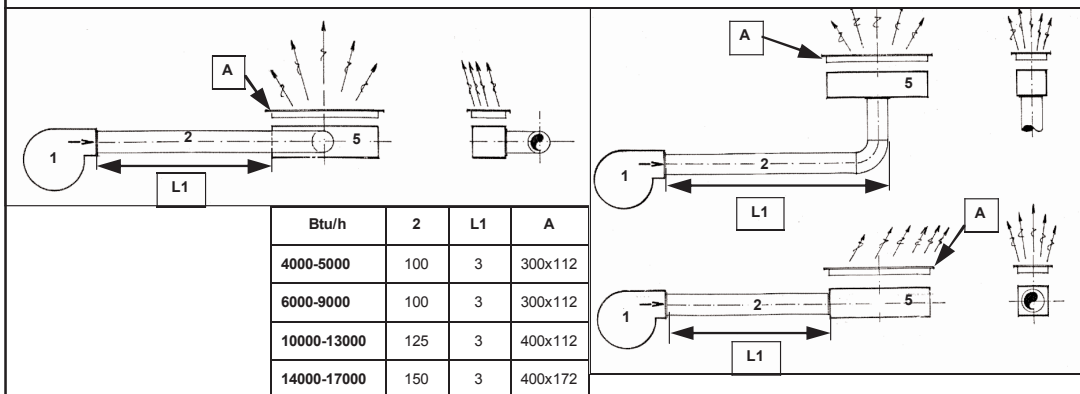
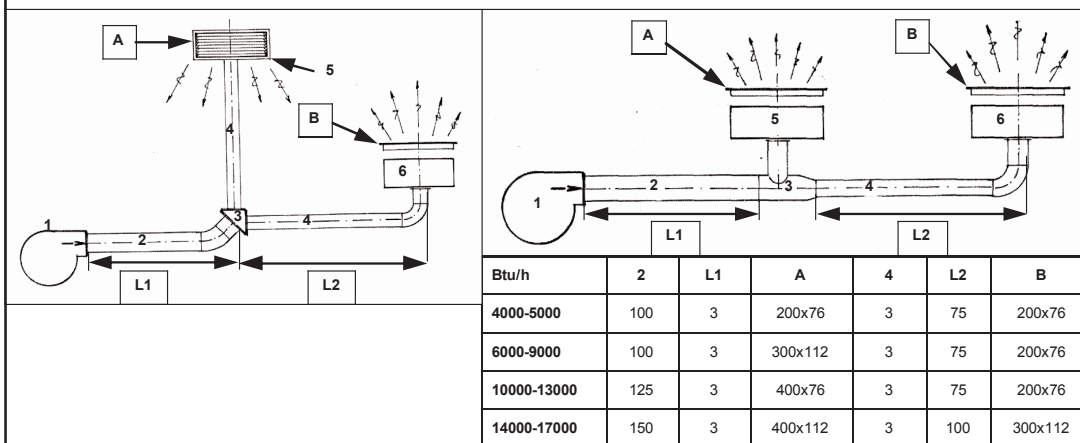


The fan can be turned of 90° in case of installation of limited height.

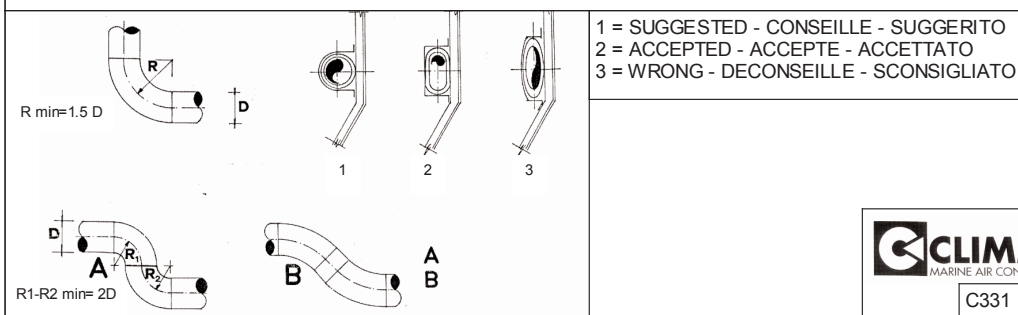


*Example of a Compact installation:
a plenum for air-conditioning two
cabins.*



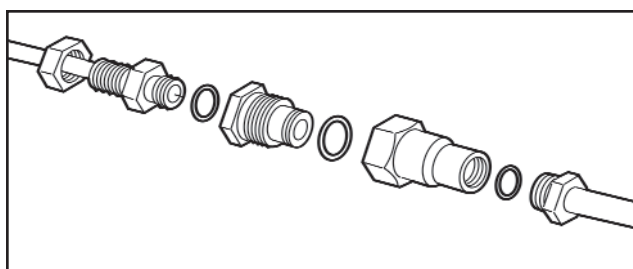
3 INSTALLATION OF THE COMPONENTS
**AIR DISTRIBUTION LAYOUT
EXEMPLE DE DISTRIBUTION D'AIR
ESEMPI DI DISTRIBUZIONE ARIA**
ONE OUTLET - UNE SORTIE SEULEMENT - UNA SOLA USCITA

TWO OUTLET - DEUX SORTIES - DUE USCITE


1 = Air-conditioning unit - Unité de climatisation - Unità condizionatore
 2 = Main air duct - Gaine d'air principal - Condotta d'aria principale
 3 = Air splitter plenum - Plenum distribution air - Plenum di divisione aria
 4 = Secondary air duct - Gaine d'aire secondaire - Condotta aria secondaria
 5 = Air plenum - Plenum grille - Plenum per griglia
 6 = Air plenum - Plenum grille - Plenum per griglia
 A = Main air delivery grill - Grille distribution principale - Griglia di mandata aria principale
 B = Secondary air delivery grill - Grille distribution secondaire - Griglia di mandata aria secondaria

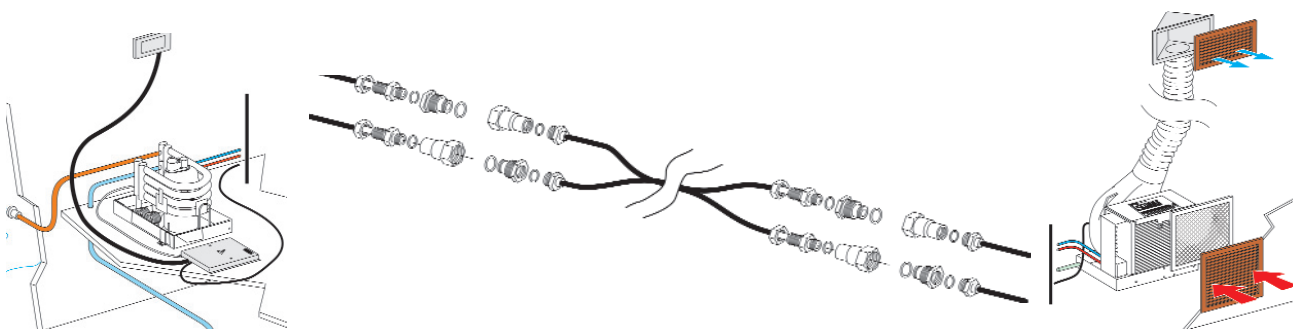
DUCT SPECIFICATIONS - SPECIFICATION DU GAINE - SPECIFICHE DELLA CONDOTTA


3.INSTALLATION OF THE COMPONENTS**3.16- PRE-CHARGED GAS PIPES WITH RAPID COUPLINGS (only for SPLIT models)**

SPLIT QUATTRO air-conditioners are composed by the compressor unit and by the evaporator. SPLIT 4 QUATTRO and SPLIT 8 QUATTRO are pre-charged with R134A and endowed with rapid couplings. The refrigerant gas circulates between them through pre-charged copper pipes with rapid couplings for the connection. The standard pipe connected to the evaporator is 70 cm long. It is possible to separate two units by means of extension leads of different length. During the connection, observe the directions of labels on two sides: "Compressor side" and "Evaporator side" according to the following outlet. Handle pipes carefully to avoid breakages due to incorrect use. The least bending radius is 50 mm.



LUNGHEZZA METRI	CODICE PROLUNGA
2	M60160A
3	M60160B
4	M60160D
5	M60160E
6	M60160F

**3.17 - CONNECTING PIPES**

Except SPLIT 4 QUATTRO and SPLIT 8 QUATTRO models, all other models of SPLIT QUATTRO range are not pre-charged. The connection between two units is a "FLARE" type connection. So only qualified personnel must carry out the discharge and the charge of the system.

It's not VECO S.p.a. but the installer to provide the material for this operation.

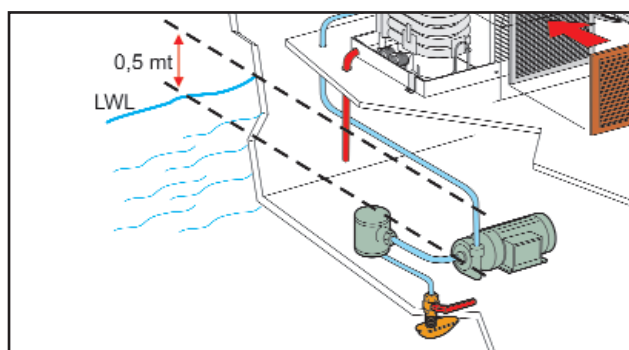
The flare must be perfect (without any burr or imperfection).
The length of the flare walls must be the same.

OUTLET AND INLET PIPES SECTIONS

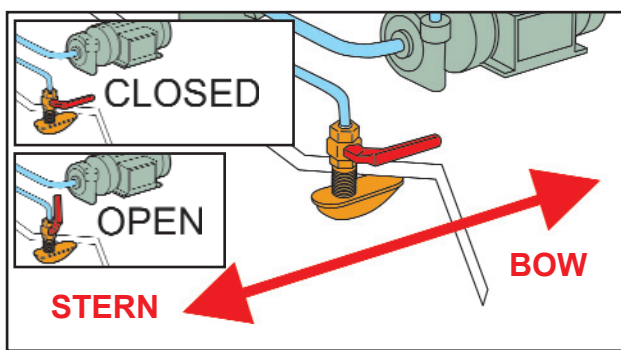
For the section of outlet and inlet pipes, it is necessary to follow carefully the directions on each SPLIT QUATTRO unit.

4 SEA WATER CIRCUIT**4.1 - SEA WATER ELECTRICAL PUMP**

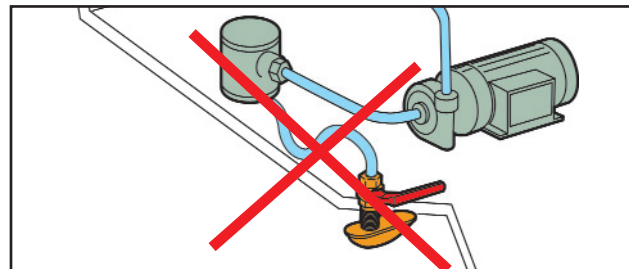
Thanks to the sea water electrical pump the water volume indicated in the exchanger can circulate. The electrical pump must be noiseless. It must work continually and it must be produced with marine building materials.

4.2 - PLACING**4.2 - A**

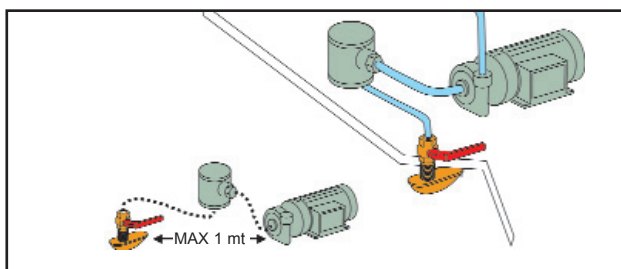
Install the electrical pump horizontally. Its vertical outlet opening must be upwards and at least 50 cm below the water line.

4.2 - B

Sea water blade intake towards the bow.

4.2 - C

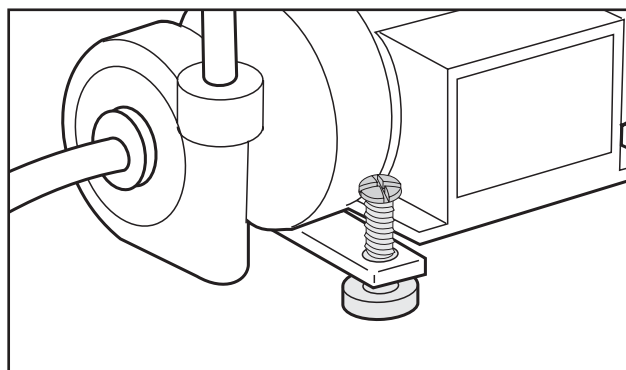
The filter and the connection to the electrical pump must be linked without any siphon (vertically from the sea water intake to the electrical pump intake).

4.2 - D

The section of the intake pump must be as short as possible (less than 1 m for an efficient circuit).

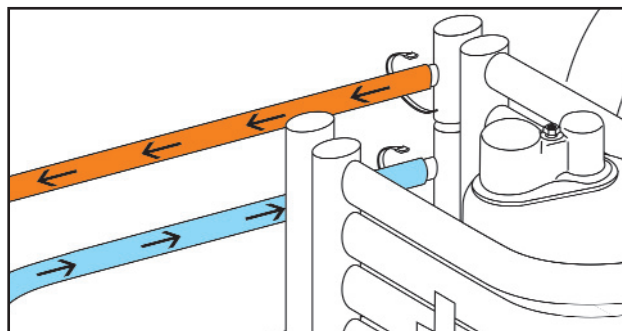
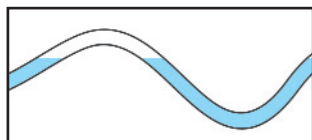
4.3 - FASTENING

Fasten the electrical pump by means of the suitable screws using the holes provided in the base. The flexible installation (with anti-vibrating system) makes the electrical pump even more noiseless.



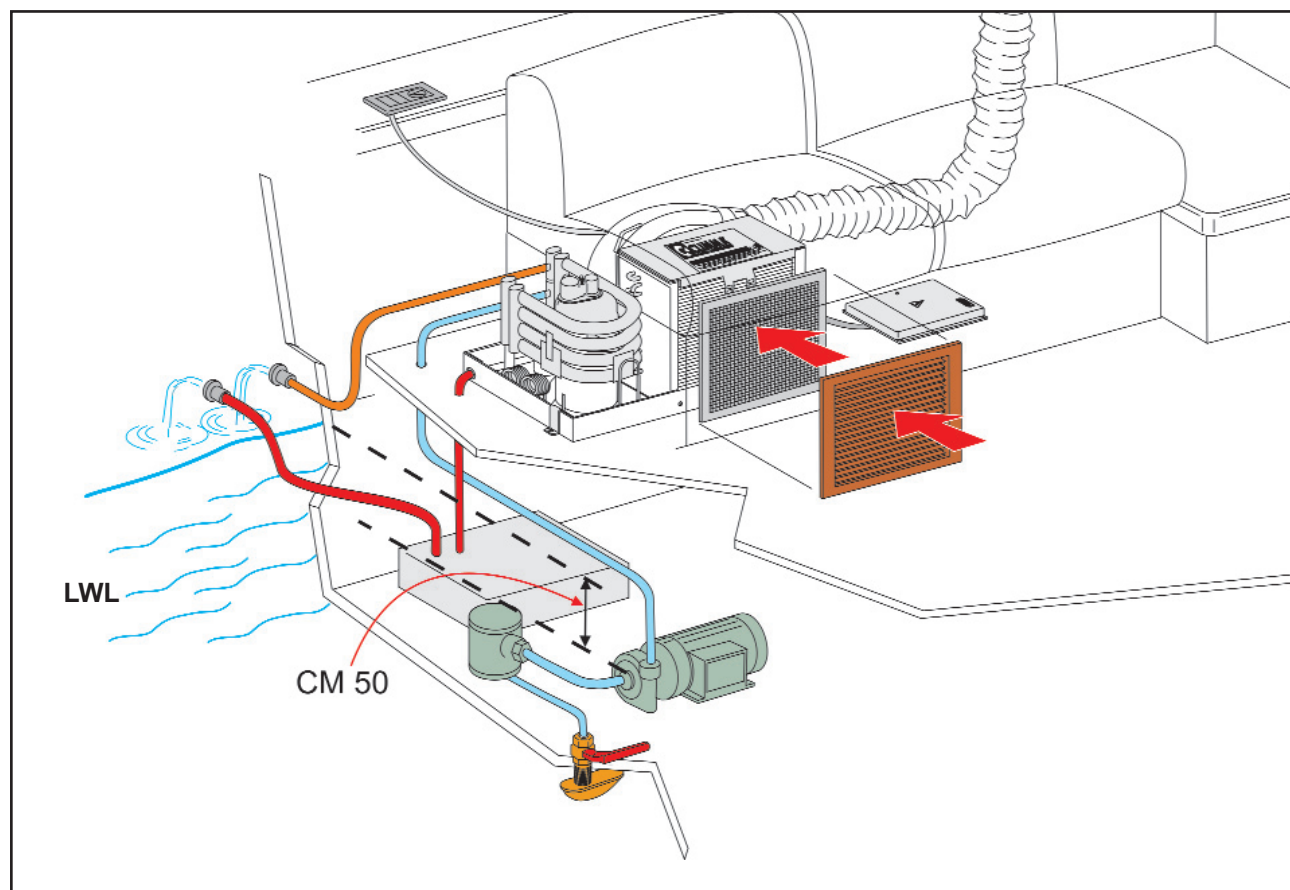
4 SEA WATER CIRCUIT**4.4- SEA WATER CIRCUIT**

The circuit follows a vertical line from the sea water intake to the unit exchanger. Then it can follow both a vertical or an horizontal direction.



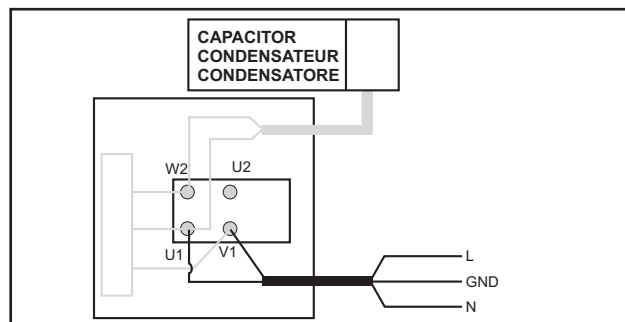
Anyway it is better not to create any siphon, because some air bubbles coming from the sea water intake during the sailing may remain in the circuit.

The water jet of the discharge must not disturb either the guests of the boat where it is installed or the ones of the other boats.

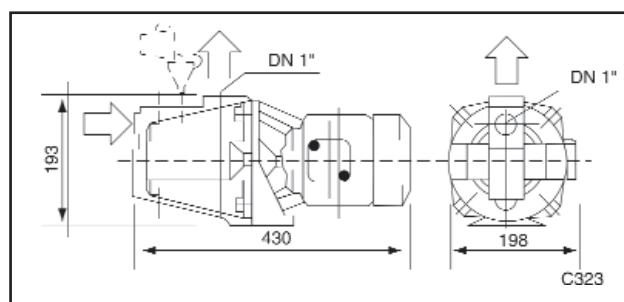


4 SEA WATER CIRCUIT**4.5 - ELECTRICAL CONNECTIONS**

All electrical pumps are single-phase pumps. So they need a connection to the neutral wire, to the phase and to the grounding. Check always that the voltage on the label corresponds to the voltage available on board. Execute the connection according to the diagram on the terminal board cover. Follow the sequence of the phases for the pump connection. Check that the rotation direction corresponds to the instructions of the pump.

**4.6 - SELF-PRIMING ELECTRICAL PUMP**

If it is not possible to follow the directions at 3.2, it is necessary to install a self-priming electrical pump following the same instructions for the connection of a centrifugal pump. Before starting it, it is necessary to fill the electrical pump tank to make it self-priming.



WARNING

AVOID THE RISK OF THE ELECTROCUTION !!!

Only the qualified staff can execute the troubleshooting and the repair.

Keep isolated from the ground during the execution of the electrical operations, wearing dry clothes, rubber shoes, rubber carpets, etc.... Don't check wires under voltage if none can bring help.

IMPORTANT NOTE

To avoid possible electrical shocks, that can cause harm or death to people, execute the grounding of the air-conditioning system, as indicated:

- 1- Use a suitable electrical cable with ground wire section and isolation to give the charge from the switch on the control board of the boat to the electrical box of the system. The ground wire must be correctly connected to the ground terminal of the panel.
- 2- Check that the ground connection between the electrical box and the air-conditioner hasn't suffer any damage during the transport.
- 3- Check that the connection of the water pump to the suitable terminal of the electrical box includes also the ground connection.
- 4- Check the ground continuity before switching off the air-conditioner.

5 ELECTRICAL CIRCUIT**5.1 - ELECTRICAL BOX**

The COMPACT and SPLIT MK3 air-conditioners are available in three configurations:

- RC reverse cycle - standard in stock
- CO cool only - on special order
- EH electrical heating - on special order

The electrical box is connected to the unit with a 1.5m long cable and must be installed in a clean and dry place, The electrical PCB is already set (RC-EH-CO) for the corresponding unit.

5.2 - SUPPLY

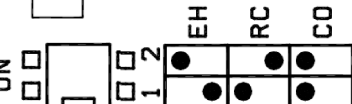
Check that the available supply corresponds to the label on the unit, on the box and on the electrical pump.

A circuit breaker with suitable fuses supplies the connection board of every unit.

The supply cables must be proportionated to the charge. The supply must be connected to the terminal board, for which section wires up to 4 mm are suitable. Fasten the cable using the suitable clamps.

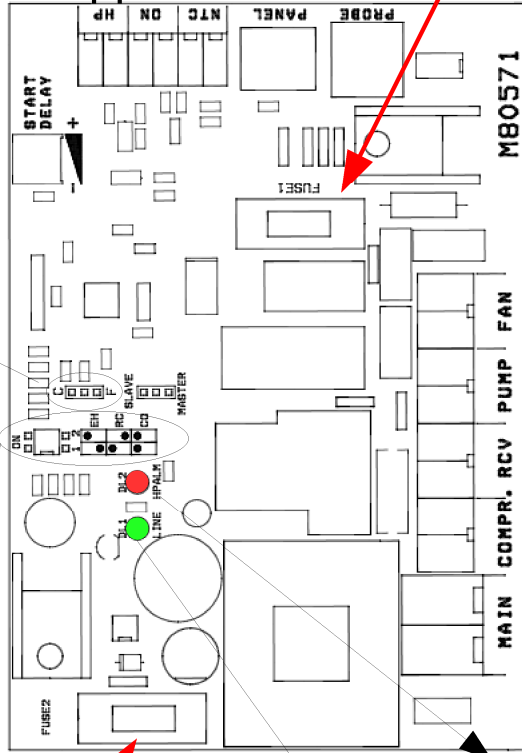
MK3 POWERBOARD CONNECTION – RC / EH VERSION

MODE SWITCH



FUSE2 = 0,5 A

Move the JUMPER to Select TEMPERATURE Mode (°C-°F)



HIGH PRESSURE SWITCH (HPS)

BLACK

BLACK

REMOTE SWITCH

ANTIFREEZE PROBE

External Probe (Optional)

FUSE1 = 6,3 A

WARNING

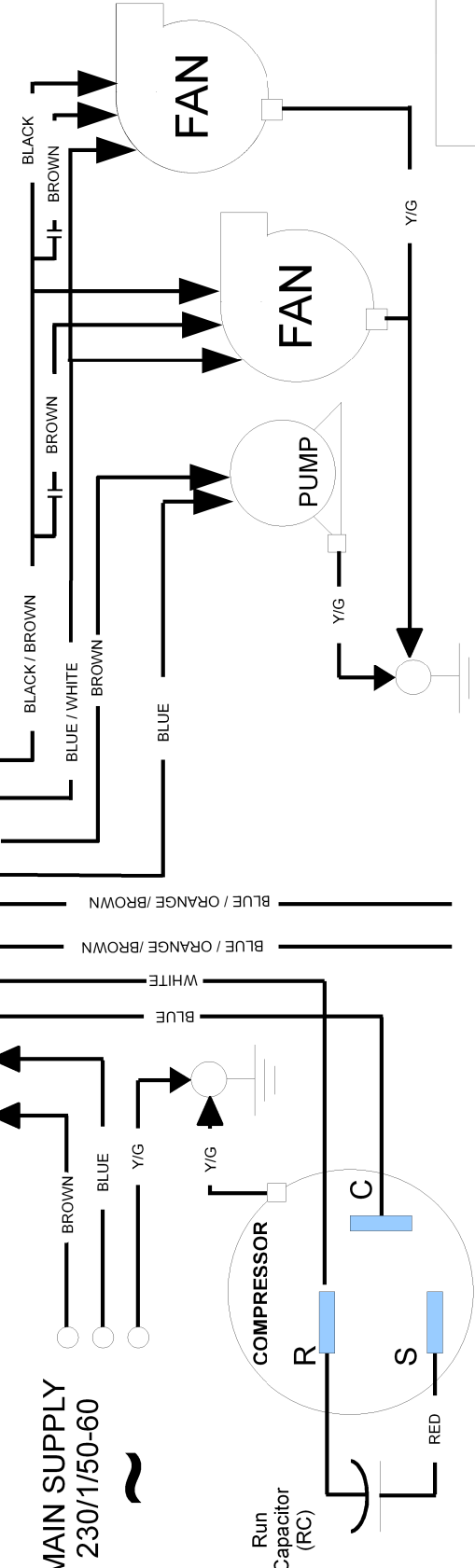
SWITCH MODE FOR OLDER VERSION



DIP SWITCH LEGEND

1-ON / 2-OFF = P0 = COOL ONLY Unit (CO)
1-ON / 2-OFF = P1 = Unit with ELECTRICAL HEATING (EH)
1-OFF / 2-ON = P2 = Unit with REVERSE CYCLE (RC)
1-OFF / 2-OFF = nP = No Program Selected

MAIN SUPPLY
230/1/50-60



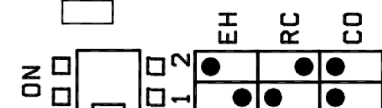
RCV

Heater



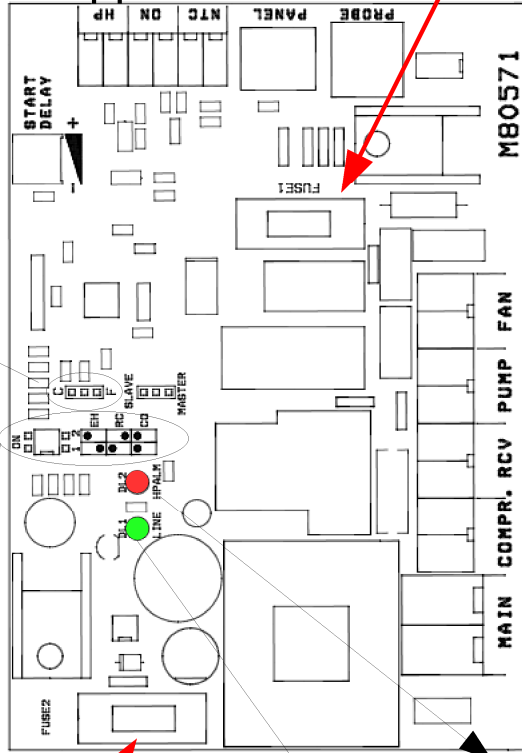
MK3 POWERBOARD CONNECTION - CO VERSION

MODE SWITCH



FUSE2 = 0,5 A

Move the JUMPER to Select TEMPERATURE Mode (°C-°F)



HIGH PRESSURE SWITCH (HPS)

BLACK

BLACK

REMOTE SWITCH

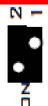
ANTIFREEZE PROBE

External Probe (Optional)

FUSE1 = 6,3 A

WARNING

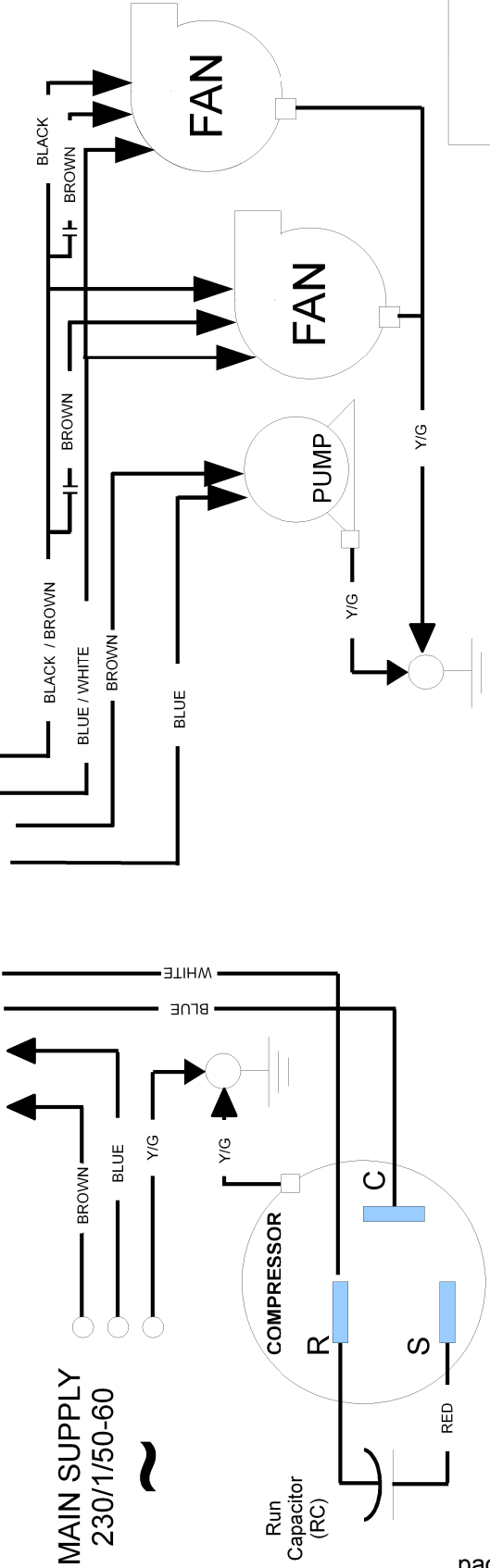
SWITCH MODE FOR OLDER VERSION



DIP SWITCH LEGEND

- 1-ON / 2-ON = P0 = COOL ONLY Unit (CO)
- 1-ON / 2-OFF = P1 = Unit with ELECTRICAL HEATING (EH)
- 1-OFF / 2-ON = P2 = Unit with REVERSE CYCLE (RC)
- 1-OFF / 2-OFF = nP = No Program Selected

MAIN SUPPLY
230/1/50-60



5 ELECTRICAL CIRCUIT

5.7 - MULTIPLE INSTALLATION

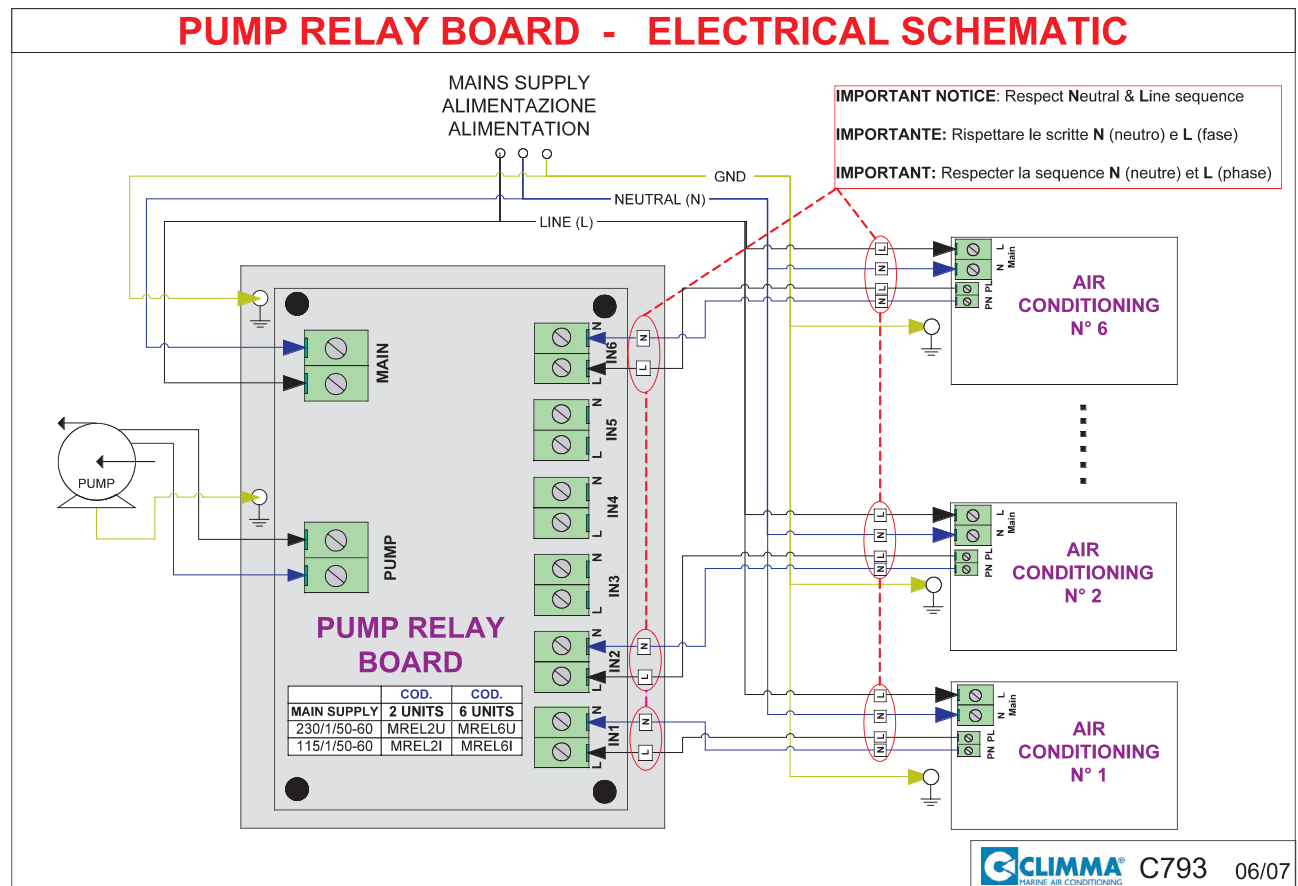
The CABIN air-conditioner fits perfectly in multiple installations. These are the features of a multiple installation:

- more systems are supplied by the same sea water electrical pump;
- the compressor of each system must start with a certain delay.

5.8 - CONNECTION TO THE PUMP FOR MULTIPLE INSTALLATIONS

It is available the relay box for the pump as optional. Each air-conditioner is connected to the relay box. The supply of the pump and of the air-conditioners must not be the same. The first one must be protected by an independent fuse. The pump must be supplied by all relays connected to each box.

WARNING: THE PHASE/NEUTRAL SEQUENCE BETWEEN EACH AIR CONDITIONER AND THE PUMP RELAY BOX MUST BE RESPECTED. A REVERSE PHASE SITUATION WOULD CAUSE AN ERRATIC FUNCTIONING OF THE SEA WATER PUMP.

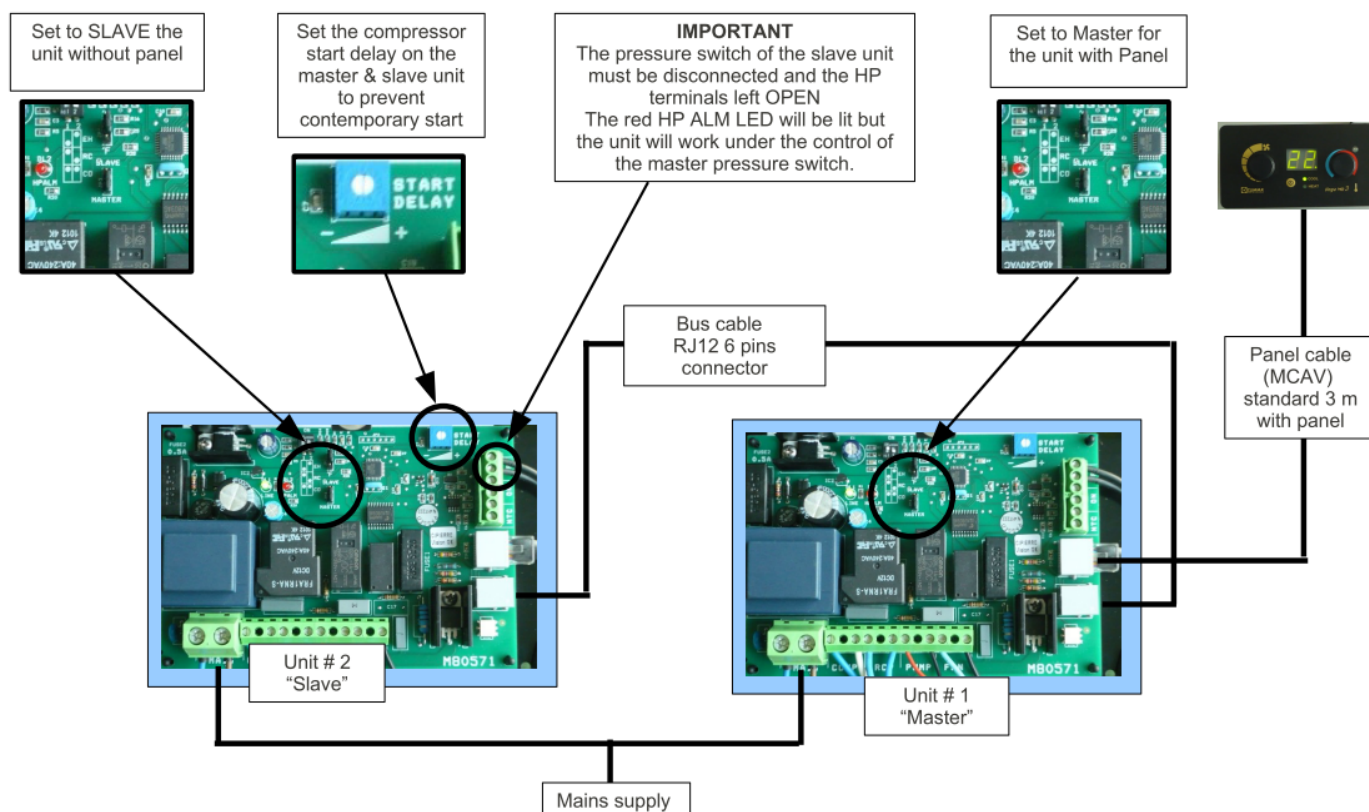


5 ELECTRICAL CIRCUIT

5.9 SINGLE CONTROL PANEL FOR 2 UNITS

The MK3 control has the feature to control 2 air conditioners by means of a single remote control MK3. This type of configuration may be chosen when 2 air-conditioners are installed to cool a single ambient. In this case, we strongly recommend to take into consideration that the 2 air-conditioners, using this configuration, will always behave in the same manner, with the same settings, same fan speed and it is not possible to stop one and let the second run.

For the connections and settings please refer to the following schematic. As it is shown, the control box connected to the remote control panel must be set to "master" while the second must be set as "slave" using a dedicated "dip-switch" on the PCB.

**Specific instructions:**

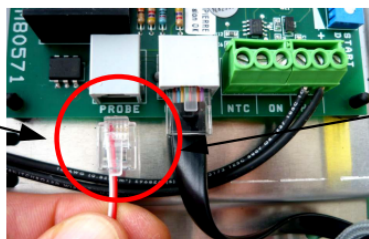
- 1) Set as Master the control box connected to the remote control panel.
- 2) Set as slave the second control box.
- 3) Disconnect the HP safety switch of the slave PCB leaving the terminals open (no bridge)
- 4) Connect the 2 boards with an original MBUS cable of appropriate length (available MBUS3-MBUS6-MBUS18-MBUS24)
- 5) Set the slave compressor start delay in order to prevent contemporary starts of the 2 compressors.

5 ELECTRICAL CIRCUIT**5.10 OPTIONAL TEMPERATURE SENSOR**

The MK3 remote control panel is equipped with an internal temperature sensor. In particular cases this sensor might be non accurate being exposed to direct sunlight or cold/warm air-flow.

In order to solve this kind of issues, it is possible to connect to the MK3 control board an optional temperature sensor (part # MSENS) which can be installed in a suitable location and improve the ambient temperature control.

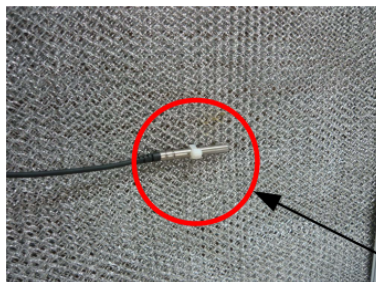
The optional temperature sensor MSENS must be connected to the RJ port on the power board. The connection of the external temperature sensor overrides automatically the temperature sensor built into the display



Il sensore di temperatura opzionale MSENS deve essere collegato alla presa RJ della scheda di comando. Il collegamento del sensore opzionale esterno sostituisce automaticamente il sensore di temperatura incorporato nel pannello di comando

The sensor tip must be positioned on the air return path, preferably not in the same space where it is installed the air-conditioner to prevent that the unit heat or cold would influence the temperature reading.

Il sensore è bene che sia fissato sul percorso dell'aria di aspirazione, preferibilmente non nello stesso vano dove è installato il condizionatore per evitare che sia influenzato dal freddo o caldo generato dal condizionatore

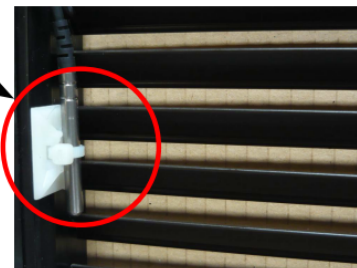


Sensor tip on the internal side of the air intake grill

Sonda di temperatura fissata all'interno della griglia di aspirazione aria

Sensor tip attached on the air intake filter (inner side of the intake grill)

Sonda di temperatura fissata al filtro della griglia di aspirazione aria



C 858 07-12

6 - COMMISSIONING TESTS**6.1.- CHECK OF THE SEA WATER ELECTRICAL PUMP**

1- The sea water pump starts immediately before the compressor. In order to test it, run the air-conditioner in cool mode. In the control versions from 2012, the pump cycles with the compressor.

6.2.- CHECK OF THE COOLING CYCLE

1- Start the air-conditioner and set the set point lower than ambient. The compressor will start within a minute.

2.- Check that after few seconds the air coming from the distribution plate cools down perceptibly. If the air-conditioner runs for some time, it is possible to check the functioning of the thermostat and the condensation outlet system. If it is damp, the exchanger will get wet and start drop forming the condensation, that must drain outboard.

6.3.A- CHECK OF THE HEATING CYCLE (REVERSE CYCLE)

Start the air-conditioner and set the set point higher than the ambient. The compressor will start within a minute. Check that in few minutes the air outlet warms-up. If the air-conditioner is left running, it will be possible to check also the thermostat functioning. The air out will get sensibly warmer if the blower is running at reduced speed.

6.3.B- CHECK OF THE HEATING CYCLE (ELECTRICAL HEATING)

Start the air-conditioner and set the set point higher than the ambient. Check that in few minutes the air outlet warms-up. If the air-conditioner is left running, it will be possible to check also the thermostat functioning. The air out will get sensibly warmer if the blower is running at reduced speed. Note that with E.H units, the compressor and sea water pump do not run in heat mode

6.4.- CHECK OF THE SEA WATER CIRCUIT

During the running, it is very important to check the tightness of all the fittings below the water line. Check the flow at the outlet or by a liter-counter.

6.5.- CHECK OF THE ELECTRICAL PUMP ABSORPTION

Since technical specifications of cooling circuits are always different, it is necessary to check that the electrical pump runs by its parameters. During the functioning, measure the electrical pump absorption by means of an ammeter. The absorption must not exceed the value on the label of the electrical pump. In this case, switch off the air-conditioner and check the circuit (see 3.7).

6.6.- CHECK AND CALIBRATION OF THE AIR CIRCUIT DISTRIBUTION

It is very important to measure and regulate the conditioned air volume. On this depends the efficiency of the system during its running in sailing. It is not necessary to switch on the compressor, but only the fan group. It is possible to execute this operation even in shipyard supplying the air-conditioner by means of the ground voltage. To obtain the hole capacity of the system, you must measure the conditioned air volume on the inlet grill of the system by means of an ammeter.

See the following page - 7.6.1

6 - COMMISSIONING TESTS

6.6 - MEASURING OF THE AIR VOLUME

Follow these instructions:

- 1.- Measure the net surface in sqmt of the inlet grill without the frame.
- 2.- Measure the air speed on different points of the grill.
- 3.- Add up the different speed values and divide them by the number of measurements to obtain the air speed average (in mt/s or mt/m according to the measuring instrument).
- 4.- Thanks to one of the following formulas it is possible to draw the air volume in the system:
 $Q = S \times V \times 3600$

$$Q = S \times V \times 60$$

Where:

Q = cmt/h of conditioned air

S = surface in sq mt of the grill without the frame

V = air speed in mt/s or mt/m

3600 = for the speed in mt/s

60 = for the speed in mt/m

From these formulas it is possible to draw the following ones:

$$S = \frac{Q}{V \times 3600} \quad S = \frac{Q}{V \times 60}$$

$$V = \frac{Q}{S \times 3600} \quad V = \frac{Q}{S \times 60}$$

Compare the volume in cu mt/h with the value indicated in the table of technical specifications. If the air volume is lower of 15/20% than values in the table (but not more than 15/20%), the value can be considered normal. The measurement on the outlet grill can be useful for the balancing if there are more outlet grills for a comparison with the air volume of the outlet grill. To air-condition two or more cabins, it is necessary to calculate the air volume to introduce. To obtain this value, divide the air volume obtained from the previous measurement by all air-conditioned cu mt (ratio between conditioned air and conditioned volume). Multiply this value by volumes of each cabin to obtain a rough value of the conditioned air to introduce.

Example:

Volume aria trattata in mc/h VT	700
Volume condizionato dinette mc VC	25
Volume condizionato cabina mc VC	15
Totale mc. VC	40
Rapporto VT/VC	17,5
Mc aria dinette = 25x17,5	438
Mc aria cabina = 15x17,5	263
Totale mc/h	700

7/8/9 USE DIRECTIONS**7.1 - FUNCTIONING OF THE COMPACT & SPLIT QUATTRO AIR-CONDITIONERS**

During the cooling cycle, the refrigerant circuit takes the ambient air away and to make it over the sea water (all versions)

It is possible to select the functioning cycle, the desired temperature and the fan speed from a remote control panel that can be installed in the air-conditioned room. For the specific distances, refer to the directions of the remote control panel (page 149).

7.2 - CONTROL PANEL MK3

The control panel MK3 has the following functions:

A - Start & stop

B - Temperature control

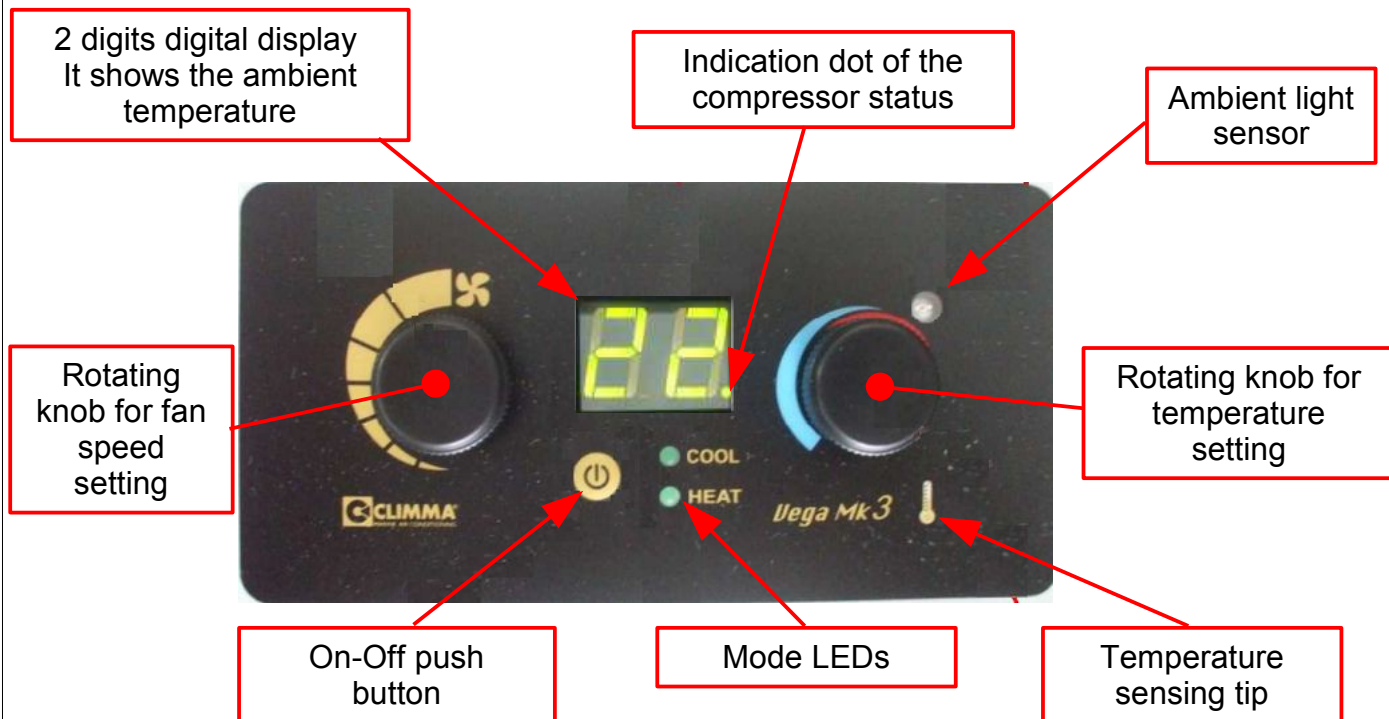
C - Fan speed control

Please refer to MK3 panel instructions for details of all the functions

USER MANUAL FOR MK3 PANEL - COMPACT & SPLIT UNITS

MK3 is a control system with innovative features for Climma independent units:

- a) large digital display
- b) simple settings by means of two rotating knobs
- c) On-Off with a single push button
- d) 8 fan speeds automatically or manually selecteable
- e) automatic selection of the functioning mode either Cool for summer or Heat for winter
- f) automatic display and LED dimming
- g) temperature sensor incorporated in the panel. Remote sensor optional



AIR- CONDITIONER ON-OFF

A simple push of the button starts (or stops) the air-conditioner. The start is confirmed by either the Cool or Heat LED. A dot in the bottom right corner of the display shows that the compressor is running.

TEMPERATURE SETTING

The right side rotating knob permits the temperature setting. Touching the knob will immediately show the actual temperature setting on the display. Rotating the knob will change the value. As you release the knob the display will blink and memorize the new value and then show again the ambient temperature.



Temperature setting rotating knob

The temperature range goes from 15°C (59°F) and 30°C (86°F).

The suggested comfort value is 22°C -24°C (71°-75°F) for the summer and 20°C– 22°C (68°-71°F) for winter. Exceeding the min or max values is not suggested and may cause malfunctioning of the air-conditioner.

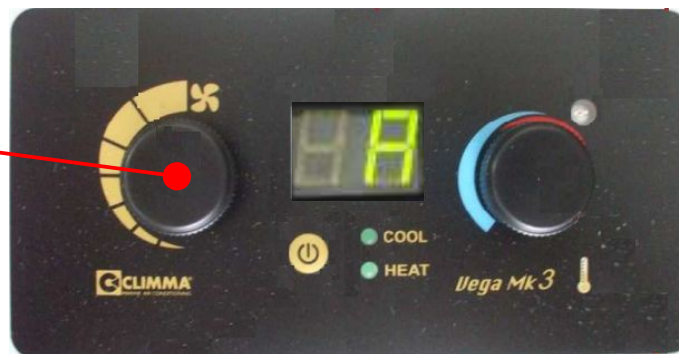
USER MANUAL FOR MK3 PANEL - COMPACT & SPLIT UNITS

FAN SPEED SETTING

The left rotating knob is used to set the fan speed. Touching the knob will immediately show the actual speed setting on the display. Rotating the knob will change the value. As you release the knob the display will blink and memorize the new value and then show again the ambient temperature.

The MK3 control offer the A – automatic option and the manual setting between the 8 available speeds. The A-automatic setting reduces automatically the speed as the ambient temperature gets close to the set temperature. As the ambient temperature reaches the set value the compressor goes off while the fan keeps blowing at the minimum speed (automatic set).

Fan speed
rotating
knob



Important note: if the functioning mode AF- Auto-special is selected, the fan speed range is automatically limited. In COOL mode the minimum speed is #5 in auto and #3 in manual. In heat mode the minimum speed is #3. In heat mode, if the HP safety stops the compressor, at restart the speed is rised by 2 steps both at first and at the second intervention. At third intervention the system is locked out.

DISPLAY INDICATIONS

THE MK3 control gives additional informations on the system functioning mode.

The display comes on when the units gets the power supply.

The display shows the ambient temperature. If no other LED or dot is on, the system is OFF.



Air-conditioner
OFF

System in summer
cool mode



Compressor running (LED steady)

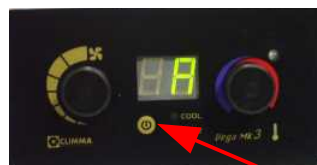
With the A – automatic and AF- automatic special functioning modes, the LED corresponding to the summer cooling (Cool) or winter heating (Heat) comes on together with the bottom-right dot in the display. This dot indicates that the compressor is running.

The indicating dot for the compressor can be steady or blinking: A steady dot means the compressor is running. A blinking dot means that the timer (2 min) is delaying automatically the compressor start. In this condition the fan is running. When the timer time expires the compressor and the pumps start automatically. , while the compressor is waiting the timer to expire. When the dot becomes steady the compressor will start automatically. The timer cannot be zeroed unless the power supply is cut. This procedure is not suggested and must be limited to the commissioning phase in the presence of a skilled engineer and only if needed.

USER MANUAL FOR MK3 PANEL - COMPACT & SPLIT UNITS

FUNCTIONING MODES

The MK3 control chooses automatically the functioning (Cool-Heat) mode. This setting A-automatic is the default setting.



A- automatic
standard

On-Off button and
mode selection

The MK3 control has memorized 3 more functioning modes:

d = Dehumidifying

AF = Automatic special

FO = Fan only

Pushing the button for 5 seconds, preferably with the unit off, gives access to the mode menu: the display shows the actual functioning mode. Pushing again the button will browse the functioning modes in sequence. The new value is memorized if the button is not touched for 3 seconds, the display blinks rapidly and then returns to show the ambient temperature,



d - dehumidifying

The “D- Dehumidifying” mode permits to keep the air-conditioner running making cooling cycles of 30 minutes every 6 hours. This mode permits to keep the humidity under control. (the display shows d if the Dehumidifying option is selected)



AF- automatic
special

The “A-automatic special” is suggested when the air-conditioner works in special conditions and avoids the icing of the evaporator. With this selection the air-conditioner in cool mode makes quick defrosting cycles every 30 minutes. This works only with RC reverse cycle models. While in heat mode the AF mode rises the minimum fan speed.



FO- Fan Only

The “FO – Fan only” mode permits to stop the compressor and pump and run the fan only. The fan speed is set to #4 in auto-mode while can be set from 1 to 8 in manual mode.

AUTOMATIC DISPLAY AND LED DIMMING

The MK3 control is equipped with an ambient light sensor which dims automatically the display and the LED when the ambient light is reduced.



Ambient light
sensor

USER MANUAL FOR MK3 PANEL - COMPACT & SPLIT UNITS

ALARM INDICATIONS

HP PRESSURE SWITCH CUT-OUT

The MK3 control has a specific behaviour in case of intervention of the safety pressure switch, When running in summer cooling (**Cool mode**): it stops the compressor and the sea water pump while the fan keeps running. As the safety intervention might be a temporary problem, for the first two interventions the compressor and pump stop for a given time (between 1.5 up to 6 minutes) and then automatically restart. The indicating dot on the display is blinking during the stop time.

If the safety cuts for the third time, the display shows HP (high pressure) and the system remains locked-out (everything stops) and needs a manual reset. Manual reset means switching off and on again with the ON/OFF button..

When running in winter heating (**Heat mode**): it stops the compressor and the sea water pump while the fan keeps running. As the safety intervention might be a temporary problem, for the first two interventions the compressor and pump stop for a given time (2 minutes) and then automatically restart. The indicating dot on the display is blinking during the stop time.

If the safety cuts for the third time, the display shows HP (high pressure) and the system remains locked-out (everything stops) and needs a manual reset. Manual reset means switching off and on again with the ON/OFF button.



System locked by safety cut out (HP)

The intervention of the safety pressure switch is caused by an excessive rise of the refrigerant pressure inside the system.

If the system is functioning in cool mode the problem is caused by the lack of sea water cooling. It is necessary to check the correct functioning of the sea water pump before resetting the system.

If instead the system is working in heat mode the problem is normally caused by lack of air flow. In this case we suggest to rise the fan speed in order to increase the air flow.

For the procedure of troubleshooting please refer to the air-conditioner user manual.

ANTIFREEZE FUNCTION WITH OPTIONAL SENSOR

The MK3 control is ready to be connected to an optional antifreeze sensor which permits the operation of the system under special conditions preventing alarm stops.

Connecting the antifreeze optional sensor automatically activates a protective function. If the sensor detects a condition of possible icing of the evaporator, it starts a heat mode run for 1 minute which guarantees the melting of the ice. After the heating cycle the air-conditioner restarts its normal cooling mode.

The antifreeze monitoring is activated every 15 minutes. This optional feature is available only for the RC – reverse cycle versions.

8 - IMPORTANT NOTES**8.1 - INSTALLATION IN THE ENGINE COMPARTMENT (only for SPLIT models)**

The air-conditioner use can cause sparks (switches, relays, etc...) To avoid the risk of explosions, it is necessary to start the extractor 10 minutes before switching on the air-conditioning system and it must be kept running as long as the air-conditioner runs.

8.2 - TROUBLESHOOTING

Only the qualified staff can execute the troubleshooting respecting the safety regulations.

8.3 - MULTIPLE INSTALLATION

It is necessary to set the start delays of each air-conditioner at least 5 seconds one from another to avoid contemporary starts.

9 - MAINTENANCE

For an efficient functioning of the air-conditioner, follow these advices about checks and maintenance. Intervention times can change according to the installation place, the pollution and the installation use.

- " Clean the sea water filter every week.
- " Clean the air filter every month.
- " Clean the condensation outlet pipe every four months.
- " Clean the condensation collection tray every year.
- " Clean the water intake every year (operation to be executed in shipyard).
- " Change the batteries (only for Vega MK II with remote control device) every year.

These operations must be executed only after having switched off the air-conditioner and only by the qualified staff.

Don't check the electrical circuit if none can bring help in case of accident.

- " Check hydraulic connections every year.
- " Consult also "Installation Manual".

9.1 - CONDENSATION WATER AND ITS OUTLET

During the cooling cycle air-conditioners produce much condensation water, above all when it is damp. Check periodically that there are no leaks or obstructions on the condensation outlet and that the condensation water drains regularly. Pour in the condensation tray some water and check that it flows currently. If the condensation water drains to the bilge, it is better to let it flow towards a limited space and let it drain continually to avoid stagnation that can cause unpleasant smells.

9.2 - AIR FILTER

The filter on the exchanger air outlet must be periodically cleaned and/or substituted. This filter avoids the obstruction of the air-conditioner exchanger. The maintenance frequency depends on the running hours number and above all on the air pollution. We suggest to clean the filter every month. An obstructed air filter can cause a decrease of the system efficiency in cooling mode (COOL). In the heating cycle (RC models) in system with reversal cycle, it can block the system because of the high pressure; in EH models with electrical resistance it can block the system because of the intervention of an internal safety device.

7/8/9 USE DIRECTIONS**9.3 - SEA WATER STRAINER**

The water filter on the intake of the cooling water electrical pump must be periodically cleaned. Thanks to this filter the pump and the cooling circuit work correctly. The maintenance frequency depends on the running hours number of the system and above all on the water pollution. We suggest to check the sea water filter every week. To check that there are no obstructions, check the pump outboard discharge (N). If there is a lack of circulating water in the cooling cycle, the efficiency of the system decreases and the air-conditioner may get stuck. In the heating cycle, in RC models it can decrease the system efficiency.

9.4 - WINTERIZING

If you don't use the boat and the temperature is below 0° C, you must drain the water in the condenser, in the electrical pump, in the filter and in the connection pipes. You must:

- close the sea water intake;
- take off the pipe of the water intake on the condenser (between the electrical pump and the air-conditioner) to drain the condenser water;
- clean the filter and drain the water in the filter and in the electrical pump.

10 TROUBLESHOOTING AND REPAIR**10.1 - IDENTIFICATION OF THE PRODUCT**

Each product is identified by means of a label. Make reference to the description, to the code, to the series number if you must eventually call the Assistance Centre.

10.2 - TROUBLESHOOTING

Before calling an Assistance Centre, check the system. The following problems are the most common ones and you can solve them. If the system doesn't work, even after having checked it, call the nearest CLIMMA Assistance Centre. Call the Veco Service: +39.0362.35321 or consult the WEB page: www.climma.it

10.3 - THE UNIT DOESN'T WORK

Has the circuit breaker tripped?

Reset the switch on the main board.

Is the supply voltage too low?

Check the voltage value between "L" and "N" of the "MAIN POWER" terminal on board.)

10.4 - THE FAN DOESN'T TURN

Is the air-conditioner switched on?

Switch on the unit by means of the control panel.

Is the fuse burned?

After the necessary checks, replace the F1 fuse with another one with the same size and rating

10.5 - THE COOLING IS NOT SUFFICIENT - CO, RC, EH VERSIONS

Have you selected the correct operational mode?

Select on the panel the cooling mode (COOL) or AUTO

Have you correctly set the thermostat?

Set the temperature on lower values.

Is the fan speed too low?

Increase the fan speed or select the AUTO mode

Is the air circulation insufficient?

Check that there are no obstructions on the outlet or inlet grills and that the filter is cleaned.

Is the air filter dirty?

Clean or replace it.

Has the compressor been running only for short periods?

The high pressure switch device has tripped. Check the water circulation, the filter and the sea water pump.

Doesn't the compressor run?

The high pressure switch device has tripped more than three times. Check the sea water circuit, switch off and then switch on again the system by means of the panel. If this happens again, call the Assistance Service.

10.6 - THE HEATING IS NOT SUFFICIENT - EH VERSION

Have you selected the correct operational mode?

Select on the panel the heating mode (HEAT) or AUTO

Have you correctly set the thermostat?

Set the temperature on higher values.

Is the fan speed too high?

Decrease the fan speed or select the AUTO mode

Is the air circulation insufficient?

Check that there are no obstructions on the outlet and inlet grills and that the air filter is cleaned.

Is the air filter dirty?

Clean or replace it.

Has the heating been working only for few minutes?

The resistance protection device has tripped. Check the air circulation, the fan speed and the air filter. If this happens again, call the Assistance Service.

10.7 - THE HEATING IS NOT SUFFICIENT - RC VERSION

Have you selected the correct operational mode?

Select on the control panel the heating mode (HEAT) or AUTO

Have you correctly set the thermostat?

Set the temperature on higher values.

Is the fan speed too high?

Decrease the fan speed or select the AUTO mode

Is the air circulation insufficient?

Check that there are no obstructions on the outlet and inlet grills and that the air filter is cleaned.

Has the compressor been running only for short periods?

The high pressure switch device has tripped. Check the air circulation and that there are no obstructions on the openings and on the inlet grill and that the filter is cleaned.

Is the air filter dirty?

Clean or replace the filter.

Doesn't the compressor run?

The high pressure switch device has tripped more than three times. Check the air circulation. Switch off and then switch on again the system by means of the panel. If this happens again, call the Assistance Service.

10.8 - THE SEA WATER PUMP DOESN'T WORK

Is the fuse burned?

After the necessary checks, replace the F1 fuse with another one with the same size and rating

Has the circuit breaker tripped?

Check the cooling circuit and clean the filter on the sea water intake. If this happens again, call the Assistance Service.

TABLE

UNITS WITH REFRIGERANT R407C
SPLIT 10 / SPLIT 12 / SPLIT 16 / SPLIT 17 SLIM / SPLIT 24 SLIM.

The connection for refrigerant pipes, must be made by a qualified engineer.

PIPE DIAMETER		
UNIT CAPACITY	SUCTION	LIQUID
10'000 Btu/h	10 mm – 3/8"	6 mm – 1/4"
12'000 Btu/h	10 mm – 3/8"	6 mm – 1/4"
16'000 Btu/h	12 mm – 1/2"	6 mm – 1/4"
17'000 Btu/h	12 mm – 1/2"	6 mm – 1/4"
24'000 Btu/h	12 mm – 1/2"	10 mm – 3/8"

COPPER PIPE Ø - code	INSULATING PIPE Thick - Ø - code
6 mm - A040745	6 x 10 A040787
10 mm - A040726	
12 mm - A040707	6 x 12 A040763

The connections between compressor unit and evaporator must be made by the installer. The compressor unit and the evaporator are pressurized with dry air and nitrogen, NOT refrigerant.

Refrigerant grade copper pipe must be used for the connecting lines. Do NOT use standard plumbing copper pipe.

The connections are made by flare connections (45° angle).

Insulate each pipe individually.

-Maximum distance between compressor unit and evaporator = 15 m.

-Maximum height difference between compressor unit and evaporator = 5 m.