

Vector Compact

INSTALLATION, OPERATION & MAINTENANCE

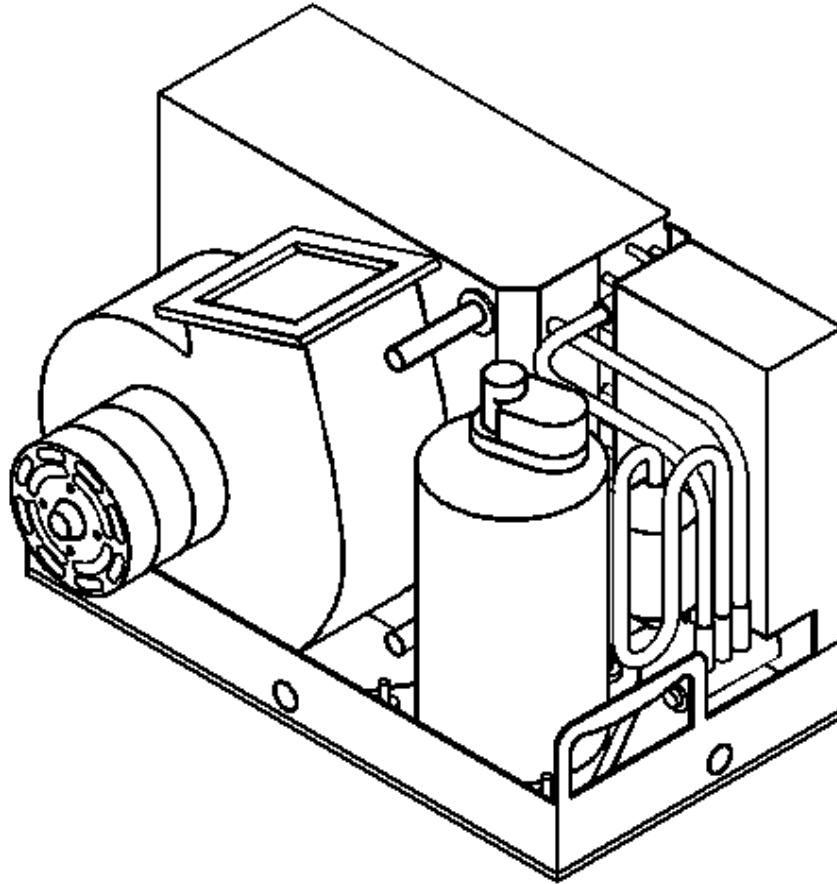


TABLE OF CONTENTS

[Preface](#)

[INSTALLATION](#)

[Unpacking and Inspection 1](#)

[Safety Considerations 1](#)

[Placement of System \(Tools Required\) 2](#)

[Spacing Allowances and Dimensions 3](#)

[Condensate Drains 4](#)

[Mounting Brackets 4](#)

[Blower Assembly 4](#)

[Supply & Return Air Grilles 5](#)

[Ducting 5](#)

[Sea Water Pump and Plumbing 6](#)

[Electrical Connections, Grounding and Bonding 7](#)

[3 Phase Notice 7](#)

[Vector Compact Passport \(VCP\) Wiring Diagrams 8](#)

[Vector Compact Mechanical \(VCM\) Wiring Diagrams 9](#)

[Manual Control Panel \(MCP\) Installation 10](#)

[Passport II Display Panel Installation 11](#)

[Installation Checklist \(review prior to installation\) 12](#)

OPERATION

[Manual Control Panel \(MCP\) Operation 10](#)

[Quick Start Operations Checklist 12](#)

[Passport II Control 13](#)

[Modes of Operation 13-14](#)

[Programming the Passport II 14-15](#)

[Programmable Parameters 15-17](#)

[Programming Notes 17](#)

[Troubleshooting Guidelines 18-21](#)

[Troubleshooting Notes 21](#)

MAINTENANCE

[Sea Water System, Return Air Filters, Winterization 22](#)

[Manufacturers Limited Warranty Agreement 23](#)

PREFACE

Congratulations on the purchase of your Marine Air Systems VECTOR COMPACT air conditioner. No matter which of the following features was the reason for your purchase of this air conditioner, we are sure it will meet your needs and will give you many years of efficient and trouble free use. The VECTOR COMPACT units are self-contained direct expansion air conditioners designed for marine applications incorporating the following features:

Patent pending compact design with the condenser coil in the evaporator shroud.

High efficiency rotary (7-16K) or scroll (24K) compressors

Cupronickel condenser coil

Raised lance fin designed evaporator coil

Polyurethane coated 2@ deep drain pan with multiple condensate drain locations

Anti-vibration base pan

Pre-charged and pre-wired systems for easy connections

Rotatable insulated blower assembly

Charge Guard⁷ ensures environmental protection and system integrity

The PASSPORT II microprocessor based digital controller included with this unit offers the most technologically advanced design specifically for the unique requirements of Marine Air Systems environmental control systems. The controller has been designed with flexibility and the following Auser friendly@ features customers require for their applications:

Non-volatile memory

Program lock – prevents accidental program tampering

Low voltage display panel

Face plate air sensor for accurate temperature control

LED cabin temperature displayed in Fahrenheit or Celsius

Multiple fan speed selections with high and low limits

User selected programs for optimum control

Optional outside air temperature sensor

Compressor pressure failsafe protection and run time hour meter

Compressor start staging delay for multiple a/c systems

Moisture mode cycle for humidity control

De-icing feature to prevent evaporator icing

Blank display for nighttime operation

This manual is intended to provide the information necessary to ensure proper installation, operation, and maintenance of the unit. Improper installation or misunderstood operating procedures can result in unsatisfactory performance and/or premature failure of these units, so before proceeding ***please read this manual completely.***

The VECTOR COMPACT a/c units are covered under the existing Marine Air Systems' warranty policy contained in this manual. In the interest of product improvement, Marine Air Systems' specifications and design are subject to change without prior notice.

CLEAN AIR ACT AMENDMENTS OF 1990 [TITLE VI - SECTION 608(C-1)]

"Effective July 1, 1992, it shall be unlawful for any person, in the course of maintaining, servicing, repairing, or

disposing of an appliance or industrial process refrigeration, to knowingly vent or otherwise knowingly release or dispose of any Class I or Class II** substance used as a refrigerant in such appliance (or industrial process refrigeration) in a manner which permits such substance to enter the environment. De minimis releases associated with good faith attempts to recapture and recycle or safely dispose of any such substances shall not be subject to the prohibition set forth in the proceeding sentence."*

**Class I substances include CFC-12 **Class II substances include HCFC-22*

MARINE AIR SYSTEMS

*Marine Air Systems (MAS) is a manufacturer of air conditioning and refrigeration equipment for the marine industry. MAS is committed to innovative technology, competitively priced products and market leadership. The MAS team has many years of experience in the design, manufacture, application and support of marine air conditioning and refrigeration. Our practical experience and design capability allows our application engineers and sales representatives to offer optimum solutions for your environmental control requirements. Marine Air Systems, Inc. is **A Member of the Taylor Made Group™**.*

VECTOR COMPACT OVERVIEW

HOW IT WORKS:

Your self-contained air conditioner consists of four main components and a refrigerant gas circulating through the system. The BLOWER draws warm cabin air across the fins on the EVAPORATOR where the heat from the air is transferred to the refrigerant in the evaporator coil. (The moisture in the air is captured on the evaporator coil by forming condensation as the air is cooled.) As the refrigerant evaporates from a liquid into a gas it absorbs the heat from the cabin air. The COMPRESSOR then compresses the refrigerant gas and pumps it through the outer tube in the CONDENSER COIL (located in the evaporator shroud). The sea water pump circulates cool sea water through the inner tube in the condenser coil, this cools the refrigerant and condenses it into a liquid. The heat from the refrigerant is exchanged to the sea water and discharged overboard. The liquid refrigerant is then passed through the EVAPORATOR COIL and the cycle repeats. Removing heat and moisture from the cabin air lowers its temperature and humidity levels. The conditioned air is blown through the ducting and out the supply air grille(s). For reverse cycle heating, the refrigerant flows in the opposite direction through the reversing valve. Heat is transferred from the sea water in the condenser coil to the refrigerant and then to the air blowing through the evaporator into the cabin. Sea water temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90°F and heat it in water temperatures as low as 40°F.

INSTALLATION

UNPACKING AND INSPECTION

When the equipment is received, all items should be carefully checked against the packing list to ensure all cartons have been received. Move units in the normal Aup@ orientation as indicated by the arrows on each carton. Examine cartons for shipping damage, removing the units from the cartons if necessary. If the unit is damaged, the carrier should make the proper notation on the delivery receipt acknowledging the damage.

SAFETY CONSIDERATIONS

VERY IMPORTANT: Never install your air conditioner in the bilge or engine room areas. Insure that the selected location is sealed from direct access to bilge and/or engine room vapors. Do not terminate condensate drain line within four (4) 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.

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. The following is a summary of the labels on the unit:

! DANGER

ELECTRICAL SHOCK HAZARD. DISCONNECT VOLTAGE AT MAIN PANEL OR POWER SOURCE BEFORE OPENING ANY COVER. FAILURE TO COMPLY MAY RESULT IN INJURY OR DEATH.

! WARNING

THIS COMPONENT DOES 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

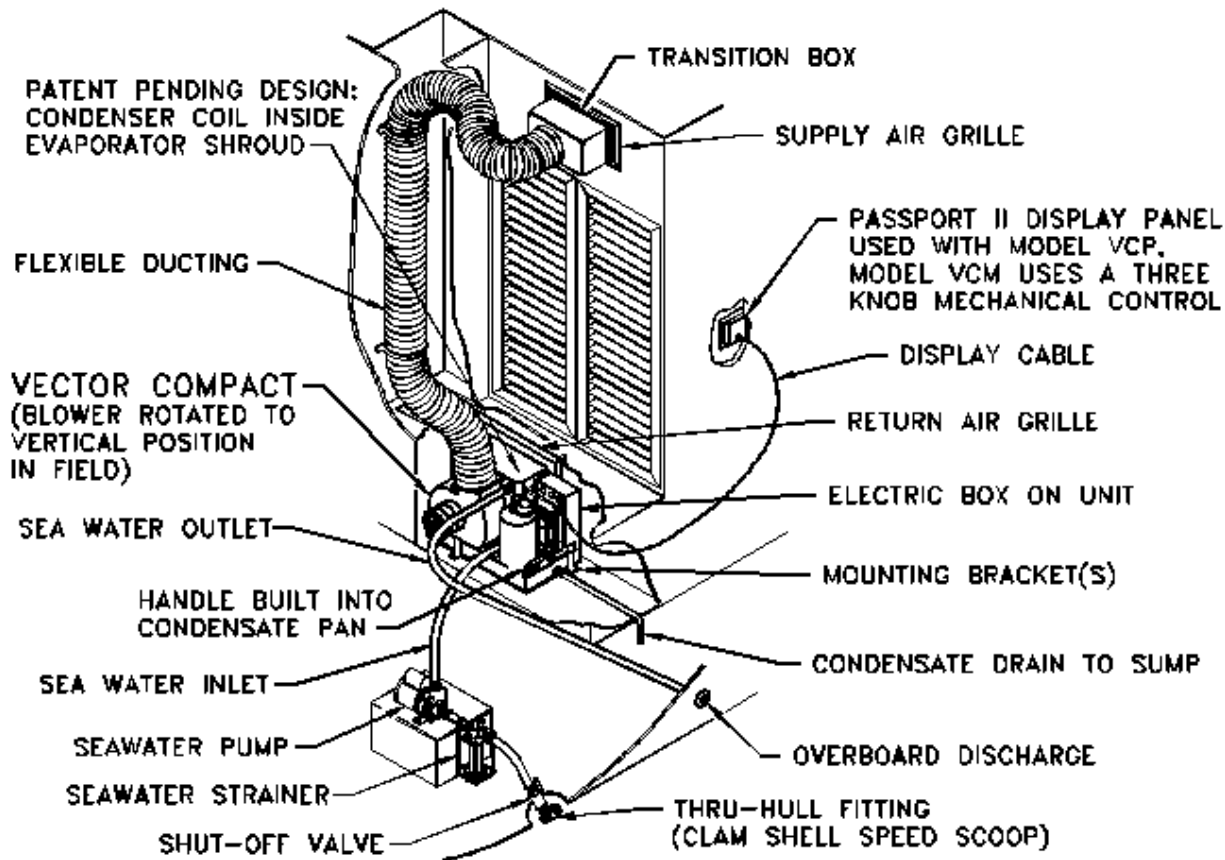
NOTICE

THIS COMPONENT IS CHARGED WITH HYDROCHLOROFLUOROCARBON (HCFC) REFRIGERANT R22. EFFECTIVE JULY 1, 1992 IT SHALL BE UNLAWFUL FOR ANY PERSON TO KNOWINGLY VENT OR OTHERWISE KNOWINGLY RELEASE ANY CLASS 1 (CFC) OR CLASS 2 (HCFC) SUBSTANCE AS A REFRIGERANT IN A MANNER WHICH PERMITS SUCH SUBSTANCE TO ENTER THE ATMOSPHERE PER THE CLEAN AIR ACT OF 1990. PUBLIC LAW 101-549 TITLE IV SECTION 608-C. FAILURE TO COMPLY MAY RESULT IN SEVERE PENALTIES, INCLUDING FINES AND IMPRISONMENT.

! WARNING

TO MINIMIZE THE HAZARD OF ELECTRICAL SHOCK AND PERSONAL INJURY, THIS COMPONENT MUST BE EFFECTIVELY GROUNDED. REFER TO THE INSTALLATION GUIDELINES FOR FURTHER INFORMATION.

PLACEMENT OF SYSTEM



Selecting a good location for your air conditioner is the most important part of your preparations. Be sure to consider the size of the area you are cooling, the air distribution needs, and the size of the unit you have chosen. Keeping in mind that cool air has a tendency to fall, it is highly recommended that you locate the supply air grille as high as possible in the cabin. See diagram below.

The VECTOR COMPACT unit should be installed as low as possible, **BUT NEVER IN THE BILGE OR ENGINE ROOM AREAS. INSURE THAT THE SELECTED LOCATION IS SEALED FROM DIRECT ACCESS TO BILGE AND/OR ENGINE ROOM VAPORS.** Installing the unit as low as possible (such as under a V-berth, dinette seat or bottom of a locker) and ducting the supply air as high as possible, creates an ideal air flow condition. This type of installation will prevent short or premature cycling.

The unit should be positioned on a firm, level surface and the condensate drain line should run aft and downward from the unit to a suitable drain location sealed away from any exhaust or bilge vapors. ***Plan all connections which must be made prior to starting installation***, including ducting, condensate drain, cooling water in and out, electrical power connections, location of control panel, and sea water pump placement and plumbing, to assure easy access for installation and servicing.

SPACING ALLOWANCES AND DIMENSIONS

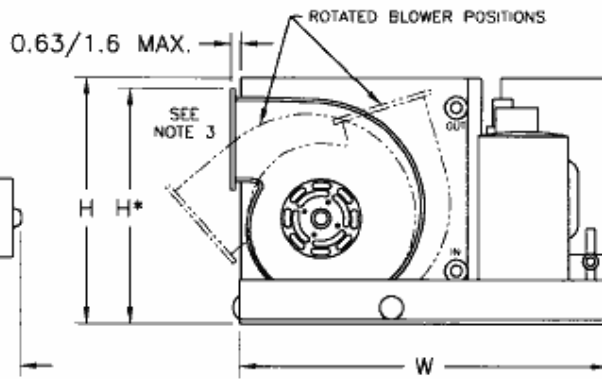
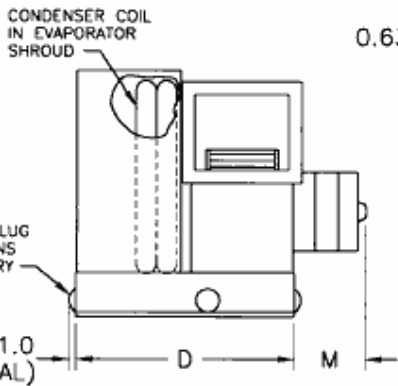
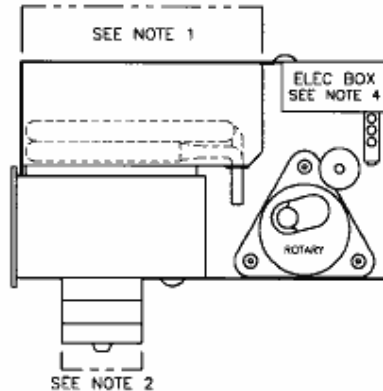
PROPRIETARY NOTE: THE INFORMATION CONTAINED WITHIN THIS DOCUMENT IS THE PROPERTY OF MARINE AIR SYSTEMS, INC. ANY ATTEMPT TO COPY OR DISTRIBUTE WITHOUT WRITTEN CONSENT FROM MARINE AIR SYSTEMS, INC. SHALL BE CONSIDERED UNLAWFUL AND CAN BE CONTESTED IN A COURT OF LAW.

REV	DATE	REVISION	DWG	APR
I	N/A	NO REVISION 'I'	DKM	
J	4/16/98	REVISED DIMENSIONS ON 10 & 12 HV UNITS	DKM	R P

SPACE ALLOWANCES TO CONSIDER WHEN DESIGNING AREA FOR A/C UNITS

- 1) Allow a minimum 3.00" [7.62cm] of air space in front of evaporator for return air intake if it is adjacent to a bulkhead.
- 2) Allow a minimum 1.00" [2.54cm] of air space for electric blower motor ventilation. Not applicable with HV units.
- 3) For flexible ducting connection:
 - A) If mount ring is used, allow 2.00" [5.08cm] for the ring, 1.00" [2.54cm] for duct bend radius and add the diameter of the ducting to get total distance as measured from blower outlet.
 - B) When using a transition box consider that each box is unique to it's application. A general rule is to add 1.00" [2.54cm] to the largest ring diameter used to get size of box (5" min.). Add mount ring and ducting as figured above to get approximate space needed to install transition box. Also note that the universal T-box is 8.00" [20.32cm] tall measured from blower outlet.
- 4) Allow enough room for removal of electric box cover for servicing.

NOTE: The above dimensions are minimums. Enough space should be allocated for installation and serviceability.

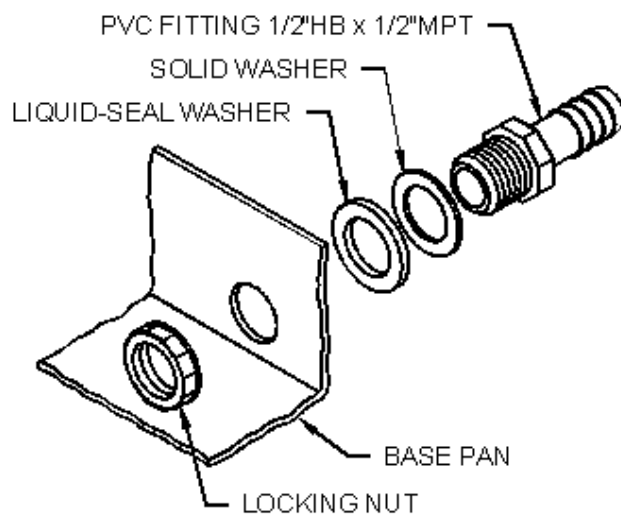


MODEL NUMBER	DIMENSIONS (inches/centimeters)					WEIGHT (lbs/kg)
	H	H*	W	D	M	
VCP/M7K	12.00/30.5	12.25/31.1	18.00/45.7	9.63/24.5	3.25/8.3	48.7/22.0
VCP/M10K	12.25/31.1	13.63/34.6	20.25/51.4	10.63/27.0	4.00/10.2	59.2/26.8
VCP/M12K	13.63/34.6	N/A	20.25/51.4	10.63/27.0	3.75/9.5	62.8/28.5
VCP/M16K	13.63/34.6	N/A	20.25/51.4	12.00/30.5	4.00/10.2	64.7/29.3
VCP/M24K	18.00/45.7	19.25/48.9	24.75/62.9	15.25/38.7	4.50/11.4	120.0/54.4
VCP/M7K-HV	12.00/30.5	12.25/31.1	18.00/45.7	9.63/24.5	1.00/2.5**	48.7/22.0
VCP/M10K-HV	12.25/31.1	13.63/34.6	20.25/51.4	12.00/30.5	1.00/2.5**	59.2/26.8
VCP/M12K-HV	13.63/34.6	N/A	20.25/51.4	12.00/30.5	1.00/2.5**	62.8/28.5
VCP/M16K-HV	13.63/34.6	N/A	20.25/51.4	12.00/30.5	1.00/2.5**	64.7/29.3

*HEIGHT TO TOP OF BLOWER OUTLET, BLOWER MAY BE ROTATED DOWN BELOW EVAP SHROUD 'H'
 **MOTOR IS INSIDE FAN HOUSING ON HIGH VELOCITY (HV) UNITS, HOWEVER, ALLOW 1"/2.5cm FOR BLOWER RING MOUNTING FLANGE AND/OR BLOWER CAPACITOR ON THAT SIDE OF UNIT

ALL DIMENSIONS ARE NOMINAL - VERIFY ALL CRITICAL DIMENSIONS WITH MAS ENGINEERING.

DATE: 9/10/97	ORTHOGRAPHIC PROJECTION VCP/M7-24K (HV) VECTOR COMPACT PASSPORT/MECHANICAL SPACING ALLOWANCES AND DIMENSIONS	
SCALE: 1/8		
STATUS: CURRENT		
DRAWN BY: DKM APPROVED BY: D D		
DRAWING NO: M1020036J		



CONDENSATE DRAINS

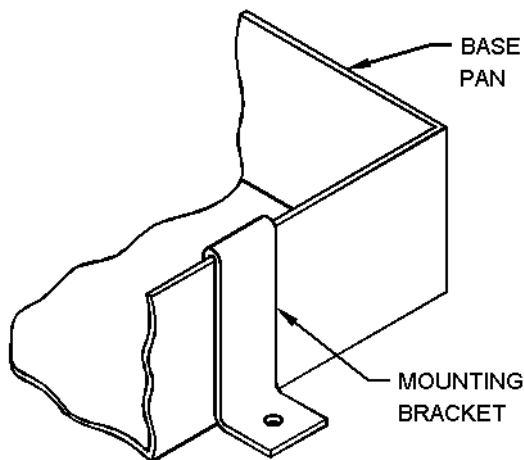
The condensate drain pan is 2" high with two drain locations. During conditions of high humidity, condensate may be produced at a rate of up to two gallons per hour. With this in mind, it is important to route condensate drains downward to a sump pump. Do not route condensate drains to the bilge. After the condensate drain installation is complete, test the installation by pouring a quart of water into the pan and checking for good flow. See note below.

For installation of the condensate drain:

1. Remove the aft facing watertight plug from the base pan of the a/c unit.

2. Slip the solid washer and the liquid-seal washer onto the PVC fitting in that order.
3. Connect the fitting through the exposed hole in the base pan with the locking nut.
4. Securely tighten with two (2) wrenches to provide a proper seal.
5. Attach a 5/8" I.D. reinforced hose to the hose barb and secure with double/reversed stainless steel hose clamps.
6. Install the condensate drain hose downhill from the unit and aft to a sump.
7. Two drain fittings may be used and the hoses teed together provided there is a minimum 2" drop from the bottom of the base pan to the tee connection.

Note: Do not terminate condensate drain line within four (4) feet of any outlet of engine exhaust systems, nor in a compartment housing an engine, unless the drain is connected properly to a sealed condensate or shower sump pump.



MOUNTING BRACKETS

The VECTOR COMPACT unit is supplied with a stainless steel base pan, which also serves as a condensate pan. Mounting clip brackets (4) are provided to secure the base pan onto a flat, horizontal surface.

BLOWER ASSEMBLY

With the VECTOR COMPACT you can achieve multi-directional supply air discharge from a single unit by rotating the blower to the desired location. It is ideal for tight installations, as 130° of rotation are available with which to position the blower. Its advanced design allows the blower to be easily removed for rotating or servicing by releasing a single stainless steel clamp and two (2) mounting ring screws. Rotate the blower to allow the most direct flow of air to the supply air grille.

SUPPLY & RETURN AIR GRILLES

Install the supply air grille as high as possible in a location that will provide uniform air distribution throughout the cabin, grille louvers should be directed upward. The return air grille should be installed as low and close to the a/c unit as possible to insure direct uninterrupted airflow to the evaporator. The return air grille should have a minimum four inches (4") or clearance in front of it, free from any furniture or other obstructions. In no instance should a supply air discharge be directed towards a return air grille, as this will cause the system to short cycle. Allow for adequate clearance behind the supply air grille(s) for the transition box and ducting connection. The following table shows minimum grille sizes. See the MAINTENANCE section of this manual for return air filter cleaning instructions.

DUCTING

Good air flow 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 degree bends (two tight 90 degree bends can reduce airflow by 25%). The following table shows minimum duct diameters and their corresponding supply and return air grille minimum areas in square inches. If a transition box is used, the total area of supply air ducts going out of the box should equal the area of the supply duct feeding the box. To calculate the square inch area of a round duct, multiply the radius by itself (r^2) and multiply that number by 3.1416 (π).

MODEL	7K	10K	12K	16K	24K
DUCT DIA	5" dia	5" dia	6" dia	7" dia	8" dia
DUCT AREA	19.6 sq in	19.6 sq in	28.3 sq in	38.5 sq in	50.3 sq in
R/A GRILLE	88 sq in	98 sq in	140 sq in	168 sq in	280 sq in
S/A GRILLE	40 sq in	50 sq in	70 sq in	84 sq in	140 sq in

The following is a summary of proper ducting connections:

1. Pull back the fiberglass insulation exposing the inner mylar duct hose.
2. Slide the mylar duct hose around the mount ring until it bottoms out.
 1. Screw 3 or 4 stainless steel sheet metal screws through the duct hose into the transition ring. Make sure to catch the wire in the duct hose with the heads of the screws. Do not use band clamps, as the hose will slide off.
 2. Wrap the duct tape around the ducting and ring joint to prevent any air leaks.
5. Pull the insulation back up over the mylar to the ring and tape this joint.

6. Remove excess ducting and use the same connection method at the s/a grille.

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.).

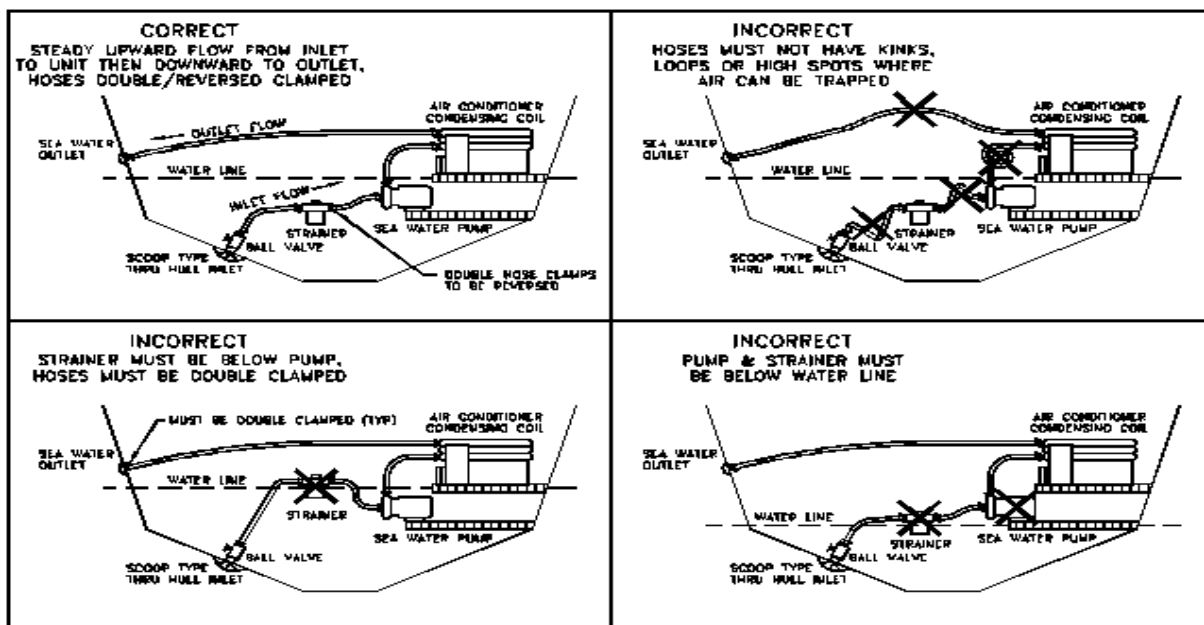
SEA WATER PUMP AND PLUMBING

Sea water temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90°F and heat (if reverse cycle option is installed) in water as low as 40°F. Several guidelines should be followed during the installation of the sea water system. Since 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. The pump may be mounted horizontally or vertically, however the discharge must always be above the inlet. The pump head should be rotated toward the direction of water flow. ***Install the sea water speed scoop intake as far below the water line and as close to the keel as possible in any application, but especially on a sail boat, to keep the intake in the water so that air does not get into the system when the boat heels over.*** The speed scoop intake must face forward and not be shared with any other pump. A sea cock (shut off valve) must be installed directly on the speed scoop outlet. A sea water strainer is mandatory between the sea cock and pump. ***Failure to install a sea water strainer will void the pump warranty.*** The sea water system should be installed with an upward incline from the speed scoop & sea cock, through the strainer, to the inlet of the pump and then up to the inlet of the a/c unit's condenser coil. The discharge from the a/c unit should then run to the sea water outlet through hull fitting which should be located where it can be visually checked for water flow, and as close as practicable to the waterline to reduce noise. Use only reinforced marine grade hose. All hose connections shall use double/reversed stainless steel hose clamps.

The following is a summary of the sea water system installation:

1. Install the speed 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 sea cock on the speed scoop thru-hull inlet.
3. Install a sea water strainer below the level of the pump with access to filter.
4. Mount the pump at least one foot below the waterline and above the strainer.
5. Connect the sea cock, strainer and pump with an uphill run of e" reinforced marine grade hose.
6. Connect the discharge from the pump uphill to the bottom inlet of the a/c unit's condenser coil.
7. Avoid loops, vertical bends (high spots) or the use of 90° elbows with sea water hose.
8. Double clamp all hose connections with stainless steel clamps, reversing the clamps.
9. Use teflon tape on all threaded connections.
10. Connect all metallic parts in contact with sea water to the vessel's bonding system including

the speed scoop inlet, strainer, pump and the air conditioner.



ELECTRICAL CONNECTIONS, GROUNDING AND BONDING

All a/c units have a terminal strip mounted inside the electric box. The terminal strip is labeled for proper connections of the electrical supply, ground wires and pump circuits. A wiring diagram is provided in this manual. The correct size circuit breaker should be used to protect the system as specified on the a/c unit's data plate label. A minimum of 12 AWG boat cable should be used to supply power to the a/c unit and the sea water pump. All connections shall be made with ring or fork terminals. **Turn off a/c power supply circuit breaker before opening electric box.**

Each a/c unit installed requires its own dedicated circuit breaker. If there is only one a/c unit installed, the sea water pump does not require a circuit breaker, the wiring from the sea water pump is connected to the terminal strip in the electric box. If two or more a/c units use the same sea water pump, the pump wires will be connected to a pump relay panel (PRP) which in turn has its own dedicated circuit breaker sized for the pump (20 amp max). Please see the wiring diagram furnished with the PRP (NOTE: PRP triac must have mounting screw installed in order to dissipate heat). Electrical connections in the bilge and/or below the waterline should use heat shrink type butt splices.

Field wiring must comply with ABYC electrical codes. Power to the unit must be within the operating voltage range indicated on the data plate. Properly sized fuses or HACR circuit breakers must be installed for branch circuit protection. See data plate for maximum fuse/circuit breaker size (mfs) and minimum circuit ampacity (mca). All units must be effectively grounded to minimize the hazard of electrical shock and personal injury. The following are to be observed:

1. AC (alternating current) grounding (green wire) must be provided with the AC power conductors and connected to the ground terminal (marked A) at the AC power input terminal block of the unit(s), per ABYC standard E-8, or equivalent.
2. Connections between the vessel's AC system grounding conductor (green wire) and the vessel's DC (Direct Current) negative or bonding system should be made as part of the vessel's wiring, per ABYC standard E-9, or equivalent.
3. When servicing or replacing existing equipment that contains a chassis-mounted Aground@ stud, the service person or installer must check the vessel's wiring for the existence of the connection required in item 2 above.

ABYC standards are available from: American Boat and Yacht Council

Telephone: (410) 956-1050

The a/c unit must be connected to the ship's bonding system to prevent corrosion due to stray electrical current or voltage. All pumps, metallic valves and fittings in the sea water circuit that are isolated from the a/c unit by PVC or rubber hoses must be individually bonded to the vessels bonding system also. This will help eliminate any possibility of corrosion due to stray current or voltage.

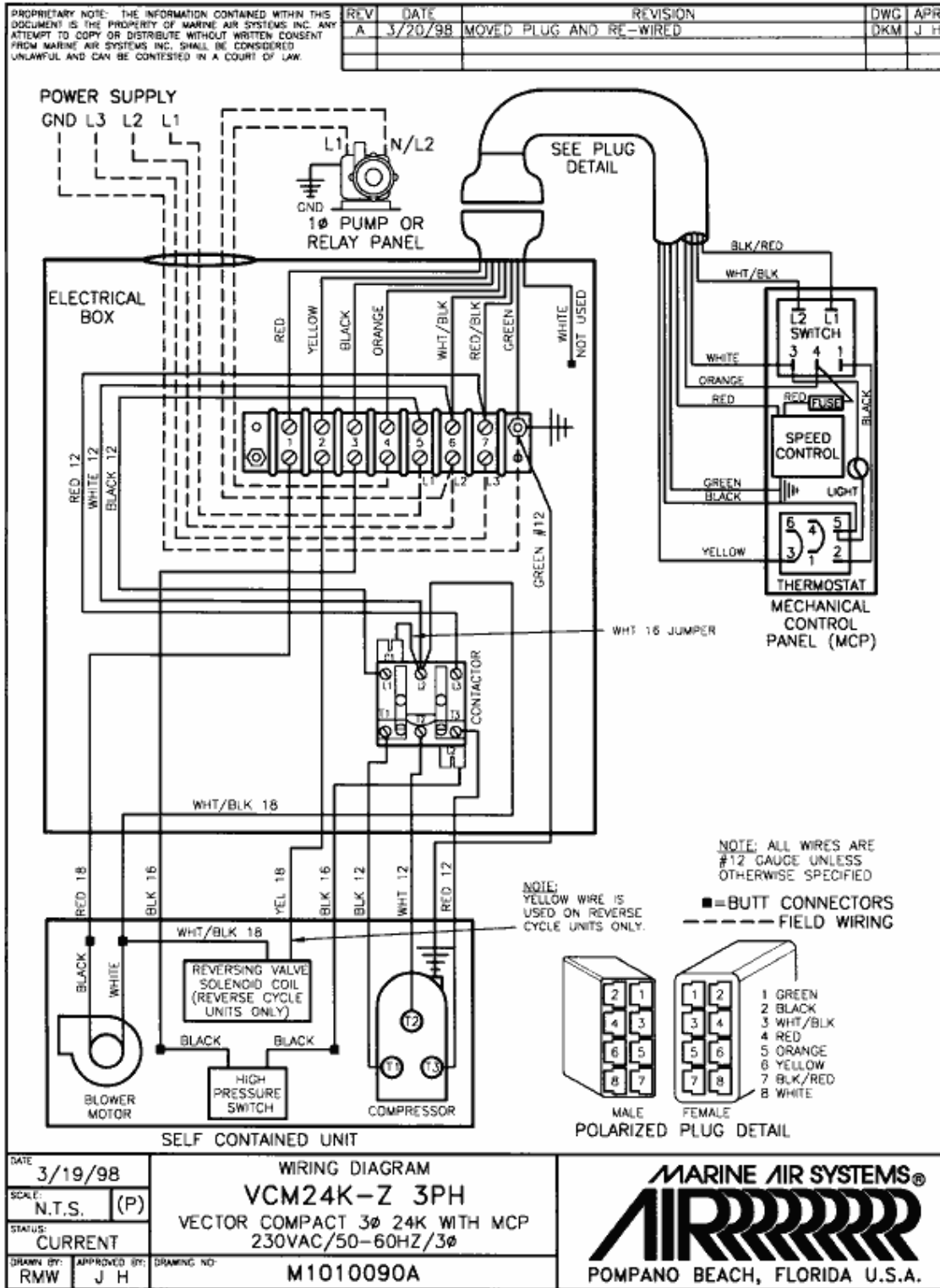
FAILURE TO PROPERLY GROUND AND BOND THE SYSTEM WILL VOID WARRANTY!

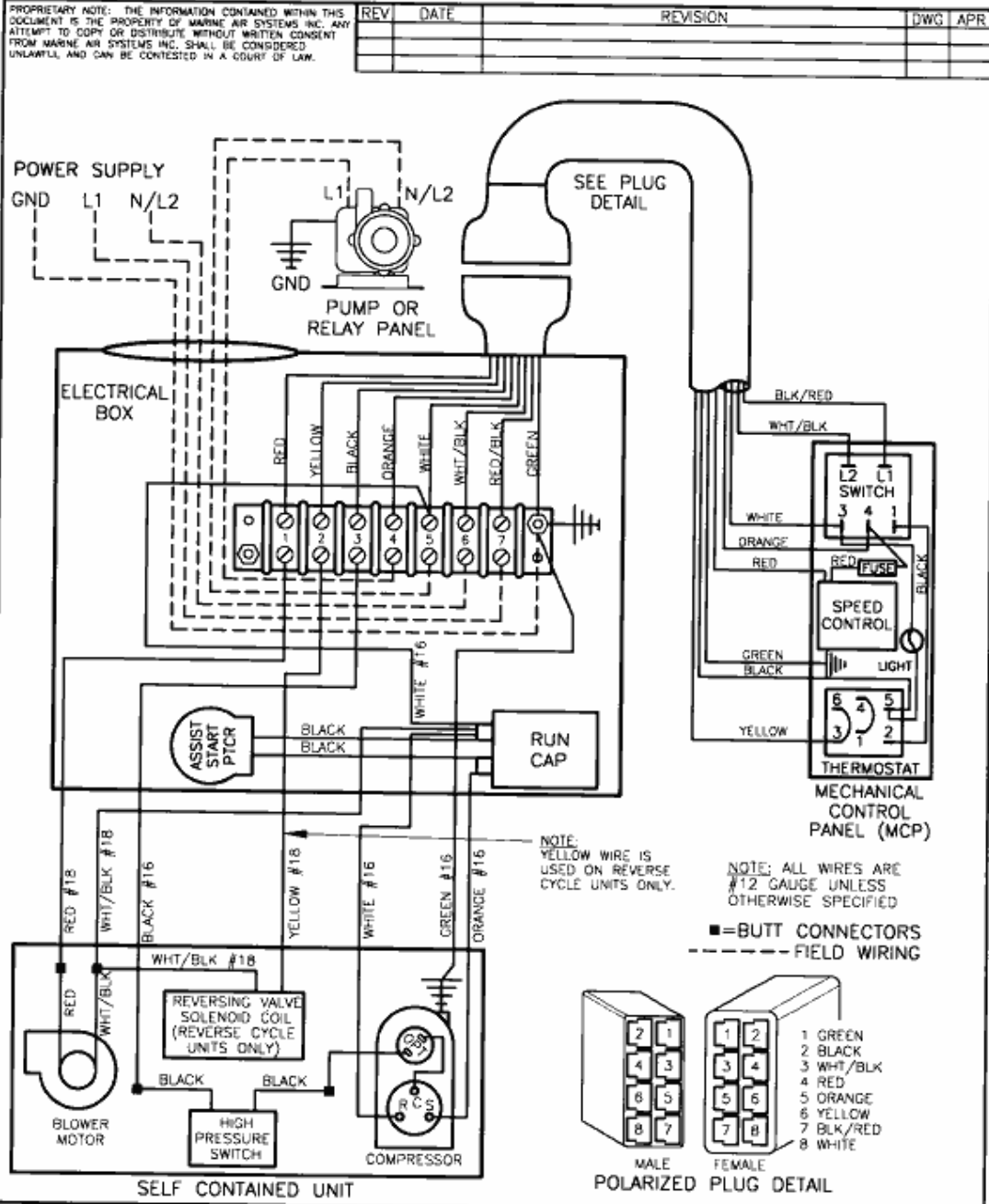
3 PHASE NOTICE

It is extremely important to insure that wiring and phase sequencing of a three phase power source is correct. Marine wiring standards call for power source phases L1, L2, and L3 to be color-coded BLACK, WHITE, and RED, respectively. These must be connected to the unit with the proper sequence, otherwise, it will not operate properly. If the wiring sequence is incorrect, the unit's compressor (*Scroll* type only) and pump (if applicable) will run in the reverse direction at a significantly

increased noise level.

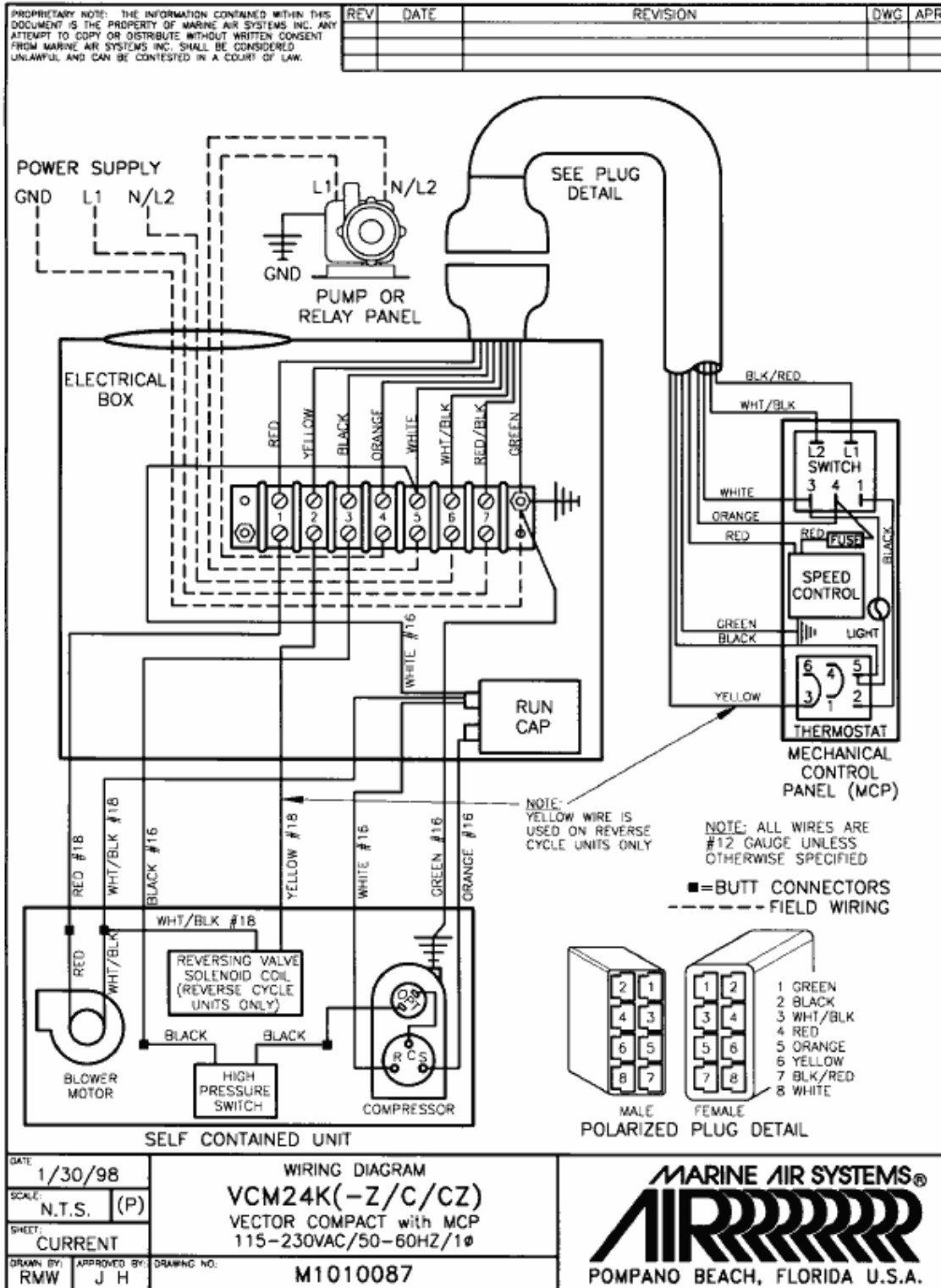
Vector Compact Mechanical Wiring Diagrams





DATE:	1/19/98	WIRING DIAGRAM
SCALE:	N.T.S. (P)	VCM7-16K(-Z/C/CZ)
SHEET:	CURRENT	VECTOR COMPACT with MCP 115-230VAC/50-60HZ/1Ø
DRAWN BY:	APPROVED BY:	DRAWING NO: M1010086
RMW	J H	





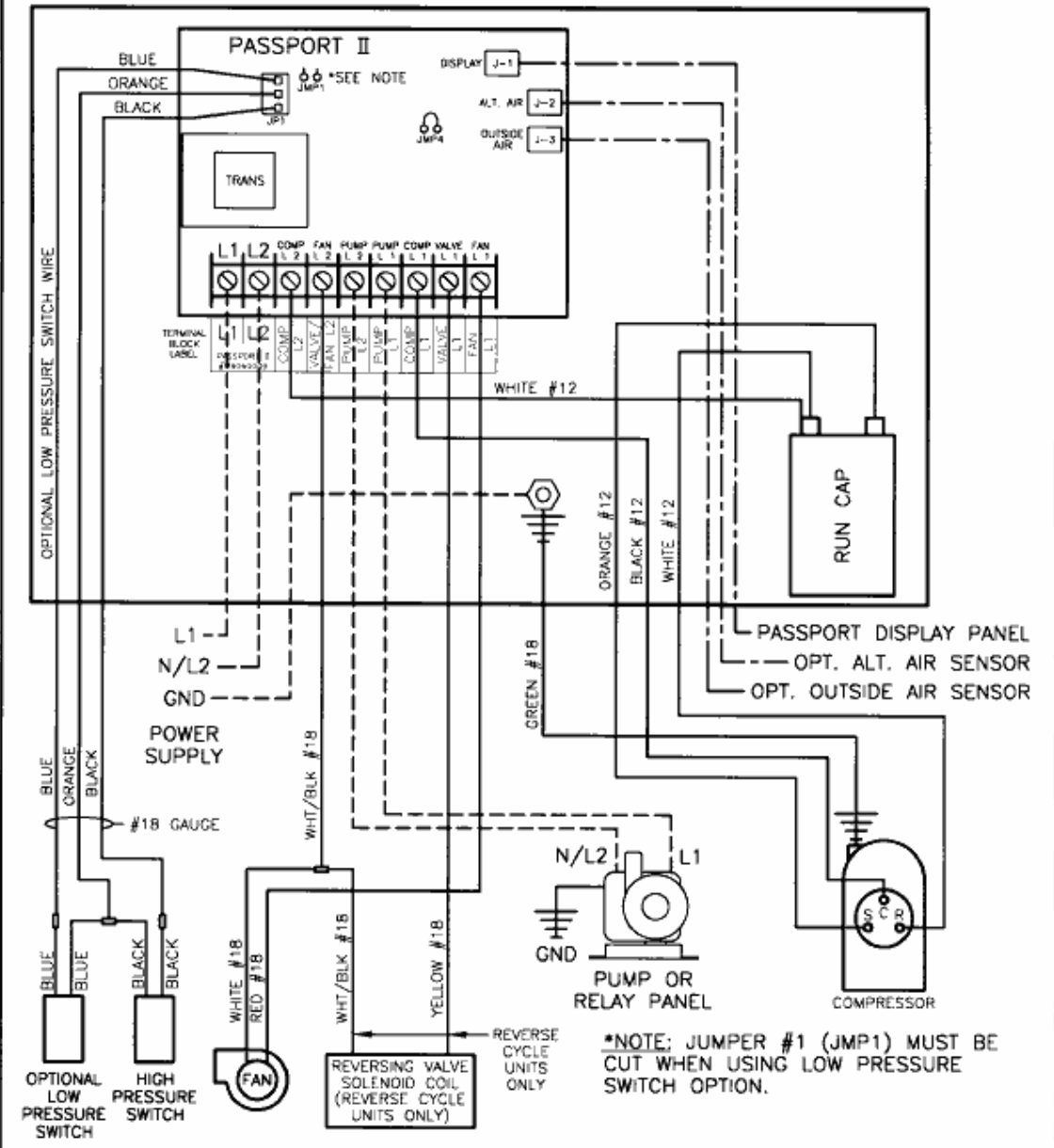
Vector Compact Passport Wiring Diagrams

PROPRIETARY NOTE: THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE PROPERTY OF MARINE AIR SYSTEMS INC. ANY ATTEMPT TO COPY OR DISTRIBUTE WITHOUT WRITTEN CONSENT FROM MARINE AIR SYSTEMS INC. SHALL BE CONSIDERED UNLAWFUL AND CAN BE CONTESTED IN A COURT OF LAW.

REV	DATE	REVISION	DWG	APR
A	11/26/97	ADDED VCP TO TITLE BLOCK	DKM	C D

REFERENCE DWG(S) M1010042 & M4060009 FOR TERMINAL BLOCK LABEL

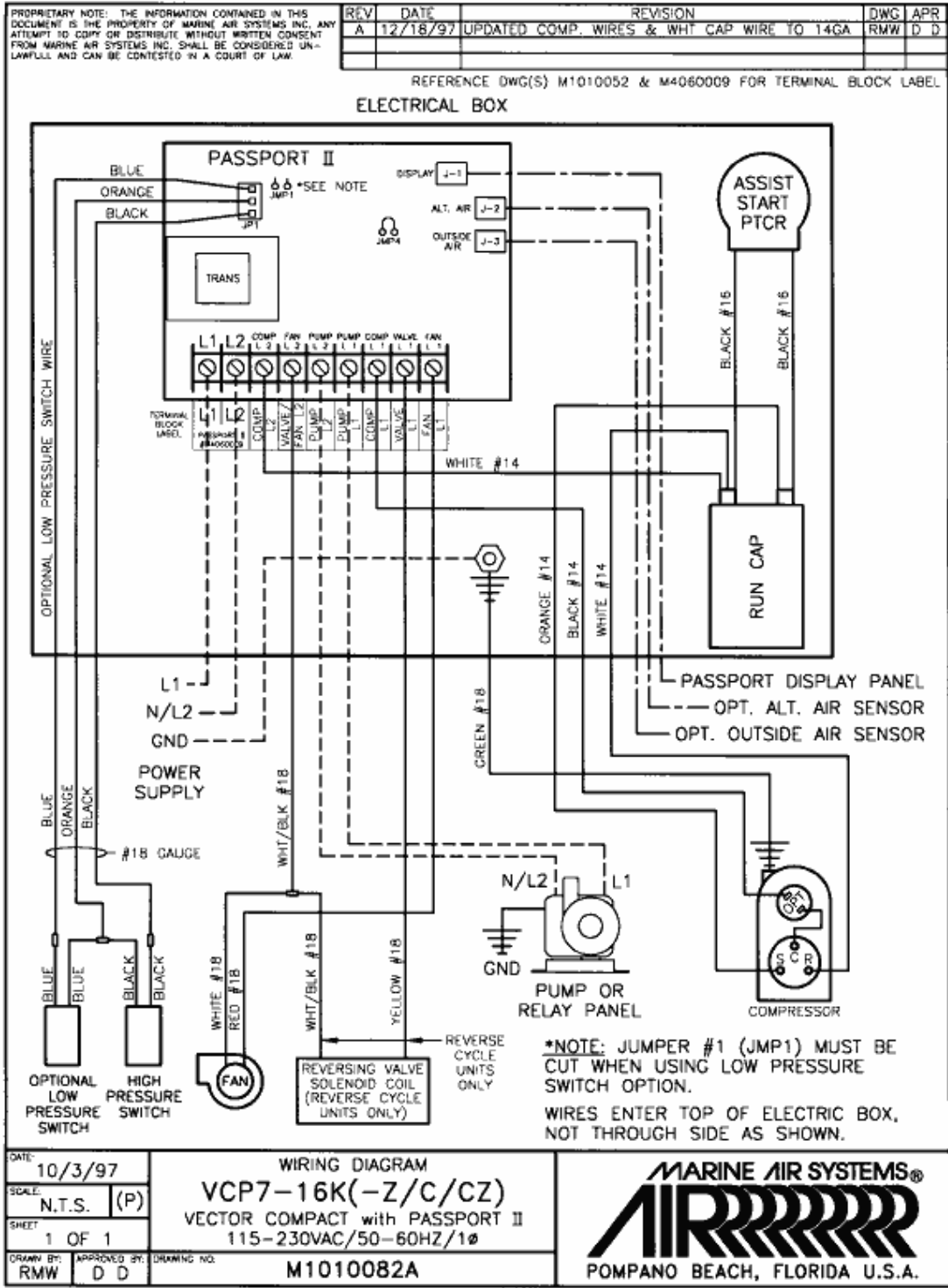
ELECTRICAL BOX



DATE:	6/5/97
SCALE:	N.T.S. (P)
SHEET:	1 OF 1
DRAWN BY:	RMW
APPROVED BY:	C D

WIRING DIAGRAM
VCP/VHP24K(-Z/C/CZ)
 VECTOR W/SCROLL COMP & PASSPORT II
 230-220VAC/50-60HZ/1Ø
 DRAWING NO: **M1010074A**





DATE:	10/3/97
SCALE:	N.T.S. (P)
SHEET:	1 OF 1
DRAWN BY:	RMW
APPROVED BY:	D D
DRAWING NO.:	M1010082A

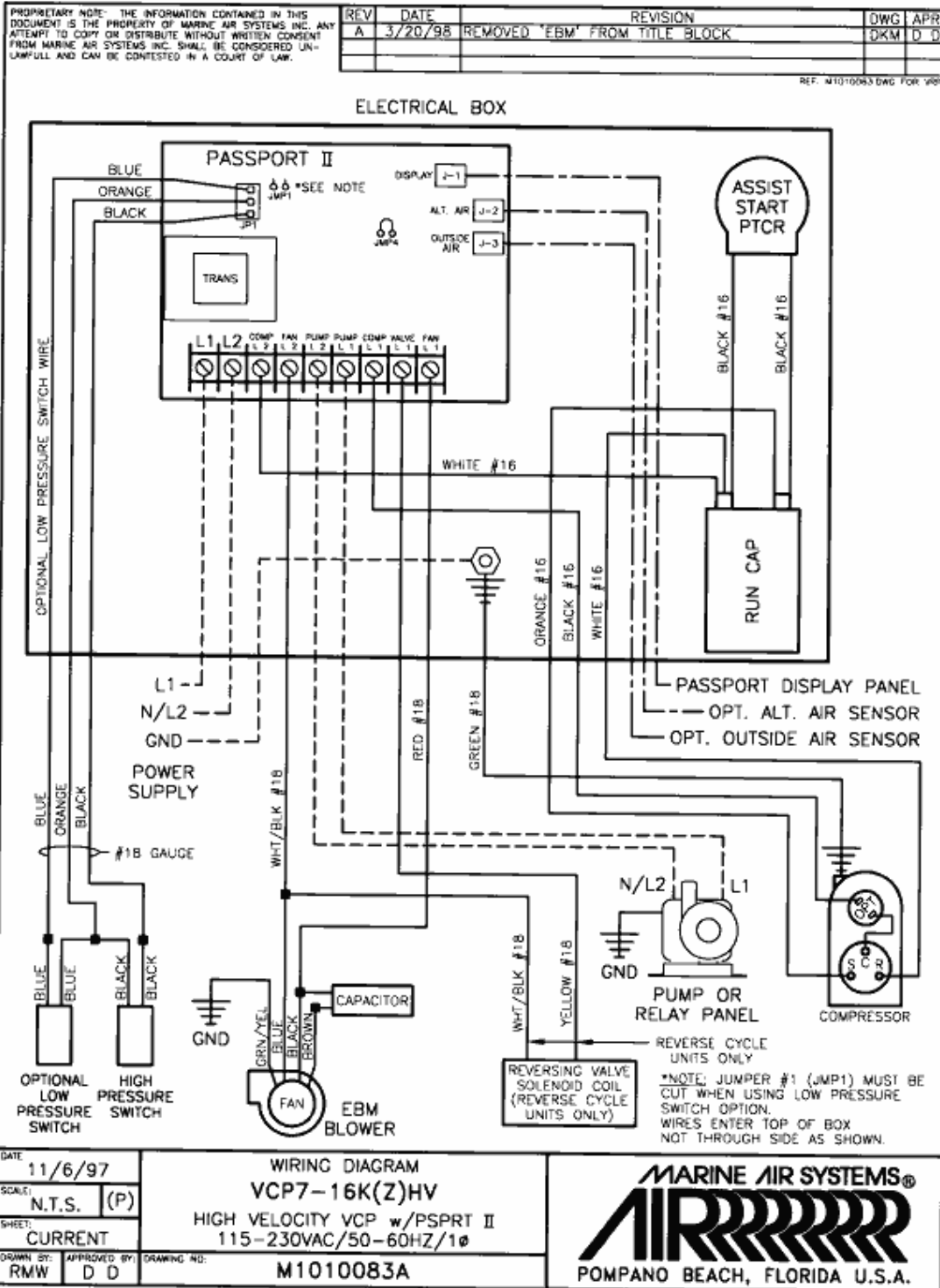
WIRING DIAGRAM

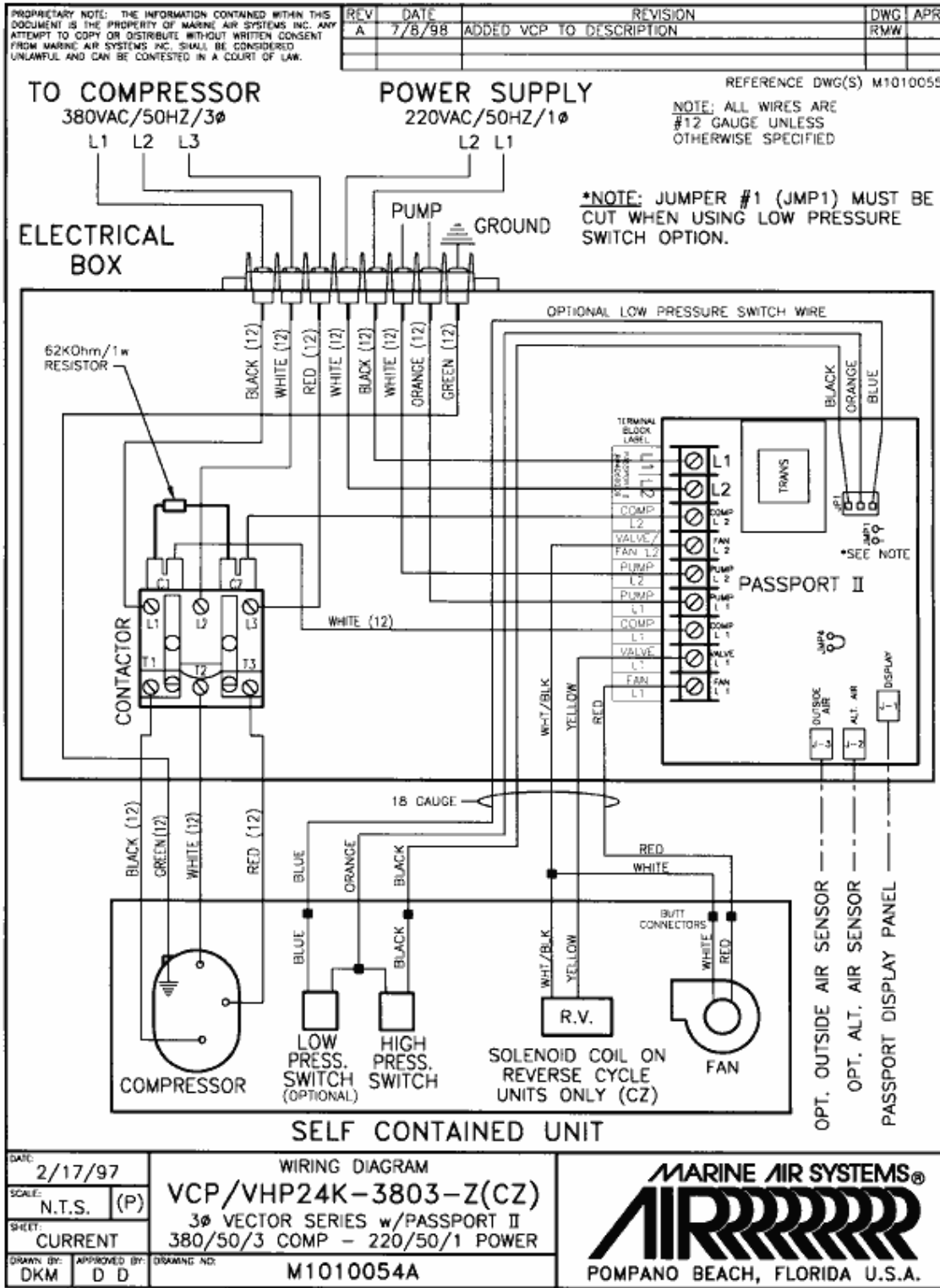
VCP7-16K(-Z/C/CZ)

VECTOR COMPACT with PASSPORT II

115-230VAC/50-60HZ/1Ø



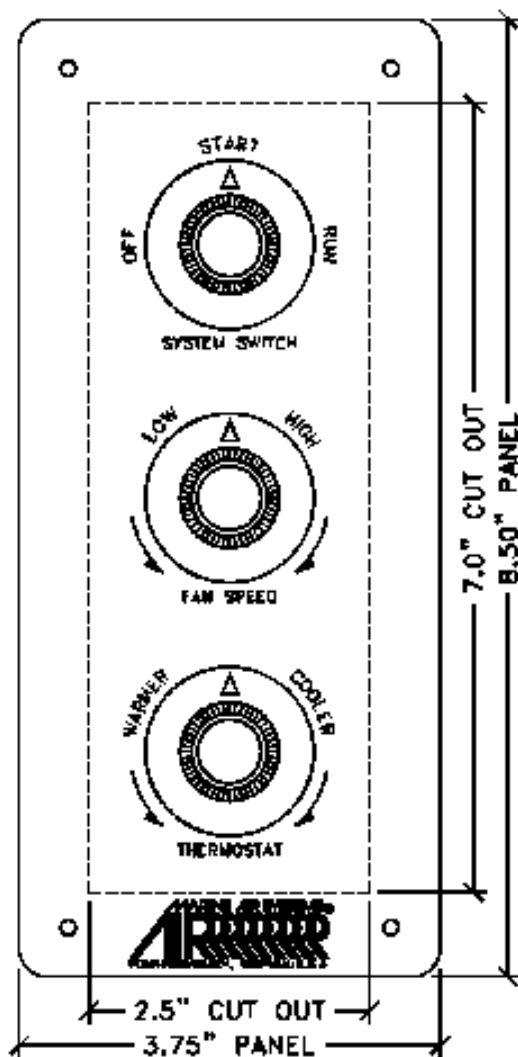




MANUAL CONTROL PANEL (MCP) INSTALLATION

The MCP should be located within cap tube length of the a/c unit. The 3 knob MCP is configured either vertically (shown) or horizontally. The cut out size is 2.5" by 7.0", see MCP for orientation. Once the cut out is made, carefully uncoil the copper cap tube with return air sensor (copper bulb) and route the control wires and cap tube through the hole and back to the a/c unit **using caution not to kink the cap tube**. Mount the return air sensor into the clips provided on the evaporator coil. If the return air sensor cannot be mounted on the evaporator coil, mount it behind the return air grille. The sensor must be mounted in

the return air stream. Make electrical connections according to the wiring diagram found in the electric box and/or in the operations manual.



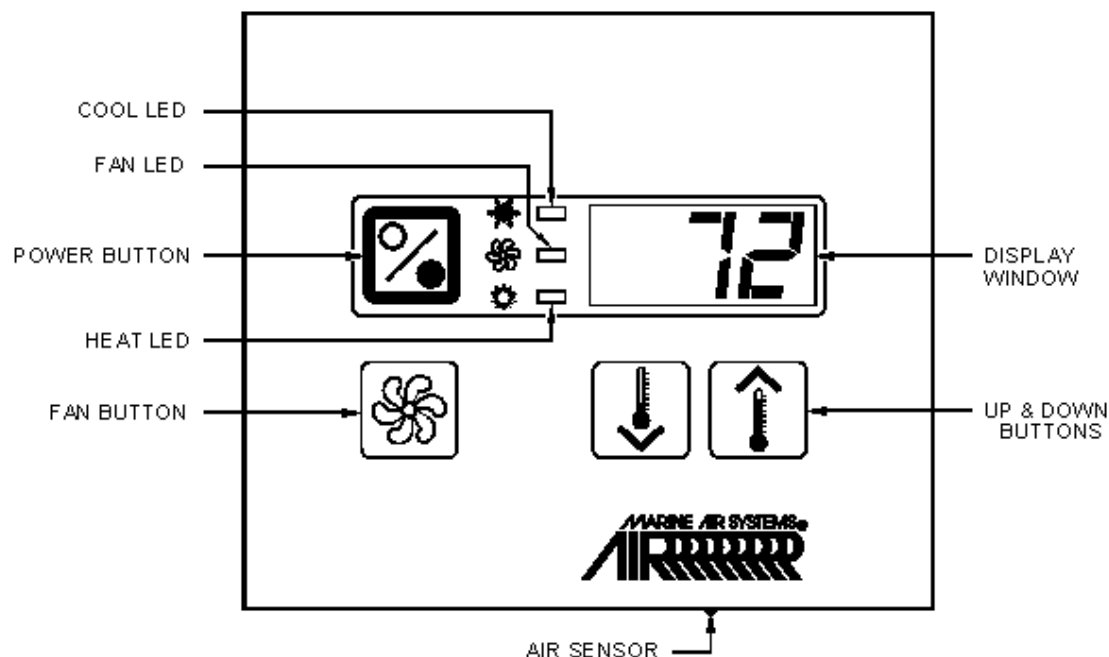
MCP OPERATION

- 1) Ensure sea water intake ball valve (sea cock) is open.
- 2) Turn SYSTEM SWITCH control knob to OFF.
- 3) Turn on AC circuit breaker. If the sea water pump has its own circuit breaker, turn that on too.
- 4) Turn the SYSTEM SWITCH control knob to START; this energizes the fan and sea water pump. Turn THERMOSTAT control knob to the coolest position by rotating fully clockwise. If system has reverse cycle, turn knob counter-clockwise for heat.
- 5) Check for a steady solid stream of sea water from the overboard discharge.
- 6) Turn FAN SPEED control knob clockwise to highest setting.
- 7) Verify that the fan is running and that there is steady airflow out of the supply air grille.
- 8) Turn the SYSTEM SWITCH to RUN; this will start the compressor. The indicator light on the control will illuminate.

9) To set the thermostat, allow sufficient time for the unit to cool/heat the area to the desired temperature. When the area is sufficiently cooled/heated, turn the thermostat knob slowly toward the center position until it clicks once (the indicator light will turn off). The thermostat is now set to maintain a constant temperature. While heating, if the ambient temperature is less than 50°F, set the FAN SPEED control knob to low for five to ten minutes until the unit begins to heat well, then increase the fan speed for more heat output.

The thermostat on the MCP control panel serves to cycle the compressor on and off and provide an automatic changeover from cooling to heating (reverse cycle only) with a 3.58 differential. Rotating the thermostat to the left after it has been set for cooling will cause the unit to heat. If you rotate the thermostat to the right, the unit will cool. If the thermostat is left stationary after being set, the unit will cycle from cooling to neutral, or heating to neutral depending on the requirement.

Note: Do not turn the unit off and immediately turn it back on. Wait at least 30 seconds.



PASSPORT II DISPLAY PANEL INSTALLATION

Before mounting the Passport II digital display panel touch pad, consider the location. The air sensor built into the display panel

will provide excellent room air temperature sensing given a proper installation. The display panel should be mounted on an inside wall, slightly higher than mid-height of the cabin, in a location with freely circulating air where it can best sense average temperature. The cut out size for the display panel is 3d" wide by 2:" high. Do not mount the display in direct sunlight, near any heat producing appliances or in a bulkhead where temperatures radiating from behind the panel may effect performance. **Do not mount the display in the supply air stream.** Do not mount the display above or below a supply or return air grille. Do not mount the display behind a door, in a corner, under a stairwell or any place where there is no freely circulating air. Mount the display within display cable length (custom lengths available) of the air conditioner. Plug the display cable (159/4.6m standard length with 8-pin connector) into the circuit board in the electric box and into the back of the display panel. Secure the display panel to a bulkhead with the adhesive strips provided. Clean the mounting surface with *isopropyl alcohol only* prior to placement (test alcohol on hidden portion of surface first). If the adhesive strips cannot be used, use #6 truss head screws to mount the display. The panel has predrilled holes in each corner that can be accessed by peeling back the adhesive strips. **Carefully & slowly drill 5/32" holes through the front of the lexan cover lining up with the predrilled holes in back. Do not use a screw gun and do not over-tighten screws when mounting panel.** Over-tightening screws will damage the lexan cover.

If a proper location for room temperature sensing cannot be found for the display, an optional remote air sensor may be used. Mount the remote air sensor in the return air stream behind the return air grille/opening and plug its cable (79/2.1m standard length with 6-pin connector) into socket #J2 on the circuit board (socket nearest the corner of the board). Installing the remote air sensor will override the face plate sensor. An optional outside air temperature (O.A.T.) sensor and cable may also be used. Plug the O.A.T. cable into the 6-pin socket #J3. Mount the sensor outside but not in direct sunlight. Air sensor cables are available in various lengths. Do not staple any cables when mounting.

INSTALLATION CHECKLIST (review prior to installation)

Sea Water cooling system:

Speed scoop located as far below the water line and as close to the keel as possible

Shut off valve and speed scoop properly sealed and tight

Sea water pump at least one foot below water line and securely mounted

Strainer mounted below pump with access to filter

Double/reversed stainless steel hose clamps on all hose connections

Teflon tape on all threaded connections

Hose runs uphill from speed scoop and sea cock to strainer, pump and a/c unit, then

downhill from a/c unit to overboard discharge

Water flowing freely from overboard discharge while pump is running

Pump relay panel, if used, must have its own circuit breaker sized for the pump (20 amp max)

Mounting

Not in engine room or bilge areas, must be sealed away from exhaust or fumes

Proper spacing allowed around unit

Attached to solid level platform with hold down clips provided

Condensate drain routed aft and down hill to a sealed sump (not bilge)

Blower rotated toward supply air grille

Electrical

All butt connections on pump wire tightly crimped and heat shrunk

AC power source installed and grounded/bonded in accordance with ABYC standards

Control wires connected to terminal strip with fork terminals

Circuit breakers sized according to specifications on the data plate label

Passport II display cable is connected at both ends

Pump relay panel, if used, must have its own circuit breaker sized for the pump (20 amps max)

Grilles and Ducting

Supply air grille mounted as high as possible

Return air grille mounted as low and as close to the a/c unit as possible

Return air grille mounted away from bilge vapors or exhaust fumes

Ducting is pulled taut, straight, smooth and properly connected with no excess

OPERATIONS

QUICK START OPERATIONS CHECKLIST

Ensure sea water intake ball valve (sea cock) is open.

Turn on the A/C circuit breaker. If the sea water pump has its own circuit breaker, turn that on.

Turn the system on.

Set the desired cabin temperature (set point).

Check for a steady solid stream of water from the overboard discharge.

Verify that there is steady airflow out of the supply air grille.

If the unit does not appear to be operating properly, refer to troubleshooting guidelines.

Note: Do not turn the unit off and immediately turn it back on. Allow at least 30 seconds for refrigerant pressure equalization.

PASSPORT II CONTROL

POWER BUTTON:

Press and release to turn unit on and off.

NOTE: To "press and release" a button, press and hold for one second and then release.

FAN BUTTON:

Press and hold until the letter "A" appears for automatic fan speed or the numbers "1" (slow) through "6" (fast) appear for manual fan speed. Fan may be used while a/c is off.

UP & DOWN BUTTONS:

Press and hold either button until desired temperature (set point) is displayed. Press either button momentarily to show current set point. Range = 60.8-85.8F.

COOL LED:

Lights when the compressor is running in cool mode or in automatic mode while cooling.

FAN LED:

Lights when fan is on in manual mode.

HEAT LED:

Lights when the compressor is running in heat mode, in automatic mode while heating or if optional electric heat is installed and operating.

DISPLAY WINDOW:

Shows current cabin temperature. It can also show outside air temperature if the optional O.A.T. sensor is installed. Also used in viewing and setting program parameters.

AIR SENSOR:

Cabin temperature is detected by the face plate air sensor, located in the bottom edge of the display. A remote air sensor can be installed if needed. Installing the remote air sensor will normally override the face plate sensor, but it is possible to utilize both sensors alternately (see program U 8).

BLANK DISPLAY FOR NIGHTTIME OPERATION:

Press the FAN and DOWN buttons simultaneously to blank the display for nighttime operation. The appropriate LEDs will remain lit during cooling and heating. When the desired temperature has been achieved, the middle segment of the display window will remain lit to indicate that the system is on. Press any button to return to normal display mode.

OUTSIDE AIR TEMPERATURE: When the optional outside air sensor is installed, press the UP and DOWN buttons simultaneously to display the outside air temperature. The outside air sensor should not be mounted in direct sunlight.

MODES OF OPERATION

COOL ONLY MODE:

When the Passport II is configured for cool only mode, only cooling systems will be operated as required. When the temperature drops below the set point the system will not automatically switch into the heating mode.

HEAT ONLY MODE:

When the controller is programmed for heating mode, only the heating system will be selected for operation as required. Should the temperature rise above the set point the system will not switch to the cooling mode automatically.

AUTOMATIC MODE:

When the controller is configured for the automatic mode, both heating and cooling will be supplied as required. The heat and cool LED indicators will light according to which mode is operating. Temperature differential in a given mode will be maintained at 28 F, however, a 48F difference is required to allow the control to change modes.

HUMIDITY MODE:

While the system is on, press the POWER and the DOWN buttons simultaneously to enter the humidity or moisture control mode. The characters "HU-1" will appear in the temperature display. Every four hours, the fan is started and air is circulated for thirty minutes. During this time the air temperature is sampled and entered into memory. The cooling cycle is then started and continues until the temperature is lowered 28F. The compressor is allowed a maximum of one hour running time to reach the desired temperature. Four hours after the temperature is satisfied or the compressor times out, the cycle is repeated. During the cycle, the cool LED will be lit when the compressor is running. Humidity mode is provided to maintain a specific temperature and humidity range when the vessel is unoccupied for extended periods of time.

AUTOMATIC FAN MODE:

Press and hold the FAN button until the letter "A" appears in the display window. Automatic fan mode allows the control to determine fan speeds based on the room temperature. The closer the room temperature is to the set point, the slower the fan will run. This permits a balance between the most efficient temperature control and the slowest (quietest) fan speed. The fan LED will not be lit during automatic fan mode.

MANUAL FAN MODE:

Press and hold the FAN button during normal operation to select one of the six manual fan speeds available. Six (6) is the highest and one (1) represents the lowest speed available. When a manual fan speed has been selected the fan LED will be lit.

NOTE: High and low fan speeds can be further tailored to suit the user by adjusting the fan limits. See programming modes "U 2" and "U 3".

CIRCULATION MODE (FAN ONLY):

With the system off, press and hold the FAN button until the desired fan speed is indicated by the numbers "1" (slow) through "6" (fast). To turn the fan off press and hold the FAN button until the number "0" appears in the display window.

PROGRAMMING THE PASSPORT II

The program mode is used to adjust operating parameters to tailor the system for efficient operation and to allow for user flexibility. Installation variables such as ducting, sensor location and system layout effect the operation of the overall system. Custom programming allows the system to operate as efficiently as possible in any given installation.

NOTE: When using the POWER button in conjunction with another button, i.e. pressing the POWER and DOWN buttons simultaneously to unlock the program mode, try to press the other button a split second before the power button so as not to turn the unit on or off accidentally.

TO ENTER PROGRAM MODE: With the system off, press and hold the POWER button for five seconds until the letter "U" appears in the display window. Release the button and the first parameter setting appears followed by "U 1".

TO UNLOCK PROGRAM MODE: After entering the program mode, simultaneously press and release the POWER and DOWN buttons.

TO SELECT PROGRAM PARAMETER: Press and hold the FAN button to scroll through the parameters indicated by the program number. Programs are described in the following table.

TO CHANGE THE PROGRAM PARAMETER: Use the UP and DOWN buttons to select data or set the desired limits. The range of parameter settings is listed in the following table.

TO RESET DEFAULT SETTINGS: With the system off, press and hold the POWER button for ten seconds until the software version number (A##) appears in the display window.

TO LOCK NEW DEFAULT SETTINGS: Once the desired program changes have been made and before exiting the program mode, simultaneously press and release the UP and DOWN buttons. Locking new defaults will render the factory defaults obsolete. Make note of the new defaults in the following chart for future reference.

TO EXIT PROGRAM MODE: Press the POWER button or press no button for sixty seconds. The software version number is displayed for one second prior to exiting the program mode.

PROGRAMMABLE PARAMETERS:

Program Number	Description	Default Setting	New** Default	Range

U 1	Operating Mode	0 or 1*		0 = Automatic Mode 1 = Cool Only Mode 2 = Heat Only Mode
U 2	High Fan Speed Limit	85		56 – 85
U 3	Low Fan Speed Limit	50		30 – 55
U 4	Compressor Staging Time Delay	15 or 135*		5 – 135 Seconds
U 5	Temperature Calibration	0		± 10° F
U 6	Compressor Fail-Safe Protection HHH = high freon pressure PPP = low freon pressure (option)	3		0 = Fail Safe Protection OFF 1 = Continuous Restarts, No Display 2 = Continuous Restarts, With Display 3 = 3 Failures w/Display, Reset Required
U 7	Fahrenheit or Celsius Temperature Display	0		0 = ° F 1 = ° C
U 8	Use Alternate Air Sensor And/or Face Plate Air Sensor	0		0 = Alternate Sensor Override 1 = Toggle Between Both Sensors
U 9	Reversed Fan Speeds During Heating	1		0 = Fan speed decreases as set point is approached. 1 = Reversed Fan Speeds
U10	Continuous Fan Operation or Cycle Fan with Compressor	1		0 = Cycle Fan with Compressor 1 = Continuous Fan Operation
U11	Reverse Cycle or Electric Heat Option Installed	0		0 = Reverse Cycle Heat 1 = Electric Heat (see page 16)
U12	Fan Motor Type Selection	Set at Factory		0 = Shaded Pole Fan Motor 1 = Split Capacitor Fan Motor
U15	De-Icing Cycle	0		0 = Off, 1 = One Minute 2 = Two Minutes, 3 = Three Minutes

* Specific default settings for cool only a/c units (no heat option installed) should not be changed.

** Default parameter settings may be reprogrammed by user, enter new default settings in this column.

U 1 OPERATING MODE: The operating mode is used to select heating, cooling, or automatic modes. Zero (0) selects automatic mode, one (1) selects cooling mode and two (2) selects heating mode. Systems that do not have heating capabilities should be programmed for cooling mode (1). The factory default is zero (0) for automatic mode (or one (1) for cool only mode if a/c unit has no heat option installed).

U 2 HIGH FAN SPEED LIMIT: The high fan speed limit can be tailored to suit various motors and operating conditions. The range of values is 56 through 85 in arbitrary units. The factory default is 85.

U 3 LOW FAN SPEED LIMIT: The low fan speed limit determines the lowest output allowed for the low fan speed. The range of values is 30 through 55 in arbitrary units. The factory default is 50.

Both the high and low fan limits may be adjusted as follows: While the system is off, start the fan by pressing and holding the FAN button until the number "1" appears in the display. Enter the program mode while the fan is running and select "U2" or "U3". Raising and lowering the fan limits while the fan is running allows the programmer to experience fan speed changes as they are made. Once the high and low fan speed limits are set, the system will automatically reprogram itself to produce six equally spaced fan speeds between them.

U 4 COMPRESSOR STAGING TIME DELAY: The compressor staging time delay is provided for use where more than one a/c system is being operated from the same power source. Setting the staging delays at different intervals allows for only one compressor to start at a time to lessen the amperage load on the power source. The minimum delay is five (5) seconds and the maximum is one hundred thirty five (135) seconds. The factory default setting is fifteen (15) seconds (or one hundred thirty five (135) seconds if a/c unit is cool only).

U 5 TEMPERATURE CALIBRATION: Use this feature to calibrate the air sensor within a range of "108 F. The factory default is 08 .

U 6 COMPRESSOR FAIL-SAFE PROTECTION: This feature is provided to monitor the refrigerant circuit. When a high head pressure condition occurs the display will flash "HHH", when the refrigerant system is low on pressure "PPP" will flash only if the optional low pressure switch is installed. This display indicates that the system requires maintenance. See the TROUBLESHOOTING GUIDELINES in this manual. The four parameter settings are:

Zero (0): Turns off all protection, no action is taken and no message displayed.

One (1): No message displayed with 90 seconds between continuous restarts.

Two (2): Message displayed with 90 seconds between continuous restarts.

Three (3): Message displayed with three 90 second restarts, manual reset is required.

The factory default is three (3).

U 7 FAHRENHEIT OR CELSIUS TEMPERATURE DISPLAY: The PASSPORT II can display temperature in either degrees Fahrenheit (8 F) or degrees Celsius (8 C). Setting to zero (0) displays 8 F and setting to one (1) displays 8 C. The factory default is zero (0).

U 8 ALTERNATE AIR SENSOR OPERATION: Installing an alternate remote air sensor will override the face plate (digital

display panel touch pad) air sensor unless this program parameter is set to one (1). This program is utilized only if the a/c unit is used to supply air to two different locations, i.e., salon and aft cabin, and if it is desired to control the temperature from either of these locations at different times of the day, i.e., day and night. The remote air sensor should be installed in the return air stream behind the return air grille. In this case, the display panel would be in a different room than the a/c unit. If the a/c unit and display panel are in the same room, mount the remote air sensor in the other room using the same guide lines for locating the display panel as stated in "Passport II Display Panel Installation" in this manual. To activate program, set parameter to one (1). To toggle from sensor to sensor, simultaneously press the fan and up buttons while a/c unit is on. When the alternate air sensor is operating, the letter "A" will appear in the display window while viewing the set point. To view set point press either up or down button. The factory default is zero (0).

U 9 REVERSED FAN SPEEDS DURING HEATING: During normal operation in the cooling mode with the fan speed set to "A" (automatic), the fan speed is reduced as the set point temperature is approached. During heating, this is not always the preferred method of operation. When this parameter is set to one (1), the fan speed will increase as the set point is approached during heating. This will reduce head pressure by increasing air flow across the coil as the set point is approached. As the ambient cabin temperature rises, the fan speed will slow which will increase head pressure making the air seem warmer. Setting the parameter to zero (0) will cause the fan speed to decrease as the set point is approached during heating, as it does in the cooling mode. The factory default is one (1).

U10 CONTINUOUS FAN OPERATION OR CYCLE FAN WITH COMPRESSOR: The fan can be programmed to run continuously while the system is on, or can be allowed to cycle with the compressor. When cycled with the compressor, the fan will only operate when cooling or reverse cycle heating is called for. To cycle the fan with the compressor, select zero (0). To operate the fan continuously, select one (1). The factory default is one (1).

U11 REVERSE CYCLE OR ELECTRIC HEAT: Units not equipped with reverse cycle heating, or reverse cycle units operating in sea water temperatures below 408 F, may need to have electric heaters added. **IMPORTANT:** the Passport II circuit board reversing valve output is used to control the optional electric heater. The valve output relay can only carry 6 amps, therefore, a heavy-duty contactor must be installed to carry the electric heater current. Select one (1) for the electric heat option, select zero (0) for reverse cycle heating. The factory default is zero (0).

U12 FAN MOTOR TYPE SELECTION: This feature allows the controller to be programmed for the type of motor on the unit's fan. Zero (0) selects a shaded pole motor, which is used on most Vector Compact units. Select one (1) for units having "HV" or "EBM" in their model number, these units have a split capacitor motor. The controller has been factory programmed for the appropriate motor type.

U15 DE-ICING CYCLE: Under certain extreme conditions ice may build up on the evaporator coil. Running the a/c at a low set point with the hatches and doors open on a hot humid day would be an example of this. If the a/c runs for an hour in cool mode and during that time the ambient temperature does not change by more than one degree, the de-icing cycle will activate turning the unit into reverse cycle heat for one to three minutes depending on the setting. The programmable parameter may be set at zero (0), one (1), two (2), or three (3) minutes. If the evaporator coil is still iced up after three minutes, see the trouble shooting section of this manual. The factory default is zero (0), which is off.

GENERAL TROUBLESHOOTING GUIDELINES

Also see specific a/c control troubleshooting sections following these general guidelines.

FAULT	POSSIBLE REASON	CORRECTION
Will not start.	A/C circuit breaker is off.	Turn circuit breaker on at ship's panel.
	Control is not turned on.	See control operation section in this manual.
	Wrong wiring at terminal strip.	Check wiring diagram and correct if necessary.
	Push-on butt connectors became disconnected during installation.	Disconnect power supply and open electric box, check wiring diagram, correct if necessary.
	Input line voltage is insufficient.	Check power source (shore/generator) for proper voltage. Check wiring and terminals for proper sizes and connections.
Fan is not running.	Check your specific control troubleshooting section.	
No cooling or heating.	Temperature set point is above (in cooling) or below (in heating) ambient temperature.	Lower or raise set point
	Obstructed sea water flow.	Clean sea water strainer. Check for obstructions at speed scoop thru-hull inlet. Check for a good steady flow from the overboard discharge.
	Sea water pump may be air-locked.	Remove hose from pump discharge to purge air from line.
	Loss of refrigerant gas.	Check a/c unit for refrigerant oil leakage, call service technician (see back of manual).
	Sea water temperature too high for cooling or too low for heating.	Sea water temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 908 F and heat (if reverse cycle option is installed) in water as low as 408 F. Switch to electric heat if installed.
	Coil is iced (in cooling).	See below.
	Fan is not running.	See below.
	Pressure switch opened.	Check your specific control troubleshooting section.
No heating.	Unit is "cool only" not reverse cycle.	Install optional electric heat; contact your dealer for details.

GENERAL TROUBLESHOOTING GUIDELINES CONTINUED

FAULT	POSSIBLE REASON	CORRECTION
No air flow.	Air flow is blocked.	Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.

	Coil is iced.	See below.
Coil is iced.	Thermostat set point is too low.	Raise set point.
Coil is iced (continued).	Improper air flow.	Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.
	Supply air is short-cycling.	Redirect supply air so that it is not blowing into the return air stream.
	Humidity level too high.	Close hatches and doors.
	When all else fails.	Switch a/c to heat until ice melts or use hair dryer to melt ice.
	Check your specific control troubleshooting section.	
System runs continuously.	Set point temperature is improperly set: too low for cooling or too high for heating.	Raise or lower set point.
	Porthole or hatches open.	Close all port holes and hatches.
	Sea water temperature too high for cooling or too low for heating.	Sea water temperature will directly affect the a/c unit's efficiency. This a/c unit can effectively cool your boat in water temperatures up to 90 F and heat (if reverse cycle option is installed) in water as low as 40 F. Switch to electric heat if installed.
	Improper air sensor location.	Check your specific control troubleshooting section.

PASSPORT II DIGITAL CONTROL TROUBLESHOOTING GUIDELINES

FAULT	POSSIBLE REASON	CORRECTION
Passport II display panel is	8-pin display cable plugs are not making contact (unplugged, dirt,	With POWER OFF at the circuit breaker, remove connector and inspect. If damaged, replace

not lit.	bent, or broken pins).	connector or entire display cable.
----------	------------------------	------------------------------------

PASSPORT II DIGITAL CONTROL TROUBLESHOOTING GUIDELINES CONT.

FAULT	POSSIBLE REASON	CORRECTION
Fan is not running.	Passport II is programmed for fan cycling with compressor.	Reprogram parameter U10.
Fan runs continuously.	Passport II is programmed for continuous fan operation.	Reprogram parameter U10.
No cooling or heating.	Passport II programmed for heat or cool only.	Reprogram parameter U1 for appropriate mode: cooling, heating or auto.
	"HHH" or "PPP" is displayed on Passport II panel.	See below.
No heat.	Electric heat option not operating properly with Passport II.	The Passport II circuit board has a 6 amp relay for reverse cycle, if electric heat is installed, a contactor must be used to carry the heater current. Check wiring and see programmable parameter U11.
Unit switches to heat while in cool mode.	Passport II de-icing feature enabled due to coil icing up.	Reprogram parameter U15. If coil is iced, see below.
Coil is iced.	Improper air flow.	Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.
		Read Passport II programmable parameter U15 and reset. If de-icing cycle does not melt ice, switch a/c to heat until ice melts or use hair dryer to melt ice.
		If problem persists program low fan speed parameter U3 for maximum value (55).
"HHH" is displayed on Passport II.	High pressure switch is open (in cooling) due to improper sea water flow.	Strainer or intake may be plugged, sea cock may be closed, check sea water hose for kinks or collapses. Verify pump operation; check pump circuit breaker if applicable.
		Remove any obstructions in return air stream.

	High pressure switch open (in heating) due to improper air flow.	Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible. If problem persists program low fan speed parameter U3 for maximum value (55). Reprogram parameter U9 for "1" to reverse fan speeds.
--	--	---

PASSPORT II DIGITAL CONTROL TROUBLESHOOTING GUIDELINES CONT.

FAULT	POSSIBLE REASON	CORRECTION
"PPP" is displayed on Passport II.	Low pressure switch is open due to low sea water and/or low return air temperatures.	Try restarting the a/c unit, the optional low pressure switch has a ten minute time delay that may be in effect.
	Low pressure switch is open due to loss of refrigerant.	Check a/c unit for refrigerant oil leakage, call service technician (see back of manual).
System runs continuously.	Improper Passport II air sensor location.	Verify display head location with criteria found in this manual. Install alternate air sensor if necessary.

MCP MECHANICAL CONTROL PANEL TROUBLESHOOTING GUIDELINES

FAULT	POSSIBLE REASON	CORRECTION
Fan is not running.	MCP system switch is not set properly	Set MCP system switch to "START" for fan only or "RUN" for cooling and heating.
	MCP fuse blown.	Replace 10 amp fuse behind MCP panel.
No cooling or heating.	High pressure switch is open (in cooling) due to improper sea water flow.	Strainer or intake may be plugged, sea cock may be closed, check sea water hose for kinks or collapses. Verify pump operation. Check pump circuit breaker if applicable.
	High pressure switch open (in heating) due to improper air flow.	Remove any obstructions in return air stream. Clean return air filter and grille. Check for crushed or restricted ducting, ducting must be as straight, smooth and taut as possible.
System runs continuously.	Improper MCP air sensor location.	Verify return air sensing bulb location with criteria found in this manual.

MAINTENANCE

Sea Water Strainer

Insure that your pump receives adequate sea water flow by regularly cleaning the strainer basket. Periodically check the overboard discharge for a steady stream of water. Check sea water intake speed scoop for obstructions. Make sure hoses are not looped, kinked or crushed.

Sea Water Pump

If the capacity of your air conditioning system is greater than or equal to 48,000 BTU/hr, the sea water pump is most likely air cooled and will need occasional oiling. See manufacturer's labeling on the pump for maintenance instructions.

Condenser Coil Cleaning

Coils can become fouled over a period of time due to marine growth or scale build-up. This both obstructs water flow and prohibits proper heat transfer. To clean coils, flush with a 5% muriatic or hydrochloric acid and fresh water solution. Disconnect system hoses from coil and pump solution through until clean. Rinse with fresh water and reconnect hoses. Follow manufacturer's safety guidelines for all cleaning solutions.

Return Air Filters

Check the return air filter about once a month and clean as necessary. To clean the filter, remove it from the unit/grille, rinse with water, air dry and reinstall.

Winterization

There are several methods of winterization, some of which work better than others. The four various methods employed using a 50/50 non-polluting biodegradable anti-freeze/water solution are:

- 1. Pumping of anti-freeze solution into the overboard thru-hull fitting, and discharging through the intake thru-hull fitting.*
- 2. Use of the sea water pump to pump anti-freeze solution through the system and discharging through the overboard thru-hull fitting. Close sea cock, remove hose from strainer discharge, raise*

hose above pump (so pump does not lose its prime) and pour in an anti-freeze solution. Pump solution through system. The strainer and hose to sea cock will also need to be drained of water.

- 3. Use of pressurized air injected at the overboard discharge fitting and the water being discharged through the sea water intake fitting.*

- 4. Use of pressurized air to force water from the intake through the overboard discharge.*

Any method that causes the anti-freeze solution to flow downward is the method of choice. By this means, the anti-freeze solution will displace any water trapped and eliminate the possibility of freezing in hidden areas. In addition, since the sea water pump utilizes a magnetically driven impeller, the impeller should be removed from the wet end assembly, wiped with an alcohol solution, and stored in a warm, dry area until commissioning takes place.

Note: Collect all discharged liquids and recycle or dispose of in a proper manner.

MANUFACTURERS LIMITED WARRANTY AGREEMENT

*The following warranty is extended to cover marine air conditioners manufactured or supplied by **Marine Air Systems, Inc. (MAS)**, and is subject to qualifications indicated. **Marine Air Systems, Inc.** warrants for the periods set forth below that products manufactured or supplied by it will be free from defects in workmanship and material, provided such products are installed, operated, and maintained in accordance with Marine Air Systems' written instruction.*

ALL IMPLIED WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE TERMS AND PERIODS OF WARRANTY SET FORTH BELOW AND, TO THE EXTENT PERMITTED BY LAW, ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED.

Warranty with the Passport II digital control (Passport II coverage effective 01/01/98):

Components comprising of the Passport II circuit boards, display heads and associated cables are warranted for a period of three (3) years from the date of installation, but not to exceed four (4) years from the date of manufacture at the Marine Air Systems factory. All other components comprising a complete system (excluding pumps and pump relay panels) on a new installation are warranted for a period of two (2) years from the date of installation, but not to exceed three (3) years from the date of manufacture at the Marine Air Systems factory. Pumps and pump relay panels are warranted for a period of one (1) year from the date of installation, but not to exceed two (2) years from the date of purchase.

Warranty with MCP (Mechanical Control Panel) control:

Components comprising a complete system on a new installation are warranted for a period of one (1) year from the date of installation, but not to exceed two (2) years from the date of manufacture at the Marine Air Systems factory.

*In addition, Marine Air Systems will pay labor costs and travel as outlined in its **Schedule of Limited Warranty Allowances** for removal and reinstallation of such components for a period of one (1) year from the date of installation, but not to exceed two (2) years from the date of manufacture at the Marine Air Systems factory. OEM installed equipment warranties begin with the purchase of the vessel, not from the date of installation. Warranty will be paid in accordance with our established schedule of allowances. Compensation for warranty repairs is only made to MAS authorized service companies.*

*Marine Air Systems will repair, or replace at its option, components found to be defective due to faulty materials or workmanship, when such components, examined by an authorized service dealer or a factory service representative, are found to have a defect for which the company is responsible. **Refer to Manufacturer's Limited Warranty Policy for complete coverage and exclusions.** Replacement components are warranted for the duration of the remaining warranty period in effect on the original component.*

This limited warranty is extended in lieu of all other warranties, agreements or obligations, expressed or implied, concerning Marine Air Systems' components. This warranty is extended only to the original purchaser and is not transferable. This warranty shall be governed by the laws of the State of Florida and gives the original first end user definite legal rights.

This warranty does not cover damages incidental and or consequential to the failure of Marine Air Systems' equipment including but not limited to; normal wear, accident, misuse, abuse, negligence or improper installation, lack of reasonable and necessary maintenance, alteration, civil disturbance or act of God.

No person or dealer is authorized to extend any other warranties or to assume any other liabilities on Marine Air Systems' behalf, unless made or assumed in writing by an officer of Marine Air Systems.

Copyright 1998 Marine Air Systems, All Rights Reserved

Every precaution has been taken in the preparation of this manual to insure its accuracy. However, Marine Air Systems assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of this product and information contained herein.