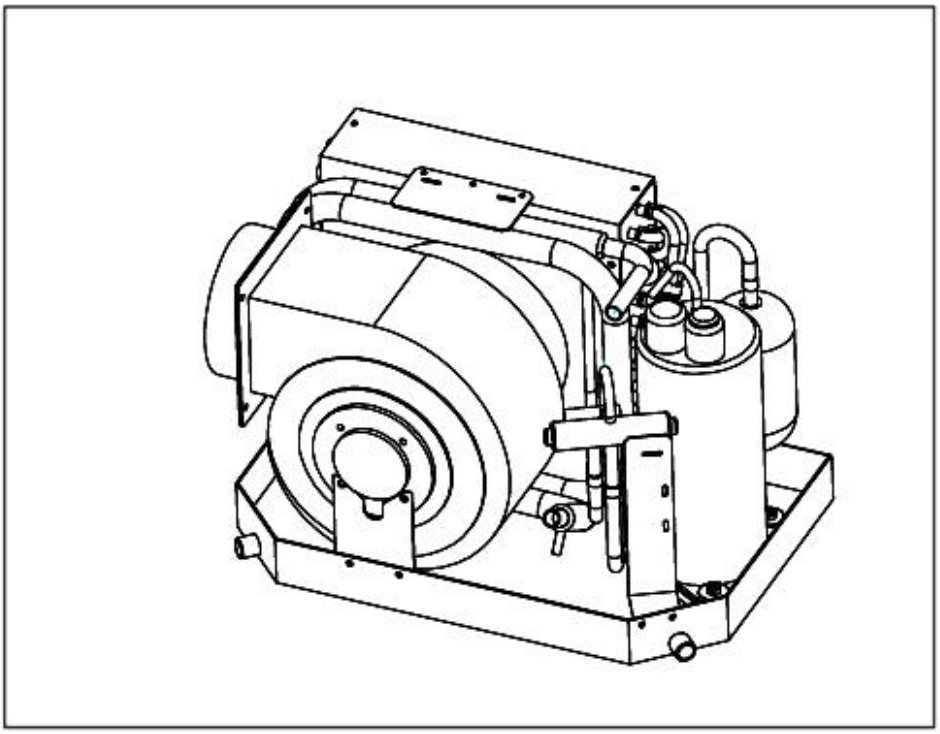
MARINE SELF-CONTAINED DX AC INSTALLATION MANUAL



TCF Marine

MODEL NO.

TCF Marine 10

TCF Marine 16

MARINE SELF-CONTAINED DIRECT EXPANSION AIR CONDITIONING SYSTEMS

INSTALLATION MANUAL

TheClimateFactory
MARINE

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INTRODUCTION

Thank you for purchasing our self-contained marine air conditioners, TCF MARINE series units are self-contained, direct- expansion, seawater cooled, reverse-cycle air conditioners, designed for marine applications incorporating the following features:

●The technical parameter, dimension and other technical requirements of MHP series marine air conditioner are subjected to the related standards, production managements are according to ISO9001 standard.

●High efficiency rotary compressors
●CuNi condenser coil
●Raised lance fin designed evaporator coil
●Insulated anti-vibration base pan
●Pre-charged and pre-wired systems for easy connections
●Electrical box with fire retardant cover mounted on unit for access and service
●Blower can be repositioned for either vertical or horizontal discharge

This manual provides proper installation information on the self-contained air conditioning unit. Improper installation procedures can result in unsatisfactory performance and/or premature failure of these a/c units. Before proceeding please read this manual completely.

In the interest of product improvement, The specifications and design are subject to change without prior notice.

SAFETY PRECAUTIONS

Very Important Safety Considerations: Never install your air conditioner in the bilge or engine room areas. Ensure that the selected location is sealed from direct access to bilge and/or engine room vapors. Do not terminate condensate drain line within three feet of any outlet of engine or generator exhaust systems, nor in a compartment housing an engine or generator, nor in a bilge, unless the drain is connected properly to a sealed condensate or shower sump pump.

Safety Warning – The a/c unit should never be placed such that it can circulate carbon monoxide, fuel vapors or other noxious fumes into the boat's living spaces. Do not install or operate a self-contained unit in the engine room or near an internal combustion engine. Failure to follow this precaution could result in serious injury or death.

Ignition Protection Warning - Self-contained units do not meet federal requirements for ignition protection. Do not install in spaces containing gasoline engines, tanks, LPG/CPG cylinders, regulators, valves or fuel line fittings. Failure to comply may result in injury or death.

Installation and servicing of this system can be hazardous due to system pressure and electrical components. When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves and place a fire extinguisher close to the work area.

Prior To Installation
Read these instructions completely and then plan all connections which must be made to the a/c unit including ducting, condensate drain line, seawater inlet and outlet hoses, electrical power connection, location of control, and seawater pump placement, to assure easy access for routing and future servicing.

Installation Overview
See Figure 1 for an overview of a typical Turbo a/c system installation.

Blower Rotation
Rotate the blower to the direction which allows the most direct airflow discharge through the ducting. Loosen the adjustment screw on blower mount ring, rotate blower to desired position, and then tighten adjustment screw See Figure 2.

Placement of A/C Unit
IMPORTANT INSTALLATION NOTE: The condensate base pan is equipped with vibration isolators installed in the bottom of the pan. These isolators are designed to dampen the vibration caused by the operating a/c unit from transferring into the mounted surface. Care must be taken when moving the a/c unit across mounting surfaces as isolators can be damaged. Isolators will not normally pull out of pan, but can turn sideways if dragged and may break if excessive dragging occurs. Unit must be picked up after moving to allow isolator to reset into well or vibration isolation will be ineffective.
The a/c unit must be mounted to a low flat level surface, in bottom of locker, under a bunk or dinette seat, or in a similar location. Read the safety considerations above and see Figure 1 before mounting unit.

TECHNICAL PARAMETER LIST 1

Model No.		TCF Marine 10	TCF Marine 16
Cooling capacity	Btu/h	10000	16000
Heating capacity	Btu/h	10800	17600
Power source		220V/50-60Hz/1	
Input power (kW)	Cooling	0.83	1.17
	Heating	0.96	1.56
Amp Draw (A)	Cooling	7.1	10.5
	Heating	9.5	13.5
Air flow	(m3/h)	580	730
Refrigerant		R410a	R410a
Dimension (mm)	Height	298	338
	Width	480	500
	Depth	285	315
Minimum Air Duct Size ø (mm)		125	150
Minimum Return Air Grille Sixe (cm2)		450	510
Minimum Supply Air Grille Sixe (cm2)		800	1030
Seawater pipe		5/8"	5/8"
Net Weight (kg)		25.5	29.5

OUTLINE DRAWING

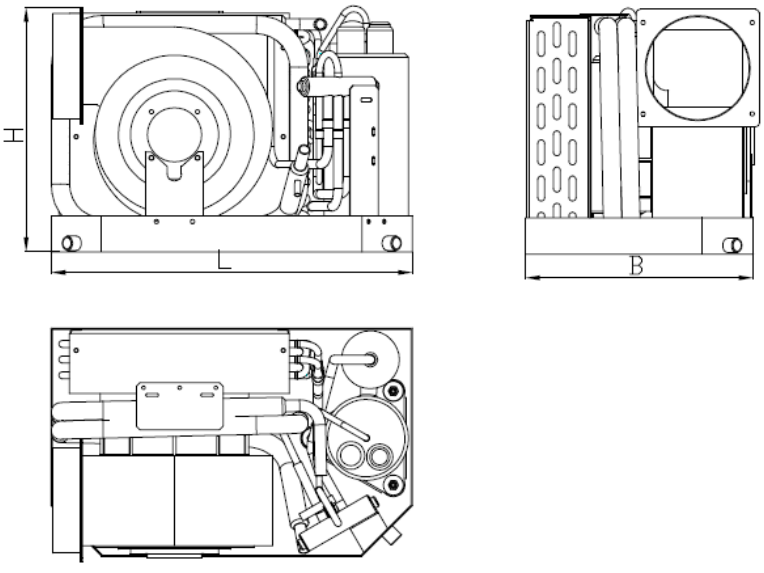
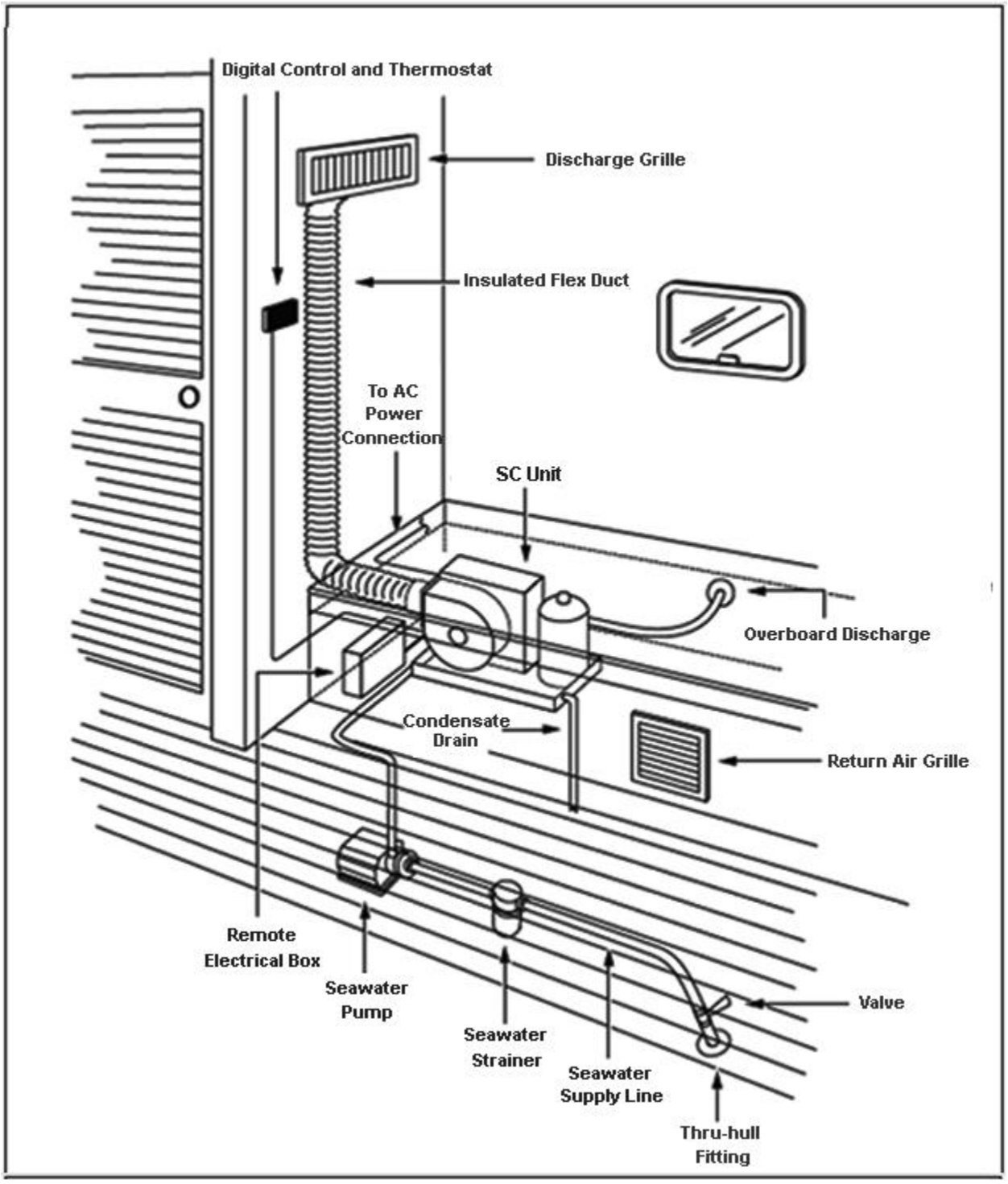


FIGURE 1. Installation overview



Mount unit with condenser/evaporator coil directly behind return air grill or with at least 3" (76mm) of air circulation clearance if adjacent to a bulkhead or other obstructions. See Figure 2. Compressor should be mounted away from return air grill if possible to minimize sound level in cabin.

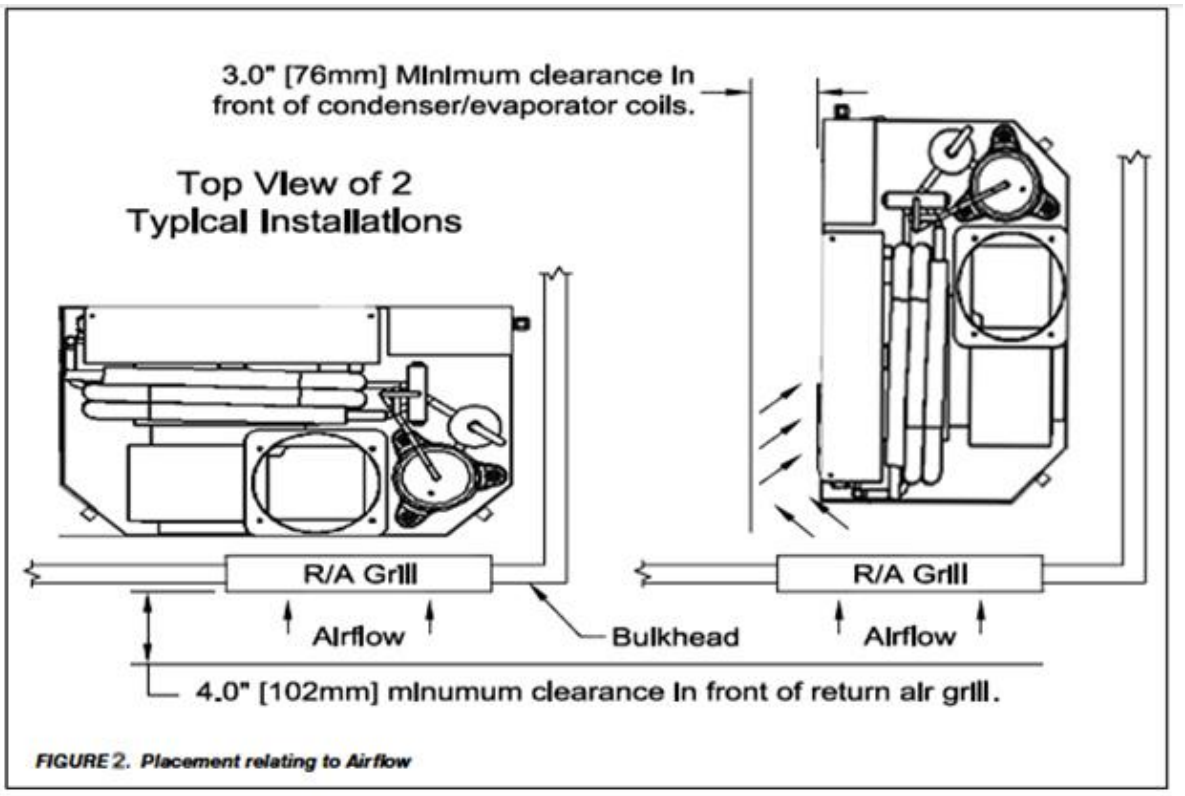


FIGURE 2. Placement relating to Airflow

Fan motor rotation

Adjust the air outlet by loosing lock screw and secure the screw tightly once the air outlet is adjusted at the optimal location.See figure 2.

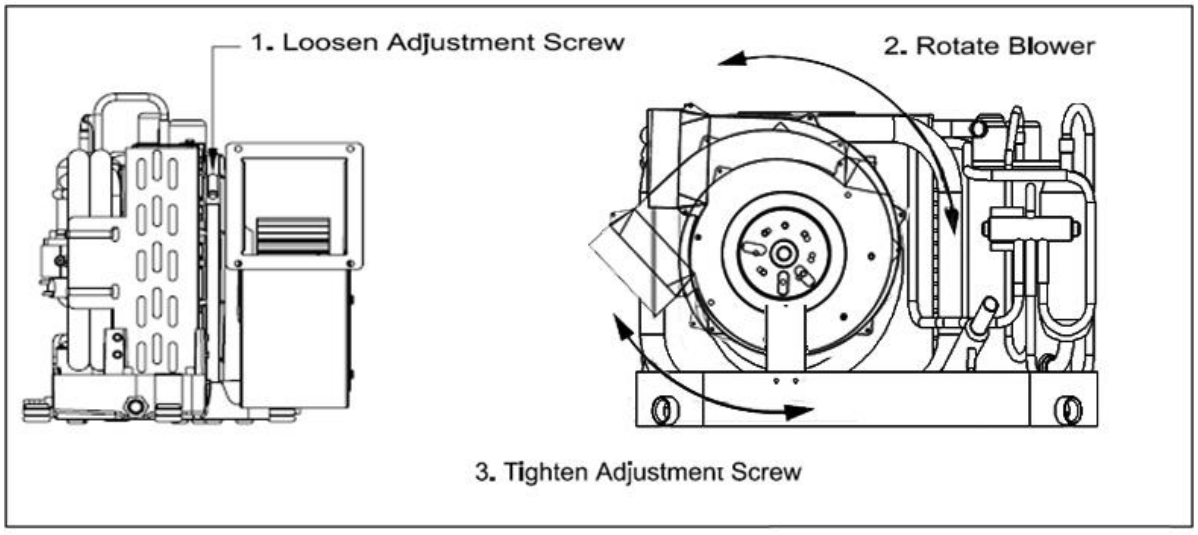


FIGURE 3. Fan motor rotation overview

Non-slip tape

Put the attached non-slip tape on the base of AC system securely. See Figure 4.

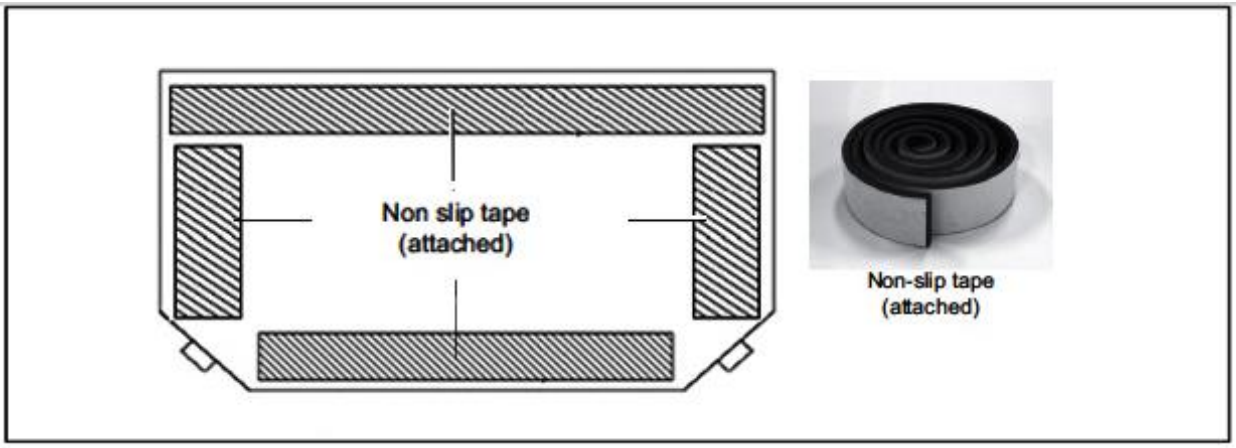


FIGURE 4. Mounting brackets installation overview

Mounting Brackets

The four mounting brackets provided should be placed around edge of drain pan as equally spaced as possible. Secure a/c unit to a flat level mounting surface. Brackets with vibration isolators and sleeves are provided. Customer is to supply screw or bolts. See Figure 5.

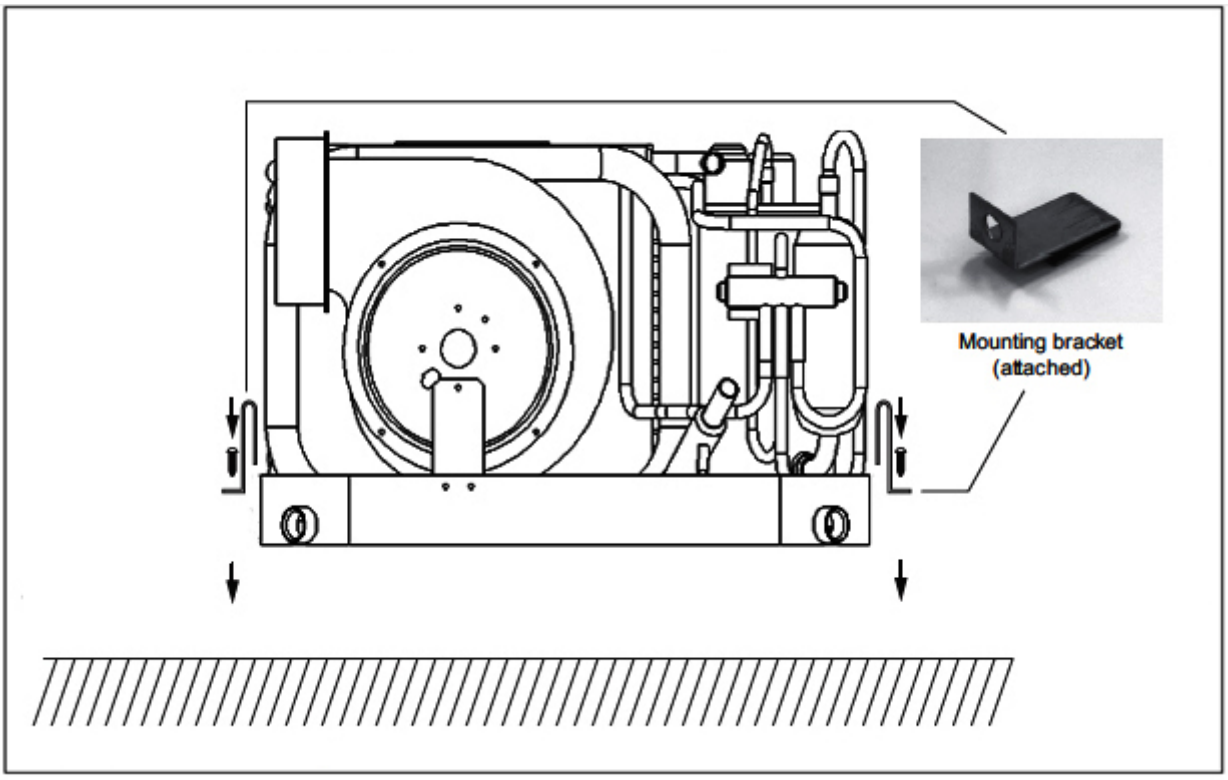


FIGURE 5. Mounting brackets installation overview

Ducting

Good airflow is critical for the performance of the entire system. It is highly dependent on the quality of the ducting installation. The ducting should be run as straight, smooth and taut as possible minimizing the number of 90° bends (two 90° bends can reduce airflow by 25%). If a transition box is used, the total area of supply air ducts going out of the box should at least equal the area of the supply duct going in to the box.

All ducting should:

- Be appropriately sized for each application.
- Run as smoothly and taut as possible.
- Have as few bends or loops as possible.
- Be securely fastened to prevent sagging during boat operation.
- Have all excess ducting lengths trimmed off.
- Not be flattened or kinked.
- Insulated when located in high heat load areas (hull side, mechanical compartments, etc.).
- Be properly protected against potential damage when routed through open areas.
- Do not route ducting through engine room or any area where it may be exposed to dangerous vapors or exhaust fumes.

Seawater System

Several guidelines should be followed during the installation of the seawater system. If the circulation pump is centrifugal and not self-priming, it must be mounted so that it is always at least one foot below the water line regardless of which tack the vessel is on. Pump may be mounted horizontally or vertically, The following is a summary of the seawater system installation:

1. Install the seawater scoop thru-hull inlet as close to the keel and as far below the water line as possible, facing forward. Bed the scoop with a marine sealant designed for underwater use.
2. Install a bronze or stainless steel full flow seacock on the seawater scoop thru-hull inlet.
3. Install a seawater strainer below the level of the pump with access to filter.
4. Mount the pump above the strainer and at least one foot below the waterline.
5. Connect the seacock and strainer with an uphill run of reinforced marine grade hose.
6. Connect the discharge from the pump uphill to the bottom inlet of the a/c unit's condenser coil with 5/8" (15.9mm) reinforced marine grade hose. Connect the discharge from the condenser coil to the overboard discharge thru-hull fitting with 5/8" (15.9mm) reinforced marine grade hose.
7. Avoid loops, high spots or the use of 90° elbows with seawater hose (each 90° elbow is equivalent to 2.5' (0.762M) of hose and a 90° elbow on the pump outlet is equivalent to 20' (61M) of hose.
8. Double clamp all hose connections with two stainless steel clamps, reversing the clamps.
9. Use Threaded seal tape on all threaded connections.
10. Connect all metallic parts in contact with seawater to the vessel's bonding system including the speed scoop inlet, strainer, pump and the air conditioner.

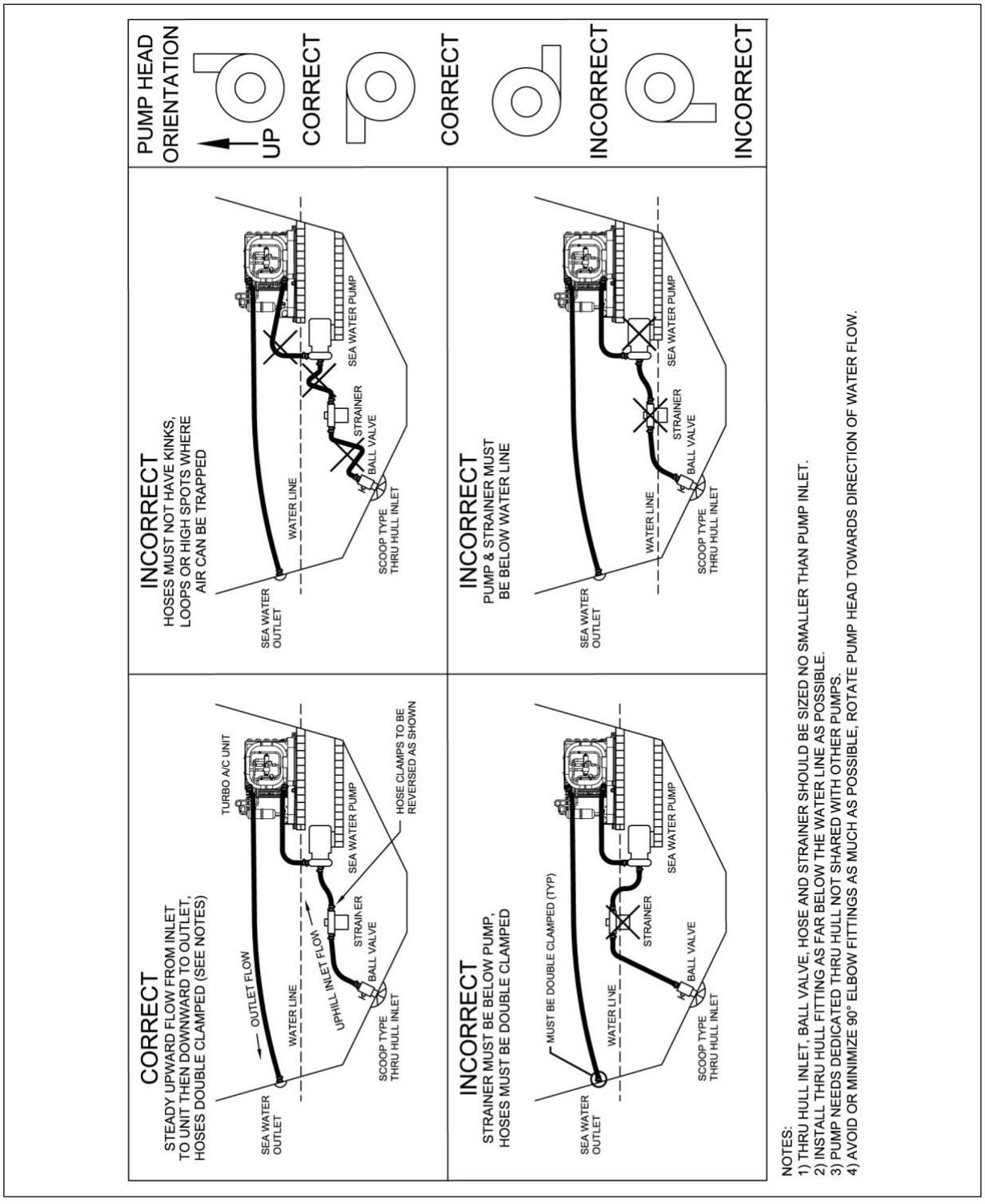


FIGURE 6. Seawater system

Installation checklist and final inspection

Check the marine air conditioner

A. Check if any damage of the appearance, inside pipes when in transporting and handling.

B. Check if the fan motor is rotating normally.

Check the piping system

A. Check if the system piping, valves are installed correctly.

B. Check if the ducts are loosened or not, its insulations and drains are well done.

C. Check if the piping is clean, in order to avoid the unit to be damaged.

D. Check if all the opening valves of the system are to be opened, all the off valves of the system are to be shut off.

Check the electricity

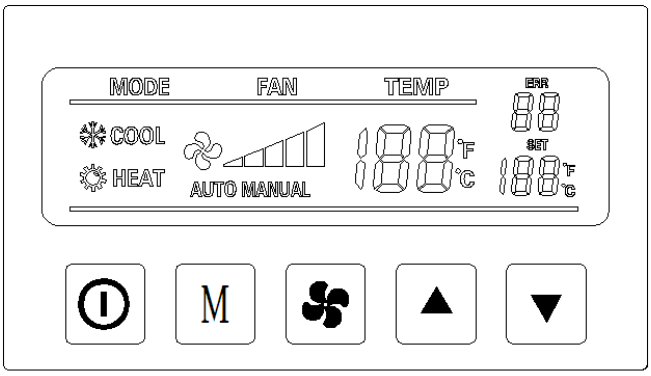
A. Check if the power source is exactly same with the instructions of the rating label and operation manual.

B. Check if the electricity and control circuit are correctly connected, well grounded, all the terminals are fastened.

Remark: the testing must completed by professional person.

Operation controllers and Display panel

The buttons on the wire control can switch on and off the unit, increase/decrease the temperature, set the mode, set the timer, and control the fan speed. etc.



On / Off

- Press and release to toggle between the **On and Off Modes**.

Mode Button

- Press to cycle through the modes of operation. Mode sequence selections are **COOL, HEAT,** and **FAN**.

FAN Button

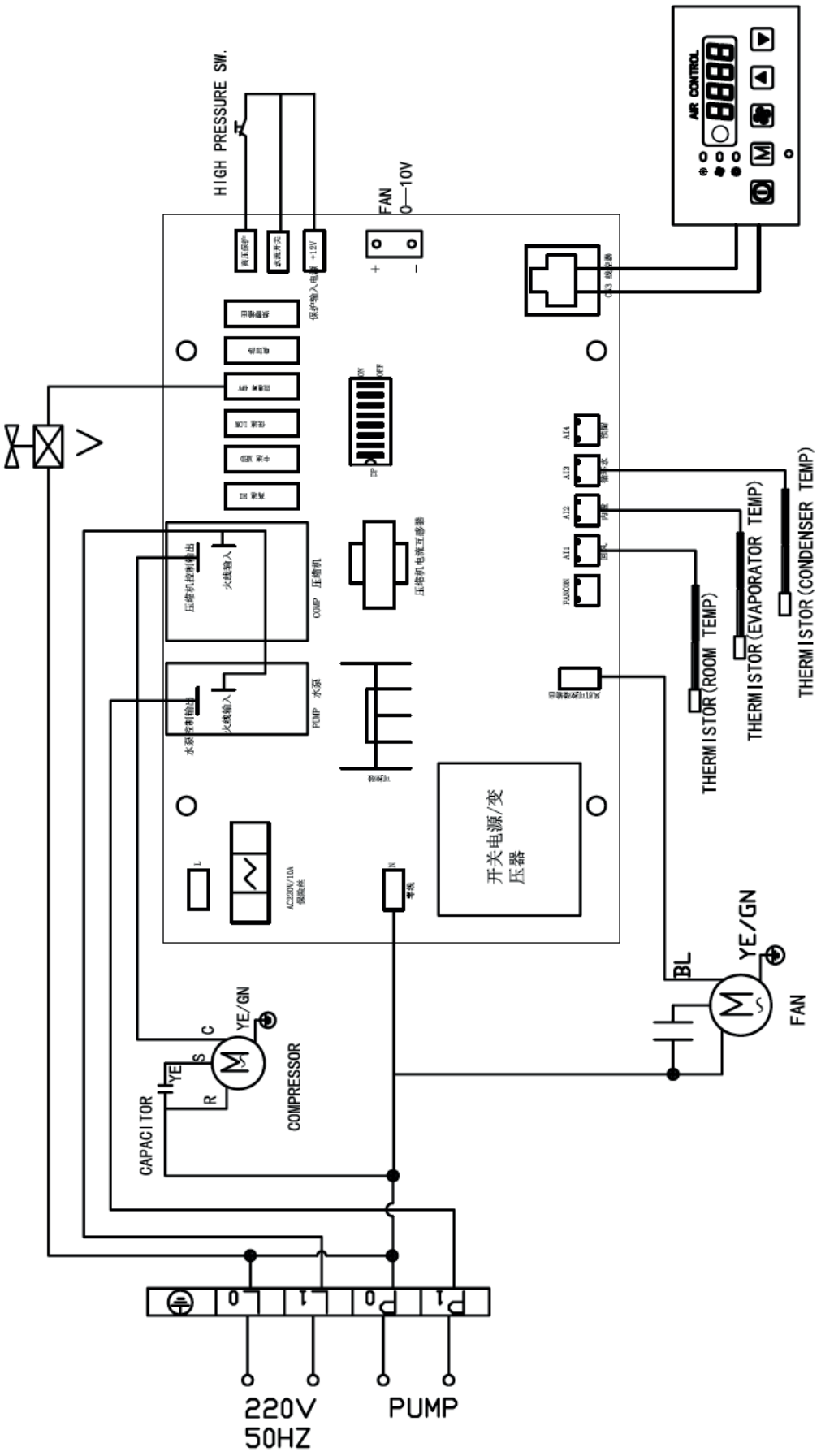
- Press to select Automatic or Manual Fan mode, indicated by the AUTO Fan LED indicator being on or off. In Manual Fan Mode, additional presses of the Fan button will adjust fan speed higher, then lower, then back to AUTO. In AUTO Fan, fan speed is controlled by the microprocessor as a function of the difference between set point and inside temperature.

Up Button

- Press and release to display the **set point**. Press and hold the UP button to increase the set point. Set point increases one degree each time the button is pressed.

Down Button

- Press and release to display the **set point**. Press and hold the DOWN button to decrease the set point. Set point decreases one degree each time the button is pressed.



Trouble shootings

The PCB controller will estimate the each error which happened in the system operation, and do the treatments according to these error types. The trouble shootings and errors go into four types, which are the unit resumed protection, system resumed protection, unit serious fault protection, and system serious fault protection.

Error codes table

Error Code	Error descriptions	Treatments	Resumes
1	Return air temp. sensor error	Shut off the compressor	Automatically resumed
2	Evaporator temp. sensor error	Shut off the compressor	Automatically resumed
3	Circuit water temperature was failure	Shut off the compressor	Automatically resumed
4	Indoor coil sensor is overheat	Shut off the compressor	Automatically resumed
5	Refrigerant gas was leakage	Shut off the compressor	Manually resumed
6	Compressor was overloaded	Shut off the compressor	Automatically resumed when unlocked / Manually resumed when locked
7	Low pressure protection is shut off	Shut off the compressor	Automatically resumed when unlocked / Manually resumed when locked
8	High pressure protection is shut off	Shut off the compressor	Automatically resumed when unlocked / Manually resumed when locked
9	Filter was blocked	Shut off the compressor	Automatically resumed
10	Chilled water temperature protection	Shut off the compressor	Automatically resumed
11	Water flow switch is failure	Stop the machine when it is locked	Manually resumed
12	Compressor current failure	Shut off the compressor	Automatically resumed
13	Fan motor was over-loaded	Shut off the compressor	Automatically resumed when unlocked / Manually resumed when locked
15	Communication failure between PCB and wireless controller	Operate the machine in previous settings, don't stop the machine	Automatically resumed
16	Input the primary password by user	Stop the machine, input the correct passwords (if it is beyond three times, password will be locked, the error code 20 displays, you should input the super password for unlocking.)	Automatically resumed when unlocked / Manually resumed when locked
18	Input the secondary password by user	Stop the machine, input the correct passwords (if it is beyond three times, password will be locked, the error code 20 displays, you should input the super password for unlocking.)	Manually resumed
19	Password was locked	Stop the air conditioner: input super password	Manually resumed
20			
N/M	Password on boot	Stop the machine, input the correct passwords (if it is beyond three times, password will be locked, the error code 20 displays, you should input the super password for unlocking.)	Manually resumed

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