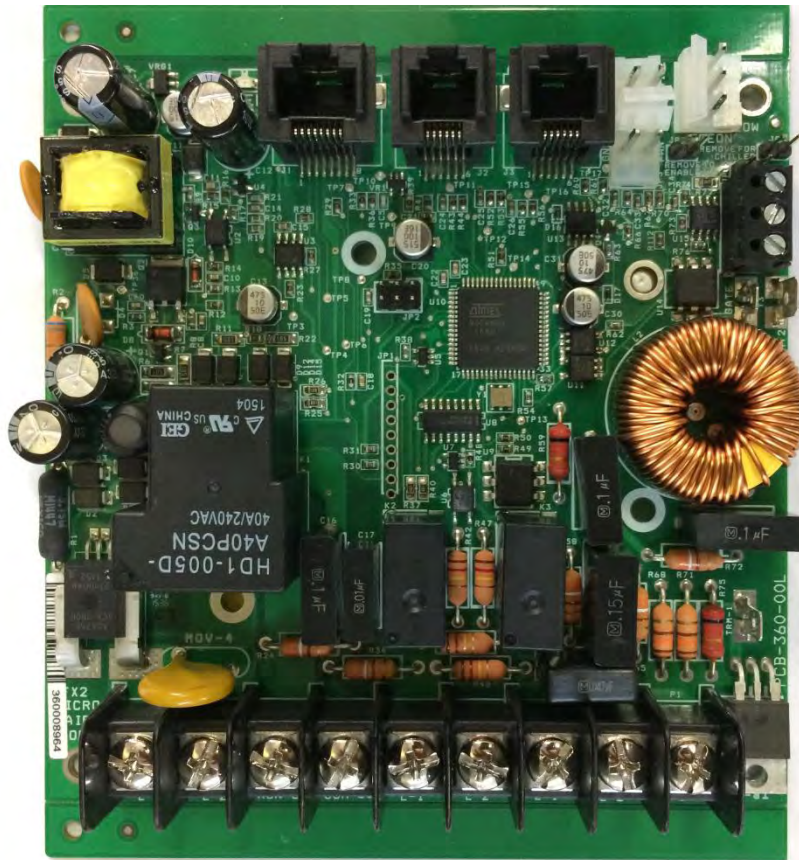


FX-2 Control Board

ASY-360-XXX

Setup and Configuration Guide



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Introduction

The FX-2 control board platform is a versatile control interface that supports a variety of displays and system configurations. Among the supported configurations are direct expansion (DX), air handler (AH), fresh air makeup unit (FAMU), EasyStart, and chiller control. The table below lists the compatible displays and the available options for each.

DX and AH are hardware selectable options in compatible displays.

FAMU is a software compatible option in compatible displays. It can function in both DX and AH systems.

EasyStart is a factory installed option that must be ordered with the FX-2 power supply. It reduces compressor starting current by controlling start characteristics. EasyStart can be used in systems where current supply is marginal or to reduce flickering of lights during starts.

Chiller is a low cost chiller control that utilizes special software in a FX-2 Joystick display and a standard FX-2 control board. The chiller provides only basic water in based temperature control and standard fault detection along with freeze detection. Boards are operated as standalone systems and do not have run time equalization in multi-unit systems.

| Modes / Options | Compatible Displays | | | | |
|-------------------------|---------------------|------------|------|---------|---------------|
| | FX-2 Touch | Easy Touch | FX-1 | FX-MAXX | FX-2 Joystick |
| DX | √ | √ | √ | √ | |
| AH | √ | √ | √ | √ | |
| FAMU | √ | | | | |
| EasyStart | √ | √ | √** | √** | |
| Humidity Reduction Mode | | √ | | | |
| CAN | √ | | | | |
| Chiller | | | | | √ |
| DC Fan option board | √ | | | | |

** Limited function.

Jumper settings

Hardware jumpers are provided on the FX-2 control board to provide additional functions. Printed circuit board (PCB) revision I and earlier have jumpers that must be set for proper display operation. Revision K and above automatically detect the display and do not have display setting jumpers. All boards have the configuration jumpers shown in the configuration table below.

Display Selection (rev I and earlier PCB):

| | JP9 | JP11 | Usage |
|---------|------------|-------------|----------------|
| OLED | OFF | OLED | OLED display. |
| FX-MAXX | ON | FXMAX | FXMAX display. |

Configuration (all revisions):

| System | JP7 | JP8 | Usage |
|---------------|------------|------------|---------------------------------|
| AH | ON | OFF | ALL |
| DX | OFF | ON | With low Freon pressure switch. |
| DX | ON | ON | No low Freon pressure switch. |
| FAMU-AH | ON | OFF | Air Handler |
| FAMU-DX | ON | ON | No Low Freon |
| FAMU-DX | OFF | ON | Low Freon |
| Chiller | ON | ON | Chiller 1 with No LP Switch |
| Chiller | ON | OFF | Chiller 1 with LP Switch |
| Chiller | OFF | ON | Chiller 2 with No LP Switch |
| Chiller | OFF | OFF | Chiller 2 with LP Switch |

Systems with EasyStart

Contactors

Systems with compressors over 24K BTU or greater than 1.5 HP must use a contactor. See the wiring diagram for details.

Capacitor Selection

Best start performance, in most cases, can be achieved by using the start capacitor values found in the table below.

| BTU Rating | Start Capacitor Size |
|------------|----------------------|
| 37K to 48K | 189 to 227uF |
| 25K to 36K | 130 to 156uF |
| 12K to 24K | 88 to 106uF |
| 5K to 11K | 64 to 77uF |

Run capacitors should be sized according to the compressor manufacturer's recommendations. Both capacitors often see voltages much higher than the applied line voltage. Select capacitors that have the appropriate voltage rating for your system.

Initial Starts

EasyStart has adaptive software that collects data during the first five starts of the compressor. EasyStart uses this data to determine the best starting characteristic for minimum start current delivered to the compressor. It is highly recommended that these starts be done with a stable power source such as shore power. Start the compressor five times after installation on shore power to allow EasyStart to learn about the compressor. No further setup is required.

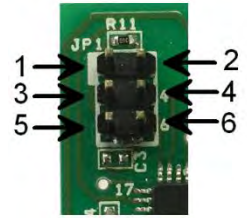
Forcing EasyStart to relearn

EasyStart may be reset to perform the learning process. This is used when changing compressors or if instructed by to manufacturer to do so. Follow these steps below to complete this process. Refer to the FX-2 DX EasyStart wiring diagram for jumper position identification.

1. Remove AC power
2. Short pins four (4) and six (6) on JP1 with the black jumper.
3. Restore AC power for 30 seconds.
4. Remove AC Power.
5. Remove the jumper from pins four (4) and six (6) on JP1 and place it over pins three (3) and four (4).
6. Restore AC power and start the compressor five times. EasyStart will relearn the start characteristics of the compressor.

Additional EasyStart Jumper Usage

The pin header JP1 on the EasyStart top board is used to configure EasyStart. The white block shown by the arrow one indicates pin number 1. Other pins are identified as shown in relation to pin 1.



Caution: *Do not place jumpers on JP1 except as indicated.*

Normal: Most operation should be done without a jumper installed on JP1 or with the jumper installed across pins 3 and 4.

Re-learn: If a compressor, start capacitor, or run capacitor is replaced, place a jumper on pins 4 and 6. Cycle power on then off again. Remove the jumper and place it across pins 3 and 4. Cycle the compressor on then off five times to complete the setup. Be sure to allow enough time for pressure to bleed off between cycles in systems without a reversing valve.

Default: A compressor may be operated with a factory defined start characteristic. This may not be the optimal start for the connected compressor and is generally used for factory diagnostics. Install a jumper across pins 1 and 3 for this configuration. No optimization is done with this setting.

Disable: This setting disables the microprocessor on the board so no operation can occur. Use this setting on an FX-2 system if you are installing a compressor with its own start device and are not using EasyStart. In this case you must follow the wiring diagram for a standard FX-2 system. Install a jumper across pins 5 and 6 for this configuration.

DC Fan Option Board

The PCB-361 option board is factory installed on the FX-2 control board. This option allows up to four PWM controlled DC fans to be connected. Speed control for each fan is individually adjustable in the programmable parameters on compatible displays.

Fan connections



Each fan is connected by three wires to the control board. Connect the control wires to their corresponding terminals on the option board. The '+' terminal is connected to the DC fans' +10 volt output. The '-' terminal is connected to the DC fans' ground control wire only. *Do not connect the GND wire to an AC ground.* The 'S' terminal is connected to the DC fans' 0-10V signal wire.

Connect the DC fan's AC input directly to the AC line input. All other connections to the FX-2 control board are as they would be in a normal installation.

Notes:

- *The FX-2 control board provides an output for a triac driven fan connected to Fan L1 and Fan L2 on the FX-2 control board. When connected, the fan will follow the speed control for Fan A on the DC fan option board.*
- *Do not connect the DC fan power source to the Fan L1 terminal on the FX-2 control board. Power for the DC fan must be supplied by the AC L1 and AC L2 terminals.*
- *The DC fan option board cannot be used with combination humidity and air sensors. Improper or erratic operation can result if combination humidity and air sensors are installed. EasyTouch humidity control feature is not available with the DC option board installed.*

CAN Bus Systems

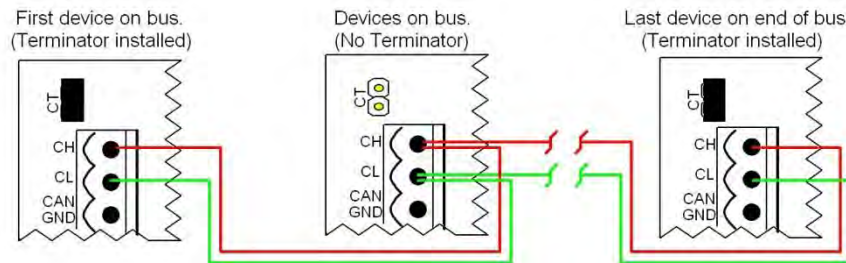
Basics

The CAN system (Computer Area Network) is a communications protocol system that facilitates communication between electronic controls. Controls are connected to each other to form a network. Typical controls in a network could include ice makers, chilled and heated water systems, air handlers, and direct expansion systems. The physical connection is called a bus and consists of a minimum of two wires connected to each device. Up to 127 controls including a computer connection may be connected on one bus. CAN bus exchange protocol follow the ISO-11898 standard for CAN specification 2.0 Part B. System integrators can find the message contents defined in the Microair CAN protocol specification available from <http://www.Microair.net>.

Wiring the CAN bus

The bus consists of a two or three wire connection to each device in the system. Wires are connected to each control in a sequentially wired, daisy chain style connection. Wire used for the CAN bus must be rated as indicated in the specifications section of this document.

To wire the system, first determine which devices will be at each end of the system. All other devices will be connected between these two devices. Wire the bus starting with a selected end device. Connect wires to CAN-L and CAN-H (and ground if used) on this device then connect the other end of these wires to the second control in the system. Connect wires in parallel to the wires connected to the second device to the third device in the system. Continue making connections until all controls are connected. Always connect GND to GND, CAN-L to CAN-L, and CAN-H to CAN-H. Never place more than two wires in any terminal connection.



The control at each end of the bus must have a terminator installed. The terminator is a two pin jumper located on the circuit board next to the CAN connector labeled CT. Place this jumper only on the first and last control in your system.

During installation, write down the serial numbers of each device connected and description of the location they are in or are responsible for. This will help to simplify system setup later.

Wiring Diagrams

Board and Firmware revisions

This manual makes reference to FX-2 control board printed circuit board (PCB) revisions. The PCB revision is found along the edge of the printed circuit board in white silk screened lettering and starts with PCB-360. PCB-360-00J indicates a revision J circuit board.

Firmware revision is marked on a label placed on the microcontroller integrated circuit on revision L circuit boards. Previous revision boards have no software revision markings and can only be determined by contacting Microair.

Wiring Diagram Identification

The included wiring diagrams are organized by board revision and system type. To find the correct diagram for your system, first identify the control board revision used in your system. Use this identifier along with the type of system you have (direct expansion (DX), air handler (AH), fresh air makeup (FAMU), EasyStart) to find the correct wiring. Systems may not include all features shown in the wiring diagrams. Colors are provided for clarity and may not reflect the colors used in your system.

Using Contactors

Circuitry on the board may adversely affect the operation of contactors by holding a contactor on when it should be off. This condition should be verified whenever a contactor is used by following the procedure below.

WARNING: AC LINE VOLTAGE CAN BE DANGEROUS OR FATAL IF IMPROPERLY HANDLED.

The following steps involve working directly with AC line power and must only be performed by trained service personnel.

Checking Contactors

1. Disconnect the contactor load from the contactor.
2. Disconnect the display by removing the plug from the display jack on the FX-2 control.
3. Apply power to the board from the AC mains power source.
4. Depress the contactor armature using a non-conductive hand tool. If the contactor armature releases quickly without any noticeable sticking or hesitation, then no load resistors are required and you can reconnect the contactor load and display.
5. If the armature does not release or sticks before releasing, add load resistors as described in the next section “Installing Load Resistors”.

Installing Load Resistors

Installers may add loading resistors of 62k ohms 2 to 3 watts, to the contactor coil to prevent contactors from remaining on. One load resistor is also required for Chiller controls when a pump relay is connected to the fan output. These resistors are available from standard electronics outlets or from Microair directly.

1. Disconnect AC power from the board.
2. Add one or two 62K ohm 2 to 3 watt resistors in parallel to the contactor coil.
3. Recheck the contactor as described in the “Checking Contactors” section.
4. If adding six or more resistors does not significantly reduce sticking or hesitation, contact Microair for additional assistance.

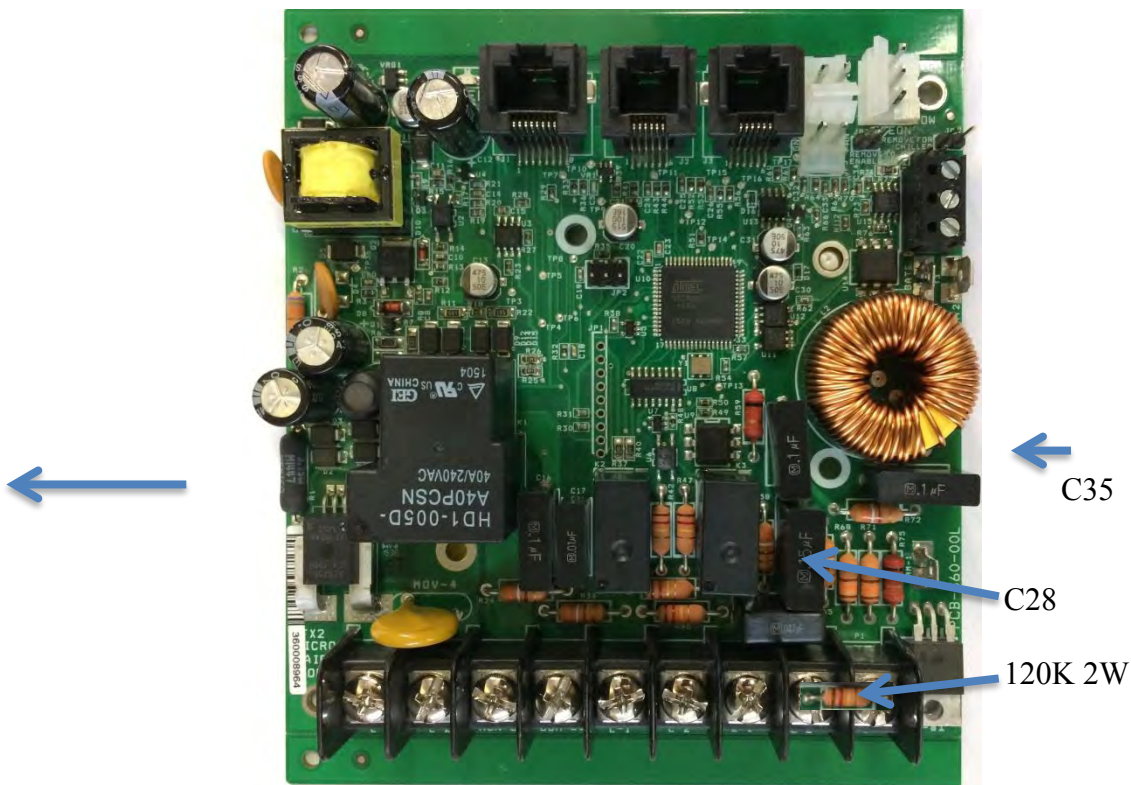
Using Solid State Relays (SSR)

Circuitry on the board may adversely affect the operation of an SSR by holding an SSR on when it should be off. Customers with applications using an SSR should contact Microair prior to purchase for factory modification of the board. Boards may also be returned to Microair for modification.

Using a Pump Relay with a Chiller

The following information is provided for identification of modified boards. Microair recommends customers call Microair and order a board specifically modified for their application needs. Improperly modified boards and other customer damages are not covered by the Microair product warranty.

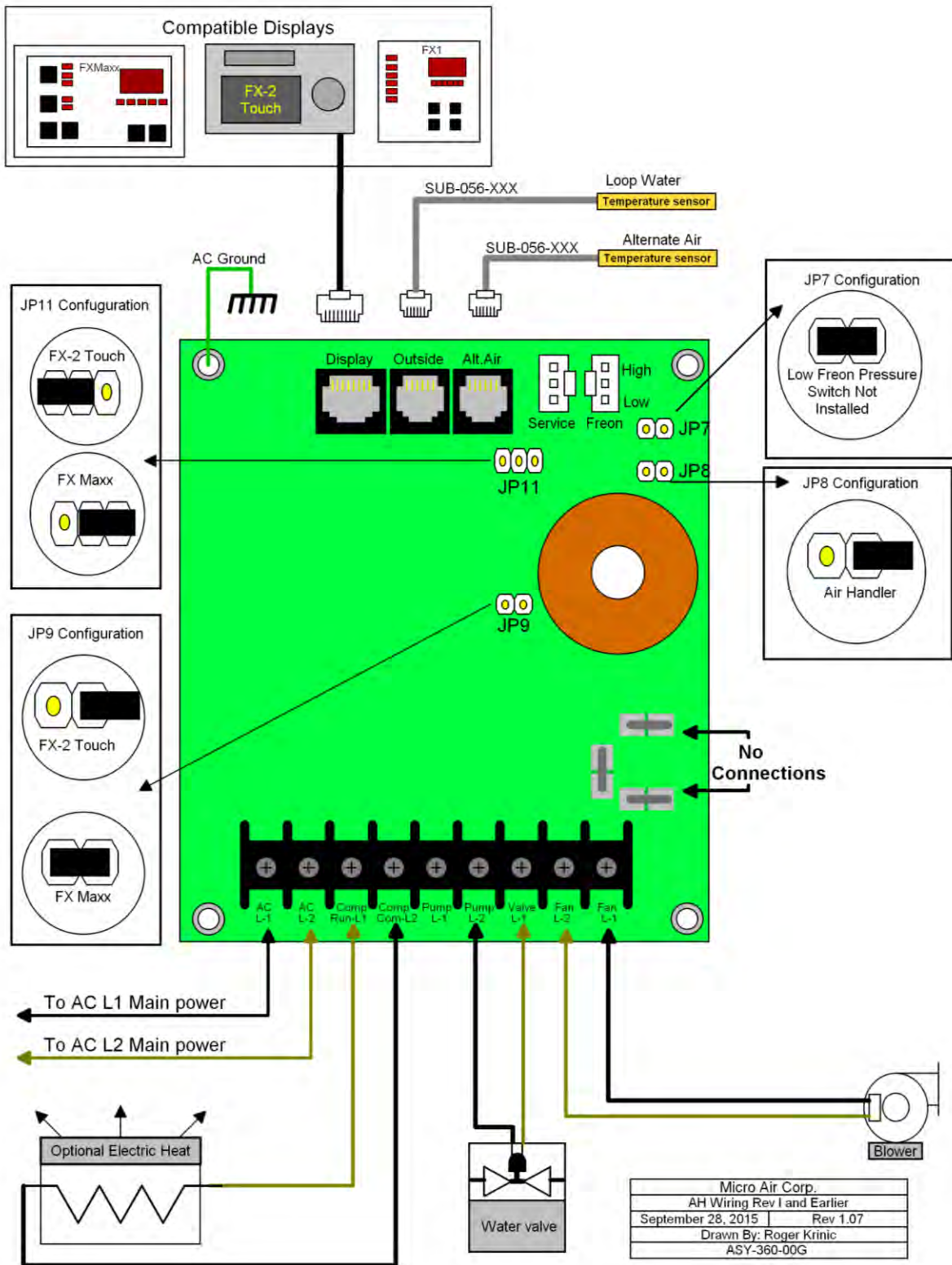
These modifications are valid only on revision L printed circuit boards.



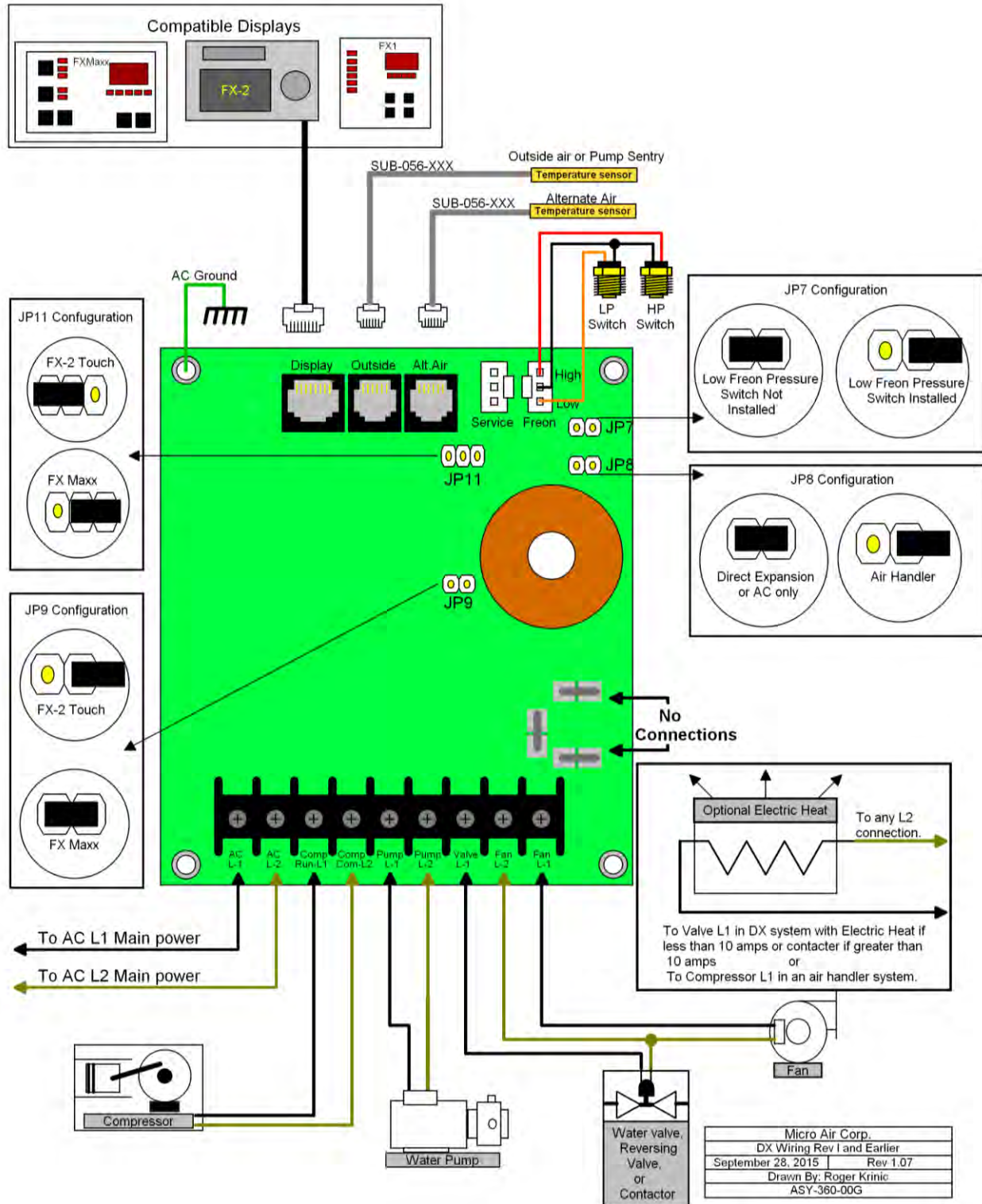
Remove C35 and C28 for contactor or pump relay connected to fan output. Install a 120K 2W resistor on fan L1, L2.

Rev I and Earlier

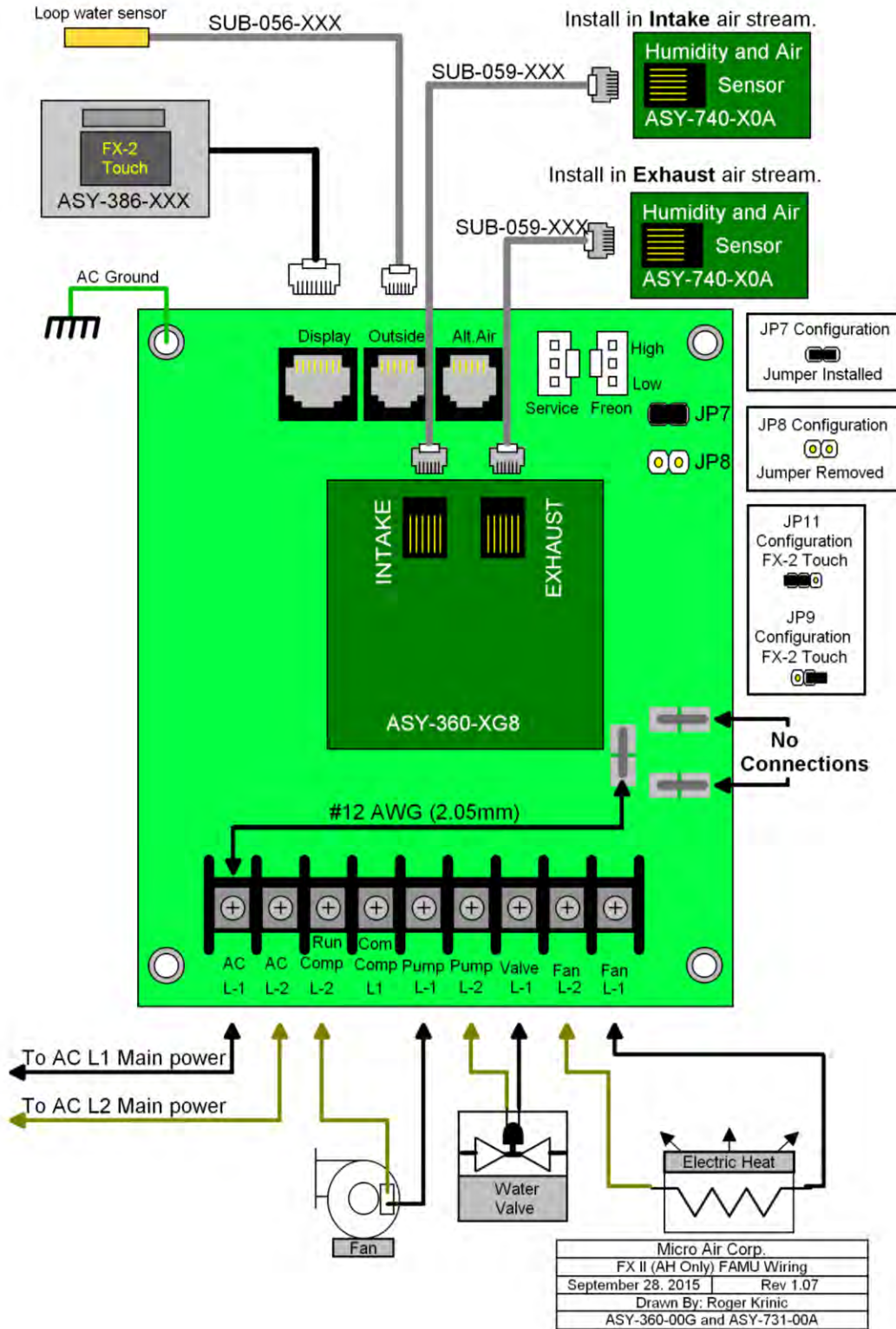
Air Handler (AH): Rev I and Earlier PCB



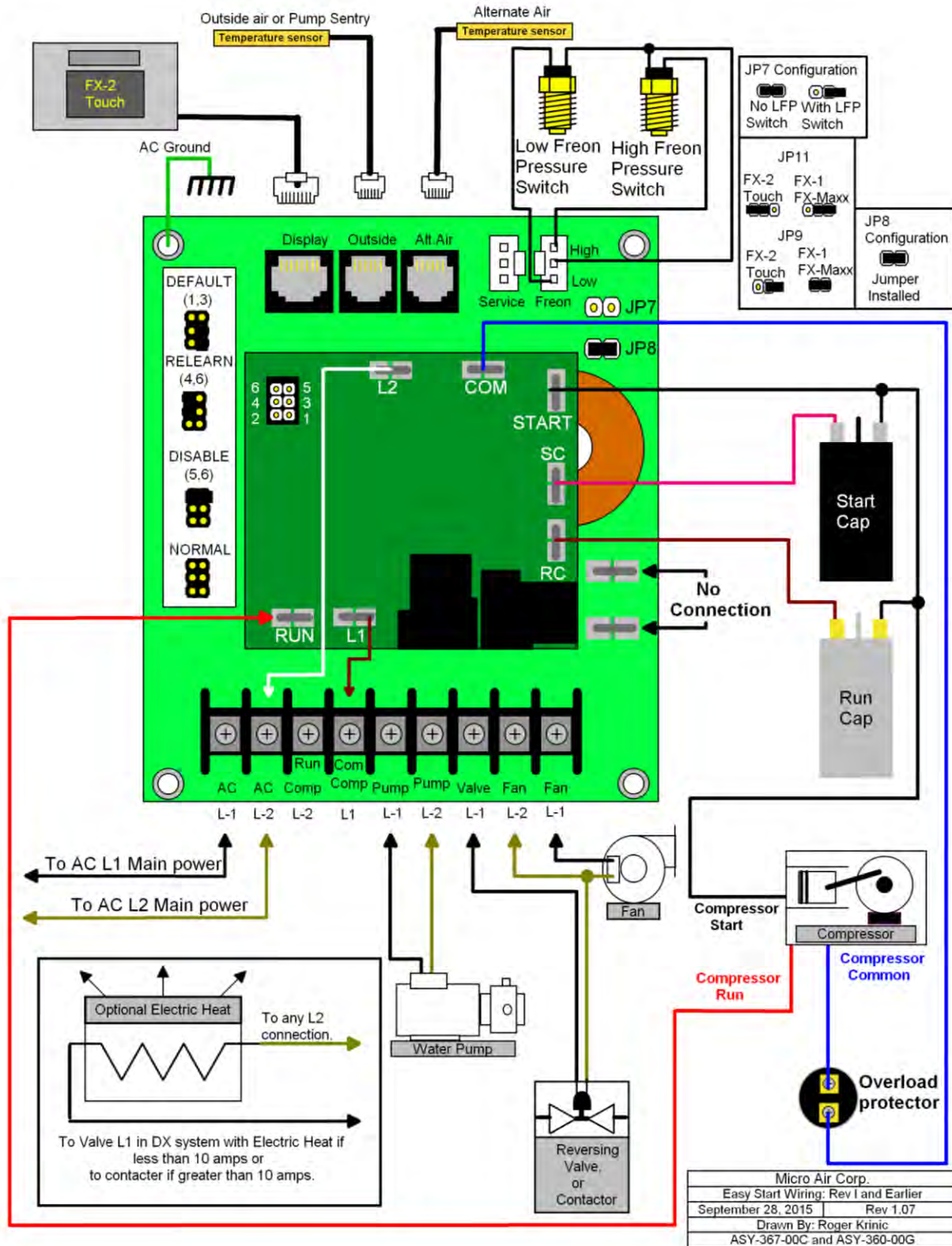
Direct Expansion (DX) Wiring: Rev I and Earlier PCB



Fresh Air Makeup Unit Wiring (FAMU) Rev I and earlier PCB

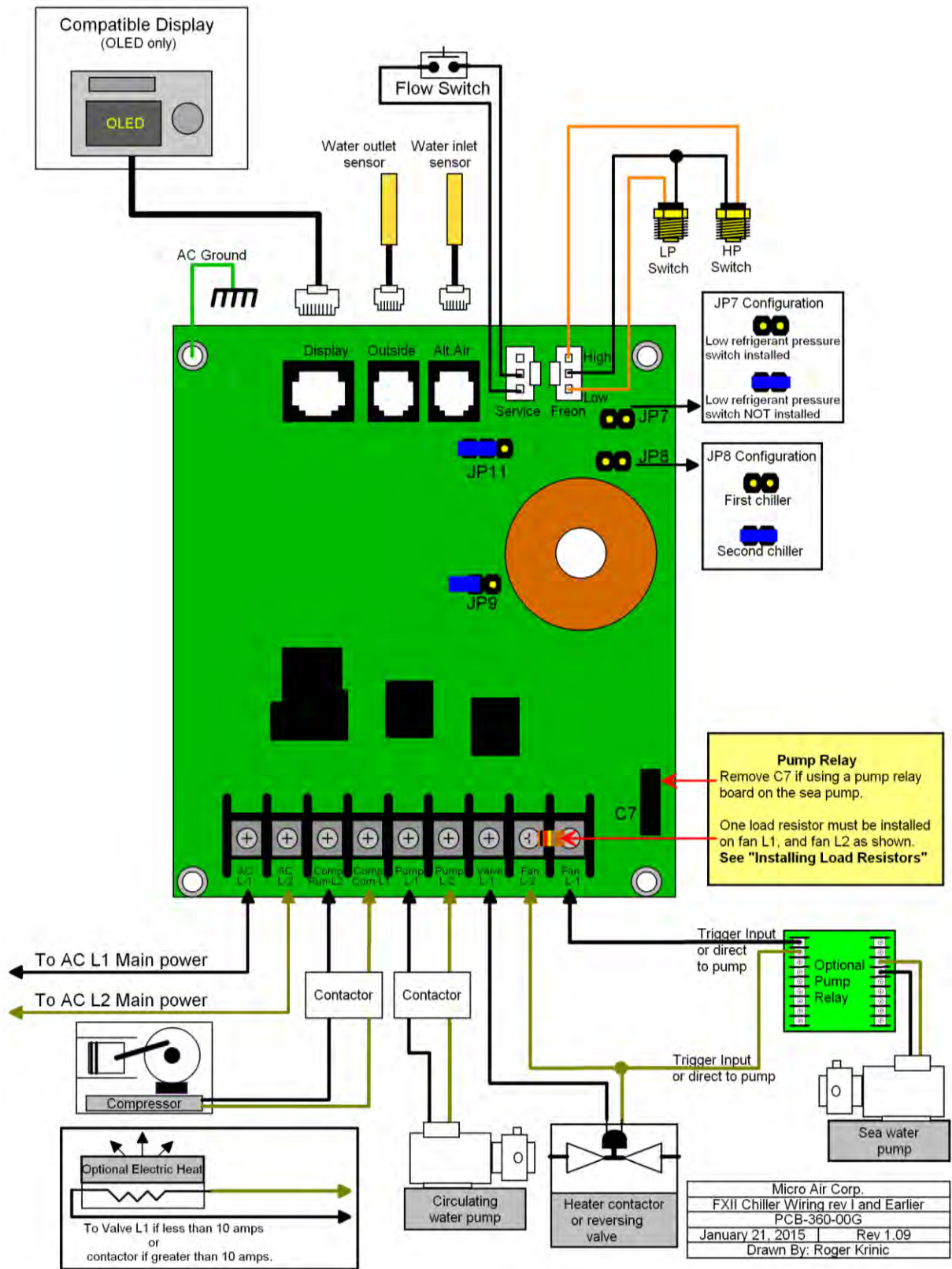


EasyStart Wiring: Rev I and Earlier



Micro Air Corp.
 Easy Start Wiring: Rev I and Earlier
 September 28, 2015 | Rev 1.07
 Drawn By: Roger Krinic
 ASY-367-00C and ASY-360-00G

Chiller Rev I and Earlier



Rev K PCB

Air Handler (AH) Wiring: Rev K PCB

