

OPERATION & MAINTENANCE MANUAL

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General Safety Information

1. Maintenance and repairs to be performed only by qualified personnel who are familiar with this type of equipment.
2. Avoid contact with sharp edges and coil surfaces. They are a potential injury hazard.
3. Make sure all power sources are disconnected before any service work is done on the equipment.
4. Make sure all refrigerant is removed from the system before attempting any repairs to the refrigerant components or lines.

Maintenance and Inspection

Maintenance should be performed on a regular basis as outlined within the manual.

Under normal operating conditions the system maintains should cover the following items at least once every six months.

A: All electrical connections should be checked and tighten if needed

B: Check contactors for worn contact points

C: Check and clean the condenser coils

D: Check and clean the evaporator coil

E: Leak check the refrigeration system

F: Check and clean the condensate drain lines

G: Check the washable filter (**Every month or more**) and Clean

H: Check and clean the evaporator drain pan

I: Check the operation of the control system makes certain all safeties operate correctly.

Warranty

M&T Air Conditioning warranties the equipment outlined in the manual for the period of one year from the date of start-up of the equipment. All warranty is subjected to proper maintenance and proper use of the equipment. Misuse of the equipment will void all warranty. M&T Air Conditioning Ltd. shall not be liable to buyer, or any customer of buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by buyer or third parties of said equipment.

Cooling and Heating Process

Located on the front panel of the main indoor cooling unit is a FUJI Electric controller this is the main controller, it is energized by a 208vac input and is connected to the main temperature sensor, it sends a 0 to 10 vdc output based on the deviation from the temperature set point. This signal is sent to the SCR (silicone controlled rectifier) and the Siemens LOGO programmable logic control, as the temperature increases 1 degree above its set point the output voltage from the FUJI Electric controller drops this is received by the LOGO controller and its pre-programmed circuit sends a signal to coil #1 solenoid energizing the cooling as the temperature now starts to decrease the FUJI controller sends a signal to the SCR to start the electric heat there for attempting to balance the cooling output to maintain perfect set point temperature. If the temperature continues to drop the FUJI controller allows more electric heat until it reaches 9 vdc at which point the electric heat is on full, if the temperature continues to drop the cooling cycle will be de-energized (cool off) until the temperature rises back to its set point.

Sequence of Operation

- System is energized with 208 AC volt power all components are ready for operation.
- The Panel mounted FUJI Controller is set to its setpoint if the temperature is above its set point cooling is energized.
- Cooling **circuit #1** – the signal from LOGO terminal I1 is sent to the air proofing switch **A1**, if A1 is open and the signal from the FUJI controller is calling for cooling solenoid #1 is energized and cooling is allowed to come on.
- Cooling circuit #2 – the signal from LOGO terminal I3 is sent to the air proofing switch **A2**, if A2 is open and the signal from the FUJI controller is calling for cooling solenoid #2 is energized and cooling is allowed to come on.
- **As the cooling runs the cooling coil #1 starts to build up a layer of ice as the ice builds the air pressure from the fan increases this increase of air pressure triggers the air proofing switch A1 to close sending a signal back to the LOGO controller therefore switching the solenoid S1 off and energizing solenoid # 2 now the same process takes place as above except with coil #2 meanwhile coil #1 electric heat is fully energized by the LOGO controller to defrost the coil of all heat when the defrost temperature controller reaches its set point it de-energizes sending a signal back to the LOGO to stop the defrost process coil #1 is now ready for its next cycle of cooling.**
- During the cooling cycle the space temperature decreases as the temperature decreases the FUJI controller also sends a signal to the SCR controller allowing a full modulation of electric heat this is done during the cooling process so that a constant temperature output can be maintained.

Factory Settings and Model

All component settings have been tested and set to their appropriate settings there is no need to re set the controls.

FUJI Controller located on the face of the control panel of the main inside cooling unit.

This controller has been pre-programed and there is no need to adjust any setting aside from the setpoint adjustment located on the face of the controller (up and down arrows)

- Set point is field set to the..... **Desired setting**

Pre programmed set points

- Ramp/Soak Command.....roFF
- Blinking ALn/a
- Blinking AHn/a
- Blinking Hb..... n/a
- AT.....1
- LoC.....2
- P..... 10%
- I.....60
- D.....350
- TC.....0
- HYS.....on/off
- TC2.....0
- Cool.....50
- Db.....50
- bAL.....50
- Ar.....50
- P-n2.....K
- P-SL.....0
- P-SU.....100
- P-dP.....0
- P-n1.....6
- P-df.....300
- Fuzzy logic.....n/a

SCR Viconics R820-213 located inside the control box, mounted on the upper right hand side, the factory settings are set for 0 to 10vdc as follows:

- Switch #1..... **off**
- Switch #2..... **off**
- Switch #3..... **off**
- Switch #4..... **on**

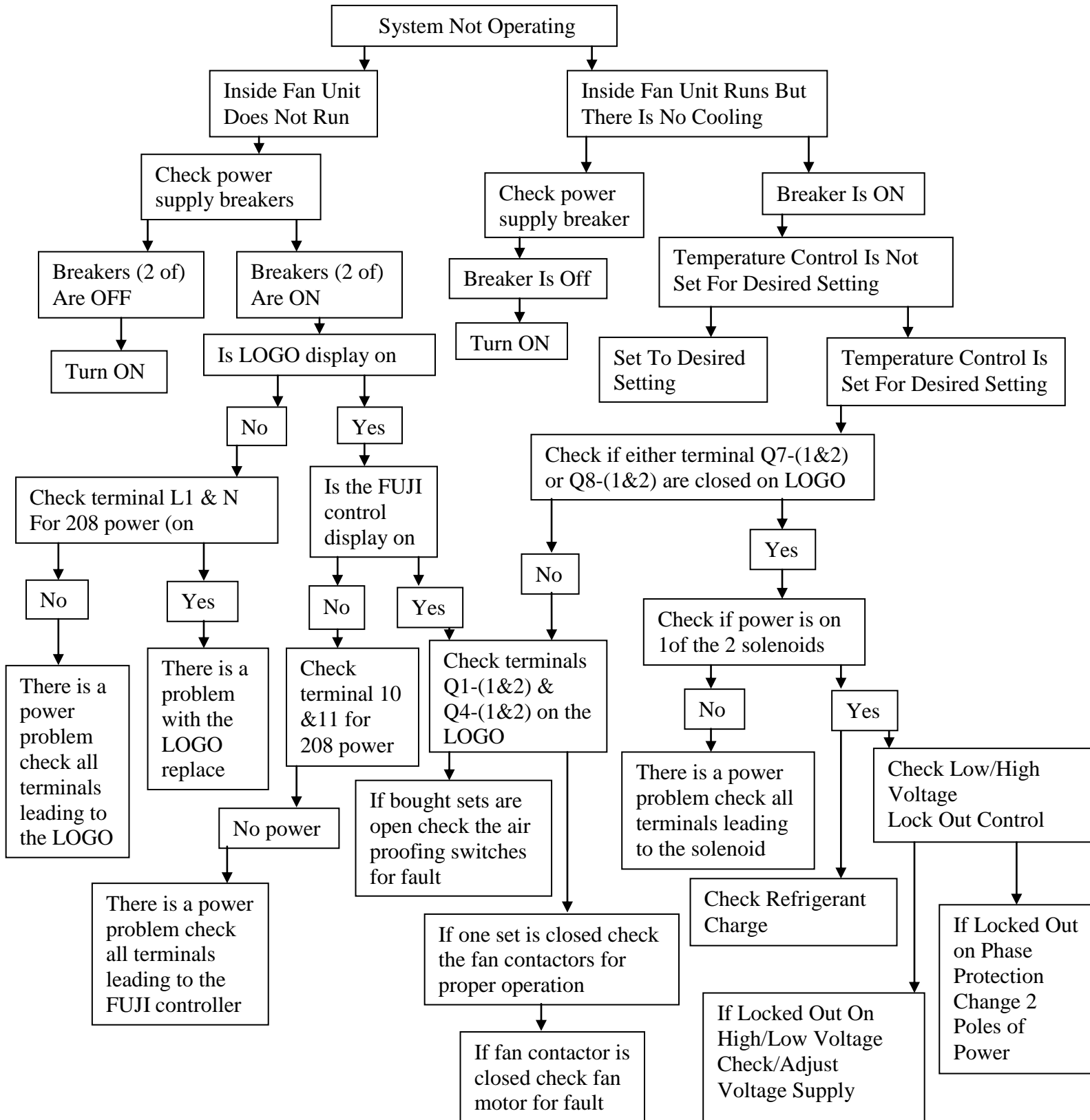
FS1 Johnson Control A19 ABC-24c Freeze stat located inside the indoor unit behind the topside access panel.

- Front Dial -30 to 100 F..... **40 F**
- Differential..... **3 (lowest setting)**

FS2 Johnson Control A19 ABC-24c Freeze stat located inside the indoor unit behind the bottom side access panel.

- Front Dial -30 to 100 F..... **40 F**
- Differential..... **3 (lowest setting)**

Trouble Shooting Flow Chart



Fresh Air System

The fresh air system is energized when the exhaust fan is turned on. There is a controller mounted on the inside fresh air air handler, factory set at 70 F this means when the outside air is above 70 F the cooling will turn on.

Filters Replacement

There is a filter mounted in the air handler that will need to be replaced periodically

Filter Size = 1 - 12 x 28 throw away



