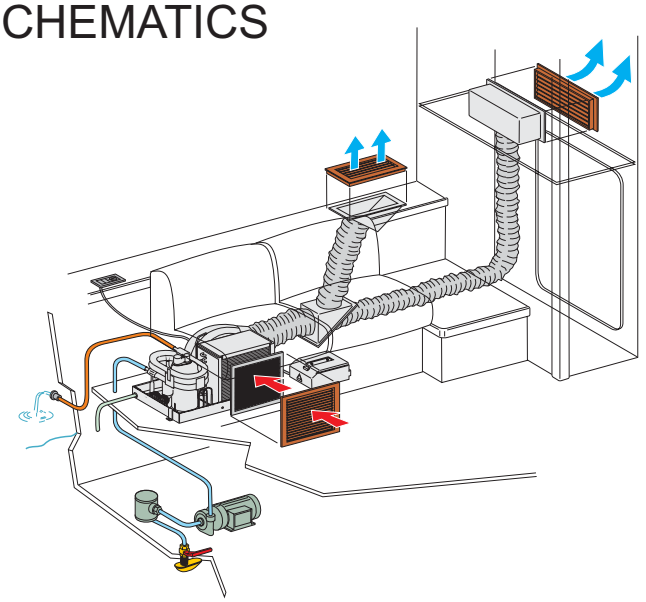
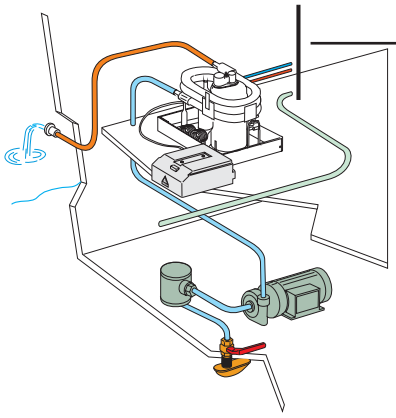
CLIMMA®
MARINE AIR CONDITIONING

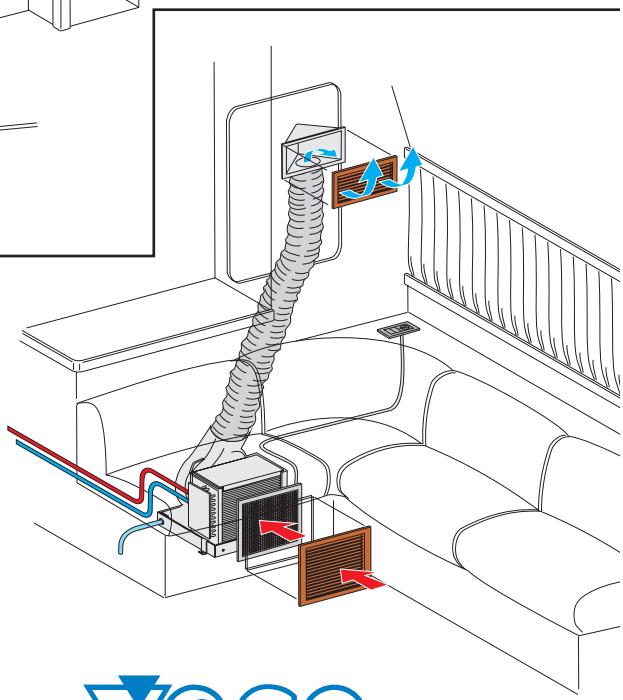
AIR-CONDITIONERS

COMPACT end SPLIT models

INSTALLATION MANUAL
USE & SCHEMATICS







Cod. A041257 27/09/05

Veco S.p.A.

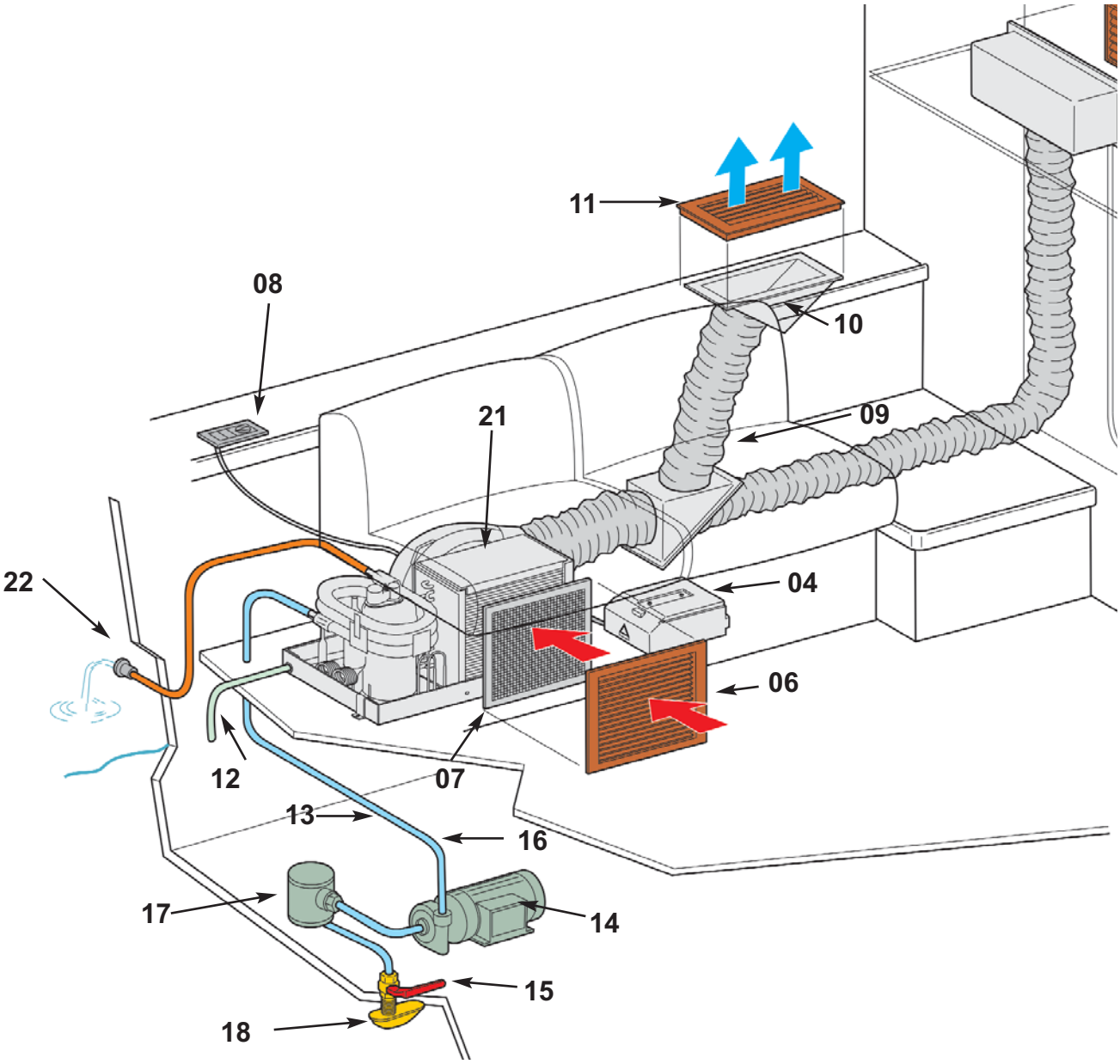
CE

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

Via Cantore, 6/8 - 20034 Giussano (MI) ITALY
Tel. +39 0362.35321 - fax +39 0362.852995
E-mail: **info@veco.net**

SUBJECT

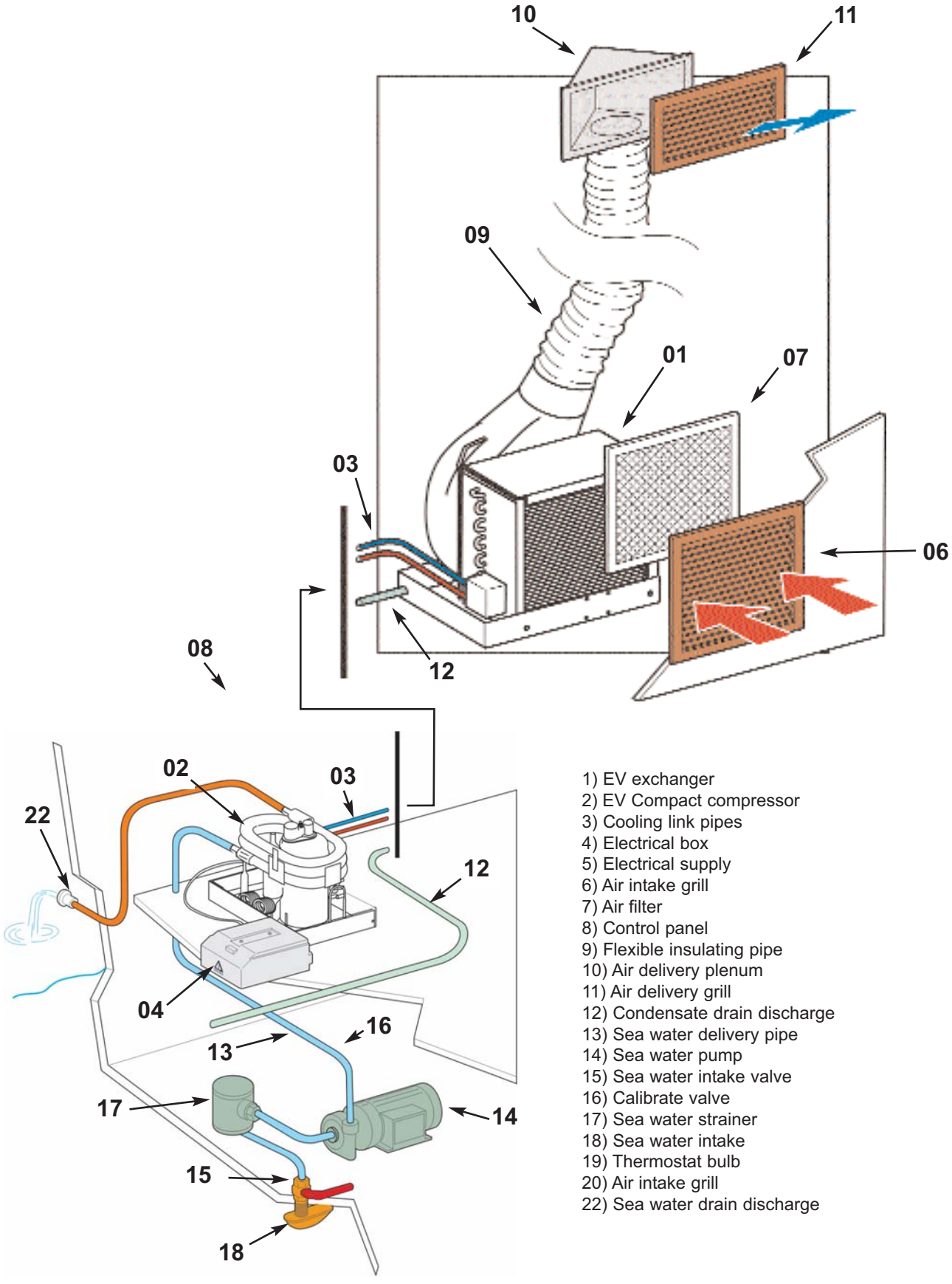
1.1 Compact 5-9-12-17-17 slim-24 slim installation schematic



3) Cooling link pipes
4) Electrical box
5) Electrical supply
6) Air intake grill
7) Air filter
8) Control panel
9) Flexible insulating pipe
10) Air delivery plenum
11) Air delivery grill
12) Condensate drain discharge

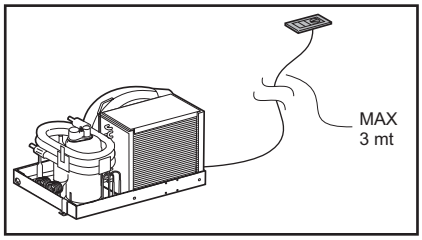
13) Sea water delivery pipe
14) Sea water pump
15) Sea water intake valve
16) Calibrate valve
17) Sea water strainer
18) Sea water intake
19) Thermostat bulb
20) Air intake grill
21) Conditioner
22) Sea water drain discharge

1.2 Split 4-8-10-14-16-17slim-22slim with EV evaporator installation schematic



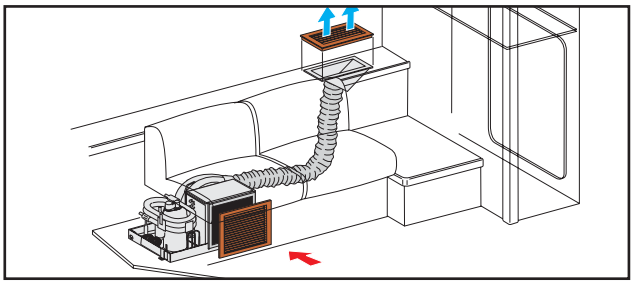
1) EV exchanger
2) EV Compact compressor
3) Cooling link pipes
4) Electrical box
5) Electrical supply
6) Air intake grill
7) Air filter
8) Control panel
9) Flexible insulating pipe
10) Air delivery plenum
11) Air delivery grill
12) Condensate drain discharge
13) Sea water delivery pipe
14) Sea water pump
15) Sea water intake valve
16) Calibrate valve
17) Sea water strainer
18) Sea water intake
19) Thermostat bulb
20) Air intake grill
22) Sea water drain discharge

2.1 - CABIN CONDITIONER: HOW IT WORKS

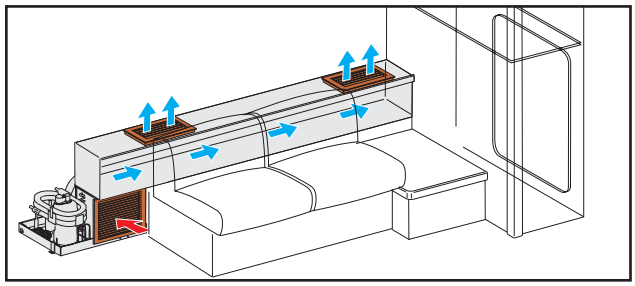


When in cool mode (ummer) the refrigerant circuit takes the heat from the ambient air and gives it to the sea water. When in heat mode (winter) the heat is taken from the sea water which cools down and it is given to the ambient air which warms up. With sea water below 10° C, the efficiency of the unit in heat mode drops so much that we do advise against its use. Units with electrical heating instead of reverse cycle are also available. Cool and heat position, thermostat knob for temperature setting and fan selector are available on the control panel which shall be installed in the air-conditioned ambient at a max distance of 3 m from the evaporator.

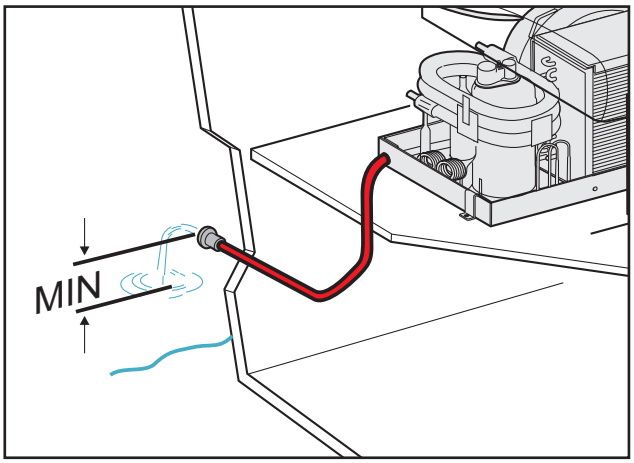
2.2 - LOCATION



A.- The unit is engineered to draw directly the ambient air, then the unit should be installed in one of the cabins to be conditioned (only the evaporator assy in case of Split models).

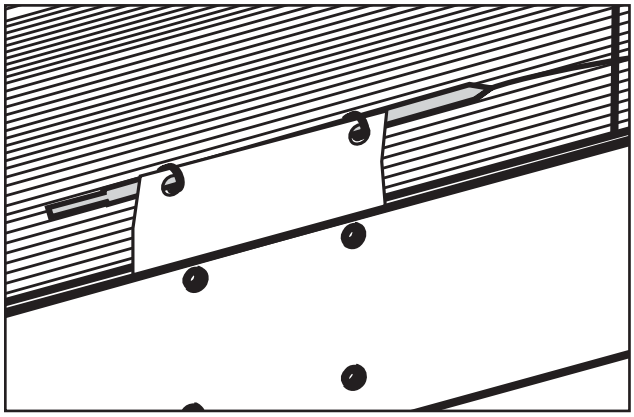


B.- The treated air (blown by the fan) should be connected to one or more delivery grills by means of flexible ducts or using a yacht structure as a duct. Duct must be properly insulated.



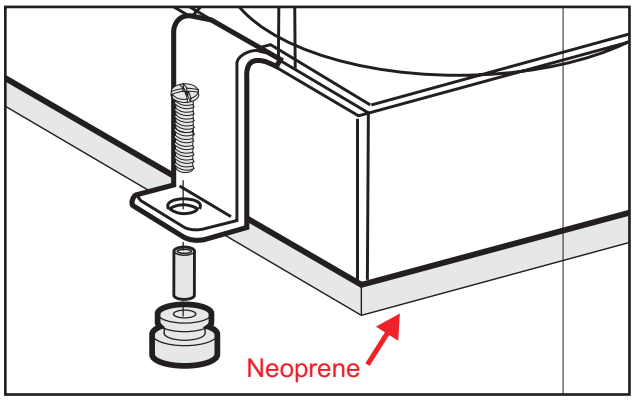
C.- Treating the ambient air means the separation of condensate produced by air humidity. His condensate must be drained and discharged over board; this means that the unit should be installed at a certain level to be connected to an outlet port, considering that the condensate hose must have a minimum heeling.

E.- The unit is linked to the electrical connections box with a 1 m long cable. So around the unit (compressor assy for Split models) there should be enough space for the box installation in a way to easy electrical connections and maintenance.
F.- The thermostat bulb and the air filter shall be installed on the refrigerant-ambient air heat exchanger (evaporator). It is necessary to leave enough space at the side of the unit for periodical maintenance.
G.- The maximum distance between unit and control panel is 3 m both for the thermostat capillary and for the connecting cable.



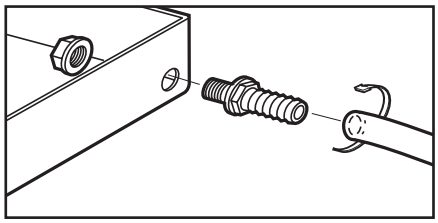
2.3 - INSTALLATION

The air-conditioner shall be installed using the stainless steel brackets supplied with it. It is better to use a silent block mounting, if you install the compressor in a cabin. It is also important not to force on the cable linking the unit to the connection box.

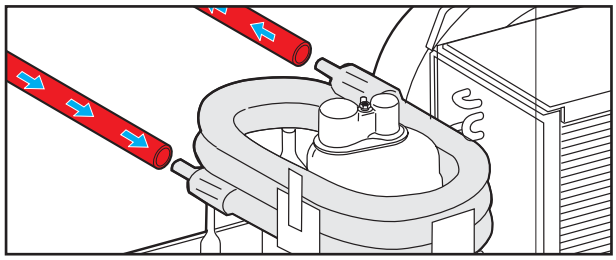


2.4 - CONDENSATE DRAIN

The condensate discharge hose should be connected to the 19 mm drain nipples of the pans.



2.5 - SEA WATER CIRCUIT

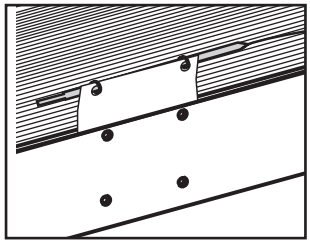


The refrigerant - sea water heat exchanger has two 16 mm hose fittings to be connected to the water circuit by means of an adequate rubber or plastic hose. The flow sense is marked with arrows; anyhow the water enters from the bottom coil of the heat exchanger and goes out from the top outlet. Hose routing should avoid siphoning which will prevent the pump to prime. The over board outlet port should be as low as possible but above the water line: this to limit the water discharge noise and to avoid horizontal jets.

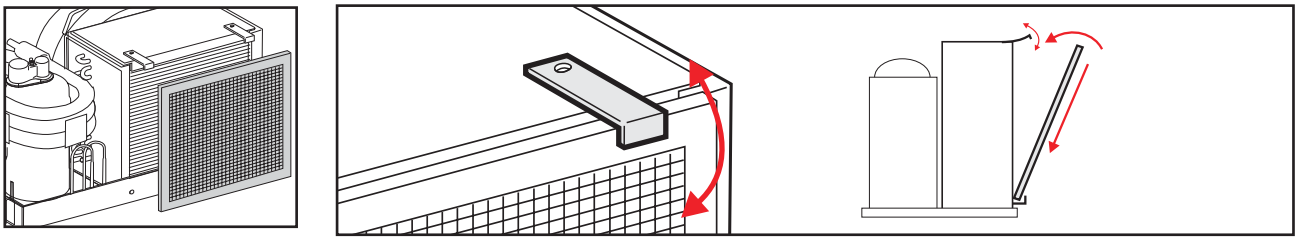
Unità mod.	SPLIT 4	SPLIT 8	SPLIT 10	SPLIT 16	SPLIT 17 slim	SPLIT 22 slim
	COMPACT 5	COMPACT 9	COPMACT 12	COPMACT 17	COPMACT 17 slim	COPMACT 24 slim
Ac. L/m	7	8	10	15	15	20

2.6 - BULB THERMOSTAT - C318

The thermostat bulb should be fastened to the refrigerant-ambient air heat exchanger by means of two plastic fasteners. The bulb shall not touch the heat exchanger fins as the direct contact will influence the thermostat set. The thermostat feels only the return air. In particular situations it is possible to install the bulb not directly on the exchanger, but in the room to feel its temperature using the plastic plate supplied with the control panel.



2.7 - AIR FILTER - C319



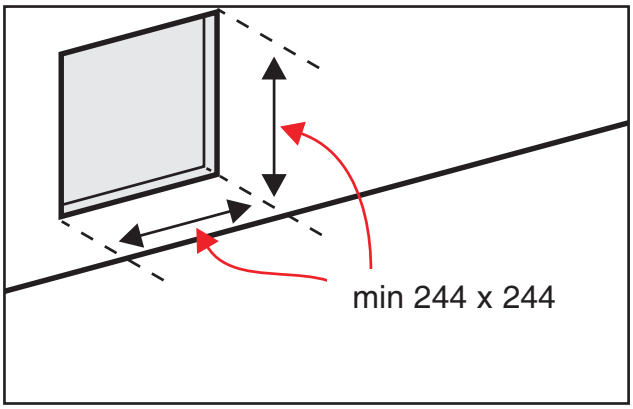
The unit draws air through the refrigerant-ambient air heat exchanger which has arrow aluminium fins. These fins so close would get soon clogged because of dust and dirty if not installed directly on the exchanger as shown in the drawing below. The air filter needs periodical maintenance and must be accessable for service.

2.8 - ELECTRICAL CONNECTION

The unit is already connected to the electrical connection box and doesn't need any other connection. For complete schematic of electrical connections, see chapter 4.

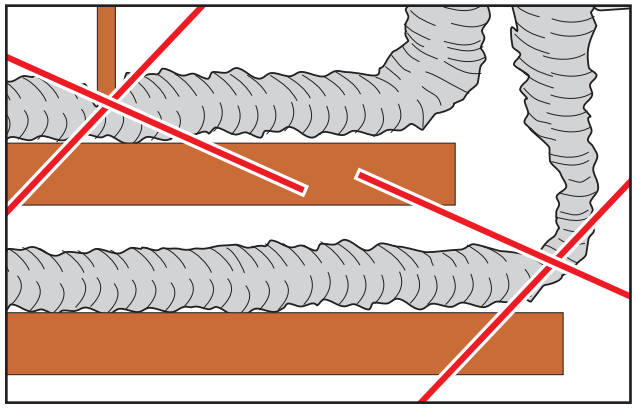
2.9- SEA DISTRIBUTION CIRCUIT (vedi anche esempi a pag. 23)

2.9.A - Suction



The unit draws air through one or more grills of adequate dimensions. Minimum dimensions of return grill are 244x244 regardless to unit capacity. The return air should be straight to the unit: if return air ducting is needed, please contact our technical service.

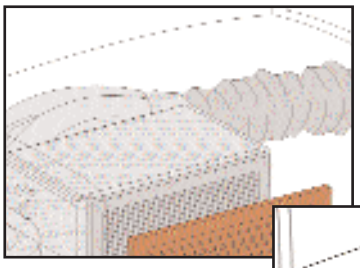
2.9.B - Air delivery



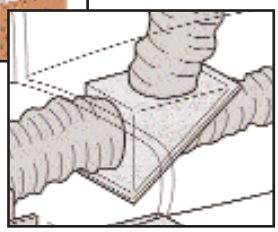
The unit efficiency is strictly related to the air flow. Thus it is important to have an air distribution without weak points, keeping the original suggested diameter, and not exceeding the suggested duct length.

2.9.C - Compact - Split with EV evaporator

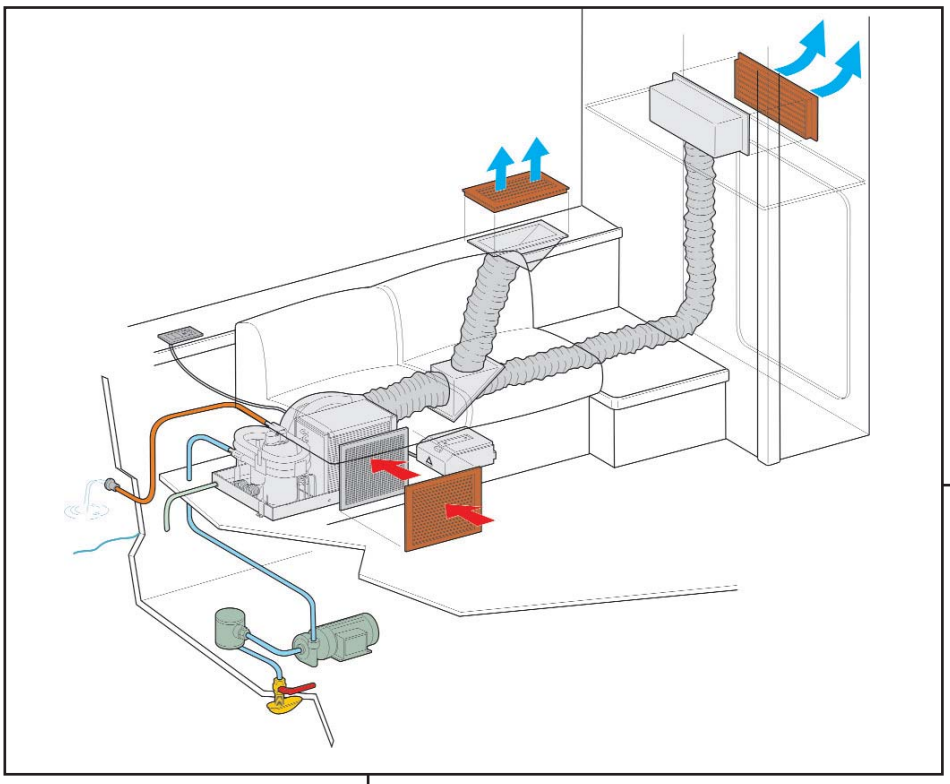
The unit is supplied with a plastic fan-duct adaptator. From this, the circuit goes to plenum and one or more grills. The main duct diameter should meet the following table:

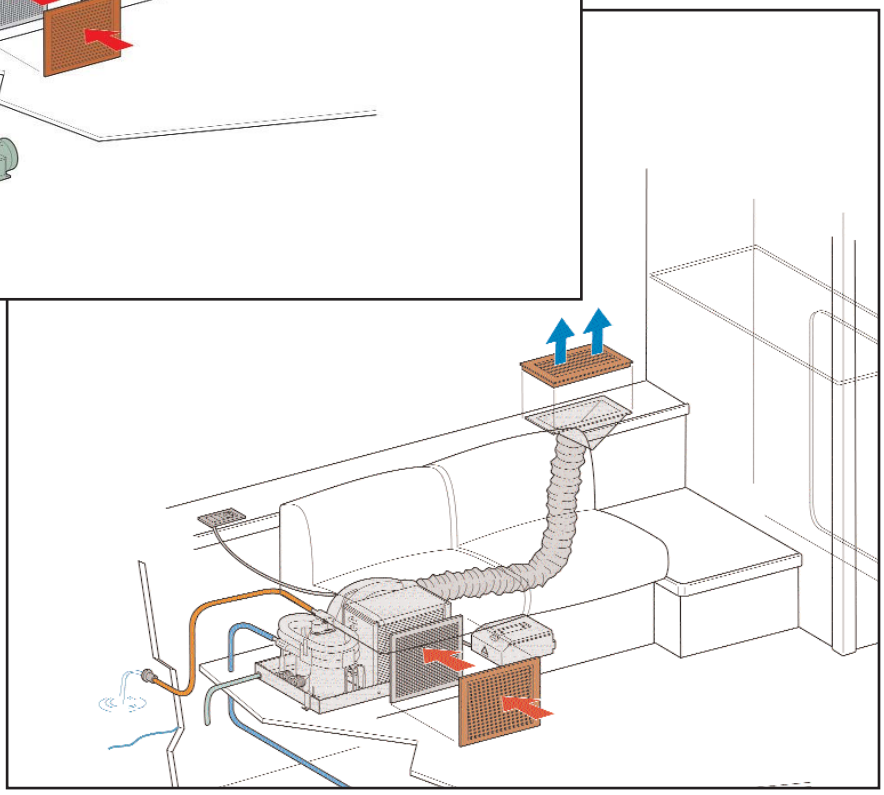


The fan can be rotated of 90° to adapt the air-conditioner to a shallow installation with reduced height.



Unità mod.	SPLIT 4	SPLIT 8	SPLIT 10	SPLIT 16	SPLIT 17 slim	SPLIT 22 slim
	COMPACT 5	COMPACT 9	COPMACT 12	COPMACT 17	COPMACT 17 slim	COPMACT 24 slim
Dia.	100	100	125	150	2 x 100	2 x 125





2.10 - ELECTRICAL CONNECTION BOX

The connection box has the following functions:

1- Electrical connections:
- From mains supply
- To compressor-fan assembly
- To control panel
- To sea water pump

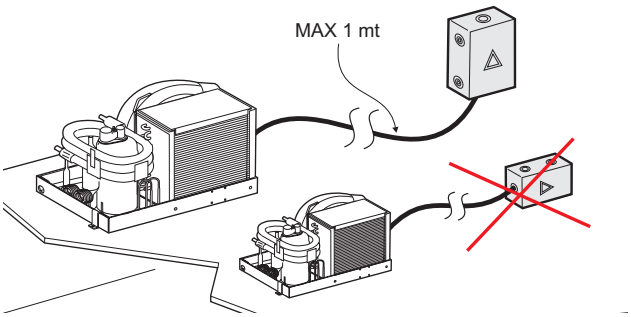
2- Safety control monitoring and compressor start delay (optional: see 4.6).

3- Power relay for compressor, reverse cycle valve or electrical heating.

4- 3 speed fan supply.

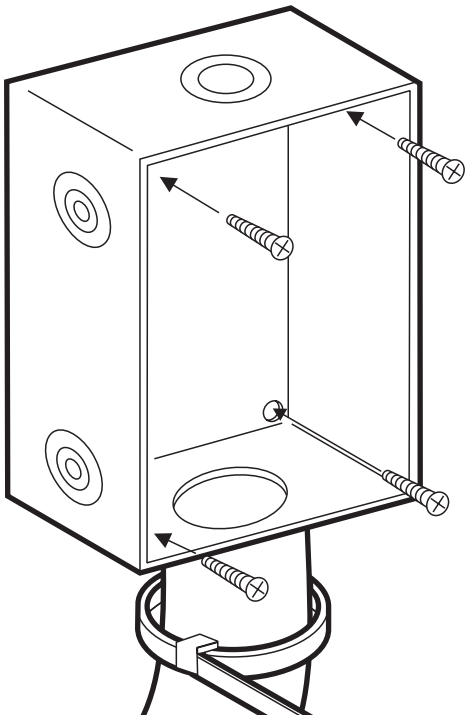
5- Compressor supply (start relay, run and start capacitors).

2.10.A - LOCATION



The connection box must be installed vertically on a bulkhead near the conditioner unit to which is linked with 1 m long cables. Cables should enter from bottom side and should be fastened by means of plastic strippers.

2.10.B - INSTALLATION



The connection box has four holes in the base to be used for fastening screws.

2.11- REMOTE PANEL

The control panel has the following functions:

A.- Start and stop
CONDIZIONAMENTO ESTIVO : premendo il tasto
SUMMER COOLING: Pushing the "COOL" button with ice star mark.
WINTER HEATING: Pushing the "HEAT" button with orange sun mark.
To stop the unit you must push the buttons "COOL" and "HEAT" together.
B.- Setting of room temperature by thermostat (TEMP).The thermostat has a 3 m long capillary with a bulb, which must feel the return air (it must not touch the evaporator fins).
C.- Adjusting the fan speed (3 speeds available)
Important: the low speed is selected pushing the two buttons "Max" and "Med" together.

2.11.A - LOCATION

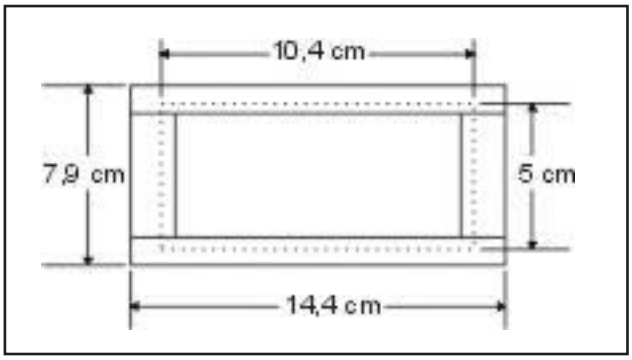
When positioning the panel, one must consider that the panel should be connected to the electrical box with the 3 m long cable and the thermostat bulb should be fastened to the unit. If necessary, the bulb can be installed not directly on the exchanger, but in the room. Anyway, it must sense the ambient temperature. The bulb can be fixed using the plastic plate supplied with it.

2.11.B.- INTERCHEANGEBLE BEZEL

The bezel supplied with the panel is black.

2.11.C - INSTALLATION

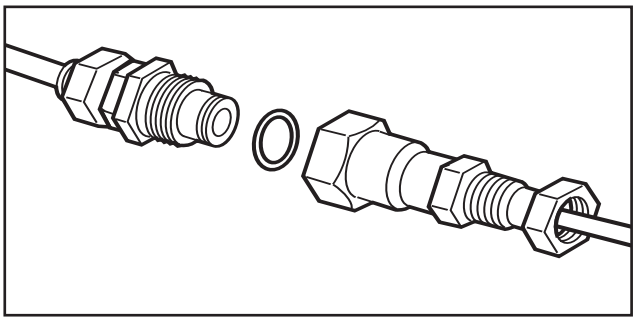
The panel is for flush installation and needs a cut out as shown here on the right:



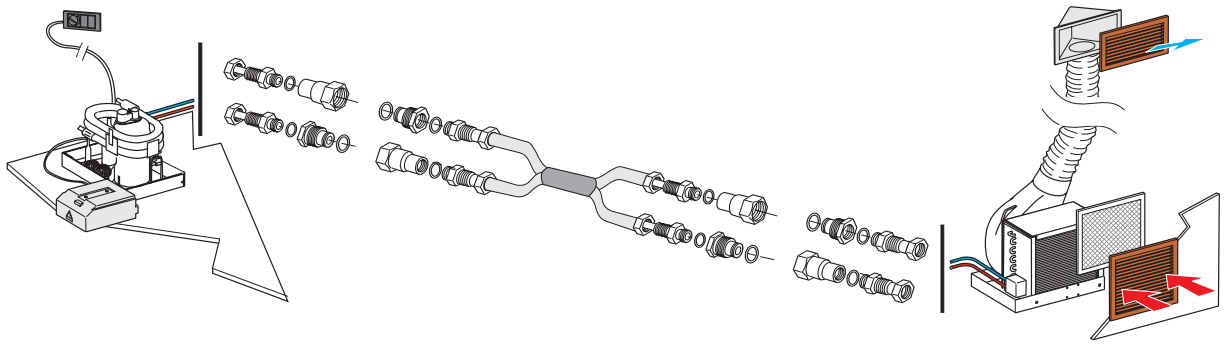
WARNING: *The panel is connected to mains supply. It is absolutely necessary that, when installed the back side of the panel, shall not be normally accessible. A plastic cover is available on request in order to protect the back of the panel if accessible, therefore dangerous.*

2.12- PRECHARGED CONNECTIONS WITH QUICK CONNECTS (only for Split models) -C300

Air-conditioner models Split 4-6-8 are composed by two parts: compressor assembly and evaporator both EV and FC models. The refrigerant circuit is done by means of precharged copper lines equipped with quick connects for easy installation. The standard length of piping is 70 cm, connected to the evaporator side. If extra-length is needed to move away the two parts, precharged extensions are available on request. When connecting the pipes, make sure to follow the indications "Compressor side" and "Evaporator side" as shown below. Handle and bend carefully the pipes to avoid any breakage because of wrong use. The minimum bending radius is 50 mm.



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



2.13 - CONNECTING LINES

FOR SPLIT 10,14 AND 16

These units are not supplied precharged. The connection between the two parts is "flare" type. It is therefore necessary the intervention of a refrigeration engineer for evacuating the system and filling it with the adequate refrigerant charge. The unit copper connecting lines must have the following minimum diameter:

The material to execute this operation is not given by VECO, but by the installer.

The flare (attacco a cartella) must be without imperfections. The lengths of the flare walls must be the same.

DELIVERY PIPES AND SUCKER SECTIONS SUCTION

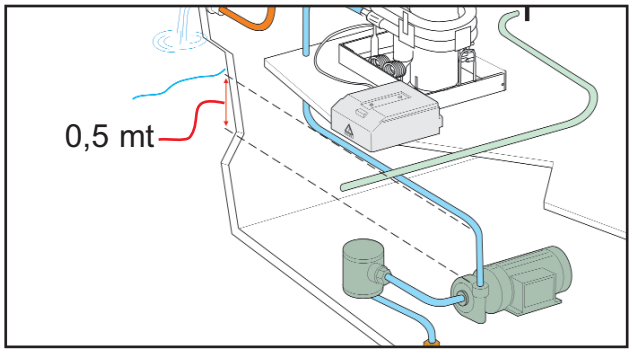
MOD.		SPLIT 10	SPLIT 16	SPLIT 17 slim	SPLIT 22 slim
Dia.	Aspirazione	12	12	12	12
Dia.	Liquido	10	10	10	10

3.1 - SEA WATER PUMP

The sea water pump is needed to circulate the given water quantity through the refrigerant sea water exchanger. The sea water pump should also be quiet, continous duty rated, grade marine construction material.

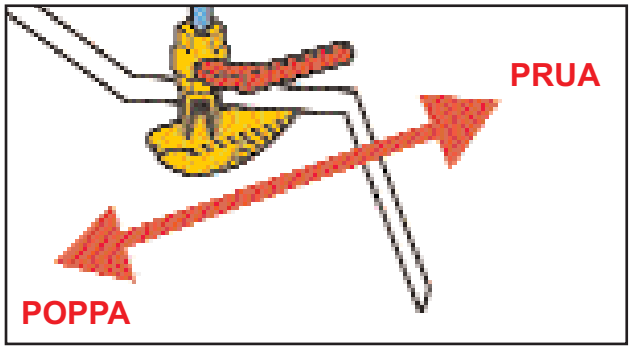
3.2 - LOCATION

3.2 - A



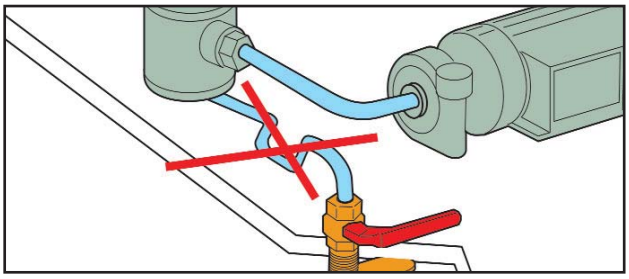
The pump should be installed with the sheft in horizontal position and the water outlet on the top or at least 50 cm below the floating level.

3.2 - B



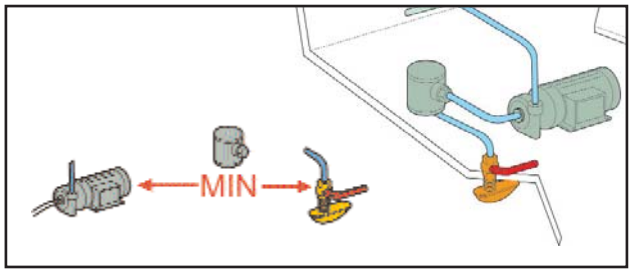
The water intake must be "scoop" type oriented forward.

3.2 - C



strainer and pump intake should be connected without siphoning; the piping should always rise from the water intake until the pump intake.

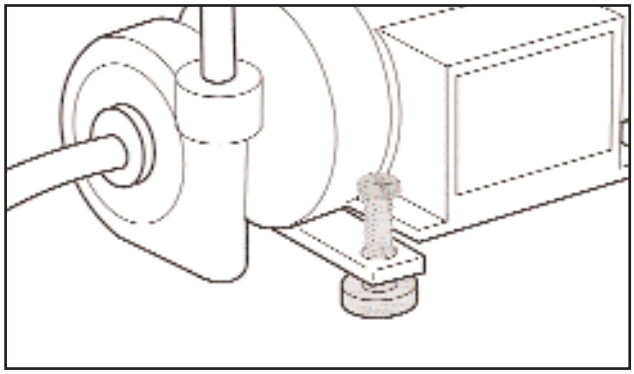
3.2 - D



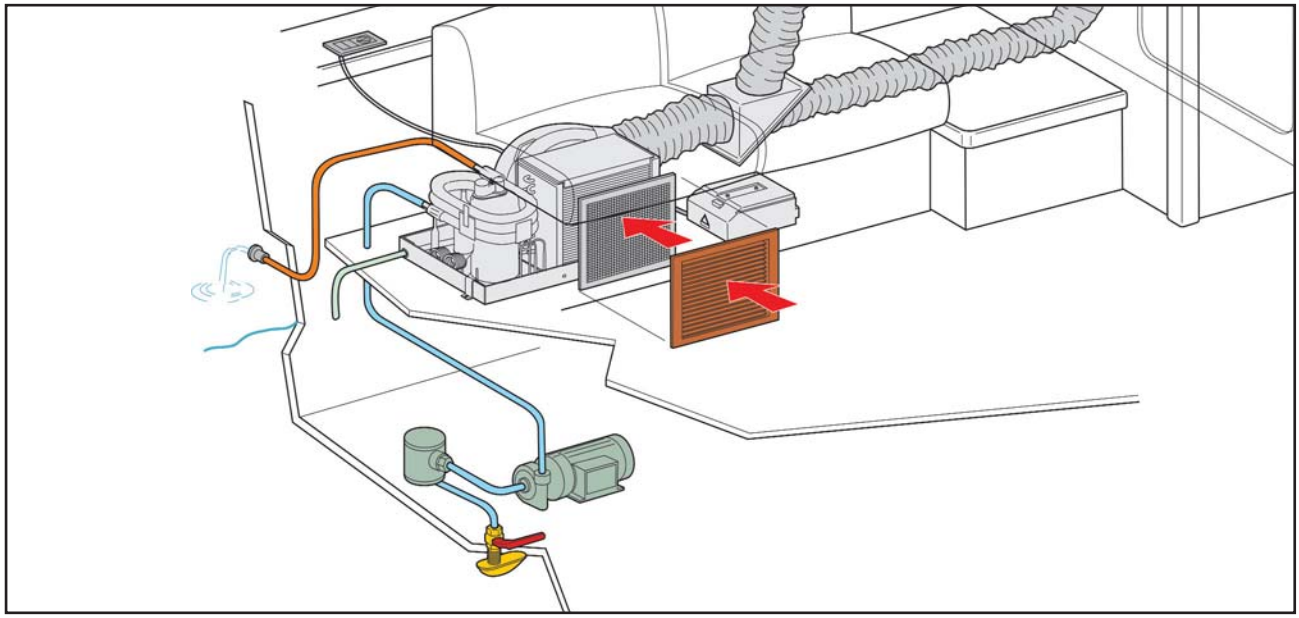
The intake line should be as short as possible (it is very difficult to run a good circuit with an intake piping longer than 1 m).

3.3 - INSTALLATION

The pump should be fastened with adequate screws using the holes in its base. Original quiet and smooth running can be improved by using a silent block mounting.



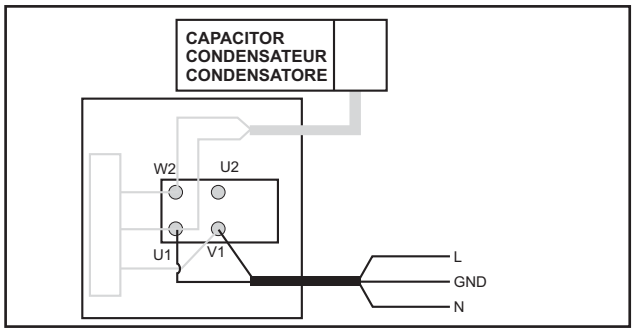
3.4- SEA WATER CIRCUIT



Some rules are given at chapter 2.6. We can resume the following:
The circuit should always rise from water intake to the unit heat exchanger. After that the circuit can rise again or drop to the discharge port. It is absolutely important to prevent that the circuit rises and drops making siphons which will prevent air to be drained, causing an air lock. The discharge side of the circuit should be made so that the water discharge doesn't cause excessive noise both for this yacht and for its neighbours.

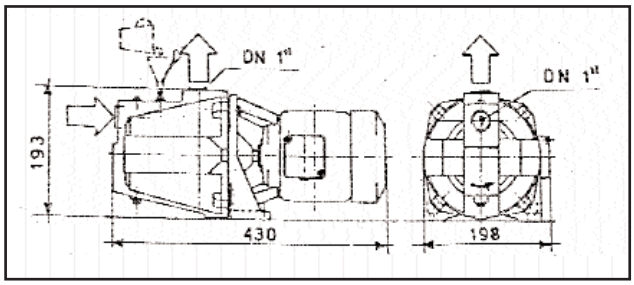
3.5 - ELECTRICAL CONNECTION

The pumps have a single phase motor, which needs a three wires connection: for neutral phase and ground. Always check that the pump voltage meets mains supply available on board. Connect the pump as shown at chapter 4. At first run check the pump electrical drawn is within the plate value. In case it exceeds, install a calibration valve on pump outlet and reduce the flow until the electrical draw drops within the limit.



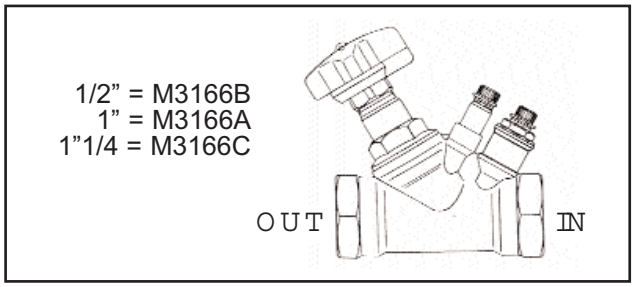
3.6 - SELF PRIMING PUMP

If installation specifications given at 3.2 cannot be met, a self priming pump should be installed. For its installation, follow the same specifications given for a centrifugal pump. Before running the pump, it is necessary to fill the pump tank to make it self priming.



3.7- WATER CALIBRATION VALVE

When more than one air-conditioner is installed at different distances, it might be necessary the use of one or more calibrating valves to compensate the different runs of water lines to the different units. The calibrating valve must be also needed in case of excessive water flow passing through the unit. Follow instruction supplied with the calibration valve.



WARNING

AVOID ELECTROCUTION!!!

Trouble shooting and repair should be performed by qualified maintenance personal.
Never ground yourself when taking electrical measurements.
Keep your body isolated from ground by dry clothing, rubber shoes, rubber mats or any approved insulating material. Don't attempt service on hot line unless another person, capable of rendering first aid and resuscitation is present.

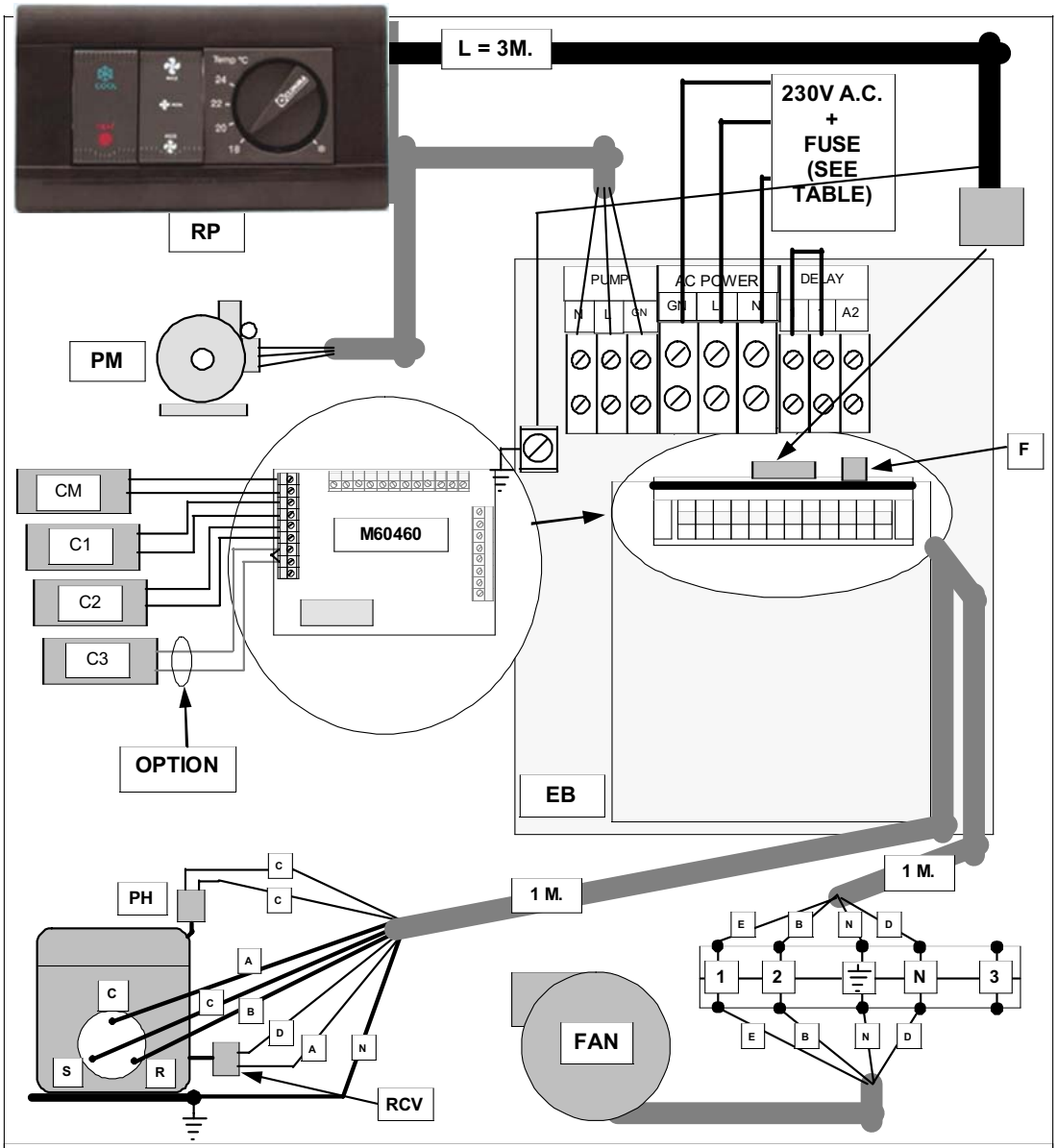
IMPORTANT WARNING

To avoid electrical shock hazard causing danger or death to persons, ground the installation as follows:
1.- Use an electrical wire with an adequate section and insulation to connect the mains supply through the yacht control panel to the unit connection box and check that the ground wire is well connected to the panel ground terminal.
2.- Check that handling didn't manage the ground connections between connection box and unit.
3.- Check that the sea water pump is correctly grounded through the connection box.
4.- Check the ground continuity before running the unit.

4.1 - ELECTRICAL CONNECTION BOX

CABIN air-conditioners are available in two configurations: reverse cycle (schematic 301) and with electrical heating (schematic 303).

REVERSE CYCLE UNIT - SCHEMATIC 301



CM = FAN RUN CAPACITOR - CONDENSATEUR DE MARCHE VENTILATEUR - CONDENSATORE DI MARCIA VENTILATORE
C1 = LOW SPEED CAPACITOR - CONDENSATEUR BASSE VITESSE VENTILATEUR - CONDENSATORE BASSA VELOCITA' VENTILATORE
C2 = MEDIUM SPEED CAPACITOR - CONDENSATEUR VITESSE MOYENNE VENTILATEUR - CONDENSATORE MEDIA VELOCITA' VENTILATORE
C3 = MAX SPEED CAPACITOR - CONDENSATEUR VITESSE MAXI VENTILATEUR - CONDENSATORE DI MASSIMA VELOCITA' VENTILATORE
CO = HERMETIC COMPRESSOR - COMPRESSEUR HERMETIQUE VENTILATEUR - COMPRESSORE ERMETICO
EB = ELECTRIC BOX - BOITE ELECTRIQUE - SCATOLA ELETTRICA
FAN = FAN MOTOR - MOTEUR VENTILATEUR - MOTORE VENTILATORE **MAX 260W** (TWO FAN)
F = FUSE 10 AMP - FUSIBLE 10 A - FUSIBILE 10 A **5x20**
PM = PUMP - POMPE - POMPA
RCV = REVERSE CYCLE VALVE - VANNE D'INVERSION DE CYCLE - VALVOLA DI INVERSIONE DI CICLO
RP = REMOTE CONTROL PANEL - PANNEAU DE CONTROLE - PANNELLO DI COMANDO

A	WHITE-BLANC-BIANCO	E	BROWN-MARRON-MARRONE	I	PINK-ROSE-ROSA	N	YELLOW/GREEN-JAUNE/VERT-GIALLO/VERDE
B	BLACK-NOIR-NERO	F	GREY-GRIS-GRIGIO	L	AZUR-CELESTE	O	YELLOW/BLUE-JAUNE/BLEU-GIALLO/BLU
C	RED-ROUGE-ROSSO	G	ORANGE-ARANCIO	M	YELLOW/BLACK-JAUNE/NOIR-GIALLO/NERO	P	YELLOW/RED-JAUNE/ROUGE-GIALLO/ROSSO
D	BLUE-BLEU BLU	H	VIOLET-VIOLETTE-VIOLA				

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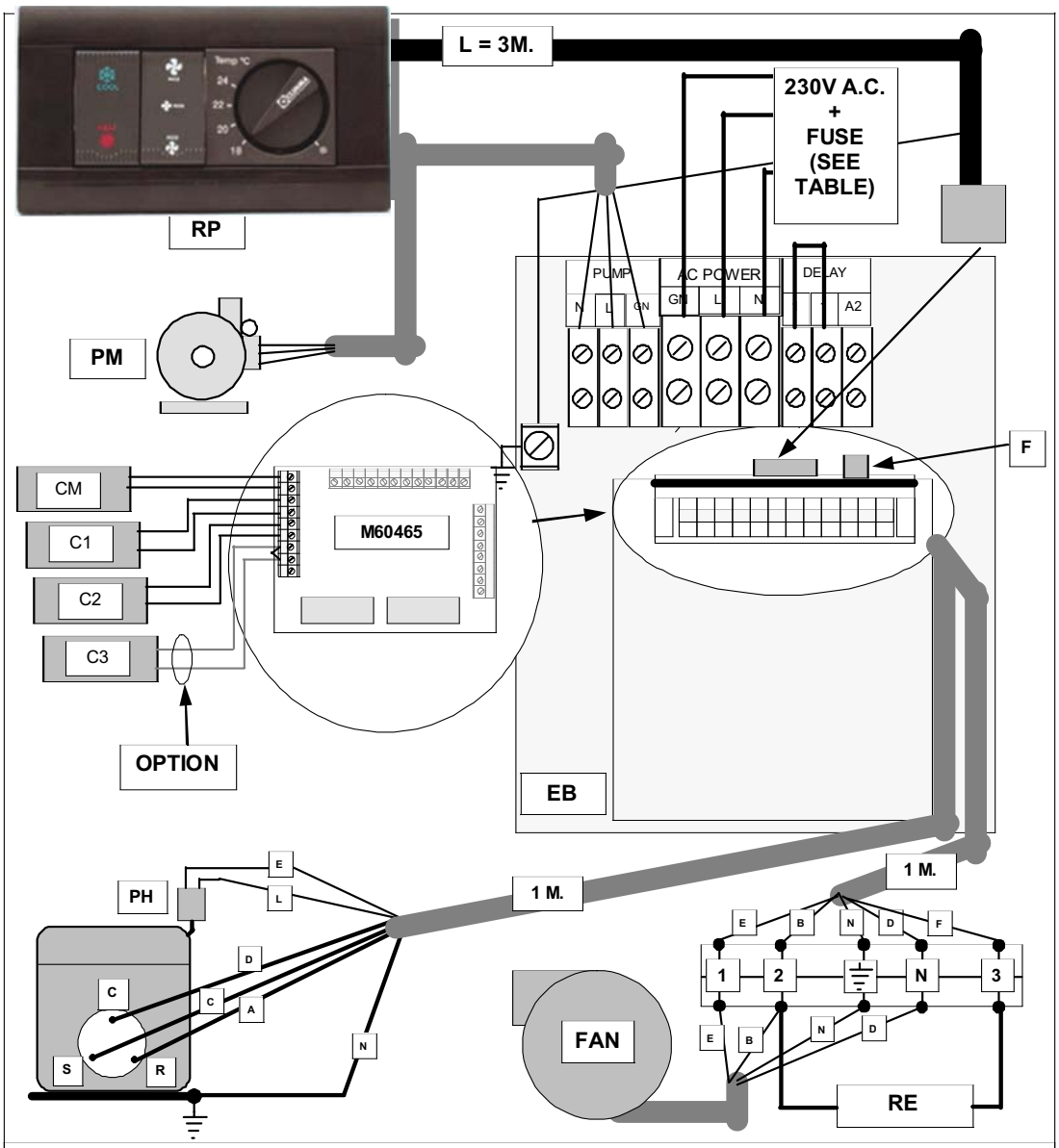
ELECTRICAL HEATING UNIT - SCHEMATIC 303



CM = FAN RUN CAPACITOR - CONDENSATEUR DE MARCHE VENTILATEUR - CONDENSATORE DI MARCIA VENTILATORE
C1 = LOW SPEED CAPACITOR - CONDENSATEUR BASSE VITESSE VENTILATEUR - CONDENSATORE BASSA VELOCITA' VENTILATORE
C2 = MEDIUM SPEED CAPACITOR - CONDENSATEUR VITESSE MOYENNE VENTILATEUR - CONDENSATORE MEDIA VELOCITA' VENTILATORE
C3 = MAX SPEED CAPACITOR - CONDENSATEUR VITESSE MAXI VENTILATEUR - CONDENSATORE DI MASSIMA VELOCITA' VENTILATORE
CO = HERMETIC COMPRESSOR - COMPRESSEUR HERMETIQUE VENTILATEUR - COMPRESSORE ERMETICO
EB = ELECTRIC BOX - BOITE ELECTRIQUE - SCATOLA ELETTRICA
FAN = FAN MOTOR - MOTEUR VENTILATEUR - MOTORE VENTILATORE **MAX 225W**
F = FUSE 10 AMP - FUSIBLE 10 A - FUSIBILE 10 A **5x20**
PM = PUMP - POMPE - POMPA
RE = ELECTRICAL HEATING - RECHAUFFAGE ELECTRIQUE - RISCALDAMENTO ELETTRICO **MAX 2 KW**
RP = REMOTE CONTROL PANEL - PANNEAU DE CONTROLE - PANNELLO DI COMANDO

A	WHITE-BLANC-	E	BROWN-MARRON-	I	PINK-ROSE-ROSA	N	YELLOW/GREEN-JAUNE/VERT-GIALLO/VERDE
B	BLACK-NOIR-NERO	F	GREY-GRIS-GRIGIO	L	AZUR-CELESTE	O	YELLOW/BLUE-JAUNE/BLEU-GIALLO/BLU
C	RED-ROUGE-	G	ORANGE-ARANCIO	M	YELLOW/BLACK-JAUNE/NOIR-GIALLO/NERO	P	YELLOW/RED-JAUNE/ROUGE-GIALLO/ROSSO
D	BLUE-BLEU BLU	H	VIOLET-VIOLETTE-				

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To the connection box should be connected:

1) Mains supply (chapter 4.2)
2) Control panel (chapter 4.3)
3) Sea water pump (chapter 4.4)

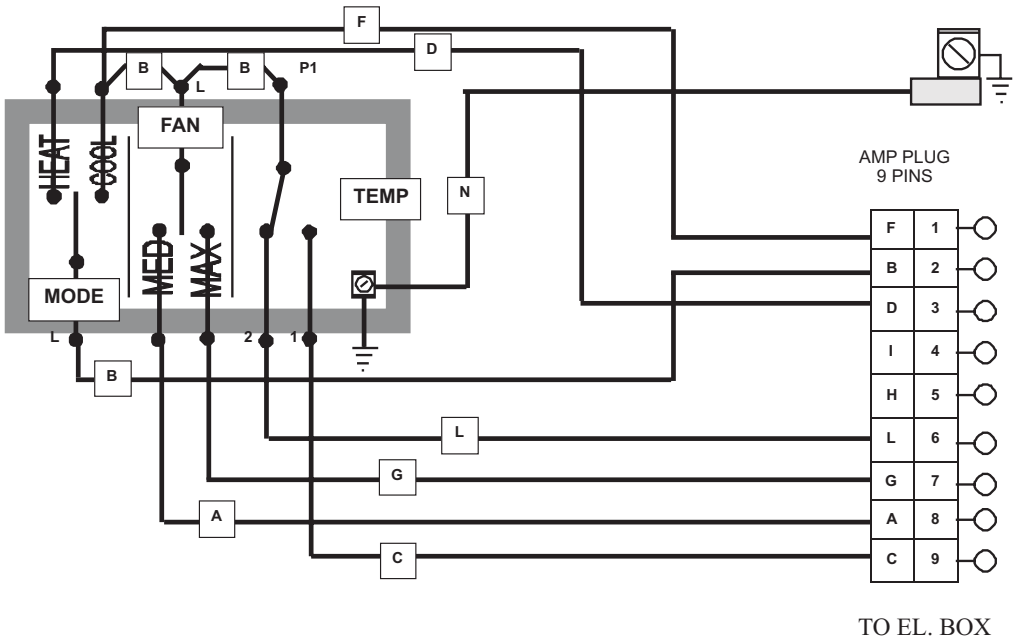
4.2 - MAINS SUPPLY

Check that the voltage available meets the voltage of the unit, the connection box and the pump. Mains supply should come to each unit connection box through a bipolar circuit breaker (see table 1) with adequate fuses. Supply cables should also be adequate to the total unit capacity. Mains supply should also be connected to terminal board (AC POWER) This board accepts section wires of 4 mm. the cable must be fastened with supplied plastic clamps.

	SPLIT 4	SPLIT 8	SPLIT 10	SPLIT 16	SPLIT 17 slim	SPLIT 22 slim
	COMPACT 5	COMPACT 9	COMPACT 12	COMPACT 17	COMPACT 17 slim	COMPACT 24 slim
Fuse A	10	10	10	15	15	15
Supply wires	1.5	2.5	2.5	4	4	4

4.3 - CONTROL PANEL (SCHEMATIC 302)

The control panel has a 3 m long connection cable with one plug, which has nine pins. The plug must be plugged in the corresponding socket with due caution and carefully. Make sure to fasten the cable with the supplied clamp on the electrical box side.



4.4 - SEA WATER PUMP

The pump should be connected to the "PUMP" marked terminal (schematics C301 and C303). The connection must be done with three wires cables (phase, neutral and ground) of adequate section (minimum 1.5 - 2 mm) according to the installed pump power and distance. The connection box can control directly pumps up to 0,5 Kw both 220 V.

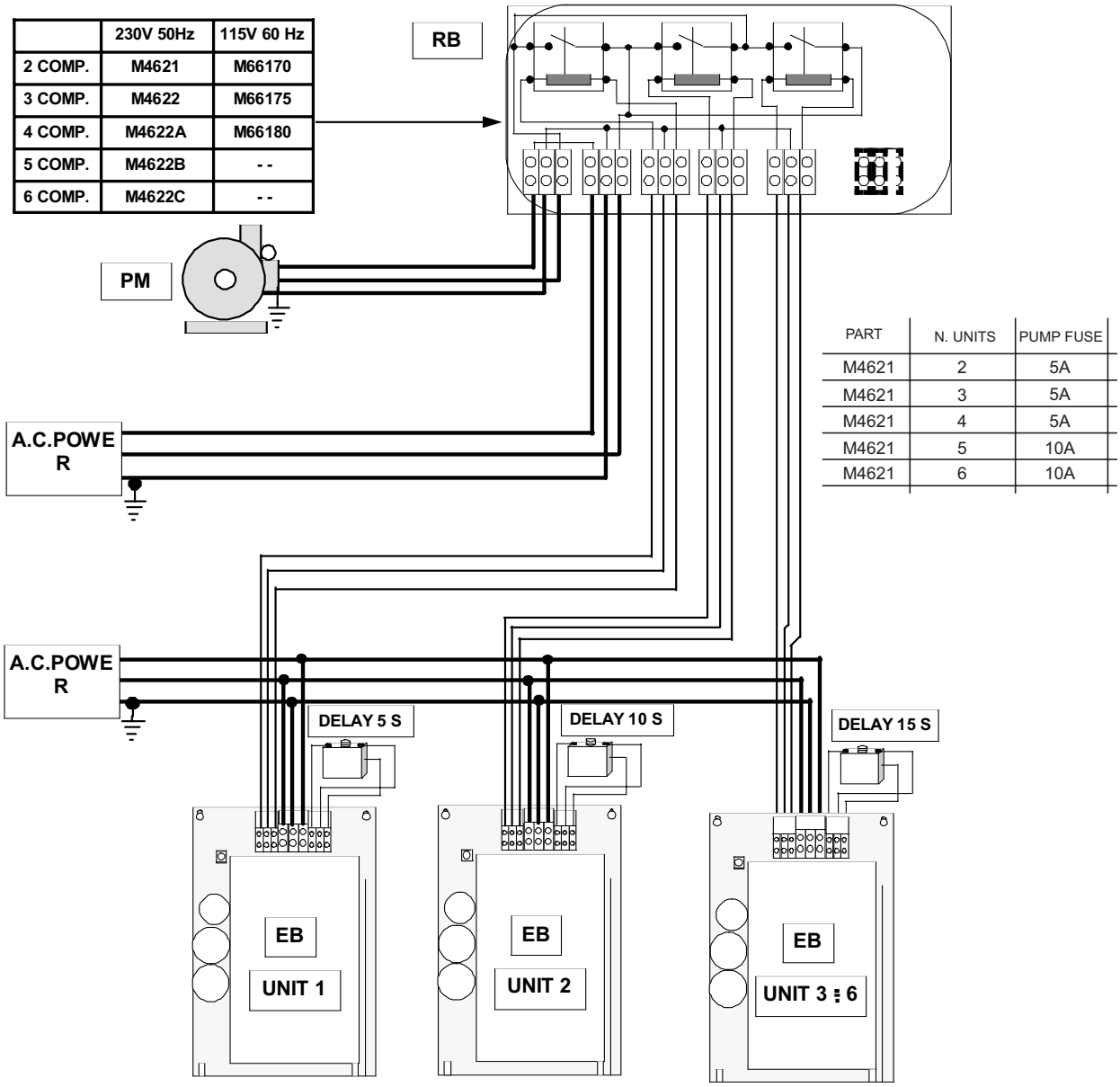
4.5 - MULTIPLE INSTALLATION

The CABIN air-conditioner is particularly suggested for a multiple installation. A multiple installation has these specific features:

- One only sea water pump supplies water to all units.
- Each unit must have its own setting of compressor starting delay (see 4.6).

4.5.1 - PUMP CONNECTION IN A MULTIPLE SYSTEM - C 307

In order to run the same pump from several units, it is available as option a pump relay box. Each air-conditioner is connected to the pump relay box. The mains supply to the pump relay box must be independent from the air-conditioners and protected by an independent fuse. The pump supply will come in parallel from each relay controlled by each air-conditioner.



	230V 50Hz	115V 60 Hz
2 COMP.	M4621	M66170
3 COMP.	M4622	M66175
4 COMP.	M4622A	M66180
5 COMP.	M4622B	- -
6 COMP.	M4622C	- -

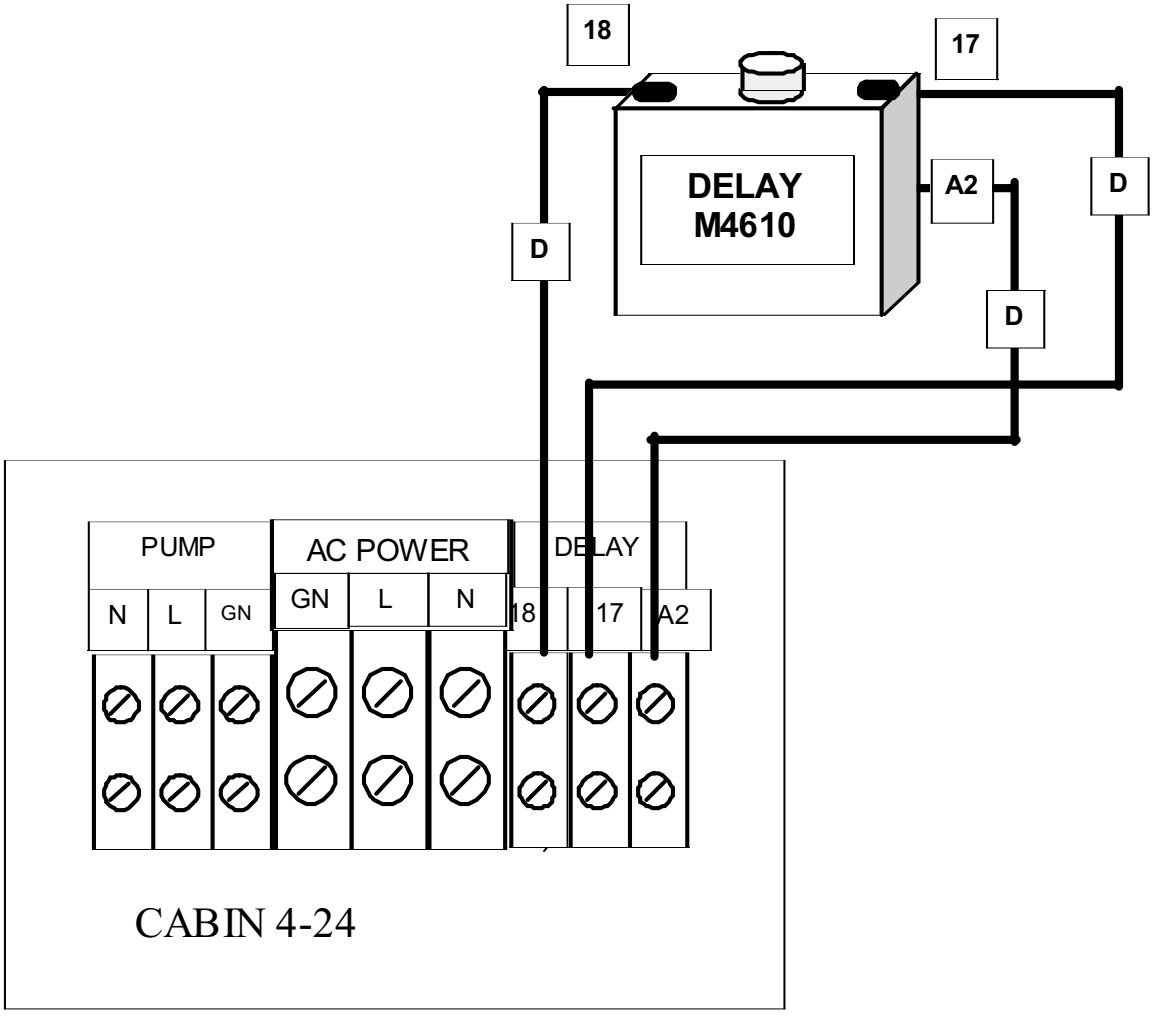
PART	N. UNITS	PUMP FUSE
M4621	2	5A
M4621	3	5A
M4621	4	5A
M4621	5	10A
M4621	6	10A

4.6 - COMPRESSOR START DELAY - C304

It is available as option a delay (cod. M4610) which is easy installable in the electrical box and must be connected as shown in schematic C304 to terminals A2, 17, 18. The delay is adjustable from 5 through 20 seconds.

IMPORTANT: respect the number sequence as reversing the connection will break the time delay.

NOTE: Each delay must be set to allow at least 5 seconds between compressor starts.



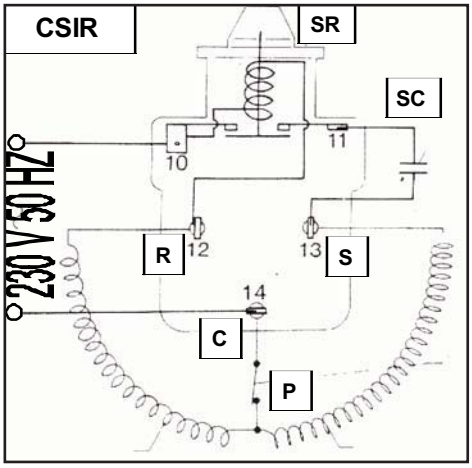
4.7 - FUSE IN THE CONNECTION BOX

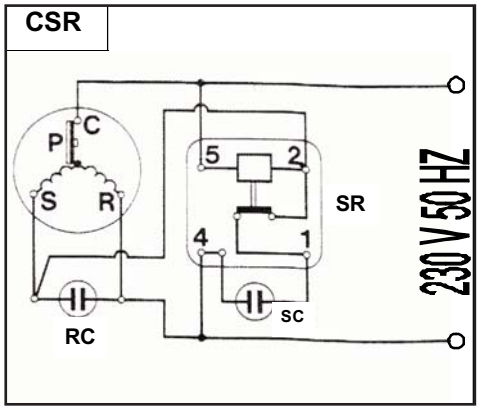
In the electrical box there is one fuse (schematics C301 and C 303). Value: 10 Amp and size: 5x20 mm, which protects all the components with the only exception of the compressor.

4.8 - COMPRESSOR ELECTRICAL PARTS - C308

Compressor schematic is the CSR type and includes:
A.- Thermal protector (on or inside the compressor).
B.- Start and run device start (relay RA), start capacitor (SC) and run capacitor (RC) installed inside the electrical box.

NOTE: Units Spilt 4 and Compact 5 use the CSIR schematic and do not have the run capacitor. The start relay and start capacitor are installed on the compressor, which controls the compressor supply.



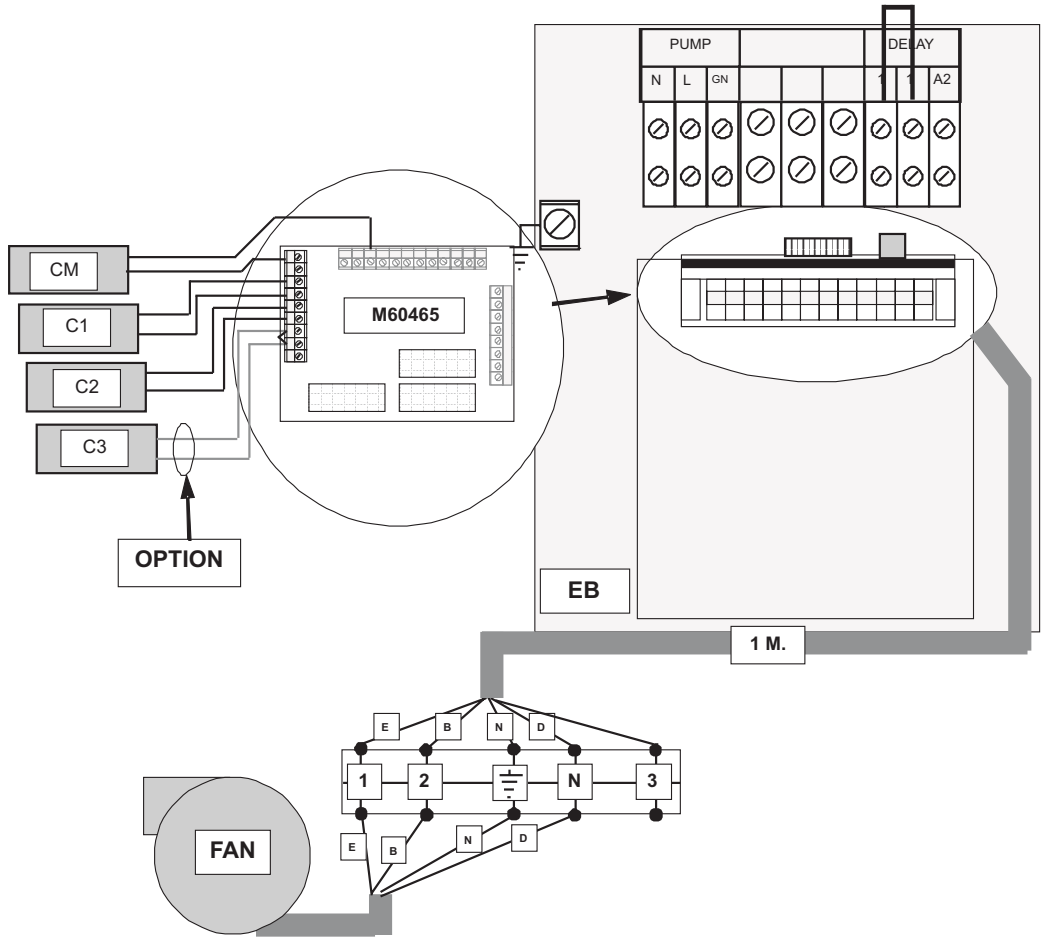


MODEL	SCHEMATIC	C.M.	C.A.	R.A.
Compact 5 - split 4 EV*	CSIR	-	80	117U6003025
Compact 9 - split 8 EV	CSR	10	40	4M6D
Compact 12 - split 10 EV	CSR	25	-	-
Compact 17 - split 16 EV	CSR	30	-	-
Compact 17 slim - split 17 slim	CSR	25	-	-
Compact 24 slim - split 22 slim	CSR	30	-	-

4.9 - FAN SPEED - C305

The fan can run on three speeds. It is possible to modify the max speed installing an optional capacitor as indicated in schematic, removing the existing bridge.

IMPORTANT NOTE: The run capacitor (CM) is specific for each fan motor and must not be modified as a different value will let the fan motor burn.



FAN CAPACITOR TABLE

MODEL	C.M.	COD.	C3	C2	C1
Compact 5 - split 4 EV*	2	M3502	8	2	4
Compact 9 - split 8 EV	2	M3502	8	2	4
Compact 12 - split 10 EV	4	M3503	-	3.15	5
Compact 17 - split 16 EV	6.3	M3505	-	4	8
Compact 17 slim - split 17 slim	4	M3502	10	2	8
Compact 24 slim - split22 slim	8	M3504	-	6.3	10

5 SMOOTH RUNNING CHECK

5.1.- SEA WATER PUMP CHECK

1.- Set the thermostat knob on "24" all clockwise.
2.- Push the "Cool" button.
3.- Check that pump is running smoothly and that the water flow meets the unit specifications. The fan runs at the chosen speed.

5.2.- COOLING MODE CHECK

With the unit, as at 5.1:
1.- Turn slowly the thermostat (TEMP) knob counter clockwise towards "18" until the compressor starts.
2.- Check that after few minutes the air out starts cooling. If the unit is left running for a while the thermostat setting and the condensate drain can also be checked. In fact, if the air is sufficiently humid, the unit will soon start to produce condensate water, which must be discharged over board.

5.3.A- HEATING MODE CHECK (REVERSE VALVE CYCLE)

With the unit OFF, turn the temperature knob clockwise towards "24", put the fan switch on "MAX" and push the "HEAT" button. Check that after few minutes the air out begins to warm up. If the unit is left running for a while, the thermostat setting can also be checked.

5.3.B- HEATING MODE CHECK (ELECTRICAL HEATING)

With the unit OFF, turn the temperature knob clockwise towards "24", put the fan switch on "MAX" and push the "HEAT" button. Check that after few minutes the air out begins to warm up. If the unit is left running for a while, the thermostat setting can also be checked.
NOTE: With electrical heating the compressor and the pump do not run. The air out will be warmer if the fan runs on minimum speed.

5.4.- SEA WATER CIRCUIT CHECK

During any running cycle, both cooling and heating, one should check the tightness of all the water fittings and pipings with special care to the parts of the circuit below thw water line. The water flow check (requested at 5.1) can be done at the outlet over board or in line with a water meter.

5.5.- SEA WATER PUMP AMP CHECK

Because of water circuit being different from one to another installation, one must check that the pump is running within its range. During the pump running, check the amp draw with an amp meter. The amp draw should never exceed the figure printed on the pump. If it exceeds, stop the unit and check the water circuit (see 3.7)

5.6.- CHECKING AND BALACING THE SYSTEM

It is extremely important to check and eventually to balance the air distribution system. This is necessary to get the maximum efficiency from the air-conditioner. This test is only an air flow test: you don't need to run the compressor but only the fan and it will be possible to check the system in the same yard, out of water, only connecting it to mains supply. The measure should be taken at the return grill in order to obtain the total air flow of the system using an adequate anemometer.

5 SMOOTH RUNNING CHECK

Proceed as follows:

1.- Calculate the free area of the return grill in sq. m.. The free area is the actual size of the grill without the external frame.

2.- Check velocity of air in different points of the grill.

3.- Calculate the average air speed through the grill in mt/min or in mt/sec according to the instrument.

4.- Use the following formula to obtain the total air quantity which is circulated by the unit:

Q = SxVx3600

Q = SxVx60

Where:
Q = Total air flow (cm/h)
S = Grill surface (free) (sq.m.)
V = Air speed mt/min or mt/sec
3600 = to be used with mt/sec speed
60 = to be used with mt/min speed

From these data it can be obtained:

$$S = \frac{Q}{Vx3600} \qquad S = \frac{Q}{Vx60}$$

$$V = \frac{Q}{Sx3600} \qquad V = \frac{Q}{Sx60}$$

The total air flow in cm./h should meet the value given in technical data. It is acceptable that the total air flow is reduced of 15-20% but not more.
Also delivery grills air flow must be checked in order to balance the system when two or more delivery grills are installed or to make a comparaison with the intake grill. When you need to air-condition two or more cabins, it is necessary to calculate the air quantity to introduce. This value can be calculated only knowing the warmth charge in each cabin.
To determine the air quantity needed by each cabin, use the following procedure:
1- Divide the total air flow by the total surface conditioned (rate treated air/ treated volume)
2- Multiply the number obtained for the volume of each cabin (treated air quantity to introduce)

EXAMPLE:

Total treated air in Cu.M./h VT	700
Volume of dinette in Cu.M.	25
Volume of cabin in Cu.M	15
Total volume VC in Cu.M.	40
Rate VT/VC	17,5
Dinette treated air in Cu.M./h= 25x17,5	438
Cabin treated air in Cu.M./h= 15x17,5	263
Total of treated air in Cu.M./h	700

6.1.- CONTROL PANEL

COOL: "COOL" mode switch
HEAT: "HEAT" mode switch
FAN: Fan speed change over switch
TEMP: Room thermostat knob

6.2.- COOLING MODE (SUMMER)

Run the unit pushing the "COOL" button. Turn the thermostat knob anticlockwise towards "18" until the compressor starts. Set the "FAN" switch on the desired speed "MIN-MAX". The minimum speed is obtained by pushing the two knobs Max and Min together.
When the cabin reaches the desired temperature, turn clockwise the thermostat knob towards "24" until the compressor stops. As the compressor goes off, the fan will circulate the air without cooling it until the compressor will start again.

6.3.A.- HEATING MODE (WITH REVERSE CYCLE HEATING - MOD. RC)

Run the unit pushing the "HEAT" button. Turn the thermostat knob clockwise towards "24" until the compressor starts. Let the unit run until the room reaches the desired temperature, then turn the thermostat knob counter clockwise towards "18" until the compressor goes off. As said at 6.2, the fan will circulate the air without heating it. In heating mode, the fan speed should be always set on MAX or MIN speed, as the low speed can cause a cut out of the compressor due to high pressure.

6.3.B.- HEATING MODE (WITH ELECTRICAL HEATING - MOD. EH)

Run the unit pushing the "HEAT" button. Turn the thermostat knob clockwise towards "24". Let the unit run until the room reaches the desired temperature, then turn the thermostat knob counter clockwise towards "18" until the heating element goes off. As said at 6.2, the fan will circulate the air without heating it. If there is a failure of the fan or the air circulation is clogged or obstructed, an internal safety klaxon cuts the element off to prevent overheating. In order to reset the normal functioning, it is necessary to stop the system, eliminating the reason of the lack of air circulation, wait approximately 5 minutes and then restart the system pushing the "HEAT" button on the control panel. In "Heat" mode the compressor and the pump will not run with electrical heating.

6.4.- CONDENSATE

During the cooling cycle, conditioners produce condensate in considerable quantity, above all in humid days. If you do maintenance or repair work on board, make sure that condensate goes overboard. Since condensate is fresh water, it shouldn't drip on electrical or wood structures. If drained into a bilge it could easily cause a very impleasant odour. So it is better to keep it in a limited and evacuated area. Therefore you should use a little container with a few liters capacity linked to an automatic pump. You must considere that the condensate outlet is exposed to a negative pressure, when the conditioner is running. This means that it can suck up air from the outlet, then it shouldn't be close to exhaust or to any source of poison gases.

6.5.- ELECTROLYSYS

Electrolysys can cause dangerous sea water leaks deteriorating through-hull and other fittings. When you find out an electrolysys, you must search the cause and repair the failure before starting the conditioner.

6.6.- EXPLOSIONS

The operation of an air-conditioner means the production of sparks (circuit breakages, relays, etc…) which are capable of ignition fumes and7or vapours. To remove such fumes and vapours, ventilating blowers should be operated at least 5 minutes before starting the unit and kept running until the air-conditioner is running.

IMPORTANT: Never sleep in an enclosed space on a yacht, when combustion plants (motors, electrical generators, etc…) are running. The combustion gases discharge system could break down and poison gases could come in, where you are sleeping. The conditioner fan always runs, after having switched on the main circuit breaker.

7.1.- AIR FILTER

The filter on return air should be cleaned or replaced periodically. This filter is absolutely necessary as it prevents the clogging of the air heat exchanger of the air conditioner. There is not a fixed rule to determine the periodicity of filter maintenance; this depends from number of running hours but also from level of air pollution where the unit works. A clogged air filter reduces the unit capacity when in "Cool" mode. In "Heat" mode a clogged air filter in a "RC" air-conditioner produces a unit shutdown because of high pressure (HP); in a "EH" electrical heating air-conditioner a clogged air filter produces a heating shutdown because of an internal safety klixon. In order to reset the normal functioning, it is necessary to stop the system putting it off from the control panel, eliminate the reason of the lack of air circulation, wait approximately 5 minutes and then restart the system pushing the "Heat" button on the control panel.

7.2.- SEA WATER STRAINER

The sea water strainer installed on sea water pump intake requires to be checked and cleaned periodically. This strainer is absolutely necessary as it prevents the sea water pump and circuit to be clogged by dirty particles. There is not a fixed rule to determine the periodicity of strainer maintenance; this depends from the number of running hours and more from level of water pollution where the unit works. In "Cool" mode a reduced or nihil water flow reduces the efficiency and eventually causes a unit shutdown (HP - high pressure switch). In "Heat" mode a clogged water strainer reduces the unit capacity.

7.3.- ELECTRICAL COMPONENTS

All electrical parts must be kept clean and dry. We suggest to check periodically for electrical leaks, which, if detected, must be immediately eliminated.

7.4.- WINTERIZING

When freezing temperature are expected you have to drain the cooling water which may be in the condenser, in the pump, in the strainer and in the connecting pipes. Therefore you should close the seacock valve; remove the condensing unit inlet water hose (the hose from the pump to the water condense). Allow time to drain all the water from the condenser; clean the strainer and drain completely the water in it and in the pump.

7.5.- CONDENSATE DRAIN

Check periodically that the condensate discharges into water are not clogged by dirtiness or other.

	ANOMALY	CHECK	ANALYSIS	REMEDY	
8.1	Nothing works	a) It lacks voltage. Check if the L and R terminals of the AC Power terminal board have got voltage. b) Check the electrical box to establish if there is water or humidity. Disconnect the different charges to find out the cause of the breakdown.	Lack of supply	Check and charge the F1 fuse of the electrical box. The F1 fuse supplies power to fan, sea pump, reverse valve, control panel, power relay. NOT TO THE COMPRESSOR:	
8.2	The fan, the sea water pump work, but not the compressor.	a) SUMMER CYCLE (COOL): Turn the thermostat knob in a counter clockwise direction towards “18”. b) WINTER CYCLE (HEAT): Turn the thermostat knob in a clockwise direction towards “24”.	Too high thermostat. Too low thermostat.	Regulate correctly the thermostat. Regulate correctly the thermostat.	
8.3	The compressor works for a while, stops and then starts again by itself, even if the thermostat is on MAX.	a) SUMMER CYCLE (COOL): Check the cooling water flow. b) WINTER CYCLE (HEAT): Check the air flow coming out from the delivery grills.	It lacks the cooling water flow and this causes the intervention of the high pressure switch. The air flow is not sufficient and this causes the intervention of the high pressure switch.	Re-establish the cooling water flow. If the FAN commutator is on the MAX, it is necessary to clean or change the air filter (see 6.1). If the problem is frequent, it is necessary to check the air level (see 5.6).	
8.4	The fan doesn't work.	Check the connection plug between fan and electrical box.	Defective connection.	Bring again into use the connection.	
8.5	The fan and the pump work well, but the compressor doesn't.	a) Check point 8.2. b) Check that the compressor C and R terminals have voltage.		If there is voltage, the compressor is defective and must be changed. If there is not voltage, check the K1 relay and eventually change it.	
8.6	F1 fuse	a) General protection fuse with the only exclusion of the compressor.	If the F1 fuse burns, check: a) Sea water pump b) Reverse valve c) Fan	Value: 10A 5x20 glass.	

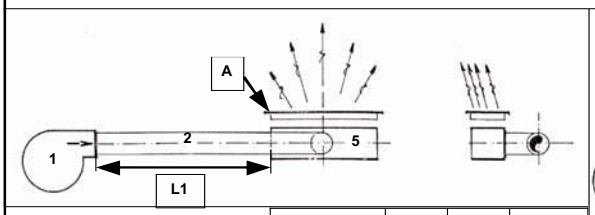
CONDIZIONATORI MOD. COMPACT	COMPACT 5	COMPACT 9	COMPACT 12	COMPACT 17	COMPACT 17slim	COMPACT 24slim
POTENZA NOMINALE BTU/H	4,000	8,000	12,000	17,000	17,000	24.000
RESA ESTIVA BTU/H	4720	7.768	10.100	15.500	16.500	21.500
RESA ESTIVA W/H	1.380	2.275	2.960	4.500	4800	6300
RESA INVERSIONE CICLO BTU/H	5810	9.690	12.500	18.000	-	22.000
RESA INVERSIONE CICLO W/H	1.700	2.800	3.660	5.270	-	6500
RESA RISCALDAMENTO ELETTRICO KW	1.3	1.3	1.3	2	2.6	2.6
PORTATA ARIA MC/H CON 20mm/H2O	240	260	360	725	520	725
ALIMENTAZIONE ELETTRICA VOLT/HZ	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%
CONSUMO IN MARCIA RAFFREDD. AMP. **	3	3.4	3.4	6	6.5	7
CONSUMO MARCIA INVERSIONE AMP. **	4	4.1	3.7	7	-	8.1
CONSUMO AVVIAMENTO AMP.	12	21	20	31	31	39
CONSUMO RISCALDAMENTO ELETTRICO AMP.	5.6	5.6	5.6	8.7	11.3	11.3
PESO KG.	25	26	24	43	31	37
DIMENSIONI LxPxH mm.	530x300x280	530x300x280	520x300x300	630x365x345	800x380x280	800x380x325
PORTATA ACQUA MARE MINIMA L/m'	7	8	10	15	15	20
REFRIGERANTE / QUANTITA' gr.	R134a/450	R134a/500	R407c	R407c	R407c	R407c
* Condizioni di prova: + 7.2° C (+45° F) - + 35°C (+95°F)						

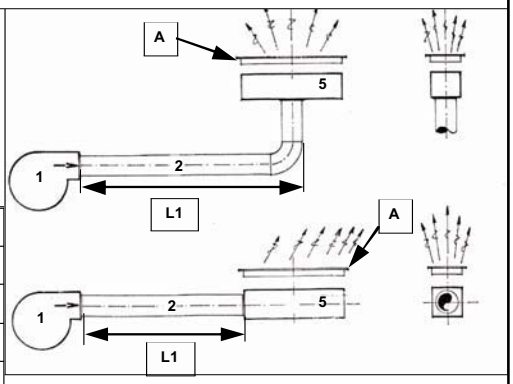
CONDIZIONATORI MOD. SPLIT	SPLIT4	SPLIT8	SPLIT10	SPLIT16	SPLIT17slim	SPLIT22slim
POTENZA NOMINALE BTU/H *	4,000	8,000	10,000	17,000	17,000	24.000
RESA ESTIVA BTU/H *	4720	7.768	10.100	15.500	16.500	21.500
RESA ESTIVA W/H *				4.500	4800	6300
RESA INVERSIONE CICLO BTU/H *	5810	9.690	12.500	18.000	-	22.000
RESA INVERSIONE CICLO W/H *				5.270	-	6500
RESA RISCALDAMENTO ELETTRICO KW	1.3	1.3	1.3	2	2.6	2.6
PORTATA ARIA MC/H CON 20mm/H2O	240	240	360	725	520	725
ALIMENTAZIONE ELETTRICA VOLT/HZ	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%	230/50+/-10%
CONSUMO IN MARCIA RAFFREDD. AMP.	3	3.4	3.4	6	6.5	7
CONSUMO MARCIA INVERSIONE AMP.	4	4.1	3.7	7	-	8.1
CONSUMO AVVIAMENTO AMP.	12	21	20	31	31	39
CONSUMO RISCALDAMENTO ELETTRICO AMP.	5.6	5.6	5.6	8.7	11.3	11.3
PESO KG.	25	26	24	43	31	37
DIMENSIONI COMPRESSORE LxPxH mm.	350x220x225	350x220x225	360x220x355	360x220x355	360x220x355	360x220x355
DIMENSIONI EVAPORATORE MOD. EV LxPxH mm.	330x240x280	330x240x280	330x285x270	430x365x330	600x380x270	600x380x270
PORTATA ACQUA MARE MINIMA L/m'	7	8	10	15	15	20
REFRIGERANTE / QUANTITA' gr.	R134a/450	R134a/500	R407c	R407c	R407c	R407c
PRECARICATO CON INNESTI RAPIDI	SI	SI	NO	NO	NO	NO

* Condizioni di prova: + 7.2° C (+45° F) - + 35°C (+95°F)
** Gli amperaggi indicati si riferiscono al valore del compressore e del ventilatore (esclusa l'elettropompa).
Con acqua di mare inferiore ai 10° C la resa dei condizionatori in pompa di calore (riscaldamento) diminuisce a valori tali da renderne sconsigliabile l'utilizzo.

AIR DISTRIBUTION LAYOUT
EXEMPLE DE DISTRIBUTION D'AIR
ESEMPI DI DISTRIBUZIONE ARIA

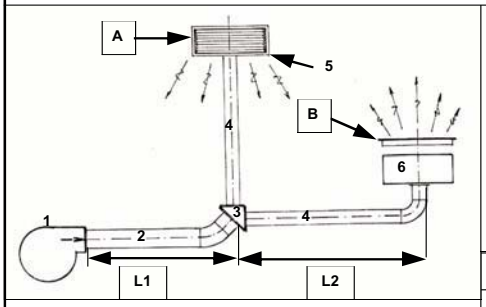
ONE OUTLET - UNE SORTIE SEULEMENT - UNA SOLA USCITA

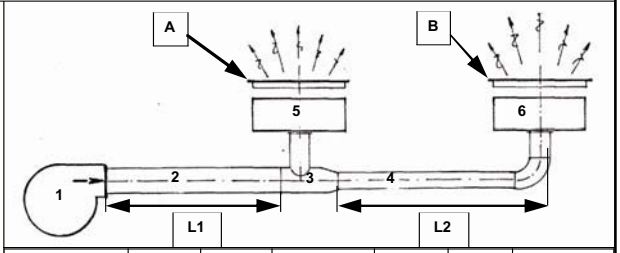




Btu/h	2	L1	A
4000-5000	100	3	300x112
6000-9000	100	3	300x112
10000-13000	125	3	400x112
14000-17000	150	3	400x172

TWO OUTLET - DEUX SORTIES - DUE USCITE

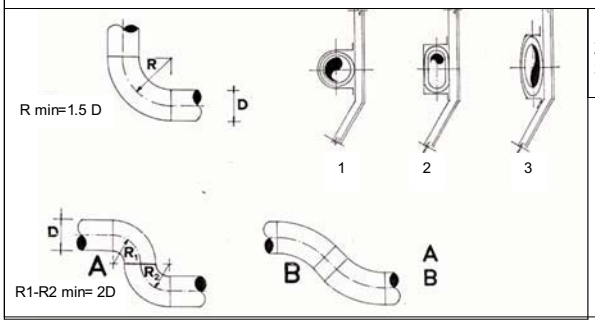




Btu/h	2	L1	A	4	L2	B
4000-5000	100	3	200x76	3	75	200x76
6000-9000	100	3	300x112	3	75	200x76
10000-13000	125	3	400x76	3	75	200x76
14000-17000	150	3	400x112	3	100	300x112

1 = Air-conditioning unit - Unitè 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



1 = SUGGESTED - CONSEILLE - SUGGERITO
2 = ACCEPTED - ACCEPTE - ACCETTATO
3 = WRONG - DECONSEILLE - SCONSIGLIATO

CLIMMA MARINE AIR CONDITIONING
C331 05/96