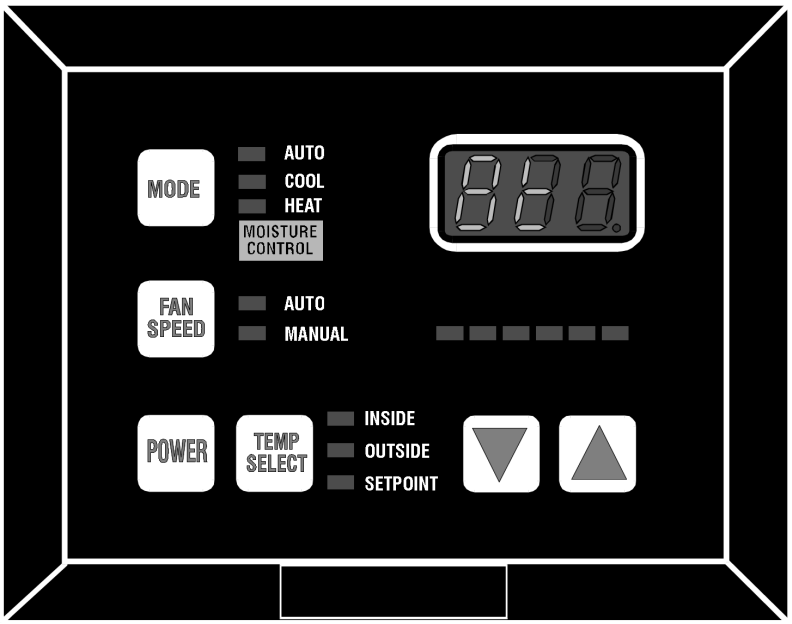
FX-Maxx SDL Air Handler Control Operations Manual



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MARINE AIR SYSTEMS®
AIRRRRRRRR

Chilled Water Systems
Revised: 4-1-04
L-2337

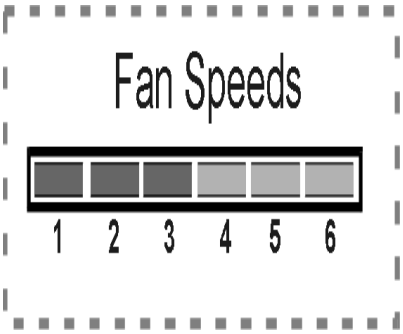
CE

Contents

NOTES:

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

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



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 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.

OVERVIEW

Fx-Maxx SDL 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 °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 SDL 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 ° 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 SDL 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.

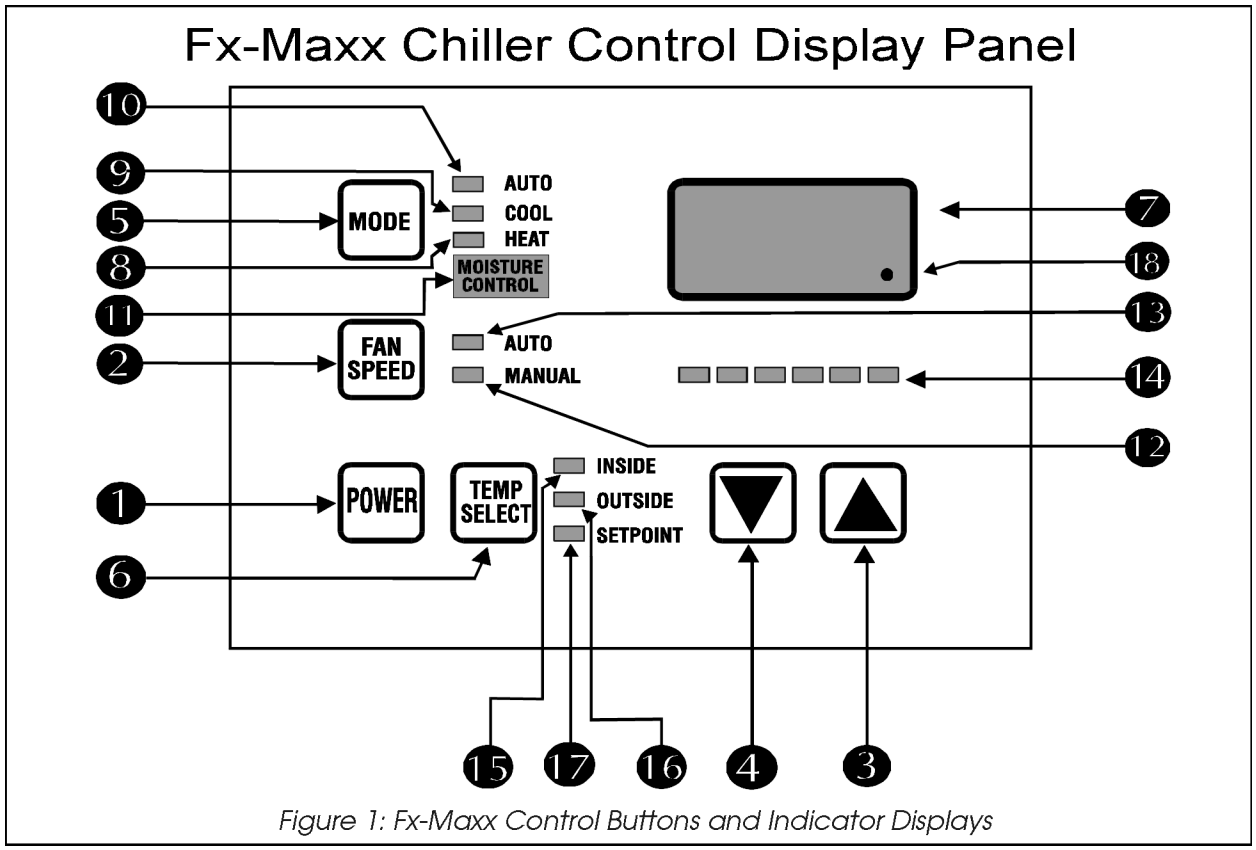


Figure 1: Fx-Maxx Control Buttons and Indicator Displays

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 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 SDL 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.

DUAL BUTTON FUNCTIONS

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

Off Mode

When the **Fx-Maxx SDL 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.

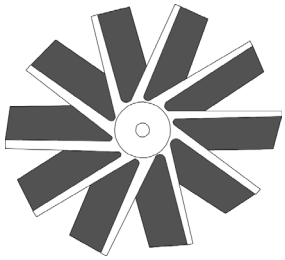
Moisture Mode

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

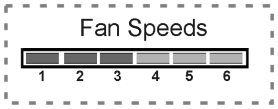
Automatic Fan Speeds

Fx-Maxx SDL 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 SDL 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

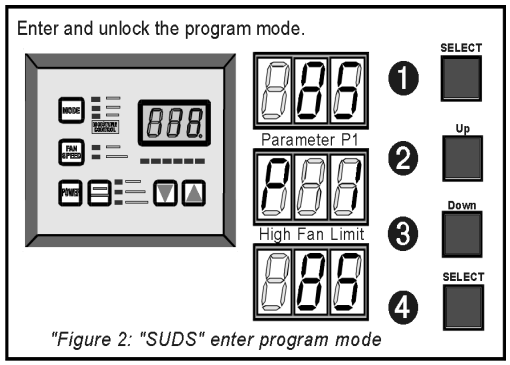
Six (6) is the fastest and one (1) represents the slowest fan speed. Manual fan mode allows the user to select and maintain the desired fan speed manually. When a manual fan speed has been selected, the fan speed bar graph will indicate the speed selected by the number of LED's lit. Select speed 3, for 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

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



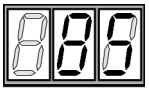
"Figure 2: "SUDS" enter program mode

Warning

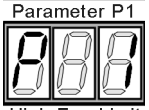
Severe electrical disturbances can sometimes upset the Fx-Maxx SDL operating sequences. Operator confusion related to program parameters can also cause, what seem to be, operational problems. Whenever there is any doubt as to the proper operation of the controller, Factory Default Parameters should be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

ENTERING PROGRAM MODE

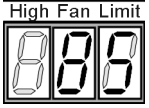
The program mode can **only** be entered from the **Off Mode**. From the Off Mode and in the following order, press the **Select**, **Up**, **Down** and the **Select** buttons [**"SUDS"**]. These buttons have to be pressed and released in the order given. The numerals "85" which represent the high fan 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 SDL Air Handler Control is now in the program mode. Exit the program mode, to the **off mode,** by pressing and releasing the **power** button.



Parameter P1



High Fan Limit

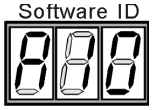


NOTE: The control will exit the program mode and return to the **Off Mode** if no programming is attempted for one (1) minute.

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

Software ID



USING THE PROGRAM MODE

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 SDL Air Handler Contro**l 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	Ambient	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	10	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	Continous 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	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.

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"

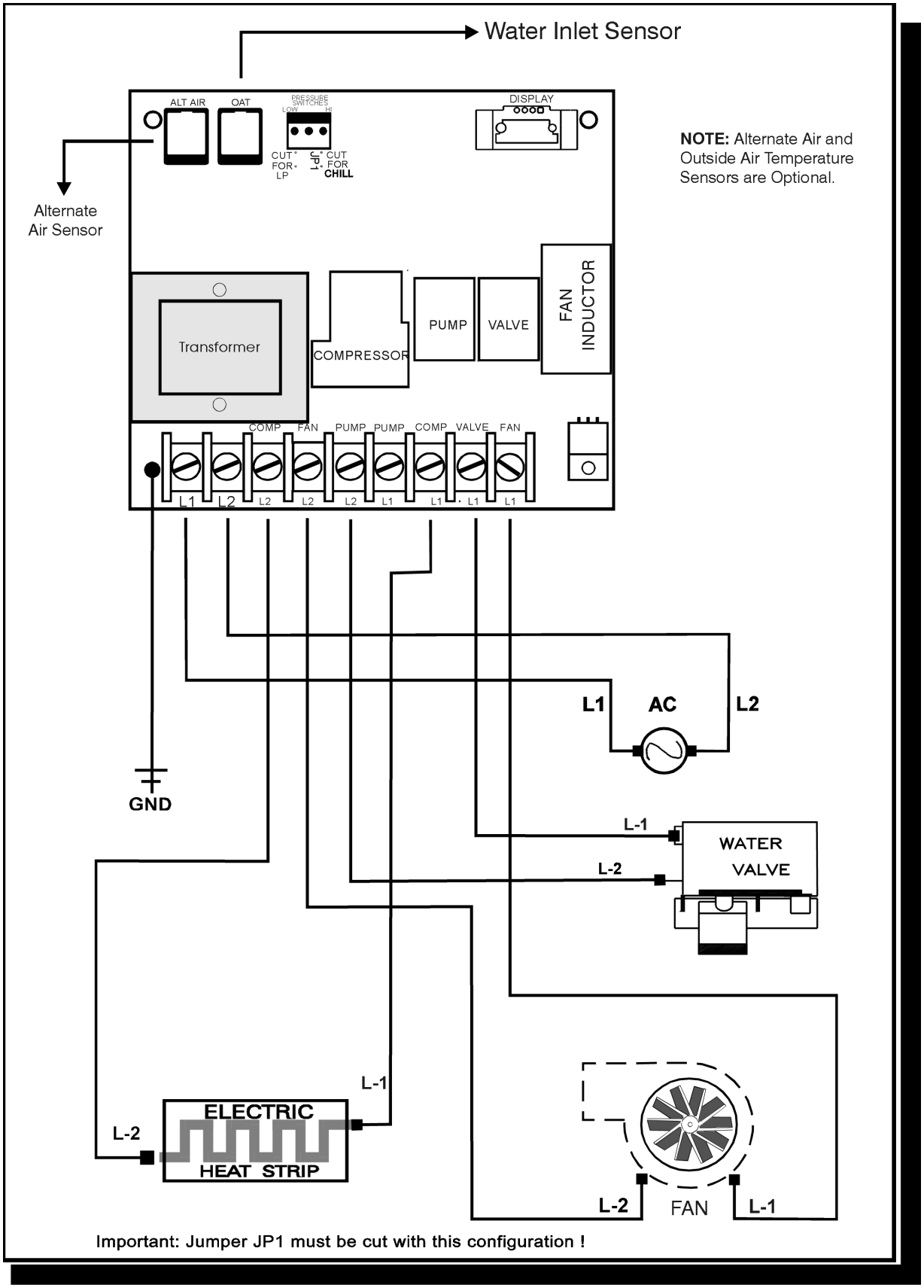
CABLE LENGTHS

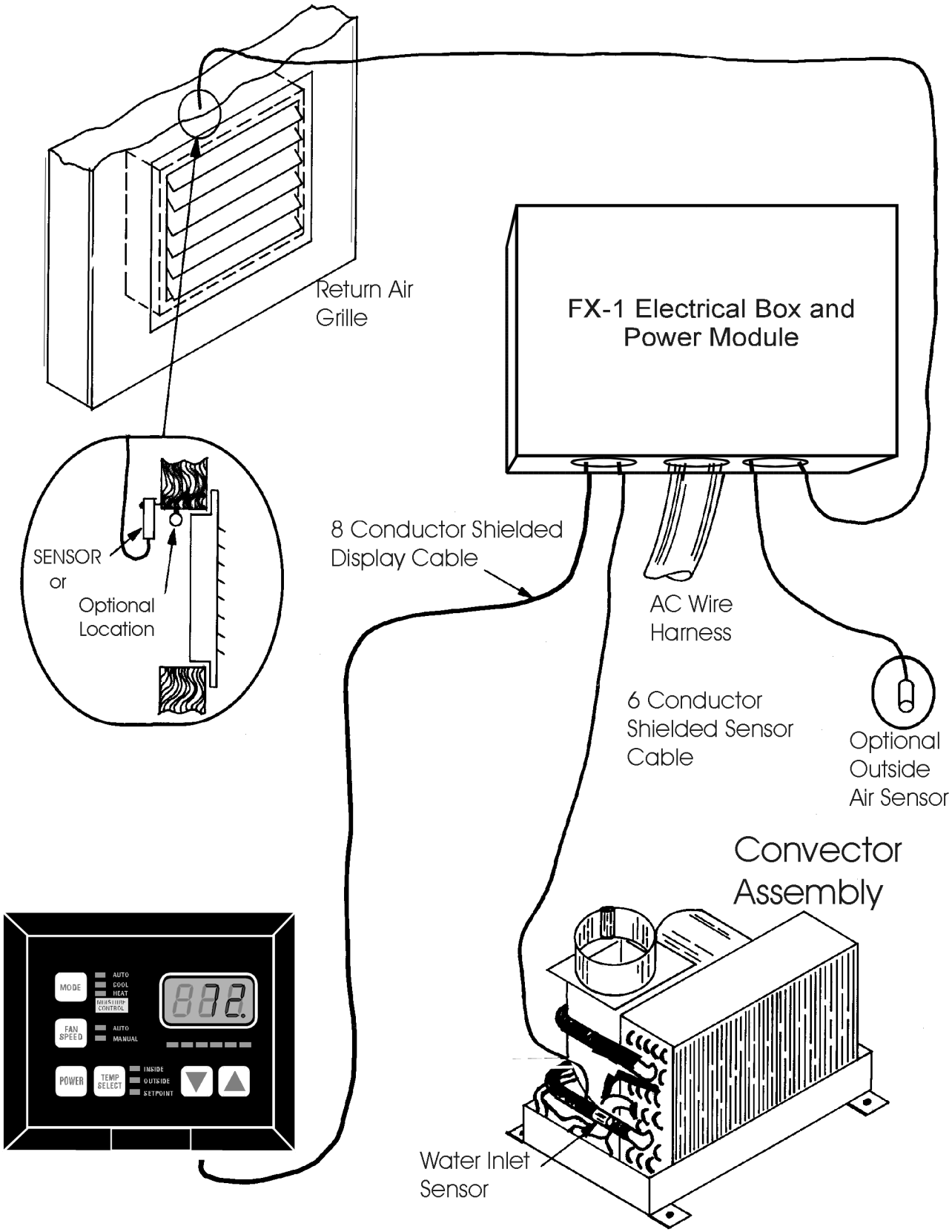
DISPLAY	15' STANDARD
AIR SENSOR	7' STANDARD
WATER SENSOR	7' STANDARD

SYSTEM INPUTS

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

NOTES: Maximum display cable length is 50 feet. Sensor cable lengths should also be limited to 50 feet. The water inlet sensor is plugged into the outside air sensor jack.


Water Inlet Sensor
ALT AIR
OAT
PRESSURE SWITCHES
LOW
HI
CUT FOR LP
JP1
CUT FOR CHILL
DISPLAY
NOTE: Alternate Air and Outside Air Temperature Sensors are Optional.
Alternate Air Sensor
Transformer
COMPRESSOR
PUMP
VALVE
FAN INDUCTOR
COMP FAN PUMP PUMP COMP VALVE FAN
L1 L2 L2 L2 L2 L1 L1 L1 L1
L1 AC L2
GND
L-1
L-2
WATER VALVE
L-1
L-2
ELECTRIC HEAT STRIP
L-2 FAN L-1
Important: Jumper JP1 must be cut with this configuration !


Return Air
Grille
FX-1 Electrical Box and
Power Module
SENSOR
or
Optional
Location
8 Conductor Shielded
Display Cable
AC Wire
Harness
6 Conductor
Shielded Sensor
Cable
Optional
Outside
Air Sensor
Convector
Assembly
MODE
AUTO
COOL
HEAT
FAN
SPEED
AUTO
MANUAL
POWER
TEMP
SELECT
INSIDE
OUTSIDE
SETPOINT
Water Inlet
Sensor

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L-2337 Revision: 4-1-04