Micro Air Corporation

FX-Maxx
Operations Manual

Contents

Copyright © 1997 Micro Air Corporation, All Rights Reserved

The **FX-Maxx Control** is designed for use with all direct expansion, reverse cycle air conditioning systems. **FX-Maxx** has a universal power supply that operates on 115, 230, 50 or 60 Hz AC power. FX-Maxx includes the following standard and optional features:

Standard Features

> User friendly 6 button display panel requires no manual for basic operation
>
> Five volt logic and micro controller located in the display
>
> 3 - digit 7 - segment display panel indicates °Fahrenheit or °Celsius
>
> Paintable Face Plate Cover with recess for matching wall covering insert
>
> Automatic fan speed reduction as set point is approached
>
> Six [6] programmable manual fan speeds
>
> 16 programmable parameters for custom installations
>
> AC voltmeter to protect valuable electrical components
>
> High and low Freon pressure sensor inputs
>
> Moisture Mode for controlling relative humidity
>
> De-Icing cycle to prevent evaporator coil icing
>
> Programmable multiple compressor staging delays
>
> Universal AC power supply
>
> Nonvolatile memory retains settings without batteries
>
> Programmable display brightness control for night use

OPTIONAL FEATURES

The following optional items can be added by plugging the device into the appropriate jack and making the necessary programming changes.

> Outside air temperature sensor… No programming necessary.
>
> Alternate air temperature sensor… No programming necessary.
>
> Custom Paintable display panels
>
> Pump Guard water sensor… Program setting of P-8 required.

This manual is intended to provide information necessary to insure proper installation and operation of the **FX-Maxx.** Poor installation and **MISUNDERSTOOD** operating parameters will result in unsatisfactory performance and premature failure of the FX-Maxx.

Read This Manual Completely Before Proceeding !

If you require assistance prior to or during the installation of the FX-Maxx call Micro Air at 609-259-2636 or Fax your questions to Micro Air at 609-259-3063.

The **FX-Maxx** is covered under existing Micro Air Warranty Policy. Incorrect installation, neglect and system abuse are not covered under Micro Air warranty policy.

POWER BUTTON Press the power button once to toggle the unit to the on mode. Press the power button again to toggle the unit to the off mode.
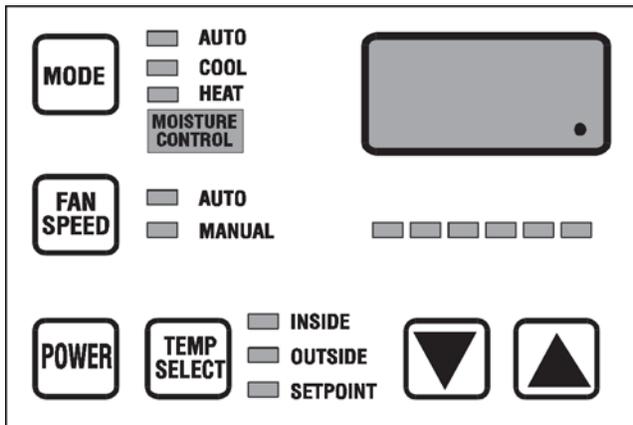
FAN BUTTON Press and release the f**an button** to advance from auto to manual fan. Press and release to increase the manual fan speeds, 1 through 6. Press and release again returns to the auto fan mode. The selected fan mode is indicated by the Auto and Manual fan LED's

UP BUTTON Momentarily press and the set point will appear in the temperature display. The set point increases one degree each time the up button is pressed and released.

DOWN BUTTON Momentarily press and release to display the set point. The set point is decreased one degree each time the down button is pressed and released.

MODE BUTTON The **mode button** is used to select one of 4 Operating Modes. Press and release to advance to the next mode. Continue to press and release until the desired Operating Mode is reached. The mode selected is indicated by the Mode LED.

TEMP SELECT BUTTON Press and release to view inside [supply] air temperature, outside [return] air temperature or set point. The appropriate LED will be lit indicating the temperature is displayed.

THREE DIGIT DISPLAY The inside [supply] temperature is displayed whenever the control is turned on. The display provides a readout of the inside air temperature which is located in the supply duct.

HEAT MODE LED The heat mode LED is lit when Heating is selected.

COOL MODE LED The cool mode LED is lit when the Cooling is selected.

AUTO LED The auto LED is lit when the Automatic Heating or Cooling Mode is selected. The control will automatically switch to heating or cooling when this mode is selected.

MOISTURE CONTROL LED The moisture LED is lit when the Moisture Control is selected.

MANUAL FAN LED The manual fan LED is lit when a manual fan speeds is selected.

AUTO FAN LED The auto fan LED is lit when automatic fan speed operation is selected.

FAN SPEED BAR GRAPH There are six [6] individual fan speed LED's. Each LED represents one [1] fan speed. Low fan [1] is indicated by illuminating the first LED. High fan speed is indicated by illuminating all six [6] LED's.

 LED The system operating status [Compressor On or Off] is indicated by turning On the right most decimal point in the 3 Digit Display.

FX-Maxx is a user friendly, easy to operate, programmable 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.

Press and release the Mode Button until the desired Mode LED is illuminated.

Set the desired room temperature by pressing the up or down button. The set point can be viewed by momentarily pressing and releasing the Up or Down Button.

Fan speed operation is automatic allowing fan speed to decrease as room temperature is approached. The fan speed decreases as the set point is approached. The fan will operate at low speed when set point is satisfied. Manual fan speeds can be selected by pressing and releasing the fan button to select the desired manual fan speed. The fan will operate at the speed selected and will not change speeds with room temperature.

The fan can be programmed to cycle on and off with demand, allowing the fan to run 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

Select Cool only and cooling only will be supplied. The cabin temperature will be maintained within 2 ° F of the set point. Select Heat only and only heating will be supplied. The cabin temperature will be maintained within 2 ° F of the set point.

Select Automatic and both heating and cooling will be supplied as required. While in the Automatic Mode FX-Maxx 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, FX-Maxx will maintain a two degree differential.

When the Heating or Cooling demand is satisfied, the compressor cycles off and the Automatic Fan returns to low speed. The fan speed will remain constant if Manual Fan Speed has been programmed.

REVERSING VALVE OPERATION

The reversing valve is toggled to the opposite mode when heating or cooling is required to reduce the compressor starting surge. The valve will only toggle to the opposite mode when a cooling or heating cycle is called for and if the system has been off for less than seventy-five (75) seconds. The valve will also toggle if a cycle is interrupted from the display panel by pressing the power button ON/OFF, or changing the set point. Unnecessary valve toggling has been limited to reduce reversing valve noise. Valve toggling can be totally eliminated by programming the minimum compressor staging delay at seventy-five seconds (75) or greater.

Power on reset, which occurs when the system is powered up, will always initiate a valve toggle.

Memory: FX-Maxx 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 and are retained indefinitely.

Refer to figure 1 for the buttons locations and display functions listed on the following pages.

Figure 1: FX-Maxx Control Buttons and Indicator Displays
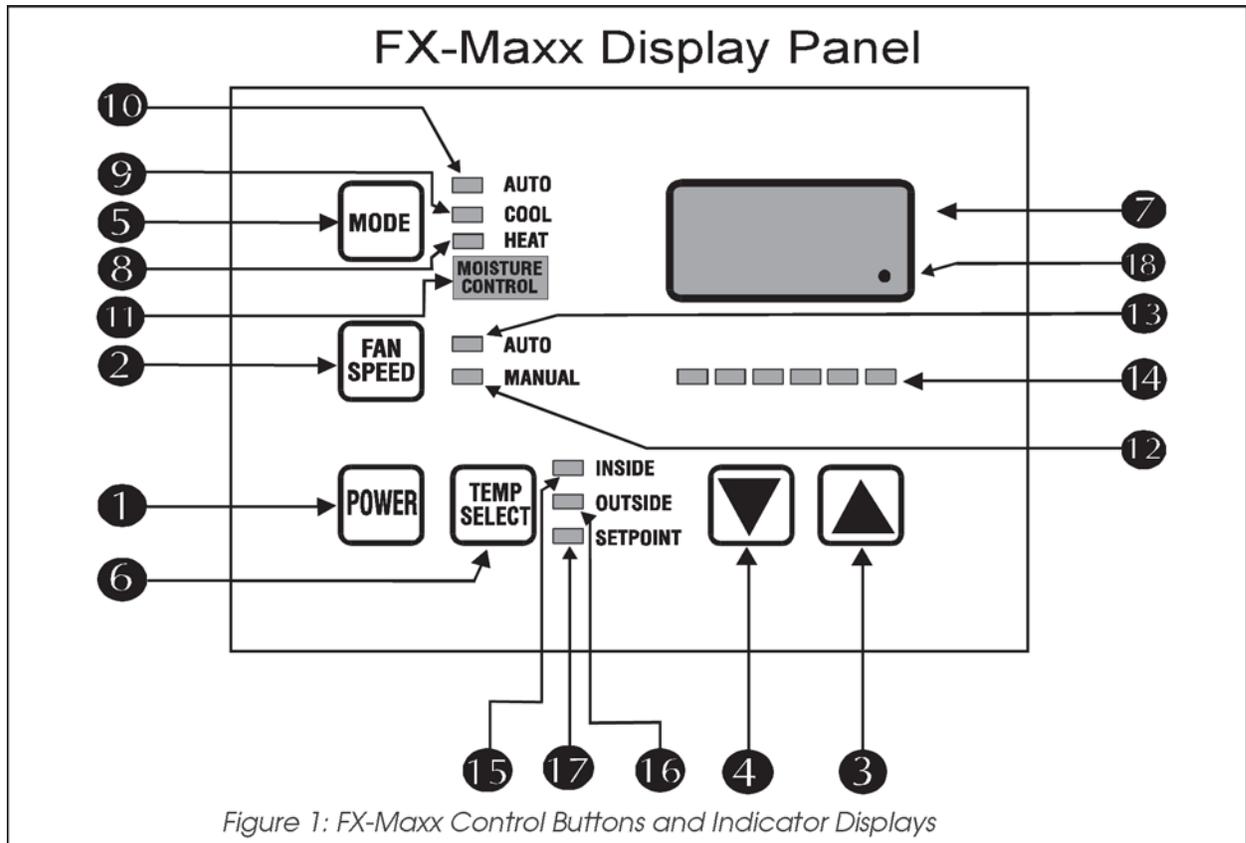
1. POWER BUTTON The power button is used to toggle between the **on** and **off modes**. Press the power button once to toggle the unit to the on mode. Press the power button again to toggle the unit to the off mode.

2. FAN BUTTON Press and release the f**an button** to advance from auto fan to manual fan. Press and release the **fan button** to advance the manual fan speeds, 1 through 6. Press and release again to return to the automatic fan mode. The selected fan mode is indicated by the auto and manual fan LED's

3. UP BUTTON Momentarily press the **up button** and the set point will appear in the temperature display. Press and release the up button to increase the set point one degree. The set point is increased by one degree each time the up button is pressed and released. The highest set point allowed is 85 ° F. The up button is used in conjunction with the down button to display the outside air temperature when the control is on. The up button is also used to increase program values in the program mode.

4. DOWN BUTTON Momentarily press and release the **down button** to display the set point. Press and release the **down button** to decrease the set point. The set point is decreased one degree each time the down button is pressed and released. The lowest set point allowed is 55 ° Fahrenheit. The down button is used in conjunction with the up button to display the outside air temperature when the control is on. The down button is also used to reduce program values in the program mode.

5. MODE BUTTON The **mode button** is used to select one of the four operating modes. Press and release the **mode button** and the FX-Maxx will advance to the next mode. Continue to press and release the Mode button until the desired operating mode is reached. The mode selected is indicated by the Mode LED, i.e., Cool, Heat, Automatic or Moisture Mode.

6. TEMP SELECT BUTTON Press and release the **Temp Select Button** to view inside air temperature, outside air temperature or the set point. The appropriate LED, Inside, Outside or Set Point will be lit indicating which temperature is being displayed. If no outside air sensor is installed three [3] dashes will appear in the Three Digit Display.

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 which is located in the face plate. An **optional alternate** air sensor is available for installations that cannot use the face plate sensor.

The display also indicates program information, fault codes and outside air temperature when the **optional outside air sensor** is installed.

The display momentarily indicates the **set point** when the **up** or **down** button is pressed.

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".

8. HEAT MODE LED The heat mode LED will be lit when the Heat Mode has been selected. The heat mode LED is also lit when the optional electric heat is installed and the heat mode is selected. Electric heater status, on or off, is indicated by the right most decimal point [18].

9. COOL MODE LED The cool mode LED will be lit when the Cooling Mode has been selected

10. AUTO LED The auto LED is lit when the automatic heating or cooling mode has been selected. The control will automatically switch to heating or cooling when this mode is selected.

11. MOISTURE CONTROL LED The moisture mode LED is lit when the Moisture Control has been selected. This mode is used to control humidity during periods when the vessel is unoccupied.

12. MANUAL FAN LED The manual fan LED will be lit when one of six manual fan speeds has been selected.

13. AUTO FAN LED The auto fan LED is illuminated when automatic fan speed operation has been selected.

14. FAN SPEED BAR GRAPH There are six [6] individual fan speed LED's in the Fan Speed Bar Graph. Each LED represents one [1] fan speed. Low fan speed [1] is indicated by illuminating the first LED. High fan speed is indicated by illuminating all six [6] LED's. Any of the six [6] fan speeds available are displayed by illuminating the appropriate LED's.

15. INSIDE LED The inside LED is lit when the inside air temperature is being displayed.

16. OUTSIDE LED The outside LED is turned on when the outside temperature is displayed.

17. SET POINT LED The set point LED is turned on when the set point is displayed.

18. COMPRESSOR LED The system operating status [Compressor On or Off] is indicated by turning On the right most decimal point in the 3 Digit Display.

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. No programming is required. **Press the UP & Down Buttons** simultaneously, while in the program mode, to set new custom programming defaults.

Power & Down Buttons… Simultaneously press the power and down buttons while viewing the Service Fault History Log clears the fault History Log.

Special button functions are implemented by pressing and holding a particular button while the controls' AC power is turned on.

1. Service History Log… View the service history log by pressing and holding the **Mode Button** while turning on the AC power. Exit the service history log by pressing the **power button** once. Clear the service history log by simultaneously pressing the power and down buttons.

2. Self Test Mode… Press and hold the **power button** while AC power is applied to enter the self test mode. The self test is used to diagnose problems and test the air conditioning system. For complete details see page 14 of this manual.

3. View Hour Meter… To view the compressor hour meter, press and hold the **down button** while applying AC power. Maximum recorded time is 10,000 hours. The hour meter stops at maximum (10,000 hrs) and can only be reset by Micro Air Corporation. The hour meter functions are described fully on page 16 of this manual.

Off Mode

When the **FX-Maxx** 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.

Cool Only Mode

When **Cool LED** is on, only the cooling systems are 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 available for customers that do not want automatic cooling and heating operation. Systems without reverse cycle heating can have an optional electric heater installed should heating be required.

Heating Only Mode

When the **Heat LED** is on, only the heating systems are 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 customers that require the system to not automatically switch from the heating to the cooling mode.

MODES OF OPERATION

Automatic Mode

When **the Automatic LED** is on, both heating and cooling are supplied as required. The **heat** and **cool LEDs** will be lit according to the mode required. When the system requires compressor operation for heating or cooling the right most decimal point [18] will turn on when the compressor is on.

Temperature in a given mode will be maintained at two degrees Fahrenheit 2 ° F), however, a four degree difference is required to allow the control to change modes. Once in a new mode, the temperature will remain within two degrees Fahrenheit 2 ° F) of the set point.

Moisture Mode

While in the **on mode**, press the Mode Button until the Moisture Mode LED is illuminated. 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 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 the cycle will be repeated. The right most decimal point is lit while the compressor is running.

FAN MODES

Automatic Fan Speeds

FX-Maxx has six automatic fan speeds available. Speed six is high, three is medium and one is low or the slowest speed. Automatic fan mode allows the FX-Maxx to determine the required fan speed 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.
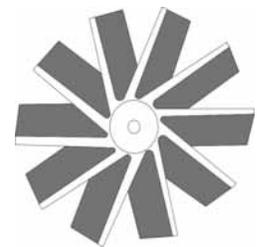
Manual Fan Mode

Six (6) is the fastest and one (1) represents the slowest speed. Manual fan mode allows the user to select and maintain the desired fan speed manually. When a manual fan speed has been selected, the fan speed bar graph will indicate the speed selected by the number of LED's lit. Select speed 3, for example, and the first 3 LEDs in the fan bar graph will turn on. Manual Fan Mode is sometimes preferred when room temperature is constantly changing due to varying heat loads.
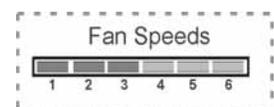
Program Mode Overview

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 the 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 under all conditions. **FX-Maxx** is shipped with factory programmable default settings which are stored in permanent memory and can be recalled at any time.

"figure 2: SUDS" enter program mode
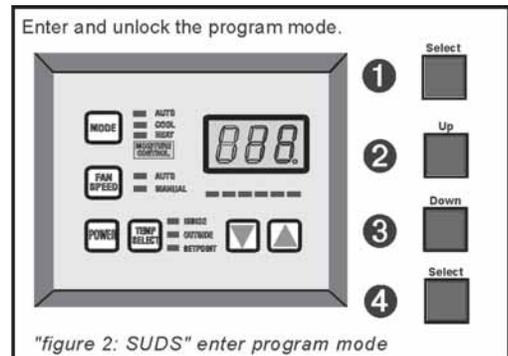
Warning

Severe electrical disturbances can sometimes upset the FX-Maxx 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.

The program mode can **only** be entered from the **Off Mode**. From the Off Mode and in the following order, press the **Select**, **Up**, **Down** and the **Select** buttons [**"SUDS"**]. These buttons have to be pressed and released in the order given. The numerals "85" which represent the high fan limit, appears in the display. The "85" is followed by the characters "P 1" followed again by the parameter setting ["85"]. **P 1** represents the first programmable parameter. The Fx-Maxx Air Handler Control is now in the program mode. Exit the program mode, to the **off mode,** by pressing and releasing the **power** button.
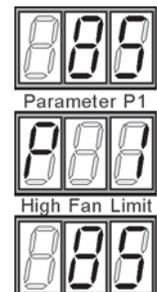
NOTE: The control will exit the program mode and return to the **off mode** if no programming is attempted for one (1) minute.

Restore Memorized Default Settings

IMPORTANT ! The memorized default settings can be **restored** by entering the program mode and setting P-16 to **rSt**. Exit the program mode and the software version number appears in the display. The **memorized default settings** are restored and the FX-Maxx control returns to the **off mode**. The software version number is always displayed when you exit the program mode.

Increment from one **parameter** to the next by pressing and releasing the **Mode Button** while in the **program mode**. Use the **up** and **down buttons** to change the program parameter values. The **programmable parameters** range from P-1 through P-16.

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 as require them.

Exiting the Program Mode

There are two methods to exit the program mode. Press the power button and the **FX-Maxx** control will return to the **off mode**. Not pressing any buttons or attempting any program changes for sixty (60) seconds will allow 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 program 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. ("A10") will appear in the display for one second, then the control will return to the off mode.

Should there be any reason to contact Micro Air Corporation about the system or programming the FX-Maxx, be sure to have the software identification number and serial number of the system available.

PROGRAMMING

P-1: High Fan Limit

The upper fan speed limit can be changed to suit different motors and operating conditions. The **high fan limit** is adjusted with the system installed and operational. The range of values are 56 through 85 and represent arbitrary units. Setting a higher number, results in a higher fan speed, setting lower numbers, lowers the high fan speed. Use the up and down buttons to select the desired high fan speed limit. The factory default is eighty-five (85).
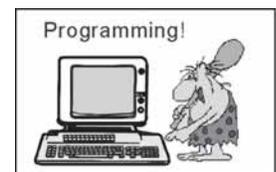
P-2: Low Fan Limit

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. Use the up and down buttons to select the desired low fan speed limit. Setting a higher number, results in a higher fan speed, setting lower numbers, lowers the low fan speed limit. The factory default setting is 50.

IMPORTANT ! Once the high and low fan speed limits are set, the unit will automatically readjust the remaining fan speeds to produce six (6) equally spaced in both the automatic and manual fan speeds modes.

Programmable Parameters

There are sixteen (16) 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 the original Factory Default Settings.

Program Number	Description	Default	Range
P-1	High Fan Speed Limit (arbitrary units)	85	56 - 85
P-2	Low Fan Speed Limit (arbitrary units)	50	30 - 55
P-3	Compressor Staging Time Delay	15	5 - 135 seconds
P-4	Temperature Sensor Calibration	0	Ambient ± 10° F
P-5	Failsafe Modes and Mnemonic High Freon Pressure - - - HPF Low Freon Pressurer - - LPF Low AC Line Voltage - - LAC	3 = 4 Failures With 90 Second Restart Delay. Manual Reset is Required.	Off 1 = Continuous No Display 2 = Continuous W / Display 3 = 4 Failures Reset Required
P-6	Low AC Voltage Cut-Off	85 VAC (115vac) 185VAC (220vac)	Off - 75 to 100 (115 vac units) Off - 175 to 200 (220 vac units)
P-7	De-Icing Cycle	O	O = Off 1 to 3 Minutes
P-8	Pump Sentry… Protects Pump and Compressor From Loss of Sea Water.	OFF	OFF On = Select 100°F to150°F
P-9	Display Brightness Control	13 = Maximum	4 = Low 13 = Maximum
P-10	Display ° Fahrenheit or ° Celsius	°F	°F = Fahrenheit Displayed °C = Celsius Displayed
P-11	Cycle Pump With Compressor or Continuous Pump	OFF = Cycle With Compressor	OFF = Cycle with Compressor On = Continuous Pump
P-12	Reverse Fan Speeds During Heating Mode	rEF = Reversed	nor = Normal Fan Operation rEF = Reversed Fan In Heating
P-13	Continous Fan or Cycle Fan with Compressor	con = Continuous Fan Operation	CYC = Cycle Fan With Comp. con = Continuous Fan Operation
P-14	Reverse Cycle Heating or Electric Heat Only Option Installed (cooling only units)	nor = Reverse Cycle Heating	nor = Reverse Cycle Heating ELE = Electric Heater Installed
P-15	Fan motor type selection… Shaded pole or split capacitor.	SP = Shaded Pole	SP = Shaded Pole Fan Motor SC = Split Cap. Fan Motor
P-16	Reset Memorized Programming Defaults	nor = Normal	rSt = Reset Defaults

Should any programming problems or confusion occur, reset the Memorized Default Settings by entering the program mode and setting P-16 to rSt.

P-3: Compressor Staging Time 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 five (5) seconds and the maximum is one hundred thirty-five (135) seconds. The factory default setting is 15 seconds.

P-4: Temperature Calibration

Use this feature to calibrate the air sensor within a range of ± ten (10) °F. Enter the program mode and the ambient temperature appears in the display. Use the up and down keys to select the desired offset. The temperature in the display will increase or decrease according to the offset programmed. The factory default setting is zero.

P-5: Fail-safe Level

The system can be configured for one of four fail-safe levels. Selecting **OFF** 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 four (4) consecutive failures… Manual reset is required to restart the system.

P-6: Low AC Voltage Cut-Off

FX-Maxx can be programmed to protect the system against sustained low AC line voltage conditions. The compressor will be shut down and **"LAC"** flashed in the display if the line voltage goes below the programmed value for more than ten (10) minutes. Programmable values are 75 VAC to 100 VAC for 120 volt units and 175 VAC to 200 VAC for 220 volt systems. The factory default is 85 VAC for 120 volt units and 185 VAC for 220 volt systems. **NOTE**: Low Voltage Protection can be turned off by programming **Off** instead of selecting a voltage value.

P-7: De-Icing Cycle

FX-Maxx 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 [55 ° 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 3 minutes. The factory default setting is Off.

P-8: Optional Pump Sentry

FX-Maxx can be equipped with an optional temperature sensor that is used to monitor the condenser coil temperature. The sensor is plugged into the outside air sensor jack and parameter P-8 programmed for a temperature between 100 and 150 ° F depending on sea water temperature and

the system type. When the coil temperature rises above the programmed value the pump and compressor are shut down and **"PPP"** is flashed in the display. The factory default is Off, no pump sentry installed.

P-9: Display Brightness Control

The display brightness can be adjusted to suit ambient cabin lighting conditions. The allowed settings are four (4) to thirteen (13), with four (4) being the dimmest and thirteen (13) the brightest. Typically a dark cabin will require a setting of four or five. A very bright cabin will require a setting of twelve or thirteen. The factory default setting is thirteen (13).

P-10: Fahrenheit or Celsius Selection

The unit can be programmed to display either Fahrenheit or Celsius. Programming °F selects degrees Fahrenheit and programming °C displays degrees Celsius. The factory default setting is °F, Fahrenheit. When degrees Celsius (°C) is selected the readings are displayed in tenths, i.e. 22.2 °
.

P-11: Cycle Pump With Compressor

To increase pump life and conserve electricity the pump can be programmed to cycle on and off with the compressor. The pump can also be programmed to operate continuously whenever the system is on. To program the pump for continuous operation turn P-11 On. The factory default is Off, which cycles the pump with the compressor.

P-12: Reverse Automatic Fan Speeds During Heating

The automatic fan speeds can be reversed during the heating mode to improve heat output in cooler climates. The fan speed is decreased as the temperature spread increases. The fan will speed up as the set point is approached. Lowering the fan speed when the cabin is cold increases head pressure and raises the supply air temperature. Increasing the fan speed as the set point is approached also reduces unnecessary high pressure faults. The fan switches to low speed when the set point is satisfied and the compressor cycles off. The fan can be programmed to operate the same as in cooling by programming P-12 **nor** which represents normal fan operation during reverse cycle heating. The factory default is **rEF**, which reverses the automatic fan speeds during heating.

P-13: 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 select **CYC** which stands for cycle the fan with the compressor. To operate the fan continuously select **con** which represents continuous fan operation. The factory default is **[con]** continuous fan operation when the system is on.

P-14: Reverse Cycle or Electric Heat

Units not equipped with reverse cycle heat may have electric heater 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 parameter **ELE** for the electric heat option. The factory default is **nor** which is normal reverse cycle heating.

P-15: 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 fan speed control. The default setting is **"SP"** which selects shaded pole motor type, however, **"SC"** should be selected if a split capacitor type of fan motor is used in the system. Most direct expansion systems are supplied with shaded pole type fan motors. The factory default is **"SP"** shaded pole motor type.

P-16: Reset Memorized Defaults

The default programming parameters can be reset by entering the program mode and selecting **rSt**. This will restore the programmable parameters to the values selected when the system was shipped. The program parameters listed on page nine may be altered by Micro Air Corp., the installing dealer or the end user. Once **New** defaults are entered (see page 6, dual button functions) and memorized the **NEW** defaults will be reset. The original factory programmable parameters as listed on page 10 will have to be restored manually.

Why Memorize 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 8 of this manual.

FAIL-SAFE AND FAULT HANDLING CODES

When a fault is detected FX-Maxx will display one of the following Mnemonic fault codes:

> **HPF…** indicates high Freon pressure. 15 Second Delay… Ignored in Heat Mode.
>
> **LPF…** Indicates low Freon pressure. There is a ten minute charge time delay.
>
> **LAC…** Indicates low AC line power
>
> **AAA…** Indicates failed air sensor. Unit will not run until repaired.
>
> **PPP…** Indicates the sea water pump has failed.

Fail-Safe

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 restarts. Level three is identical to level two with the inclusion of a three successive failures lockout routine. After four [4] consecutive failures the system is shut down and a manual reset is required.

Lockout

Lockout occurs if P-5 is programmed for level 3 and four consecutive faults are detected within a heating or cooling cycle. Lockout causes the system to shut down and flash the mnemonic fault code. **Lockout** can only be cleared by turning the unit **off,** then **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 <u>pressing and releasing</u> the **power button** to reset the control. <u>Resetting the control does **not** solve the problem that caused the fault!</u>

Failsafe Level	Action	Description of Action Taken
OFF	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 4 failures.	MAXIMUM PROTECTION LEVEL: FAULT CODE MESSAGES ARE DISPLAYED and The Appropriate Action is Taken According to The Problem Encountered.After 4 Consecutive Failures Manual Reset is Required.

SPECIFICATIONS

SET POINT OPERATING RANGE .... 55 ° F TO 85 ° F

AMBIENT TEMPERATURE OPERATING RANGE DISPLAYED .... 55 ° F TO 85 ° F

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 RESET .... 65 VAC

LINE VOLTAGE .... 115 THROUGH 230 VAC

FREQUENCY .... 50 OR 60 HZ

FAN OUTPUT .... 6 AMPS @ 115 VAC

FAN OUTPUT .... 6 AMPS @ 230 VAC

VALVE OR HEATER OUTPUT .... 1/4 AMP @ 115 VAC

VALVE OR HEATER OUTPUT .... 1/4 AMP @ 230 VAC

PUMP OUTPUT .... 1/4 HP @ 115 VAC

PUMP OUTPUT .... 1/2 HP @ 230 VAC

COMPRESSOR OUTPUT .... 1 HP @ 115 VAC

COMPRESSOR OUTPUT .... 2 HP @ 230 VAC

MINIMUM OPERATING TEMPERATURE .... 0 ° F

MAXIMUM OPERATING TEMPERATURE .... 180 ° F

MAXIMUM RH CONDITIONS .... 99% NON CONDENSING

POWER CONSUMPTION .... LESS THAN 5 WATTS

DIMENSIONS

DISPLAY PANEL .... 5.310" X 4.130"

PANEL CUT OUT .... 5.10" X 3.40"

CABLE LENGTHS

DISPLAY CABLE SELF CONTAINED .... 15' STANDARD

DISPLAY CABLE CENTRAL SYSTEM .... 30' STANDARD

ALTERNATE AIR SENSOR .... 7' STANDARD

ALTERNATE AIR SENSOR CENTRAL SYSTEM .... 30' STANDARD

OUTSIDE AIR SENSOR .... 15' STANDARD

SYSTEM INPUTS

1 .... AMBIENT OR INSIDE AIR TEMPERATURE

1 .... HIGH FREON PRESSURE

1 .... LOW FREON PRESSURE

1 .... ALTERNATE INSIDE AIR TEMPERATURE SENSOR (OPTIONAL)

1 .... OUTSIDE AIR TEMPERATURE SENSOR (OPTIONAL)

1 .... PUMP SENTRY CONDENSER COIL SENSOR (OPTIONAL)

SPECIFICATION NOTES

Custom cable lengths available on special request in 5 foot increments. Maximum length of display cable is 50 feet. Sensor cable lengths should be limited to 50 feet. The **outside air sensor**, **alternate air sensor** and **condenser coil sensor** are optional items and are **not** included with the standard control package.

In order to continually improve and advance the FX-Maxx Control, Micro Air, Inc. reserves the right to change this products' basic operation, specifications and design criteria without prior notice.

AUTOMATED FACTORY-SELF TEST PROGRAM

Self-Test Mode

The **FX-Maxx** 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 **on/off button** is pressed once which returns the system to the off mode.

Activate the self-test by pressing and holding the **on/off button** while turning on the AC power. Be sure to continue to hold the button until the **power on reset** is completed… FX-Maxx 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 **on/off button** once.

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 hour meter mnemonic [Hr] is displayed for one [1] second.
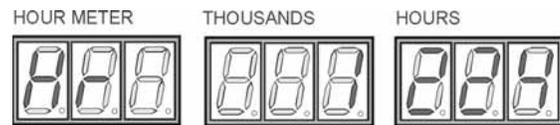
2. The display blanks out for one second and then displays the THOUSANDS units for three [3] seconds.

3. The display blanks out for one [1] second and then displays the hours for three [3] seconds.

4. The unit returns to the last operating state before power was removed.

The example shown is displaying twelve-hundred twenty-four [1,124] hours.

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

Service History

FX-Maxx 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 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
4. Low AC Voltage
5. Pump or Loss of Sea Water Fault

To view the service log turn off the AC power and depress the **Mode Button**. With the **Mode Button** depressed turn on the AC power. Once **Power-On** reset is completed, the display will flash the most recent mnemonic for 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** or the **Mode 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 viewing the service log mode.
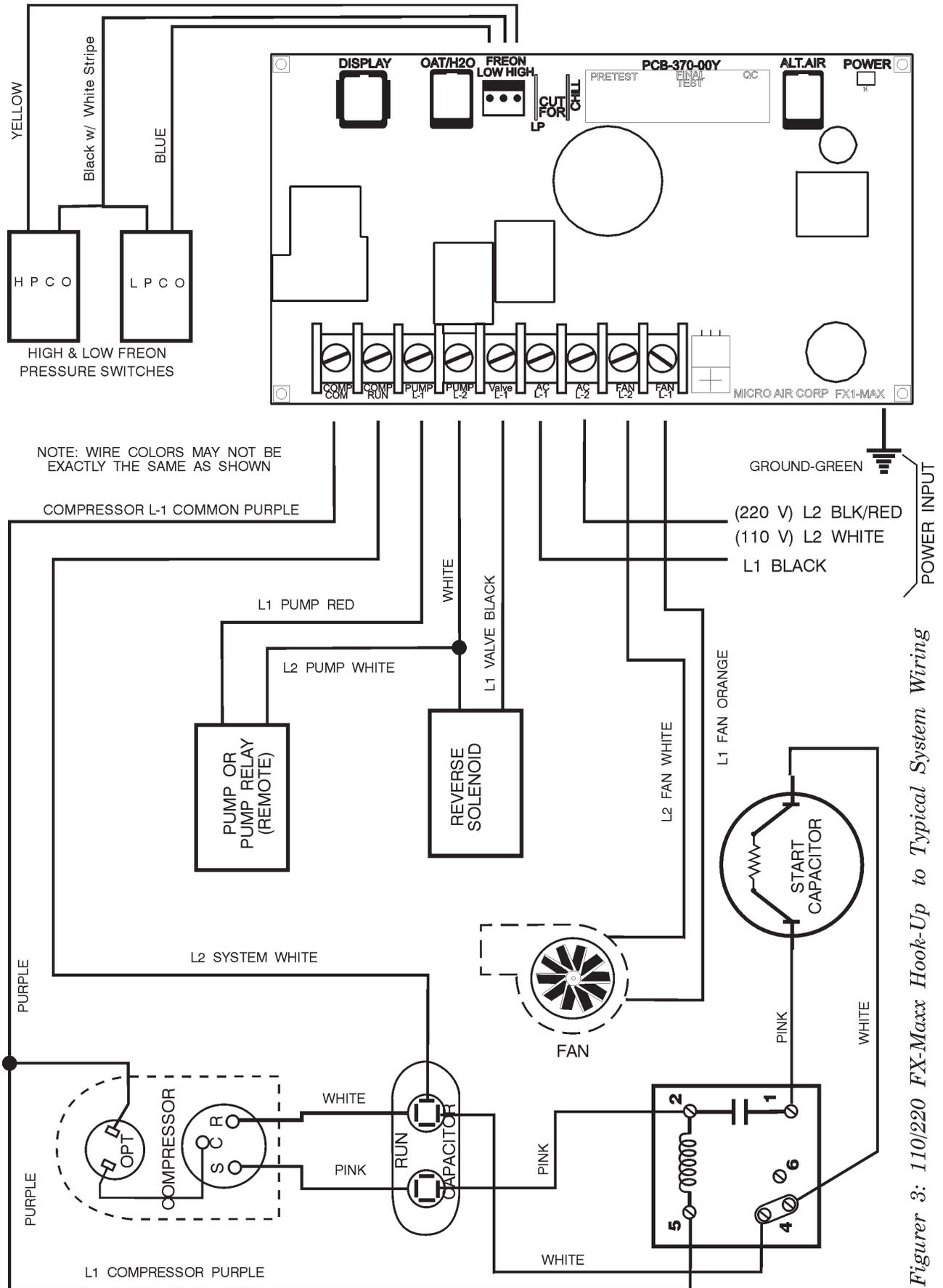
Figurer 3: 110/220 FX-Maxx Hook-Up to Typical System Wiring

NOTE: WIRE COLORS MAY NOT BE EXACTLY THE SAME AS SHOWN

HIGH & LOW FREON PRESSURE SWITCHES

Optional Sensor Locations and Cable Connections

Optional Remote Air Sensor

RETURN AIR GRILLE

NOTE: WHEN USING THE AIR SENSOR IN THE FACE PLATE THE DISPLAY MUST BE MOUNTED AT LEAST THREE (3) FEET ABOVE THE DECK AND ON AN INSIDE WALL NOT IN DIRECT SUNLIGHT. DO NOT LOCATE WHERE THE DISCHARGE AIR FROM THE UNIT WILL BLOW DIRECTLY ONTO THE DISPLAY.

FX-Maxx Electrical Box and Power Module

SENSOR

OR OPTIONAL LOCATION

MODE   AUTO
        COOL
        HEAT
        MONITOR/
        CONTROL

FAN   AUTO
SPEED   MANUAL

POWER TEMP   INSIDE
       SELECT OUTSIDE
               SETPOINT

Power Harness to Unit

O.A.T. OPTIONAL

ALWAYS USE A METAL FASTENER TO SECURE THE OPTIONAL SERVICE SENSOR.

SELF-CONTAINED SYSTEM

figure 3