

# Technical Service Guide

November 2021

## 2021 GEA Zoneline VTAC "Vertical Packaged Terminal Air Conditioner"

**AZ95H09DACK1**

**AZ95H09EACK1**

**AZ95H12DACK1**

**AZ95H12EACK1**

**AZ95H18DACK1**

**AZ95H18EACK1**



# Safety Information



## IMPORTANT SAFETY NOTICE

The information in this service guide is intended for use by individuals possessing adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

### WARNING

To avoid personal injury, disconnect power before servicing this product. If electrical power is required for diagnosis or test purposes, disconnect the power immediately after performing the necessary checks.

### RECONNECT ALL GROUNDING DEVICES

If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

# Warranty

For Warranty Information:

1. Go to <http://products.geappliances.com>
2. Search the model number.
3. Click on the Literature tab.
4. Click on Use and Care Manual.
5. Locate the Warranty page.

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# Safety Requirements

GEA Factory Service Employees are required to use safety glasses with side shields, safety gloves and steel toe shoes for all repairs.



Brazing Glasses



Plano Type Safety Glasses



Prescription Safety Glasses

Safety Glasses must be ANSI Z87.1-2003 compliant



Dyneema® Cut Resistant Glove



Cut Resistant Sleeve(s)



Electrically Rated Glove and Dyneema® Cut Resistant Glove Keeper



Steel Toed Work Boot

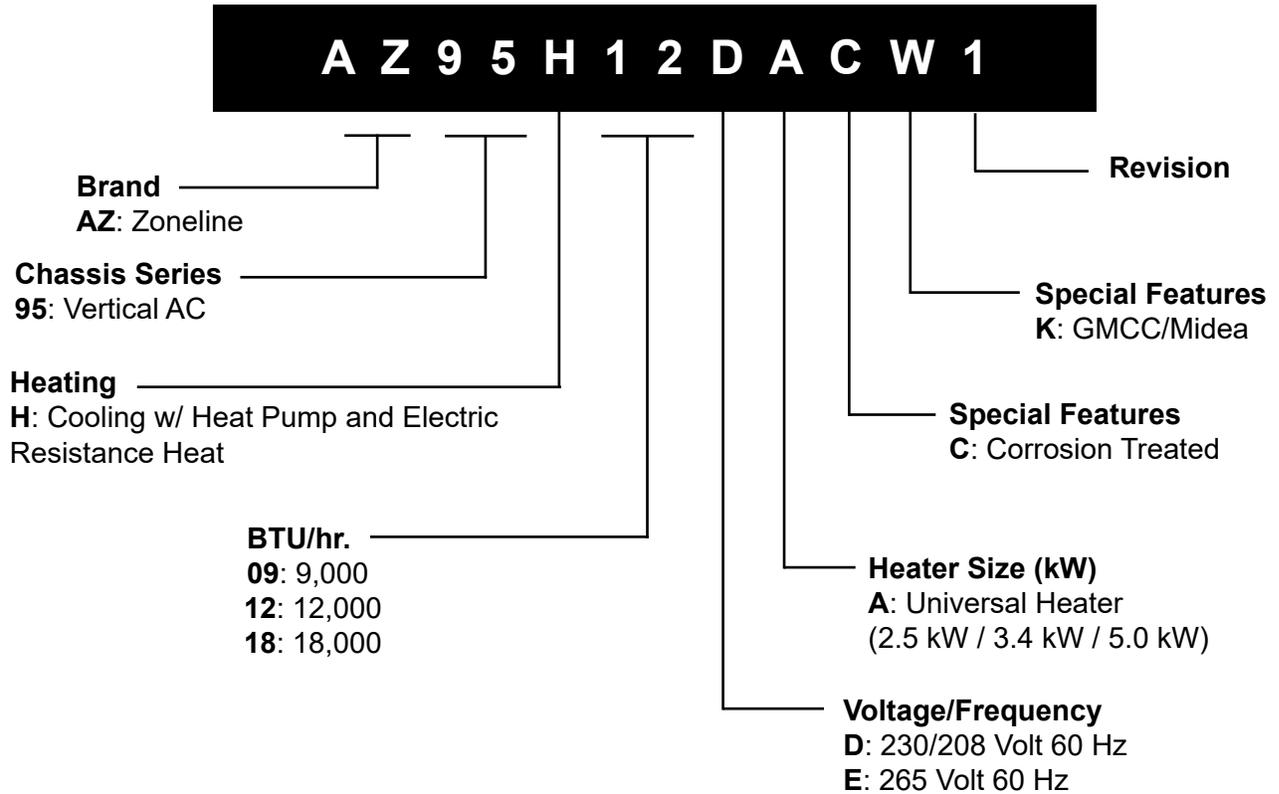


Prior to disassembly of the water heater to access components, GEA Factory Service technicians are REQUIRED to follow the Lockout / Tagout (LOTO) 6 Step Process:

<b>Step 1</b> Plan and Prepare	<b>Step 4</b> Apply LOTO device and lock
<b>Step 2</b> Shut down the appliance	<b>Step 5</b> Control (discharge) stored energy
<b>Step 3</b> Isolate the appliance	<b>Step 6</b> "Try It" verify that the appliance is locked out

# Nomenclature

## Model Number



The nomenclature breaks down and explains what the letters and numbers mean in the model number.

## Serial Number

The first two characters of the serial number identify the month and year of manufacture. The letter designating the year repeats every 12 years.

**Example:** FS123456S = March, 2021

A: JAN	2024: Z
D: FEB	2023: V
F: MAR	2022: T
G: APR	2021: S
H: MAY	2020: R
L: JUN	2019: M
M: JUL	2018: L
R: AUG	2017: H
S: SEP	2016: G
T: OCT	2015: F
V: NOV	2014: D
Z: DEC	2013: A

Model and Serial Tag



Mini Manual  
The mini manual is located behind the junction box cover

# Specifications

## Features

**Sensible Heat Ratio:** 76%

**Central Desk Control Compatibility:** Yes

**Corrosion Treated:** Yes

**Fan Speed Selections:** 3 Cooling

**Freeze Sentinel:** Yes

**Heat Pump:** Yes

**Heat Sentinel:** Yes

**Remote Thermostat:** RAK149F2, RAK149P2, RAK180W1

**Rotary Compressor:** Yes

### VTAC Features:

Anti-Corrosion Design

Auto Compressor Random Restart

Automatic Emergency Heat

Automatic Indoor Frost Control

Boost Heat

Chassis Design with Perfect Fit to Insta-Platform™ and Quick-Install Plenum (sold separately)

Fast-Connect Plumbing

Freeze Sentinel

Heat Pump with Resistance Heat Backup

Heat Sentinel

Onboard Electronic Error Diagnostics

Quick Heat Recovery

Reverse Cycle Defrost

Self-Aligning, Lock In Place Platform System

Self-Contained Drainage System

SmartHQ Wi-Fi Capability

Thermostat Quick Disconnect

Ultra-Quiet

**Heating System:** Heat Pump

**Product Type:** Vertical Air Conditioners (SPVU)

**Refrigerant Type:** R410A

## Weights and Dimensions

### Approximate Shipping Weight:

131 0/1-lb to 148 0/1-lb (Depending on model)

### Net Weight:

119 0/1-lb to 136 0/1-lb (Depending on model)

**Overall Depth:** 24 1/8-in.

**Overall Height:** 31 7/8-in.

**Overall Width:** 23 5/8-in.

## Power / Ratings

### AZ95H09DACK1

**Cooling - Amperes:** 3.7

**Cooling - Watts:** 800

**Heating - Reverse Cycle - Amps:** 3.5

**Heating - Reverse Cycle - COP:** 3.3

**Heating - Reverse Cycle - Watts:** 735

**Voltage (MIN):** 208.0 V

**Voltage (MAX):** 230.000000 V

**Cooling BTUH (MAX):**

8900.000000 Btu

**Cooling EER (BTUH / Watt):** 11.1

**CFM Indoor Fan Medium:** 408

**CFM Indoor Fan Low:** 305

**Dehumidification (pts./hr.):** 1.9

**Heating - Reverse Cycle - BTUH:**  
8,500

(Continued next page)

**AZ95H09EACK1**

**Cooling - Amperes:** 3.0  
**Cooling - Watts:** 775  
**Heating - Reverse Cycle - Amps:** 2.8  
**Heating - Reverse Cycle - COP:** 3.3  
**Heating - Reverse Cycle - Watts:** 660  
**Voltage (MAX):** 230.000000 V  
**Cooling BTUH (MAX):**  
 8700.000000 Btu  
**Cooling EER (BTUH / Watt):** 11.0  
**CFM Indoor Fan Medium:** 408  
**CFM Indoor Fan Low:** 305  
**Dehumidification (pts./hr.):** 1.9  
**Heating - Reverse Cycle - BTUH:**  
 8,000

**AZ95H12DACK1**

**Cooling - Amperes:** 4.5  
**Cooling - Watts:** 955  
**Heating - Reverse Cycle - Amps:** 4.3  
**Heating - Reverse Cycle - COP:** 3.5  
**Heating - Reverse Cycle - Watts:** 870  
**Voltage (MIN):** 208.0 V  
**Voltage (MAX):** 230.000000 V  
**Cooling BTUH (MAX):**  
 11300.000000 Btu  
**Cooling EER (BTUH / Watt):** 11.8  
**CFM Indoor Fan Medium:** 417  
**CFM Indoor Fan Low:** 376  
**Dehumidification (pts./hr.):** 2.5  
**Heating - Reverse Cycle - BTUH:**  
 10,500

**AZ95H12EACK1**

**Cooling - Amperes:** 4.0  
**Cooling - Watts:** 925  
**Heating - Reverse Cycle - Amps:** 3.7  
**Heating - Reverse Cycle - COP:** 3.3  
**Heating - Reverse Cycle - Watts:** 865  
**Voltage (MAX):** 265.000000 V  
**Cooling BTUH (MAX):**  
 11400.000000 Btu  
**Cooling EER (BTUH / Watt):** 11.0  
**CFM Indoor Fan Medium:** 417  
**CFM Indoor Fan Low:** 376  
**Dehumidification (pts./hr.):** 2.5  
**Heating - Reverse Cycle - BTUH:**  
 10,500

**AZ95H18DACK1**

**Cooling - Amperes:** 7.1  
**Cooling - Watts:** 1525  
**Heating - Reverse Cycle - Amps:** 6.6  
**Heating - Reverse Cycle - COP:** 3.3  
**Heating - Reverse Cycle - Watts:** 1,400  
**Voltage (MIN):** 208.0 V  
**Voltage (MAX):** 230.000000 V  
**Cooling BTUH (MAX):**  
 17000.000000 Btu  
**Cooling EER (BTUH / Watt):** 11.1  
**CFM Indoor Fan Medium:** 468  
**CFM Indoor Fan Low:** 408  
**Dehumidification (pts./hr.):** 4.4  
**Heating - Reverse Cycle - BTUH:**  
 15,800

## AZ95H18EACK1

**Cooling - Amperes:** 6.3

**Cooling - Watts:** 1560

**Heating - Reverse Cycle - Amps:** 5.9

**Heating - Reverse Cycle - COP:** 3.3

**Heating - Reverse Cycle - Watts:** 1,435

**Voltage (MAX):** 265.000000 V

**Cooling BTUH (MAX):**

17100.000000 Btu

**Cooling EER (BTUH / Watt):** 11.0

**CFM Indoor Fan Medium:** 468

**CFM Indoor Fan Low:** 408

**Dehumidification (pts./hr.):** 4.4

**Heating - Reverse Cycle - BTUH:**

15,900

## Certifications

### California Prop 65

## Installation Requirements

### Accessories Required for Installation:

Outdoor Grille - RAVAL3

### Accessories Required for Installation:

Plenum - RAVWPT15 or RAVTRANS2, 3, 4

### Accessories Required for Installation:

RAVDPLAT

### Accessories Required for Installation:

Return Air Grille - RAVRG4, RAVRG2

### Accessories Required for Installation:

Wall Thermostat - RAK149F2, RAK149P2,

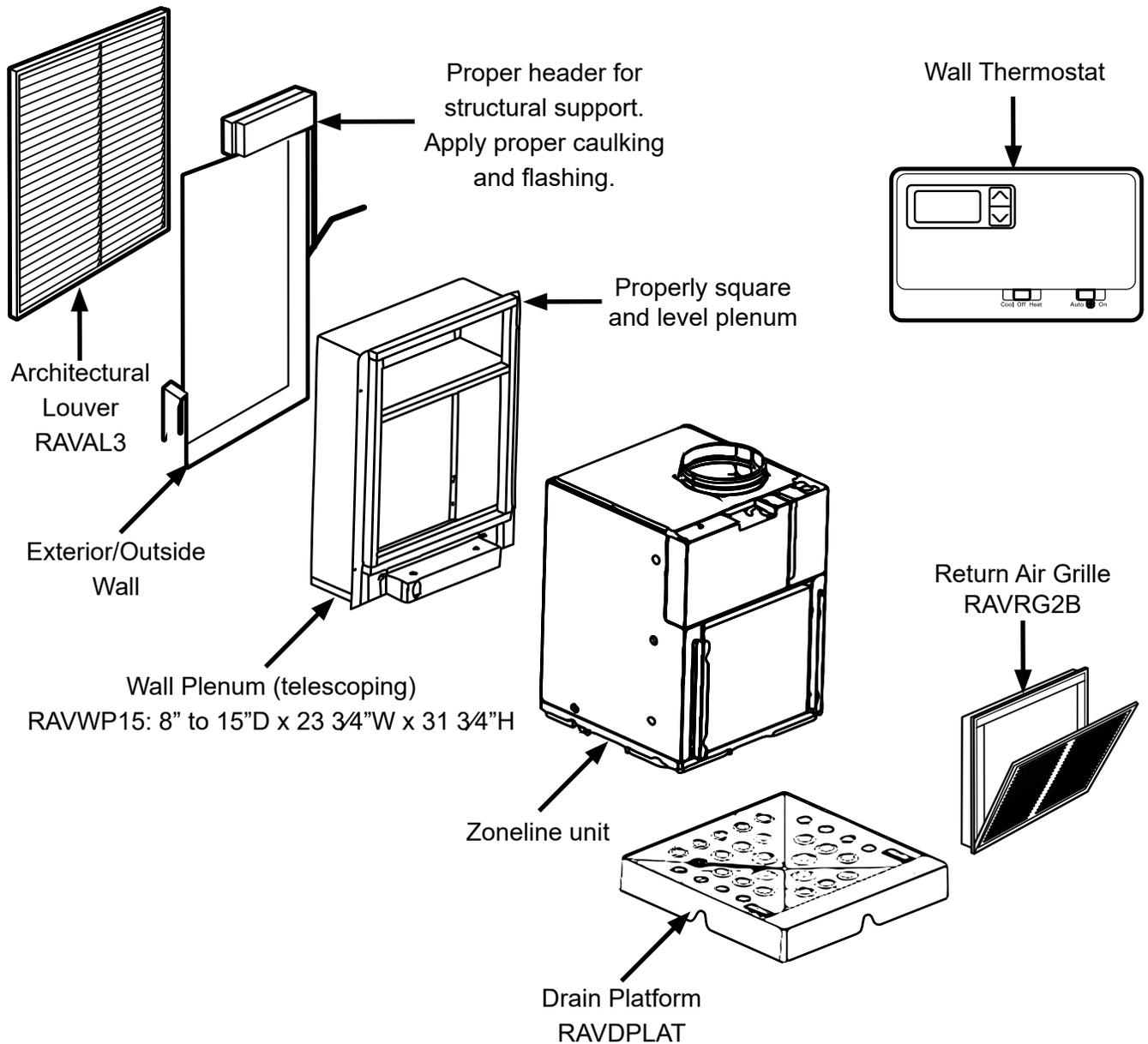
RAK180W1

### Power Connection Kit:

RAK5XXD Series

# Installation

## Installation Overview



- Install the wall plenum through the exterior wall in accordance with the Installation Instructions provided with the plenum.

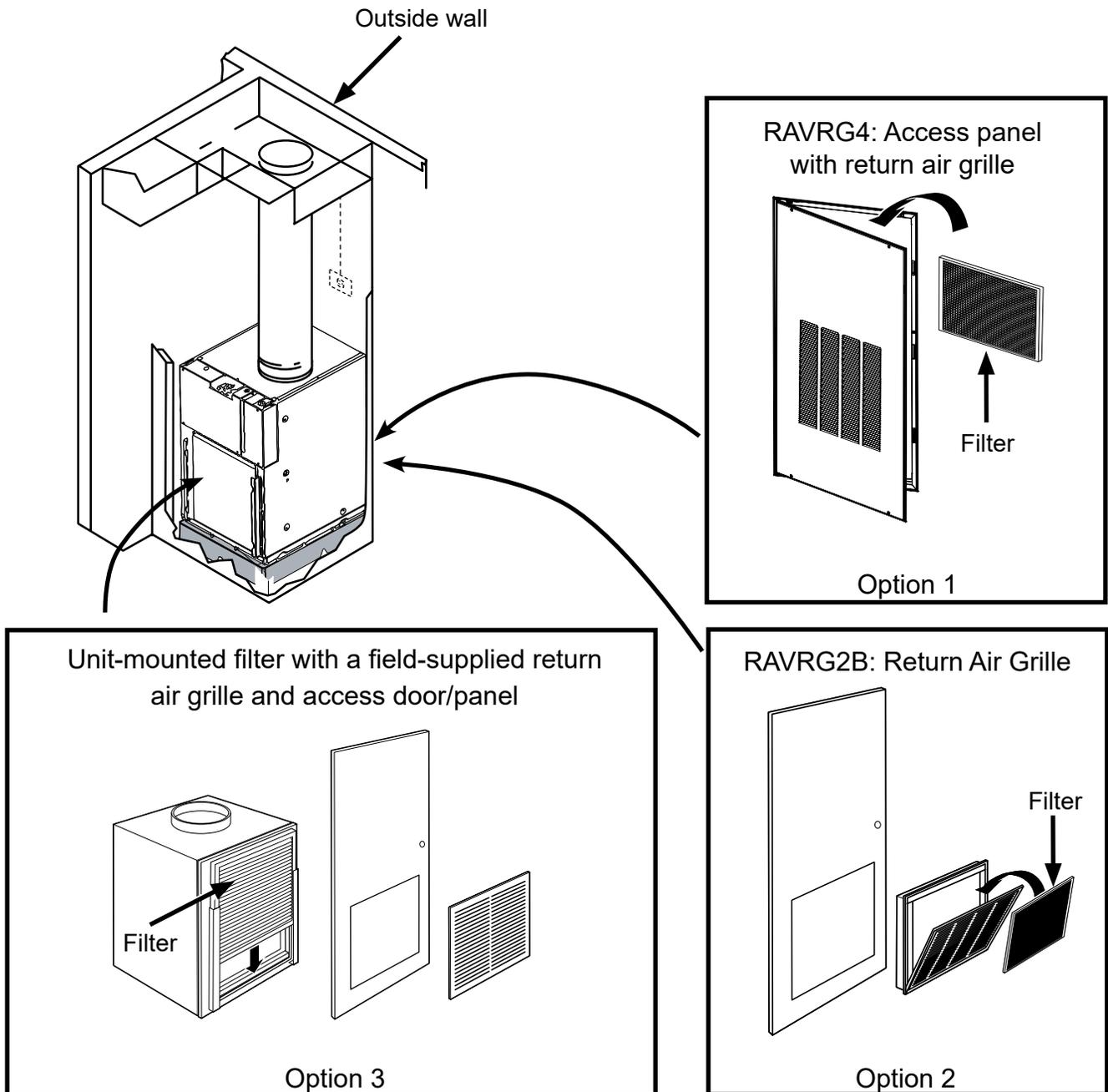
**IMPORTANT:** The wall plenum is not designed to carry structural loads. Proper wall header construction is required. The plenum requires proper flashing, shim, and caulk for a weather resistant installation.

## Return Air Grille Installation Options

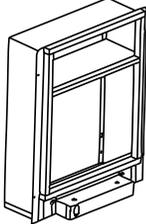
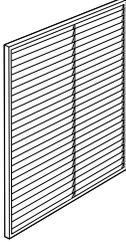
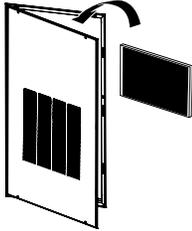
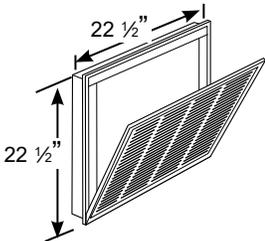
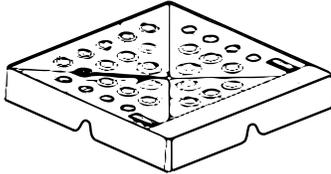
The room return air grille may be installed toward the front or either side of the unit. Improper return air arrangements will cause performance problems.

There are three indoor return air grille installation options. Choose the option that best suits the installation requirements. Follow the Installation Instructions provided with the return air grille accessory for installation details.

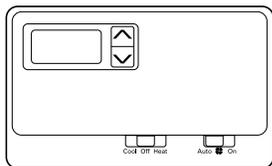
**NOTE:** Use only one filter in the installation. The filter may be installed on the unit or in the access panel/door.



## Accessories for New Installation

RAVRG2B: Return Air Grille	Appearance	Cutout Dimensions
<b>Plenum (telescoping)</b> RAVWPT15 8" to 15"D x 23 3/4"W x 31 3/4"H *excluding flange		Cutout Dimensions: 24"W x 32"H
<b>Architectural Louver</b> RAVAL3		Architectural Louver designed to fit the following Plenums: RAVWP15 8" to 15"D x 23 3/4"W x 31 3/4"H
<b>Access Panel with Return Air Grille</b> RAVRG4		Cutout Dimensions: 28 1/8"W x 55 7/8"H
<b>Return Air Grille</b> RAVRG2B		Cutout Dimensions: 20 3/8"W x 20 3/8"H
<b>Drain Platform</b> RAVDPLAT		Not Applicable

### Wall Thermostat



Model Type	Wiring	Thermostat Type	Fan Speed(s)	Kit Number
Electric Resistance Models	5-wire	5-wire	1	RAK149P2
Electric Resistance Models	6-wire	6-wire	2	RAK149P2
Heat Pump Models	6-wire	6-wire	1	RAK149P2
Heat Pump Models	7-wire	7-wire	2	RAK149P2
All Models	*	*	2	RAK180W1

\*0 wires if powered by a battery, 2 wires if powered by the unit

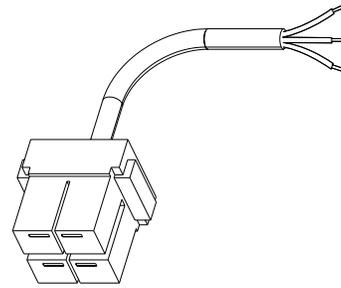
## Type of Electric Connections

A power supply kit must be used to supply power to the Zoneline unit. Models must be installed using the appropriate GE Appliances power supply kit for the branch circuit amperage and the electrical resistance heater wattage desired. See the POWER CONNECTION CHART (below) to select the appropriate kit. It is the responsibility of the installer to ensure the connection of components is done in accordance with electrical codes.

### External Disconnect:

There shall be disconnecting means from the electrical supply located within line of sight of the closet door opening or access panel opening. The disconnecting means shall be readily accessible while the air conditioner is installed in the closet. The disconnect shall not obscure the rating plate or be located on the access panel or closet door. A properly rated field supplied switch is a common means for electrical disconnection.

### Power Supply Kit Direct Connect 208/230/265 Volt Applications



Power Supply Kit: Direct Connect

**Important:** Connection to a branch circuit **MUST** be done by direct connection in accordance with the National Electrical Code. Plugging this unit into a building mounted exposed receptacle is not permitted by code.

### Power Connection Chart

Direct Connections			
Power Supply Kits 230 / 208 Volts	Configuration Direct Connection	Heater Wattage @ 230 / 208 Volts	Circuit Protective Device 9k/12k/18k
RAK315D	Hard Wired	2.45 / 2.00 KW	15/15/NA-Amp Time Delay-Fuse or Breaker
RAK320D	Hard Wired	3.45 / 2.82 KW	20-Amp Time Delay-Fuse or Breaker
RAK330D	Hard Wired	5.00 / 4.09 KW	30-Amp Time Delay-Fuse or Breaker
Power Supply Kits 265 Volts*	Configuration Direct Connection	Heater Wattage @ 265 Volts	Circuit Protective Device 9k/12k/18k
RAK515D	RAK515D	RAK515D	RAK515D
RAK520D	RAK520D	RAK520D	RAK520D
RAK530D	RAK530D	RAK530D	RAK530D

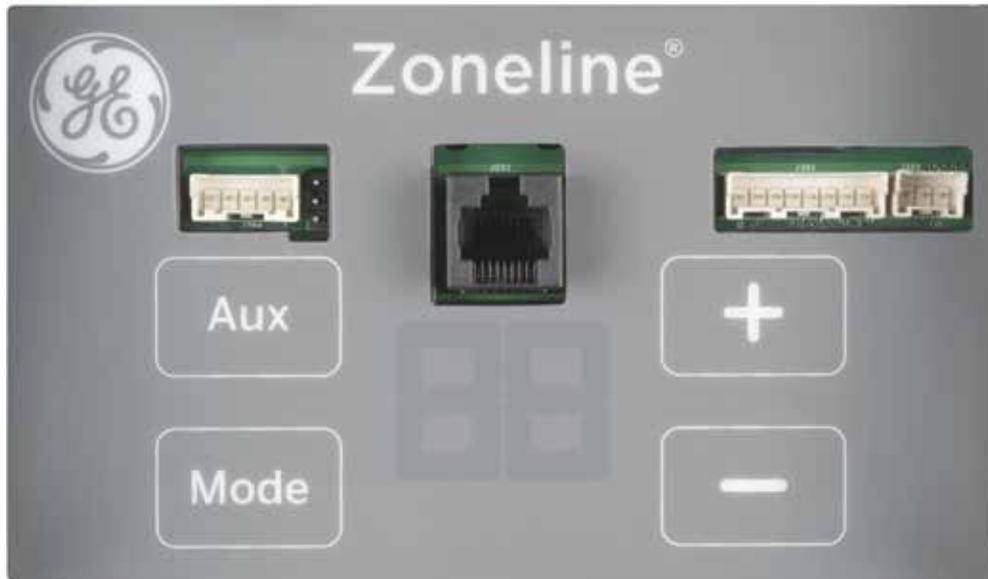
\*See National Electric Code (NEC) for 265 Volts applications

# Operation

## Auxiliary Control Features

The electronic control for the unit comes preset from the factory to control the unit how “most” customers would prefer the unit to operate. The presets (called modes or functions) can be modified to accommodate differences in installation parameters or personal preferences on how the unit should operate and perform.

If the owner modifies the auxiliary controls, it is then the owner that is responsible for ensuring the auxiliary controls are set to the desired function. There are five different modes (functions) that can be set using the auxiliary set button.



### Modes of the Auxiliary Control

**Mode 1:** Not Applicable

**Mode 2:** Not Applicable

**Mode 3:** Freeze Sentinel/Heat Sentinel

**Mode 4:** Constant ON Fan

**Mode 5:** Not Applicable

**Mode 6:** Not Applicable

**Mode 7:** Fan Boost Mode

**Mode 8:** Electric Heat Only (AZ95H only)

**Mode 9:** Heat Boost (AZ95H only)

To change operating or set-up parameters the control must be in AUX Mode. With power applied to the unit, press the AUX button until the "AU" appears on the display.

The display will look like this when entering the AUX Mode:



While in AUX Mode, press the **MODE** button to scroll through the eight different modes. Continue to press the **MODE** button until the number corresponding to the mode to be modified is showing in the first digit of the display. Once the correct number is displayed, use the **+/-** buttons to change the second digit of the display for that mode to either "Π" for **On** OR "⊥" for **Off** depending on the desired function.

When the selection for a given mode is complete, press the **MODE** button to continue setting other auxiliary control functions **OR** press the **AUX** button to confirm the selection and exit **AUX** mode.

### Mode 3 Freeze Sentinel / Heat Sentinel

With power to the unit and **Freeze Sentinel** activated, the unit automatically provides heat without user interface (UI). This prevents potential plumbing damage by turning the heater and indoor fan **ON** at 41°F and then **OFF** once the closet temperature reaches 46°F.

Freeze Sentinel OFF

When **Heat Sentinel** is activated, the unit automatically provides cooling without user interface (UI). This prevents an excessively hot room by turning the air conditioner **ON** at 85°F and then **OFF** once the room temperature reaches 80°F.

Freeze Sentinel ON

Press **MODE** until a **3** appears in the first digit of the display for **Freeze Sentinel** mode. Press the - pad for **OFF** "⊥" or the + pad for **ON** "Π". This is shown in the second digit of the display. Press **MODE** again to access the **Heat Sentinel** settings. Press the - pad for OFF "⊥" or the + pad for ON "Π". Press **AUX** to lock in selection and exit **AUX** mode or press **MODE** to continue setting other functions.

Heat Sentinel OFF

In the default setting for Mode 3, **Heat Sentinel** is off, **Freeze Sentinel** is on.

Heat Sentinel ON

**NOTE:** These functions are active whenever the unit is plugged in, even if the unit is turned off.

### Mode 4 Constant ON Fan

Press **MODE** until a **4** appears in the first digit of the display to set the fan to run continuously at high speed, **even if the unit is turned off**.

Press the - pad for OFF "⊥" or the + pad for **ON** "Π" This is shown in the second digit of the display.

Press **AUX** to lock in selection and exit **AUX** mode or press **MODE** to continue setting other functions.

Constant  
Fan OFF

Constant  
Fan ON

The default setting for Mode 4 is **OFF**.

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## Mode 7 Fan Boost Mode

This setting is used when the unit is installed with more restrictive duct work where additional airflow is needed. This increases the fan speed to ensure proper circulation.

Press **MODE** until a **7** appears in the first digit of the display. Press the **-** pad for **OFF** “**␣**” or the **+** pad for **ON** “**␣**”. This is shown in the second digit of the display. Press **AUX** to lock in selection and exit **AUX** mode.

The default setting for Mode 7 is **OFF**.



Fan Boost  
Mode OFF



Fan Boost  
Mode ON

## Mode 8 All-Electric Heat (AZ95H Only)

This electric heat option functions only on the AZ95H model. When this option is **ON** “**␣**”, heat pump operation is locked out, causing the unit to provide only electric resistance heat.

To set **All-Electric Heat** option, press **MODE** until an **8** appears in the first digit of the display. Press the **-** pad for **OFF** “**␣**” or the **+** pad for **ON** “**␣**”. This is shown in the second digit of the display.

The default setting for Mode 8 is **OFF**.



All-Electric  
Heat OFF



All-Electric  
Heat ON

## Mode 9 Heat Boost (AZ95H Only)

When **Heat Boost** is **ON**, supplementary electric heat is added to the heat pump operation to help maintain a consistent, comfortable room temperature.

To set Heat Boost, press **MODE** until a **9** appears in the first digit of the display. Press the **-** pad for **OFF** “**␣**” or the **+** pad for **ON** “**␣**”. This is shown in the second digit of the display. Press **AUX** to lock in selection and exit **AUX** mode.

The default setting for Mode 9 is **OFF**.



Heat Boost  
OFF



Heat Boost  
ON

## Mode P Engineering Revision Setup

This setting is used to configure the unit when the circuit board is replaced.

The first time the unit is powered after a service board is installed, the unit will automatically enter this mode. The UI will read **P1**. Press the **+** pad until the number matches the engineering revision as shown. The engineering revision is the last number in the model number. Press **AUX** to save and exit.

The engineering revision may be adjusted after the first power cycle using **AUX**. Press **MODE** until **P** appears in the first digit, and follow the steps described above.

Nomenclature Example

**AZ95E09DACK2**

Engineering Revision



## Connect Auxiliary Features (If Required)

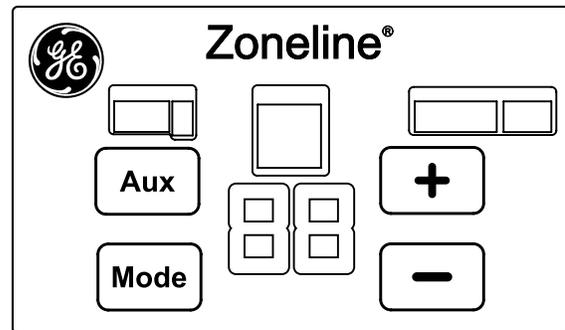
### Auxiliary Controls: Terminal Connections

**NOTE:** Connector Kit RAKCDC is required to make CDC electrical connections.

(See wiring diagrams for RAKCDC, shown in the next section.)

The auxiliary control terminal connects are located on the front of the unit.

1. To connect auxiliary devices to the unit, connect the wires from the RAKCDC Kit to the wires from the auxiliary devices. Then insert the RAKCDC connector into the mating control board connector next to the thermostat connector.
2. After all desired connections have been made, replace the front case panel.



The owner is responsible for making all connections and setting the appropriate **AUX** mode.

**NOTICE:** Improper wiring may damage the Zoneline electronics. No common busing is permitted. Damage or erratic operation may result. A separate wire pair must be run from each separate controlling switch to each individual Zoneline.

### Central Desk Control (CDC)

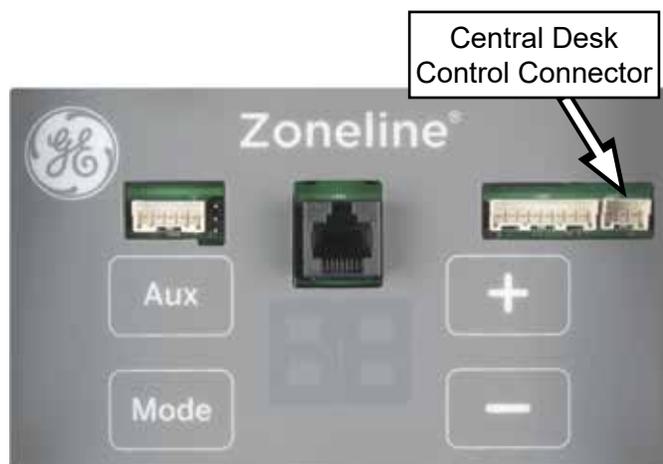
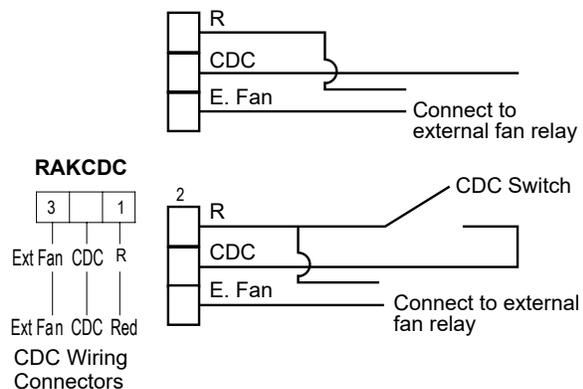
#### Central Desk Control (Field Supplied)

The central desk control is a feature that allows the unit to be made operable/inoperable from a remote location. Operation of the feature requires that an **ON-OFF** switch at the remote location be wired to the two CDC terminals on the control panel of the Zoneline. When the remote switch is **CLOSED**, the unit cannot be operated in the Fan, Cool, or Heat modes by the control. The Freeze Sentinel and the Heat Sentinel features remain operable. When the remote switch is Open, the unit is fully operable by control.

The **RAKCDC** accessory must be used with a central desk control system. No "Common Busing" is permitted.

**NOTICE:** Improper CDC wiring may damage the Zoneline electronics or cause erratic Zoneline operation. No common busing is permitted. A separate wire pair must be run from each separate controlling switch to each individual Zoneline.

Use only Class 2 wiring.



## Remote Thermostat

This unit must be controlled by a Class 2 remote control wall mounted heating and cooling thermostat. Refer to the operating instructions of the thermostat being used on how to control the unit.

**IMPORTANT:** The Zoneline thermostat connections provide 24 VAC only. If using a digital/electronic wall thermostat, it must be set to the 24 VAC setting. See the Installation Instructions for the wall thermostat. **NOTICE:** Damage to a wall thermostat or to the Zoneline electronics can result from improper connections. Exercise extra attention when connecting **blue** and **black** wires. No line voltage connections should be made to any circuit in the thermostat. Isolate all wires in building from line voltage.

Maximum Wiring Length for Thermostat Connection to the Unit
66 ft. for AWG 18
60 ft. for AWG 20
40 ft. for AWG 24
AWG – American Wire Gauge
Use only Class 2 wiring

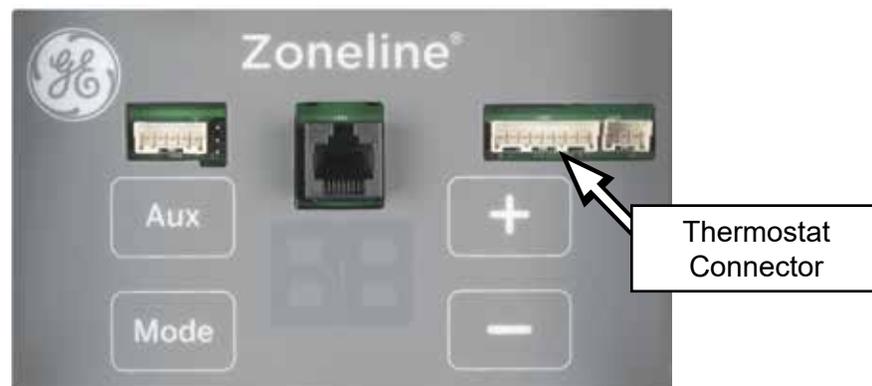
### Thermostat Connector

7	6	5	4	3	2	1
R	GL	GH	B	Y	W	C
red	tan	green	blue	yellow	white	black

1. Thermostat connector harness is included with the unit. It is located behind the junction box cover.



2. Plug the thermostat connector into the user interface (UI). Follow the instructions included with the thermostat to connect the thermostat to the unit.



## Normal Operating Conditions



A pinging noise caused by water being picked up and thrown against the condenser on rainy days or when the humidity is high may be heard. This design feature helps remove moisture and improve efficiency.

---

**“CLICK”**

Relays click when the controls cycle on and off or are adjusted to change the room temperature may be heard.



Water will collect in the base pan during high humidity or on rainy days. The water may overflow and drip from the outdoor side of the unit.



The indoor fan runs continuously when the unit is operating in the cooling mode, unless the Smart Fan Auxiliary Control is set to cycle. This will cause the fan to cycle on and off with the compressor. A fan noise stop and start may also be heard.

There are times when the fan on the unit will run even when the unit is not heating or cooling. If the system is set up to be in continuous fan the indoor fan will run regardless if the unit may be cooling or heating. Other times the fan will run longer than the heating/cooling cycle or kick on occasionally. This is normal and is done to improve room comfort and balance.

If the unit is equipped with a make-up air ventilation system, fans will run continuously.

Digital makeup air unit will perform a system check upon power up, power cycle, and once every 7 days if the unit is in occupancy mode. The system check lasts approximately 45-seconds. During this time the fans will speed up, slow down and then go to the set point.



A user may notice a few minutes delay in starting if they try to restart the Zoneline too soon after turning it off or if the thermostat is adjusted right after the compressor has shut off. This is due to a built-in restart protector for the compressor that causes a 3-minute delay.

---

**SILENCE**

During the defrost cycle, both indoor and outdoor fans stop, and the compressor will operate in the cooling mode to remove frost from the outdoor coil. After defrost, the unit will restart in electric heat to quickly warm the room to the desired comfort level.

---

**COMPRESSOR PROTECTION**

To protect the compressor and prevent short cycling, the unit is designed to run for a minimum of 3-minutes after the compressor starts at any thermostat setting.

# Controls

## Main Control Board

The electronic control for the unit comes preset from the factory to control the unit how “most” customers would prefer the unit to operate. The presets (called modes or functions) can be modified to accommodate for differences in installation parameters or personal preferences on how the unit should operate and perform.

If the owner modifies the auxiliary controls, it is then the owner that is responsible for ensuring the auxiliary controls are set to the desired function. There are five different modes (functions) that can be set using the auxiliary set button.

## Main Control Board Diagnosing

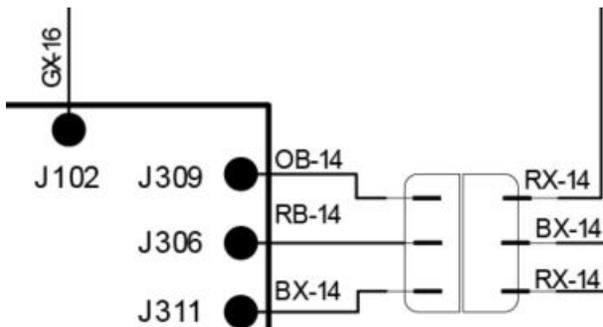
### 208/230 VAC

Verify voltage on 208/230 VAC PTAC's by gaining access to the main control.

- J102 (**green**) Ground to J306 (**red/black**) L1: 120 VAC
- J102 (**green**) Ground to J309 (**orange/black**) L2: 120 VAC
- J306 (**red/black**) L1 to J309 (**orange/black**) L2: 208/230 VAC

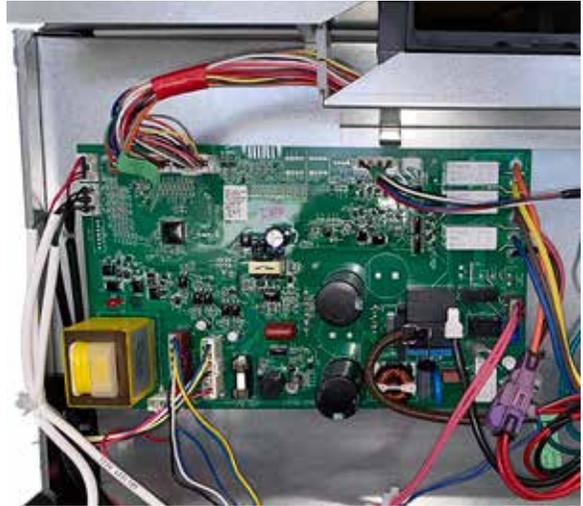
### 265 VAC

- J102 (**green**) Ground to J306 (**red/black**) L1: 265 VAC
- J102 (**green**) Ground to J309 (**orange/black**) Neutral: 0 VAC
- J306 (**red/black**) L1 to J309 (**orange/black**) Neutral: 265 VAC

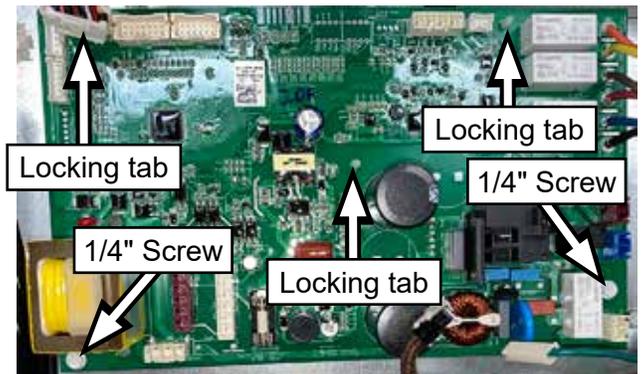


## Main Control Board Removal

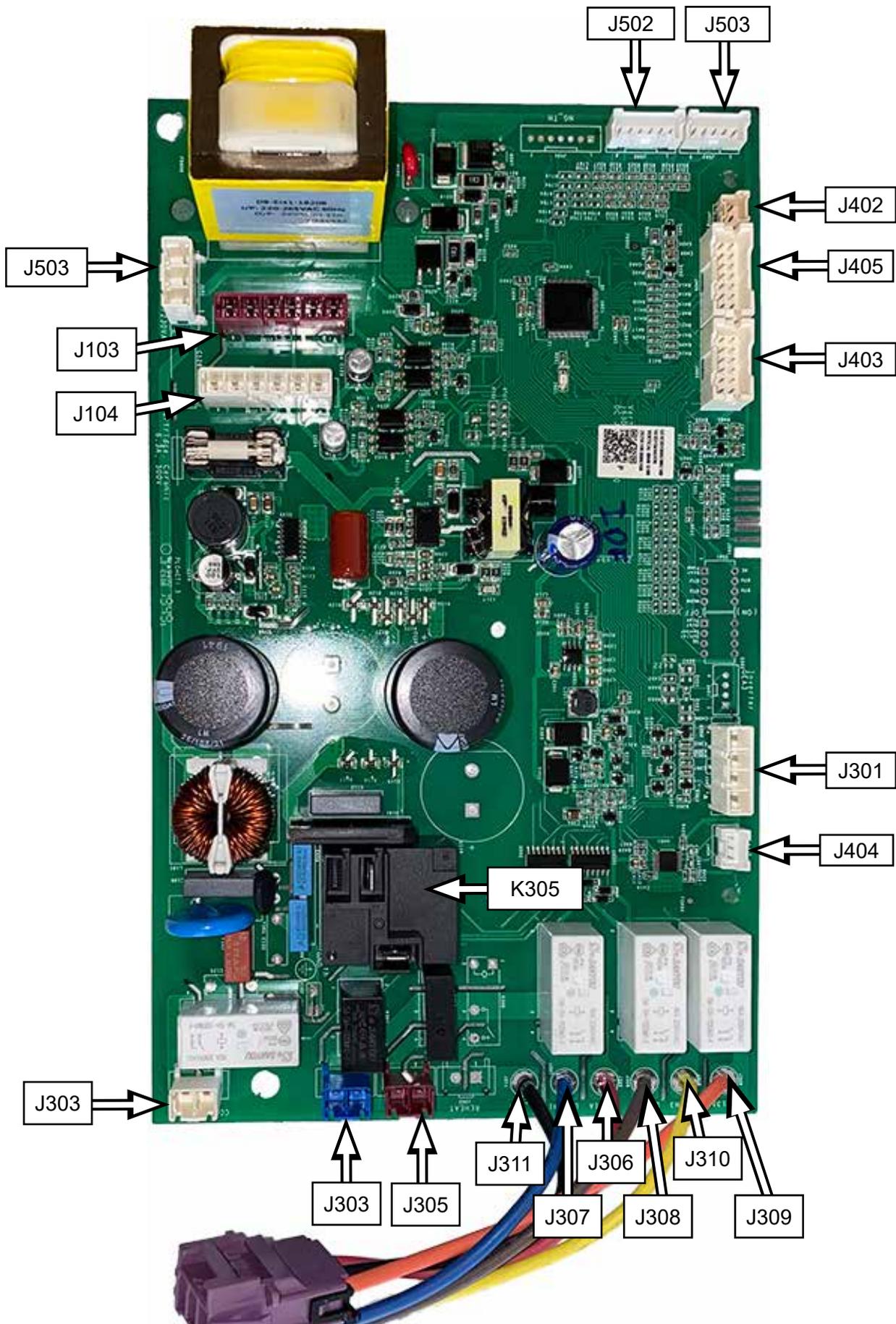
1. Remove junction box cover and main control board cover to gain access to the main control board.



2. Disconnect all connectors from the main control board. Remove two 1/4-in. screws from the bottom of the main control and release the locking tabs by squeezing them while pulling the board forward.



# Main Control Board Connector Locations



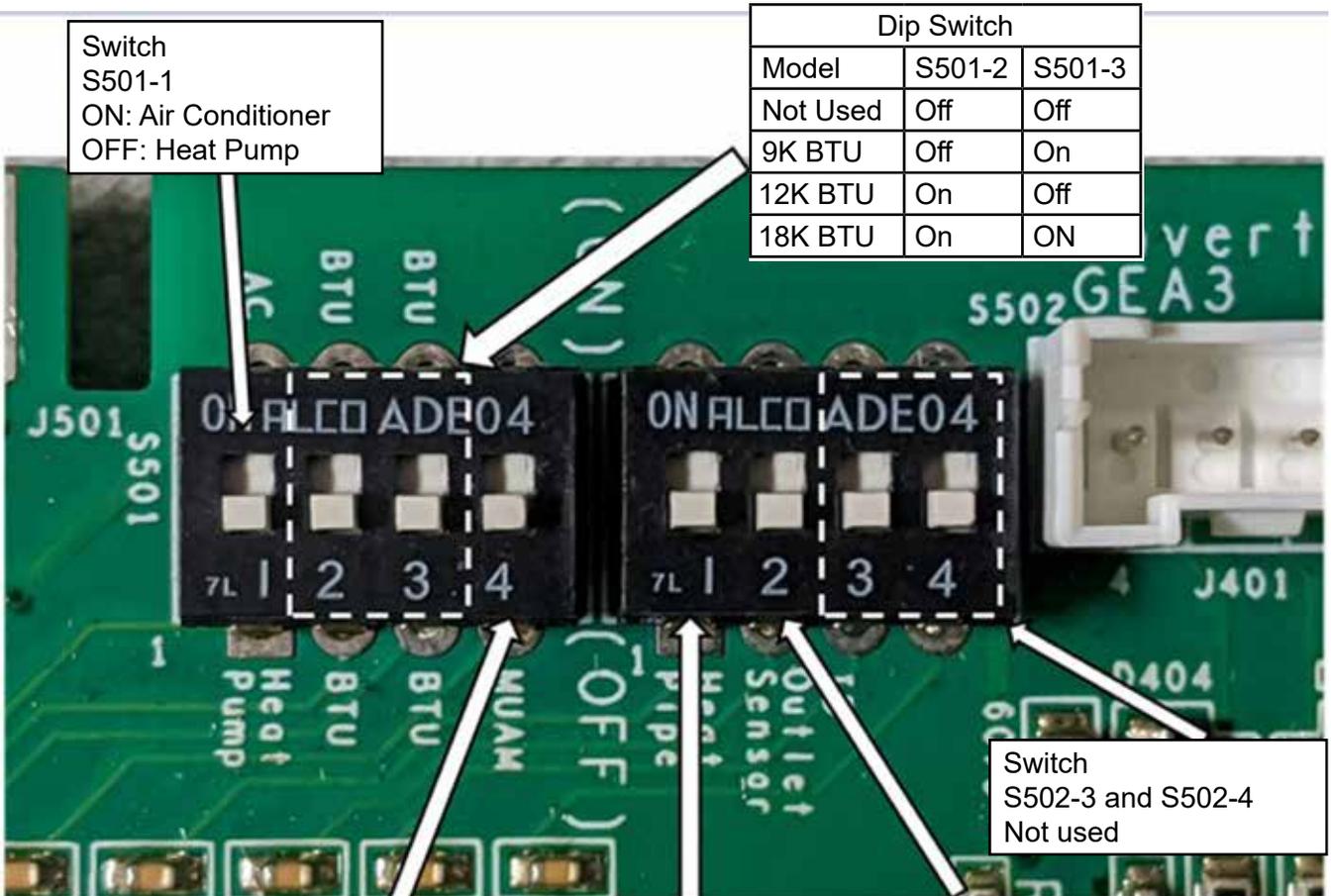
## Service Main Control Board Set-Up

### Replacement of main control board on AZ95 Zonelines:

1. Disconnect power and access main control board.
2. Disconnect all connections on the original board.
3. Remove original board and install the new board.
4. Reconnect all connections.
5. Use the chart below to set the “dip-switches” to correspond with the model number. If unsure of features check nomenclature on the next page.
6. Reassemble and re-apply power.
7. When the unit is powered on after replacing the board, the display will show “P1”.
8. Press the “Aux” button to save and exit, then verify proper operation.

**NOTE:** If all the switches are OFF as shown, it would be programmed as an AZ95H15D (230V) without a make-up air module, heat pipe, or outlet air thermistor.

Dip Switch		
Model	S501-2	S501-3
Not Used	Off	Off
9K BTU	Off	On
12K BTU	On	Off
18K BTU	On	ON



Switch  
S501-1  
ON: Air Conditioner  
OFF: Heat Pump

Switch  
S502-3 and S502-4  
Not used

Switch  
S501-4  
ON: Make up air module equipped

Switch  
S502-1  
ON: Heat pipe equipped

Switch  
S502-2  
ON: All models. Outlet Air Thermistor equipped.

# A Z 9 5 H 1 2 D A C W 1

**Zoneline**  
Package Terminal Chassis

**Chassis Series**  
**95:** Vertical AC  
**9V:** Vertical AC Variable Speed (Inverter)

**Heating**  
**E:** Cooling with Electric Resistance Heat  
**H:** Heat Pump with Electric Resistance Heat

**Cooling Capacity in BTU/hr.**  
 # #: BTUH in 1000's

**Voltage/Frequency**  
**D:** 230/208 Volt 60 Hz  
**E:** 265 Volt 60 Hz

**Engineering/Service Change**  
 1: Original, 2-First  
 3: ....Change

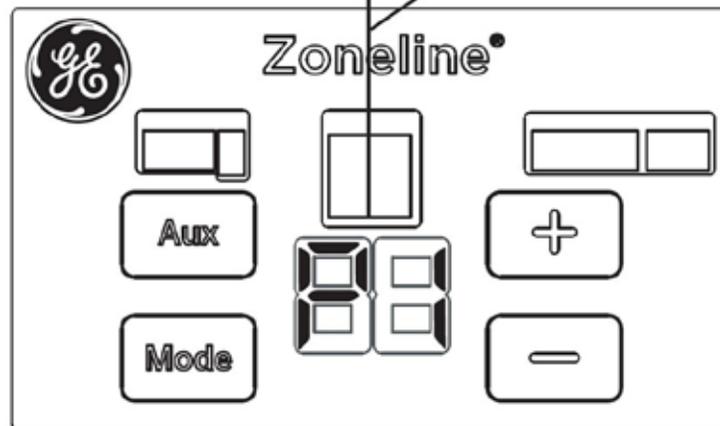
**Compressor Type**  
**H:** Highly      **M:** Mei  
**W:** Rechi      **K:** GMCC/  
                                  Midea

**Special Features**  
**C:** Corrosion Treated  
**M:** Make Up Air

**Heater (kW)**  
**A:** Universal Heater  
       (2.5 kW / 3.4 kW / 5.0 kW)  
**7:** 7.5 kW  
**9:** 10 kW

## AZ95E09DACK1

Engineering Revision



Press the "Aux" Button to Exit.

## User Interface (UI) Board

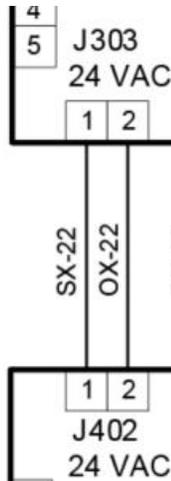
### User Interface (UI) Board Diagnosing

If a user interface (UI) board were to fail, the Zoneline will not operate and the display will be blank.

### Verify Voltage to User Interface Board

Verify voltage by gaining access to the main control board at the J402.

- Pin 1 (**gray**) to pin 2 (**orange**): 24 VAC



### Verify Voltage to Main Control Board

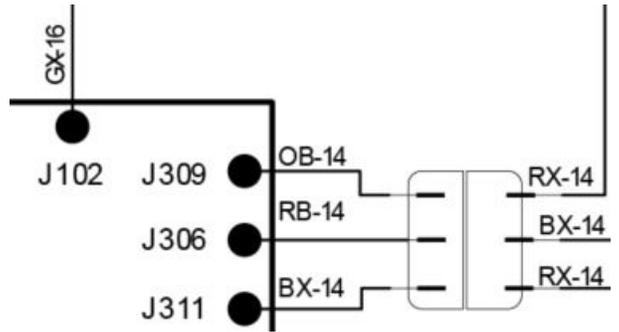
#### 208/230 VAC

Verify voltage on 208/230 VAC PTAC's by gaining access to the main control.

- J102 (**green**) Ground to J306 (**red/black**) L1: 120 VAC
- J102 (**green**) Ground to J309 (**orange/black**) L2: 120 VAC
- J306 (**red/black**) L1 to J309 (**orange/black**) L2: 230 VAC

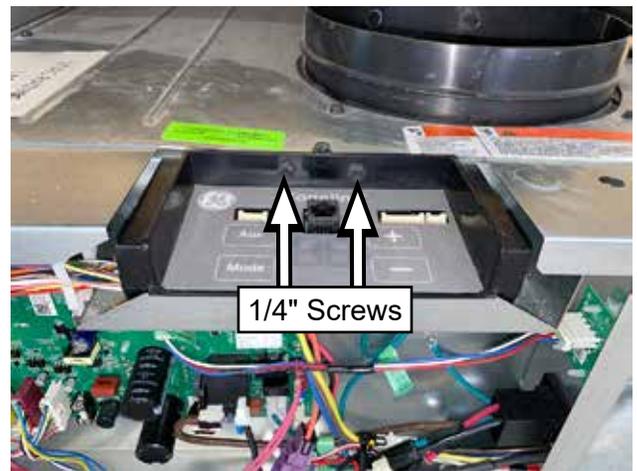
#### 265 VAC

- J102 (**green**) Ground to J306 (**red/black**) L1: 265 VAC
- J102 (**green**) Ground to J309 (**orange/black**) Neutral: 0 VAC
- J306 (**red/black**) L1 to J309 (**orange/black**) Neutral: 265 VAC

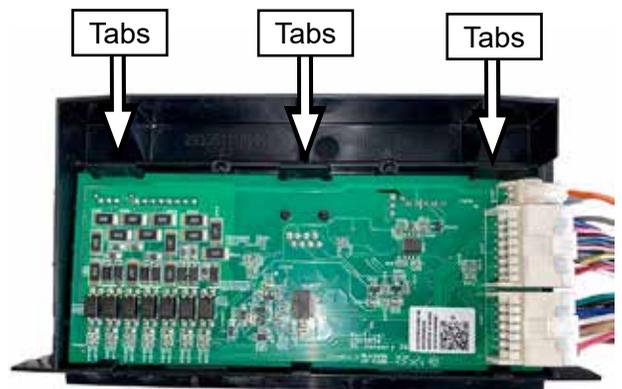


### Main User Interface Board Removal

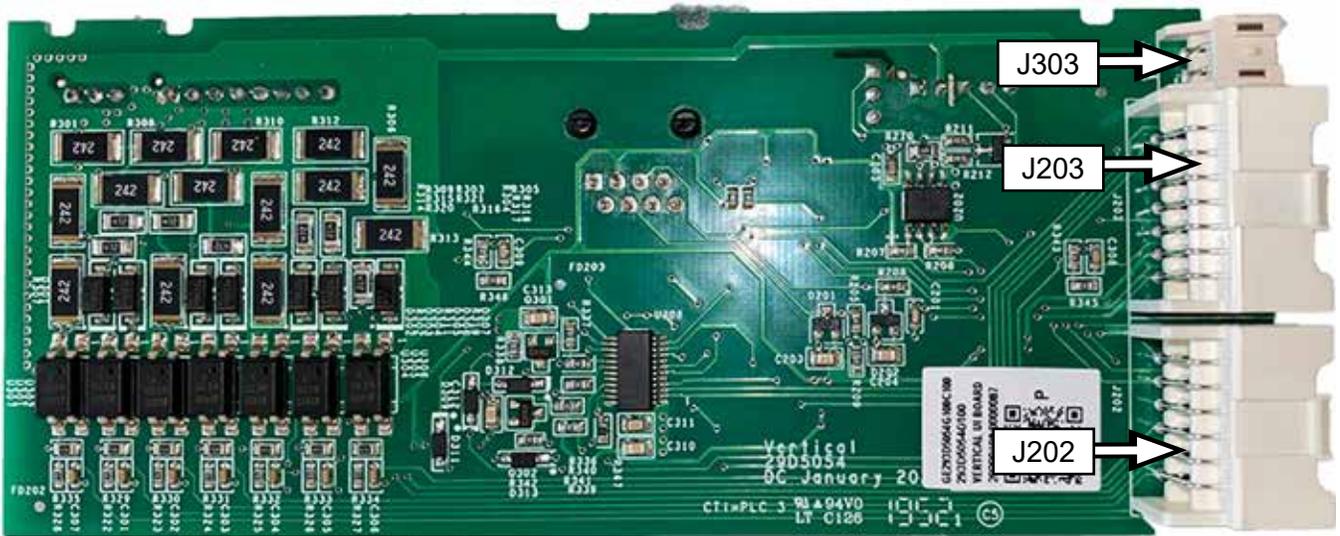
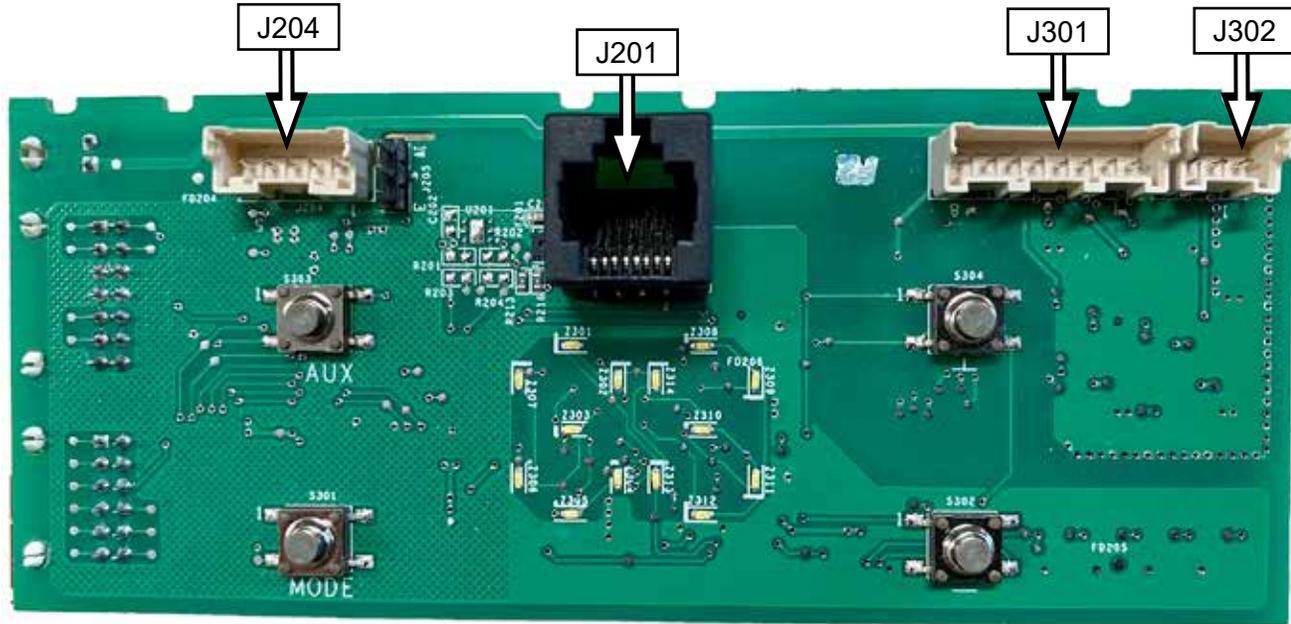
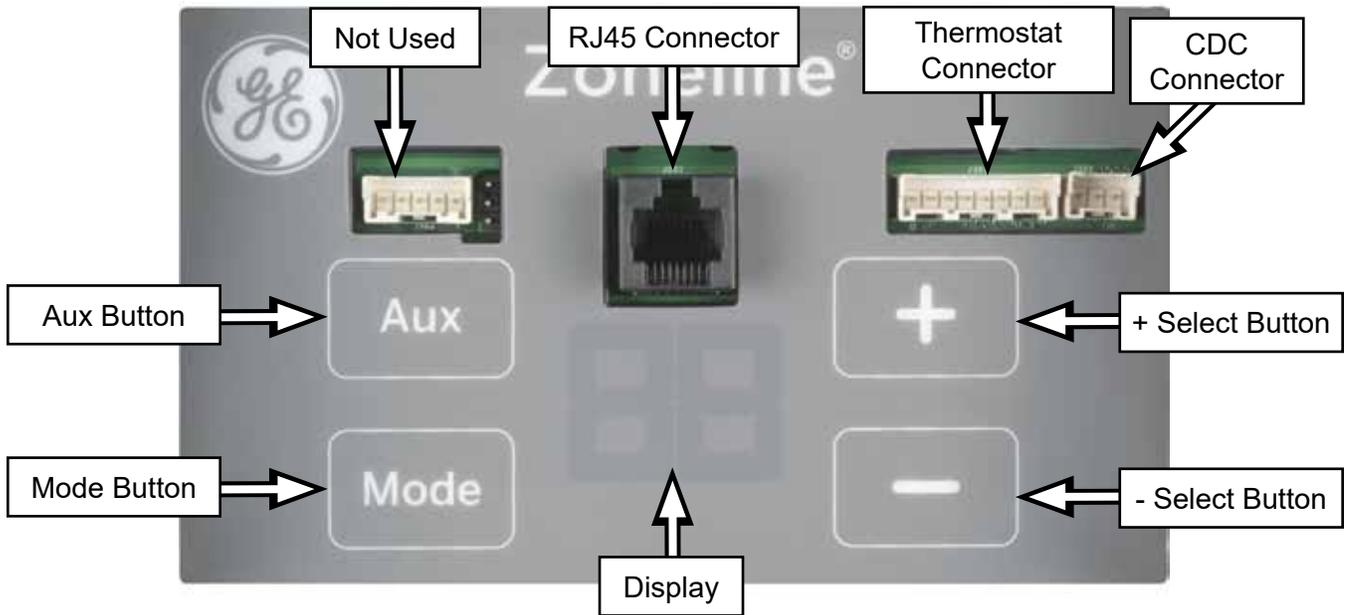
- Remove junction box cover and main control board cover. Remove two 1/4-in. screws from the top of the user interface display.



- Push on all three retaining tabs to release the user interface board from its cover.



**User Interface (UI) Board Connector Locations**

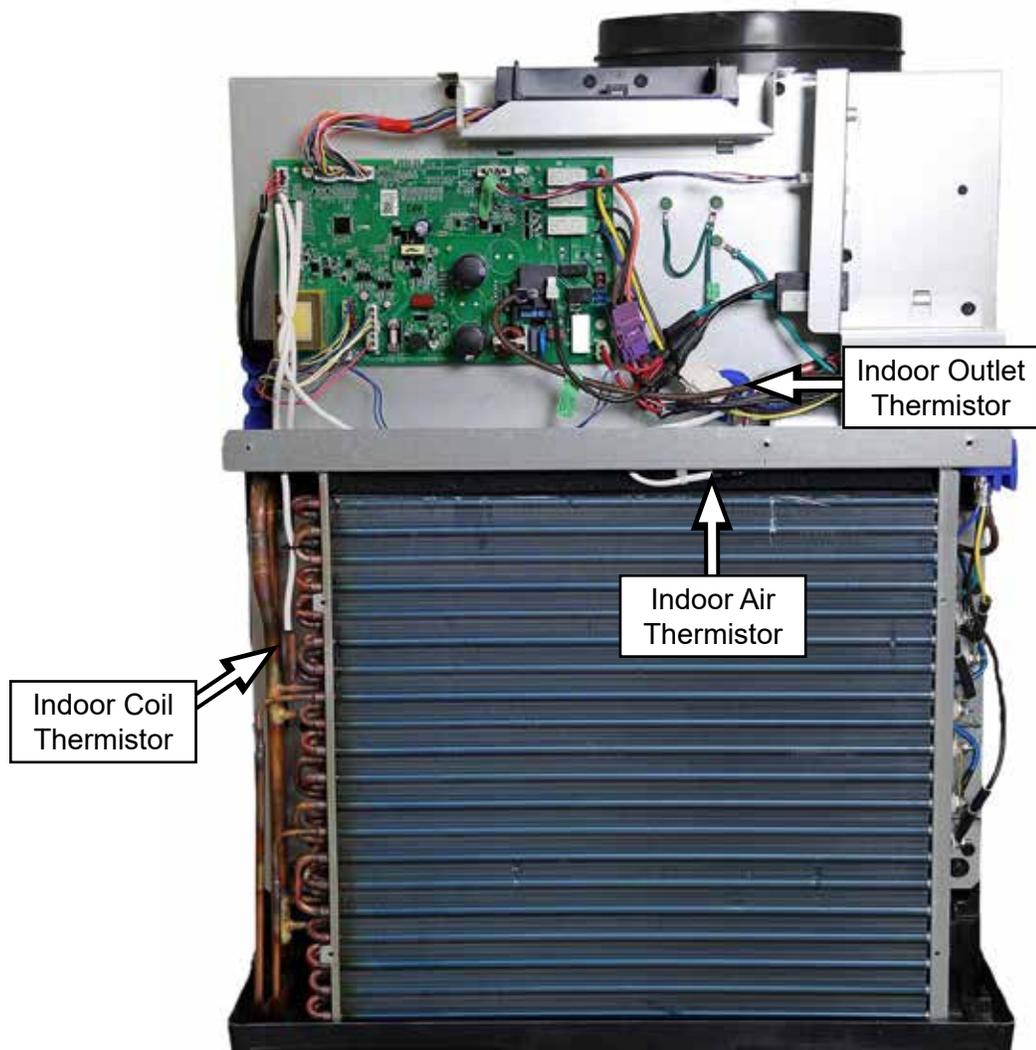


# Thermistors

Thermistors provide temperature feedback to the main board to maintain proper room temperature and operating conditions of the sealed system. Thermistors also provide outdoor air temperature and outdoor coil temperature in order for the main board to operate the Zoneline by the most efficient means.

## Indoor Thermistors Locator

All Zoneline models have three indoor thermistors: indoor coil thermistor, indoor outlet thermistor and indoor air thermistor.



## Indoor Air Thermistor

The indoor air thermistor is located on the top of the indoor coil. This thermistor measures the indoor air temperature.

### Indoor Air Thermistor Diagnosing

If an indoor air thermistor were to fail, the resistance heater and fan will continue to operate, but the compressor will not come on for cooling or heat pump.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 4 (Indoor Thermistor Fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

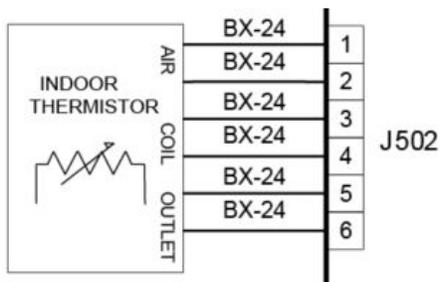
### Verify Indoor Air Thermistor Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until **S1** is shown in the display. Pressing **+** displays the indoor ambient temperature. **AUX** key exits Service Mode.

### Verify Indoor Air Thermistor Resistance Value

Indoor air thermistor resistance values can be checked from the main control board at the J502 connector.

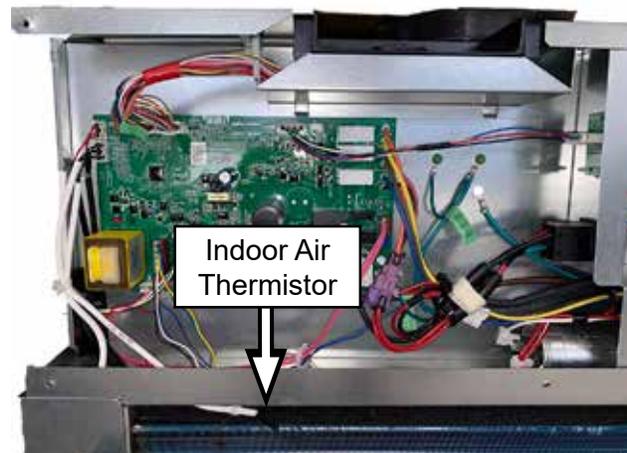
- Pin 1 (**black**) to pin 2 (**black**): Use Indoor Air Thermistor Resistance chart below to verify resistance to actual temperature.



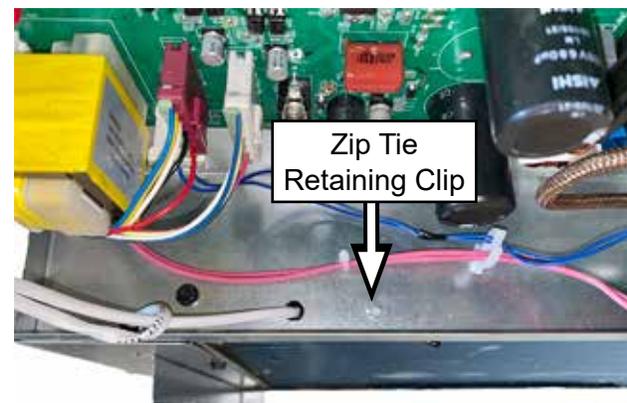
Indoor Air Thermistor Resistance (ohms)	
°F	Air
10	63,260
30	34,620
32	32,860
50	19,970
70	11,950
90	7,320

## Indoor Air Thermistor Removal

1. Remove junction box cover and main control board cover.



2. Remove indoor thermistor from the indoor coil top cover by squeezing the zip tie retaining clip from above.



3. Slide zip tie retaining clip off of thermistor. This will allow the thermistor to fit through the indoor coil top cover.



## Indoor Coil Thermistor

The indoor coil thermistor is located on the left side of the indoor coil. This thermistor measures the indoor coil temperature.

### Indoor Coil Thermistor Diagnosing

If an indoor coil thermistor were to fail, the resistance heater and fan will continue to operate, but the compressor will not come on for cooling or heat pump.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 4 (Inside Thermistor Fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

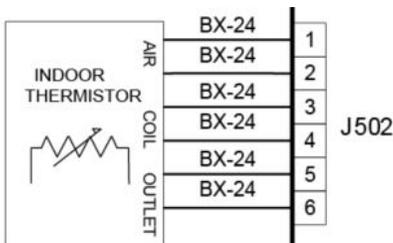
### Verify Indoor Coil Thermistor Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until **S2** is shown in the display. Pressing **+** displays the indoor coil temperature. **AUX** key exits Service Mode.

### Verify Indoor Coil Thermistor Resistance Value

Indoor coil thermistor resistance values can be checked from the main control board at the J502 connector.

- Pin 3 (**black**) to pin 4 (**black**): Use Indoor Coil Thermistor Resistance chart below to verify resistance to actual temperature.



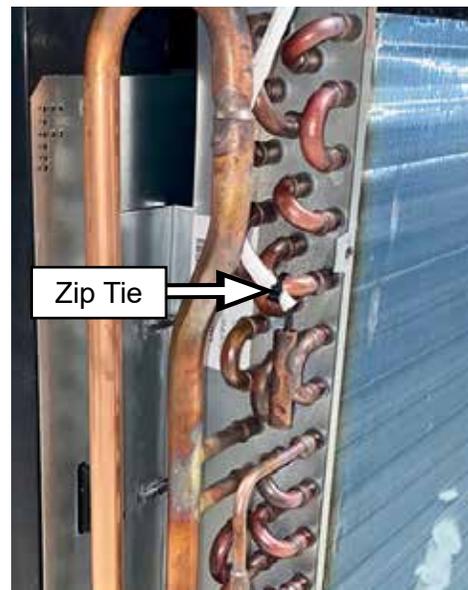
Indoor Coil Thermistor Resistance (ohms)	
°F	Air
10	28,030
30	15,340
32	14,570
50	8,850
70	5,300
90	3,280

## Indoor Coil Thermistor Removal

- Remove junction box cover, main control board cover, top cover panel and left side panel.



- Clip zip tie and pull the indoor coil thermistor out of its holder. **NOTE:** Remember to reattach another zip tie when reinstalling the new thermistor.



## Indoor Outlet Thermistor

The indoor outlet thermistor is located inside the outlet duct. This thermistor measures the air leaving the outlet duct.

### Indoor Outlet Thermistor Diagnosing

If an indoor outlet thermistor were to fail, the resistance heater and fan will continue to operate, but the compressor will not come on for cooling or heat pump.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 4 (Inside Thermistor Fault) or fault 17 (Outlet Thermistor Failure) codes are active. Record any other faults and clear the codes by pressing **AUX**.

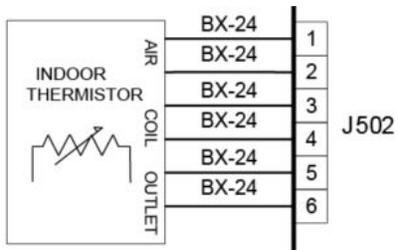
### Verify Indoor Outlet Thermistor Operation

Enter Service Mode by pressing and holding + and - buttons. On entry, the display lights all LED's. Press **MODE** until **S5** is shown in the display. Pressing + displays the indoor coil temperature. **AUX** key exits Service Mode.

### Verify Indoor Outlet Thermistor Resistance Value

Indoor outlet thermistor resistance values can be checked from the main control board at the J502 connector.

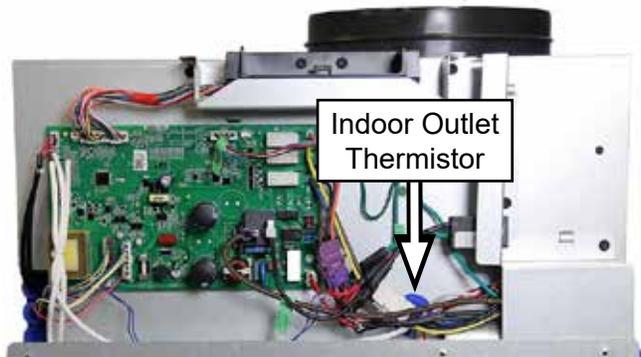
- Pin 5 (**black**) to pin 6 (**black**): Use the Indoor Outlet Thermistor Resistance chart below to verify resistance to actual temperature.



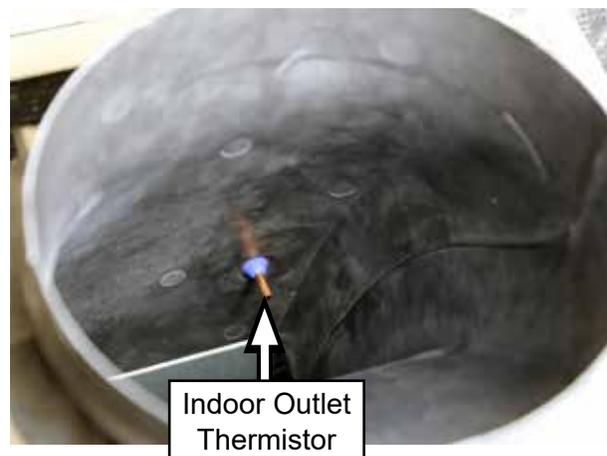
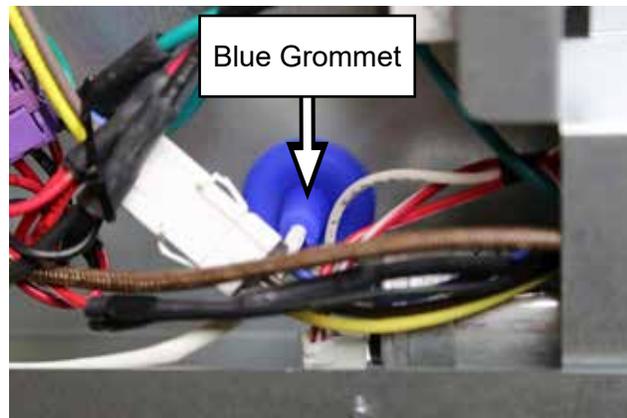
Indoor Outlet Thermistor Resistance (ohms)	
°F	Air
10	296,800
30	169,800
32	161,500
50	99,180
70	59,700
90	36,990

## Indoor Outlet Thermistor Removal:

- Remove junction box cover and main control board cover.

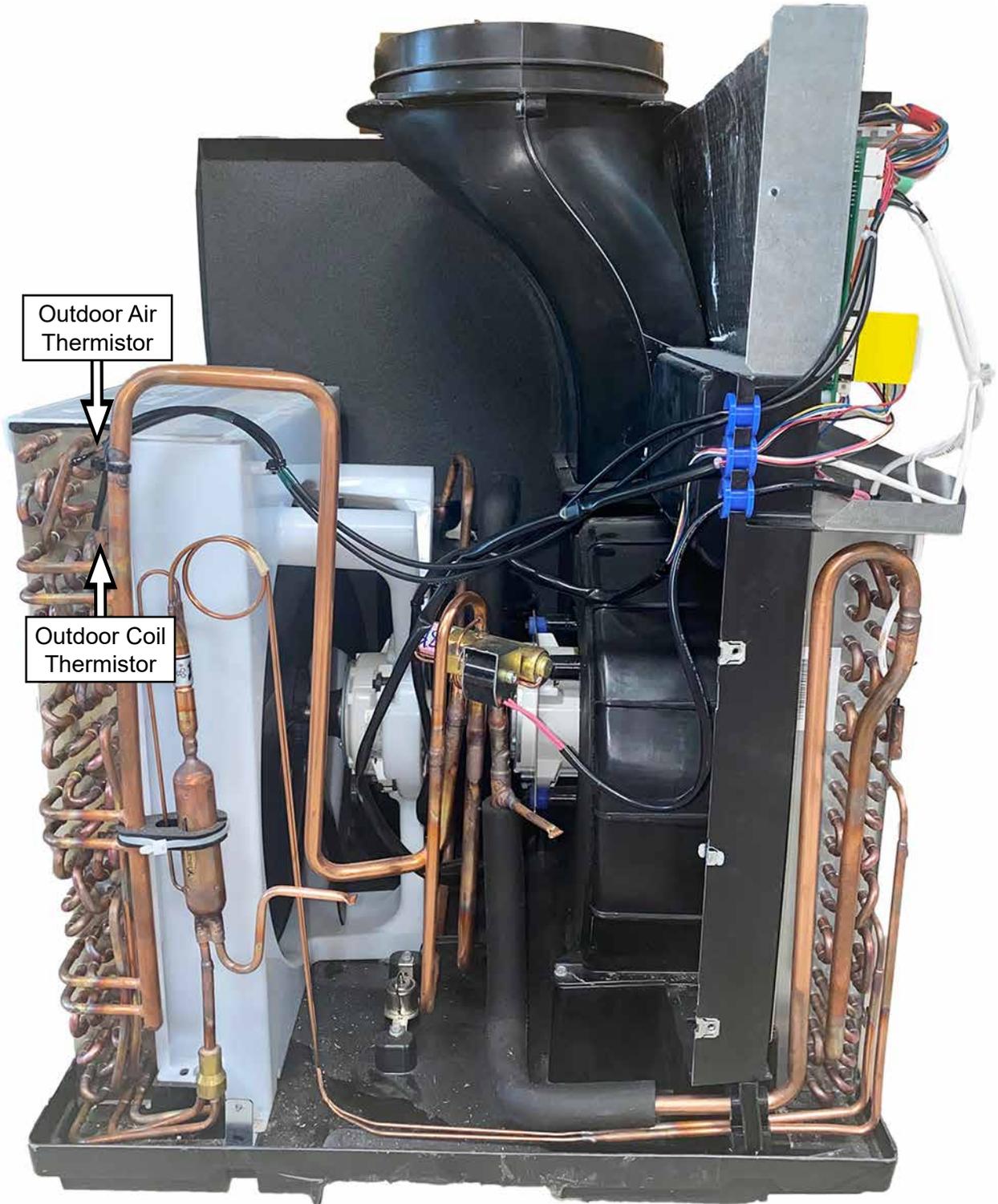


- Pull indoor outlet thermistor through the blue grommet towards the front of the unit.



## Outdoor Thermistors Locator

All Zoneline models have two outdoor thermistors: the outdoor coil thermistor and the outdoor air thermistor.



## Outdoor Air Thermistor

The outdoor air thermistor is located on the top left side of the outdoor coil. This thermistor measures the outside ambient temperature.

### Outdoor Air Thermistor Diagnosing

If an outdoor air thermistor were to fail, the resistance heater and fan will continue to operate, but the compressor will not come on for cooling or heat pump.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 5 (Outside Thermistor Fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

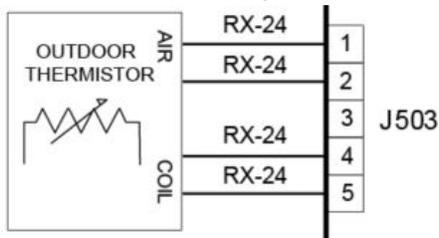
### Verify Outdoor Air Thermistor Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until **S3** is shown in the display. Pressing **+** displays the indoor coil temperature. **AUX** key exits Service Mode.

### Verify Outdoor Air Thermistor Resistance Value

Outdoor air thermistor resistance values can be checked from the main control board at the J503 connector.

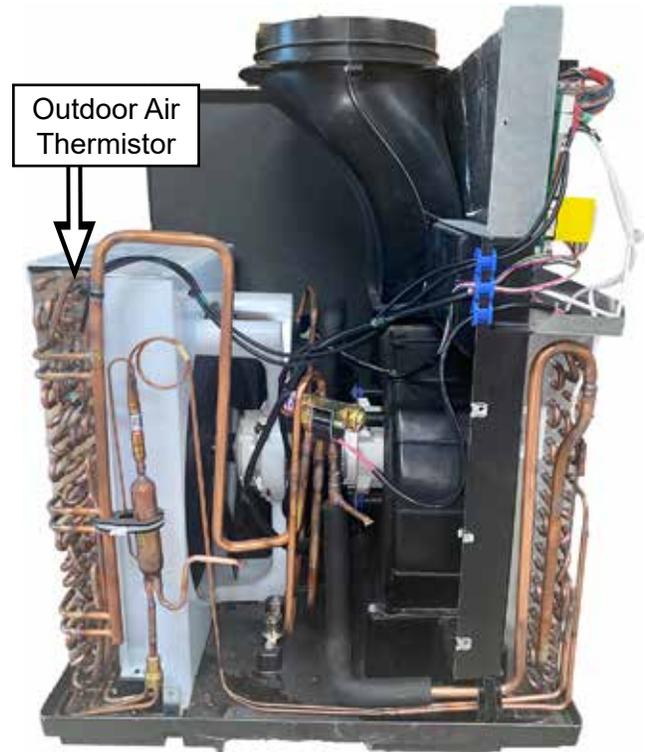
- Pin 1 (**red**) to pin 2 (**red**): Use Outdoor Air Thermistor Resistance chart below to verify resistance to actual temperature.



Outdoor Air Thermistor Resistance (ohms)	
°F	Air
10	28030
30	15340
32	14570
50	8850
70	5300
90	3280

## Outdoor Air Thermistor Removal

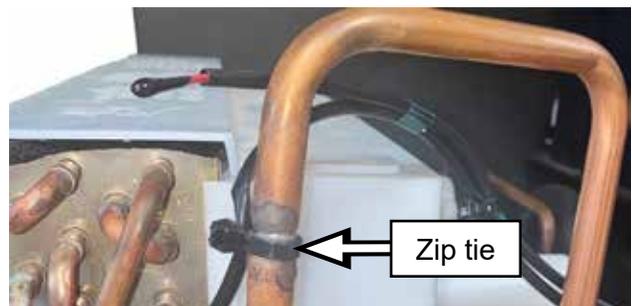
1. Remove junction box cover and main control board cover.



2. Remove one 5/16-in. screw from fan shroud.



3. Clip zip tie holding the thermistor harness to the tubing. **NOTE:** Install a new zip tie to the tubing and harness after replacing the thermistor.



## Outdoor Coil Thermistor

The outdoor coil thermistor is located on the top left side of the outdoor coil. This thermistor measures the outdoor coil temperature.

### Outdoor Air Thermistor Diagnosing

If an outdoor coil thermistor were to fail, the resistance heater and fan will continue to operate, but the compressor will not come on for cooling or heat pump.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 5 (Outside Thermistor Fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

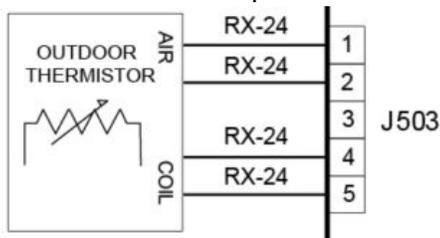
### Verify Outdoor Coil Thermistor Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until **S4** is shown in the display. Pressing **+** displays the indoor coil temperature. **AUX** key exits Service Mode.

### Verify Outdoor Coil Thermistor Resistance Value

Outdoor coil thermistor resistance values can be checked from the main control board at the J503 connector.

- Pin 4 (**red**) to pin 5 (**red**): Use Outdoor Coil Thermistor Resistance chart below to verify resistance to actual temperature.



Outdoor Coil Thermistor Resistance (ohms)	
°F	Air
10	28030
30	15340
32	14570
50	8850
70	5300
90	3280

## Outdoor Air Thermistor Removal

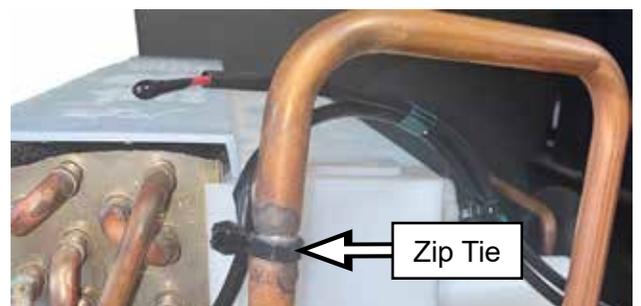
- Remove junction box cover and main control board cover.



- Remove one 5/16-in. screw from fan shroud.



- Clip zip tie holding the thermistor harness to the tubing. **NOTE:** Install a new zip tie to the tubing and harness after replacing the thermistor.



# Air Flow

## Indoor Fan Motor

The indoor fan motor is a DC motor driven by the main board and provides feedback to the main board for proper speed confirmation.

### Indoor Fan Diagnosing

Fan voltages cannot be checked due to the high DC output. If a fan motor were to fail, there is a possibility the fan motor could short out the main control board.

### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether F1 (Inside fan fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

### Verify Fan Operation

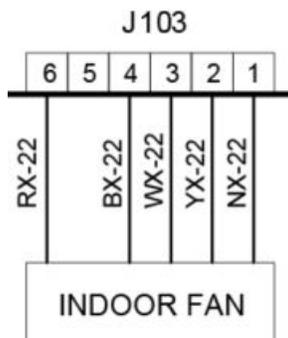
Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until IF is shown in the display. Pressing **+** turns the fan on and pressing **-** will turn the fan off. **AUX** key exits Service Mode.

### Verify Fan Resistance Value

Approximate fan resistance values can be checked from the main control board at the J103 connector.

- Pin 6 (**red**) to pin 4 (**black**): 12.56 Ohms + or - 15%.

Model Name	Winding Resistance (ohm)
	Indoor Motor
	Red to Black
<b>All Models</b>	12.56Ω ± 15%



### Verify No Motor Binding

Disconnect power and check for binding or a foreign object restricting the blade movement if the indoor fan is not running.

### Verify Outdoor Fan Motor Is Not Causing The Indoor Fan Motor Not To Run

- If the indoor motor is not running, unplug the outdoor motor connector. Restore power and if the indoor motor runs with the outdoor motor unplugged, then replace the outdoor fan motor.
- If the indoor fan motor will still not run, replace both fan motors and main control.

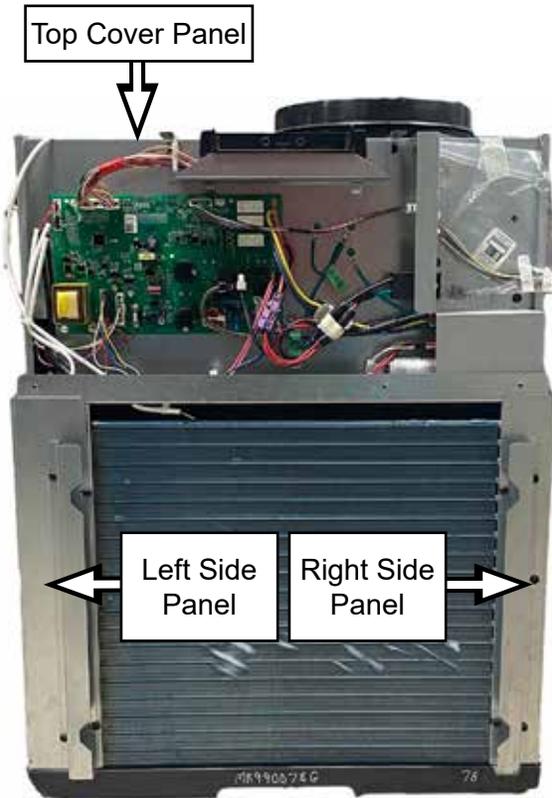
### Indoor Fan Removal

- Remove main control board cover and junction box cover. All screws are 5/16-in. screws.

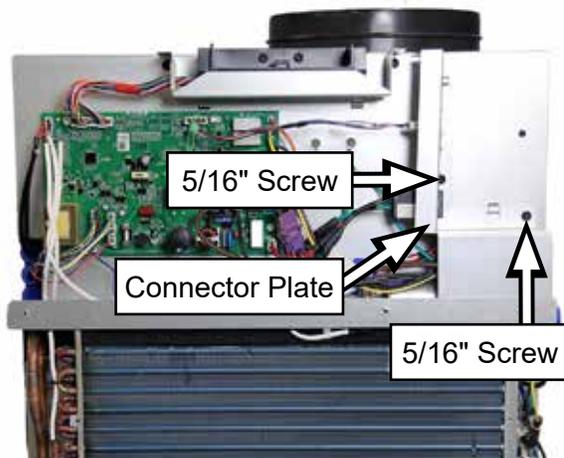


(Continued next page)

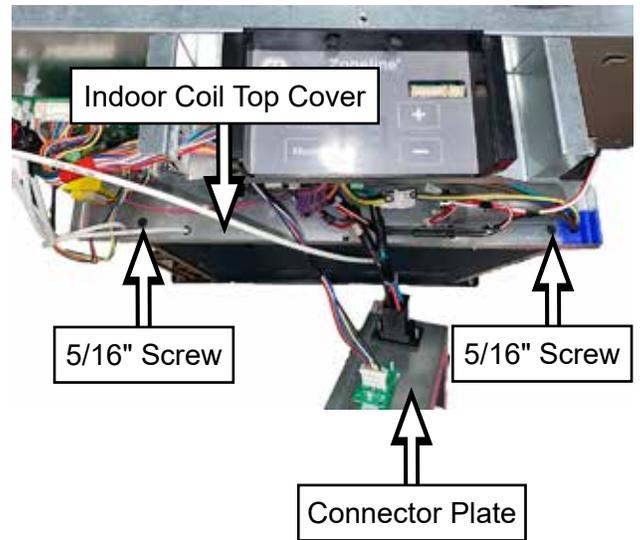
- Remove top cover panel and left and right-side panels.



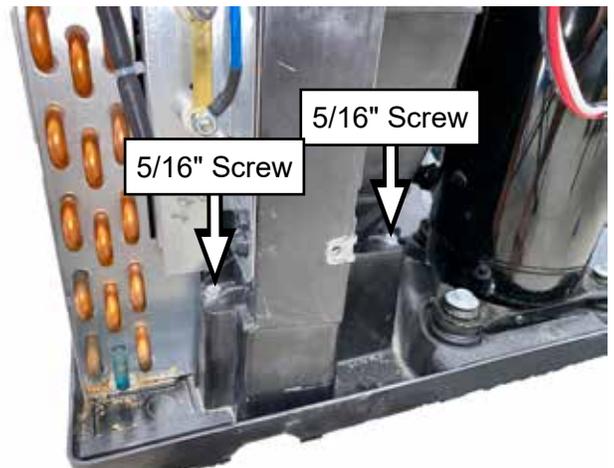
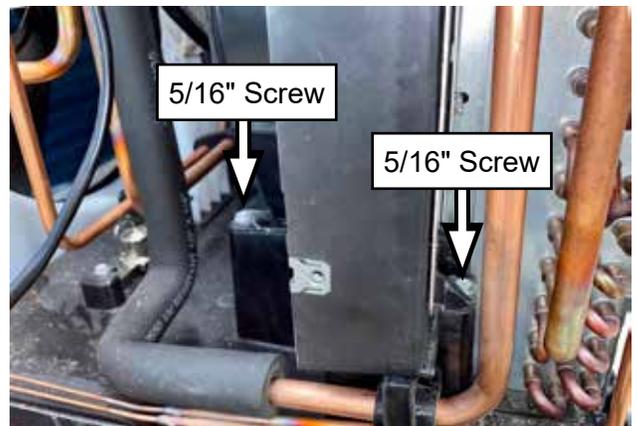
- Remove power connector plate by removing two 5/16-in. screws. The connector harness going to the main control board will still be attached, and the connector plate will hang in front of the indoor coil.



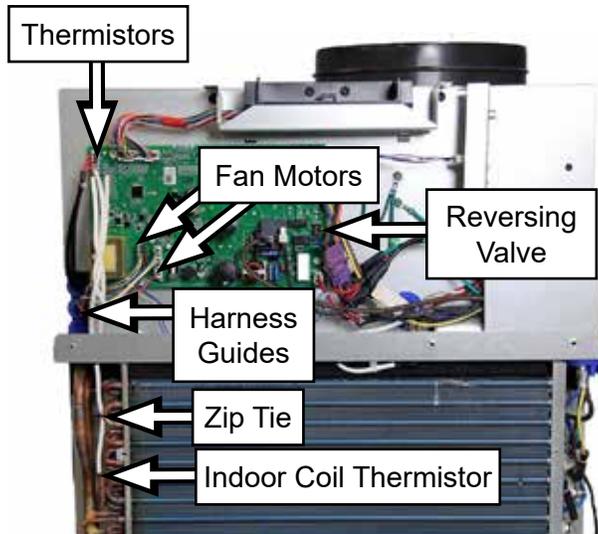
- Remove two 5/16-in. screws from the indoor coil top cover.



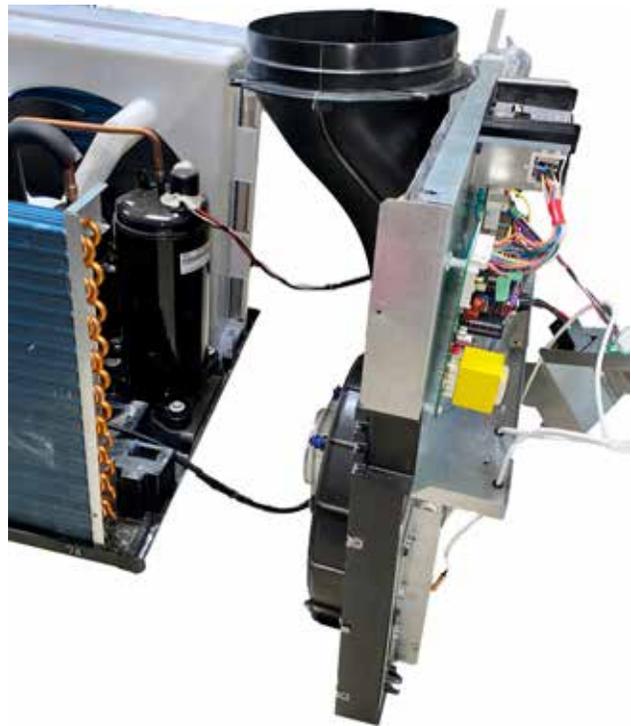
- Remove four 5/16-in. screws from the bottom of the indoor fan shroud. There are two screws located on the right side and two screws located on the left side.



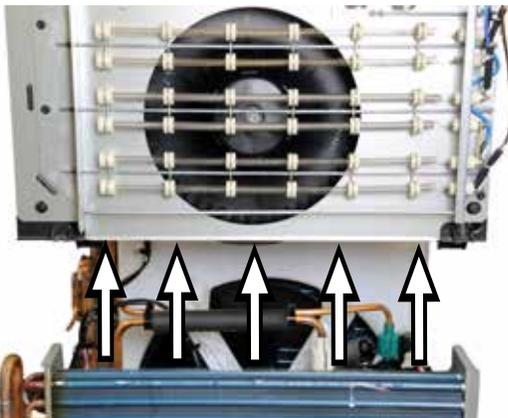
6. Remove all harnesses from the left side going through the harness guides towards the back. Disconnect both thermistor connectors, both fan motor connectors and reversing valve connector from the main board. Then break zip tie holding the indoor coil thermistor in place and pull it out of its holder.



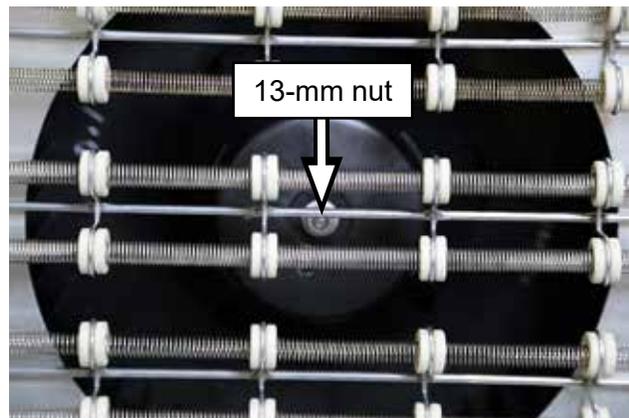
8. Set indoor fan assembly to the right of the Zoneline. Notice the compressor is still connected.



7. Lift indoor fan assembly straight up.



9. Remove fan shroud by removing a 13-mm nut. The nut can be accessed with the heater assembly installed, or remove the heater assembly to gain easier access.



- Remove four 5/16-in. screws from the rear of the indoor fan motor and slide the motor from the rear housing.



### Outdoor Fan Motor

The outdoor fan motor is a DC motor driven by the main control board and provides feedback to the main control board for proper speed confirmation.

#### Outdoor Fan Diagnosing

Fan voltages cannot be checked due to the high DC output. If a fan motor were to fail, there is a possibility that the fan motor could short out the main control board.

#### **Check for Fault Codes**

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether F2 (Outdoor fan fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

### Verify Fan Operation

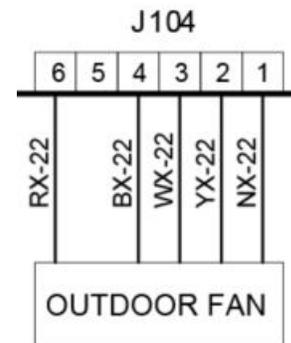
Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until OF is shown in the display. Pressing **+** turns the fan on and pressing **-** will turn the fan off. **AUX** key exits Service Mode.

### Verify Fan Resistance Value

Approximate fan resistance values can be checked from the main control board at the J104 connector.

- Pin 6 (**red**) to pin 4 (**black**): 7.5 Ohms + or - 15%.

Model Name	Winding Resistance (ohm)
	Outdoor Motor
	Red to Black
<b>All Models</b>	7.5Ω ± 15%



### Verify No Motor Binding

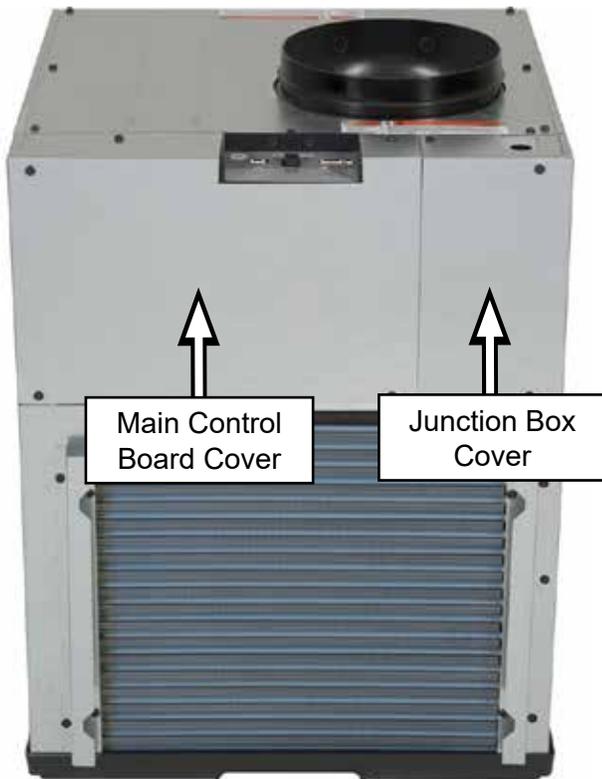
Disconnect power and check for binding or a foreign object restricting the blade movement if the outdoor fan is not running.

### Verify Indoor Fan Motor Is Not Causing The Outdoor Fan Motor Not To Run

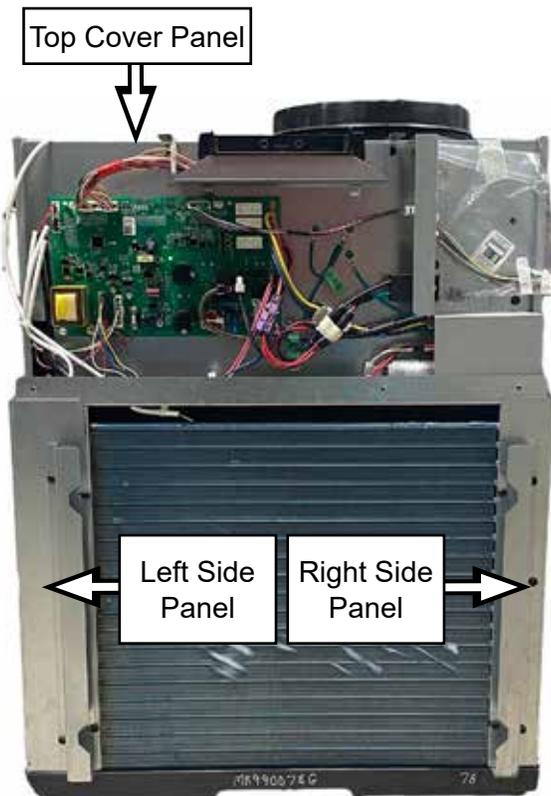
- If the outdoor motor is not running, unplug the indoor motor connector. Restore power and if the outdoor motor runs with the indoor motor unplugged, then replace the indoor fan motor.
- If the outdoor fan motor will still not run replace both fan motors and main control.

## Outdoor Fan Removal

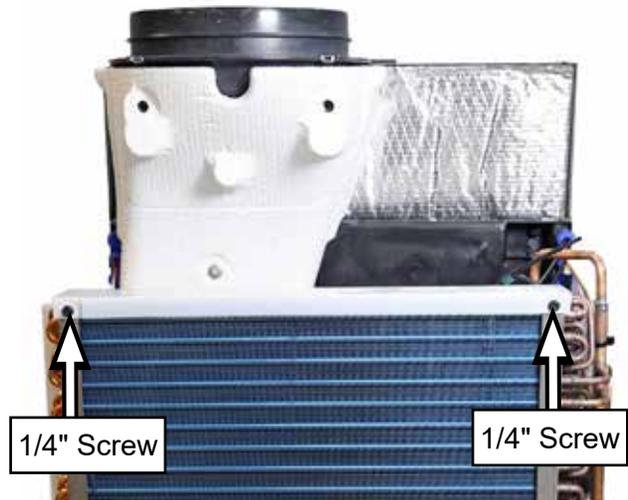
1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



2. Remove top cover panel and left and right-side panels.



3. Remove outdoor shroud cover by removing two 1/4-in. screws.



4. Lift outdoor fan shroud cover up slightly and pull towards the outdoor coil.



5. Remove two 1/4-in. screws from the base of the fan shroud. They are located on the right and left side.

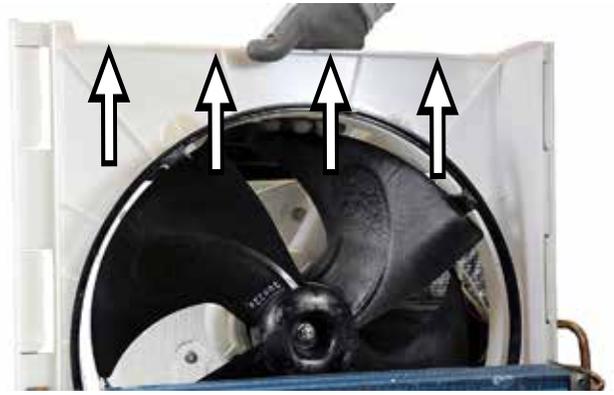




6. Near the compressor, pull the outdoor coil and fan assembly slightly out. This will allow the fan assembly to slide up without hitting the outlet duct.



7. Remove the fan assembly from the outdoor coil by pulling up on the assembly.



8. Remove outdoor fan blade from motor by removing one 13-mm nut.



9. Detach fan motor from fan shroud by removing four 5/16-in. screws.



# Condensate Removal

## Slinger Ring on Outdoor Fan Blade

The water that is collected through the normal process of air conditioning is collected in the rear base pan. To aid in dissipating this water, the outdoor fan blade has a ring around the blade that picks up the water and "slings" it onto the outer coil. This assists in removing heat from the coil when the Zoneline is in cooling mode.



## Drain Pan Plug

When operating in the heat-pump mode, defrost water is also collected in base pan, but because outdoor temperatures may drop below freezing, the water level could cause the outdoor fan blade to freeze in the pan. To prevent this from occurring, a thermostatically operated drain pan plug is utilized. Located in the base pan, when the air temperature is above 65°F it is closed and opens when the temperature drops below 45°F, lowering the water level in the base pan.

## Drain Pan Plug Removal

1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.
2. Remove top cover panel and left side panel.



# Electric Heat

## Electric Heater

The electric heating element is located behind the indoor coil and consists of a three-bank heater assembly. It has two thermal switches located on top of the heater assembly; one cycling (resettable) and one "One Shot" thermal switch.

### Electric Heater Diagnosing

An indoor fan failure, outlet thermistor failure, outlet temperature overheat condition, a thermal cut off (TCO) failure, heater failure, board failure and external thermostat wiring can cause a heater not to turn on.

#### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 1 (Inside fan fault), 3 (External thermostat wiring), 13 (Heater airflow fault), 17 (Outlet thermistor failure), 18 (Outlet temperature overheat) codes are active. Record any other faults and clear the codes by pressing **AUX**. Use corresponding fault codes to diagnose other components as being the electric heater fault condition.

#### Verify Electric Heater Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until **EH** is shown in the display. Pressing **+** turns the electric heater on and pressing **-** will turn the electric heater off. **AUX** key exits Service Mode.

#### Verify Electric Heater Voltages

Verify electric heater voltages from the main control. Heater banks are depended on breaker/cord size (15A, 20A, 30A). While turning on the heater in Service Mode, the main control will only turn on the respective bank based off the power cord installed. Use the active heater chart in the next column to determine which heater bank will be active.

Active Heater	
Coil Wattage (230V/265) [208V]	Power Cord Amp Size
2.45 kW [2.00 kW] Large Bank	15A, 20A, 30A
1.55 kW [1.27 kW] Medium Bank	30A
1.00kW [0.82 kW] Small Bank	20A, 30A

#### 208/230 VAC 30 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**brown**): 208/230 VAC
- Medium Bank: J308 (**brown**) to K305 relay (**brown**): 208/230 VAC
- Small Bank: J310 (**yellow**) to K305 relay (**brown**): 208/230 VAC

#### 208/230 VAC 20 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**brown**): 208/230 VAC
- Small Bank: J310 (**yellow**) to K305 relay (**brown**): 208/230 VAC

#### 208/230 VAC 15 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**brown**): 208/230 VAC

#### 265 VAC 30 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**Orange**): 265 VAC
- Medium Bank: J308 (**brown**) to K305 relay (**orange**): 265 VAC
- Small Bank: J310 (**yellow**) to K305 relay (**orange**): 265 VAC

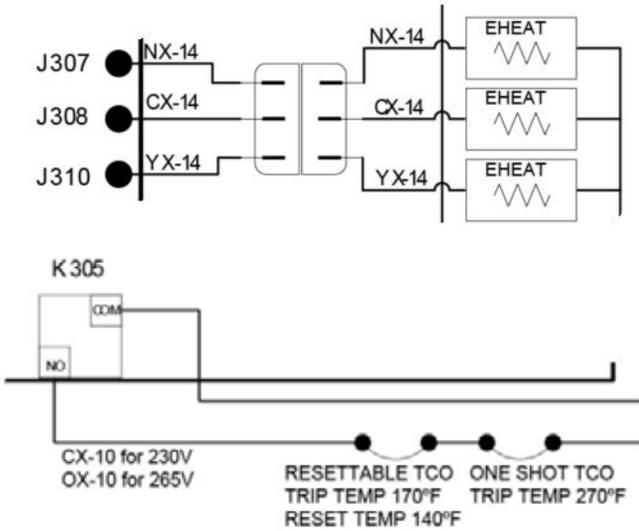
#### 265 VAC 20 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**orange**): 265 VAC
- Small Bank J310 (**yellow**) to K305 relay (**orange**): 265 VAC

#### 265 VAC 15 Amp Power Cord Installed

- Large Bank: J307 (**navy**) to K305 relay (**orange**): 265 VAC

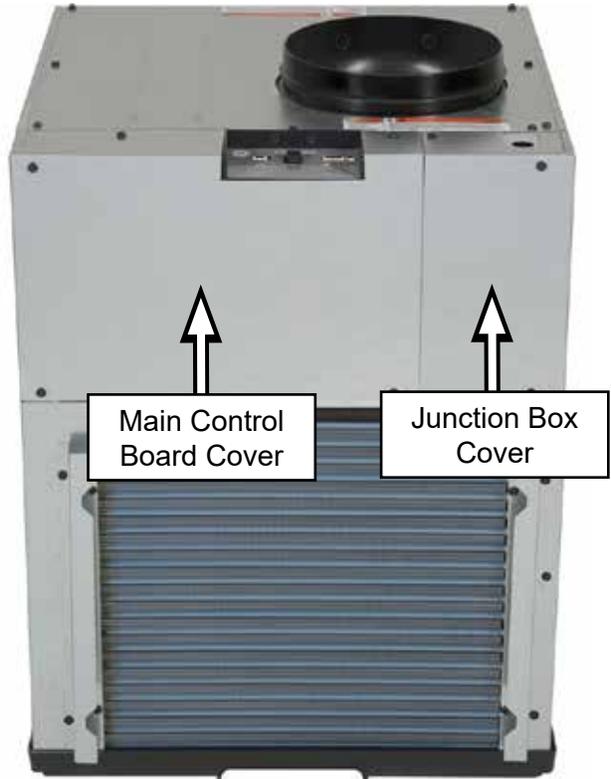
(Continued next page)



- Self Resettable TCO trip temperature point is 170°F and the reset temperature is 140°F.
- One Shot TCO trip temperature point is 270°F and will not reset once tripped.

### Electric Heater Removal

1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



### Verify Electric Heater Resistance Values

Approximate electric resistance values can be checked from the main control board.

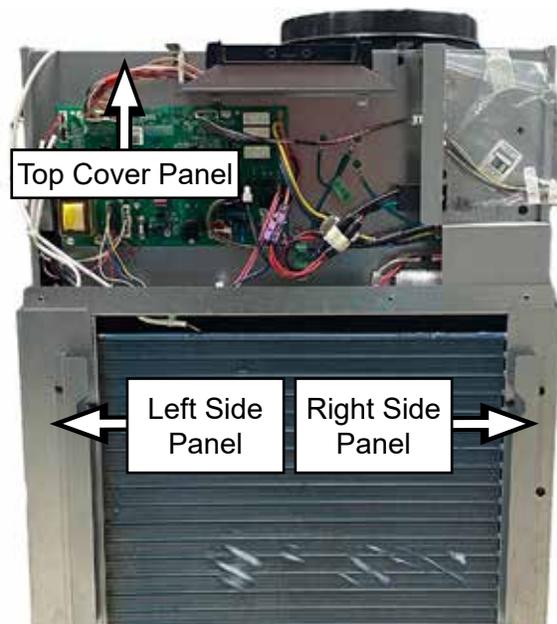
#### 208/230 VAC

- Large Bank: J307 (**navy**) to K305 relay (**brown**): 19.0 ohms + or - 5%.
- Medium Bank: J308 (**brown**) to K305 relay (**brown**): 30.0 ohms + or - 5%.
- Small Bank: J310 (**yellow**) to K305 relay (**brown**): 46.5.0 ohms + or - 5%.

#### 265 VAC

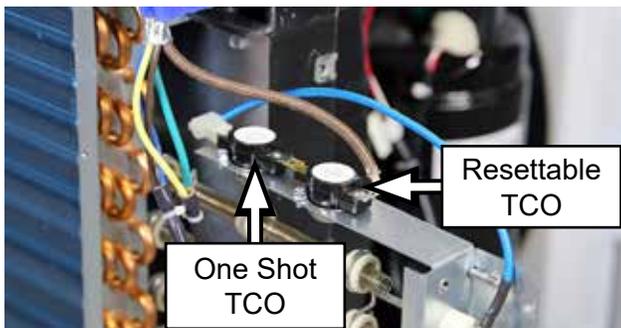
- Large Bank: J307 (**navy**) to K305 relay (**Orange**): 25.2 ohms + or - 5%.
- Medium Bank: J308 (**brown**) to K305 relay (**orange**): 39.9 ohms + or - 5%.
- Small Bank: J310 (**yellow**) to K305 relay (**orange**): 61.8 ohms + or - 5%.

2. Remove top cover panel and left and right-side panels.



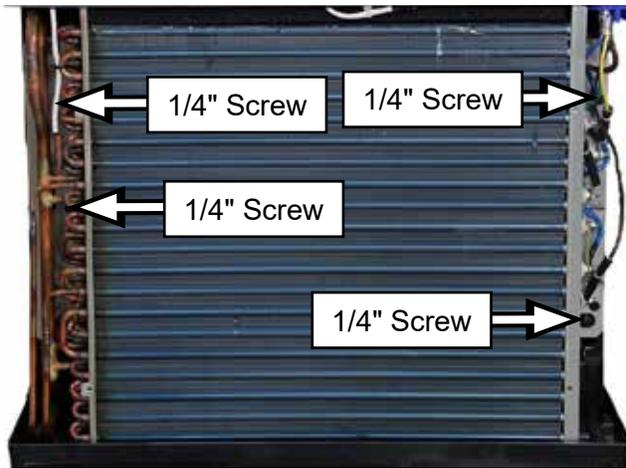
### Verify TCO's

Verify TCO's are closed by checking continuity across TCO terminals at the heater assembly.

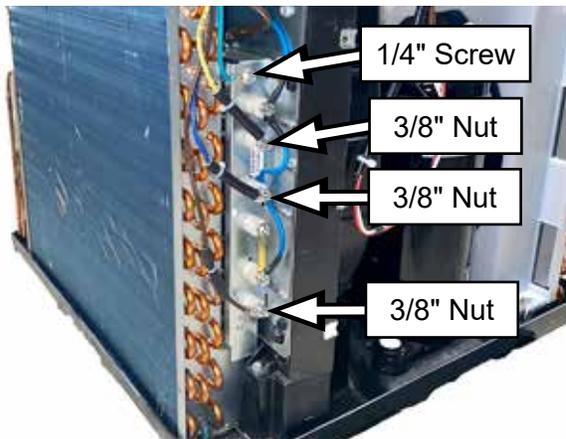


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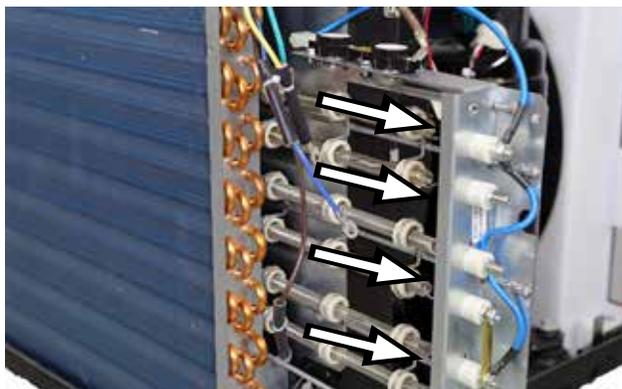
3. Remove four 1/4-in. screws from the heater assembly.



4. Remove three 3/8-in. nuts and a 1/4-in. ground screw from the heater assembly.



5. Slide the heater assembly out to the right from behind the indoor coil.



# Sealed System Components

Zonelines have an indoor coil, outdoor coil, compressor, drier, refrigerant metering device (capillary tubes), check valve and reversing valve.

**NOTE:** A new drier **MUST** be installed anytime a sealed system is repaired.

## Compressor

### Compressor Diagnosing

#### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 6 (Compressor Fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

#### Verify Compressor Operation

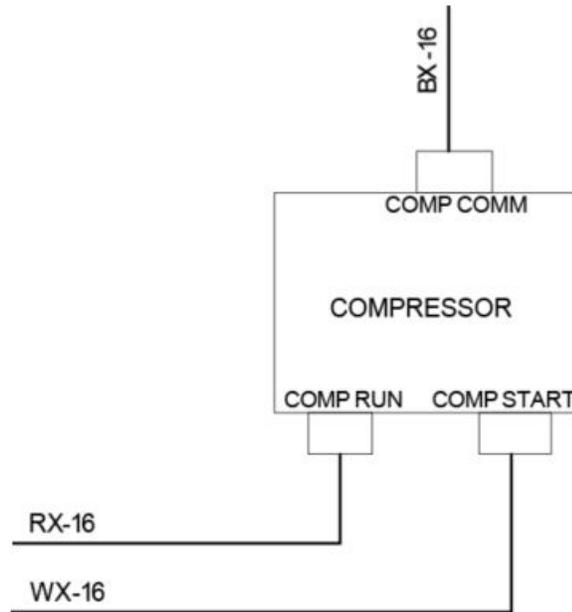
Enter Service Mode by pressing and holding + and - buttons. On entry, the display lights all LED's. Press **MODE** until CL or HP (depending on outside temperature) is shown in the display. Pressing + turns the compressor on and pressing - will turn the compressor off. **AUX** key exits Service Mode.

#### Verify Compressor Resistance Values

Approximate compressor values can be checked from the main control board or at the compressor.

**NOTE:** The resistance values are depended on BTU and supplied voltage.

Compressor Resistance (ohms) +/- 5% at 68°F			
BTU	Voltage	Run	Start
9k	208/230V	4.06Ω	4.87Ω
9k	265V	6.56Ω	8.06Ω
12k	208/230V	3.21Ω	1.98Ω
12k	265V	4.28Ω	3.46Ω
18k	208/230V	1.82Ω	1.14Ω
18k	265V	2.30Ω	2.05Ω



#### Verify Compressor Capacitor Microfarad Values

Approximate compressor capacitor microfarad values can be checked from the capacitor.

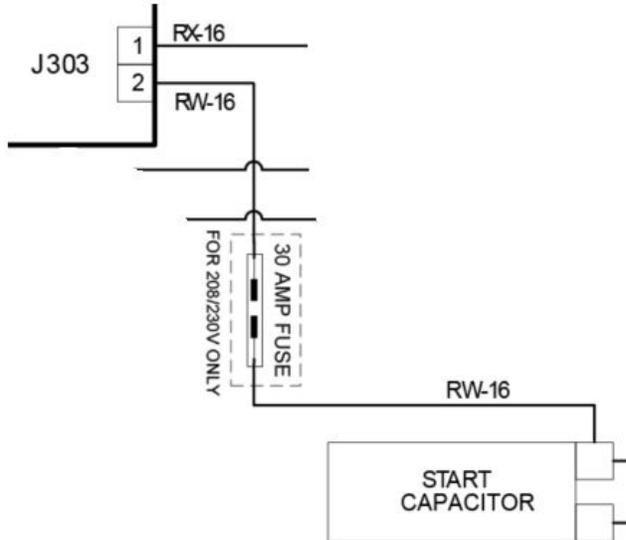
**NOTE:** The resistance values are depended on btu and supplied voltage.

Compressor Capacitor Microfarad (μF)		
BTU	Voltage	Microfarad
9k	208/230V	25 μF
9k	265V	15 μF
12k	208/230V	35 μF
12k	265V	25 μF
18k	208/230V	50 μF
18k	265V	35 μF

**Verify Continuity Through In-line Fuse**  
**NOTE: Fuse is only located on 208/230 VAC models.**

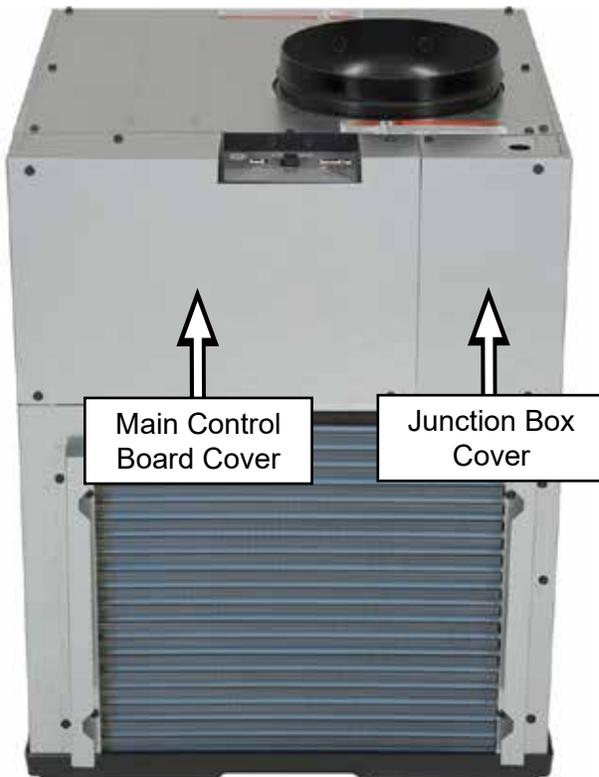
Fuse continuity can be checked from the main control board **J303** to the compressor capacitor.

- Pin 2 (**red/white**) to capacitor (**red/white**): Closed circuit.

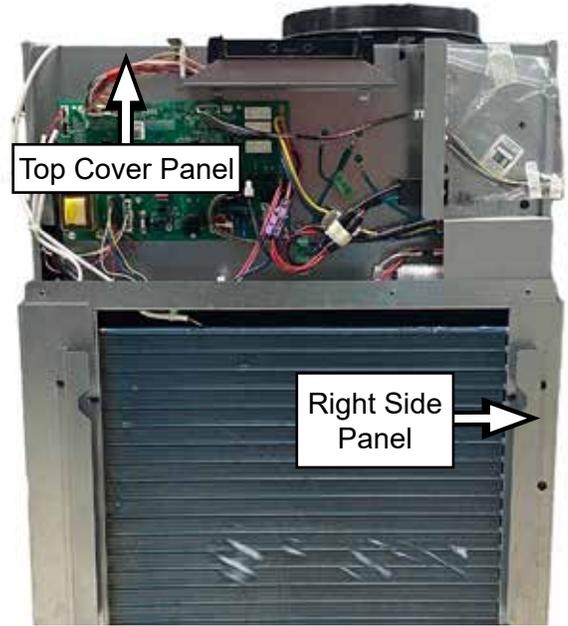


**Compressor Removal**

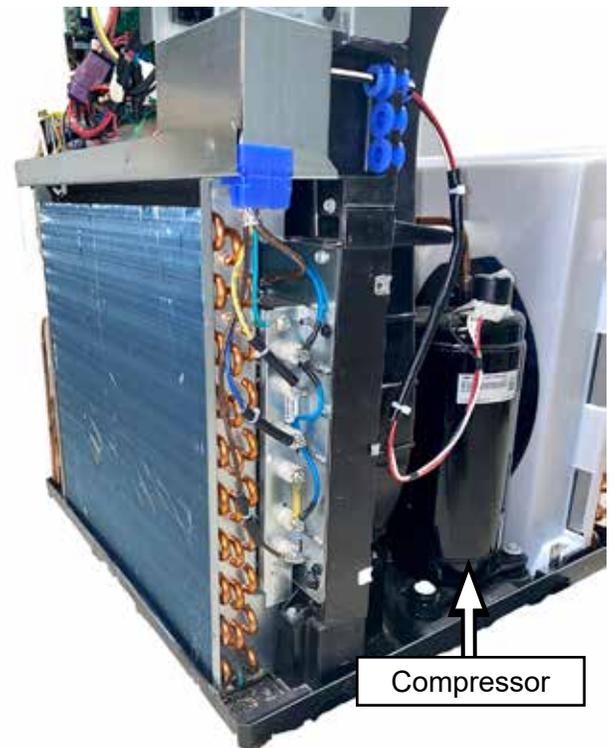
1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



2. Remove top cover panel and right-side panel.



3. Compressor is located to the right side on the Zoneline.



## Service Compressor



### Compressor Capacitor

#### Compressor Capacitor Diagnosing

A compressor not running could be caused by a failed capacitor.

#### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 6 (Compressor fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

#### Verify Compressor Operation

Enter Service Mode by pressing and holding + and - buttons. On entry, the display lights all LED's. Press **MODE** until CL or HP (depending on outside temperature) is shown in the display. Pressing + turns the compressor on and pressing - will turn the compressor off. **AUX** key exits Service Mode.

## Verify Compressor Capacitor Microfarad Values

Approximate compressor capacitor microfarad values can be checked from the capacitor.

**NOTE:** The resistance values are depended on btu and supplied voltage.

Compressor Capacitor Microfarad ( $\mu\text{F}$ )		
BTU	Voltage	Microfarad
9k	208/230V	25 $\mu\text{F}$
9k	265V	15 $\mu\text{F}$
12k	208/230V	35 $\mu\text{F}$
12k	265V	25 $\mu\text{F}$
18k	208/230V	50 $\mu\text{F}$
18k	265V	35 $\mu\text{F}$

## Compressor Capacitor Removal

**WARNING:** Discharge the capacitor with proper insulated pliers and electrically rated gloves before attempting service.

1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



(Continued next page)

- Remove one 1/4-in. screw from the capacitor holder. Gently slide the capacitor out of its clamp.



1/4" Screw

## Reversing Valve

### Reversing Valve Diagnosing

#### Check for Fault Codes

Check fault codes by pressing and holding **MODE** and then press **AUX**. Verify whether fault 7 (Reverse valve fault) code is active. Record any other faults and clear the codes by pressing **AUX**.

#### Verify Compressor Operation

Enter Service Mode by pressing and holding **+** and **-** buttons. On entry, the display lights all LED's. Press **MODE** until CL or HP (depending on outside temperature) is shown in the display. Pressing **+** turns the compressor on and pressing the **-** will turn the compressor off. The indoor coil should be getting hot or cold depending which mode was selected. **AUX** key exits Service Mode.

#### Verify Reversing Solenoid Valve Resistance Values

Approximate reversing valve solenoid values can be checked from the main control board at the J304 connector. **NOTE:** The resistance values are depended on supplied voltage.

### 208/230 VAC

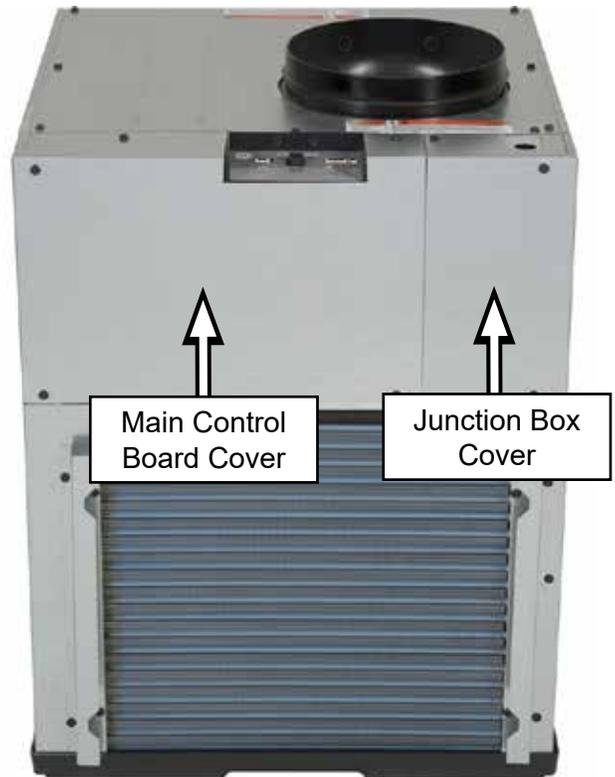
- Pin 1 (**pink**) to pin 2 (**pink**): 1,500 Ohms + or - 15%.

### 265 VAC

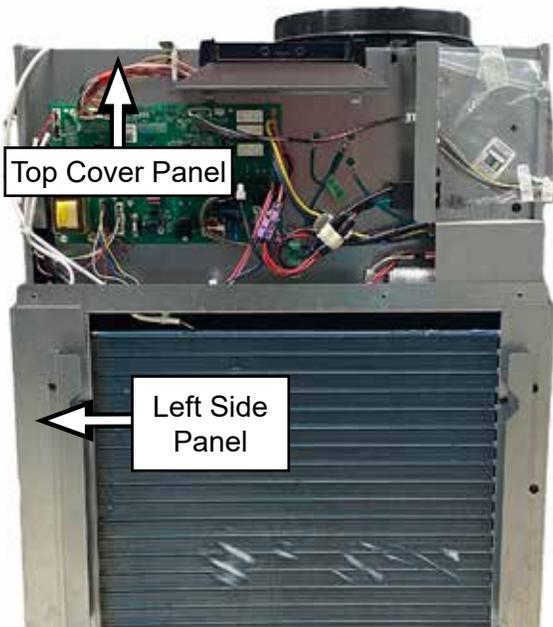
- Pin 1 (**navy**) to pin 2 (**navy**): 3,110 Ohms + or - 15%.

### Reversing Valve Removal

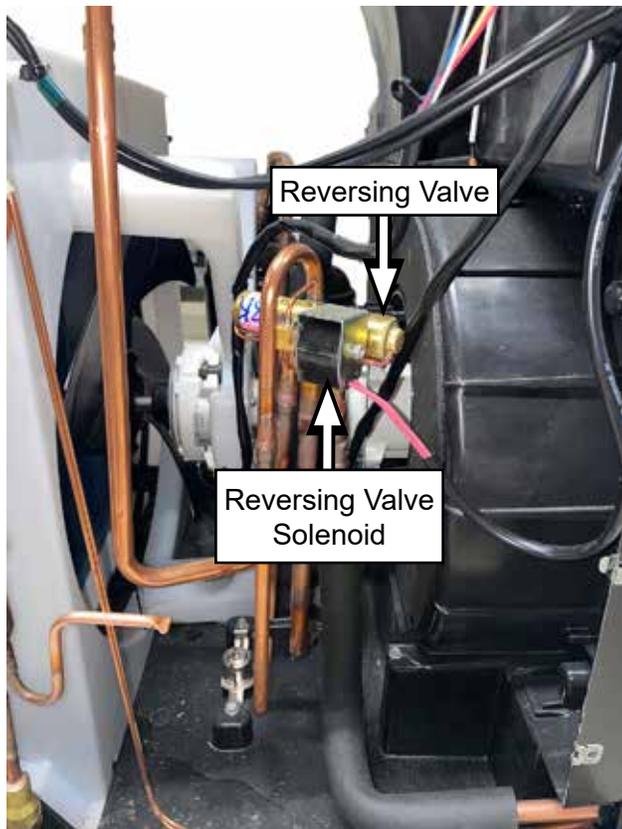
- Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



2. Remove top cover panel and left-side panel.



3. The reversing valve is located on the left-side of the Zoneline.



## Service Reversing Valve Assembly



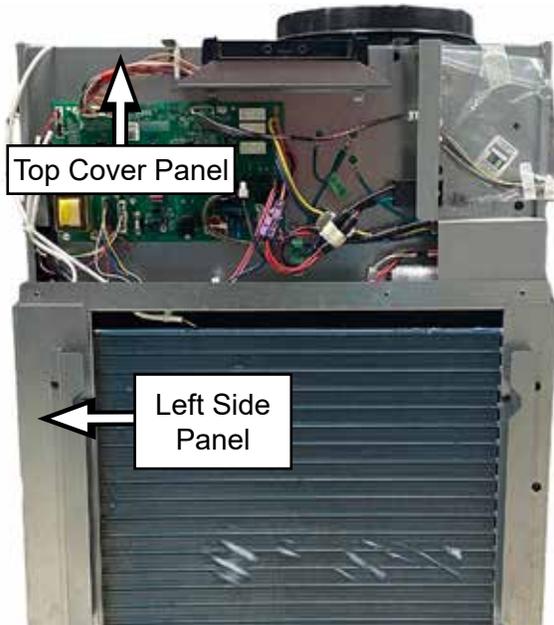
## Filter Drier Capillary Tube Assembly

### Filter Drier Capillary Tube Assembly Removal

1. Remove main control board cover and junction box cover. All screws are 5/16-in. screws.



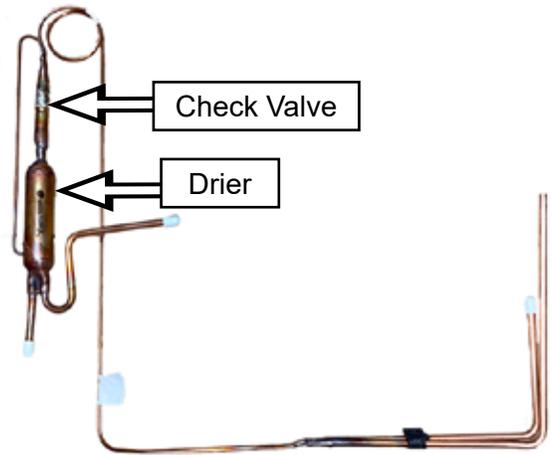
2. Remove top cover panel and left-side panel.



3. The filter drier capillary tube assembly is located on the left-side of the Zoneline.



## Service Filter Drier Capillary Tube Assembly



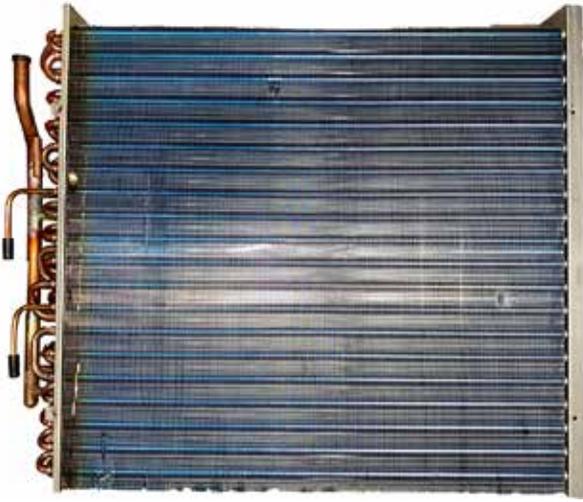
## Indoor Coil

### Indoor Coil Removal

1. Remove indoor fan assembly. See **Indoor Fan Removal** under **Indoor Fan Motor** in the **Air Flow** section of this service guide.



## Service Indoor Coil



## Service Outdoor Coil



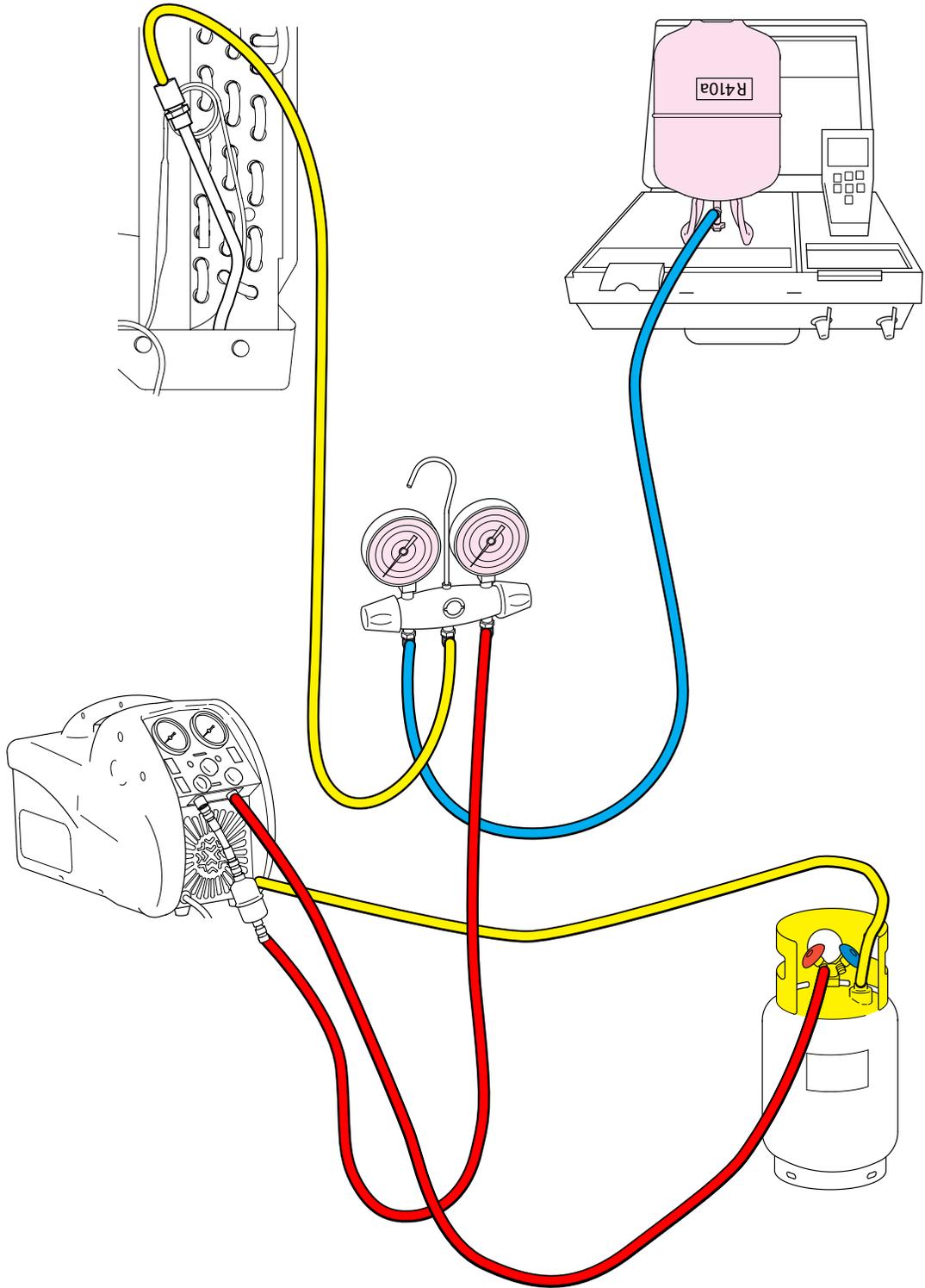
## Outdoor Coil

### Outdoor Coil Removal

1. Remove outdoor fan assembly. See **Outdoor Fan Removal** under **Outdoor Fan Motor** in the **Air Flow** section of this service guide.



# Charging and Recovery Process



## Tools

**WARNING:** Gauge manifold sets, hoses, recovery cylinders and the recovery machine must be rated for the higher pressures encountered with R-410A. An attempt to use standard refrigerant service tools on R-410A systems is very dangerous and foolish. Such a mistake could cause serious injury or death.

### Tap Valve

Part number WX5X328 tap valve is used to tap the sealed system for R-410A recovery. The recommended placement of the tap is the process stub at the outlet of the condenser.

### R-410A Recovery Pump

The recovery pump must have an EPA certification notice showing the use for designated refrigerants include R-410A. The high side gauge should read up to 800 psi.

### R-410A Recovery Cylinder

Recovery cylinders must be rated for R-410A use. These cylinders, DOT-4BA 400 or DOT-4BW 400, meet the Department of Transportation standards for R-410A recovery cylinders. Be very careful. It would be easy and convenient to use whatever recovery cylinder was handy rather than the correct cylinder. This is a safety issue of great concern to the industry and is one reason the AC&R Safety Coalition was formed, and R-410A Safety and Handling certification was established.

### In-Line Filter

The recovery pump can be exposed to debris that can damage it. Contamination can also be introduced from the refrigerant storage tanks. An in-line filter, such as the Catch All C-032, is to be used for all refrigerants, including 410A. Change the in-line filter as needed.

### R-410A Gauge Manifold Set

R-410A systems require higher pressure gauges and hoses. Look for R-410A printed on the center of the dial. The high side pressure gauge should read up to 800 psi and the low side up to 500 psi.

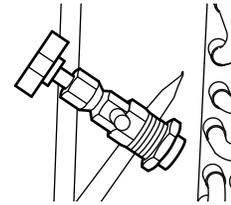
### Digital Refrigerant Scale

A CPS® Compute-a-Charge CC220 digital scale is used when charging R-410A.

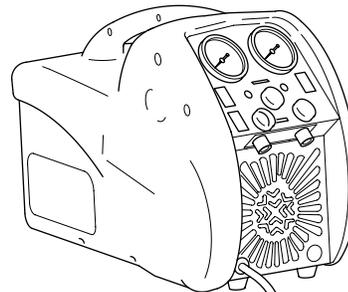
### R-410A Refrigerant Cylinder

For instant identification, all brands of R-410A are shipped in a rose-colored tank.

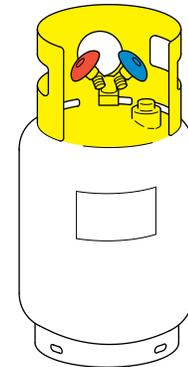
### R410 Rated Tools



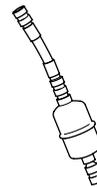
Tap Valve



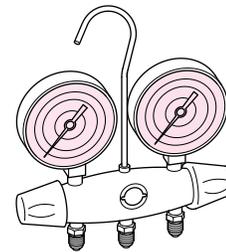
R-410A Recovery Pump with 800 psi gauge for the High Side



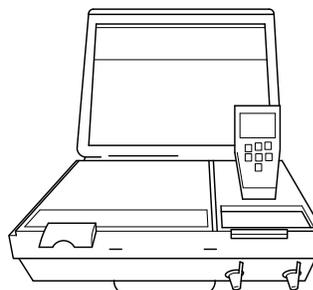
R-410A Recovery Cylinder DOT-4BA400 or DOT-4BW400



In-Line Filter No. WX10X10003



R-410A Cylinder Gauge Manifold



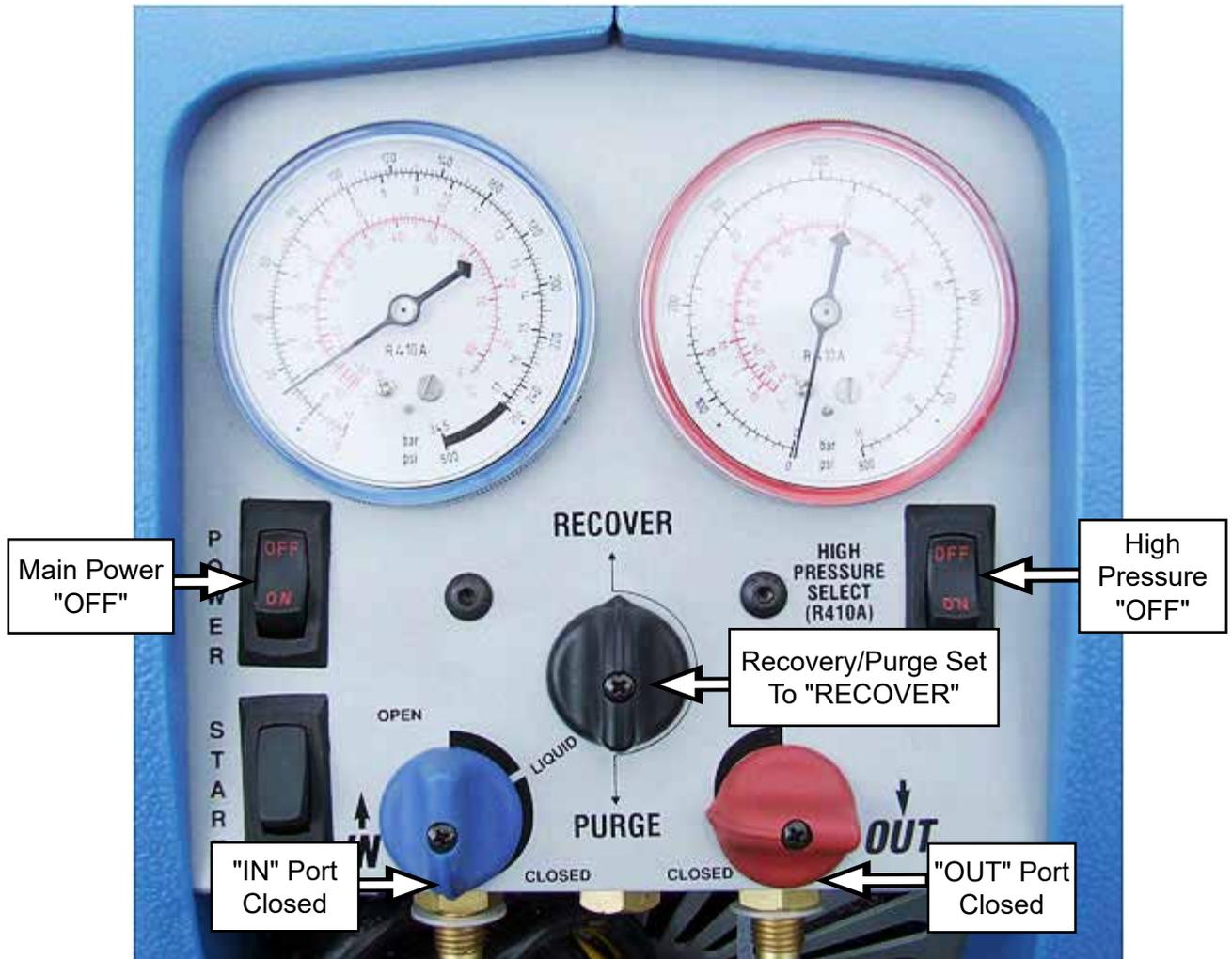
Digital Refrigerant Scale #CC220



R-410A Refrigerant

## Recovery Pump

**NOTE:** The pressure gauge for the high side reads up to 800 psi.



## In-line Filter

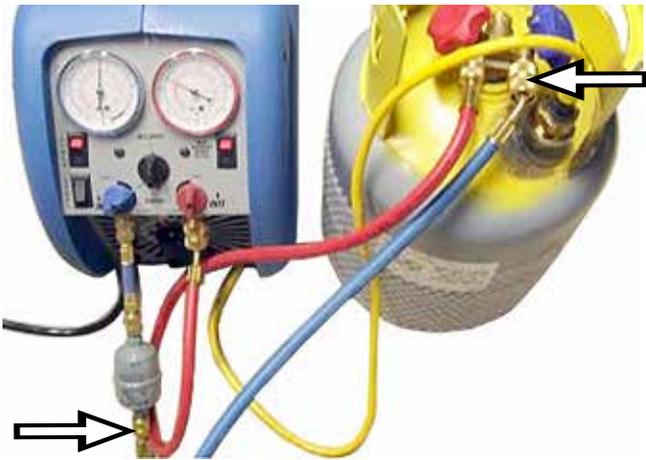
During the recovery process, the recovery machine may be exposed to debris that can damage it. This includes brazing spatter and copper or brass slithers. Contamination can also be introduced from the refrigerant storage tanks. To prolong the life of the recovery pump, always use an in-line filter at the inlet port. The Catch All C-032 in-line filter (Part No.: WX10X10003) is acceptable for all refrigerants, including 410A. When installing the in-line filter, be sure the directional arrows on the filter point towards the pump. Change the in-line filter as needed.

## Sub Cooling the Recovery Tank

When working in extreme ambient temperatures, the recovery tank can be sub cooled before the recovery procedures are performed. This sub cooling can speed up the recovery process.

**NOTE:** To sub cool the recovery tank, it is necessary for the tank to contain a minimum of 5-pounds of liquid R-410A in the tank.

1. Connect one end of the blue hose to the pump inlet port and the other end to the vapor port on the recovery tank.



2. Connect one end of the red hose to the pump outlet port and the other end to the liquid port on the recovery tank.



3. Start the recovery pump.



4. Throttle the output valve so that the output pressure is 100 psi greater than the input pressure, but not more than 300 psi.



5. Run until the recovery tank is cold.

## Recovery Procedures

Standard recovery procedures remain unchanged. The only difference is the necessity to use a recovery machine and cylinders approved for the higher pressures of R-410A.

**WARNING:** When working in extreme ambient temperatures, the recovery tank can be sub cooled before the recovery procedures are performed (see **Sub Cooling the Recovery Tank**, previous section).

**NOTE:** Check all hoses to make sure the "O" rings are in place before connecting to system.

1. Tap the sealed system at the process stub tube, using the WR5X27079 tap valve.

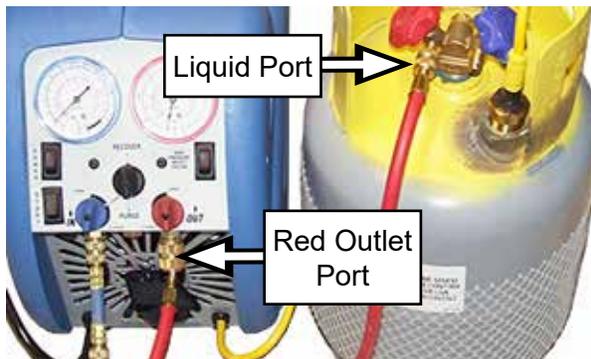


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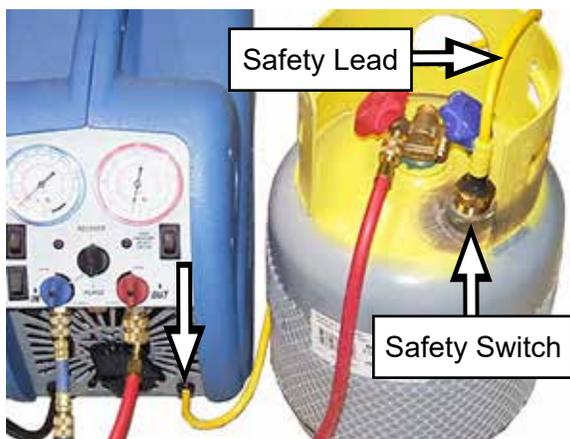
- Attach one end of the blue recovery hose to the tap valve and the other end to the in-line filter attached to the recovery pump.



- Close the red outlet port of the recovery pump.
- Attach one end of the red hose to the outlet port of the recovery pump and the other end to the liquid port of the recovery tank.



- Connect the yellow overfill safety lead from the recovery pump to the tank limit safety switch on the recovery tank.



- Set the black Recover/Purge valve of the recovery pump to RECOVER.



- With all hoses connected and tight, open the liquid port of the recovery tank slowly to check hoses and connections for leaks.
- Rotate the output port of the recovery pump to the OPEN position.



- Open the tap valve on the high-pressure side of the sealed system.
- Press recover pump power switch to ON.



**NOTE:** The fan should be running.

- Press the high pressure select switch to the ON position, and press the compressor START switch.



**NOTE:** If the pump begins to knock, slowly throttle back the input valve until the knocking stops.

- Slowly open the input port of the recovery pump. Once the liquid has been recovered, fully open the input valve.



- Run the recovery pump until a 15-inch vacuum is achieved.
- After recovery is complete, self-purge the recovery pump.

### Self-Purge/Auto Evacuate

The hygroscopic nature of the oils used in R-410A systems cannot be over-emphasized. Moisture can be a significant problem affecting the proper operation and life expectancy of any system operating on the mechanical refrigerant cycle. Therefore, it is more important than in the past to take precautions to keep moisture out of a system during installation and service. Evacuate to 15-inch vacuum and replace filter-driers when a system has been opened. Questionable workmanship that may have been acceptable when working on R-22 systems cannot be tolerated by R-410A systems.

#### After Recovery Is Complete:

- Close the input port valve.
- Turn the recovery pump off.



- Set the Recover/Purge valve to PURGE.
- Restart the recovery pump until a 15-inch vacuum is achieved.



- Turn unit off, reset Recover/Purge to Recover, and remove the tap valve from the process stub tube.

The pump is now ready for another recovery.

### Summary of Normal System Recovery

- Inspect the recovery pump thoroughly to ensure that it is in good operating condition.
- Connect recovery tank to recovery pump and make sure all connections are correct and tight.
- Open the liquid port of the recovery cylinder. (Always open valves slowly to check hoses and connections for leaks.)
- Make sure the Recover/Purge valve is set on Recover.
- Open the output port of the recovery pump.
- Open the tap valve on the sealed system.
- Switch the main power to ON. The fan should be running.
- Press the compressor START switch.
- Slowly open the input port on the recovery pump.
- Run recovery pump until the desired vacuum is achieved.
- Close tap valve.
- Close the recovery pump input port.
- Turn off recovery pump.

(Continued next page)

14. Turn the Recover/Purge valve to the Purge position.
15. Restart the recovery pump.
16. Run until the desired vacuum is achieved.
17. Close the ports on the recovery tank and the recovery pump.
18. Turn off the recovery pump and return the Recover/Purge valve to Recover.

### Installation of Charge Valve

After the system recovery and self-purge/auto evacuate is completed, cut the process stub tube below the piercing valve hole. Braze a Schrader charge valve onto the process stub tube prior to charging.



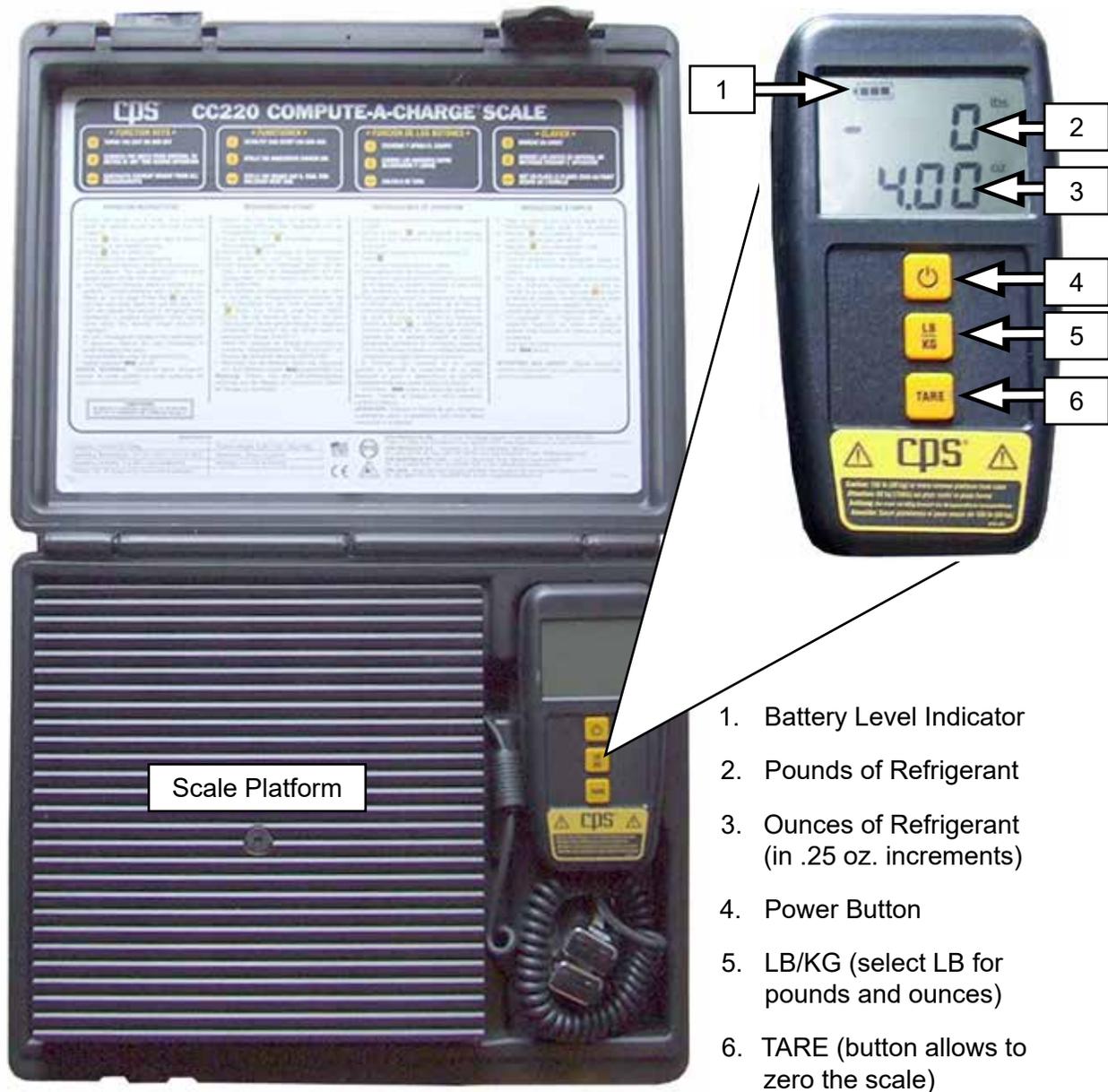
### Charge Valve

There are two basic types of Schrader charge valves available to the service technician. The first type (Part No.: WJ56X10008) is swaged to fit over 1/4-inch tubing. The second type (Part No.: WJ56X61) has a 90° bend to ease access to the Schrader valve in certain installations.



Part No.: WJ56X10008 Part No.: WJ56X61

## Digital Refrigerant Scale



### The CPS CC220 Scale

The CPS CC220 scale is used to add the required amount of 410A refrigerant.

There are two 9-Volt batteries supplied with the scale. Insert these in the back of the controller. The back of the controller has a magnetic surface, which allows the controller to be attached to any metal surface. If a metal surface is unavailable, use the hook located in the case under the controller to hang the controller. The base of the hook attaches to the top of the controller.

## Digital Scale Operating Instructions

**NOTE:** All objects should be removed from the scale platform.

After recovery is complete:

1. Place the scale on a level, rigid surface.
2. Press the power button key to turn the unit on. Wait for the LCD to display a zero-weight reading.

**NOTE:** Change batteries when all segments of the battery level indicator are off.

3. Press the unit selection key, LB/KG, to select LB (pounds and ounces).
4. The scale is now ready for weighing.

## Refrigerant Charging

**Caution:** Carefully place the R-410A refrigerant cylinder on the scale platform to avoid subjecting the scale to mechanical shock.

1. Place the R-410a cylinder on the digital scale platform and allow the liquid refrigerant to come to rest in the tank.
2. Connect the charging hose to the cylinder.
3. Bleed the air out of the hose.
4. Press the TARE key (LCD will now read zero).
5. Open the R-410A cylinder valve. The LCD will indicate the amount of R-410a refrigerant being transferred in negative numbers.
6. Close the R-410A cylinder valve when the desired charge amount is displayed.

## Manifold Gauges

The R-410A system requires higher pressure gauges. Be sure that R-410A is printed on the face of the gauge being used.

A normally operating R-410A system with a condensing temperature of 120° and 45°F evaporator saturation temperature has a high side pressure of approximately 418 psi, and a low side pressure of approximately 130 psi.

## Low Side Pressure Gauge

The inner dial of the low side pressure gauge reads the temperature in °F from 80 to -40.

The outer dial reads pressure in psi from 0 to 500. The outer dial also reads vacuum in Inches Hg.

## High Side Pressure Gauge



The inner dial of the high side pressure gauge reads the temperature in °F from 0 to 160.

The outer dial reads pressure in psi from 0 to 800.



## Charging Procedures

**IMPORTANT:** The R-410A system can only be charged on the high-pressure side of the system, and only with liquid refrigerant.

The amount of refrigerant used in the charge is measured by weight with a digital scale. If the R-410A cylinder does not have a dip tube, the cylinder must be turned upside down when placed on the digital scale.

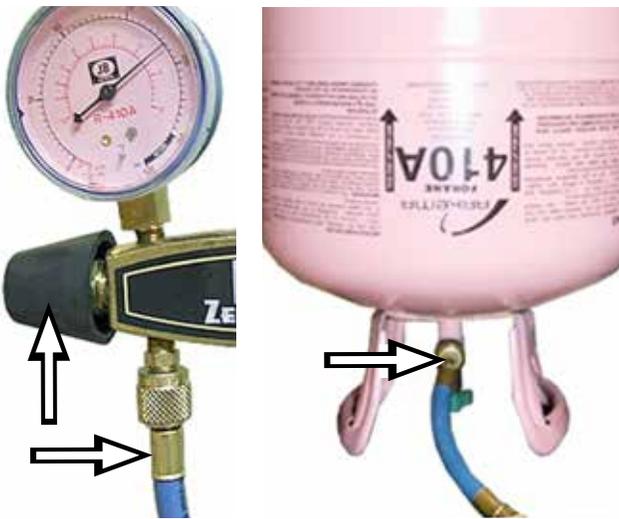
A 15-inch vacuum is required in the sealed system before the charging process begins. This permits the system's compressor to remain off during the charging process. Pressures are monitored by manifold gauges.

The high side pressure gauge must be capable of reading pressures up to 800 psi.

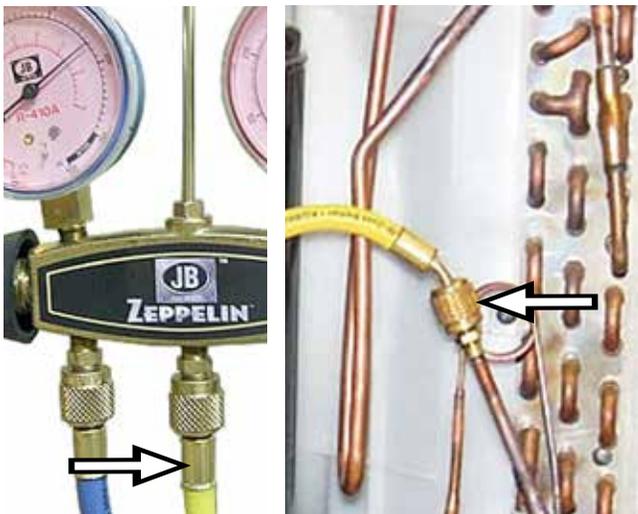
**NOTE:** Using the recovery pump, achieve a 15-Inch vacuum prior to charging the system.

### After Recovery Is Complete

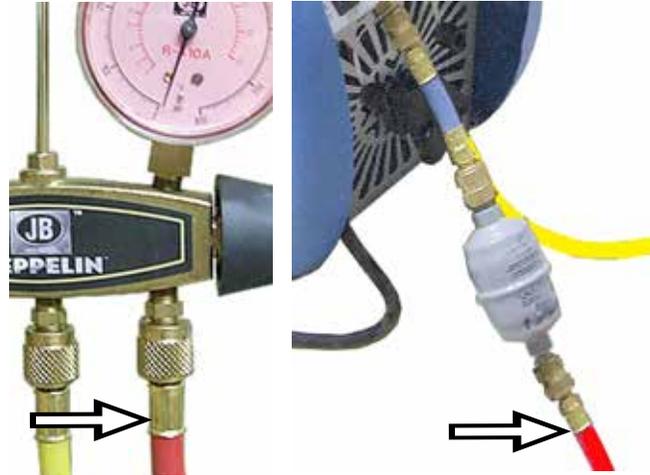
1. Set up recovery pump, recovery tank, gauge manifold, and scale (see **Refrigerant Charging Connections**).
2. Connect the blue hose from the refrigerant cylinder to the low side port of the manifold.
3. Open the R-410A refrigerant cylinder to purge the air from the blue refrigerant hose using the low side port manifold valve.



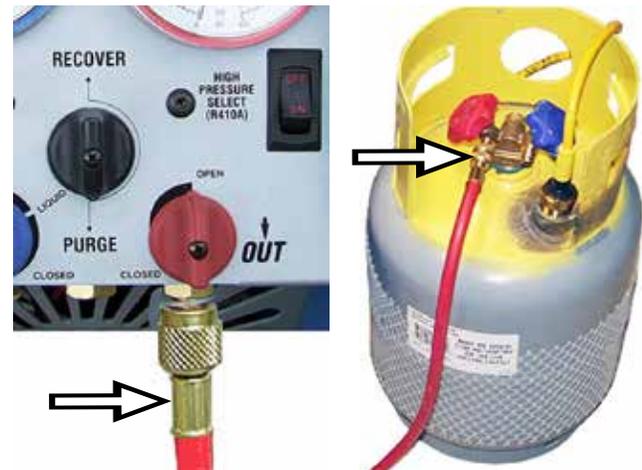
4. Connect the yellow hose from manifold to the charge valve on the high-pressure side of the sealed system.



5. Connect the red hose from the manifold gauge to the filter on the inlet port of the recovery pump.



6. Connect the outlet port of the recovery pump to the liquid port of the recovery cylinder.



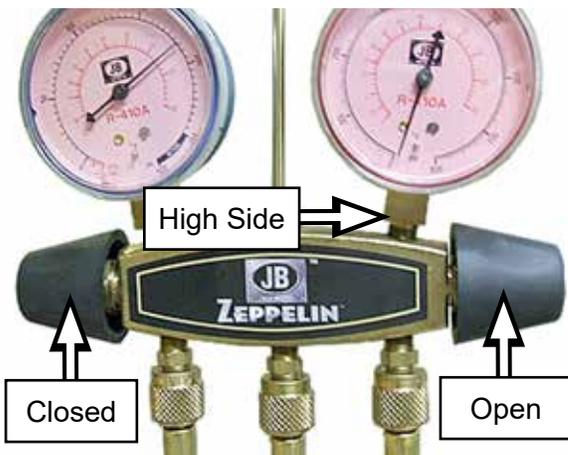
7. Open the inlet and the outlet ports on the recovery pump and turn the power on. Open recovery cylinder liquid valve.



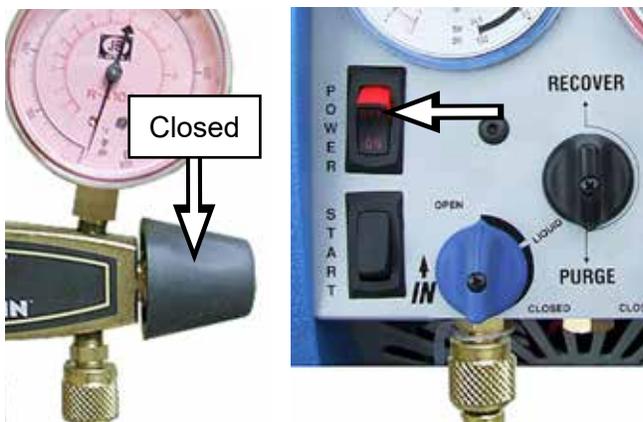
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- Open the high-pressure valve on the manifold and start the recovery pump.

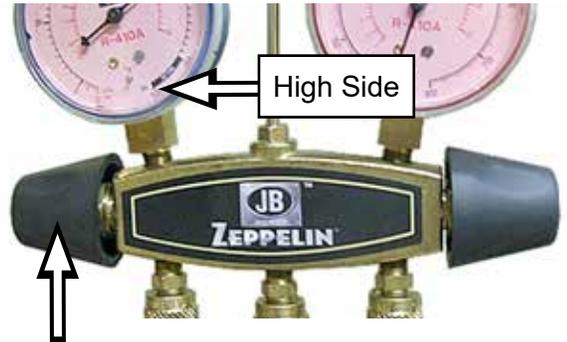


- After a 15-inch vacuum is achieved, close the high-pressure valve on the manifold, then turn the recovery pump off.



**NOTE:** Make sure to press the TARE key on the digital scale controller to set the scale to zero.

- Open the low-pressure valve on the manifold to allow the refrigerant to enter the sealed system.



- When the proper charge weight is displayed, add 0.25 oz. for each 5 ft. length of hose in the sealed system line that has not been purged. (In this case, only 0.25 oz. would need to be added for the 5 ft yellow hose).

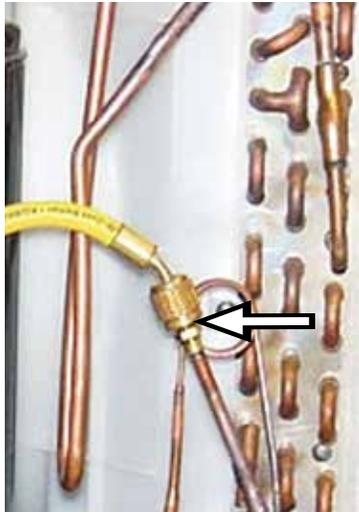


- When the proper charge weight has been reached, close the low-pressure manifold valve to stop the refrigerant flow.



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- Disconnect the yellow hose attached to the sealed system.



- Run the recovery pump to achieve a vacuum (see **Recovery Procedures**, in this section of the service guide). Then, run a purge on the recovery pump (see **Self Purge/Auto Evacuate**, in this section of the service guide). Carefully disconnect all hoses.

**NOTE:** The system should now be fully charged and ready for operation. To be certain, complete the following check list:

- Double check the sealed system valve and the sealed system for leaks.
- Secure the cap on the charge valve.
- Check the system for proper operation.
- Complete all of the EHS Safety requirements.

### Purging Non-Condensable Gasses from the Recovery Cylinder

- Allow the recovery cylinder to sit undisturbed for 24-hours to allow the air to rise to the top.
- Determine the ambient temperature in the room.
- Connect the high-pressure manifold gauge to the vapor port of the recovery cylinder and compare the pressure reading to the ambient temperature.

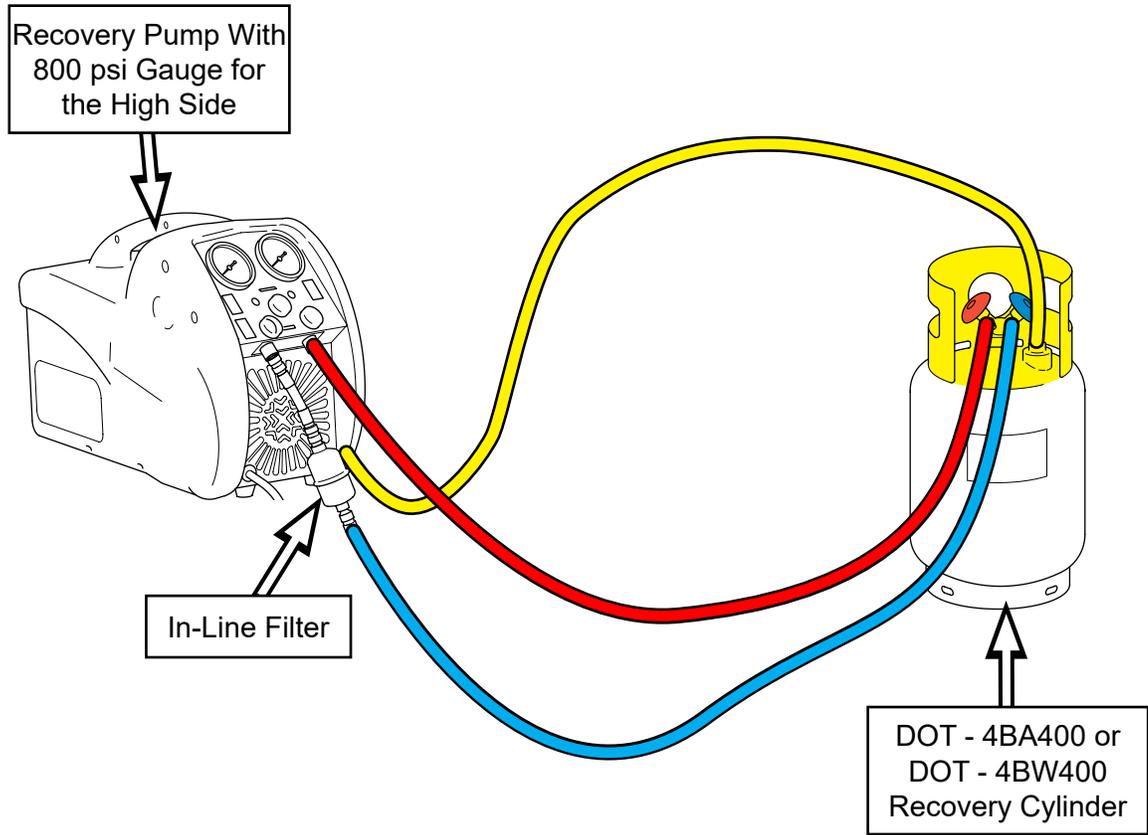
- If the pressure reading is higher than the pressure listed for the ambient temperature, slowly open the manifold to release the non-condensable gas until the pressure reading is within 5 psi of the corresponding chart pressure.
- Close vapor port and allow the recovery cylinder to sit for 10-minutes; then check the cylinder pressure again.
- Repeat the process if necessary.

Relative Refrigerant Pressures (psi)				
Temp. in °F	Freon® R-22	Suva® R-410A	Suva® R-134a	Temp. in °C
32 °F	57.7	101	28.0	0 °C
34 °F	60.4	105	29.7	1.1 °C
36 °F	63.1	109	31.5	2 °C
38 °F	65.9	114	33.4	3.3 °C
40 °F	68.7	118	35.3	4.4 °C
42 °F	71.7	123	37.3	5.6 °C
44 °F	74.7	127	39.3	6.7 °C
46 °F	77.8	132	41.4	7.8 °C
48 °F	81.0	137	43.5	8.9 °C
50 °F	84.2	142	45.7	10.0 °C
55 °F	92.7	156	51.5	12.8 °C
60 °F	102	170	57.7	15.6 °C
65 °F	111	185	64.3	18.3 °C
70 °F	122	200	71.3	21.1 °C
75 °F	132	217	78.9	23.9 °C
80 °F	144	235	86.9	26.7 °C
85 °F	156	254	95.4	29.4 °C
90 °F	168	274	104	32.2 °C
95 °F	182	295	114	35.0 °C
100 °F	196	317	124	37.8 °C

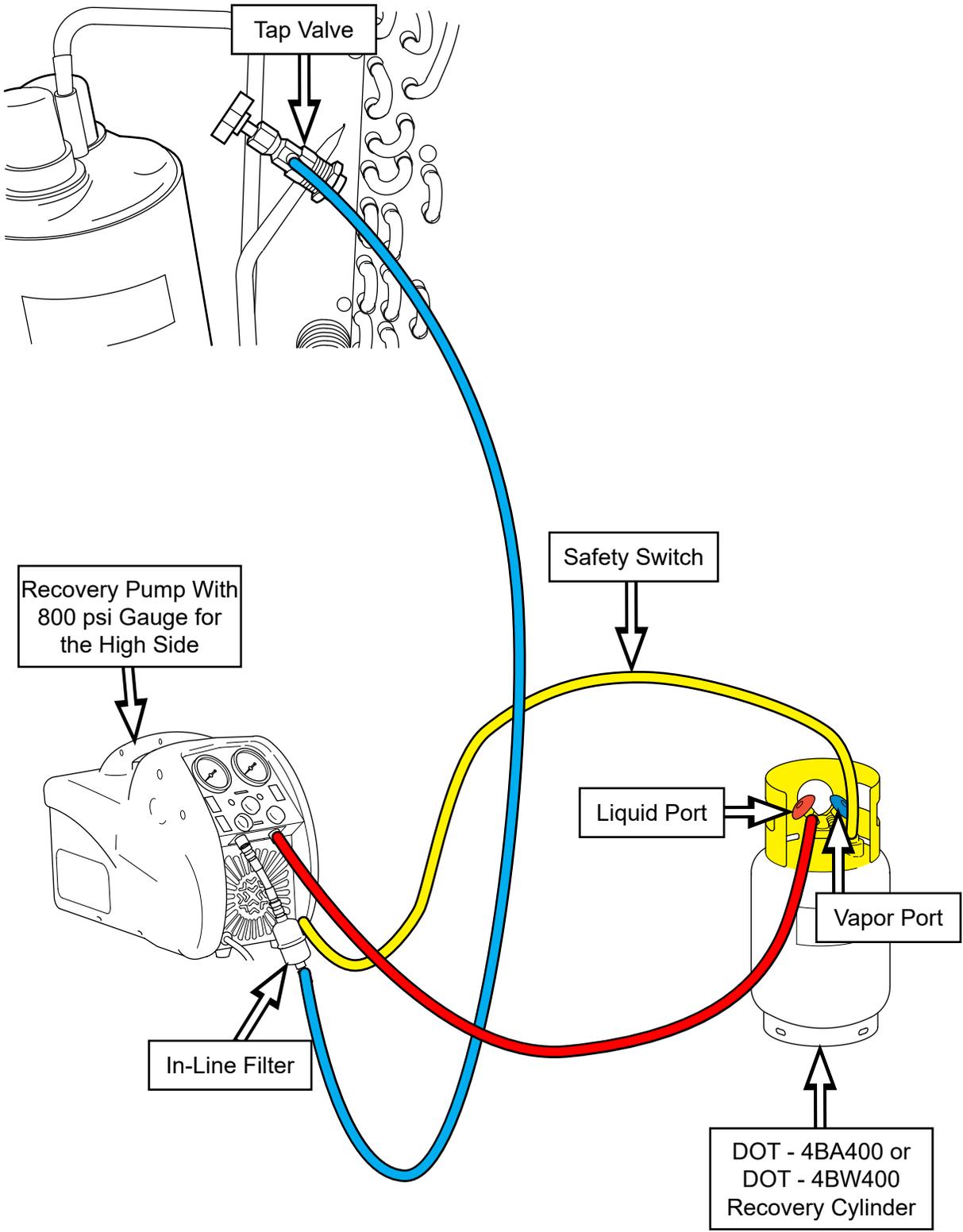
### Refrigerant Charge

Model	R410a (oz.)
AZ95H09DACK1	34 oz.
AZ95H09EACK1	34 oz.
AZ95H12DACK1	38.45 oz.
AZ95H12EACK1	38.45 oz.
AZ95H18DACK1	48 oz.
AZ95H09EACK1	50 oz.

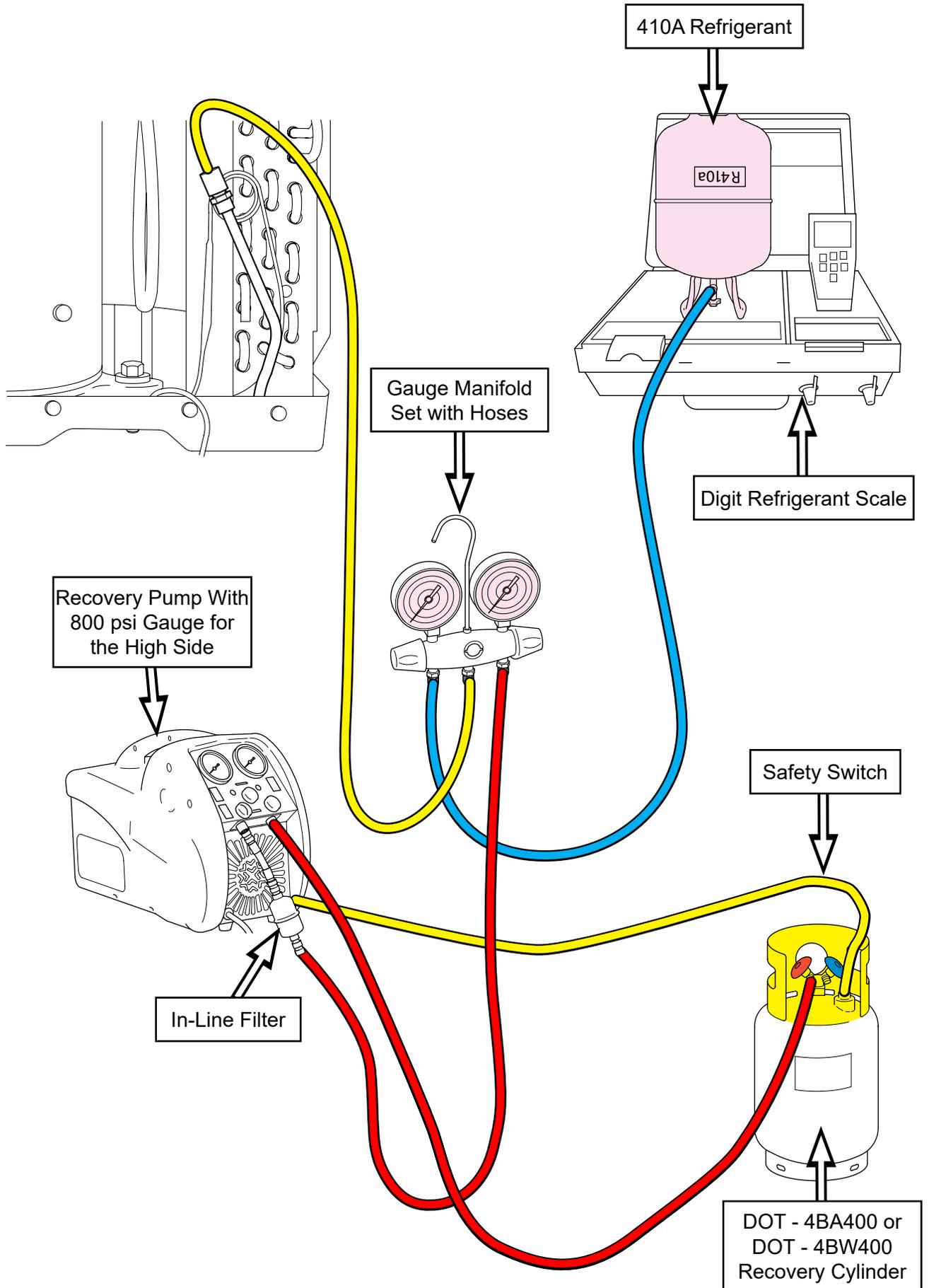
# Refrigerant Sub Cooling Recovery Tank Connections



# Refrigerant Recovery Connections



# Refrigerant Charging Connections



# Fault Codes

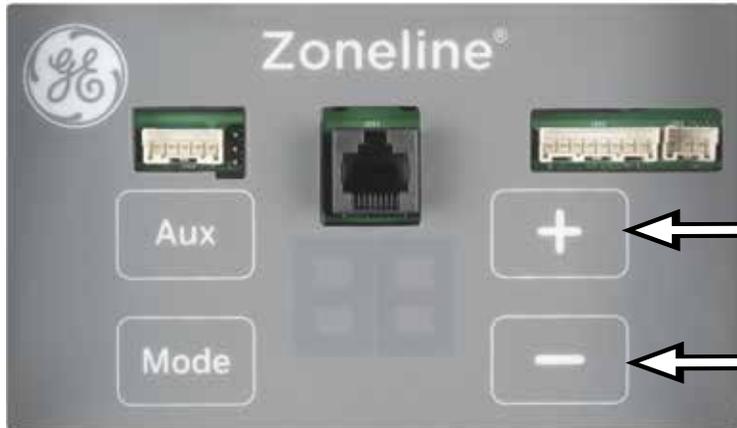
Fault Code Number	Fault Meaning	Effect on System Operation While Fault Is Active
1	<b>Inside fan fault.</b> Fan motor not moving at command speed after 90-seconds of drive. Fault clears after 10-minutes.	No resistance heating, fan, heat pump or cooling available.
2	<b>Outside fan fault.</b> Fan motor not moving at command speed after 90-seconds of drive. Fault clears after 10-minutes.	No heat pump or cooling available. Resistance heating and fan only.
3	<b>External thermostat wiring fault.</b> Applied signal is not valid and has been constant for 30-seconds.	No resistance heating, fan, heat pump or cooling available.
4	<b>Inside thermistor fault.</b> One of the inside thermistors is not reading valid temperatures.	No cooling or heat pump operation available. Resistance heating and fan only.
5	<b>Outside thermistor fault.</b> One of the outside thermistors is not reading valid temperatures.	No cooling or heat pump operation available. Resistance heating, and fan only.
6	<b>Compressor fault.</b> No temperature change has been detected after 1 minute of running.	No effect.
7	<b>Reverse valve fault.</b> Temperature change not happening as expected after 1-minute of running.	No cooling or heat pump operation available. Resistance heating, and fan only.
8	<b>Software fault.</b> Stack overflow.	No effect.
9	<b>Indoor coil freeze fault.</b> The temperature of the inside coil has fallen below the freeze threshold (34°F).	The compressor is shut down until the coil temperature recovers.
10	<b>Heat pump overload fault.</b> The inside coil temperature is over the overload threshold (131°F).	The compressor is shut down while the coil temperature recovers.
11	<b>Overheat fault.</b> The incoming air is too hot to run the heater (95°F or more).	Heat pump and resistance heating are shut down and restarted when the temperature falls below 85°F.
13	<b>Heater airflow fault.</b>	No resistance heating available.
17	<b>Outlet thermistor fault.</b> Fault clears when thermistor reads value other than short circuit or open circuit.	No resistance heating available.

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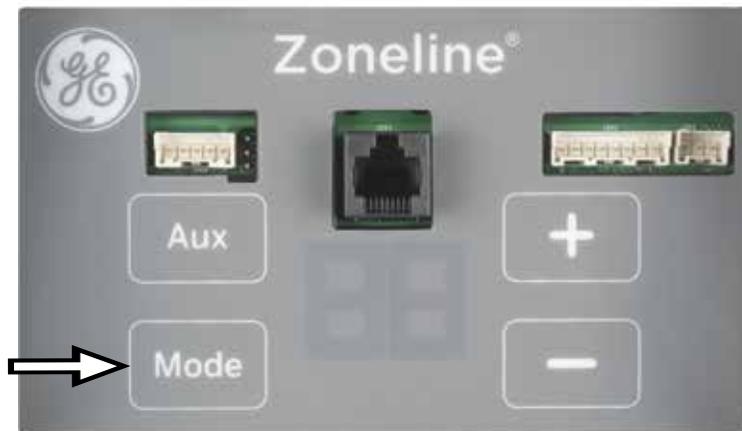
Fault Code Number	Fault Meaning	Effect on System Operation While Fault Is Active
18	<b>Outlet temperature overheat.</b> The outgoing air is too hot. Fault clears when air temperature drops below threshold.	No resistance heating available.
19	<b>Outlet temperature overheat.</b> The outgoing air is too hot.	No resistance heating available.
23	N/A	N/A
24	N/A	N/A
25	<b>Abnormal Defrost Fault (heat pump models only).</b> Set when five consecutive defrost cycles failed to warm outdoor coil above 68°F. Will self-clear after 4.5-days.	Locks out heat pump, locks out defrost.

# Service Mode

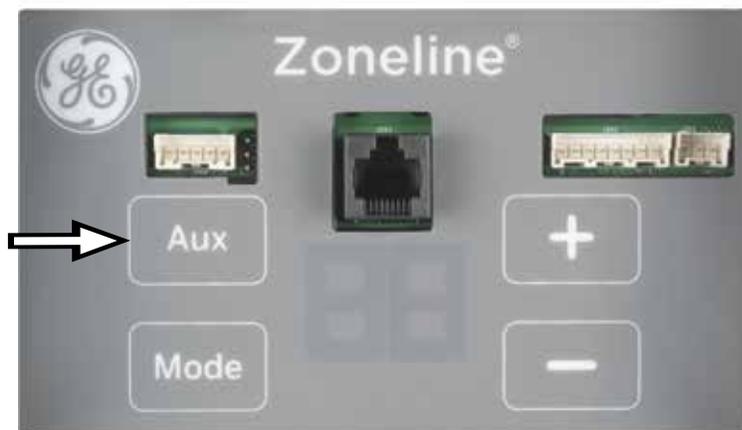
1. **Enter Service Mode:** Press and hold + and - for 2-seconds. All LED's will turn on in the display.



2. **Toggle Function:** Press mode to toggle through the entries. + turns the mode on and - turns the mode off. Stepping to the next mode turns the previous mode off.



3. **Exit Service Mode:** Press **Aux** button or after 15 minutes of button inactivity.



Entry	Selection
CL	Cooling
HP	Heat pump (only on HP models)
EH	Resistance heat
IF	Indoor fan
OF	Outdoor fan
dF	Defrost (only on HP models)
S1	Indoor ambient temperature display
S2	Indoor coil temperature display
S3	Outdoor ambient temperature display
S4	Outdoor coil temperature display
S5	Outlet air temperature display
UI	LED test sequence
So	Software version. Indicates V, major crit, minor crit, major non-crit, minor non-crit and cycles round
C2	Interpretation of thermostat signal. CL: Cool, HP: Heat Pump, EH: Electric Heat, FH: Fan High, FL: Fan Low, OF: Off, In: Invalid



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