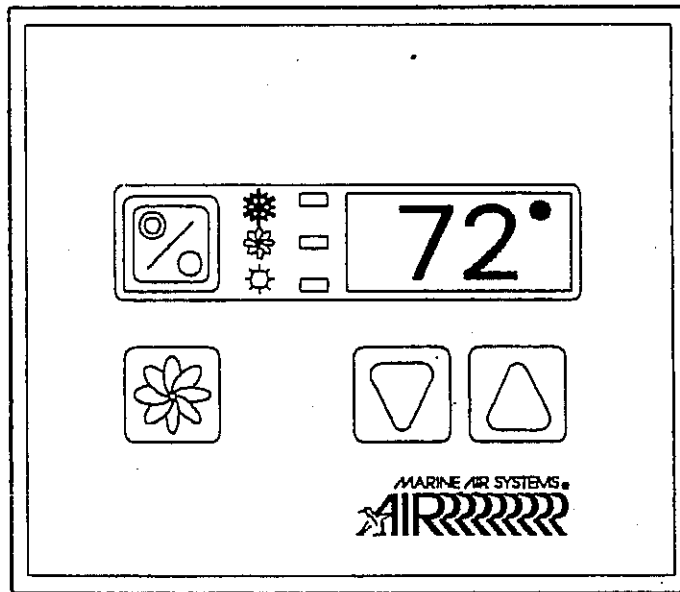


# ECU PASSPORT

## Operations Manual



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

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

- Non-Volatile Memory
- Low Voltage Display Panel
- LED Cabin Temperature Displayed in Fahrenheit or Celsius
- Face Plate Air Sensor For Accurate Operation
- Multiple Fan Speed Selections
- User Selected Programs For Optimum Control
- Optional Outside Air Temperature Sensor
- Compressor Load Fault Protection
- Compressor Start Staging Delay For Multiple Systems
- Moisture Cycle For Humidity Control
- Optional Outside Air Temperature Sensor

This manual is intended to provide information necessary to insure proper installation and operation of the **ECU PASSPORT**. 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 further assistance is needed, prior to or during the installation; call Marine Air Systems at (954) 973-2477— Fax (954) 979 - 4414.

The **ECU PASSPORT** is covered under existing Marine Air Systems Warranty Policy.

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

***Temperature Ranges***

|                        |           |               |
|------------------------|-----------|---------------|
| Set Point              | 60 - 85°F | 15.6 - 29.4°C |
| Display Temperature    | 0 - 150°F | 18 - 66°C     |
| Air Sensor Temperature | 0 - 150°F | 18 - 66°C     |

***Dimensions***

|               |                              |
|---------------|------------------------------|
| Display Panel | Width 3.875" X 4.50"         |
| Panel Cut Out | Width 3.375" X Height 2.750" |

***Cable Lengths***

|                             |                             |
|-----------------------------|-----------------------------|
| Display Cable               | Self Contained 15' Standard |
|                             | Central System 30' Standard |
| Optional Air Sensor         | 7' Standard                 |
|                             | Central System 30' Standard |
| Optional Outside Air Sensor | 15' Standard                |

**NOTE:** Custom cable lengths available on special request in 5' increments. Maximum length of display cable is seventy-five (75) feet.

***Memory***

**ECU PASSPORT** has nonvolatile memory which requires no batteries or any form of backup power. When power is lost the operating parameters are retained indefinitely. When power is restored, the control resumes operating as last programmed. All operating and programming parameters are entered into nonvolatile memory instantly, where they are retained indefinitely.

***Temperature Hysteresis***

While in a given mode the controller will maintain a two (2) ° F temperature variation. A four degree variation is required to cause the unit to shift to the opposite mode. Once in a given mode, heating or cooling, the controller will maintain a two degree hysteresis.

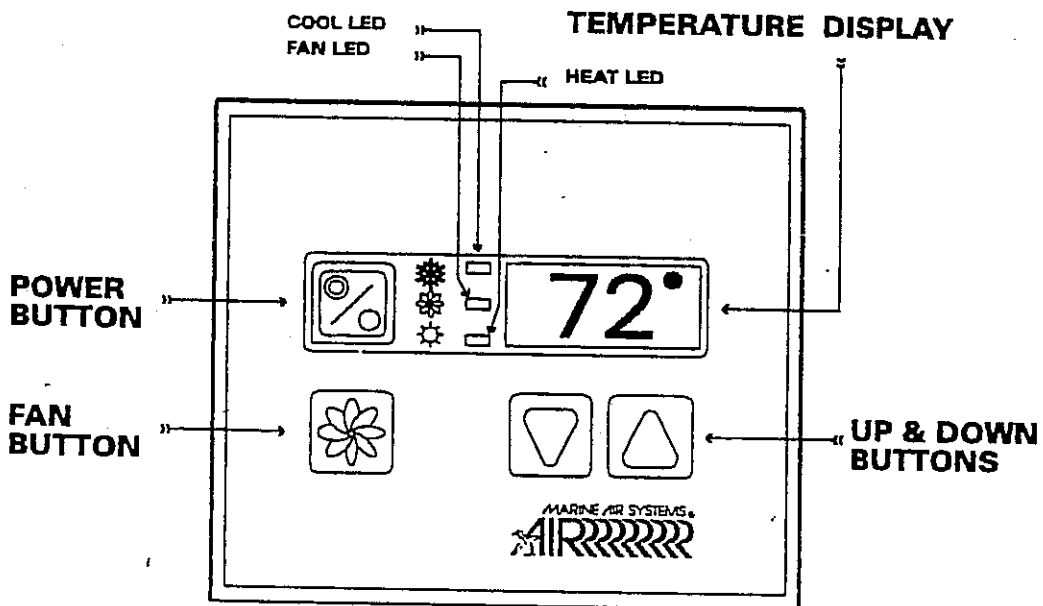
Button Locations and Functions



Single Button Functions

**1. POWER BUTTON** The Power Button is used to toggle between On and Off Modes. Press and hold the Power Button while in the Off Mode to enter the Program Mode. Continue holding the button to reset Factory Default Program Parameters.

**2. FAN SPEED BUTTON** The fan speed button is used to select one of the six manual or automatic fan speed settings. Automatic Fan Mode controls speed according to the difference between set point and room temperature. The greater the difference, the faster the fan will run unless programmed for reverse operation in the Heating Mode.



**3. DOWN BUTTON** Press the down button momentarily and set point temperature will appear in the display. Continue holding 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.

*Button Functions Continued*



**4. Up Button** Press the up button momentarily 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.

*Dual Button Functions*



**5. Up & Down Buttons** Press the up and down button together and the outside air temperature will be displayed, providing the **OPTIONAL OUTSIDE AIR TEMPERATURE SENSOR** has been installed and programmed. — See program item (U-8).



**6. Fan & Down Button** 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 to indicate the system is operational. Pressing any button returns the display to normal operation.



**7. Power & Down Button** While in the **ON MODE**, press the Power and the Down Buttons together to enter the **MOISTURE CONTROL MODE**. Once in Humidity Mode, the display will indicate **H U 1**. Exit to the Off Mode by pressing and releasing the Power Button once.

**NOTE:**

*Re. Item Six (6) — While in the Blank Display Mode, the center segment of the temperature display remains " LIT " when no heating or cooling is called for indicating the control is operational.*

*Modes of Operation*

*Off Mode*



When the Passport 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. Operating and program parameters resume based on those stored the last time the unit was operating.

**NOTE:**

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".

*Cool Only Mode*



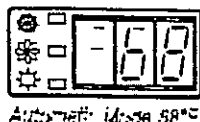
When the PASSPORT is configured for cool only mode, only the cooling systems will be selected and operated as required. When the temperature drops below the cool set point the system will not switch to the heating mode.

*Heating Mode Only*



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

*Automatic Mode*



When PASSPORT 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. Temperature hysteresis in a given mode will be maintained at two degrees (2° F) Fahrenheit, however, a four degree (4° F) Fahrenheit 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.

*Modes of Operation cont.*



**Humidity Mode**

While in the On Mode, press the power and the down button simultaneously to enter the Humidity or Moisture Control Mode. The letters HUI will appear in the temperature display indicating successful entry.

Every four (4) hours, 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 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 yacht is unoccupied for extended periods of time. **PLEASE NOTE: THE HUMIDITY MODE CAN ONLY BE ENTERED FROM THE ON MODE.**

**Fan Modes**



Automatic Fan Mode



**Automatic Fan Mode**

Press and hold the fan button until the letter A appears in the temperature display window. The Fan LED not being lit indicates Automatic Fan has been selected. Automatic Fan Mode allows the PASSPORT to determine 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 a Factory Default Mode, however, manual fan speed control is available.

**Manual Fan Mode**

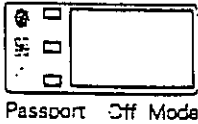
Press and hold the fan button during normal operation to select one of the six (6) manual fan speeds available. Six (6) is the fastest and one (1) represents the lowest speed available. Manual Fan Mode allows the user to select the desired fan speeds manually. When a manual fan speed has been selected the fan LED will be lit.

**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**



The program mode is used to adjust many operating parameters to suit particular needs of individual users. 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 affect the perceived operation of the overall system. The program mode allows the system to operate as efficiently as possible within a given installation. **PASSPORT** is shipped with factory programmable default settings which are stored in permanent memory and can be recalled at any time.

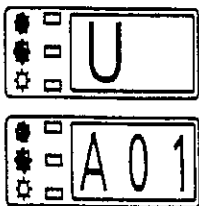


Severe electrical disturbances can sometimes upset the **PASSPORT** operating sequences. Operator confusion related to program parameters can also cause what seem to be operational problems. Whenever there is any doubt as to the proper operation of the controller, Factory Default Parameters should be 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 a parameter value will appear in the display. **PASSPORT** is now in the program mode. To exit the program mode press the **OFF** button.



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

**IMPORTANT!** Restoring Factory Default Settings Initialize Factory Default Settings by pressing and holding the power button for ten (10) seconds when the control is in the off mode.

Five (5) seconds after the button is pressed, "U" appears in the display. After ten (10) seconds a software revision number, such as (A01), appears indicating initialization has been completed. Release the power button and the **PASSPORT** will return to the off mode. **Factory Default Settings** have been restored.

*Using the Program Mode*

The program parameters are displayed by pressing the fan button while in the program mode. Press and hold the Fan Button to advance to the next parameter. Press and hold the fan button to scroll through the program parameters. The Programmable parameters range from "U 1" through "U11" for direct expansion air-conditioning systems.

*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 will return to the Off Mode. Not pressing any buttons 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.

*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 will appear in the display for one second, then the control will turn off.



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

**NOTE:**

*Button Functions are Not 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.*

**Programmable Parameters**

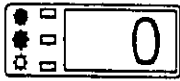
There are eleven (11) programmable parameters with their Factory Default Settings listed in this section. The table below indicates what these parameters are, along with the permitted values and Factory Default Settings.

| Program Number | Description   | Default Setting            | Range   |
|----------------|---|----------------------------|---|
| U-1            | Operating Mode Cooling Only, Heating Only or Automatic Cooling and Heating as Required.   | 0 = Automatic              | 0 = Auto Heat or Cool<br>1 = Cool Only<br>2 = Heating Only                                |
| U-2            | High Fan Limit (arbitrary units)  | 75                         | 50 - 80   |
| U-3            | Low Fan Limit (arbitrary units)   | 40                         | 25 - 49   |
| U-4            | Compressor Staging Time Delay   | 15                         | 15 - 135 seconds  |
| U-5            | Temperature Calibration   | 0                          | ±10°F   |
| U-6            | Compressor Load Fault Detection. Mnemonic Displayed is Three Dashes ("---"). Zero Turns CLF Off. One Continuous No Display, Two Continuous With Display and Three Failures Requires Manual Reset. | 1=Continuous<br>No Display | 0=Off<br>1=Continuous No Display<br>2=Continuous W/Display<br>3=3 Failures Reset Required |
| U-7            | Fahrenheit or Celsius Selection   | 0 = °F                     | 0 = °F 1 = °C   |
| U-8            | Outside Air Sensor Option Installed   | 0 = Not Installed          | 0=Not Installed 1=Installed   |
| U-9            | Reverse Fan Speeds During Heating   | 0=Normal                   | 0 = Normal 1 = Reversed   |
| U-10           | Continuous Fan or Cycle Fan with Compressor   | 1=Continuous Fan           | 0 = Cycle W./ Comp.<br>1 = Continuous Fan   |
| U-11           | Reverse Cycle Heat or Electric Heat   | 0=Reverse Cycle Heating    | 0 = Reverse Cycle Heat<br>1 = Electric Heat   |

**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-1: Operating Mode**



Automatic Mode

The Operating Mode is used to select Heating, Cooling or Automatic Mode depending on the particular requirement. Zero (0) selects the Automatic Mode, one (1) selects Cooling and two (2) selects Heating. **EXAMPLE:** Systems that do not have heating capabilities should be programmed for Cooling Only. The factory default is zero (0) — Automatic Mode.

**U-2: High Fan Limit**



High Fan Limit

The upper fan speed limit can be tailored to suit various motors and operating conditions. The high fan limit is adjusted with the system installed and operational. The range of values are 50 through 80 and represent arbitrary units. Setting a higher number, results in a higher fan speed, setting lower numbers, lowers the high fan speed limit. Use the Up and Down Buttons to select the desired high fan speed limit. The factory default setting is seventy-five (75).

**U-3: Low Fan Limit**



Low Fan Limit

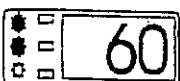
The low fan limit determines the lowest output allowed for the low fan speed. The range of values for the low fan speeds are 25 through 49, in arbitrary units — the factory default setting is 40.

**NOTE !** Both the High and Low Fan Limits may be adjusted while the fan is operational. From the Off Mode, start the fan by pressing and holding the Fan Button. Continue to hold the button until one (1) appears in the display. This is Circulation Mode Only, fan speed one (1). Enter the Program Mode while the fan is running and select "U - 3" which is the Low Fan Limit adjustment. Raising and lowering the Low Fan Limit allows the programmer to experience fan speed changes as they are made.

Adjustment of the High Fan Limit while the fan is operating is accomplished the same way except "U - 2" is selected instead of "U - 3"

**IMPORTANT !** Once the High and Low Fan Speed Limits are set, the unit will automatically adjust the remaining fan speeds to produce six (6) equally spaced fan speeds

**U-4: Compressor Staging Time Delay**



Staging Delay

The compressor staging delay is provided for installations where more than one system is being operated from 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 five (5) seconds apart. The minimum delay is fifteen (15) seconds and the maximum is one hundred thirty-five (135) seconds. The factory default setting is 15 seconds.



**U-5: Temperature Calibration**

Use this feature to calibrate the air sensor within a range of  $\pm$  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 is zero.



**U-6: Compressor Load Fault**

Compressor Load Fault is provided to monitor the compressor output circuit. Should, for example, the klixon or high head pressure switch open up a COMPRESSOR LOAD FAULT or C L F is displayed. When C L F occurs the display will flash three dashes - - - alternating with the room temperature. Compressor load fault can be caused by lack of cooling water, clogged inlet air filter (in heating mode), poor ducting resulting in restricted air flow, or a failed compressor. C L F indicates the system needs some serious attention and should not be ignored.

**CLF Settings as Follows:**

- Zero (0) turns off CLF, no action is taken and no message displayed.
- One (1) continuous CLF, no display with 90 seconds between restarts.
- Two (2) continuous CLF with display and 90 seconds between restarts.
- Three (3) CLF's with display, 90 second restarts and manual reset is required.



Compressor Load Fault detection can be programmed to shut down the unit after one occurrence or as many as three occurrences. Compressor Load Fault (CLF) can be disabled by programming Zero (0) = Off. The program range is zero (0) through three (3) factory default is one (1).



**U-7: Fahrenheit or Celsius Selection**

The unit can be programmed to display either Fahrenheit or Celsius by programming zero (0) or one (1). Zero selects degrees Fahrenheit and one (1) selects degrees Celsius. ... factory default setting is zero (0).



**U-8: Outside Air Sensor Option**

When this option is installed, the outside air sensor is plugged into the Alternate Air Sensor Jack and one selected (1) for the program value. The outside air temperature can be viewed during normal operation by pressing the up and down buttons simultaneously. ... factory default setting is zero (0) not installed.



**U-9: Reverse Fan Speeds During Heating**

During normal operation, in both Heating and Cooling Modes, the automatic fan speeds are reduced as the set point is approached. In the Heating Mode, this is not always the preferred method of operation. Some customers prefer that the fan operate faster as set point is approached, allowing lower fan speeds at cooler temperatures, making the air seem warmer. This method also reduces head pressures during reverse cycle heating. Program one (1) if you wish to reverse fan speeds during the Heating Mode ... factory default is zero (0) normal 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 only operate 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. Program one (1) for the electric heat option. The factory default is zero (0) which selects reverse cycle heating.

**ELECTRICAL SPECIFICATIONS**

|   |                    |
|---|--------------------|
| SET POINT RANGE .....                         | 55°F TO 85°F       |
| TEMPERATURE RANGE DISPLAYED .....             | 0°F TO 150°F       |
| LOW VOLTAGE LIMIT 115 VOLT UNITS .....        | 85 VAC             |
| LOW VOLTAGE LIMIT 220 VOLT UNITS .....        | 185 VAC            |
| SENSOR ACCURACY .....                         | ±1° AT 77°F        |
| LINE VOLTAGE .....                            | 115 OR 220 VAC     |
| HERTZ .....                                   | 50 OR 60 Hz        |
| FAN OUTPUT .....                              | 12 AMPS AT 220 VAC |
| HEATER OUTPUT .....                           | 20 AMPS AT 220 VAC |
| COMPRESSOR OUTPUT .....                       | 20 AMPS AT 220 VAC |
| COMPRESSOR LOAD FAULT MINIMUM DETECTION ..... | 2 AMPS             |
| MINIMUM TEMPERATURE OPERATION .....           | 0°F                |
| MAXIMUM TEMPERATURE OPERATION .....           | 185°F              |

