Split System Units
Installation Manual

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CONTENTS

INTRODUCTION

Thank you for purchasing a Stellair Split System Marine Air Conditioner. SAC…SSC/220 and SAC…SSE/220 series units are split system, direct-expansion, seawater cooled, reverse-cycle air conditioners, designed for marine applications incorporating the following features:

- The technical parameters, dimensions and other technical requirements of SAC…SSC/220 and SAC…SSE/220 series marine air conditioners are subject to the related standards and production procedures according to ISO9001.
- Feature 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 water resistant 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 split system air conditioning unit.

Incorrect installation procedures can result in unsatisfactory performance and/or premature failure of these a/c units. Before proceeding, please read this manual carefully.

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 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.

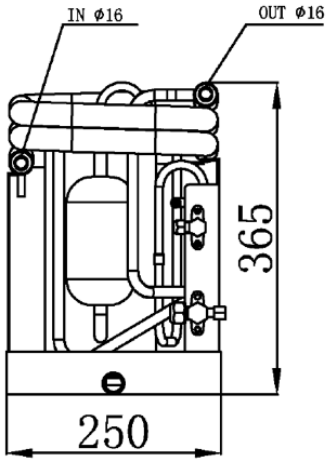
Installation Overview
See Figure 1 for an overview of a typical a/c system installation.

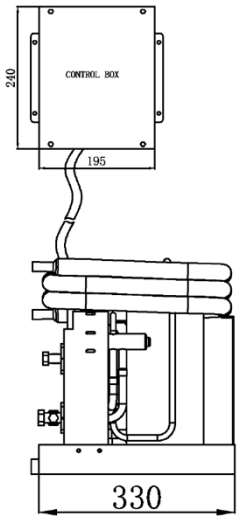
Blower Rotation
Rotate the blower to the direction which allows the most direct airflow discharge through the ducting. Loosen the adjustment screw on blower mount ring, rotate blower to desired position, and then tighten adjustment screw See Figure 2.

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.

Model			SAC07SSC/220	SAC10SSC/220	SAC12SSC/220	SAC16SSC/220	SAC20SSC/220	SAC24SSC/220	SAC36SSC/220
Power Supply		Ph/V/Hz	AC220V 1ø 50-60 HZ						
Cooling	Capacity	BTU/hr	7,000	10,000	12,000	16,000	20,000	24,000	36,000
	Power	kW	0.68	0.72	0.85	1.12	1.28	1.46	2.30
	Current	A	3.1	3.3	3.9	5.2	6	6.75	11.2
Heating	Capacity	BTU/hr	7,700	10,800	13,000	17,500	22,000	26,400	37,500
	Rated Power	kW	0.73	0.89	1.08	1.36	1.58	1.68	2.85
	Rated Current	A	3.4	4.2	5.1	6.3	7.3	7.8	13.1
Starting Current		A	12.0	16.0	19.0	23.0	26.0	30.0	45.0
Seawater Flow		m3/h	0.45	0.72	0.85	1.2	1.5	1.7	2.6
Noise Level		dB(A)	≤50	≤50	≤50	≤54	≤54	≤58	≤61
Dimensions	Width	mm	220	220	220	250	250	250	250
	Height	mm	300	315	315	365	365	408	430
	Depth	mm	250	280	280	330	330	330	330
Net Weight		kg				28		38	48
Connection Pipes			Ø6.35/ Ø9.52	Ø6.35/ Ø9.52	Ø6.35/ Ø9.52	Ø6.35/ Ø12.7	Ø9.52/ Ø12.7	Ø9.52/ Ø12.7	Ø9.52/ Ø15.88
Refrigerant Type			R410a						
Seawater Pipe Dia			3/4"						
Condensate Water Pipe Dia		mm	1/2"						

OUTLINE DRAWING





TECHNICAL PARAMETERS LIST – FAN COIL

Model		SAC07SSE/220	SAC10SSE/220	SAC12SSE/220	SAC16SSE/220	SAC20SSE/220	SAC24SSE/220	SAC36SSE/220
Power Supply	Ph/V/Hz	AC220V 1ø 50-60 HZ						
Cooling Capacity	BTU/hr	7,000	10,000	12,000	16,000	20,000	24,000	36,000
Heating Capacity	BTU/hr	8,000	11,000	13,800	17,800	22,500	27,500	40,000
Rated Power	W	480	750	950	1250	1550	1850	2650
Refrigerant Type		R401a						
Connection Pipes		Ø6.35/ Ø9.52	Ø6.35/ Ø9.52	Ø6.35/ Ø9.52	Ø6.35/ Ø12.7	Ø9.52/ Ø12.7	Ø9.52/ Ø12.7	Ø9.52/ Ø12.7
Air Flow	m3/h	450	600	600	820	950	1350	1650
Noise Level	dB(A)	≤50	≤52	≤52	≤56	≤58	≤60	≤68
Net Weight	kg			9.5kg	13		20	
Air Duct Dia	mm	Ø100	Ø125	Ø125	Ø150	Ø175	Ø200	
Condensate Water Pipe Dia		1/2"						

OUTLINE DRAWING

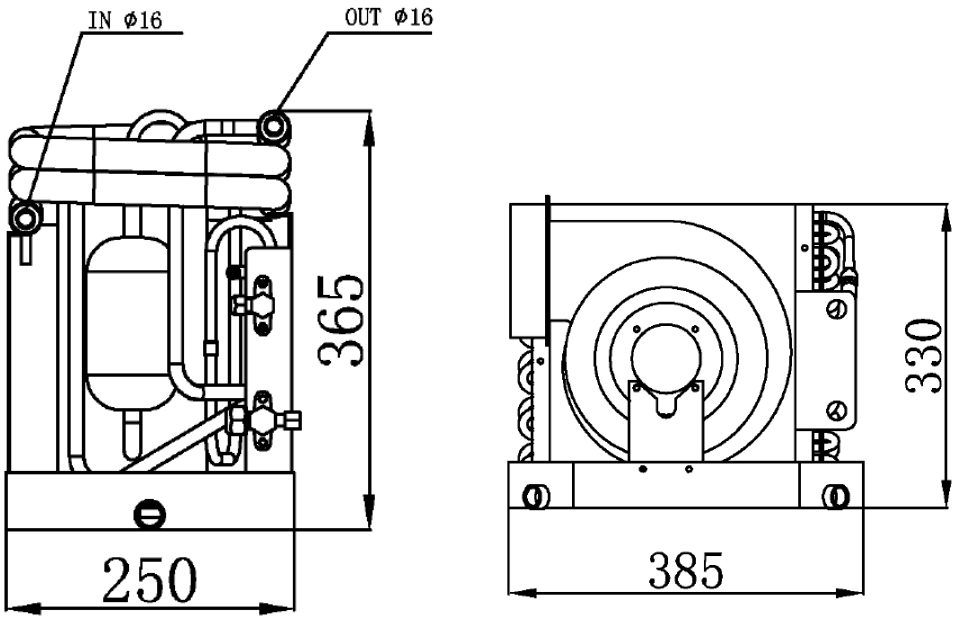
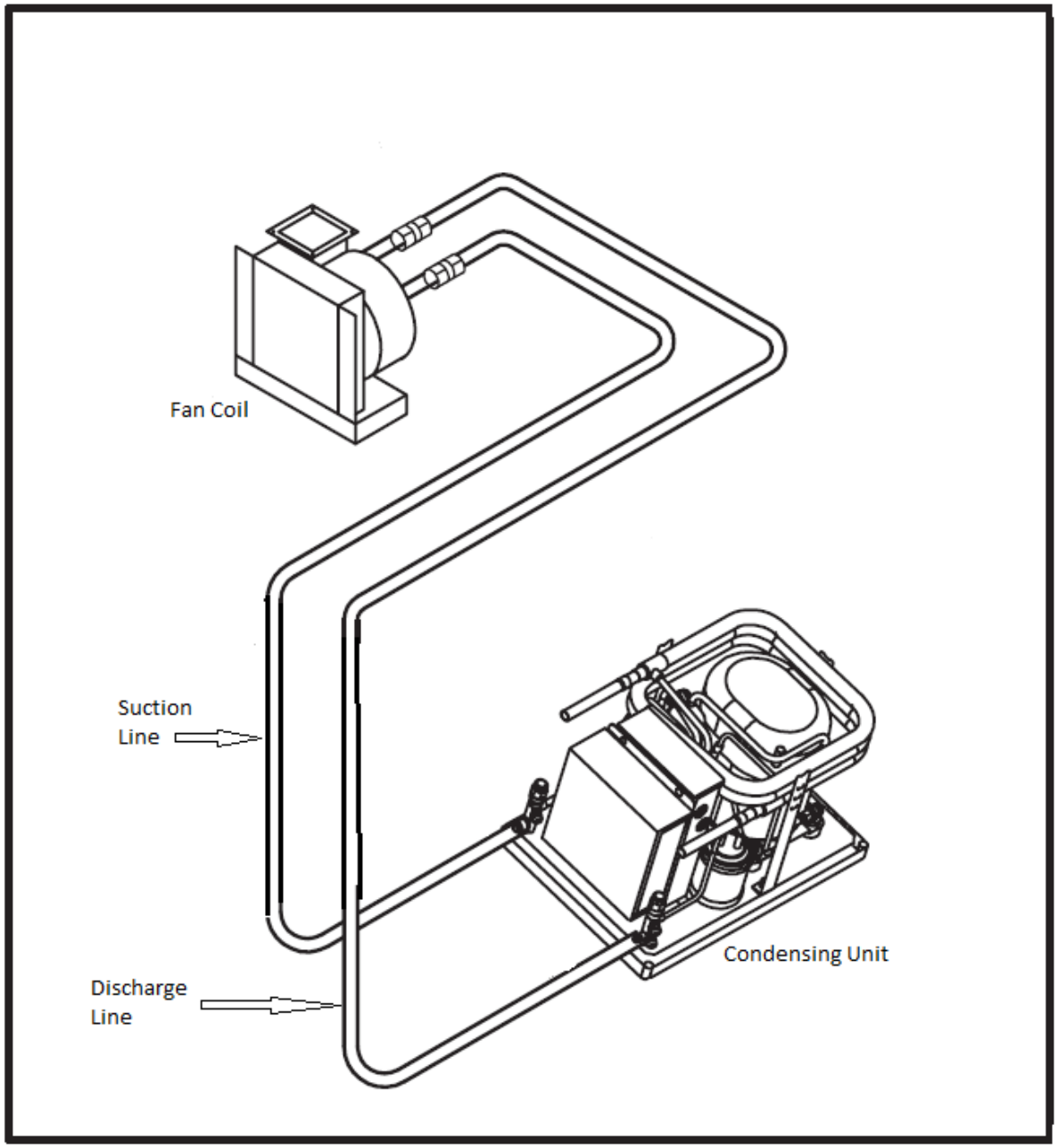
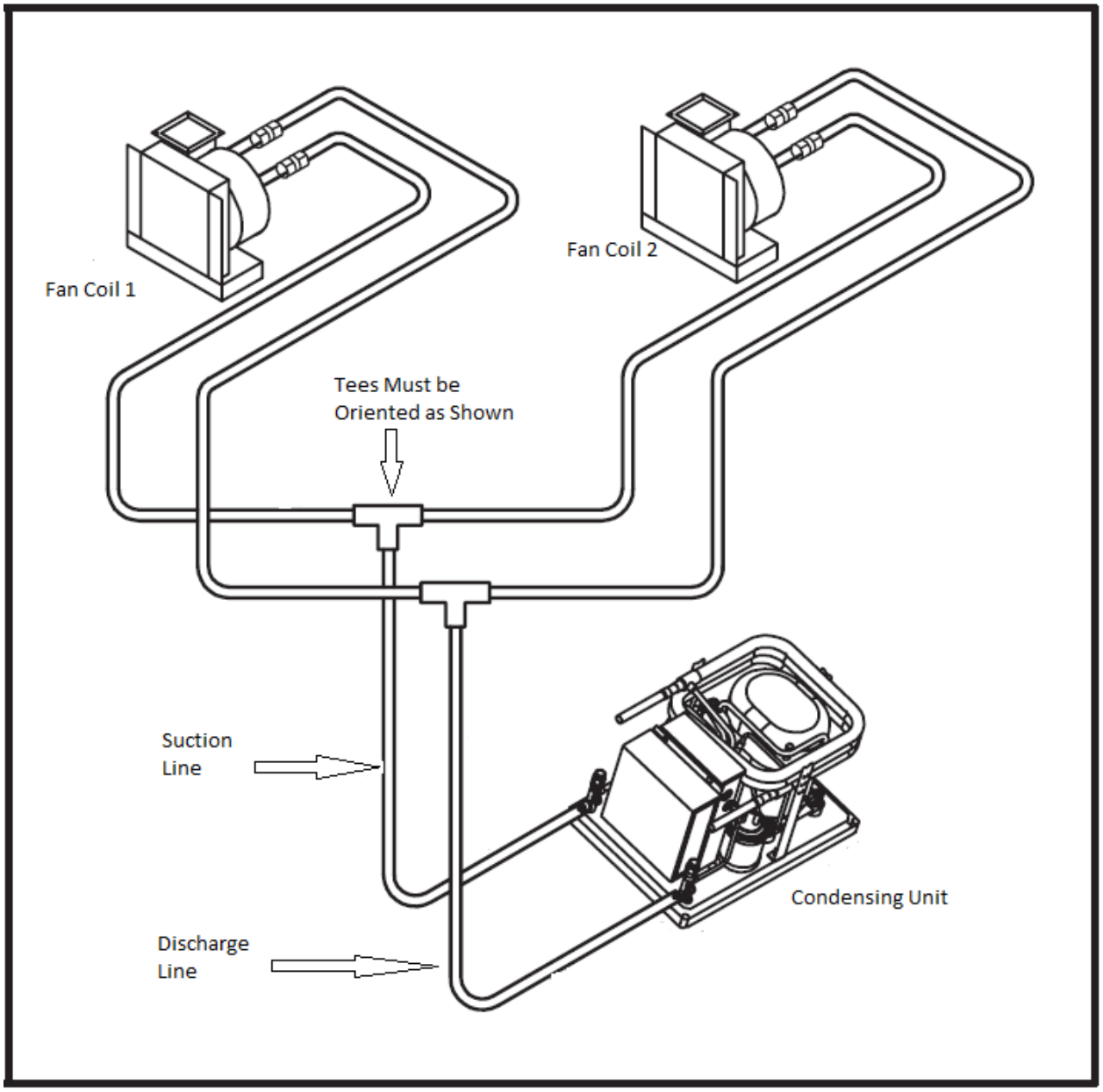


FIGURE 1. Installation overview

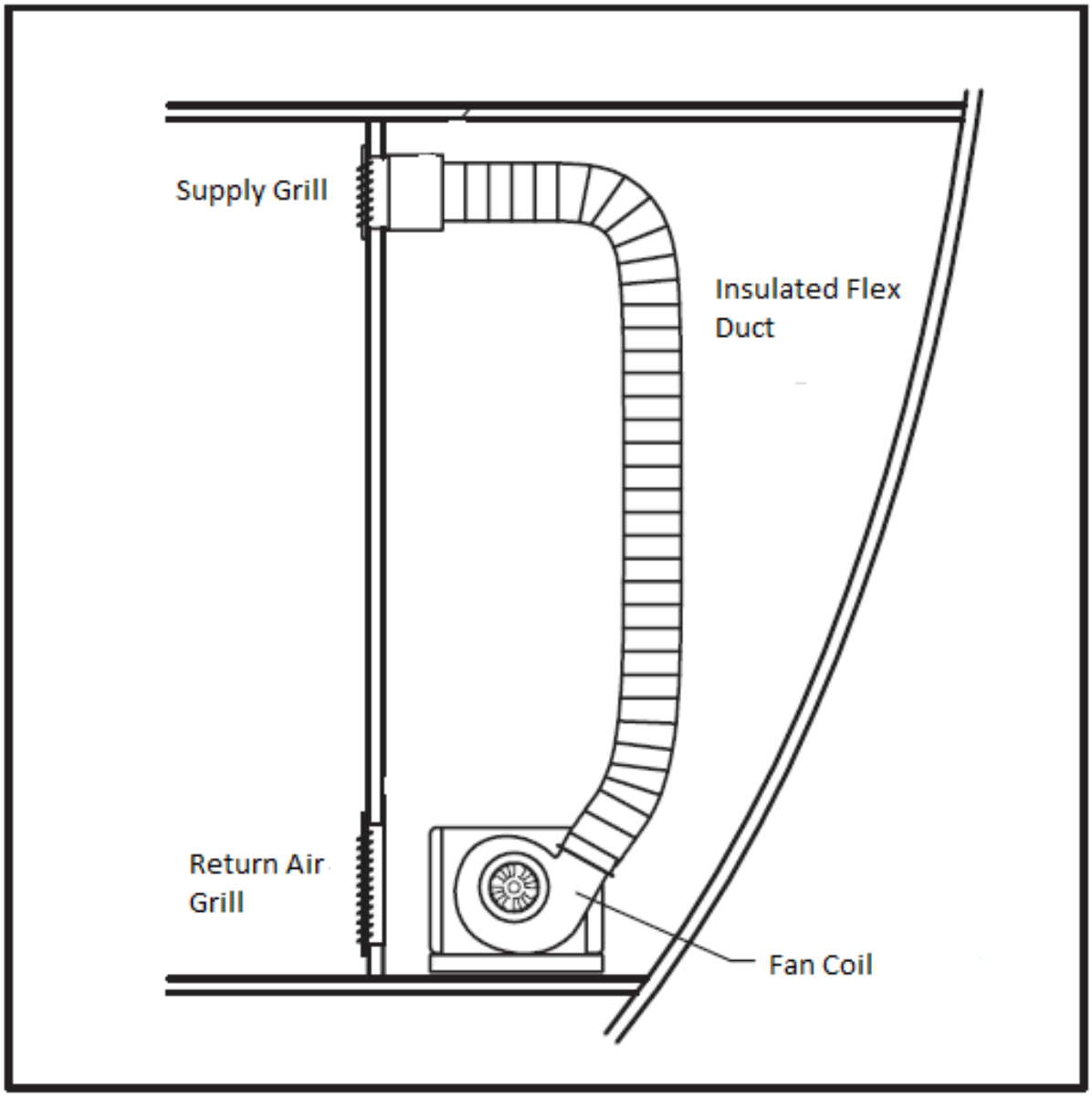
Single Fan Coil Installation



Double Fan Coil Installation



Typical Fan Coil Installation

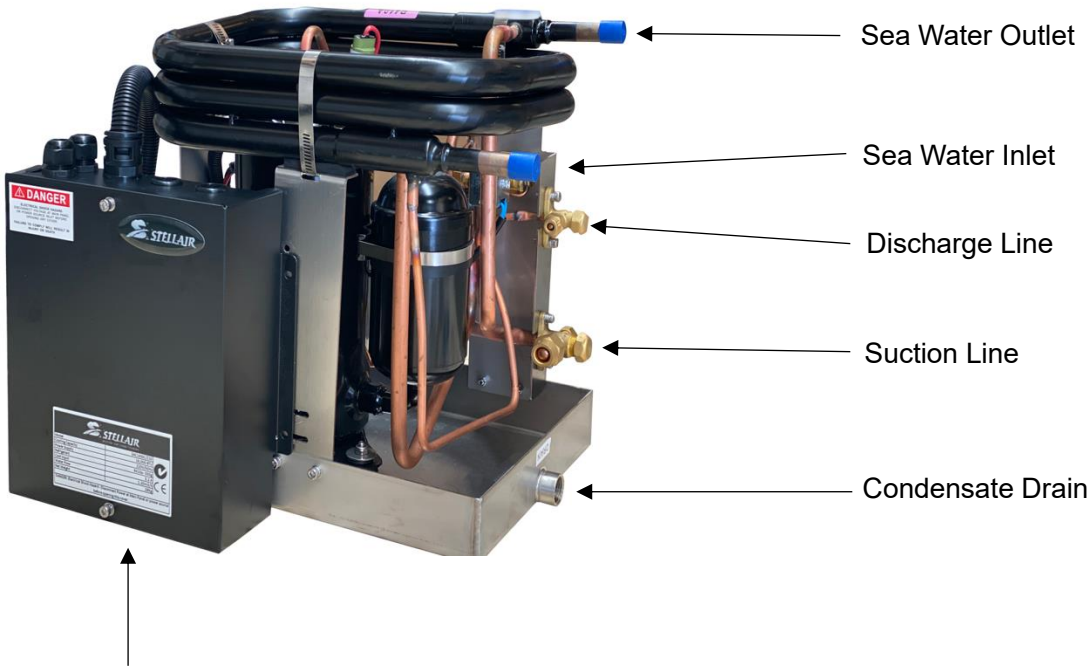


Placement of The Condensing Unit

The Stellair SAC…SSC/220 are designed to be placed in a location such as the engine room or a machinery compartment. Take in mind that a twin Pair refrigerant line must be run from the unit to the Fan Coil with a maximum length of 15 meters. The units are not ignition protected and must not be mounted near LPG/Gas Cylinders or Regulators, Gasoline Engines, tanks or fuel line fittings. Failure to comply with these recommendations may result in injury or death.

Find and area with adequate space to access and service the units, connect refrigerant lines, Seawater hoses and electrical connections. Surface must be flat and horizontal and away from salt spray ingress from Air Vents or wash downs.

Place the unit so all connections are accessible. There is also a condensate pan that will require a drain to remove condensate water from the unit to a suitable location. Use the supplied mounting brackets to secure the condensing unit in position.



Electrical Connection Box

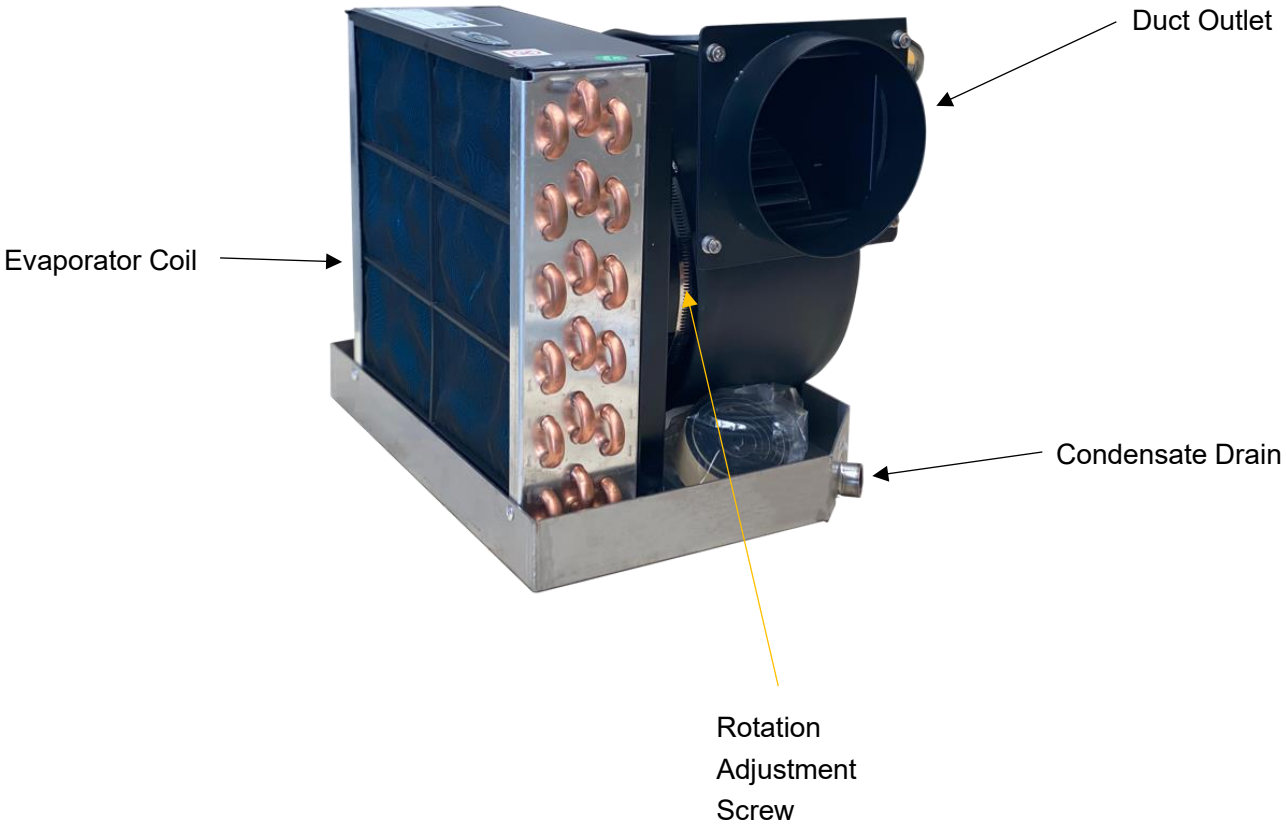
Placement of the fan coil unit

The Stellair SAC…SSE/220 Fan Coil Units are designed to be located low in the cabin if possible, this can be in the bottom of a wardrobe or under a seating or bunk. The unit should have a return air grill that allows the unit to suck air from low in the cabin, as a rule of thumb make the return air grill the same size as the Evaporator coil so as not restrict air flow.

The supply air should be ducted back to the cabin using an Insulated Flexible duct up to a suitably sized supply air grill that matched the diameter of the fain coil outlet. The Supply Air should be ducted back into the cabin as high as possible to ensure good air circulation.

Find a suitable flat horizontal surface to place the unit and secure down using the supplied mounting brackets. Bear in mind that the units have a drip tray and condensate drain that needs to be plumbed in a constant downhill configuration to remove condensate away from the unit to a suitable discharge point.

The fan outlet can easily be rotated to suit your installation by loosening the adjustment screw and rotating the housing to the desired position before retightening.



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 into 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.

Condensate Drain

The condensate drain must be run to a suitable drain point overboard or to a sump box for draining, all Marine Air Conditioners will produce condensation, and this must be drained away sufficiently to keep your unit in good condition.

Installing the Refrigerant Tubing

Use Refrigerant Grade soft copper tubing of the correct sizes for the units your are installing. Each tube must be insulated separately. For ease of installation the tubing is available in pre insulated twin pair refrigerant coil, this is recommended for use installing these systems.

For systems with two fan coils operating from one condensing unit a tee must be installed in both the suction and discharge lines, the branch of the tee must always be facing the condensing units to provide even refrigerant flow to both fan coil units and gaining the best efficiency from the system.

The tubing can be run up and down with no issues, but sharp bends should be avoided as it can kink the copper tubing and restrict flow or leak refrigerant gases. Secure the tubing every meter for support.

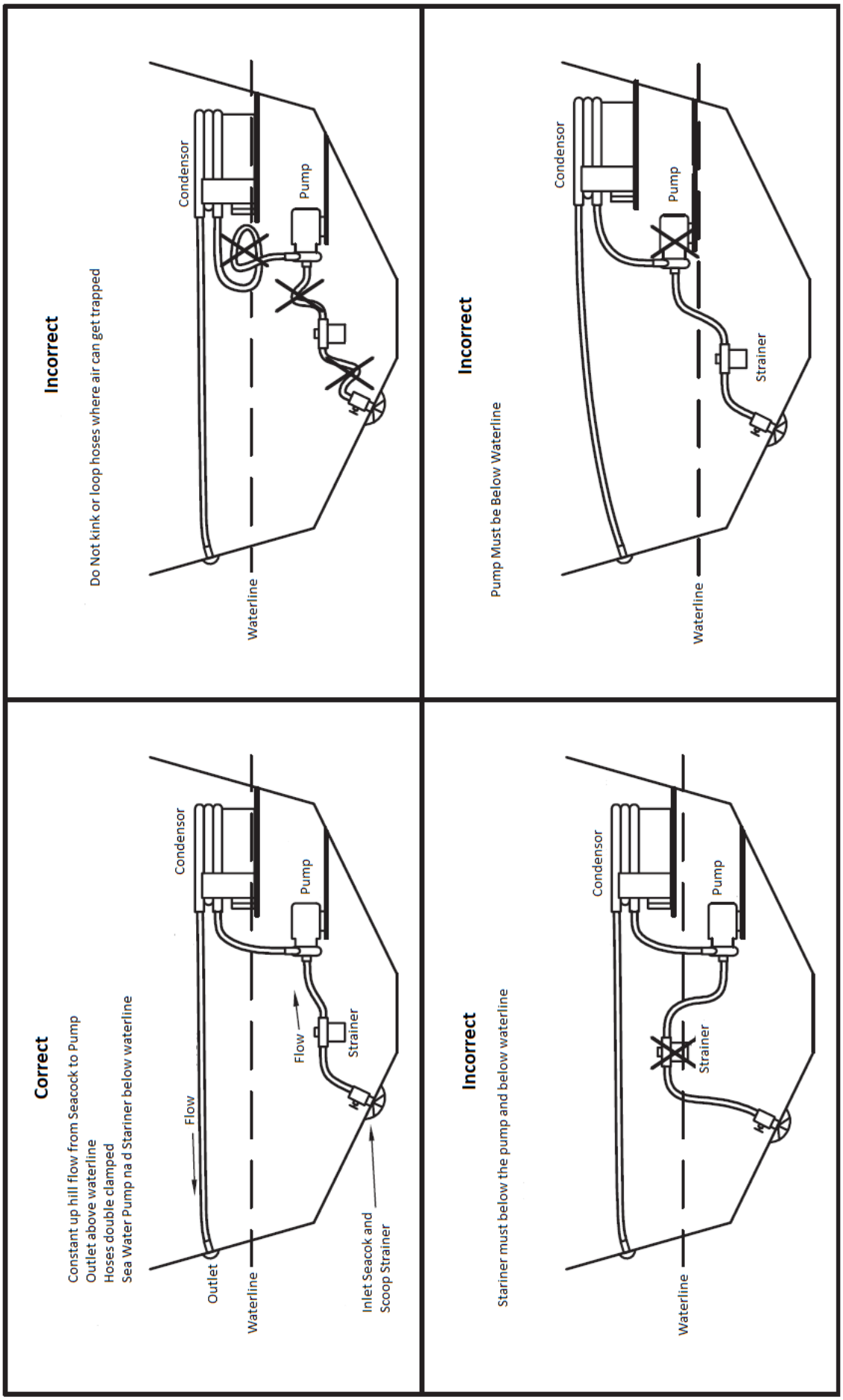
The copper tubing is connected to the condensing unit and the fan coil unit using flare joints, only 45-degree single flares should be used. Flares should be made according to the tool manufacturer’s instructions, ensure the flare nut has been installed on the tube prior to flaring. This should be performed by a licensed refrigerant mechanic to avoid leaks.

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, 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 wire 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) braid reinforced marine grade hose.
7. Connect the discharge from the condenser coil to the overboard discharge thru-hull fitting with 5/8" (15.9mm) braid reinforced marine grade hose.
8. 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.
9. Double clamp all hose connections with two stainless steel clamps, reversing the clamps.
10. Use good quality threaded seal tape or suitable thread sealant on all threaded connections.
11. 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.

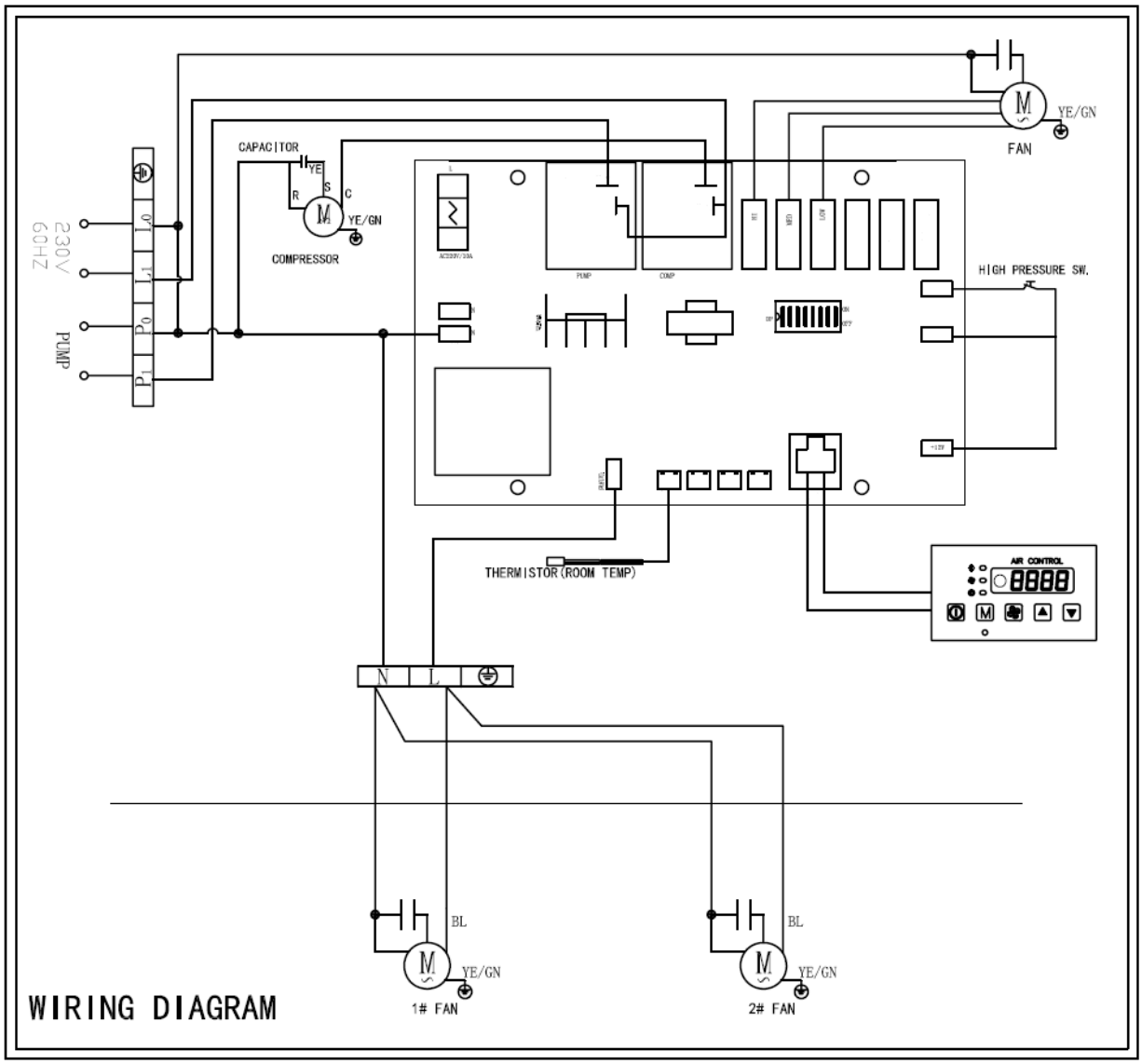


Wiring Diagram

Electrical Connections

IMPORTANT: All Electrical connections must be performed by a qualified licensed Electrical Contractor.

Please refer to wiring diagram below for wiring details.



Prestart checklist and final inspection

Check your Stellair Marine Air Conditioner

A. Check for any damage to the unit while handling.

Check All plumbing and ducting

A. Check the system piping and valves are installed correctly with no leaks.
B. Check the ducts are straight and secure and not crushed or have to many sharp bends.
C. Check condensate drains are connected to a drain point.
D. Check all sea water valves are open and system has sea water flow

Check the Electrical Connections

A. Check the power source is exactly same as the rating label and operation manual.
B. Check the electricity and control circuit are correctly connected, well grounded, all the terminals are fastened
C. All Electrical connections must be made by a qualified Electrician

Check the Condensing Unit

A. Is the condensing unit mounted securely and are fasteners accessible for future servicing?
B. Are the refrigerant connections secure, tight and accessible for servicing?
C. Are the sea water hoses double clamped and accessible?
D. Is the condensate drain connected and accessible?
E. Are all electrical connection made and secure?
F. Refrigeration lines should be connected, and leak checked by a licensed refrigeration technician.
G. All Electrical connections must be performed by a licensed electrician.

Check the Fan Coil Unit

A. Is the unit mounted securely?
B. Are the condensate drains connected?
C. Is the ducting run and secure?
D. Is the control unit mounted and connected?
E. Is the return air grill mounted and unobstructed?
F. Are all refrigeration connections secure and tight?
G. Refrigeration lines should be connected, and leak checked by a licensed refrigeration technician.
H. All Electrical connections must be performed by a licensed electrician.

Charging a New System

Each Stellair SAC…SSC/220 Condenser is shipped with approximately enough refrigerant gas to fill the circuit; this can vary depending on the length of refrigerant lines and may need to be field adjust on commissioning.

The copper tube and the fan coil unit will need to be evacuated to remove any nitrogen charge in the fan coil and copper lines, there is an evacuation port on the discharge line, do not open the condenser valves and release the gas until the fan coil has been evacuated correctly.

All work to the refrigerant circuit must be performed by a licensed refrigeration technician with the appropriate equipment and experience.

Startup

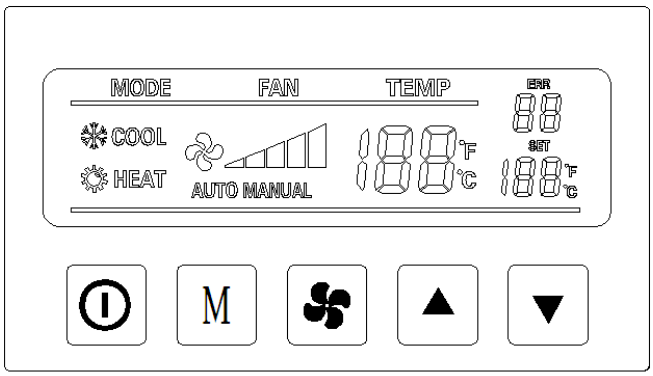
Check Seacock is open
Turn On the circuit breaker for the air conditioner and pump is it is on its own circuit.
Turn on the unit at a control panel
Check the sea water pump is running and you have water flow
Allow the unit to run for 10 minutes at high fan speed then check temperature differential between supply and return air
Check all refrigerant pressures and adjust if necessary.

NB: Refrigerant pressure must only be check and adjusted by a licensed Refrigeration technician.

Controller/Display Panel

The buttons on the controller can switch the unit on and off, 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 to control room 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 Shooting

Marine air conditioner does not start.

Possible causes	A/C unit circuit breaker is off
Recommended actions	Turn on the circuit breaker.

Possible causes	Power switch on control panel is off.
Recommended actions	Turn on the power switch of control panel.

Possible causes	Compressor protection is activated.
Recommended actions	Turn off the power and wait 3minutes, then restart.

Possible causes	Wrong wiring at control box terminal.
Recommended actions	Connect the wiring correctly.

Possible causes	Inadequate voltage.
Recommended actions	Check the power source voltage with voltmeter and A/C unit wiring.

Compressor does not work.

Possible causes	A/C unit circuit breaker is off
Recommended actions	Turn on the circuit breaker.

Possible causes	Compressor protection is activated.
Recommended actions	Turn off the power and wait 3minutes, then restart.

Compressor tried to start but failed.

Possible causes	Inadequate voltage.
Recommended actions	Check the power source voltage with voltmeter.

Possible causes	Malfunction of high-pressure switch.
Recommended actions	Consult your local distributor/dealer or Stella Systems

No cooling or heating.

Possible causes	Sea water temperature is too high for cooling or too low for heating.
Recommended actions	Reset set temperature lower or higher.

Possible causes	Freezing of coil.
Recommended actions	Shut down A/C unit and check the sea water temperature.

Possible causes	Air entrainment to seawater pump
Recommended actions	Purge air completely from the system.

Possible causes	Loss of refrigerant.
Recommended actions	Check the refrigerant leakage. Consult your local distributor/dealer or Stella Systems.

Low airflow.

Possible causes	Sea water temperature is too high for cooling or too low for heating.
Recommended actions	Reset set temperature lower or higher.

Possible causes	Freezing of a coil.
Recommended actions	Shut down A/C unit and check the sea water temperature.

No cooling or heating.

Possible causes	Temperature reaches the set point.
Recommended actions	Reset the set temperature lower or higher.

Possible causes	Sea water flow is obstructed
Recommended actions	Check if the seawater strainer and scoop type thru-hull and clean them if necessary. Check if seawater is discharged smoothly.

Possible causes	Air entrainment to seawater pump
Recommended actions	Purge the air completely from the pump.

Possible causes	Loss refrigerant.
Recommended actions	Check refrigerant leakage and Contact to dealer or Stella Systems.

Probable causes	Control panel is not lit.
Recommended actions	Reset the set temperature lower or higher.

Radiator is iced.

Probable causes	Airflow is obstructed.
Recommended actions	Check the air flow and remove obstructions at the front of return air grill. Check flexible duct is not kinked or it bends sharply.

Probable causes	Coil freezing.
Recommended actions	Shut down A/C unit and check the sea water temperature.

Probable causes	High humidity.
Recommended actions	Close hatches and doors to lower humidity.

Error Codes

Display error code 01

Return Air temperature sensor error
Description - Compressor stops.
Cause - Failure of room temperature sensor

Check

• Check for operation panel and RJ45 cable.
• Replace them as necessary.

Note - Automatic recovery

Display Error Code 05

Refrigerant Leak Code

Call Service Technician.

Display error code 07

Fault Low pressure gas error
Description Compressor stops.

Cause

• Usually occurs in heating mode
• Too much sea water flow
• Seawater temp is very cold.
• System has lost Gas

Check

• Check for seawater flow and restrict if necessary
• Check correct operation of fan
• contact you nearest service agent.

Note
• Automatic recovery during unit operation.
• Repower circuit breaker when the unit is stopped.

Display error code 08

Fault High pressure gas error
Description Compressor stops.

Cause

• Loss of seawater or clogged seawater strainer.
• Seawater pump is broken.
• Air does not circulate through the unit.
• Clogged inlet grille.
• FAN does not rotate normally.

Check

• Check for seawater outlet and clean the seawater passage and seawater strainer as necessary.
• Bleed the air from seawater pump if the pump absorbed the air.
• Clean inlet grille and filter if air volume is not enough.
• Check for duct piping.

Note

• Automatic recovery during unit operation.
• Repower circuit breaker when the unit is stopped.

Display error code 09

Fault Radiator freezing error
Description Compressor stops.

Cause

• Air does not circulate through the unit.
• Clogged inlet grille.
• FAN does not rotate normally.

Check

• Clean inlet grille and filter if air volume is not enough.
• Check for duct piping.
• Change direction of the supply grille if air gets colder.

Note - Automatic recovery

Display error code 12

Fault Compressor overcurrent error
Description Compressor stops due to overcurrent.

Cause

• Loss of seawater or clogged seawater strainer.
• Seawater pump is broken.
• Voltage drop.
• Compressor trouble.

Check

• Check for seawater outlet and clean the seawater passage and seawater strainer as necessary.
• Bleed the air from seawater pump if the pump absorbed the air.
• Check if power supply voltage is normal.
• Consult an authorized distributor or dealer if compressor of fan has a problem.

Note - Repower circuit breaker.

Display error code 15

Fault Communication error
Description Unit stops due to communication error (between circuit breaker and operation panel).

Cause

Operation panel, RJ45 cable or circuit board is broken.

Check

Check for the operation panel, RJ45 cable and circuit board.

Note - Automatic recovery

Warranty

Stella Limited Warranty

Stellair Conditioners are warranted to the original purchaser under normal use and if installed, operated and maintained in accordance with applicable user manual to be free of manufacturer's defects and to perform according to the stated specification for a period of **twelve (12) months** from the date of shipment, subject to the following.

Any replacement product or part will be warranted only for the remainder of the original warranty period or thirty (30) days, whichever is longer.

The warranty shall be void if: defects are not reported during the warranty period, the Air Conditioner is subject to accident, damage, incorrect installation, mishandling, abuse, misuse, negligence or accident by any other party, problems are caused by modification or alteration, chemical exposure or acts of nature, wear on replaceable components under normal conditions.

The warranty does not cover components where the serial number has been removed or defaced.

In the event of a defective component or failure during the term of warranty, Stella will inspect the defective part and repair or replace, with **all shipping charges being the responsibility of the purchaser to and from their location to our office on Gold Coast, Australia**.

As a condition of the warranty, the purchaser is responsible for carrying out the recommended maintenance as stated and or the component manufacturer's specification and operating the system within operational parameters outlined in this manual.

Stella makes no expressed or implied warranty other than that specifically set forth in this warranty statement. Stella disclaims any warranty of merchantability or of fitness for a particular purpose. Stella's liability under the terms of this warranty shall not exceed the purchase price of the component which are claimed to be defective. Stella shall not be liable for any consequential or incidental damages whatsoever, including but not limited to injuries or damages to person or property, loss of business profits, business interruption, loss of use, cost of removing/installing components, or the claims of third parties.

No agent, employee, dealer, or other person has any authority to make any warranties or representations concerning Stella or the product. Stella is not responsible for such claims of warranty or representation.

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