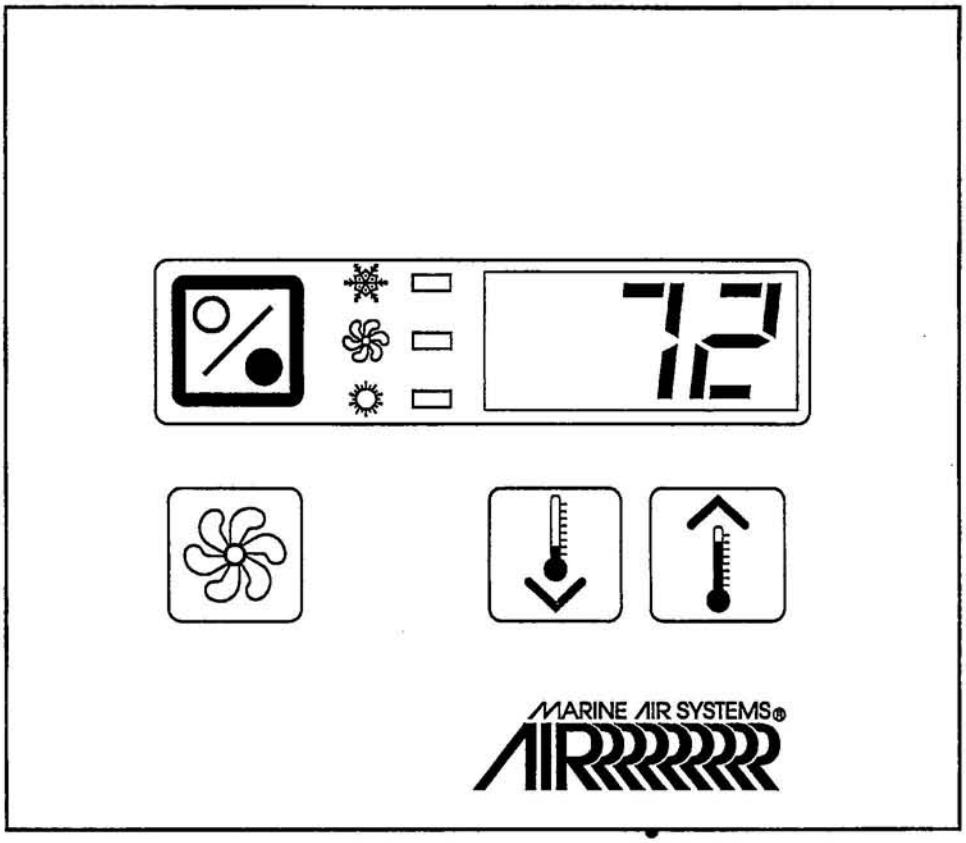
Passport II

OPERATIONS MANUAL

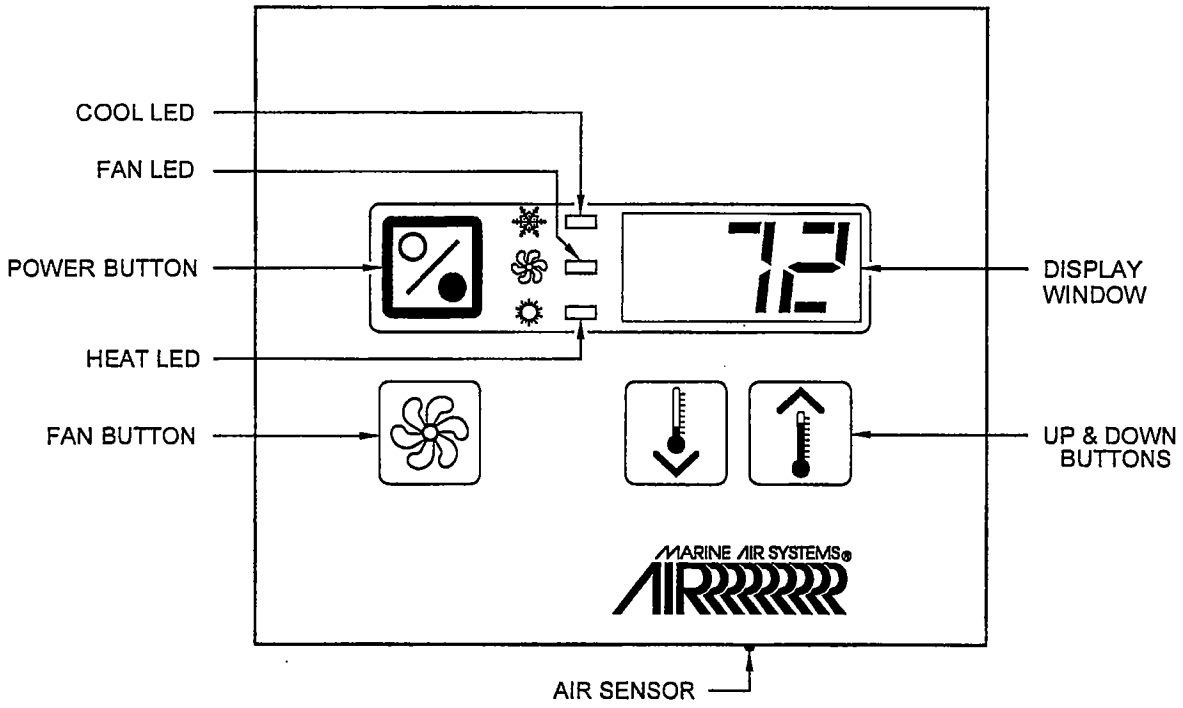


Dometic®

MARINE AIR SYSTEMS®

Revision: 14 05/08/98

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 3⅜" wide by 2¾" 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 (15'/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 directly on the bulkhead then use the plastic bulkhead adapter. The bulkhead adapter (sold separately) is mounted to the bulkhead with screws and the display panel is secured to the adapter with adhesive strips. Do not use a screw gun and do not over-tighten screws when mounting adapter.

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 (7'/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.

Contents

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The **Passport-II Control** unit is designed for use with Direct Expansion Reverse Cycle Marine Air Conditioning Systems. The control operates on 115 or 230 volt AC power, 50 or 60 Hz. The system provides optimum control and cabin comfort by incorporating the following features:

Standard Features

Non-Volatile Memory

Low Voltage Display Panel

LED Cabin Temperature Display... Fahrenheit or Celsius

Face Plate Air Sensor For Accurate Temperature Control

Programmable Multiple Fan Speed Selections

User Selected Programs For Optimum Control

High and Low Freon Pressure Inputs

Moisture Mode Cycle For Humidity Control

Anti Icing Cycle to Prevent Evaporator Icing

Multiple Compressor Staging Delay

Dual AC Voltage Input... 115 or 220 VAC

Optional Features

Outside Air Temperature Sensor

Alternate Air Temperature Sensor

This manual is intended to provide information necessary to insure proper installation and operation of the **PASSPORT-II.** Improper installation or MISUNDERSTOOD operating procedures can result in unsatisfactory performance and or premature failure of the controller.

Before Proceeding Read This Manual Completely

If assistance is required prior to or during the installation call Marine Air Systems at 954-973-2477 or send Fax to 954-979-4414.

The **PASSPORT-II** is covered under existing Marine Air Systems Warranty Policy. Neglect and system abuse are not covered under the implied or stated warranty policy.

In the interest of product improvement, Marine Air Systems' specifications and design are subject to change without prior notice.

BASIC OPERATION

Passport-II is a programmable, user friendly, easy to use, temperature control.

Press the ON/OFF button once to engage the system. The display indicates room temperature when the system is on and the display is blank when the system is off.

Set the desired room temperature by pressing the up or down button. The set point can be viewed at any time by momentarily pressing and releasing the up or down button.

Select automatic or any one of six fan speeds by pressing the fan button. The fan starts in automatic which is indicated by "A" in the display. Press and hold the fan button and the control will scroll through the available fan speeds, i.e., A, 1, 2, 3, 4, 5, 6 and return to automatic. Release the button at the desired setting and the fan will operate at that speed. The fan LED is lit when a manual fan speed has been selected and the fan LED is off when automatic fan operation has been chosen.

An "A" in the display indicates automatic fan operation has been selected and the fan will operate in conjunction with room temperature. The further the room temperature is from set point, the faster the fan will run while in the cooling mode. The fan speed will gradually decrease as the set point is approached and will run at low speed when set point is satisfied. The automatic fan speed operation is reversed in the heating mode. Fan speed is increased as set point is approached, however, the fan runs at low speed, once the set point is reached.

The fan can be programmed to cycle on and off with demand, allowing fan operation only when cooling or heating is required. Normally, the automatic fan speed operation is reversed in the heating mode, however, the fan can be programmed to operate the same as in the cooling mode.

NORMAL HEATING OR COOLING CYCLE

When heating or cooling is called for the valve toggles to the opposite mode (unless the compressor has been off for 75 seconds), the compressor cycles on and 4 seconds later the automatic fan adjusts to the proper speed. When the demand is satisfied, the compressor cycles off and the fan returns to low speed.

While in a given mode the controller will maintain a two degrees Fahrenheit (2 °F) temperature variation. A four degree swing is required to cause the unit to shift to the opposite mode. Once in a given mode, heating or cooling, Passport-II will maintain a two degree hysteresis. Passport-II can be programmed for automatic operation, i.e. heating or cooling on demand, cooling only or heating only.

REVERSING VALVE OPERATION

The reversing valve is toggled to the opposite mode when heating or cooling is required to reduce compressor start surge. The valve will only toggle when the system has been off for less than seventy-five (75) seconds. The valve will also toggle if a cycle is interrupted at the display panel by pressing the power button ON/OFF, or changing the set point. Unnecessary valve toggling has been limited to reduce noise. Valve toggling can be eliminated by programming the compressor delay at 75 seconds or more. Power on reset, will always initiate a valve toggle since no timer is running when the AC power is off.

MEMORY

PASSPORT-II has a memory chip which requires no batteries or backup power. When AC power is lost all operating parameters are retained indefinitely. When AC power is restored, the control resumes operating as last programmed.

Please refer to figure 1, below, for location of the buttons and displays listed on the following pages.

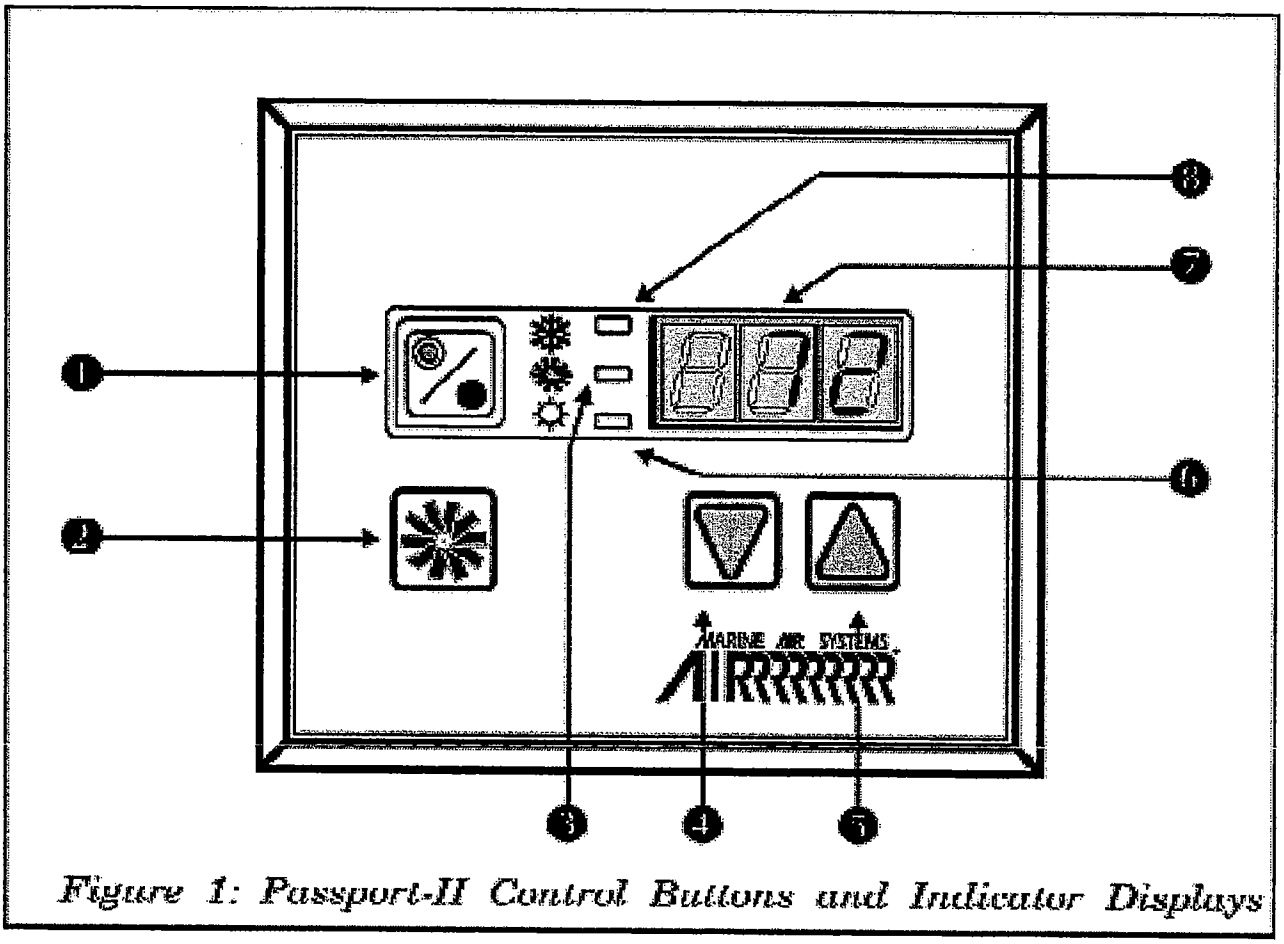


Figure 1: Passport-II Control Buttons and Indicator Displays

1. POWER BUTTON The power button is used to toggle between the **on** and **off modes**. Press and hold the power button while in the off mode to enter the **program mode**. Press and hold the power button for ten seconds to reset the **factory default program parameters**. The **power** and **down buttons** are used to unlock the program values and allow programming changes while in the programming mode.

2. FAN SPEED BUTTON The fan speed button is used to select one of the six manual or automatic fan speed settings. The automatic fan mode controls fan speed according to the difference between set point and room temperature. The greater the difference, the faster the fan will run unless the system is programmed for reverse fan operation in the heating mode. The fan button is used with the down button to blank the display for nighttime operation.

3. MANUAL FAN SPEED LED The manual fan speed indicator LED will be lit when a manual fan speed has been selected. The fan speed indicator is also lit when the fan is operated in the **circulation mode** only.

4. DOWN BUTTON Momentarily press and release the **down button** and the set point temperature will appear in the display. Press and hold the down button and the set point will begin to decrease, slowly at first, then faster as the button remains depressed. The lowest set point allowed is 60° Fahrenheit which is where the display will stop. The down button is also used in conjunction with the fan button to blank the display making night time operation less obtrusive. The down button is also used to change programmable parameters in the program mode.

5. Up Button Momentarily press the **up button** and the set point will appear in the temperature display. Press and hold the up button and the set point will increase, slowly at first, then faster as the button remains depressed. The highest set point allowed is 85° F which is where the display will stop no matter how long the button is held down. The up button is also used to change programmable parameters in the program mode.

6. HEAT MODE LED The heat mode LED indicator will be lit when the system is calling for heating and the compressor is running. The heat mode LED is also lit when electric heat is installed and heating is required.

Temperature Satisfied

7. THREE DIGIT SEVEN SEGMENT DISPLAY The inside air temperature is displayed in the window whenever the control is turned on. The three digit 7 segment display provides a readout of the inside air temperature as detected by the inside air sensor (located on the face plate unless the **alternate** air sensor is installed).

The display provides program information, fault codes, depending on the mode selected by the user and outside air temperature when the **optional outside air sensor** is installed.

The three digit display also indicates set point when either the **up** or **down** buttons are momentarily pressed.

8. COOL MODE LED The cool mode indicator LED will be lit when cooling is called for and the compressor is running. When **cooling only** is selected the cool LED turns on and off with the compressor.

Passport-II Reset

When the control resumes operation after a power interruption all the display LEDs will turn on for one second. This is a normal operating condition and is referred to as "Power On Reset".

SINGLE BUTTON FUNCTIONS

Power Button

1 - Turn the system on and off and enter the program mode.

2 - Exit the program mode.

3 - Hold down while turning on AC power to enter the Self Test Mode.

Fan Button

4 - Select automatic or manual fan operation and select manual speed.

5 - Advance to the next parameter in the program mode.

6 - Hold down while turning on AC power to view the Service History.

Up Button

7 - View the set point and raise the set point.

8 - Advance data values in the program mode.

9 - Move forward through the service log.

Down Button

10 - View the set point and lower the set point.

11 - Reduce data values in the program mode.

12 - Move back through the service log.

13 - Hold down while turning on AC power to view the Hour Meter.

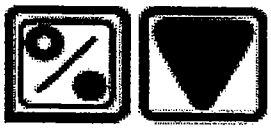
DUAL BUTTON FUNCTIONS

Up and Down Buttons

14 - View the outside air temperature.

15 - Save new defaults when exiting the program mode.

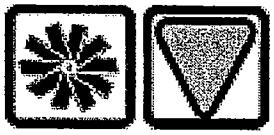
Power and Down Buttons



16 - Enter the humidity mode while the control is in the on mode.

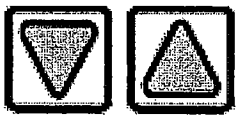
17 - Unlock the program parameters while in the program mode.

Fan and Down Buttons

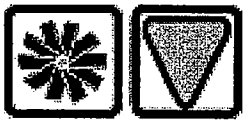


18 - Blank the display during night time operation.

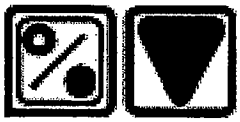
DUAL BUTTON FUNCTIONS



1. Up & Down Buttons... Press the up and down buttons together and the outside air temperature will be displayed, providing the OPTIONAL OUTSIDE AIR TEMPERATURE SENSOR has been installed... No programming is required. The outside air temperature can only be viewed when the control is in the on mode. **Press the UP & Down Buttons...** simultaneously, while in the program mode, to set new custom programming defaults.



3. Fan & Down Buttons... Press the fan and down buttons simultaneously to blank the display for night time operation. While the display is blanked, the heating or cooling mode LED will remain lit indicating proper system operation. When the control is satisfied the middle segment of the three digit display remains lit indicating the system is operational. Pressing any button returns the display to normal operation.



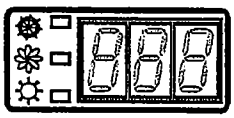
4. Power & Down Buttons... While in the ON MODE, press the power and the down buttons together to enter the MOISTURE CONTROL MODE. Once in the moisture mode, the display will indicate **HU-1**. Pressing the power button once returns the control to the off mode.

5. Power & Down Buttons in Program Mode... Press the power and down button after entering the program mode to **unlock** the programming values and allow program changes. This feature prevents accidental programming changes should someone access the program mode by mistake.

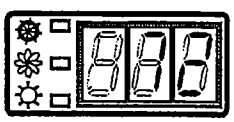
NOTE:

IMPORTANT ... ***While in the Blank Display Mode, the center segment of the temperature display remains " ON " when no heating or cooling is called for indicating the control is operational.***

MODES OF OPERATION



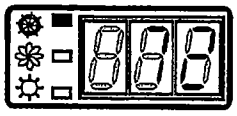
OFF MODE: When the **Passport-II** is in the off mode, all control outputs are turned off. Program parameters and user settings are saved in nonvolatile memory. The program mode can only be accessed from the off mode.



ON MODE: When the control is in the on mode, power will be supplied to the appropriate control outputs and the display will indicate the current state of operation. The operating and program parameters resume based on those stored the last time the unit was operating.

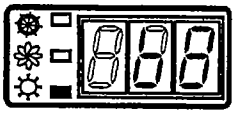
MODES OF OPERATION CONTINUED

Cool Only Mode


Cooling Mode

When **PASSPORT-II** is configured for the **cooling only mode**, only the cooling systems will be selected and operated as required. When the temperature drops below the set point, the system will **not automatically** switch to the heating mode. Cooling only is supplied for systems without reverse cycle heating, however, an electric heater can be installed should heating be required.

Heating Mode Only


Heating Mode

When the control is programed for the **heating only mode**, only the heating systems will be selected and operated as required. Should the temperature rise above the set point, the system will **not automatically** switch to the cooling mode. Heating only is supplied for circumstances that require the system to not automatically switch from the heating mode to the cooling mode.

Automatic Mode

When **PASSPORT-II** is configured for the automatic mode, both heating and cooling will be supplied as required. The heat and cool LED indicators will be lit according to which mode is required. The **heat** and **cool** LED follow the compressor operation, i.e. on when the compressor is on and off when the compressor is off. Temperature hysteresis in a given mode will be maintained at two degrees (2° F) Fahrenheit, however, a four degree difference is required to allow the control to change modes. Once in a new mode, the hysteresis will remain at two degrees (2° F) Fahrenheit.

HUMIDITY MODE


Humidity Level 1

While in the **on mode**, press the power and the down buttons simultaneously to enter the humidity or **moisture control mode**. The characters **"HU-1"** appear in the temperature display indicating successful entry.

The first cycle starts in 1 minute. The fan is started and air circulated for thirty (30) minutes. During this time the air temperature is sampled and entered into memory. The cooling cycle is started and continues until the temperature is lowered two (2) °F. The compressor is allowed a maximum of one hour running time to reach the desired temperature. Four (4) hours after the temperature is satisfied or the compressor times out, the cycle is repeated. During the humidity cycle the cool LED is lit while the compressor is running.

The humidity mode is provided to maintain a specific temperature and humidity range when the yacht is unoccupied for extended periods of time.

Exit the **Humidity Mode** to the **Off Mode** by pressing the **Power Button** once.

PLEASE NOTE: THE HUMIDITY MODE CAN ONLY BE ENTERED FROM THE ON MODE.

FAN MODES

Automatic Fan Mode

Passport-II has six automatic fan speeds available. Speed six is high, three is medium and one is low or the slowest speed. Press and hold the fan button until the letter "**A**" appears in the temperature display window. Please note that when the fan LED is off, **automatic fan operation** has been selected. Automatic fan mode allows Passport-II to determine the fan speeds based on 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 slower, quieter fan speeds. Automatic fan operation is the **factory default**, however, manual fan speed control is available.

Manual Fan Mode

Press and hold the fan button during normal operation to select one of the six (6) manual fan speeds available. Six (6) is the fastest and one (1) represents the slowest fan speed. Manual fan mode allows the user to select the desired fan speed manually. When a manual fan speed has been selected, the fan LED will be lit. Manual fan mode is sometimes preferred when room temperature is constantly changing due to varying heat loads.

Circulation Mode

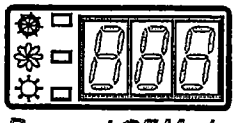
When the system is off at the display panel the fan can be used to only circulate the air. Press and hold the fan button when the display is off until the desired speed number appears in the window. Release the fan button and the fan will run at the selected speed circulating the air without heating or cooling. Press the power button once to cancel the circulation mode and enter the on mode.

NOTE:

High and Low Fan Limits - Fan speeds can be further tailored to suit the user by adjusting the high and low fan limits. See programming modes U 2 and U 3.

PROGRAM MODE

Program Mode Overview

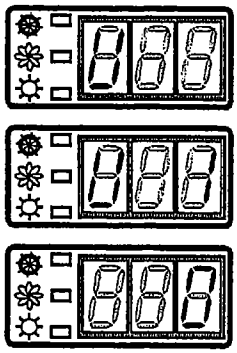


The program mode is used to adjust the systems operating parameters to suit the particular needs of individual users. The program mode is also used to tailor the air-conditioning system for most efficient operation within an installation. Installation variables such as ducting, sensor location and system layout effect the perceived operation of the overall system. The program mode allows the system to operate as efficiently as possible within a given installation. **PASSPORT-II** is shipped with factory programmable default settings which are stored in permanent memory and can be recalled at any time.

PROGRAM MODE

Severe electrical disturbances can sometimes upset the PASSPORT-II operating sequences. Operator confusion related to program parameters can also cause, what seem to be, operational problems. Whenever there is any doubt as to the proper operation of the controller, Factory Default Parameters should be Re-initialized.

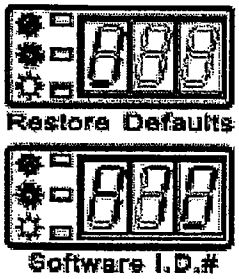
ENTERING PROGRAM MODE



The program mode can ONLY be entered from the **off mode**. From the off mode, press and hold the power button for five (5) seconds until a "U" appears in the display. Release the power button and the characters "U 1" followed by the parameter setting, appear in the display. The PASSPORT-II control is now in the program mode. Exit the program mode, to the **off mode,** by pressing and releasing the **power** button.

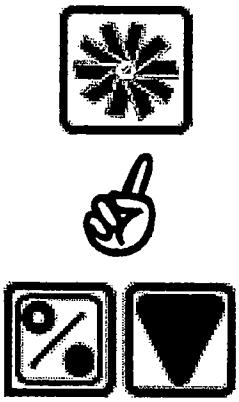
NOTE: The control will exit the program mode and return to the **off mode** if no programming is attempted for one (1) minute.

Restore Factory Default Settings



IMPORTANT ! Factory default settings can re **restored** by pressing and holding the power button for ten (10) seconds while the control is in the **off mode**. Five (5) seconds after the power button is pressed, the letter "U" appears in the display window. After ten (10) seconds a software revision number, such as ("A.10") appears, indicating re-initialization has been completed. Release the power button and the Passport-II control will return to the **off mode** with the **factory default settings** restored.

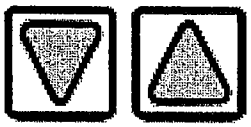
USING THE PROGRAM MODE



Increment from one **program parameter** to the next by pressing the **fan button** while in the **program mode**. Press and hold the fan button for a moment, then release the button when the desired parameter appears in the display. Press and **hold** the fan button to scroll through the program parameters. The **programmable parameters** range from "U-1" through "U-15" for direct expansion air-conditioning systems.

NOTE: Before you can alter any of the programming parameters, you must first UNLOCK the program mode. Simultaneously pressing the POWER and DOWN BUTTONS, while you are in the PROGRAM MODE, unlocks the programming parameters.

The Up and Down Buttons

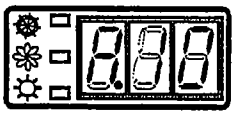


The **up** and **down buttons** are used to select the data or set the desired limits for the parameter being programmed. This method is followed throughout the program mode, however, special instructions are included for individual functions that require them.

Exiting the Program Mode

There are two methods to exit the program mode. Press the power button and the **PASSPORT-II** control will return to the **off mode**. Not pressing any buttons or attempting any program changes for sixty (60) seconds will cause the control to exit the **program mode** to the **off mode**. Any programming changes that were made while in the program mode will be memorized and put into operation when the mode is exited and the control is returned to the on mode.

Software Identification



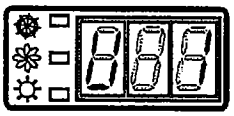
The software version of the control is identified for one (1) second prior to the exit from the program mode. The software identification number, i.e. ("A.10") will appear in the display for one second, then the control will return to the off mode.

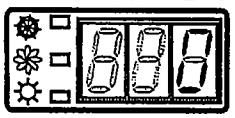
INFO

Should there be any reason to contact Marine Air Systems about the system or programming the PASSPORT-II, be sure to have the software identification number available.

NOTE:

Button Functions are <u>Not</u> instantaneous as in pressing keys of a typewriter. When using the control press and hold the button for an instant before releasing. Follow specific button instructions closely, where such instructions are given.





U-1: Operating Mode

The **operating mode** is used to select **heating only**, **cooling only** or **automatic mode** depending on the particular requirement. Zero (0) selects the automatic mode, one (1) selects cooling only and two (2) selects heating only. EXAMPLE: A system that does not have heating capabilities should be programmed for **cooling only**. The factory default is zero (0) — **automatic heating or cooling mode**.

PROGRAM TABLE

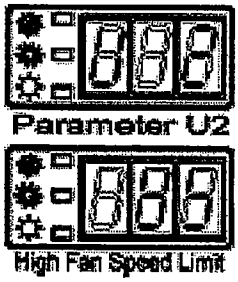
There are twelve (12) programmable parameters with their Factory Default Settings listed in this section. The table below indicates what these parameters are, along with the permitted values and Factory Default Settings.

Program Number	Description	Default	Range
U-1	Operating Mode ... Cooling Only, Heating Only or Automatic Cooling and Heating as Required.	0 = Automatic	0 = Auto Heat or Cool 1 = Cooling Only 2 = Heating Only
U-2	High Fan Speed Limit (arbitrary units)	85	56 - 85
U-3	Low Fan Speed Limit (arbitrary units)	50	30 - 55
U-4	Compressor Staging Time Delay	15	5 - 135 seconds
U-5	Temperature Sensor Calibration	0	±10° Fahrenheit
U-6	Failsafe Modes and Mnemonic High Freon Pressure = HHH Low Freon Pressure = PPP	3 = 3 Failures With 90 Second Restart Delay. Manual Reset is Required.	0 = Off 1 = Continuous No Display 2 = Continuous W / Display 3 = 3 Failures Reset Required
U-7	Display ° Fahrenheit or ° Celsius	0 = °F	0 = ° Fahrenheit Displayed 1 = ° Celsius Displayed
U-9	Reverse Fan Speeds During Heating Mode	1 = Reversed	0 = Normal Fan Operation 1 = Reversed Fan In Heating
U-10	Continous Fan or Cycle Fan with Compressor	1 = Continuous Fan Operation	0 = Cycle Fan With Comp. 1 = Continuous Fan Operation
U-11	Reverse Cycle Heating or Electric Heat Only Option Installed (for cooling only units)	0 = Reverse Cycle Heating	0 = Reverse Cycle Heating 1 = Electric Heater Installed
U-12	Fan motor type selection... Shaded pole or split capacitor.	0 = Shaded Pole	0 = Shaded Pole Fan Motor 1 = Split Cap. Fan Motor
U-15	De-Icing Cycle	0 = Off	0 = Off 1 = One Minute 2 = Two minutes 3 = Three Minutes

NOTE:

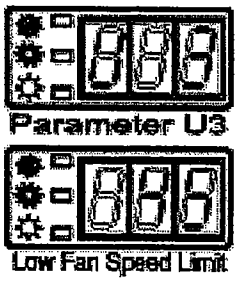
Should any programming problems or confusion occur, reset the Factory Default Settings by pressing and holding the Power Button while in the Off Mode for ten (10) seconds.

U-2: High Fan Limit



The high fan speed limit can be tuned for various motors. The **high fan limit** is adjusted with the system operating. The range of values are 56 through 85 arbitrary units. Setting a higher number, results in a higher fan speed, setting a lower number, lowers high fan speed. Use the up and down buttons to select the desired high fan speed. The factory default setting is eighty-five (85).

U-3: Low Fan Limit

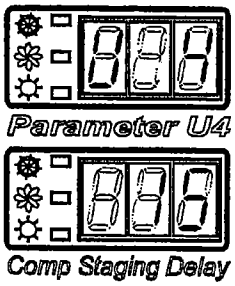


The **low fan limit** determines the lowest output allowed for the low fan speed. The range of values for the low fan speeds are 30 through 55, in arbitrary units. The factory default setting is 50.

NOTE ! Both the high and low fan limits can be adjusted while the fan is operating. From the **off mode**, start the fan by pressing and holding the **fan button**. Continue to hold the button until a one (1) appears in the display. This is the fan **circulation mode only**, fan speed one (1). Enter the **program mode** while the fan is running and select "U-3", the low fan limit adjustment. Raising and lowering the low fan limit allows the programmer to experience the fan speed changes as they are made.

Adjust the **high fan limit** while the fan is running by selecting speed 6 and using parameter "U - 2" instead of "U-3". **IMPORTANT !** Once the high and low fan speed limits are set, the unit will automatically adjust the remaining fan speeds for 6 equally spaced speeds.

U-4: Compressor Staging Time Delay

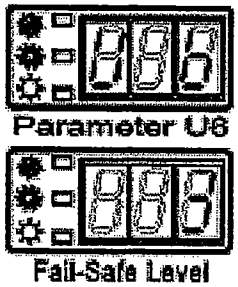


The **compressor staging delay** is provided for installations where more than one system operates on the same power source. Setting the staging delays at different intervals allows only one compressor to start at a time. The units should be staged at least 5 seconds apart. The minimum delay is 5 seconds and the maximum is 135 seconds. The Factory Default is 15 seconds.

U-5: Temperature Calibration

Use this feature to calibrate the air sensor within a range of ± ten (10) °F. Enter the program mode and the offset will be displayed. Use the up and down keys to select the desired offset. The factory default setting is zero.

U-6: Fail-safe Level



The system can be configured for one of four fail-safe levels. Level zero (0) turns off all fail-safe protection and mnemonic display codes. Level one (1) shuts down the system, allows the system to restart after a 90 second delay and displays no failure code. Level two (2) shuts down the system allows continual restarts after the 90 second delay and displays the appropriate mnemonic failure code. Level three (3) operates the same as level two with the addition of a system shutdown after three (3) consecutive failures... Manual reset required to restart the system.

U-7: Fahrenheit or Celsius Selection

The unit can be programmed to display either Fahrenheit or Celsius. Programming zero (0) selects degrees Fahrenheit and selecting one (1) displays degrees Celsius... The factory default setting is zero (0), degrees Fahrenheit. When degrees Celsius (°C) is selected the readings are displayed in tenths, i.e. 22.2° Celsius which represents room temperature.

U-9: Reverse Fan Speeds During Heating

During normal operation, in both the **heating** and **cooling modes**, the automatic fan speeds are reduced as the set point is approached. During heating, this is not always the preferred method of operation. Some customers prefer that the fan run faster as the set point is approached. Lower fan speeds at cooler temperatures help increase head pressure and make the air seem warmer. This method also reduces head pressure as the set-point is approached by increasing air flow across the coil. Program one (1) if you wish to reverse fan speeds during heating... The factory default setting is one (1), reversed fan operation.

U-10: Cycle Fan with Compressor

The fan can be programmed to run continuously when the system is on or can be allowed to cycle with the compressor. When cycled with the compressor, the fan will operate only when heating or cooling is called for. To cycle the fan with the compressor program zero (0). To operate the fan continuously, select one (1). The factory default is one (1) which allows continuous fan operation while the system is on.

U-11: Reverse Cycle or Electric Heat

Units not equipped with reverse cycle heat may have after market electric heaters added. Electric heat requires the compressor be turned off when heating is called for. The reversing valve output is used to control the optional electric heating element contactor. The valve output relay can only carry 6 amps, therefore, a heavy duty contactor must be installed to carry the heater current. Program one (1) for the electric heat option. The factory default is zero (0) which is reverse cycle heating.

U-12: Fan Motor Selection

There are two basic fan motor types, shaded pole and split capacitor. Each motor reacts differently to speed control and each motor requires different timing for optimum speed control. The default setting is zero (0) which selects shaded pole, however, one (1) should be selected if a split cap fan motor is used in the system. Most direct expansion systems are supplied with shaded pole type fan motors.

U-15: De-Icing Cycle

Passport-II is equipped with a **De-Icing Cycle** to prevent ice build up on the evaporator coil during extended periods of cooling operation. Installation variables such as grille sizes, length of ducting, insulation R factors and ambient temperatures determine the cooling run time required to achieve set point. Customer usage may substantially increase run times by operating the system with the hatches and doors open. Programming unrealistic set point [60° F] and leaving the salon door open will usually cause the evaporator to ice up on warm muggy days.

De-Icing is accomplished by switching the reversing valve into the Heat Mode while the system is cooling. The valve will remain energized for the programmed cycle time. The cycle is programmable from OFF through a period of three [3] minutes. The factory default setting Off [O].

Program Lock and New Defaults

Program Lock

The systems program parameters cannot be altered without first unlocking the **program mode**. Defeat the program lock by **simultaneously** pressing and releasing the **power** and **down buttons** after entering the program mode. The program lock is provided to prevent accidental parameter value changes by someone unknowingly stumbling into the program mode.

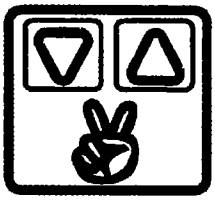
New Defaults

Once the desired programming changes have been made and the system tests satisfactorily, your work can be saved as the **new factory defaults**. Your new defaults are initiated by **simultaneously** pressing and releasing the **up** and **down buttons** prior to exiting the **program mode.** New defaults can be initialized at any time by entering the program mode and following the above instructions. Once **new defaults** have been initialized the control will revert back to the new defaults whenever factory defaults are restored as described on pages 9 and 11 of this manual.

Hardware Configuration

Several features are both hardware and software configured. The optional item is plugged into the board, the appropriate jumper selected, the program parameter set and the system recognizes the option on power-up.

Outside Air Sensor Option



When this option is installed, the outside air sensor is plugged into the **outside air sensor jack (J-3)** and the feature is ready for use. The outside air temperature can be viewed, during normal operation, by simultaneously pressing the up and down buttons. Passport-II units manufactured after February, 1996 will have the outside air sensor option.

Alternate Air Sensor Input

Provisions are made for an **alternate air sensor** should installation restrictions not allow the use of the standard **face plate air sensor**. Install the alternate air sensor plug in the jack marked **J-2** located on the module board and fasten the sensor in the return air stream. The control will automatically recognize the alternate air sensor and no further programming is required.

High and Low Freon Pressure Inputs

A three pin Molex jack (JP-1) is supplied on the main board for high and low Freon Pressure Inputs. One jumper, (**JMP-1**... Low Freon Pressure), is used to emulate the switch when it is not installed. Cut **JMP-1** when the **low pressure switch** is installed. Cutting jumper **JMP-1** when the low pressure switch is installed automatically configures the system to monitor the low pressure input, and eliminates the need for any further programming.

Fail-safe and Fault Handling Codes

High Freon Pressure

Low Freon Pressure

When a fault is detected Passport-II will display one of the following Mnemonic fault codes:

HHH... indicates high Freon pressure. 15 Second Delay... Ignored in Heat Mode.

PPP... Indicates low Freon pressure. Compressor will not restart until the fault is cleared.

AAA... Indicates failed air sensor. Unit will not run until repaired.

Fail Safe Levels

There are four levels of fail-safe protection including the fail-safe **off mode**. Level one monitors the sensors, takes appropriate action and allows continuous restarts after a 90 second delay... **Does not display the fault code**. Level two works the same as level one, however, the appropriate fault code mnemonic is displayed during the time-out between recycles. Level three is identical to level two with the inclusion of a three successive failures lockout routine. After three consecutive failures the system is shut down and a manual reset is required.

SYSTEM LOCKOUT

Lock out occurs if U-6 is programmed for level 3 and three consecutive faults are detected within a heating or cooling cycle. Lockout causes the system to shut down and flashed the fault code in the display. **Lockout** can only be cleared by turning the unit **off** and **on** using the **power button.**

FAULT DISPLAY

When a fault occurs the appropriate mnemonic code is flashed in the display. The flashing mnemonic can be removed from the display by pressing and releasing the **power button** to reset the control. Resetting the control does **not** solve the problem that caused the fault!

Failsafe Level	Action	Description of Action Taken by Passport
0	All Protection Turned Off	FAILSAFE PROTECTION LEVELS TURNED OFF: Air Sensor Fault: Heating/Cooling Immediately Suspended; Normal Operation Not Resumed Until Fault is Cleared. Air Sensor Fault Code "Flashing Display" NO OTHER FAILSAFE PROTECTION PROVIDED.
1	No Mnemonic Fault Code Displayed Continuous 90 Sec. Re-Starts Allowed !	MINIMUM PROTECTION LEVEL: All Actions Taken in Failsafe Protection Level "0" Plus: In Addition, Continous 90 Second Compressor Restarts Allowed. FAULT Mnemonic CODE NOT DISPLAYED NO OTHER FAILSAFE PROTECTION PROVIDED.
2	Display Fault & Shut Down Compressor With Continuous 90 Second Delay Between Restarts.	INTERMEDIATE PROTECTION LEVEL: All Actions Taken in Failsafe Protection Level "0" & Level "1" Plus: In Addition, The FAULT MNEMONIC CODE Message Will Be Displayed With Continous 90 Second Compressor Restarts Allowed. NO OTHER FAILSAFE PROTECTION PROVIDED.
3	Display fault & require manual reset after 3 failures.	MAXIMUM PROTECTION LEVEL: FAULT CODE MESSAGES ARE DISPLAYED and The Appropriate Action is Taken According to The Problem Encountered. After 3 Consecutive Failures Manual Reset is Required.

AUTOMATED FACTORY-SELF TEST PROGRAM

The **Passport-II** software contains a self-test program to facilitate factory testing of the entire air-conditioning system. Once the **self-test mode** is activated, the test cycle will continue until the AC power is interrupted or the **power button** is pressed once which returns the system to the off mode.

Activate the self-test by pressing and holding the **power button** while turning on the AC power. Be sure to continue to hold the button until the **reset** is completed. Passport-II is now in the self-test mode.

Once activated the self-test software will continuously execute the following procedure:

1 - Turn on in the **heat mode** and supply heating for ten (10) minutes.

2 - Stop heating and run the **fan only** for five (5) minutes.

3 - Switch to **cooling** and continue cooling for ten (10) minutes.

4 - Stop cooling and run the **fan only** for five (5) minutes.

5 - Return to step one (1) and continue until interrupted.

The test mode will continue until the power is interrupted or the test is halted by pressing the **power button** once.

SPECIFICATIONS

SET POINT RANGE	60°F TO 85°F [15.6 TO -29.4° C]
TEMPERATURE RANGE DISPLAYED	O°F TO 150°F [-17.8 TO 65.6° C]
SENSOR ACCURACY	±2°F AT 77°F
LOW VOLTAGE LIMIT 115 VOLT UNITS	75 VAC
LOW VOLTAGE LIMIT 220 VOLT UNITS	175 VAC
LOW VOLTAGE PROCESSOR RESET	60VAC
LINE VOLTAGE	115 THROUGH 240 VAC
HERTZ	50 OR 60 Hz
FAN OUTPUT	12 AMPS AT 220 VAC
VALVE OR HEATER OUTPUT	6 AMPS AT 220 VAC
COMPRESSOR OUTPUT	20 AMPS AT 220 VAC
MINIMUM / MAXIMUM OPERATING TEMPERATURE	0° F TO 180° F
POWER CONSUMPTION	LESS THAN 5 WATTS

DIMENSIONS

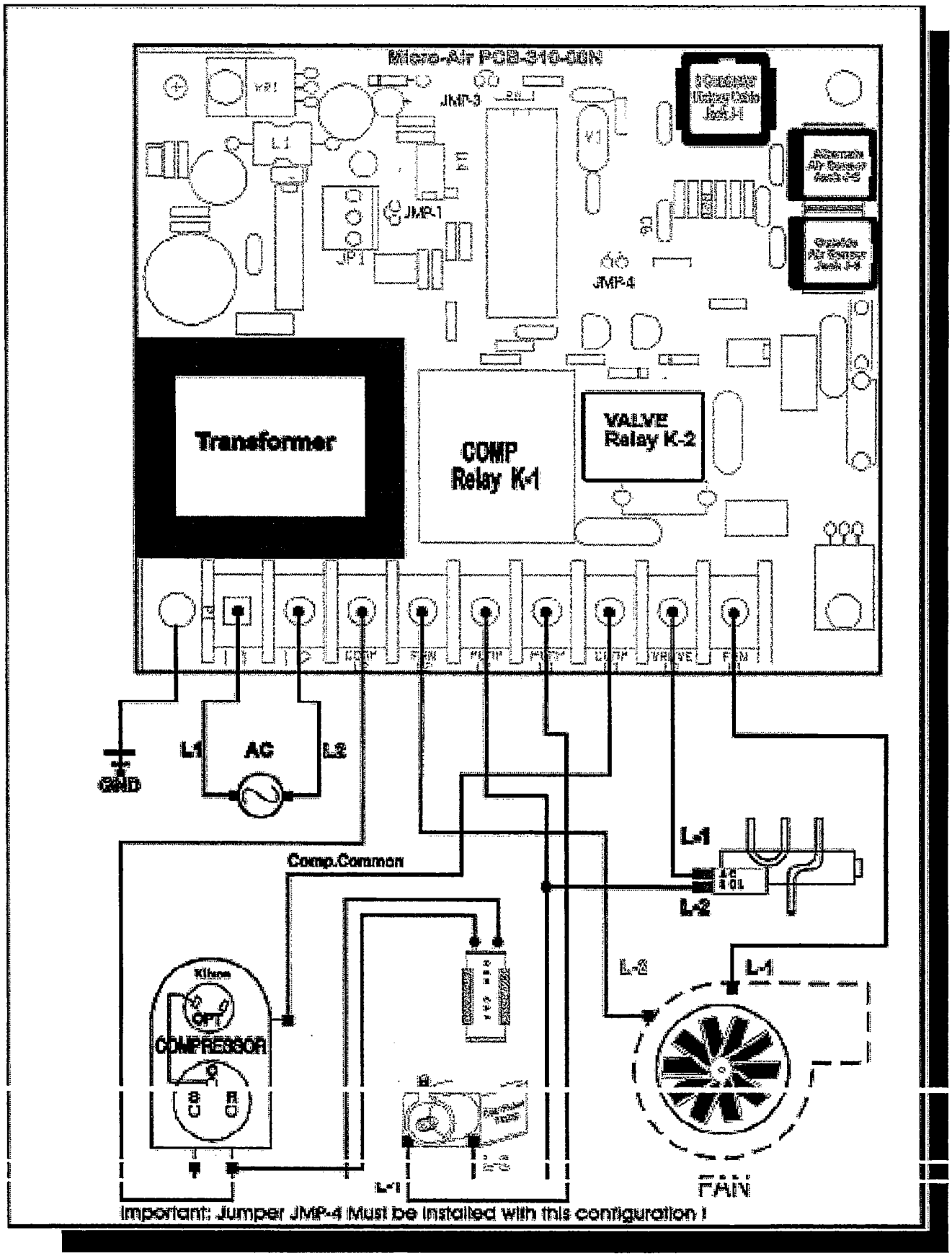
DISPLAY PANEL	WIDTH 3.830" X 4.50"
PANEL CUT OUT	WIDTH 3.375" X HEIGHT 2.775"

Maximum length of display cable is fifty (50) feet. Sensor cable lengths should be limited to 50 feet. The **outside air sensor** and **alternate air sensor** are optional items and are **not** included with the standard control package.

SYSTEM INPUTS

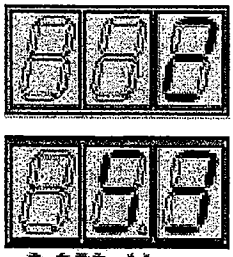
1. AMBIENT OR INSIDE AIR TEMPERATURE
2. ALTERNATE INSIDE AIR TEMPERATURE SENSOR (OPTIONAL)
3. OUTSIDE AIR TEMPERATURE SENSOR (OPTIONAL)
4. HIGH FREON PRESSURE
5. LOW FREON PRESSURE

FIGURE 3: TYPICAL APPLICATION



HOUR METER

Total compressor cycle time is saved in EEPROM every 6 minutes of continuous compressor running time. Cycles less than 6 minutes will be discarded to conserve memory and allow the most flexible hour-meter possible.

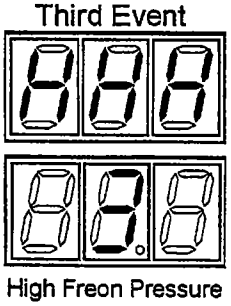


To view the hour meter turn off the power at the AC breaker and hold the down button depressed. While depressing the down button, restore AC power. After the power on reset routine is complete, the following will appear in the display:

1. The thousands units of the hour meter are displayed for 3 seconds.
2. The display blanks out for one second.
3. The hundreds and the tenths units are displayed for 3 seconds.
4. The unit returns to the last operating state before power was removed.

Maximum recorded time is 10, 000 hours. The hour meter stops at maximum (10,000 hrs) and can only be reset by Marine Air Systems.

SERVICE HISTORY



Passport-II will record and remember the last eight (8) service problems or service faults detected. Each time a fault is detected, a one hour timer is started. During that hour the same or recurring fault will not be recorded. Should a different fault be detected during that hour, it will be entered into the service history log.

The following events are entered into the service history log:

1. High Freon Pressure
2. Low Freon Pressure
3. Air Sensor Fault

To view the service log turn off the AC power and depress the fan button. With the fan button depressed turn on the AC power. Once the power on reset is completed the display will flash the most recent mnemonic of the fault detected followed by the event number. To view the other events detected press either the up or down buttons.

To exit the service history log press the power button or wait 30 seconds without pressing any buttons.

The service log can be cleared by simultaneously pressing the power and down buttons while you are in the view service log mode.

Trouble Shooting Guide

PROBLEM	PROBABLE CAUSE	SOLUTIONS
• No lights in the display and the system does not heat or cool. Power on reset does not occur when AC power is applied.	• AC breaker is not on or AC power not available. • Display cable or jacks broken or dirty. • Display cable is improperly assembled. • AC input is less than 75 VAC .	• Check for AC power at circuit breaker. • Check for AC power at module input. • Clean all jacks and plugs. • Try another known good display cable. • Check for proper AC and system wiring .
• The system operates but there is no compressor and no heat or cool lights.	• The set-point is satisfied!	• Raise or lower the set-point to allow the unit to cycle.
• The display toggles between **AAA** and zero **(0)**, and the systen will not run.	• The face plate air sensor is shorted or the display cable has been shorted or damaged. • The face plate air sensor is open or the display cable is broken.	• Clean all plugs and jacks. • Try an alternate air sensor or replace the display with a known good display. • Try a known good display cable. • Check the existing display cable for screws, staples and other damage.
• System displays room temperature but there is no fan or compressor.	• Set-point is satisfied and U-10 is programmed to cycle the fan on demand.	• Raise or lower the set-point to allow the system to cycle on... Check U - 10.
• The system runs but there is no cooling or heating, the compressor cycles on and off and eventually the AC breaker trips.	• The sea water valve is not open. • The sea water strainer is clogged. • The sea water pump is air-bound. • The sea water pump is inoperable.	• Open the sea water valve. • Clean the sea water strainer. • Bleed the air from the water system. • Check wiring, replace pump if necessary.
• The system operates but there is no fan. • The fan runs but only high speed, lower speeds are not available. • The fan runs very slow and is noisey.	• The fan wiring is incorrect. • Ducting is restricted or fan is miswired or triac has failed in closed mode. • Fan triac has failed or motor is defective.	• Check and correct fan motor wiring. • Check for proper duct sizes, correct any ducting restrictions and check wiring. Return the module for fan output triac replacement. • Check fan motor and replace triac or return module for repair or call for service.
• You can enter the program mode but aren't allowed to make any program changes.	• The programmable parameters are locked to prevent accidental programming changes.	• Refer to pages 5 and 14 for instructions. • Un-lock the programmable parameters.

Advanced Passport - II System Problems		
PROBLEM	**PROBABLE CAUSE**	**SOLUTIONS**
• System runs continuously and is not able to achieve set-point.	• Face plate air sensor is located in direct sun light or the display is mounted on an outside wall. • Outside air sensor is plugged into the alternate air sensor jack. • Set-point temperature set too low.	• Re-locate the display assembly• If this is not possible install an alternate air sensor. • Check the module board and plug the outside air sensor into the proper jack. • Raise the set-point to some reasonable level, i.e. 68 or 70° Fahrenheit.
• System short cycles and display indicates low temperatures.	• Supply air vent is blowing directly on display face plate. • The alternate air sensor improperly installed.	• Re-direct the air guide vanes, relocate the display or install an alternate air sensor. • Check and correct the sensor location.
• Evaporator coil is icing up during the cooling cycle.	• Duct work is restricted. • Temperature set-point is set too low. • Low fan speed (U-3) is programmed too low.	• Check and repair ducting. • Raise the set-point to something reasonable. • Raise the low fan speed parameter (U-3). • See Page 12 of this manual.
• All eights ("888") appear in the display on start-up and the system operates normally.	• Power on reset indicating all LED's are ok and the system is functional.	• This is the normal system boot-up routine and occurs when the AC power is first applied.
• All eights ("888") appear in the display and the system shuts-down or trips the AC breaker when the compressor attempts to start.	• Insufficient power to handle the start surge. • Locked compressor rotor --- Temporary! • Locked compressor rotor --- Permanent!	• Check the shore power, move to a better dock or switch to the ships generator. • Temporary imbalance, wait 5 min & re-start. • Compressor or start components have failed. Call for Service.
• The AC breaker trips when switching from shore to ships power• Applies to vessels with two or more systems on board	• Multiple compressor staging delays ("U -4") are not set or are all set at the same value. • See Page 12 of this manual.	• Enter the programming mode and set the staging delays at least 5 seconds apart • See page 11 for instructions.
• Pump cycles on and off with the compressor.	• Normal wiring calls for the pump to be connected to the compressor output.	• This is normal operation. The pump will cycle with the comp. since its wired the same output
• Unit trips the AC breaker during heating but runs fine in the cooling mode.	• The high freon pressure switch is shutting down the compressor due to excessive head pressure. This is usually caused by a combination of warm sea water, low fan speed settings and duct work restrictions. • See Page 12 of this manual.	• Raise the low fan speed setting (U-3) to 55. • Reverse the fan speeds during heating. U-9 = 0 • Remove any excess ducting and reduce the number of bends. Check for proper sizing of supply grilles, return grilles and duct work.

Advanced Passport - II System Problems		
PROBLEM	**PROBABLE CAUSE**	**SOLUTIONS**
• The high head pressure switch functions properly in the Cooling Mode, but does not function in the Heating Mode.	• The system is programmed to ignore the high pressure switch in the Heat Mode.	• This is normal operation and no service is required.
• The display indicates **"A A A"** and the control will not function.	• The air sensor in the face plate, the alternate air sensor or the display cable has failed.	• Unplug the alternate air sensor if installed. If the alternate sensor is not installed change the display. Try a known good display cable.

Stuck Button Chart

Stuck Button	Display Behavior
POWER	Display will indicate"888" on Power-Up and operate in the Self-Test Mode from Both the **On** and **Off Modes.**
FAN	The display will enter the trouble log... **VIEW HISTORY MODE.** The last fault logged will be displayed, whether you are in the **ON** or **OFF MODE.** The system wiIL **NOT** operate and continues to display the last fault logged.
UP	The original set point will increase to 85°F, where it will stay, and no other buttons will function. From the**OFF MODE,** the control will reset **("888")** and the display will go blank. The display will increase the setpoint starting from the original setpoint to 85°, where it will stay.
DOWN	The original setpoint will decrease to 60°F, where it will stay, and no other buttons will function. From the **OFF MODE,** the control will reset **("888"),** the display will indicate the compressor run time and then go blank.

Passport - II Display Cable Troubleshooting Guide

Display Problem	Possible Causes
NO BUTTONS OPERATE, BUT THE DISPLAY IS OK.	- Line 1 is Shorted to Line 2. - No Connection Line 2 ... From Display On Mode. - Line 2 is Shorted to Line 3, or Line 5 is Shorted to Line 6.
NO DISPLAY AND THE BUTTONS DO NOT WORK.	- Cable Not Plugged In or Plugged In Backwards. - No Connection On Line 6 or Line 7. - No Connection on Line 2... From Display Off Mode. - Line 1 Shorted to Line 2... From Display Off Mode.
DISPLAY INDICATES "000" AND NO BUTTONS FUNCTION.	- Line 3 Shorted to Line 4. - Line 5 is Open. - Line 4 is Shorted to Line 5.
THE DISPLAY FLASHES "AAA" AND NO BUTTONS FUNCTION.	- Line 3 is Open. - Line 7 is Shorted to Line 8.
THE DISPLAY FLASHES "AAA" AND THE BUTTONS FUNCTION OK.	- Line 8 is Open.
NO BUTTONS FUNCTION AND ONLY THE FAN LED IS ON.	- Line 4 is Open.
DISPLAY INDICATES AMBIENT TEMP AND NO BUTTONS FUNCTION.	- Line 5 is Open... From Display On Mode.

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Dometic®

Dometic Corporation

2000 N. Andrews Ave. Ext. • Pompano Beach, FL 33069-1497 USA • 954-973-2477 • Facsimile: 954-979-4414
Service Hot Line: 954-633-3150 • Service Fax: 954-973-8795 • www.marineair.com

Fleets Industrial Estate • 26 Willis Way • Poole, Dorset BH15 3SU, England
+44(0)8703306101 • Facsimile: +44(0)8703306102

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