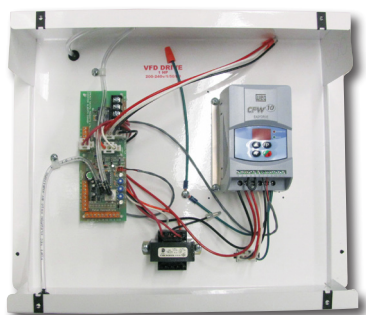




## Manual-WEG-HE-Z-LV-Z HE-Z-50/70/100, LV-Z-1050 External Circuit Box c/w WEG Variable Speed Drive Installation



For the Installation of:

Part Name	Description	Part Number
HE-Z Electrical Box w/ 110v WEG Controller	Upgrade for <b>HE-50/70/100</b> <b>LV-E-1050</b> Air Handlers ( <b>110v</b> power)	WEG <b>Zoning-Ready</b> Controller, PSB Circuit Board, Transformer in Powder Coated Box 40120100004

Part Name	Description	Part Number
HE-Z Electrical Box w/ 220v WEG Controller	Upgrade for <b>HE-50/70/100</b> <b>LV-E-1050</b> Air Handlers ( <b>220v</b> power)	WEG <b>Zoning-Ready</b> Controller, PSB Circuit Board, Transformer in Powder Coated Box 40120100005

Manufactured By



## External Circuit Box Installation

**IMPORTANT** - Before you begin, ensure input voltage of WEG Controller matches line input voltage to air handler.



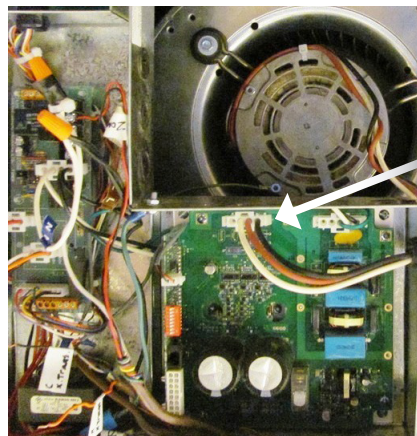
Fig. 1 - HE/LV-E Air Handler

← Middle Access Door

← Large Access Door

**1.** Turn off power to the air handler, and allow 5 minutes for power stored in capacitors to dissipate. Remove middle and large access doors from air handler. (Fig. 1)

**2.** Unplug motor plug from control board and remove from L-Shaped box. Plastic grommet can be removed by squeezing the sides with needle nose pliers. (Fig. 2)



← Motor Plug

← Plastic Grommet

Fig. 2 - L-Shaped Box

**3.** Disconnect motor ground wire from L-Shape box. Using existing machine bolt, connect motor ground wire to provided ground wire extension. (Figs. 3a-3c)

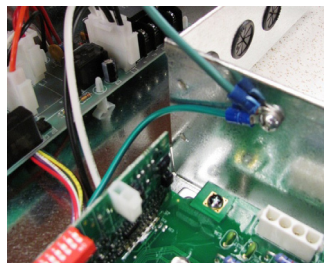


Fig. 3a

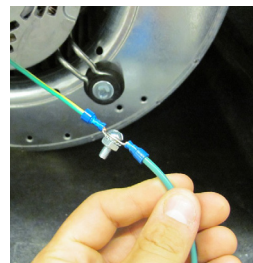


Fig. 3b

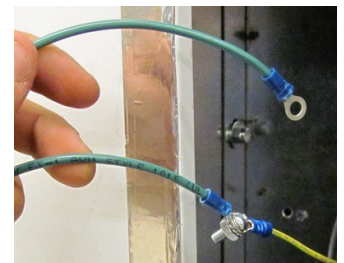


Fig. 3c

**4.** Insert ground wire extension into 4-prong motor plug. (Figs. 4a, 4b)

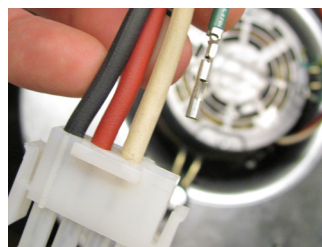


Fig. 4a - Ground Wire Extension

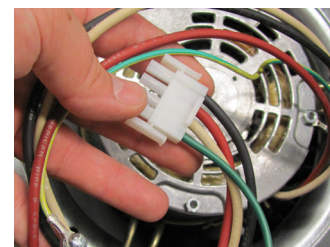


Fig. 4b - Motor Plug

## External Circuit Box Installation

5. Remove all thermostat and power wiring from the air handler. Undo screw on L-Shape box and remove box from air handler. (Fig. 5a)

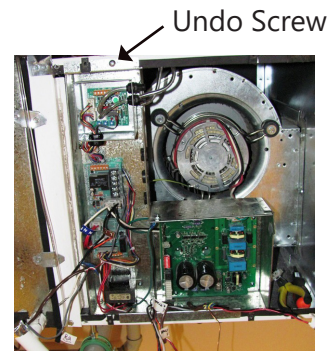


Fig. 5a - Undo Screw

(To use MANUAL Mode, or for Circuit Boards without pressure tubes, skip to step 8)

6. Drill hole in the center plate of the air handler, for the provided bulkhead fitting. (Figs. 6a, 6b)

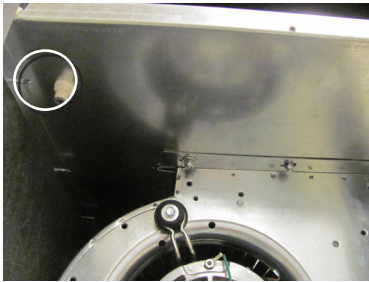


Fig. 6a

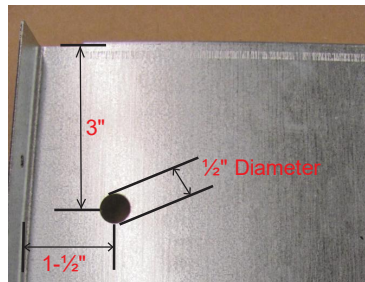


Fig. 6b

7. Install provided bulkhead fitting into the drilled hole. (Figs. 7a, 7b)

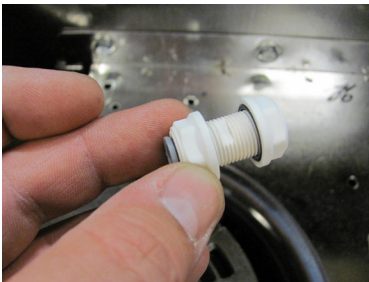


Fig. 7a



Fig. 7b

8. Replace middle access door of air handler. (Fig. 8)



Fig. 8

(To use MANUAL Mode, or for Circuit Boards without pressure tubes, skip to step 10)

9. Pull the positive (+) pressure tube through the rubber grommet in the bottom of the box (Fig. 9a) and connect the end of the tube to the center plate bulk head. (Fig. 9b)



Fig. 9a

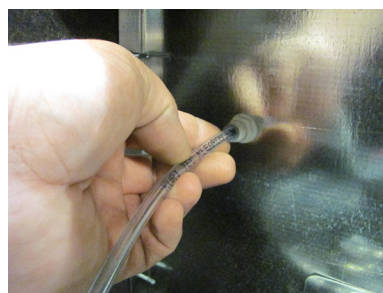


Fig. 9b



## External Circuit Box Installation

- 10.** Plug in the 4-prong motor plug (male) into the female connection on the bottom side of the external box. (Figs. 10a-10c)

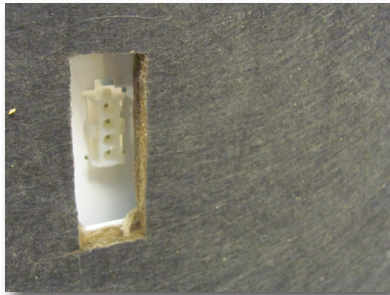


Fig. 10a

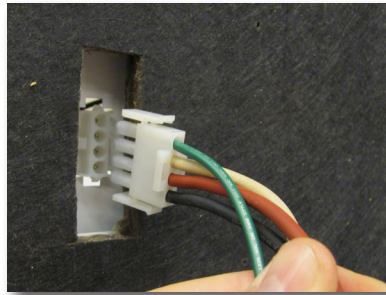


Fig. 10b

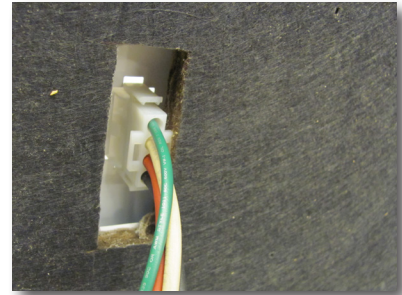


Fig. 10c

- 11.** Using 5/16" nut driver, secure external box to air handler in place of the large door, using screws provided in all four corner holes. (Fig. 11)

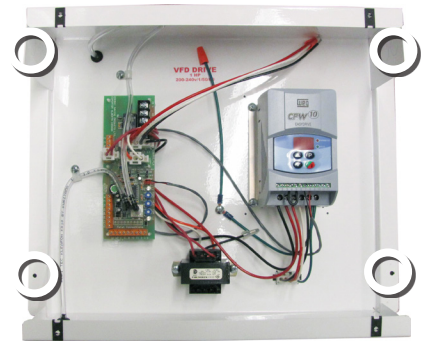


Fig. 11

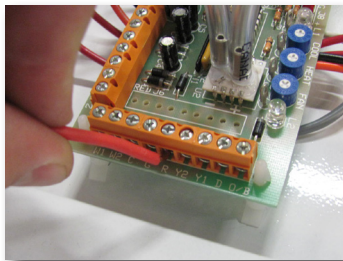


Fig. 12a

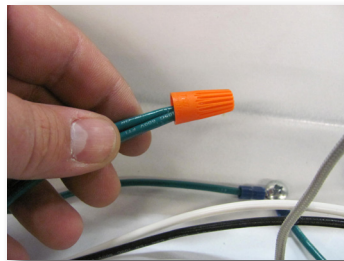


Fig. 12b

- 12.** Re-wire thermostat connections, line in and ground wires to the air handler. (Figs. 12a, 12b)

- 13.** Double check that all wires and wiring harnesses are connected. (Fig. 13)

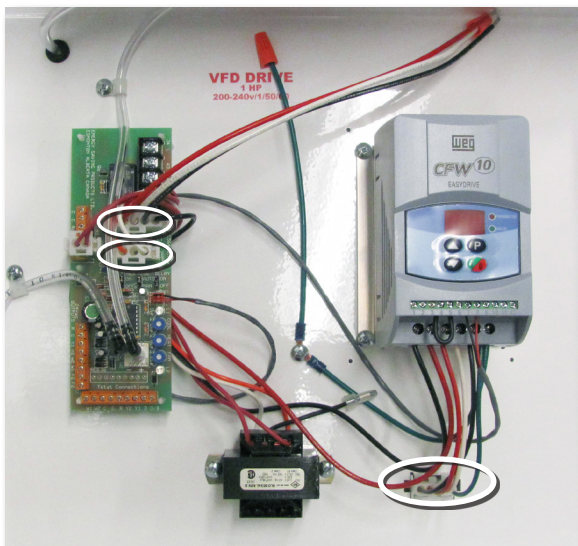


Fig. 13

- 14.** Install the provided large door on newly installed box. (Fig. 14)



Fig. 14

## Quick Reference Guide

### Quick System Setting Reference

	Hertz Output	Outlet Velocity	Static Pressure
Cooling Mode:	55-66 Hz	1250-1400 FPM	0.8-1.2"wc
Heating Mode:	45-66 Hz	1100-1400 FPM	0.6-1.2"wc
Constant Fan:	25-35 Hz	500-900 FPM	0.2-0.5"wc

#### Notes:

- Hertz will be displayed on the Variable Frequency Drive digital display.
- Outlet velocity is based on ideal noise levels.
- Static Pressure reading must be taken perpendicular to airflow, minimum of 18" away from supply air collar of air handler.
- Quick references should only be used to roughly set air handler, not to be used as primary air handler set up method.

#### Fan Adjustment Trim Pots



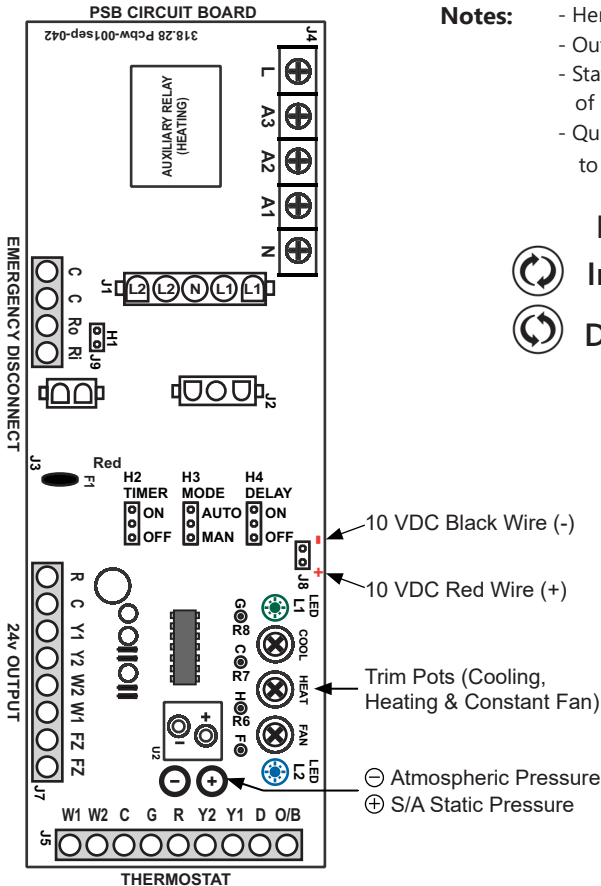
**Increase Airflow (Clockwise)**



**Decrease Airflow (Counter Clockwise)**

#### Jumper Pin Settings

<b>H1 Emergency Disconnect:</b>	(Remove pin to activate)
<b>H2 Timer:</b>	Activates auxiliary relay for 5 min every 24 hours.
<b>H3 Mode (Auto):</b>	Blower output speed modulates dependent upon static pressure.
<b>H3 Mode (Manual):</b>	Blower output speed operates at fixed flow rate.
<b>H4 Delay:</b>	Cooling/20second, heating/30 second fan delay, and 30 second post purge.



#### LED Description

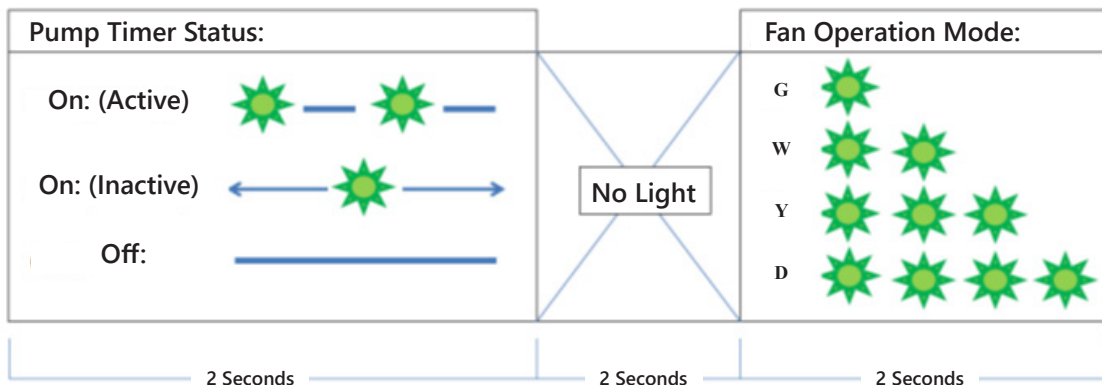
**LED 1 - Pump timer/Operation Mode Indicator Light**

**LED 2 - Pressure Sensor Indicator Light**

Note: If trim pots don't modulate the blower speed, check S/A Static Pressure pressure hose orientation and make sure the t-stat call is the same as the trimpot being adjusted.

#### Pump timer & Mode Indicator Light Sequence (Green LED1):

= Light On  
 = Light Off



# HE-Z/LV-Z Air Handler - PSB Circuit Board/CFW300 WEG Wiring Diagram

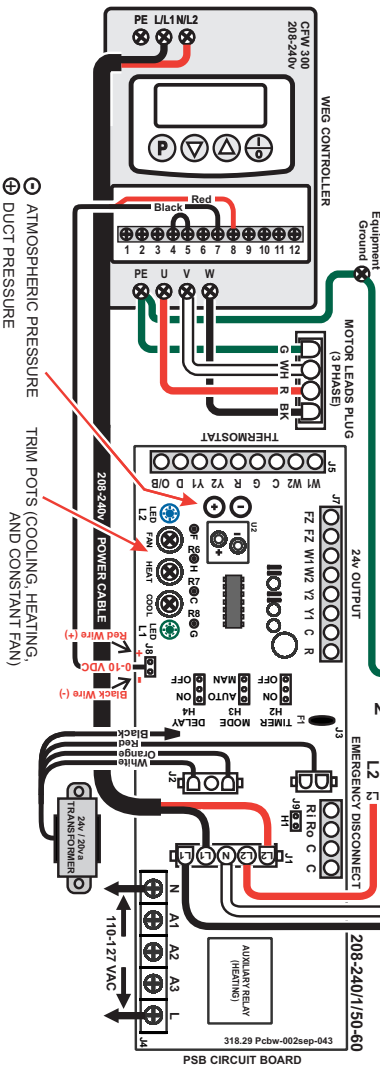
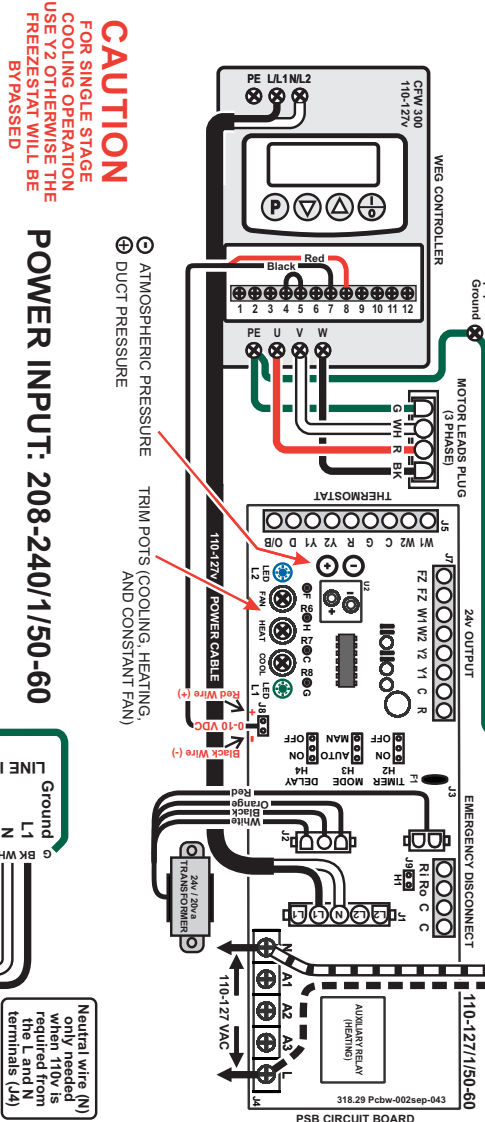
PLEASE NOTE: CFW10 has slightly different appearance, terminals and wiring are the same.

NOTE: CFW10 HAS SLIGHTLY DIFFERENT APPEARANCE - TERMINALS AND WIRING ARE THE SAME

## CFW300 HE-Z / LV-Z / VFD

- THERMOSTAT CONNECTIONS**
- R - 24 VAC OUTPUT
  - W1 - FIRST STAGE HEAT
  - W2 - SECOND STAGE HEAT
  - (OR SINGLE STAGE)
  - Y1 - FIRST STAGE COOLING
  - Y2 - SECOND STAGE COOLING
  - (OR SINGLE STAGE)
  - C - 24 VAC COMMON
  - G - THERMOSTAT FAN SWITCH
  - D - PRIORITY (RUNS AT W SPEED)
  - O/B - HEATPUMP REVERSING
- EMERGENCY DISCONNECT**
- C - 24 VAC COMMON
  - R - 24 VAC OUTPUT
  - RI - 24 VAC INPUT
- AUXILIARY HEATING RELAY**
- N - NEUTRAL
  - L - LINE VOLTAGE
  - A1 - AUXILIARY NORMALLY OPEN
  - A2 - AUXILIARY NORMALLY CLOSED
  - A3 - AUXILIARY COMMON
- 24 VAC OUTPUT CONNECTIONS**
- FZ - FREEZE STAT
  - W1 - HEATING (W1) 24 VAC OUTPUT
  - W2 - HEATING (W2) 24 VAC OUTPUT
  - Y2 - CONDENSING UNIT 24 VAC OUTPUT
  - C - 24 VAC COMMON
  - R - 24 VAC OUTPUT
- JUMPER PIN SETTINGS**
- H1 EMERGENCY DISCONNECT: REMOVE PIN IF WIRED TO EMERGENCY DISCONNECT
  - H2 TIMER: AUXILIARY RELAY TIMER (SEE NOTES)
  - H3 MODE:
    - AUTO - FAN SPEED MODULATES DEPENDING UPON STATIC PRESSURE
    - MANUAL - FAN SPEED OPERATES AT TRIM POTS SET AIR FLOW
  - H4 DELAY: Y20 AND W30 SECOND FAN DELAY. Y AND W 30 SECOND POST PURGE.
- LED LIGHT INDICATORS**
- LED 1 - GREEN LIGHT, PUMP TIMER OPERATION MODE INDICATOR
  - LED 2 - BLUE LIGHT, PRESSURE SENSOR

### POWER INPUT: 110-127/1150-60



#### NOTES:

- 1) USE THERMOSTAT FAN SWITCH TO DISABLE/ENABLE CONTINUOUS FAN.
- 2) 'C' TERMINAL ON THERMOSTAT (COMMON) IS NOT NEEDED FOR SOME THERMOSTATS CONSULT THERMOSTAT INSTRUCTIONS FOR DETAILS.
- 3) W1 AND W2 ACTIVATES AUXILIARY RELAY (A3) ON CALL AND CAN BE USED WITH A1 AND/OR A2 AS DRY CONTACTS, ARMED 24VAC FROM THE 'R' TERMINAL, OR ARMED 110V FROM THE 'L' TERMINAL.
- 4) AUXILIARY HEATING RELAY TIMER ACTIVATES CIRCUIT FOR 5 MINUTES EVERY 24 HOURS STARTING WHEN POWER IS APPLIED TO THE UNIT.
- 5) LED 1: INDICATOR LIGHT FOR FAN SPEED OPERATION AND AUXILIARY RELAY OPERATION. SEE BELOW FOR LIGHT OPERATION SEQUENCE.
- 6) SEE INSTALLATION MANUAL FOR MORE DETAILED WIRING DIAGRAMS.
- 7) **FOR SINGLE STAGE COOLING OPERATION USE Y2, OTHERWISE THE FREEZE STAT WILL BE BYPASSED.**
- 8) FAILURE TO SET PROPER AIR FLOW AND/OR OPERATION OF THE SYSTEM MAY RESULT IN DAMAGE TO EQUIPMENT.
- 9) FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLATION COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.
- 10) ENSURE THAT THE FILTER IS KEPT CLEAN AT ALL TIMES.
- 11) MOTOR HAS PERMANENT LUBE BEARINGS AND DOES NOT REQUIRE OILING.
- 12) WARRANTY VOID IF FAN COIL UNIT IS USED DURING CONSTRUCTION.

#### PUMP TIMER/OPERATION MODE INDICATOR LIGHT SEQUENCE

PUMP TIMER STATUS	FAN OPERATION MODE
ON: (ACTIVE)	G
ON: (INACTIVE)	W
OFF:	Y
	D

#### LED 2: PRESSURE SENSING INDICATOR (BLUE LIGHT)

##### H3 JUMPER PIN: AUTO OR MANUAL MODE

AUTO MODE: LED 2 WILL SPORADICALLY FLICKER (ON/OFF) TO SHOW THAT IT IS PROPERLY SENSING PRESSURE IN THE SYSTEM.

- \* NO LIGHT INDICATES TRIM POT IS ABOVE NORMAL OPERATING RANGE (COUNTER CLOCKWISE DECREASE).
- \* SOLID LIGHT INDICATES TRIM POT IS BELOW NORMAL OPERATING RANGE (CLOCKWISE, INCREASE).

MANUAL MODE: LED 2 WILL BE OFF, ADJUST EACH OF THE AIR FLOWS TO DESIRED CFM/LPS OUTPUT.

ADJUSTING TRIM POTS: ON POWER START UP, ALLOW 45 SECONDS FOR SYSTEM TO PRESSURIZE BEFORE MAKING ANY CHANGES.

DO NOT ADJUST MORE THAN A 1/2 TURN AT A TIME, ALLOW 30 SECONDS BETWEEN ADJUSTMENTS FOR THE PSB TO REACH SET POINT.

#### FAN ADJUSTMENT TRIM POTS

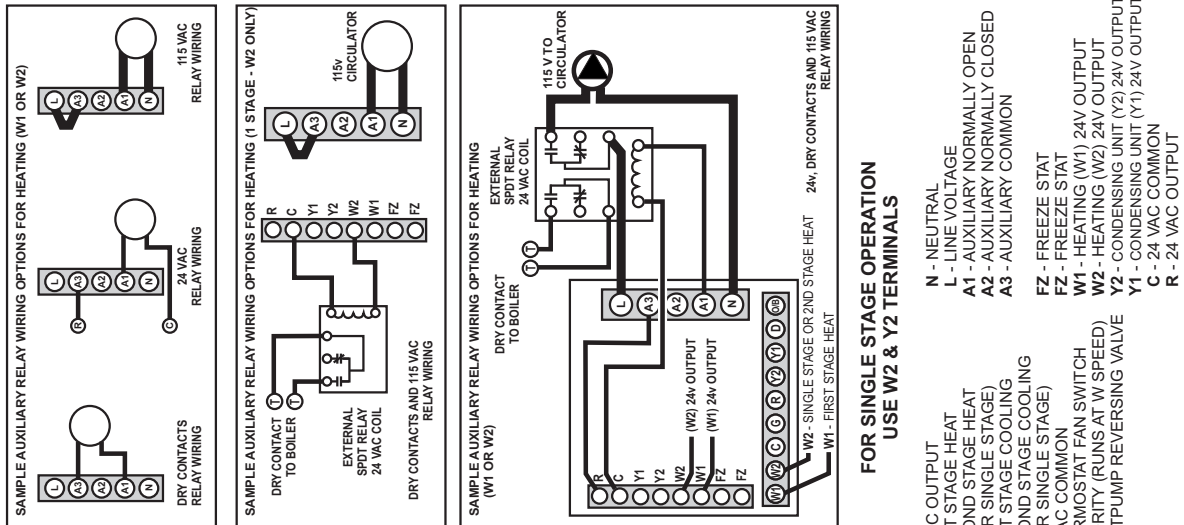
- INCREASE AIR FLOW (CLOCKWISE)
- DECREASE AIR FLOW (COUNTER CLOCKWISE)

REFER TO COMPLETE COMMISSIONING REPORT PRIOR TO NORMAL OPERATION. REPORT IS AVAILABLE WITH THE INSTALLATION MANUAL OR ONLINE AT [WWW.HI-VELOCITY.COM](http://WWW.HI-VELOCITY.COM)



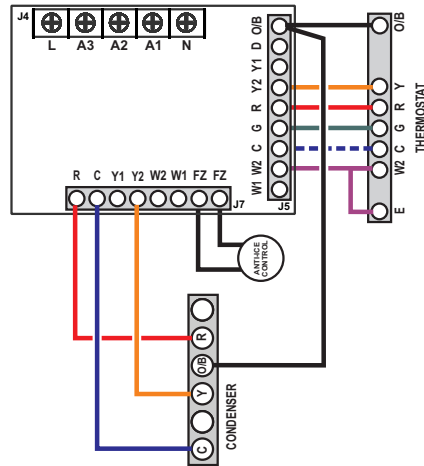
## HE-Z Air Handler - Extended Wiring Diagrams

Extended wiring diagrams for the various applications the Hi-Velocity HE-Z model can be used for. If you do not find the wiring configuration you require, please call the technical department at Energy Saving Products Ltd. for further assistance.

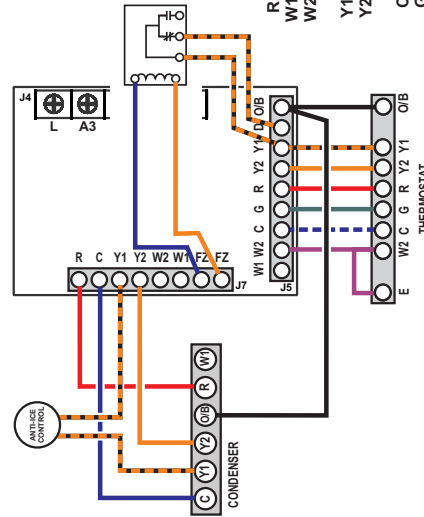


HE-Z-LV-Z-Extended-Wiring-Pg-1-082615

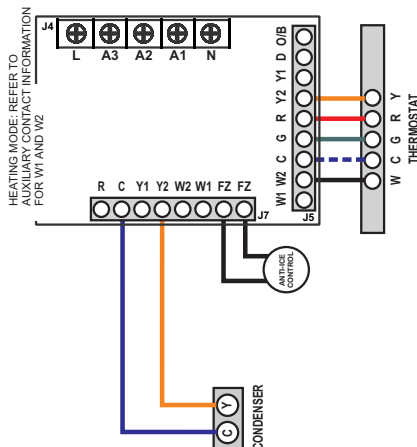
**1 Stage Cooling 2 Stage Heating Heatpump**



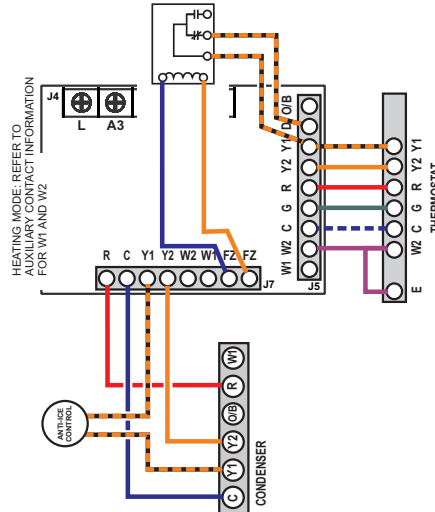
**2 Stage Cooling 3 Stage Heating Heatpump**



**1 Stage Cooling 1 Stage Heating**



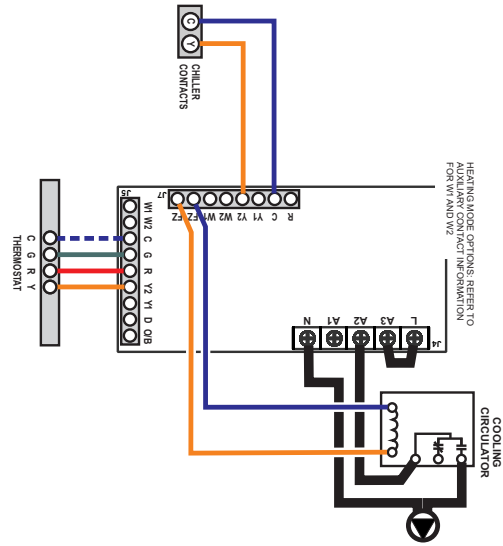
**2 Stage Cooling 1 Stage Heating**



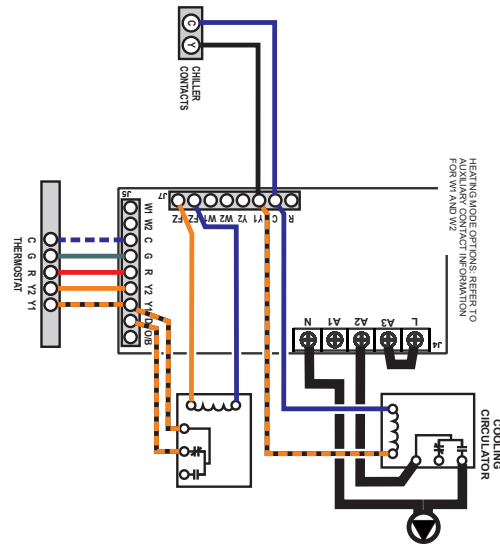
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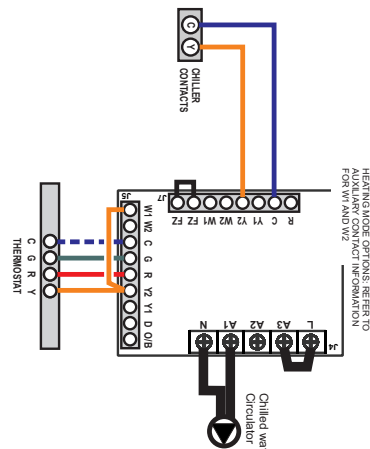
### 1 Stage Cooling c/w chilled water circulator



### CHILLED WATER WIRING 2 Stage Cooling c/w chilled water circulator

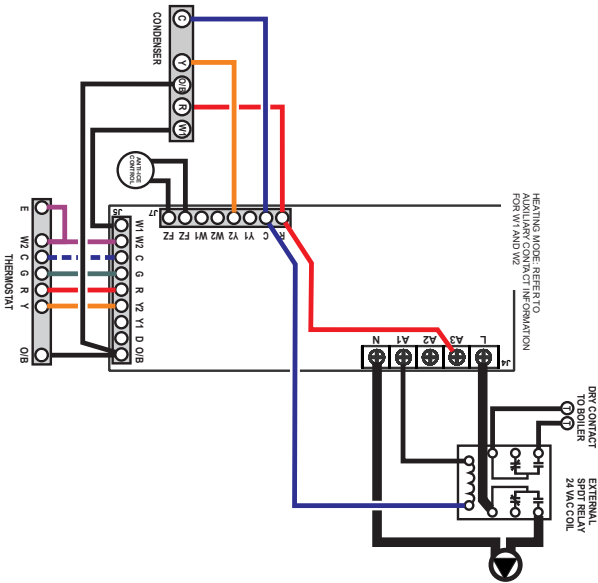


### 1 Stage Cooling (Only) c/w chilled water circulator

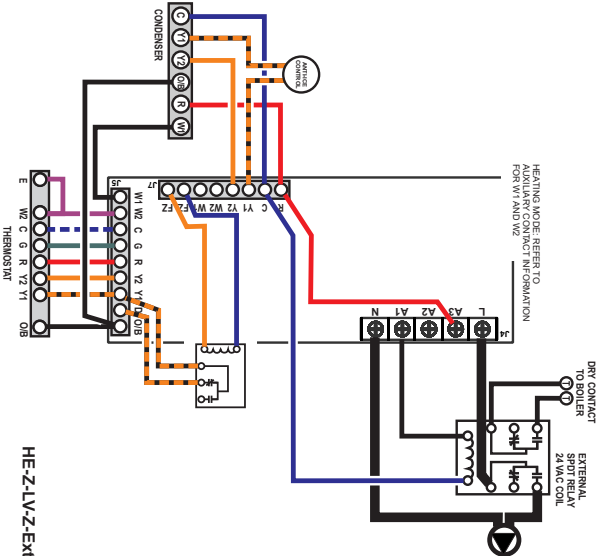


## HEAT PUMP C/W CONDENSER DEFROST CYCLE - BOILER BACK-UP

### 1 Stage Cooling 2 Stage Heating Heat pump c/w condenser defrost cycle



### 2 Stage Cooling 3 Stage Heating Heat pump c/w condenser defrost cycle



HE-Z-LV-Z-Extended-Wiring-Pg-2-082615

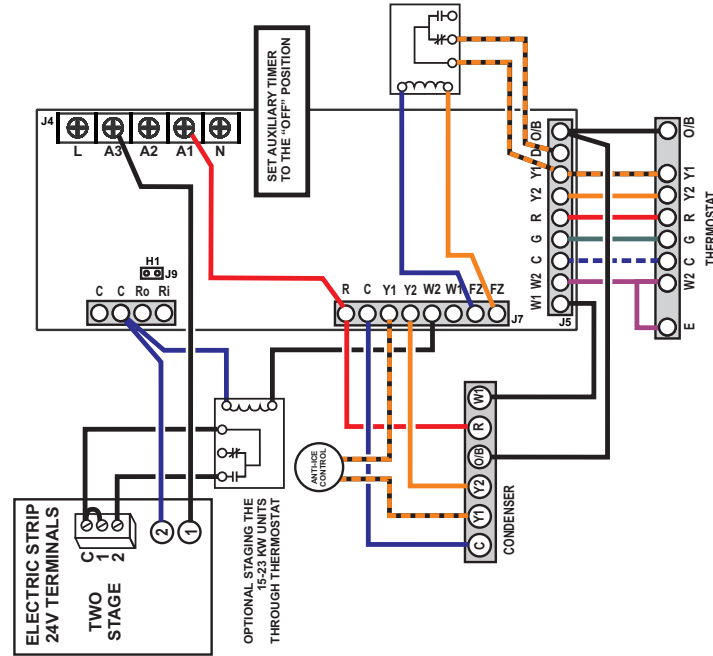


## HE-Z Air Handler - Extended Wiring Diagrams

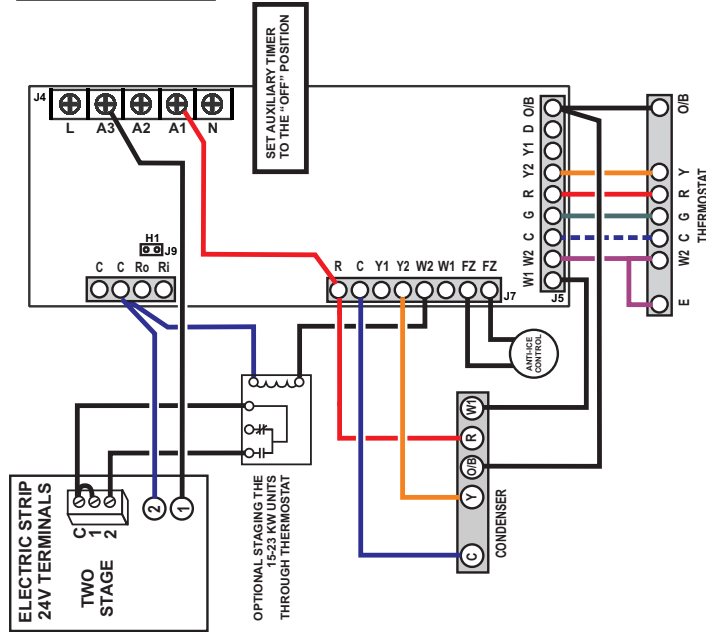
Extended wiring diagrams for the various applications the Hi-Velocity HE-Z model can be used for. If you do not find the wiring configuration you require, please call the technical department at Energy Saving Products Ltd. for further assistance.

### HEAT PUMP C/W CONDENSER DEFROST CYCLE ELECTRIC BACK-UP

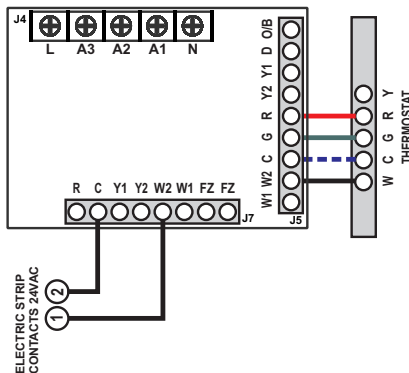
#### 2 Stage Cooling 3 Stage Heating (Electric) Heat pump c/w condenser defrost cycle



#### 1 Stage Cooling 2 Stage Heating (Electric) Heat pump c/w condenser defrost cycle

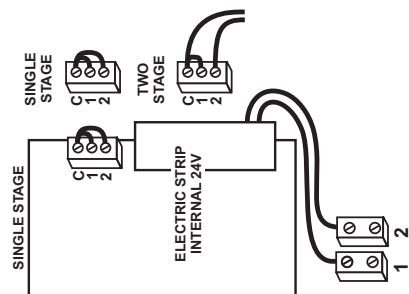


#### WIRING FOR ELECTRICAL STRIP HEATER (ESH) 1 Stage Heating



#### OPTIONAL THROUGH OUT DOOR THERMOSTAT STAGING THE 15-23 KW UNITS

For optional energy savings install a outdoor thermostat to limit the use of the second stage of the ESH. For example - 2 staging the electric strip interrupt "C" and "1" or "C" and "2" with a outdoor stat as shown below. This allows single stage of the two banks of the electric strip to activate, the second stage will be allowed to activate by the outdoor stat.



**PSB Circuit Board Setup and Troubleshooting Flowchart**

- Start**
- Jumper desired Tstat setting with R on the PSB Circuit Board (Figs. 001-002)**
- Power Air Handler**
- Verify that Main Supply Voltage is present on the PSB circuit board between the L and N terminals (Fig. 003)**
- Supply Power present?**
  - N** → **Inspect Supply Voltage** → **Return to Step 4**
  - Y** → **Verify that 24VAC is present between R & C on the PSB circuit board (Fig. 004)**
- Verify that 24VAC is present between C & desired T-Stat setting**
  - N** → **Ensure Transformer is connected properly** → **Replace Transformer** → **Turn off Supply Power, connect Transformer, turn on Power - Return to Step 5**
  - Y** → **Ensure that Jumper is installed correctly (Fig. 002)**
- Input Voltage and T'Stat function on PSB is functioning correctly**
  - N** → **Install Jumper and return to Step 6**
  - Y** → **Verify that Pressure Sensing section of PSB is functioning within proper operating range**
- Verify that Pressure Sensing section of PSB is functioning within proper operating range**
- Blue Light present on PSB Circuit Board?**
  - N** → **Turn appropriate PSB trimpot 1/2 turn Counter-Clockwise, wait 30-45 seconds for drive to adjust - Return to Step 9**
  - Y** → **Verify that Pressure Sensing section of PSB is functioning properly by measuring Voltage Output (Volts DC) @ the WEG controller, Terminals 7 & 8 (Fig. 005)**
- Verify that Pressure Sensing section of PSB is functioning properly by measuring Voltage Output (Volts DC) @ the WEG controller, Terminals 7 & 8 (Fig. 005)**
- Voltage present? (0-10VDC)**
  - N** → **Ensure that Volt Meter is set to read Volts DC. Test Voltage on opposite end of cable (Fig. 006)** → **Voltage present?**
    - N** → **Call Technical Support Toll Free 1-888-652-2219**
    - Y** → **Return to Step 11**
  - Y** → **VDC < 9VDC**
- VDC < 9VDC**
  - N** → **Decrease PSB trimpot of jumped tstat setting 1/2 turn Counter-Clockwise - Wait 30 seconds for drive to adjust (Fig. 007)**
  - Y** → **Read and record Volts DC Value**
- Read and record Volts DC Value**
- Adjust trimpot 1/2 turn Counter-Clockwise**
- Read and record Volts DC value to confirm adjustment**
- VDC changed?**
  - N** → **Adjust trimpot 1/2 turn Counter-Clockwise, wait 30 seconds - VDC changed?**
  - Y** → **PSB Circuit Board is functioning correctly**
- PSB Circuit Board is functioning correctly**
- Adjust trimpots on PSB Circuit Board until airflow is running at desired speed**  
\*See *System Commissioning Report and Set-Up*

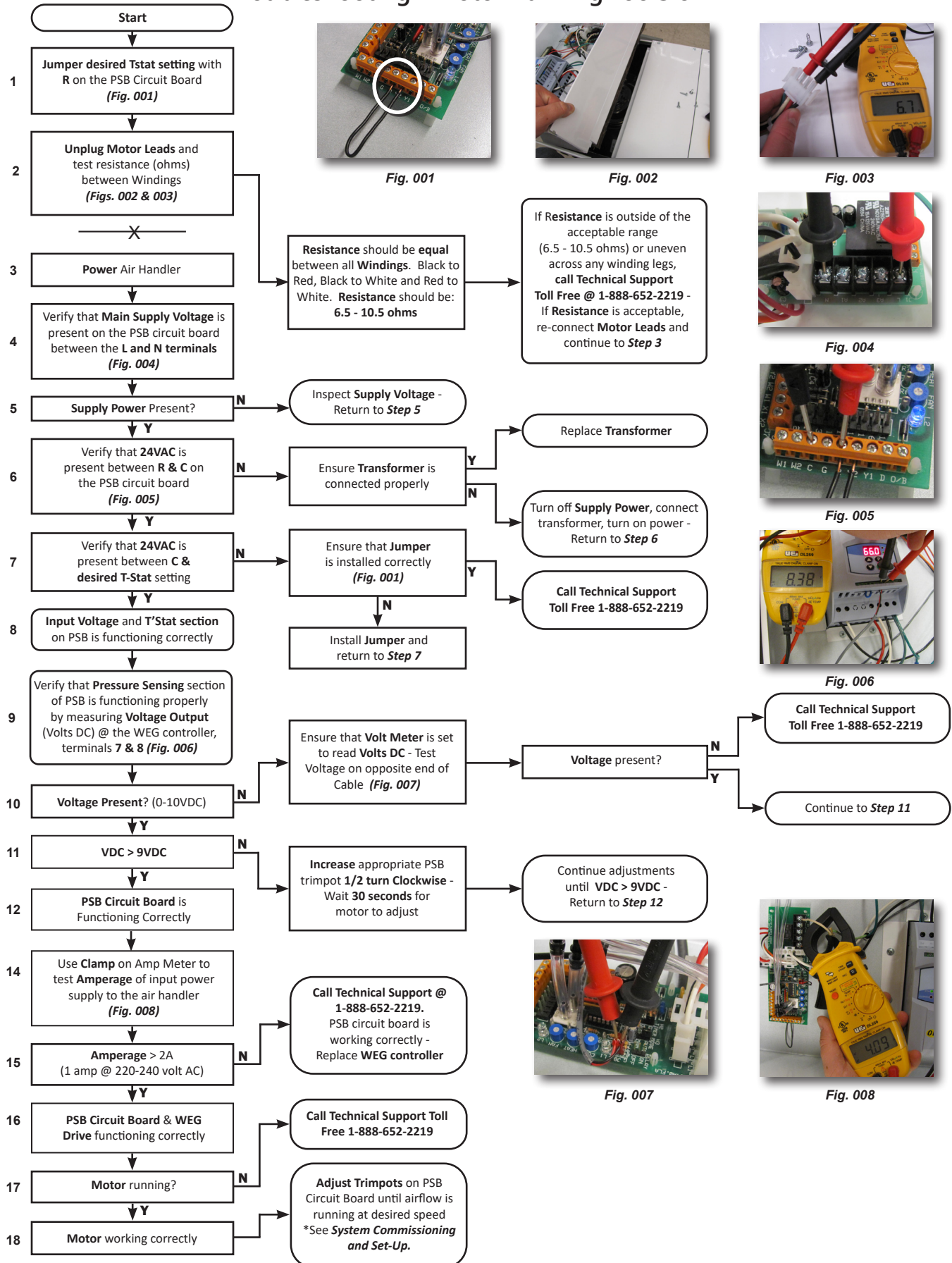
**Figures:**

- Fig. 001:** PSB circuit board with jumper installed.
- Fig. 002:** PSB circuit board with jumper installed.
- Fig. 003:** PSB circuit board with jumper installed.
- Fig. 004:** PSB circuit board with jumper installed.
- Fig. 005:** Voltmeter reading 8.38V.
- Fig. 006:** PSB circuit board with terminals labeled: Cooling (Y2 terminal), Heating (W2 terminal), Recirc Fan (G terminal).
- Fig. 007:** PSB circuit board with trimpot adjusted.

**\*To adjust the remaining T-Stat settings:**

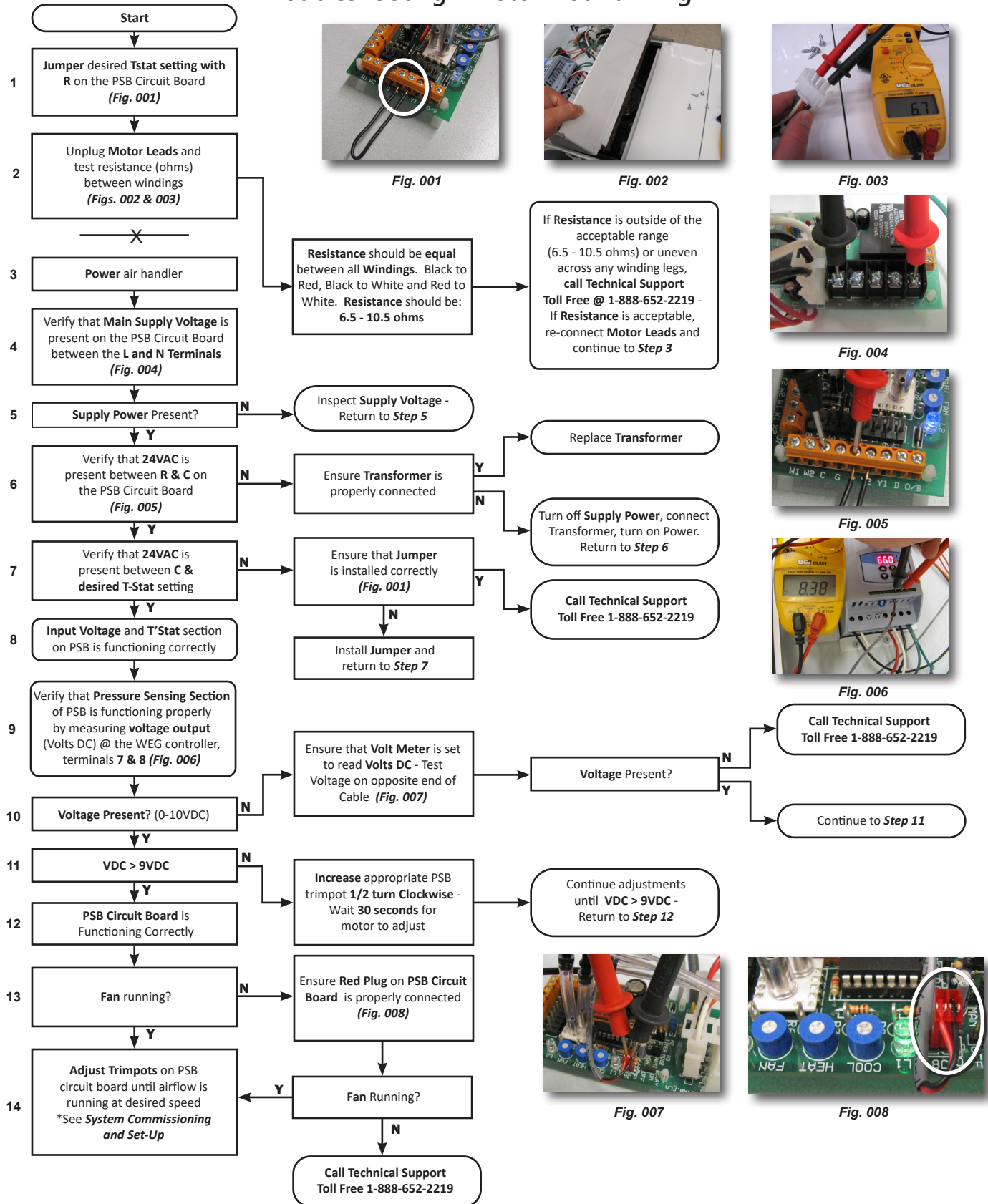
- Jumper between R & the desired T-Stat setting
- Adjust the corresponding trimpot to the desired airflow using the method described in the *System Commissioning and Set-Up*.

## Troubleshooting - Motor Running Too Slow



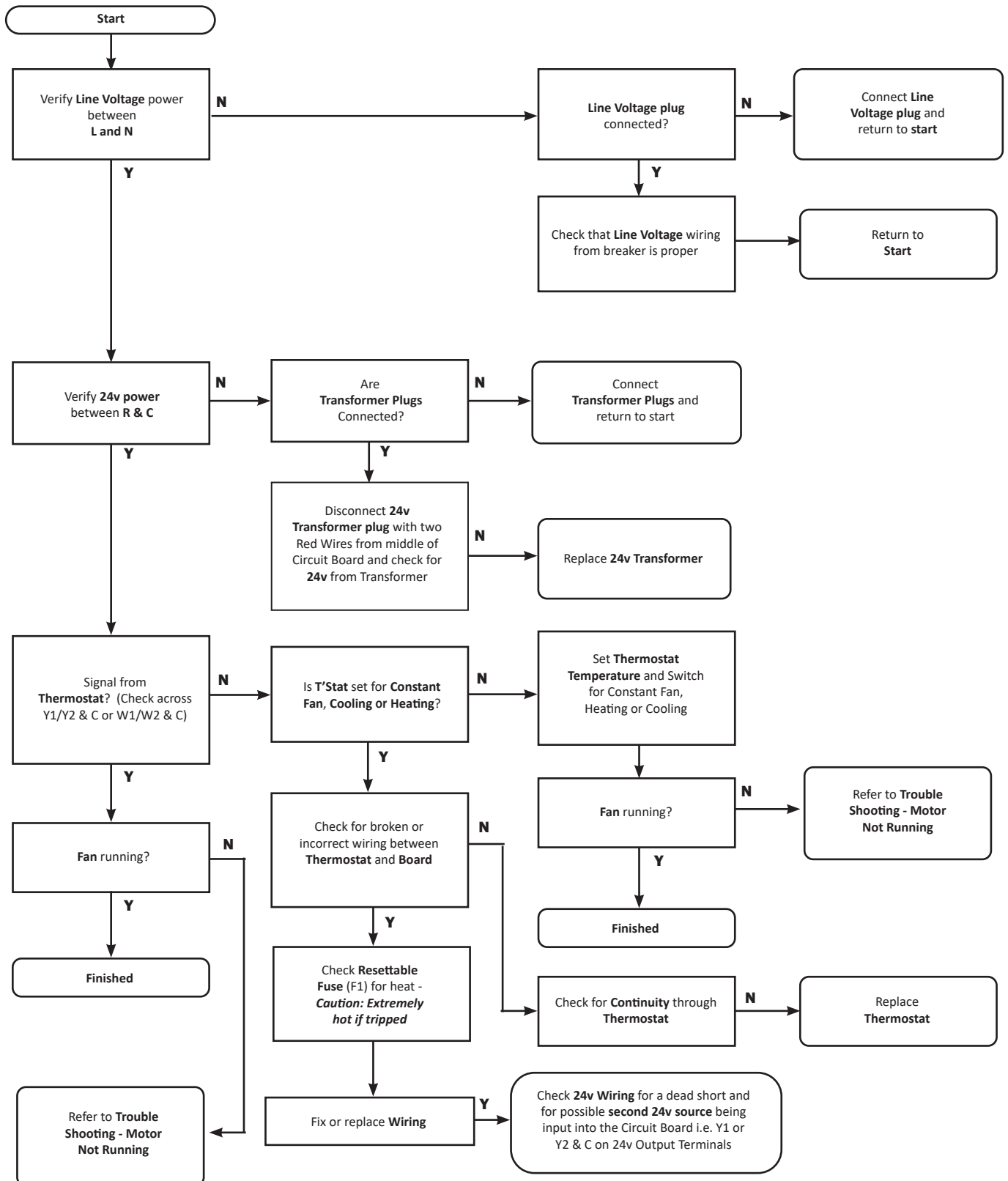


## Troubleshooting - Motor Not Running

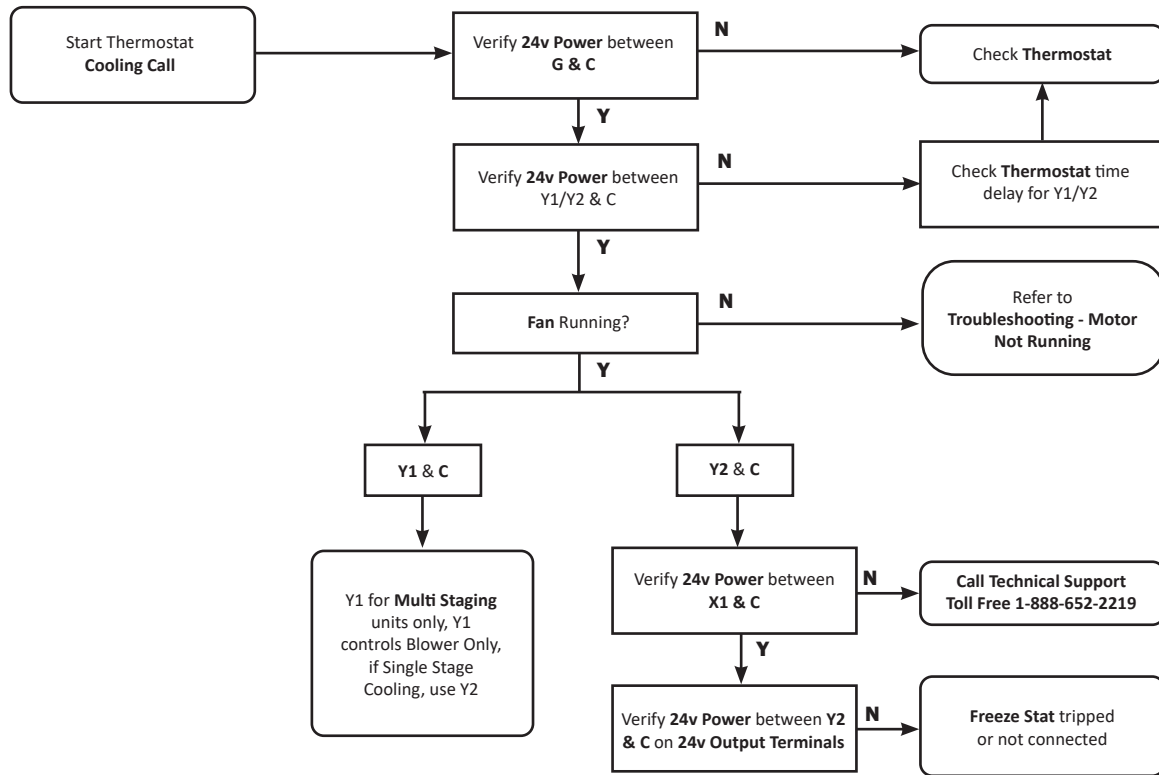




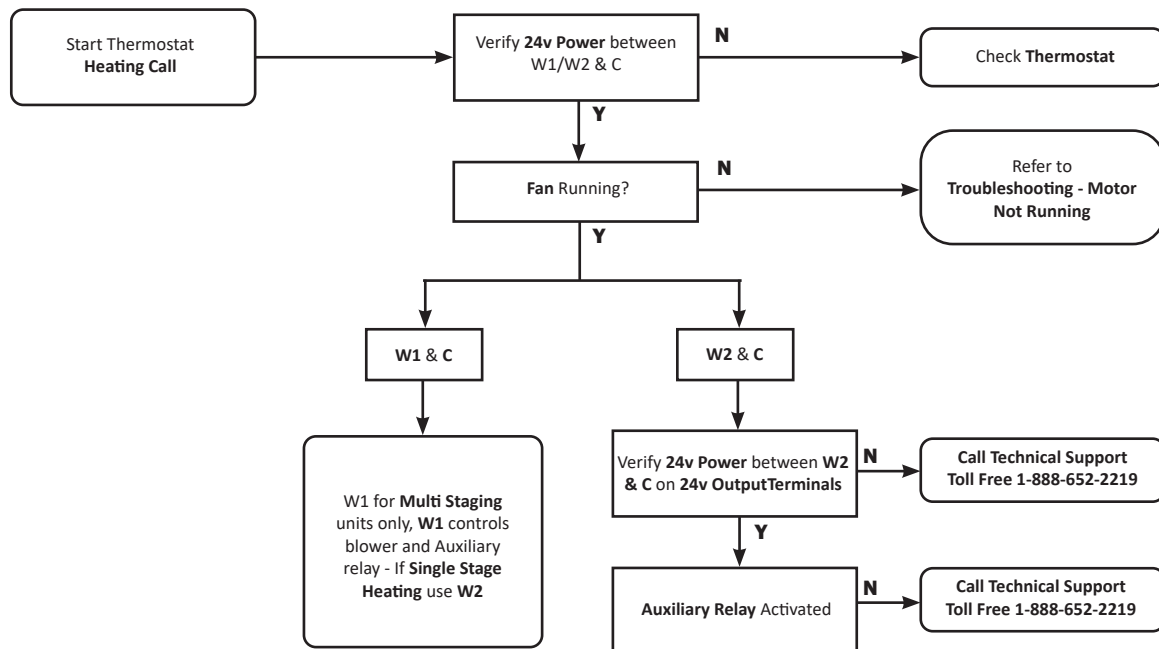
## Troubleshooting - 24Volt Thermostat to PSB Circuit Board



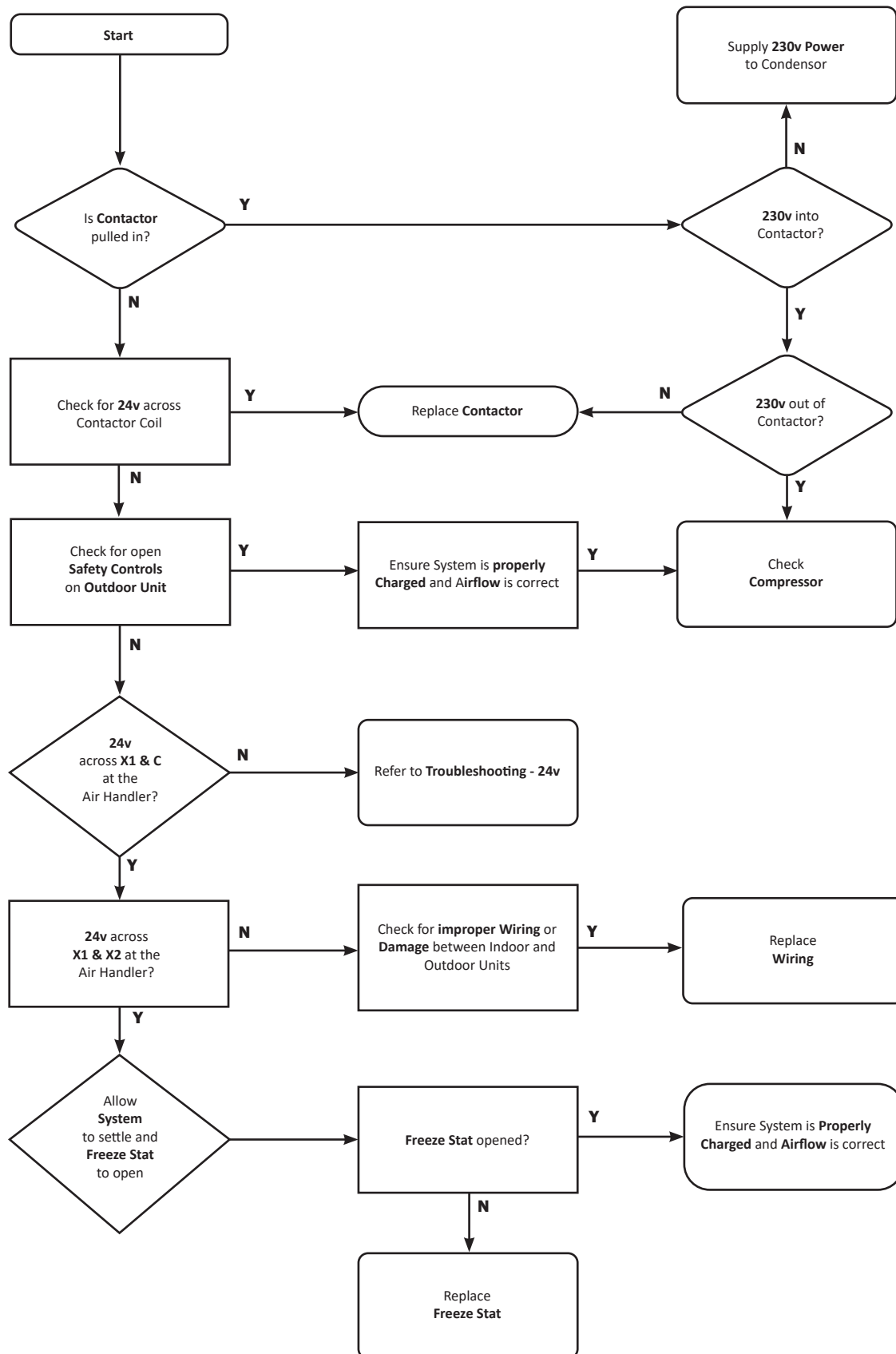
## Troubleshooting - Cooling 24 Volt Circuit Board



## Trouble Shooting: Heating 24 Volt Circuit Board



## Troubleshooting - Outdoor Unit - Electrical



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