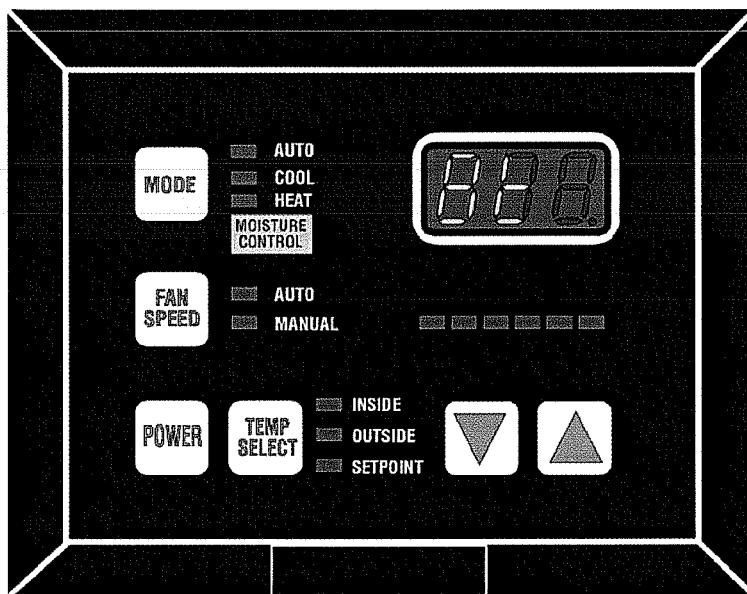


# Micro Air Corporation

## FX-Maxx Air Handler Control Operations Manual



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Fx-Maxx Air Handler Control  
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## NOTES:

All items labeled **COMP** should be considered Electric Heater applications.

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When the Alternate Air Sensor is required the Outside Air Sensor is not available

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The **Fx-Maxx Control** is designed for use with Chilled Water Air Conditioning Systems. **Fx-Maxx** has a universal power supply that operates on 115, 230, 50 or 60 Hz AC power. Fx-Maxx Air Handler Control includes the following standard and optional features:

### ***Standard Features***

- Paintable Face Plate Cover with recess for matching wall covering insert.
- 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 indicates °Fahrenheit or °Celsius.
- Automatic fan speed reduction as set point is approached.
- Six [6] manual fan speeds.
- 18 programmable parameters for custom installations.
- Water In Sensor allowing individual cabin heating.
- Moisture Mode for controlling relative humidity.
- Universal 115/230 VAC 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.
- Alternate air temperature sensor.
- Custom Polished Brass Display Panels.
- Electric Heat Option.

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

### ***Read This Manual Completely Before Proceeding !***

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

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

**NOTE:** In order to continually improve the Fx-Maxx Air Handler Control, Micro Air reserves the right to change this products' basic operation, specifications and design criteria without prior notice.



**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 fan 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 air temperature, outside air temperature or set point. The appropriate LED will be lit indicating the temperature is displayed.

**THREE DIGIT DISPLAY** The room temperature is displayed whenever the control is turned on. The display provides a readout of the inside ambient air temperature and the set point.

**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.

**WATER VALVE STATUS LED** The system operating status [ Water Valve Open or Closed ] 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 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. The fan speed decreases as room temperature is approached. The fan will operate at low speed when set point is satisfied. Manual fan speeds can be selected by pressing the Fan Speed Button and selecting the desired 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 the Heating and Cooling demand. Normally the automatic fan speed operation is reversed in the heating mode, however, the fan speeds 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 water valve switches to the appropriate mode. Four [4] seconds later the automatic fan control adjusts the fan to the proper speed. When the demand is satisfied, the water valve cycles off and the fan returns to low speed. If cooling is required, the water valve will not open unless adequate cooling water is available. The fan will remain in low speed until adequate cooling water is available. If heating is required the valve will not open unless adequate heating water is available. The fan remains in low speed until adequate heating water is available. The water temperature can be viewed by simultaneously pressing the Up and Down Buttons while in the On Mode. Heat will be supplied when no heating water is available if the Optional Electric Heater [Electric heating element] has been installed and programmed.

While in a Heating or Cooling Mode the controller will maintain a two degrees Fahrenheit ( $2^{\circ}\text{F}$ ) temperature variation. A four degree swing is required to cause the unit to shift to the opposite mode. Once in a new mode, Heating or Cooling, Fx-Maxx Air Handler Control will maintain a two degree differential.

---

### MOISTURE MODE

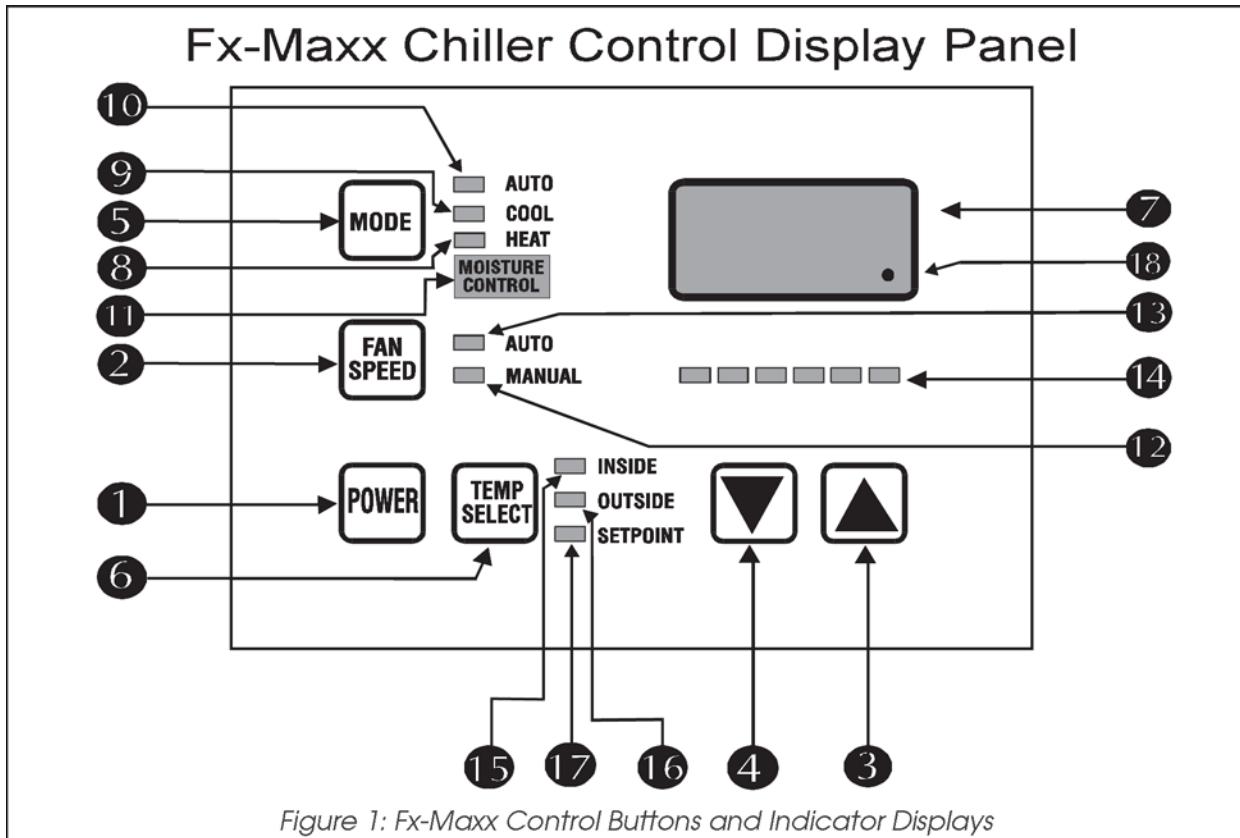
While in the **on mode**, press the Mode Button until the Moisture Control LED is lit. The first cycle will start in 1 minute. Every 4 hours, the fan is started and air circulated for 30 minutes. During this time the air temperature is sampled and entered into memory. The cooling cycle is started and continues until the temperature is lowered  $2^{\circ}\text{F}$ . The system is allowed a maximum of one hour running time to reach the desired temperature. Four hours after the temperature is satisfied or the Cooling Mode times out, the cycle is repeated. During the humidity cycle the Valve LED is lit while the system is Cooling.

---

### MEMORY

**Fx-Maxx Air Handler Control** 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.



**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 to the off mode.

**2. FAN SPEED BUTTON** The fan speed button is used to switch between Auto and Manual Fan Speeds. Pressing and releasing the Fan Speed Button once toggles the fan mode as indicated by the Fan LED indicator lamps. Press and release the fan speed button until the desired Automatic [A] or Manual Fan Speed [1 through 6] is selected.

**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 with the down button to display the Water In 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 Water In 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 Air Handler Control 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 Mode 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.

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

**Up & Down Buttons** Simultaneously Press the Up and Down buttons, while in the On Mode, to view the chill water inlet temperature.

**Simultaneously Press the UP & Down Buttons** while in the program mode to set new custom programming defaults.

MODES OF OPERATION

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### ***Off Mode***

When the **Fx-Maxx Air Handler Control** 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.

### ***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.

### ***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 the water valve to be turned on for heating or cooling the water valve LED will turn on when the valve is on and will turn off when the valve is off.

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

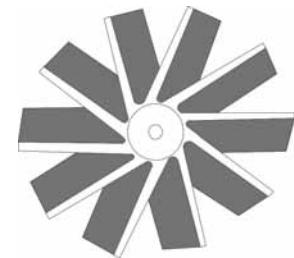
While in the **on mode**, press the Mode Button until the Moisture Mode LED is illuminated. The first cycle will start in 1 minute. Every 4 hours, the fan is started and air circulated for 30 minutes. During this time the air temperature is sampled and entered into memory. The cooling cycle is started and continues until the temperature is lowered 2 ° F. The system is allowed a maximum of one hour running time to reach the desired temperature. Four (4) hours after the temperature is satisfied or the one hour timer runs out the cycle is repeated. During the humidity cycle the Water Valve LED is lit while the water valve is turned on and the system is cooling.

## FAN MODES

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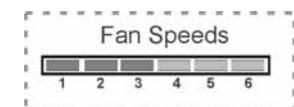
### Automatic Fan Speeds

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 Speeds

Six (6) is the fastest and one (1) represents the slowest fan 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.

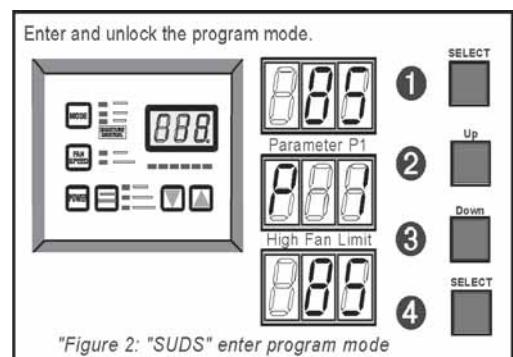


## PROGRAM MODE

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### 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 Air Handler Control** is shipped with factory default settings which are stored in permanent memory and can be recalled at any time.



"Figure 2: "SUDS" enter program mode

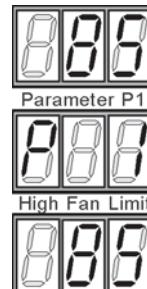
## Warning

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.

## *ENTERING PROGRAM MODE*

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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 Air Handler Control returns to the **off mode**. The software version number is always displayed when you exit the program mode.



## *USING THE PROGRAM MODE*

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Increment from one **program parameter** to the next by pressing the **Mode Button** while in the **program mode**. Press and release the Mode Button to advance to the desired parameter. Use the **up** and **down buttons** to change the program parameter values. The **programmable parameters** range from P-1 through P-18.

## *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 Air Handler 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.

## **Programmable Parameters**

There are eighteen (18) programmable parameter locations 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	Unused --- Reserved for future options	N/A	N/A
P-4	Temperature Sensor Calibration	0	Ambient ± 10° F
P-5	Unused --- Reserved for future options	N/A	N/A
P-6	Unused --- Reserved for future options	N/A	N/A
P-7	Unused --- Reserved for future options	N/A	N/A
P-8	Unused --- Reserved for future options	N/A	N/A
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	Outside Air Temp Sensor Only When Alt Air Sensor in Not Required	OFF	OFF = Alt Air Available On = OAT Sensor Only
P-12	Reverse Fan Speeds During Heating Mode	rEF = Reversed	nor = Normal Fan Operation rEF = Reversed Fan In Heating
P-13	Continuous Fan or Cycle Fan with Demand	con = Continuous Fan Operation	CYC = Cycle Fan On Demand con = Continuous Fan Operation
P-14	Chill Water Heating or Electric Heat	nor = Chill Water Heat Only Heat Only	nor = Chill Water Heat Only 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
P-17	Water Valve Forced Open 4 Hours to Bleed the Chillwater System	nor = Normal Operation	nor = Normal Operation OPn = Valve Forced Open
P-18	Ambient Air to Chill Water Temperature Differential	15°F	5°F to 25° Fahrenheit

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

## ***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.

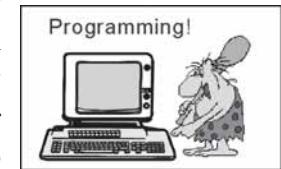
***Should there be any reason to contact Micro Air Corporation about the system or programming the Fx-Maxx Air Handler Control be sure to have the software identification number available.***

## ***PROGRAMMING***

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### ***P-1 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 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 limit. Use the up and down buttons to select the desired high fan speed limit. The factory default setting 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.

### ***P-3 Reserved For Future Options***

Program item P-3 is reserved for future options.

### ***P-4 Temperature Calibration***

Use this feature to calibrate the air sensor within a range of  $\pm$  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, P-6, P-7 & P-8: Reserved For Options***

Program items P-5, P-6, P-7 and P-8 are memory locations reserved for future options.

### **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 Outside Air Sensor Option**

The ALT AIR jack can be used as an optional outside air temperature sensor input when the alternate air sensor is not required. Plug in the outside air sensor and program P-11 on. The outside temperature can be viewed by using the Temp Select Button. Press and release the Temp Select Button until the Outside LED is lit. The outside air temperature will appear in the display while the Outside LED is lit. **Note:** The OAT can also be viewed by simultaneously pressing and holding the Up and Down Buttons while in the **Off** Mode.

### **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 raises the supply air temperature. The fan switches to low speed when the set point is satisfied and the water valve 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 the heating cycle. The factory default is **rEF**, which reverses the automatic fan speeds during heating.

### **P-13 Cycle Fan with the Cooling or Heating Demand**

The fan can be programmed to run continuously when the system is on or can be allowed to cycle with the demand. When cycled with demand, the fan will operate only when heating or cooling is called for. To cycle the fan with the Heating or Cooling Demand select **CYC**. To operate the fan continuously select **con** which represents continuous fan operation. The factory default is continuous fan operation [**con**] when the system is on.

### **P-14 Electric heating element Option**

Units may be equipped with Electric heating element or an in line Electric Duct Heater. Electric heating elements are used when the main Chillwater system is in the Cooling Mode and a particular cabin requires heating. The electric heating elements are also used to supplement Chillwater heating when necessary. Program P-14 for **ELE** to select the electric heating element Option. The factory default is **nor** which normally selects Chillwater Heating and Cooling only. **IMPORTANT:** Please note that option **P-14** has to be programmed for **ELE** to allow electric heat electric heating element operation.

### **P-15 Fan Motor Selection**

There are two basic fan motor types, shaded pole [SP] and split capacitor [SC]. Each motor reacts differently to speed control and each motor requires different timing for optimum fan speed variation. The default setting is "SP" which selects the shaded pole motor type, however, "SC" should be selected if a split capacitor type of fan motor is used. Most manufacturers supply shaded pole type fan motors, therefore, the factory default selection is "SP".

### **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, 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 nine (9) 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.

### **P-17 Chillwater Valve Forced Open**

This feature allows service personnel to force the Chillwater water valve open to facilitate bleeding air from the system. Selecting **OPn** will force the valve open for 4 hours while normal cooling and heating is maintained. The valve can be returned to normal operation anytime during the cycle by selecting **nor** which stands for normal operation.

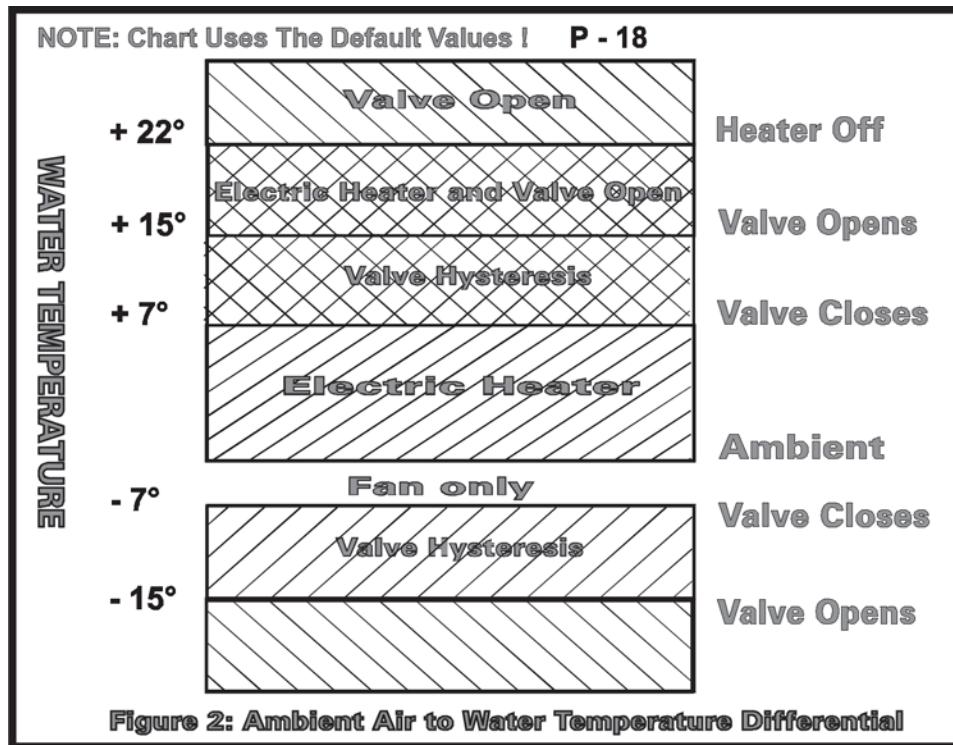
### **P-18 Ambient to Water Temperature Differential**

The difference between ambient air temperature and Chillwater water temperature is used to control water valve opening and closing. The programmable range is five ( 5 ° F ) through twenty-five ( 25 ° F ) degrees Fahrenheit. Selecting fifteen ( 15 ° F ) opens the valve when water temperature is 15 degrees less than ambient in **cooling mode** and fifteen degrees ( 15 ° F ) greater than ambient in the **heating mode**. Figure two ( 2 ), shown on page 13, illustrates the relationship between ambient air and Chillwater water temperature using the factory default values.

Careful selection of the temperature differential can fully utilize the ships heating and cooling resources. For example, while in the **cooling mode** and using a ten degree value, the valve will open to allow some cooling while the Chillwater system is coming down to temperature... The programmable range is 5 to 25 ° Fahrenheit and the Factory Default Setting is 15 ° F.

***AMBIENT AIR TEMPERATURE TO WATER TEMPERATURE DIFFERENTIAL***

When equipped with an optional electric heater, the heater will overlap with the Chillwater heat by twenty-two degrees Fahrenheit ( 22 ° F ). The heater will turn on when heat is required and remain on until the Chillwater water temperature exceeds the ambient by twenty-two degrees Fahrenheit or until the room temperature is satisfied.



The electric heat is allowed to overlap the Chillwater heat to supplement the main heating system during very cold conditions.

**SPECIAL HARDWARE INSTRUCTIONS*****Outside Air Sensor Option***

Install this option by plugging the Outside Air Sensor into the **Alternate Air Sensor Jack (J1)**. Program P-11 **On** and the feature is ready for use.

**IMPORTANT!:** The **OUTSIDE AIR SENSOR** option is not available when the **ALTERNATE AIR SENSOR** is installed.

**Note:** The **CHILL WATER TEMPERATURE** be viewed by simultaneously pressing the **UP** and **DOWN** buttons.

**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 PROCESSOR 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 OUTPUT .....	1/4 AMP @ 115 VAC
VALVE OUTPUT .....	1/4 AMP @ 230 VAC
PUMP OUTPUT .....	6 AMPS @ 115 VAC
PUMP OUTPUT .....	6 AMPS @ 230 VAC
HEATER OUTPUT .....	1 HP @ 115 VAC
HEATER 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 .....	5.30" X 4.125"
PANEL CUT OUT .....	4.20" X 3.375"

**CABLE LENGTHS**

DISPLAY .....	15' STANDARD
AIR SENSOR .....	7' STANDARD
WATER SENSOR .....	7' STANDARD

**SYSTEM INPUTS**

1 .....	AMBIENT OR INSIDE AIR TEMPERATURE
1 .....	WATER INLET TEMPERATURE SENSOR
1 .....	OUTSIDE AIR TEMPERATURE SENSOR [ OPTIONAL ]
1 .....	ALTERNATE AIR TEMPERATURE SENSOR [ OPTIONAL ]

**NOTES:** Maximum display cable length is 50 feet. Sensor cable lengths should also be limited to 50 feet. The **outside air sensor** is an optional item and is **not** included with the standard control package. The Outside Air Sensor is **NOT** available when an Alternate Air Sensor is required.

