



**GE APPLIANCES**  
*a Haier company*

# Technical Service Guide

July 2019

## 2019 Zoneline Air Conditioner

**AZ45E07EACW5**

**AZ45E07EACW6**

**AZ45E09EACW5**

**AZ45E09EAPW5**

**AZ45E12EACW5**

**AZ45E12EACW6**

**AZ45E12EAPW5**

**AZ45E15EACW5**

**AZ45E15EACW6**

**AZ45E15EACW7**

**AZ65H07EACW5**

**AZ65H07EADW5**

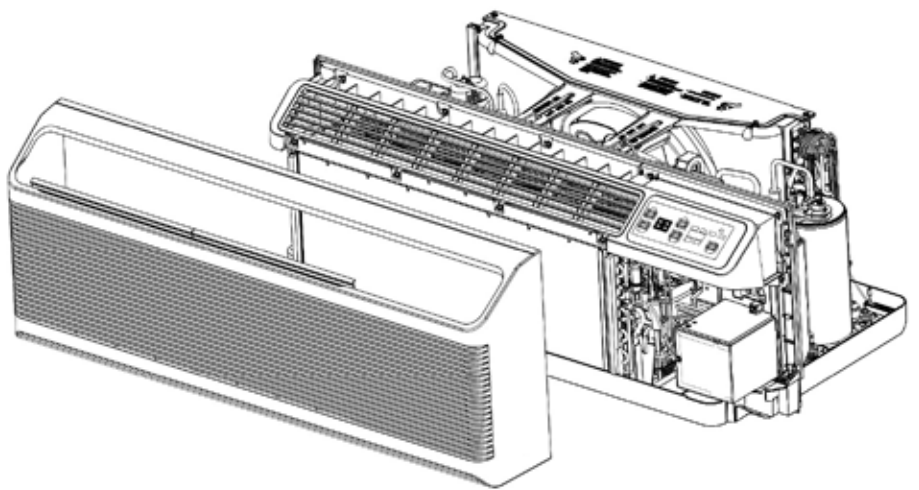
**AZ65H07EBMW5**

**AZ65H09EACW5**

**AZ65H09EADW5**

**AZ65H09EBMW5**

**AZ65H12EACW5**



**AZ65H12EACW6**

**AZ65H12EACW7**

**AZ65H12EADW5**

**AZ65H12EADW6**

**AZ65H12EADW7**

**AZ65H12EBMW5**

**AZ65H12EBMW6**

**AZ65H12EBMW7**

**AZ65H15EACW5**

**AZ65H15EACW6**

**AZ65H15EACW7**

**AZ65H15EADW5**

**AZ65H15EADW6**

**AZ65H15EADW7**

**31-9303**

Rev. 2 ~ 11/18/20

# 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

GE 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 Zoneline to access components, GE 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

# Tools Required

- 5/16-in. socket or drive (most screws are 5/16-in. hex-head)
- 1/4-in. socket or drive (ground screws and control assembly use 1/4-in. machine thread screws)
- 3/8-in. socket or drive (for outdoor fan blade removal)
- 4-mm Allen wrench (for indoor fan blade removal)
- Volt-Ohm meter
- Amp probe
- Needlepoint meter leads
- Sealed system and R-410A recovery equipment
- Thermal paste: WX5X8927
- Extension needed for condenser shroud screws
- Voltage rated pliers (for discharging the capacitor)

## Caution



### System Pressures

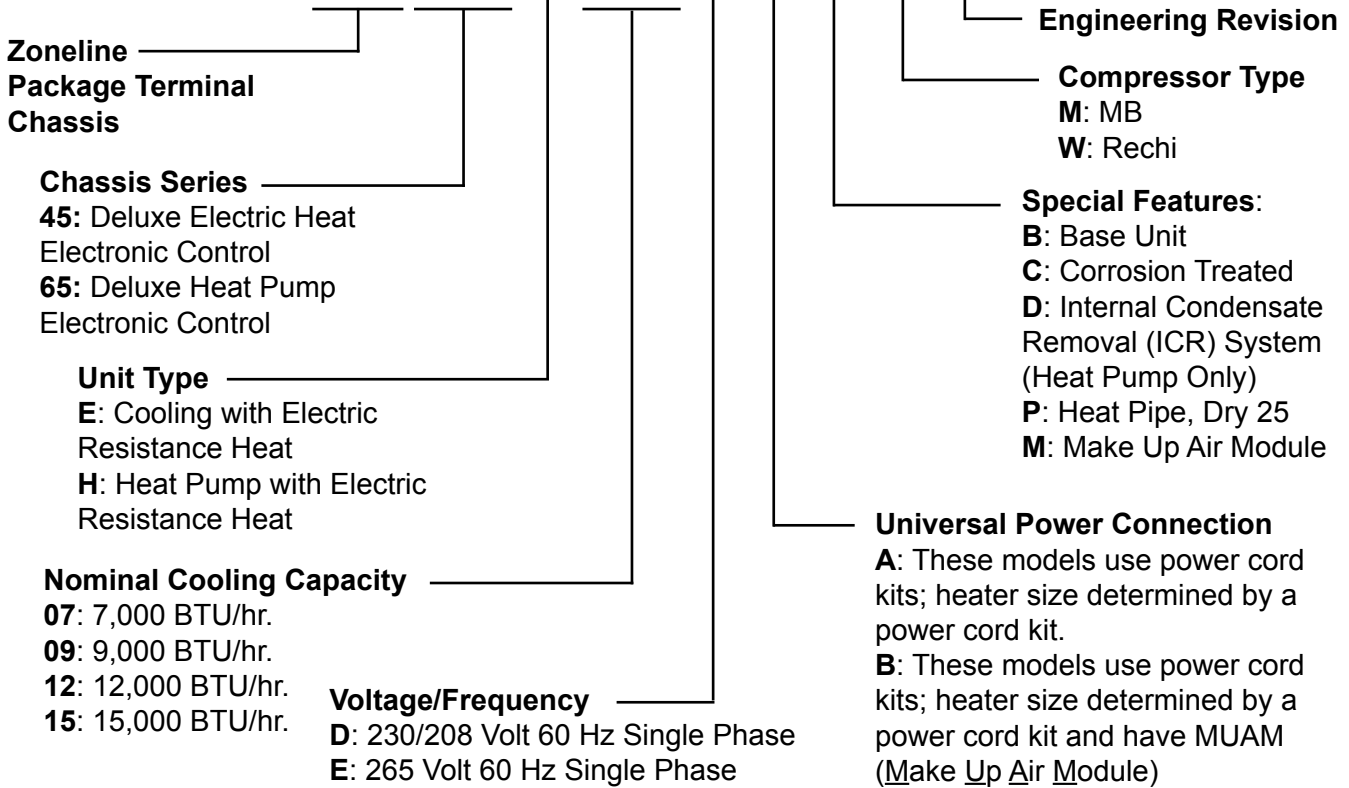
Technicians with R-22 experience will need to become familiar working with high and low side pressures that are much higher when using R-410A. A typical R-22 system operates normally with a high side pressure of approximately 260 psi @ 120°F condensing temperature, and a low side pressure of approximately 76 psi @ 45°F evaporator saturation temperature.

A normally operating R-410A system with the same condensing temperature of 120°F and 45°F evaporator saturation temperature will have a high side pressure of approximately 500 psi, and a low side pressure of approximately 150 psi.

# Nomenclature

## Model Number

**A Z 4 5 E 0 9 D A B W 5**



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:** LA123456S = June, 2013

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 Serial location

Mini Manual location  
(bottom of pan)

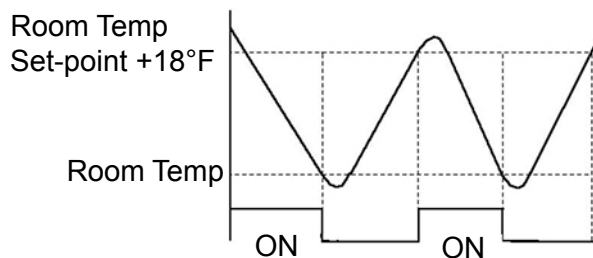


# Operation

## Cooling

<b>AZ4500</b>	In the cooling mode, the compressor, indoor fan and outdoor fan run.
<b>AZ6500</b>	In the cooling mode, the compressor, indoor fan and outdoor fan run. The reversing valve is energized throughout the entire cooling cycle.

For both AZ4500 and AZ6500, once the compressor comes on in cooling, it will pull the room temperature down to the thermostat setting.



### Fan pulsing for temperature checking after compressor shut-off when not in class 2 mode:

- The Zoneline will pulse the indoor fan periodically when it is not on a remote thermostat and set to cyclic cooling.
- The system will wait 6 minutes after the compressor shuts off, then will pulse the indoor fan, pulling air across the air thermistor for a duration of 30 seconds.
- Should the first 2-minute pulse not activate the Zoneline, the system will continue pulsing until cooling is needed.
- Each pulse of the fan is running at low speed, no matter what setting the user has chosen.

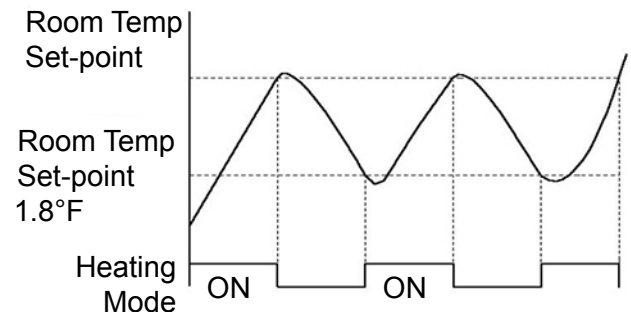
## Heating

<b>AZ4500</b>	In the heating mode, AS4500 shall utilize the built-in resistance heater, running with the indoor fan at one of two speeds determined by the Fan Speed selection.
---------------	---

Resistance heater output is not determined by software. It is determined by hardware (power cord amperage rating).

Temperature control in the heating mode is done by cycling the resistance heater under control of the room air thermistor, or the room thermostat (if in Class 2 mode).

Whenever the room temperature is 1.8°F below the temperature setting, the control will energize the heating cycle and remain in operation until the room temperature reaches the temperature setting. At this point, the Zoneline will turn off the heating cycle.



## Heat Pump Operation

When an AZ6500 Zoneline is in the heating mode, the resistance heater or the compressor runs with the appropriate fans. The control is capable of independently switching power for two resistance heater loads. Each of the two heater loads can be made up of different heating elements, but the elements will be tied together in parallel. There are three stages of operation associated with the heating mode:

- **Stage 1:** Heating due to heat pump (compressor) with both fans on.
- **Stage 2:** Heating due to heat pump (compressor) and supplemental 1,000-watt resistance heater (Heater A) with both fans on. (This mode can also be activated via Auxiliary Set (or Aux Set) mode to run in place of Stage 1 heating). This auxiliary setting is known as Boost Heat, and essentially disables Stage 1 heating which is replaced by Stage 2 heating. When this mode is active, it will run when the Zoneline is being controlled via the Zoneline control panel, or when a remote wall thermostat is connected and calling for heat pump. It will override Stage 1 heating in both cases. **NOTE:** Any time the Zoneline enters Stage 2 heating mode, it should continue heating in this mode until the room temperature is satisfied. If the room offset increases, then stage 3 heating will be engaged.
- **Stage 3:** Heating due to resistance heater (Heater A, B and C); indoor fan only on.

**NOTE:** Any time the Zoneline enters Stage 3 heating mode, it will continue heating in this mode until the room temperature is satisfied, regardless of indoor room temperature offset or outdoor temperature conditions. The Zoneline can then resume normal heating operation modes of Stage 1 or Stage 2 heating upon the next call for heat.

**NOTE:** In low fan speed, the Zoneline will only activate heater A and B to allow for a maximum heater output of 3,800 watts. A, B, and C output is only available in high speed. **Heat Pump Mode and Heater B shall never be on at the same time.**

Upon initial start-up or resumption after a power interruption, Stage 3 (Heater A and Heater B) are energized at full power to generate heat until the room temperature rises to the temperature setting, regardless of the outdoor temperature.

Automatic changeover between the compressor and the heating elements is utilized.

In order to keep the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize. The control circuit will not try to start the compressor until it has been off for 3 minutes. To minimize compressor cycling, the control has a built-in minimum compressor run time of 3 minutes (+/- 10 seconds). Even if the thermostat is satisfied, or the indoor temperature is dropping, the compressor will run for a minimum of 3 minutes. The Zoneline can switch to Stage 2 heating, but must wait until the 3 minutes of compressor run time is satisfied before switching to Stage 3 heating.

- **FIRST STAGE HEAT (HEAT PUMP ONLY)**

Once heating initializes, the room temperature will start to rise. The compressor will run until the temperature rises 0.9°F above the temperature control setpoint, at which time the compressor will shut down. If the outdoor ambient temperature is less than 25°F, Stage 1 heating will be disabled and only stage 3 heating will energize. This is also the case for the remote wall thermostat. When the outdoor ambient temperature is greater than 46°F, the Zoneline runs at First Heat (Heat Pump).

- **SECOND STAGE HEAT (HEAT PUMP + HEAT A): Boost Heat mode**

When either the room temperature falls from the setting by greater than 1.8°F, or the outdoor temperature is lower than 25°F, Stage 2 heating will be disabled and only Stage 3 heating will energize.

If the outdoor temperature is above 25°F, the control will energize Stage 2 heating. Stage 2 heating will continue to operate until the room temperature exceeds the temperature control set point by 0.9°F, at which time the heater and the compressor will stop.

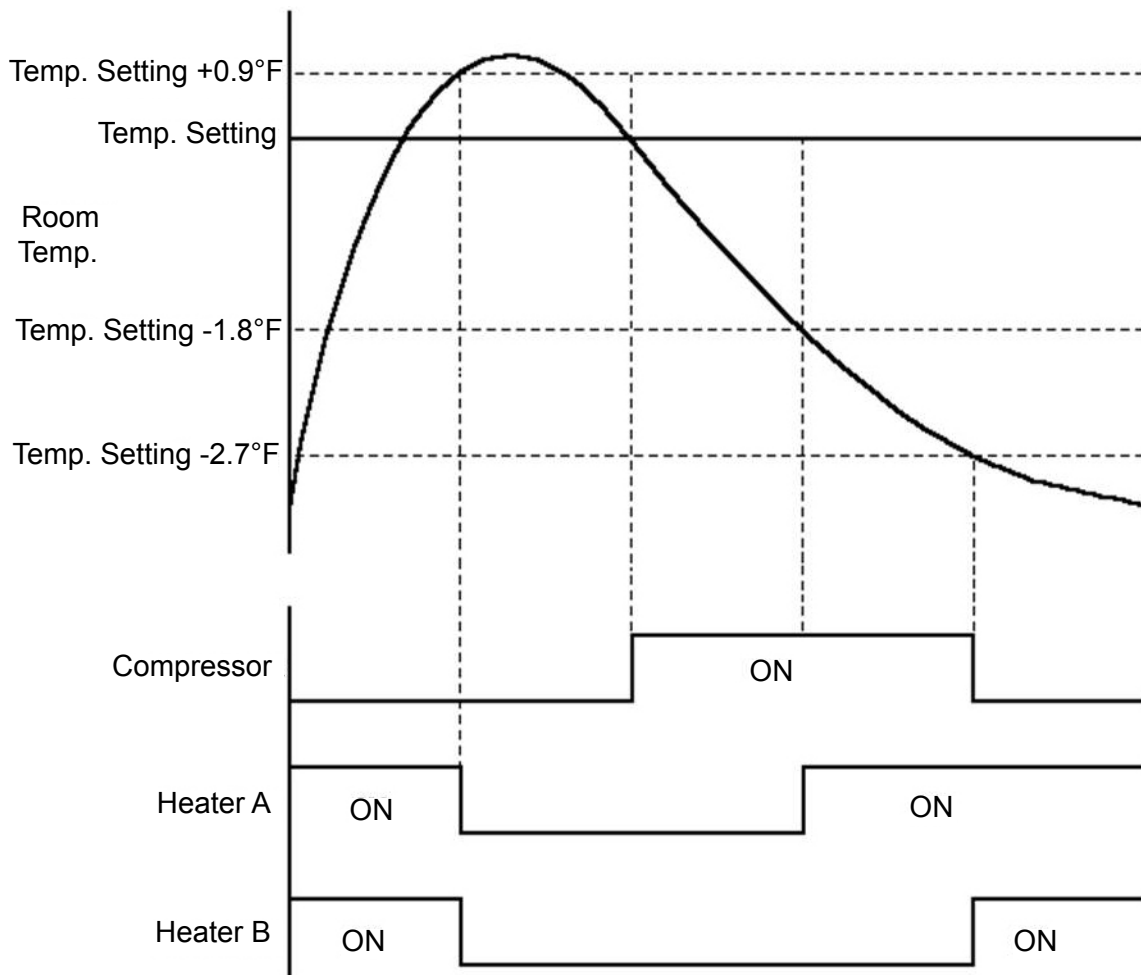
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**NOTE:** Second stage heat is not utilized in Class 2 mode. Unless Auxiliary Set (or Aux Set) "boost heat" is selected. Stage 2 heating will operate when the thermostat calls for Stage 1 heating.

- **THIRD STAGE HEAT (HEATERS A AND B ONLY)**

When the room temperature falls below 2.7°F from the temperature control setpoint, the heat pump operation will stop. Stage 3 heating is activated (based on power cord) for all outdoor temperatures, except for I2R lock out conditions. I2R lockout prohibits all resistance heating and will only allow heat pump and boost heating. Stage 3 will continue to operate until the room temperature exceeds the temperature control setpoint by 0.9°F, at which time the heaters will shut down.

**Stage Heating Mode Logic for AZ6500 Series**



## All Heat Pump Lockout Mode

### AZ6500 Series ONLY

The Heat Pump Lockout Mode is controlled through the Auxiliary Set Mode. When this Auxiliary Set Button is on, the control will run in electric resistance heat (Stage 3) mode only, with the heat pump operation (Stage 1 and 2 heating) off. When the Auxiliary Set button mode is off, the heat pump is allowed.

The heat pump lockout mode is utilized in the Class 2 mode.

**NOTE:** If the Heat Pump Lockout mode and Boost Heat mode are both selected as active in the auxiliary settings, the Heat Pump Lockout mode takes priority, and the Heat Pump modes remain off.

## Boost Heat Mode

### AZ6500 Series ONLY

When the Boost Heat Auxiliary set button is enabled and the outdoor temperature is above 25°F, the first stage heat (heat pump only) is locked out.

It will be controlled through an Auxiliary Set Button mode. Staged Heating selection logic and Resistance Heat Lockout mode have priority over this function.

This Boost Heat setting is used to provide supplementary heat to the heat pump operation in conditions where the heat pump only operation (Stage 1 heat) is not sufficient to maintain a consistent comfortable room temperature for the consumer.

**Fan Only Mode:** All models

In the Fan Only mode, the indoor fan runs continuously at the fan speed selected (High or Low). All other loads are de-energized.

## Fan Cycle Operation

There are two Fan Cycle auxiliary settings. These modes are utilized to switch between a CONTINUOUS setting, and the fan motor continues to operate even when the compressor or the electric heater cycles ON/OFF. In the CYCLE setting, the indoor fan cycles ON/OFF with the heating and cooling functions.

When the Class 2 Mode is selected, the fan motor is controlled by the remote wall thermostat, independent of positions of Fan Cycle auxiliary set button modes.

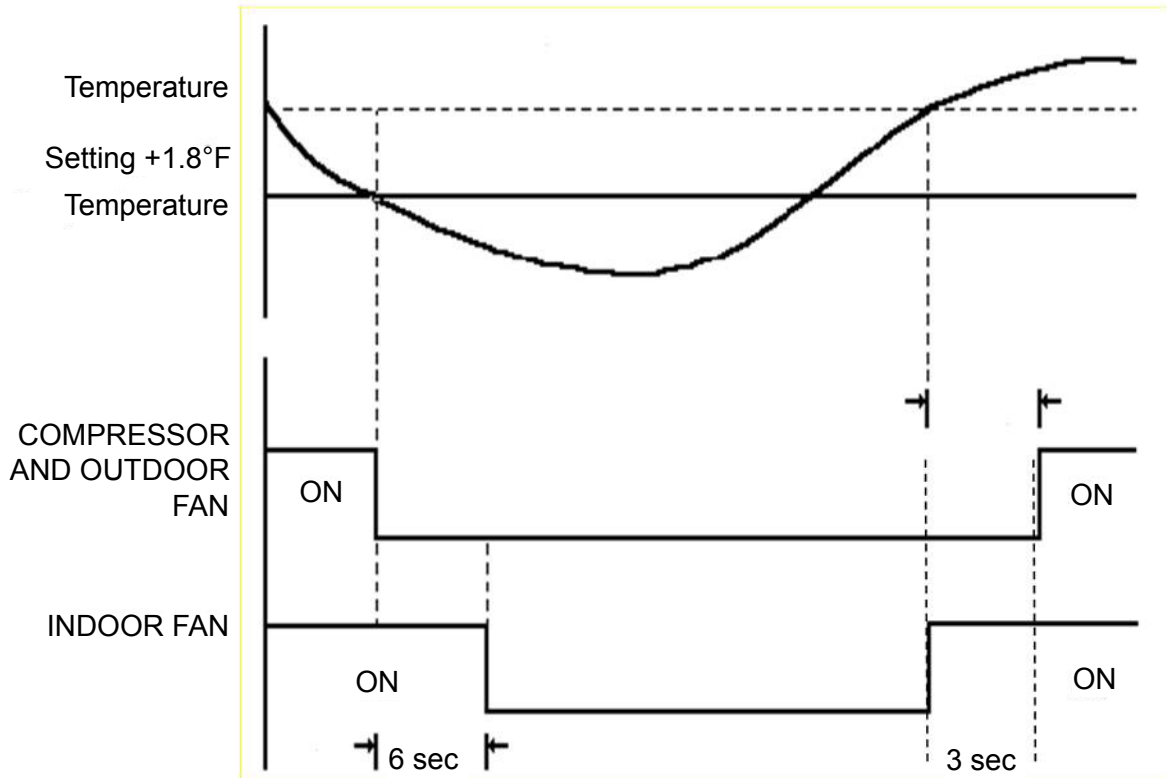
### Fan Cycle: Cooling Mode

The indoor fan runs for a short period of time, approximately 3 seconds, before the compressor and outdoor fan are turned on.

The indoor and outdoor fan runs continuously for a short period of time, approximately 30 seconds, after the compressor and outdoor fan are turned OFF.

In the cooling mode, the indoor fan is designed to operate at two different speeds. If the control happens to be in the compressor restart delay (allowing the internal pressure to equalize before turning the compressor ON), the indoor fan turns ON in the normal sequence as shown in the figure below. The outdoor fan and compressor turn ON at the end of the restart delay.

In the Class 2 mode, the indoor fan shall be controlled directly by the remote thermostat.

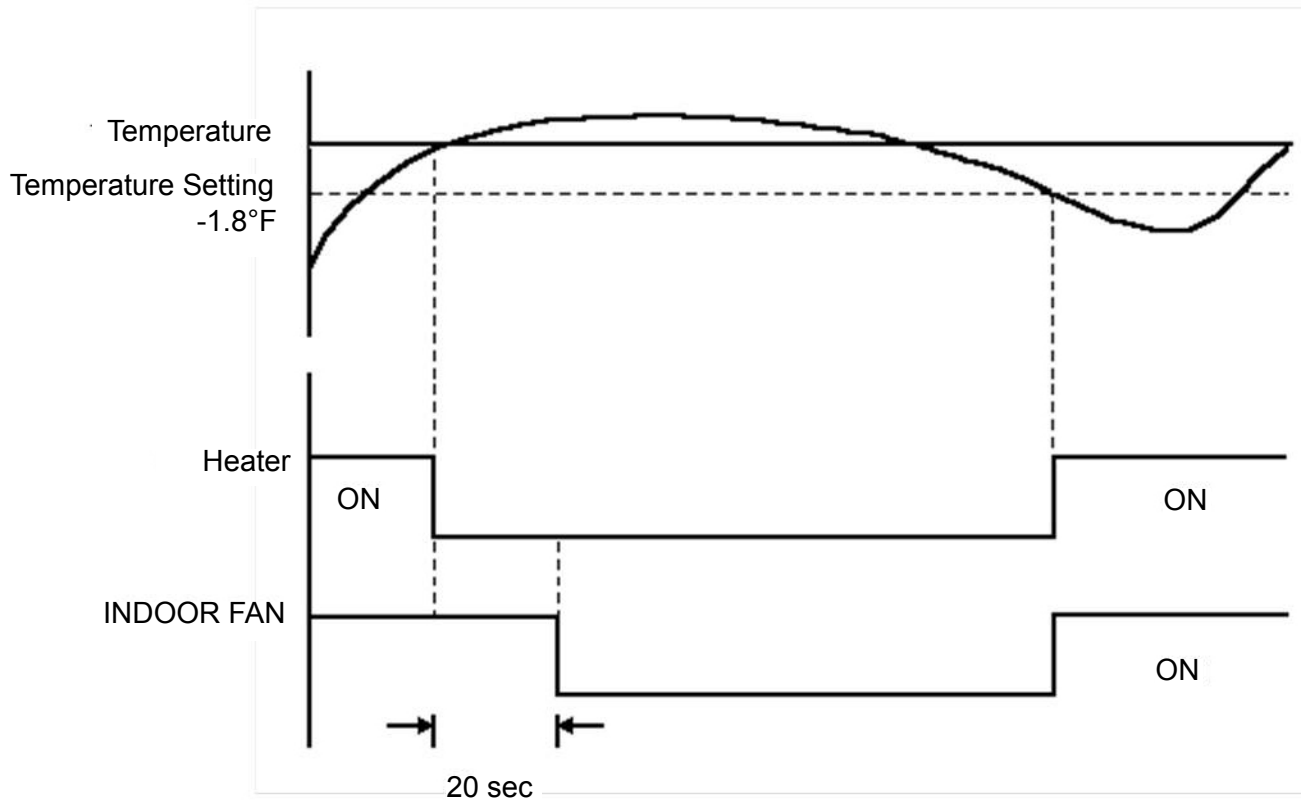


## Fan Cycle - Resistance Heating Mode

The indoor fan and heaters are turned ON at the same time. The indoor fan is turned OFF, approximately 20 seconds, after the heaters are de-energized as shown in the graph below. In the OFF mode, the indoor fan will continue to operate for 6 seconds after the user has stopped the Zoneline, in order to dissipate the heat inside the Zoneline.

In the heating mode, the indoor fan shall be designed to operate at two different speeds (RPM).

### Fan Cycle: Resistance Heating Mode

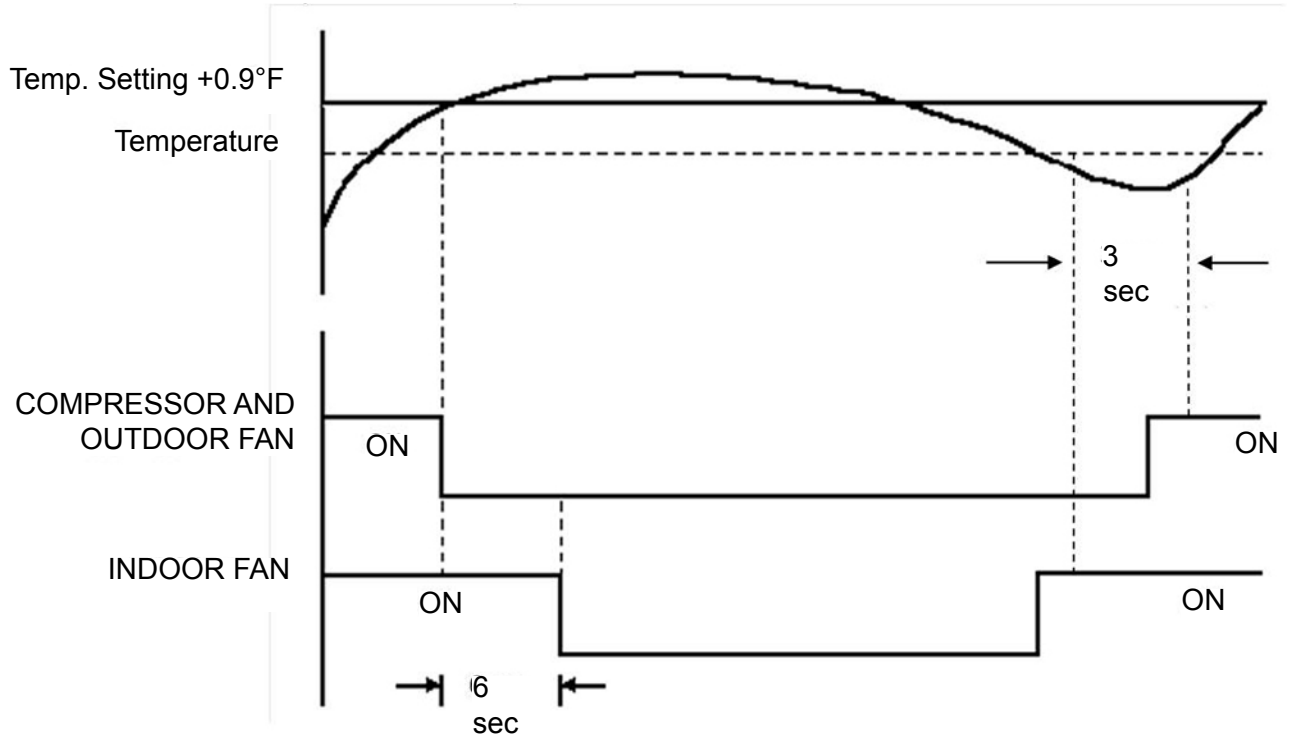


## Fan Cycle - Heat Pump Mode

### AZ6500 series ONLY.

The indoor fan is turned on 3 seconds before the compressor and outdoor fan is turned ON. The outdoor fan and the compressor are turned ON at the same time. The indoor fan is then turned OFF 6 seconds after the compressor and outdoor fan are turned OFF.

### FAN CYCLE: HEAT PUMP MODE



## Constant Fan

In Constant Fan mode, the Zoneline operates in High fan mode regardless of fan setting.

The constant fan feature allows the fan to operate even when the Zoneline is set in the OFF position. This will allow continuous air circulation in the room even if the Zoneline is turned off. This function shall be made available as a selectable option through the use of an auxiliary set button mode. The selection of this function will override the CDC provision.

### Fan Operation

Both fan motors are variable speed DC fan motors with RPM feedback and regulation control. Any time a fan is energized, the control checks that the fan reaches the target RPM speed +/- 150 RPMs. If the target cannot be met, the fan motor will shut down for 15 minutes, and will set a fault code. It will then reattempt to run every 15 minutes. If the fan motor reaches the proper RPM, the fault code will clear. If the error does not clear, the fault code shall be stored in memory and the Zoneline will function as follows:

- For detected indoor fan failures, the Zoneline will cease all operation until the next try to energize the fan.
- For detected outdoor fan failures, the Zoneline will revert to stage 3 heating (if it is trying to run in stage 1 or stage 2 heating). The Zoneline will then the run indoor fan only if it is trying to run in cooling mode.

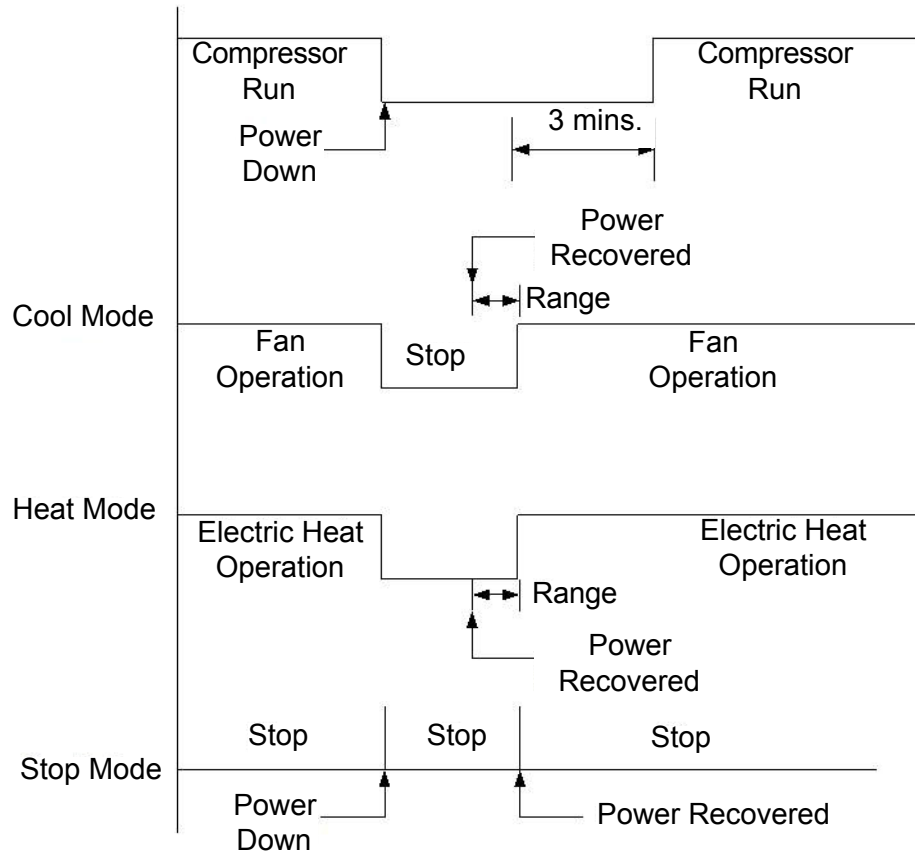


## Random Restart

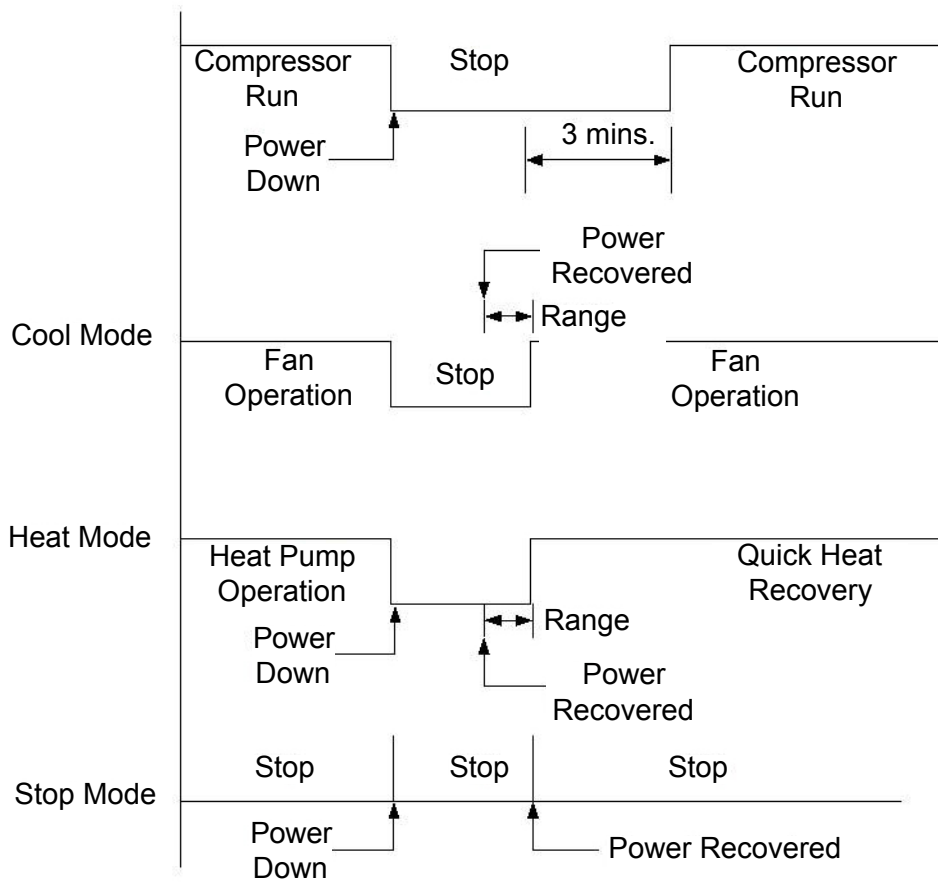
The start-up condition for the different modes is shown in the following two diagrams (Random Restart for AZ4500 Series and Random Restart for AZ6500 Series). This function allows for the random restart of Zonelines in the event of a power outage. The restart delay will reduce the initial inrush current from the building to help prevent a second power outage. The controls will revert to settings established prior to the outage.

The Random Restart function is effective in the Class 2 mode.

### Random Restart for AZ4500 Series



## Random Restart for AZ6500 Series



The main board will power up the Zoneline randomly over a 3 to 20 seconds timing period.

## Freeze Prevention for Indoor Coil (Cooling)

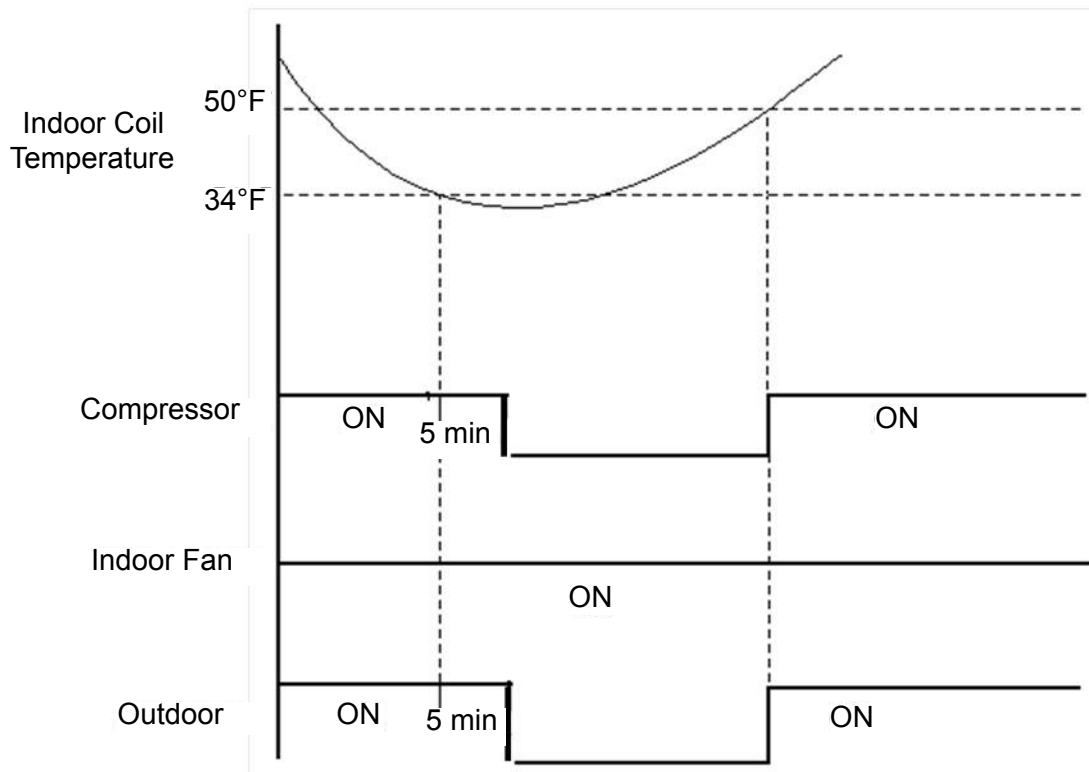
### (Cooling Mode)

During the cooling operation, if the temperature of the indoor coil falls below 34°F for a period of approximately 5 minutes, the compressor will shut off. This will prevent the indoor coil from freezing. The compressor will start running again when the coil temperature reaches 50°F or above.

The safety restarting function will prevent the compressor restarting if the minimum 3-minute shutdown time period has not elapsed. The indoor fan motor will continuously operate during this coil freezing prevention mode.

The indoor coil freeze prevention function is also available in the Class 2 mode.

### Freeze Prevention for Indoor



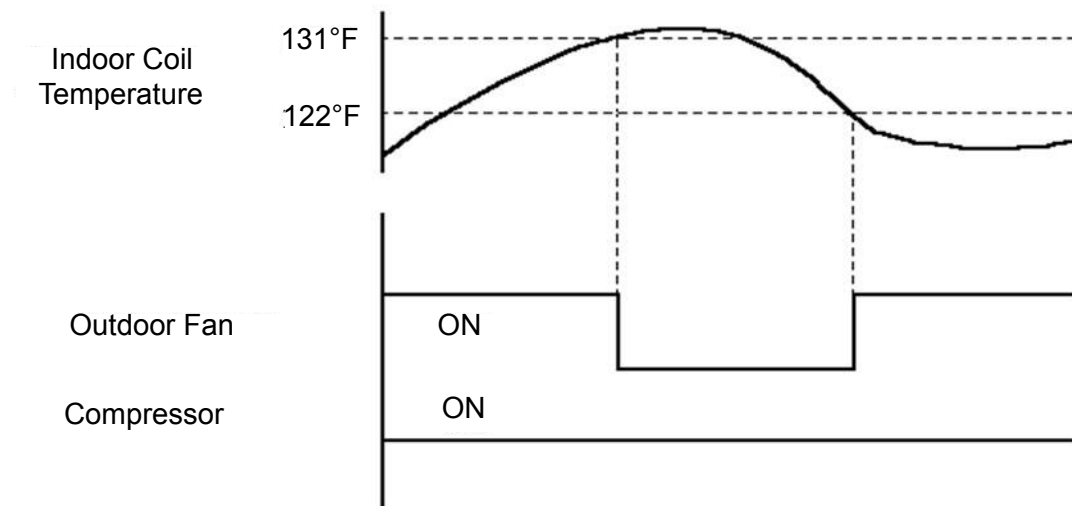
## Indoor Coil Overheat Protection

### Heat Pump Operation

The Overheat Protection is only on the AZ6500 series.

The Overheat Protection system protects the Zoneline from overworking when the outdoor temperature is too high for heat pump operation. The temperature of the indoor coil is monitored, and if it rises above 131°F, the control stops the outdoor fan. The Zoneline will resume normal operation when the coil temperature is less than 122°F.

### Indoor Coil Overheat Protection



## Reverse Cycle Defrosting Heat Pump Mode

Reverse Cycle Defrost shall be controlled as a function of compressor run time and outdoor coil temperature.

### a) Defrost Enable

The reverse cycle defrost shall begin when either:

1. The outdoor coil temperature, as measured by the S4 thermistor during compressor operation is less than or equal to 14°F for at least 3 consecutive minutes.

-OR-

2. The outdoor temperature as measured by the S3 Thermistor, is less than or equal to 42°F OR the outdoor coil temperature is less than or equal to 32°F for at least 3 hours of accumulated compressor run time.

**NOTE:** As described in item 1, if the outdoor coil temperature, as measured by the S4 thermistor, rises above 14°F before 3 minutes has elapsed; the accumulated time register is reset to zero. A defrost sequence will not be initiated, as a result.

NOTE as described in item 2, if the outdoor temperature, as measured by the S3 thermistor, rises above 42°F AND the outdoor coil temperature as measured by the S4 thermistor, rises above 42°F before 3 hours of compressor run time has been accumulated, the accumulated time register is reset to zero. A defrost sequence will not be initiated, as a result.

### b) Defrost Operating Sequence

When either of these conditions are detected, the Zoneline will initiate a reverse cycle defrost. The following steps comprise the reverse cycle defrost:

1. Immediately stop heat pump operation.
2. Run stage 3 heating until room temperature is satisfied.
3. Wait for compressor off time (3 minutes) to be satisfied

4. Run reverse cycle defrost (cooling mode without fans) until either:
  - The outdoor coil temperature rises to 68°F
  - or The total elapsed time of compressor run in reverse cycle defrost reaches 9 minutes.
5. Run a stage 3 heating cycle to satisfy room temperature.
6. If reverse cycle defrost is exited due to
  - The outdoor coil rising above 68°F, resume normal heat pump operation
  - The total elapsed time exceeding 9 minutes and total number of defrost cycles is less than 5, go back to item 4 and run another defrost cycle. If the total number of defrost cycles equals 5, see **Abnormal Defrost Fault** below.

### c) Abnormal Defrost Fault

If five consecutive defrost cycles have been completed and the outdoor coil has not reached 68°F, Abnormal Defrost Fault will be initiated. Heat Pump operation is disabled while this fault is active. The Zoneline will wait for the following conditions to be met.

1. Elapsed time > 4.5 days  
and
2. Outdoor Coil Thermistor > 42°F  
and
3. Outdoor Ambient > 42°F

At this time, up to five more defrosts will be attempted. If the outdoor coil thermistor stays below 68°F, it will reenter abnormal defrost fault. If it increases above 68°F, it will resume normal heat pump operation.

Reverse cycle defrost has the highest priority. Once the defrost starts the defrost operation continues regardless of any temperature conditions and any kind of manual operation, except for changing the operation switch.

Reverse cycle defrost is used in Class 2 mode. During reverse cycle defrost, all Class 2 signal modes are overridden except when "Cooling" is called from the thermostat.

## Internal Condensate Removal Control

### Internal Condensate Removal Control (AZ6500 Only)

The Internal Condensate Removal (ICR) function will be utilized to drip the condensation, from the base pan, onto the indoor coil to evaporate it when the compressor is running during the heat pump operation.

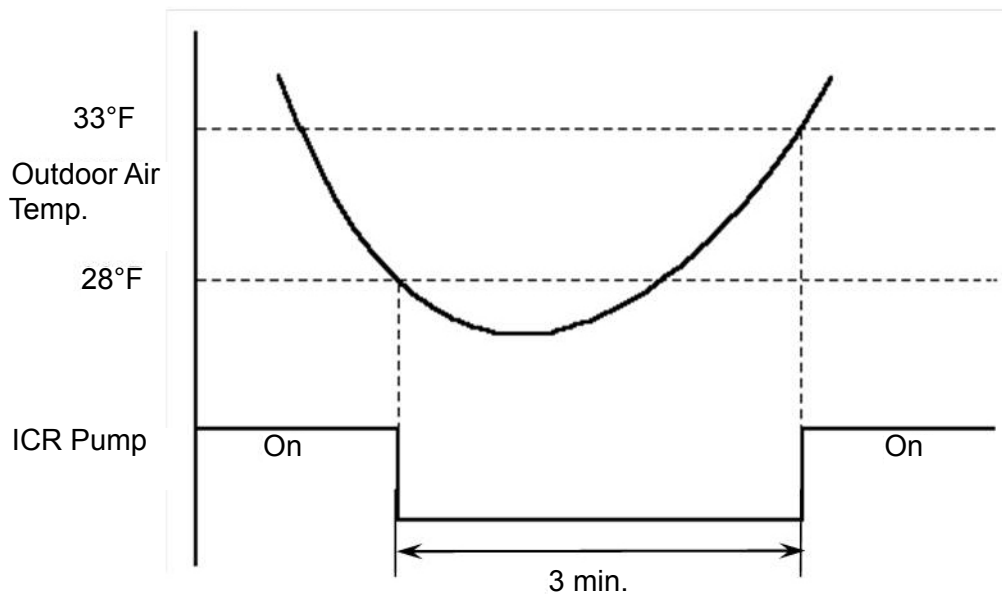
During heat pump operation, the ICR system pumps condensate water from the Zoneline base pan into a collector tray, positioned above the indoor coil.

The collected condensate will then drain from the tray onto the warm indoor coil where it is evaporated into the room atmosphere. If an excessive amount of condensate water is pumped to the indoor side, the excess amount is routed back to the outdoor portion of the Zoneline base pan.

The ICR function works in tandem with heat pump compressor operation, except in case of Reverse Cycle Defrosting.

The ICR function can be utilized in the Class 2 mode.

### ICR Pump Operation



## Heat Sentinel Mode

To prevent the room from overheating (Zoneline must be powered), cooling is energized when the indoor temperature is sensed to be 85°F to maintain room temperature below 85°F in any operation mode except heating mode. The Heat Sentinel mode is disabled when the room temperature reaches 80°F. The indoor fan runs at high speed. An auxiliary set mode is provided to enable the heat sentinel mode. If the auxiliary mode is in the OFF position, the heat sentinel function is disabled. The factory default of the heat sentinel mode is OFF.

## Freeze Sentinel Mode

To prevent the room from freezing, the electric heater is energized to maintain the room temperature above 41°F regardless of any operation mode.

The freeze sentinel mode is disabled when the room temperature reaches 46°F.

The indoor fan runs at high speed. An auxiliary set mode is provided to enable the freeze sentinel mode. If the auxiliary mode is in the OFF position, the freeze sentinel function is disabled. The factory default of the mode is ON.

## Control Lock Out

The control panel can be locked out from the user being able to change the operating mode of the Zoneline.

While the Zoneline is operating in the desired mode, press and hold the “Display On/Off” button for 10 seconds to lock the control to this setting.

The display will flash the mode LED and temperature and then go dormant. Any key press after this will result in the mode LED and temperature to flash 5 times and then go dormant. Pressing the “Display on/off” button for 10 seconds will unlock the control and resume normal operation.

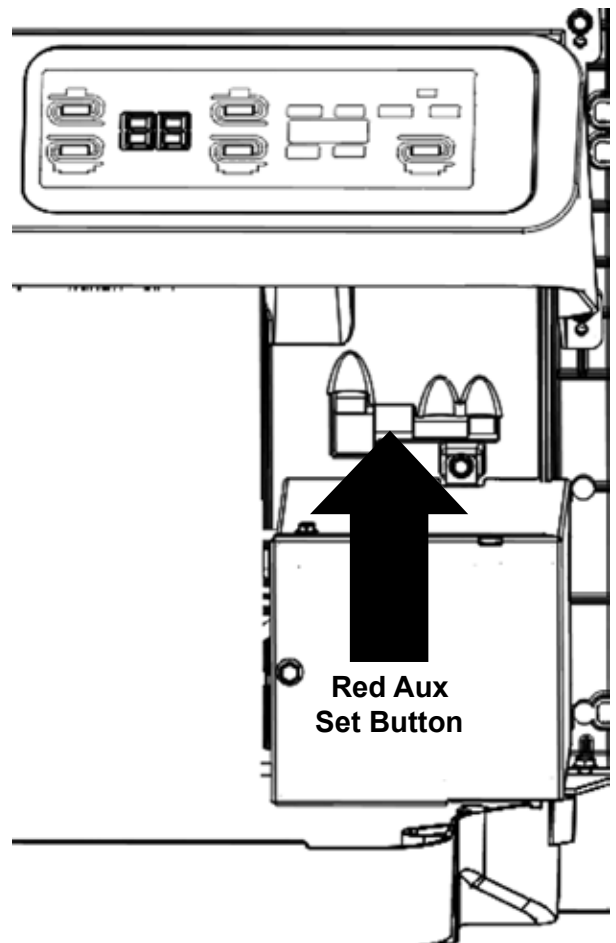
The Zoneline will come back on in the locked mode if power is lost and restored.

## Auxiliary Controls

The red auxiliary set (or Aux Set) button is located behind the room cabinet, below the user interface.

There are ten different modes that can be set using the auxiliary set button.

To change modes, press the red auxiliary set button. “AU” appears on the display. Press the MODE button on the control until the first digit in the display shows the number corresponding to the desired mode being changed. Press the up pad (+) or down pad (-) to make the HEAT or COOL selection where applicable. Press the red auxiliary set button to confirm the selections once all changes have been made.



## Auxiliary Set Button

### Auxiliary Set Button: Press the Red Aux Set Button when in the STOP Mode

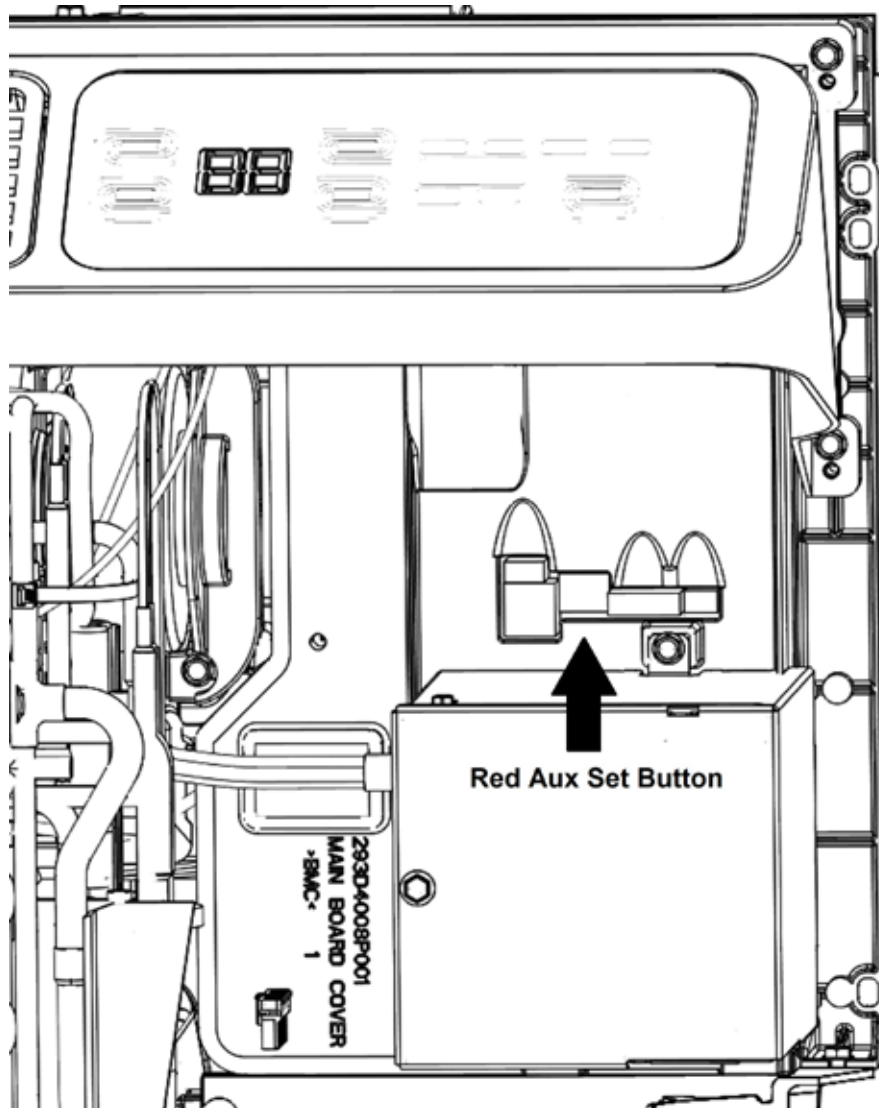
This menu allows the user to set up various configurations. The display has a number 0 in the left digit, and the setting in the right digit. The heat and cool LED's are also used.

On entry, the display shows AU. Pressing MODE steps through the entries, and pressing +/- changes the value. AUX saves and exits the set-up.

Press "Aux Set"		Press "Aux Set"		Press "Aux Set"	
<i>R</i> First Digit	<i>U</i> Second Digit	<i>R</i> First Digit	<i>U</i> Second Digit	<i>R</i> First Digit	<i>U</i> Second Digit
Press "Mode"	Press +/-	Press "Mode"	Press +/-	Press "Mode"	Press +/-
<i>1</i> Smart Fan <small>HEAT COOL</small>	<i>U</i> - Cycle / <i>n</i> - Continue	<i>5</i> Temperature Limit <small>HEAT COOL</small>	<i>1</i> COOL HEAT 0: 60F-85F 0: 60F-65F 1: 64F-85F 1: 60F-70F 2: 66F-85F 2: 60F-72F 3: 68F-85F 3: 60F-74F 4: 70F-85F 4: 60F-76F 5: 72F-85F 5: 60F-78F 6: 74F-85F 6: 60F-80F 7: 76F-85F 7: 60F-85F	<i>0</i> Makeup Air Mode *	<i>1</i> 0: OFF 1: 25CFM 4: 40CFM 2: 30CFM 5: 45CFM 3: 35CFM 6: 50CFM
<i>2</i> Temperature Display	<i>F</i> / <i>L</i>	<i>6</i> Class 2 Mode	<i>U</i> - Off / <i>n</i> - On (Cool/Heat) / <i>R</i> - On (Auto Change Over)	<i>E</i> Makeup Air Occupancy *	<i>U</i> - Disable / <i>n</i> - Enable
<i>3</i> Sentinel <small>HEAT COOL</small>	<i>U</i> - Off / <i>n</i> - On	<i>7</i> Duct Mode *		<i>P</i> Engineering Revision *	<i>1</i> Press +/- to match last digit of model number
<i>4</i> Constant Fan	<i>U</i> - Off / <i>n</i> - On	<i>8</i> All I2R Mode (AZ85 Only)			
		<i>9</i> Boost Heat (AZ85 Only)			

\* Not available on all models.

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## CDC: (Field Supplied)

CDC is not used on MUAM models. The Central Desk Control (CDC) is a feature that allows the Zoneline 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 Zoneline cannot be operated in the FAN, COOL, or HEAT modes by the control. The Freeze Sentinel and the Heat Sentinel features remain operable.

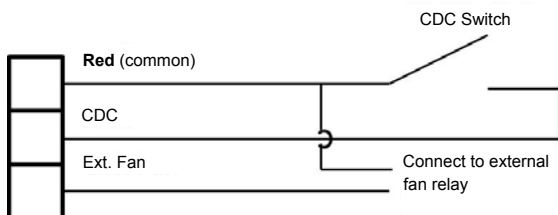
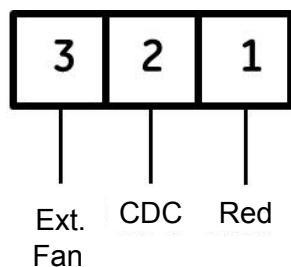
When the remote switch is OPEN, the Zoneline is fully operational by the control.

The RAKCDC accessory must be used with a Central Desk Control system. No “common busing” is permitted. In other words, one switch and two wires per Zoneline.

## External Fan (Field Installed)

When connected, an auxiliary or external fan can be controlled with the indoor fan motor on the Zoneline. Connections provide 24 VAC to energize a remote relay.

The RAKCDC accessory must be used when using an external fan.



**NOTE:** Mode 6 in in the **Auxiliary Set Button** section must be set to ON to operate the Zoneline on remote thermostat.

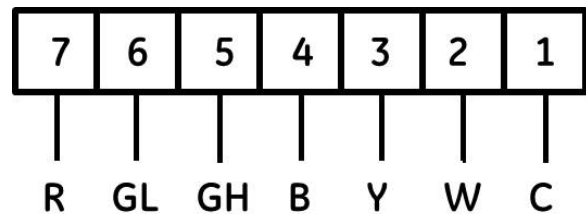
## Remote Thermostat

The Remote Thermostat Connectors are included with each Zoneline. If required, order a replacement (**Part #:** WP26X24981).

When connected to a remote thermostat, the indoor air temperature sensing is shifted from the Zoneline to the remote thermostat. For this reason, the Zoneline will operate slightly different when connected to a remote thermostat.

**IMPORTANT:** The Zoneline thermostat connections provide 24 VAC only. If using a digital/electronic wall thermostat, it must be set to 24 VAC setting (see the installation instructions that accompany the wall thermostat).

**NOTICE:** Damage to a wall thermostat or to the Zoneline electronics can result from improper connections. No line voltage connections should be made to any circuit. Isolate all wires in the building from line voltage.



- R** 24 VAC RED
- GL** Low indoor fan TAN
- GH** High indoor fan GREEN
- B** Reversing valve BLUE
- Y** Compressor YELLOW
- W** Resistance Heat WHITE
- C** Common BLACK

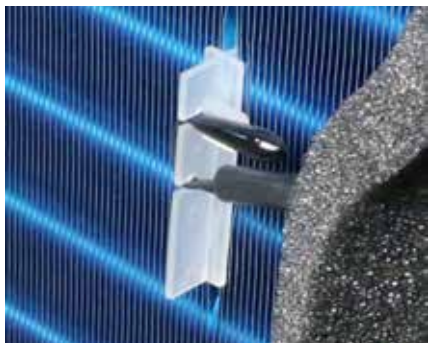
# Thermistors

## Thermistors

Thermistors provide temperature feedback to the main board to maintain proper room temperature and operating conditions of the sealed system. On heat pump models (AZ65), 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.

## Thermistors Indoor

**Thermistors:** All Zoneline models have two indoor thermistors which are attached to the indoor coil. The indoor air thermistor is mounted on the front of the coil to sample the incoming room air.



The indoor coil thermistor is mounted on the right side of the coil in a copper well to sample the coil temperature.



The outlet air thermistor is mounted on the air deflector to sample the outgoing air temperature.



## Indoor Thermistor Resistance (ohms)

°F	AIR	COIL	OUTLET
10	63,260	94,900	296,800
30	34,620	51,940	169,800
32	32,860	49,330	161,500
50	19,970	29,960	99,480
70	11,950	17,930	59,700
90	7,320	10,970	36,990

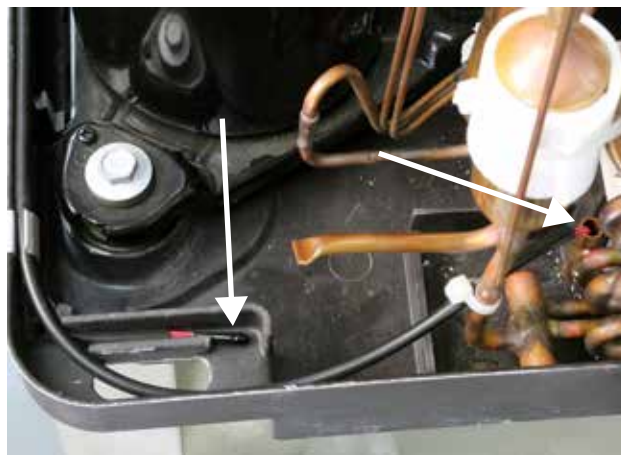
All Zoneline heat-pump models have two indoor thermistors and two outdoor thermistors.

## Thermistors Outdoor

Features may vary depending model number throughout this Service Guide.

All Zoneline heat pump models have two outdoor thermistors.

One outdoor thermistor is attached to the outdoor coil and the other outdoor thermistor is set into the base assembly, enabling it to monitor outdoor air temperature.



## Outdoor Thermistors Resistance (ohms)

°F	Air	Coil
10	28030	28030
30	15340	15340
32	14570	14570
50	8850	8850
70	5300	5300
90	3280	3280

# Controls

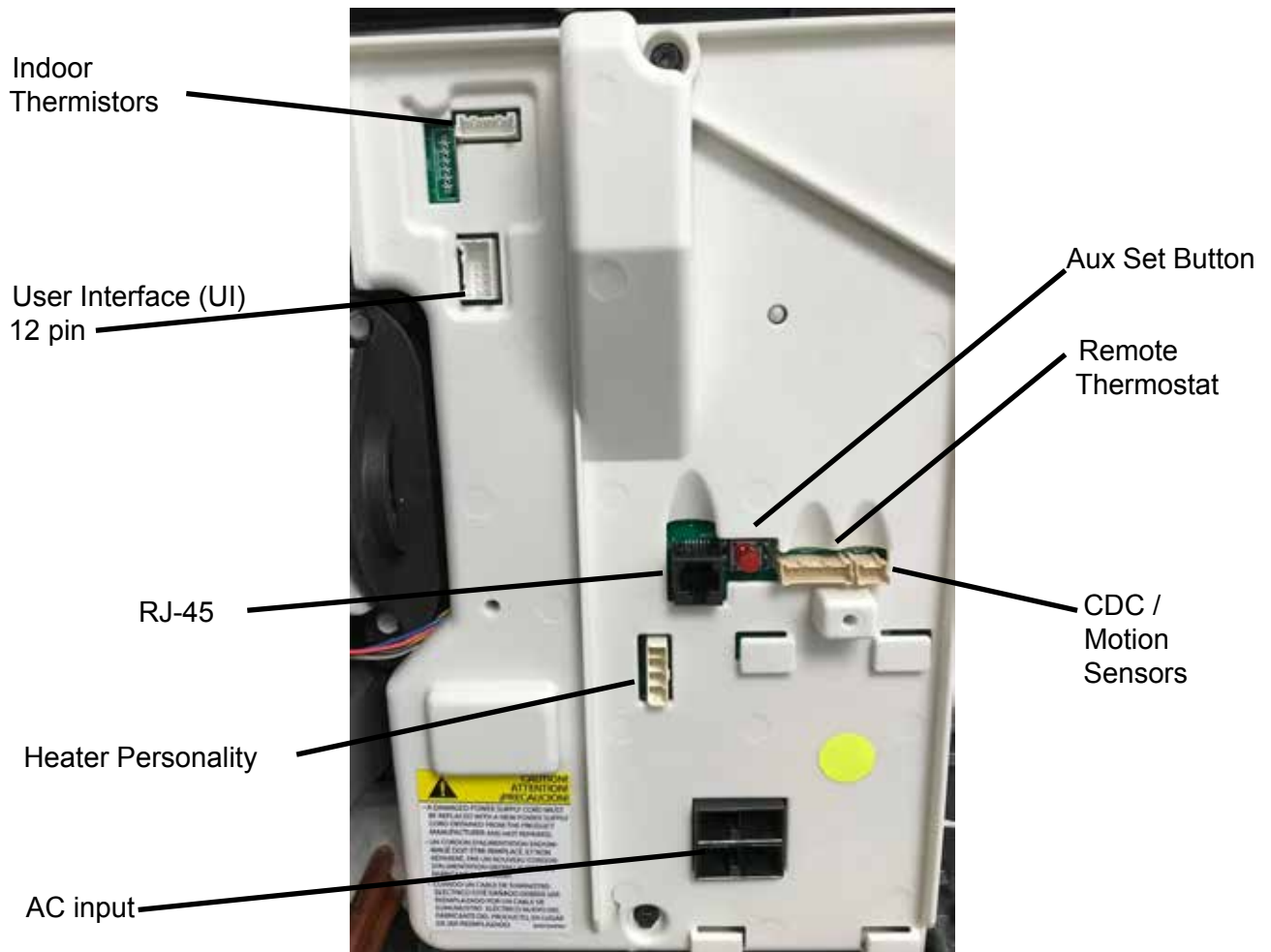
## Main Board: Front Cover

### MAIN BOARD

The new Zoneline series uses a main board that contains the microprocessor. It processes the information input from the User Interface (UI) or wall thermostat, the thermistors, and fan motors feedback. It then activates the associated relays for the selected cycle. The main board also has a DC power supply to provide the needed DC voltage to run the indoor and outdoor fan motors.

Personality is programmed into the board at the time of manufacture.

Service main boards will have two “dip” switches to allow it to be set up for the proper Zoneline model it will be installed in.



## Power Cords

The new Zonelines have new power cords (sold separately). Three amperage ratings are available: 15-Amp (**Part #:** RAK315P), 20-Amp (**Part #:** RAK320P), and 30-Amp (**Part #:** RAK330P). All cords will have the LCDI protector built in.

In addition, the 20 and 30-amp cords will have a separate heater-enabling jumper that plugs into the main board which limits the heater wattage according to house supply limitations. If this jumper is not connected, the heater circuit will be limited to 15-amp operation.

All new cords are required for both series of Zonelines. They are redesigned to eliminate the AC jumper wires.

### 15-amp: No DC Harness



### 20-amp: Single Wire DC Harness

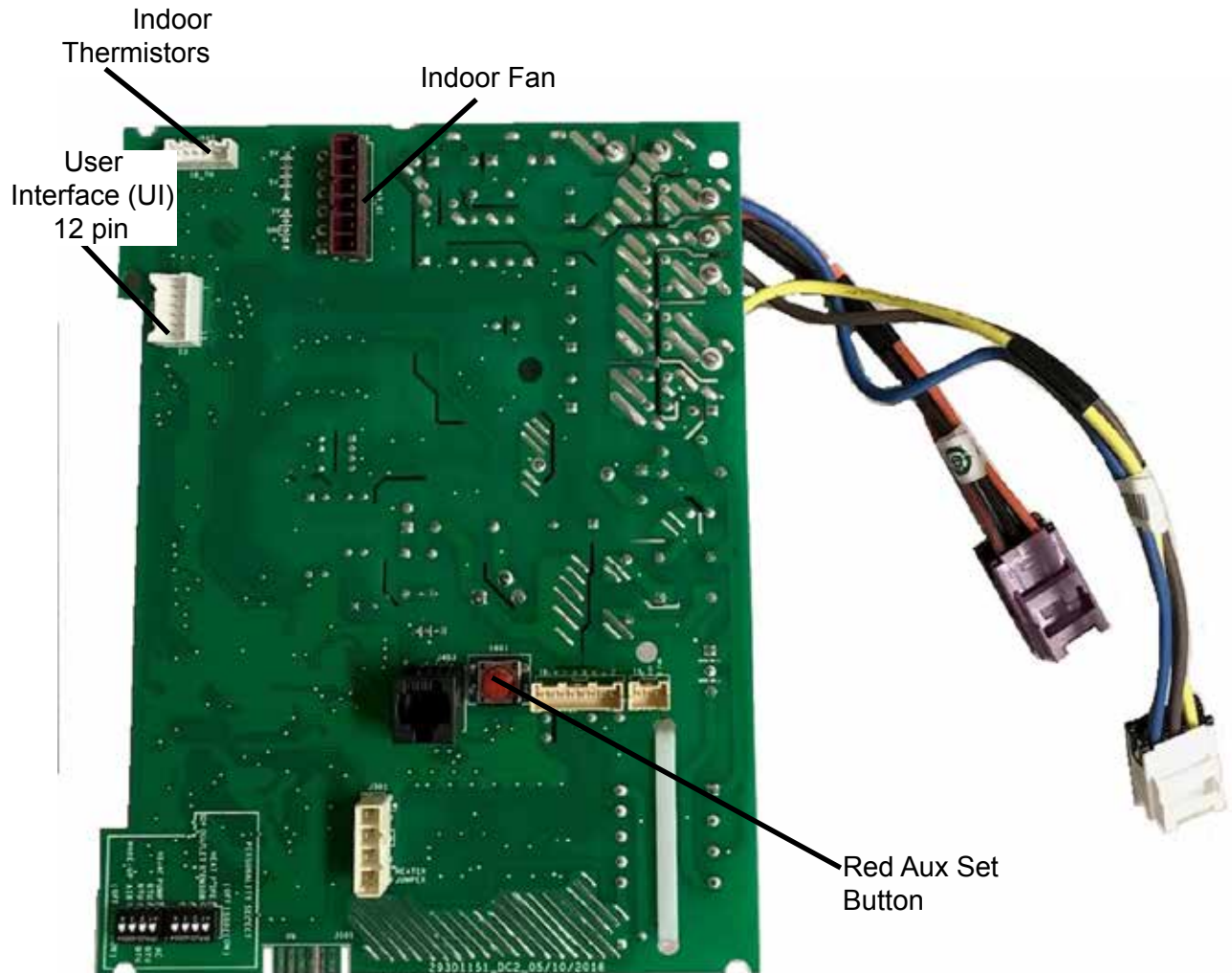


### 30-amp: Double Wire DC Harness



## Main Board - Front

Removing the front cover exposes the indoor fan connector, the indoor thermistors, User Interface and indoor fan connectors are all located on the upper left portion of the main board.

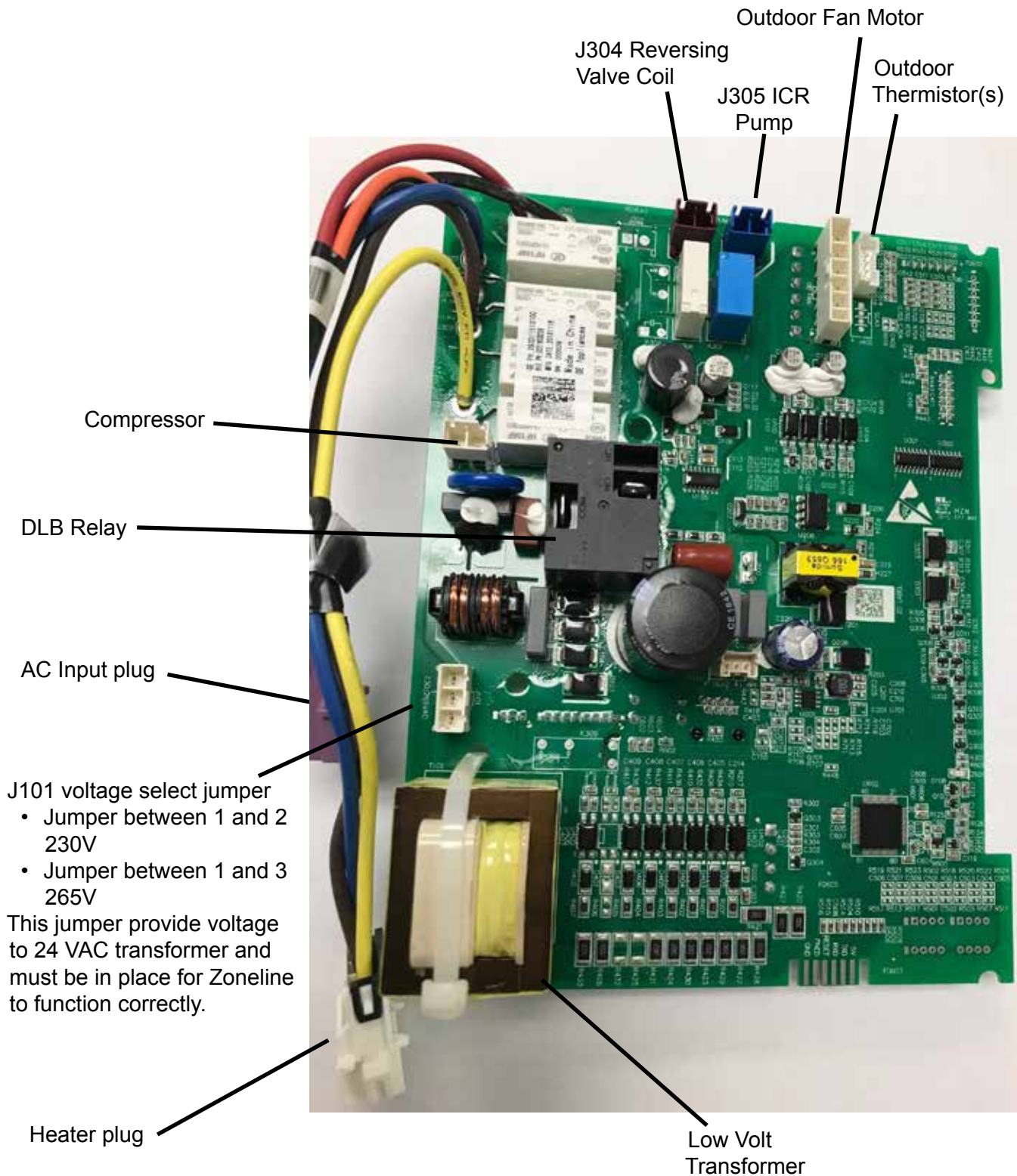


## RJ-45

A RJ-45 connector is mounted to the front of the main control board next to the red auxiliary set button of the main board to provide a way to easily update software or to hook up other monitoring devices. It is accessible by removing the front cover of the Zoneline.



## Main Board



## Component Checks at Main Board

<b>Thermistors</b>	<b>INDOOR</b>
	J502 pin 1 and pin 2 AIR range 7k ohms to 64k ohms
	J502 Pin 3 and pin 4 COIL range 10.5k ohms to 95k ohms
	J502 Pin 5 and pin 6 OUTLET range 35k ohms to 300k ohms
	<b>OUTDOOR</b>
	J503 pin 1 and pin 2 AIR range 3k ohms to 28.5k ohms
	J503 Pin 4 and pin 5 COIL range 3k ohms to 28.5k ohms
<b>Indoor Fan Motor</b>	*
	J103 pin 1 and pin 2 <b>blue to yellow</b> ∞
	J103 Pin 3 and pin 4 <b>white to black</b> 38.5k ohms approximately
	J103 pin 3 through pin 6 <b>white to red</b> ∞
	J103 pin 4 through 6 <b>black to red</b> ∞
<b>Outdoor Fan Motor</b>	*
	J104 pin 1 and pin 2 <b>blue to yellow</b> ∞
	J104 Pin 3 and pin 4 <b>white to black</b> 47k ohms approximately
	J104 Pin 3 through pin 6 <b>white to red</b> 8meg ohms approximately
	J104 Pin 4 through pin 6 <b>black to red</b> ∞
<b>ICR Pump</b>	J305 pin 1 and pin 2 <b>yellow to yellow</b> ~ 335 ohms (265 models)
<b>Reversing Valve Coil</b>	J304 pin 1 to pin 2 <b>blue to blue</b> ~ 3.23k ohms (265 models)
<b>Heaters (230/208 models)</b>	Plug <b>blue to brown</b> on relay 26 ohms
	Plug <b>brown to brown</b> on relay 46 ohms
	Plug <b>yellow to brown</b> on relay 65 ohms

**NOTE: ALL RESISTANCES SHOWN ARE APPROXIMATIONS**

\* DC Motors - Resistances should read very high if at all, lower readings indicate a defective motor.

∞ = Infinite

# Fault Codes

## Fault Code Display Mode

While the Zoneline is in the "OFF" mode, press and hold the fan button with the red auxiliary set button simultaneously to enter into this mode. The Zoneline will then display all active fault codes held in memory, showing each one for 3 seconds on/off.

If no codes are present, display will show "--" and flash that every 3 seconds on/off.

Displays all fault codes three times and then after an additional 30 seconds the Zoneline reverts to OFF mode. Pressing AUX will clear stored faults but it will not exit the fault code menu. Any other button press takes Zoneline out of this mode.

Fault Code Number	Fault Meaning	Effect on Operation While Fault is ACTIVE	Fault Reset Time
F1	<b>Indoor fan fault:</b> Fan motor not moving at commanded speed after 30 seconds of drive voltage.	No resistance heating, fan, heat pump or cooling available.	Fault clears after 10 minutes.
F2	<b>Outdoor fan fault:</b> Fan motor not moving at commanded speed after 30 seconds of drive voltage.	No heat pump or cooling available. Resistance heating and fan only.	Fault clears after 10 minutes.
F3	<b>External thermostat wiring:</b> Applied signal is not valid and has been constant for 30 seconds.	No external control of fans, heat or cooling. Internal control operation only.	Clears once a valid signal is received.
F4	<b>Indoor thermistor fault:</b> One of the indoor thermistors is not reading valid temperatures. Valid range is -10°F to 140°F.	No resistance heating, fan, heat pump or cooling available. Fan only.	Clears once a valid signal is received.
F5	<b>Outdoor thermistor fault:</b> One of the outdoor thermistors is not reading valid temperatures. Valid range is -30°F to 140°F.	No cooling or heat pump operation. Resistance heating or fan only.	Clears once a valid signal is received.
F6	<b>Compressor fault:</b> No temperature change has been detected after 1 minute of running.	No effect.	Fault clears after 3 minutes.
F7	<b>Reversing valve fault:</b> Temperature change not happening as control expects after 1 minute of running.	No cooling or heat pump operation. Resistance heating or fan only.	Fault clears after 3 minutes.
F8	Software fault	No effect	
F9	<b>Indoor coil freeze fault:</b> The temperature of the indoor coil has fallen below the freeze threshold of 34°F.	The compressor is shut down until the coil temperature recovers.	Fault clears once indoor coil temperature rises above 50°F.

Features may vary depending model number throughout this Service Guide.

(Continued next page)



Fault Code Number	Fault Meaning	Effect on Operation While Fault is ACTIVE	Fault Reset Time
F10	Heat pump over-temperature fault. The temperature of the indoor coil is over 131°F.	The outdoor fan motor is shut down until the coil temperature recovers.	Fault clears once indoor coil temperature drops below 122°F.
F11	Inlet air temperature. Indoor air thermistor warmer than 95°F.	Shut off compressor and resistance heat operation until inlet thermistor temperature drops below 85°F.	Fault clears once air temperature drops below 85°F.
F12	UI board disconnected/failed.	No effect.	
F13	<b>Heater airflow fault:</b> The main board detects too low of indoor fan speed.	No resistance heat or heat pump available.	Fault clears after X minutes.
F16	Make-Up Air module communication fault.	No communication between Zoneline and Maku-Up air module.	
F17	Outlet thermistor failure. Fault clears when thermistor reads value other than short circuit or open circuit.	No resistance heating available.	
F18	Outlet temperature overheat. The outgoing air is too hot. Fault clears when air temperature drops below threshold.	No resistance heating available.	
F19	Outlet temperature overheat. The outgoing air is too hot.	No resistance heating available.	
F23	Make-up Air Module Fault	Shuts Down MUAM, including MUAM compressor	
F24	Make-up Air Module Vent Door Fault	This is set if the vent door state change validation fails.	No effect
F25	Abnormal Defrost Fault (heat pump models only). Set when five consecutive defrost cycles failed to warm outdoor coil above 68°F.	Locks out heat pump, locks out defrost.	Will self-clear after 4.5 days.
F26	Air Conditioning Lockout Fault (heat pump models only). Sets when outdoor ambient temperature drops below 35°F.	Locks out compressor cooling operation.	Will self-clear after Outdoor Ambient temperature rises above 40°F.

# Service Mode

## Service Mode

While Zoneline is in OFF mode, press and hold the "+" and "-" buttons simultaneously with the AUX SET button to enter into this mode.

All LED's light up to indicate entered into service mode.

These modes can be entered even if the Zoneline is in class 2 mode.

Service Mode times out after 15 minutes of inactivity.

Minimum run times are not applicable in this mode. Compressor delay start times in service mode shall be 10 minutes.

**NOTE:** Fault codes are stored in this mode but do not intervene with the Zoneline operation.

Press the Mode button to cycle through the run modes.

Press +/- to toggle on/off.

## AZ4500

1. **"CL"**: Cooling. Compressor, Indoor Fan, and Outdoor fan are energized. Fan speed is high.
2. **"EH"**: Electric heat. Electric heater (all relays) and Indoor Fan are energized. Fan speed is high.
3. **"IF"**: Indoor Fan only. Indoor fan is energized. Fan speed is high.
4. **"OF"**: Outdoor Fan only. Outdoor fan is energized. Fan speed is high.
5. **"S1"**: Indoor Ambient Air Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds. (If no thermistor is detected, "--" will be displayed).
6. **"S2"**: Indoor Coil Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds.
7. **"S5"**: Indoor Outlet Air Thermistor - temperature will be displayed between -9°F and 99°F.

8. **"UI"**: User Interface Test - Run the LED test sequence.

9. **"So"**: Software version is displayed.

## AZ6500

1. **"CL"**: Cooling. Compressor, Indoor Fan, reversing valve, and Outdoor fan are energized. Fan speed is high.
2. **"HP"**: Heat Pump. Compressor, Indoor Fan, and Outdoor fan are energized, reversing valve is not energized. Fan speed is high.
3. **"EH"**: Electric Heat. Electric heater (all relays) and Indoor Fan are energized. Fan speed is high.
4. **"IF"**: Indoor Fan only. Indoor fan is energized. Fan speed is high.
5. **"OF"**: Outdoor Fan only. Outdoor Fan is energized. Fan speed is high.
6. **"IC"**: ICR Pump - Pump only is activated, if equipped.
7. **"dE"**: Defrost - Reverse cycle defrost (cooling without any fans) is activated to melt ice on outdoor coil.
8. **"S1"**: Indoor Ambient Air Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds. (If no thermistor is detected, "--" will be displayed).
9. **"S2"**: Indoor Coil Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds.
10. **"S3"**: Outdoor Air Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds.
11. **"S4"**: Outdoor Coil Thermistor - temperature will be displayed between -9°F and 99°F on screen after the Zoneline has been in this mode for 10 seconds.

(Continued next page)

12. "S5": Indoor Outlet Air Thermistor – temperature will be displayed between -9°F and 99°F.

13. "Ui": User Interface test - Run the LED test sequence.

14. "So": Software version is displayed.

### Accessing Control

Behind the control area on the bulkhead is a cover which allows access to the capacitor and some connections to the control board.

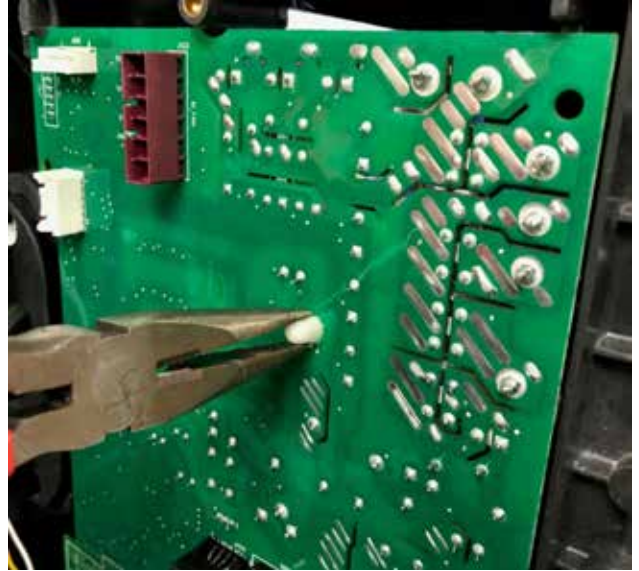


**Capacitor:** The capacitor assists the compressor starting and lowers the running current.

**WARNING:** Move the protective shield and discharge the capacitor with proper insulated pliers and electrically rated gloves before attempting service.



To access the control connectors or remove the control, release the standoff and carefully lower the control to a service friendly position.



## Low Voltage Transformer

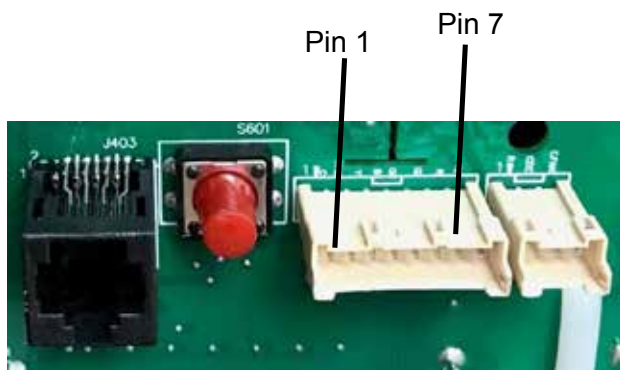
The low voltage transformer is mounted to the control board. If the Low Volt Transformer has failed, the main control will need to be replaced.



### Low Volt Transformer Diagnosing

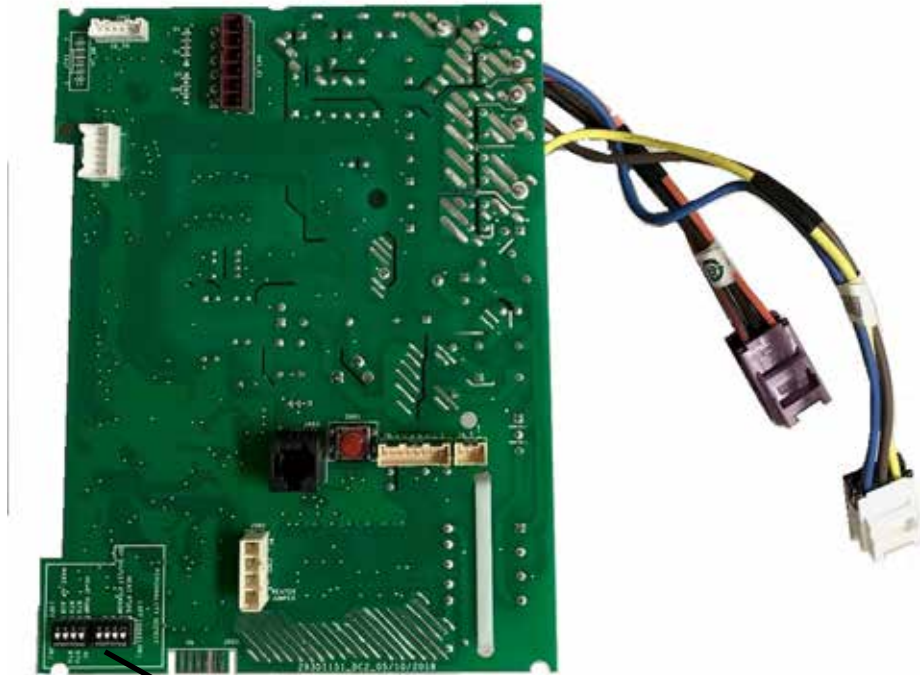
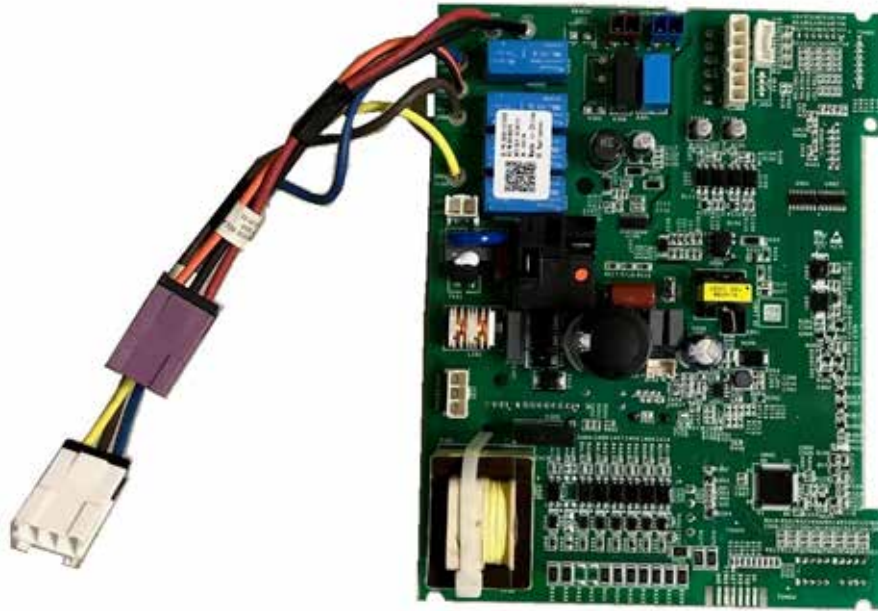
To verify Low Volt Transformer operation, AC Volts may be checked on the Remote Thermostat Connector J401 pins 1 - 7. 24 VAC is normal.

To diagnose the low volt transformer, check for 24 VAC on connector J401.

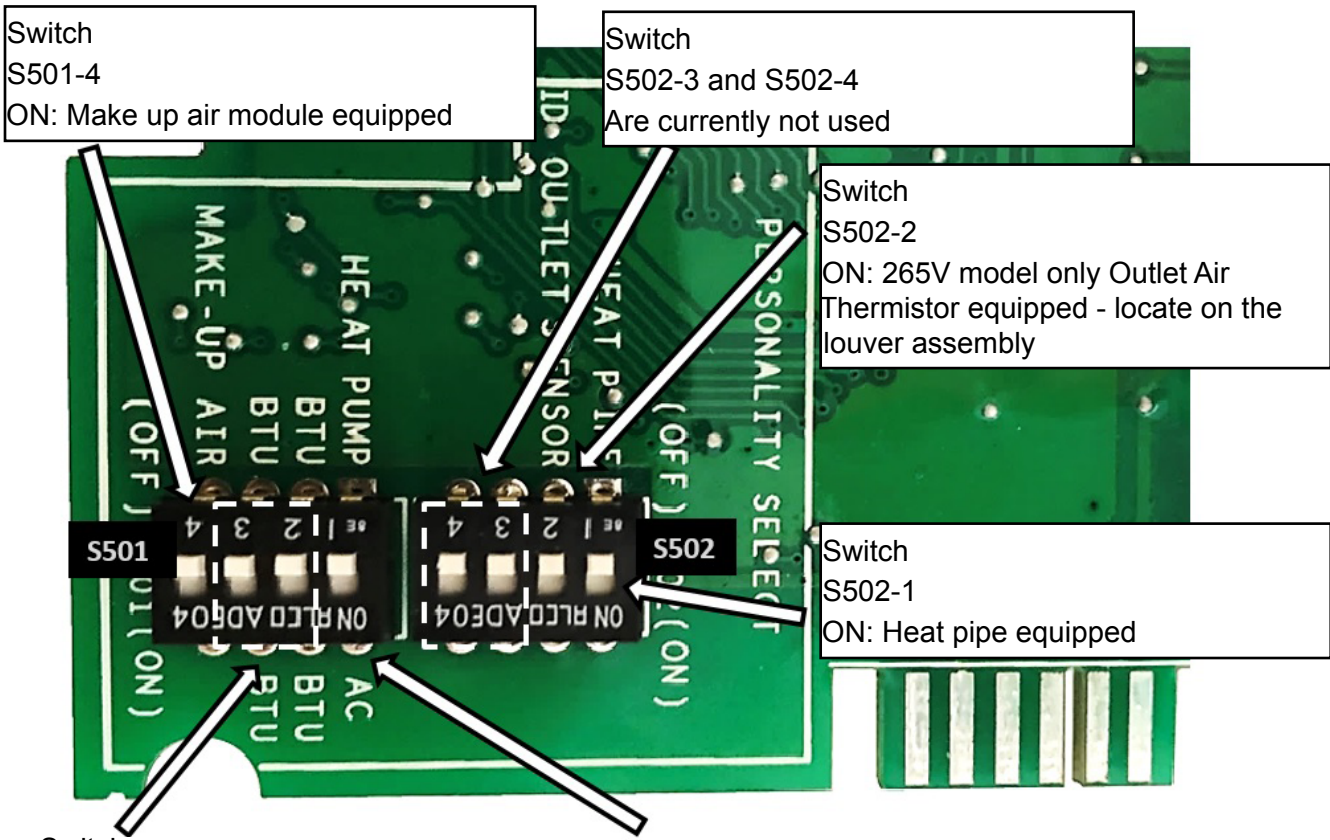




# Service Main Board

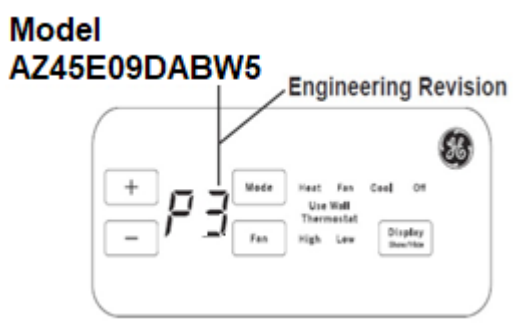
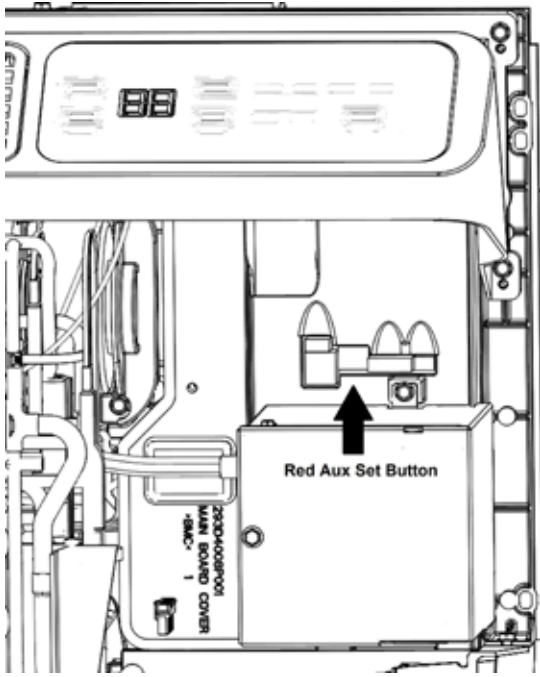


Personality Settings



Switch	<b>S501-2</b>	<b>S502-3</b>	Switch
15k BTU	OFF	OFF	S502-1
12k BTU	ON	OFF	ON: AZ45
9k BTU	OFF	ON	OFF: AZ65
7k BTU	ON	ON	

When the unit is powered on after replacing the board, the display will show “P1”. Press the up pad (+) button until the display shows “P3” for engineering digit 5 models. Press the red “Aux” button to save and exit, then verify proper operation.



# User Interface

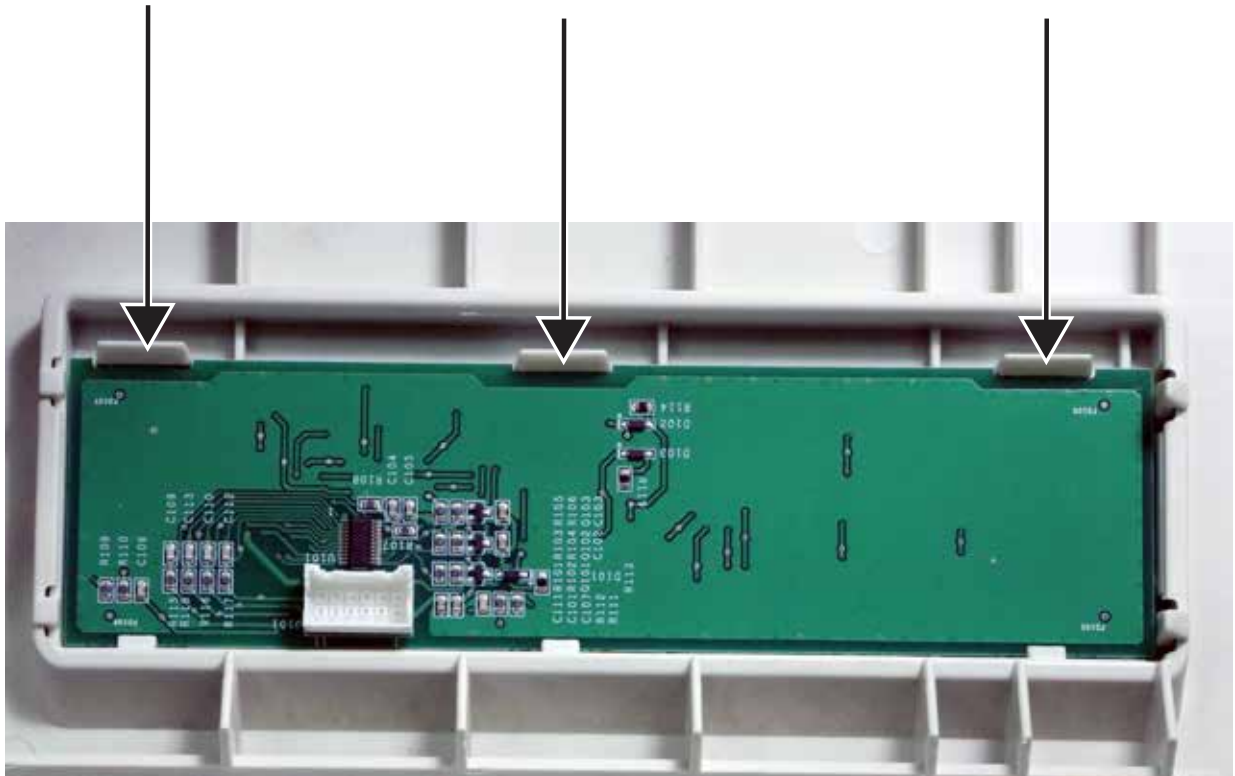
The USER interface is just a display board with tactile push button switches. There aren't any processors contained on this board.

There is a ferrite bead that the harness connecting the boards wraps around to minimize Electro-Magnetic Interference (EMI).

Three screws secure the User Interface/Control assembly to the chassis. Once removed, the control slides to the right.



Three tabs secure the User Interface board to the control assembly.



# Air System

## Fan Motors

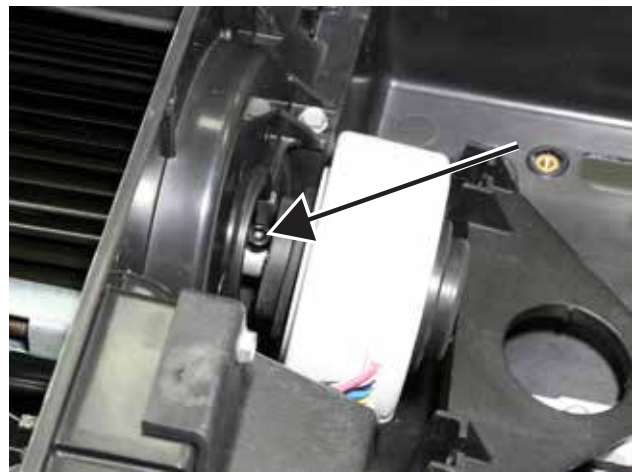
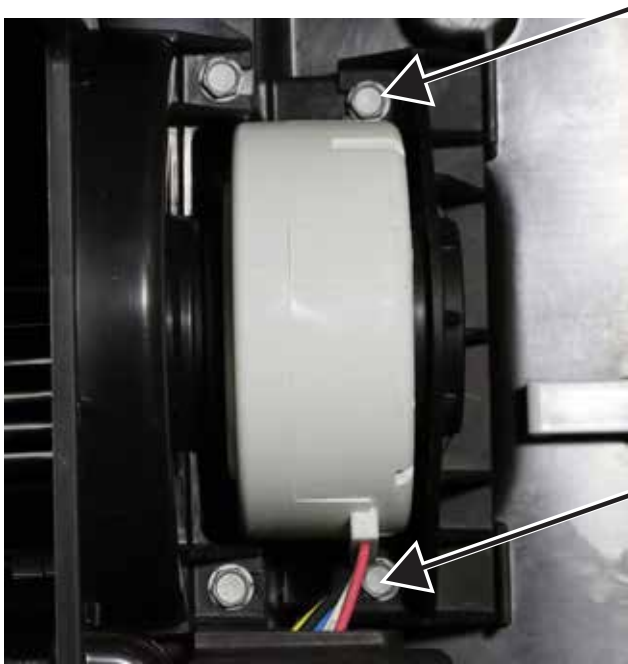
Both the indoor and outdoor fan motors are DC motors driven by the main board and provide feedback to the main board for proper speed confirmation.

## Indoor Fan Motor

The indoor fan motor turns a blower wheel which is attached to the motor shaft with a 4-mm Allen screw. The opposite end of the blower wheel inserts into a bearing assembly.

The main board supplies high voltage DC to drive the fan motor and receives speed feedback from the motor.

The motor is secured with a bracket and two screws.



**NOTE:** If the blower should disengage the bearing on the left side, the end cap will have to be removed and the bearing repositioned on the shaft.

## Indoor Blower Wheel

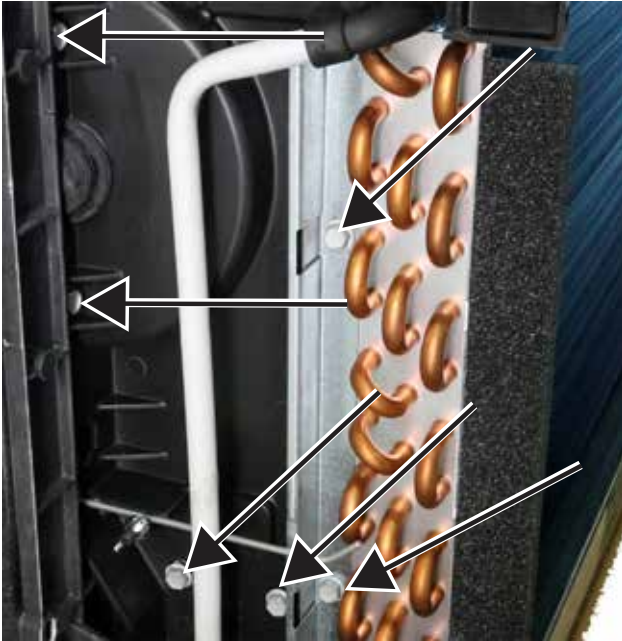
The indoor blower wheel is attached to the motor shaft with a 4-mm Allen screw. The opposite end of the blower wheel inserts into a bearing assembly.





## Indoor Fan Bearing

Remove six screws to remove the end cap to access the bearing assembly. Two screws are used to secure the bracket attached to the indoor coil and end cap.



## Components: Indoor Fan Bearing



## Proper Bearing Placement



**NOTE:** When reinstalling the bearing, ensure the shaft goes directly into the bearing assembly. The image above shows proper placement of the bearing. Failure to install properly will result in a noise complaint.



## Outdoor Fan Motor Shroud

The outdoor fan shroud provides proper airflow through the outdoor coil and also supports the outdoor fan motor.



The outdoor fan shroud and motor assembly are attached to the base pan and outdoor coil assembly with twelve screws and a “sleeve” that slides over the shroud and outdoor coil assembly.

**NOTE:** An extension will make accessing the lower screws easier.

Slide the “sleeve” up to separate the shroud and outdoor coil assembly.



## Outdoor Fan Motor

The outdoor fan motor turns a slinger fan blade, which is attached to the motor shaft with a 3/8-in. regular thread nut.



The motor is secured to the outdoor shroud with four 5/16-in. hex-head shoulder bolts.



**NOTE:** If the wire clip found below the motor breaks, secure the wire to the support with a wire tie.



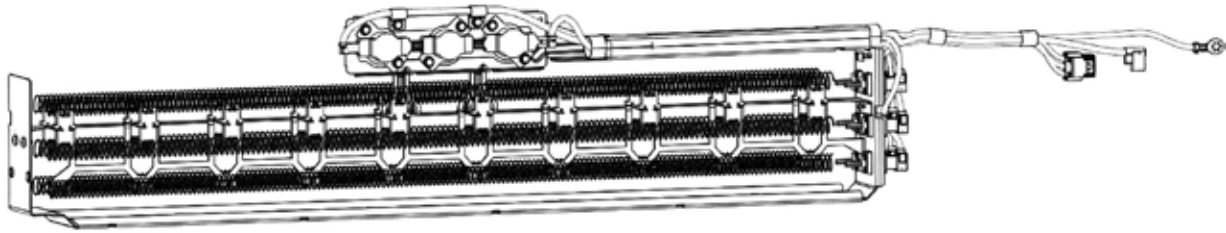
# Electric Heat

## Heater

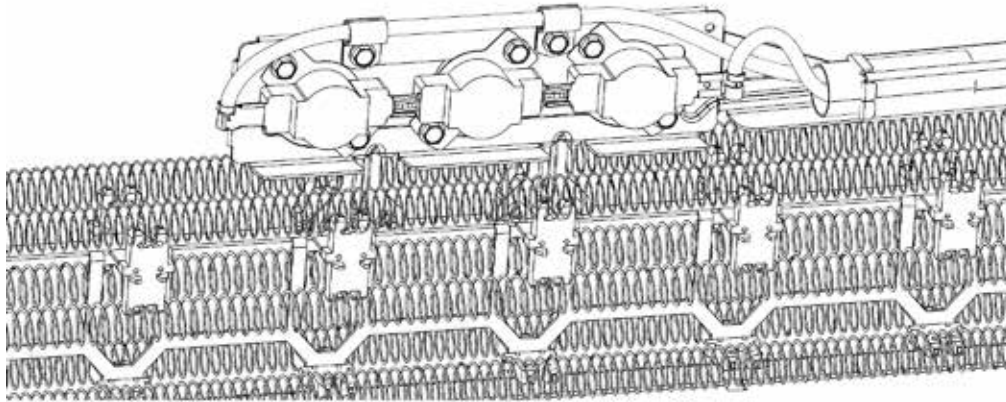
All models (with Electric Heat) of the new Zoneline have a three bank heater assembly. They have three thermal switches to protect the circuit; two are cycling (resettable) thermal switches and the one is a "one-shot" thermal switch.

Features may vary depending model number throughout this Service Guide.

The heater assembly sets on the base pan and is secured by two screws on the left end cap.

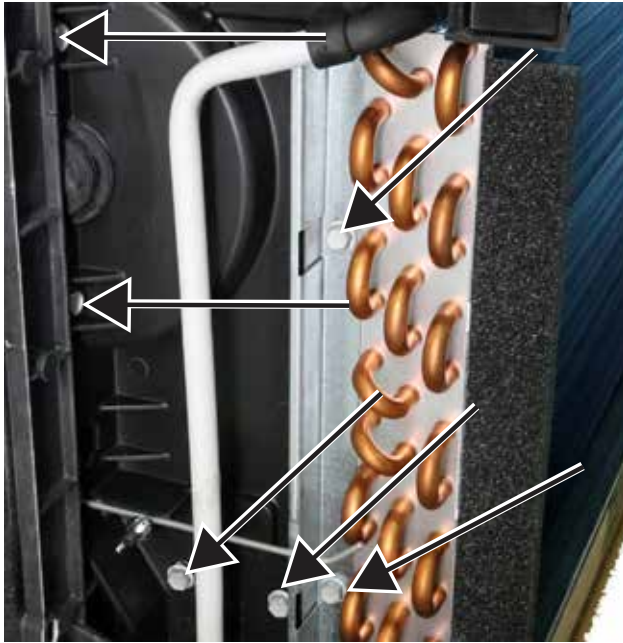


The thermal cut-outs are part of the heater assembly.



## Heater Assembly

Remove six screws to remove the end cap to access the heater assembly. Two screws are used to secure the bracket attached to the indoor coil and end cap. After disconnecting the wire harness from the board and removing one ground screw, the heater assembly will slide out the left side of the Zonline.



Heater Assembly

# Condensate Removal

## ICR System

The Internal Condensate Removal system consists of a small pump that is driven by the main board. The board supplies line voltage to the pump. \*Defrost water that is collected in the rear base pan is pumped up into a trough that rests along the length of the indoor coil. Water from the trough drips down the indoor coil to add moisture to the indoor air and to reduce the amount of water in the base pan.



\*ONLY during Heat Pump Mode.

## ICR Pump

On some Zoneline models, an Internal Condensate Pump is mounted into the outer base pan. As with previous ICR models, this pump is designed to pump condensate water, which accumulates from the outdoor coil when in heat pump mode, up to the top of the indoor coil and allows the water to trickle down the coil to evaporate. This process cuts down on excessive water flowing out of the rear of the Zoneline and adds moisture to the indoor air.

## Slinger on Outdoor Fan Blade

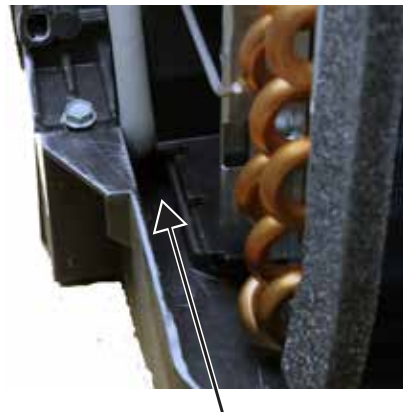
The water that is collected through the normal process of air conditioning is collected in the rear base pan. To aid in dissipating this water, the outdoor fan blade has a ring around the blade that picks up the water and “slings” it onto the outer coil. This assists in removing heat from the coil when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



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.



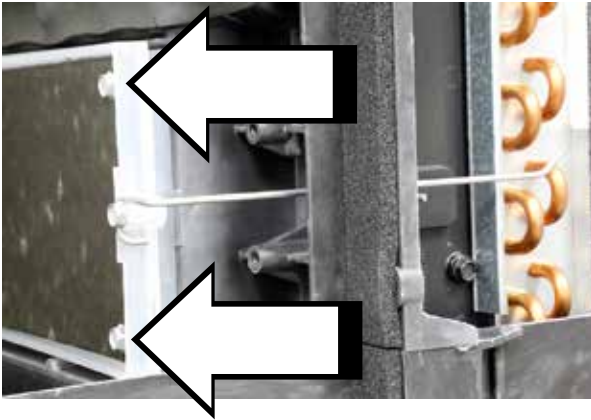
If water that is collected off the indoor coil is not draining back to the base pan, clean the drain trough exit located on the left side of the trough.





## Damper Door

The damper door feature allows outside air into the room. The door is secured with two screws from the factory that must be removed upon installation if the customer would like to use this feature. The damper assembly consists of a door, filter, rod and wing nut. The wing nut can be loosened and the rod may be slid back which opens the door. It then can be locked into place by tightening the wing nut.

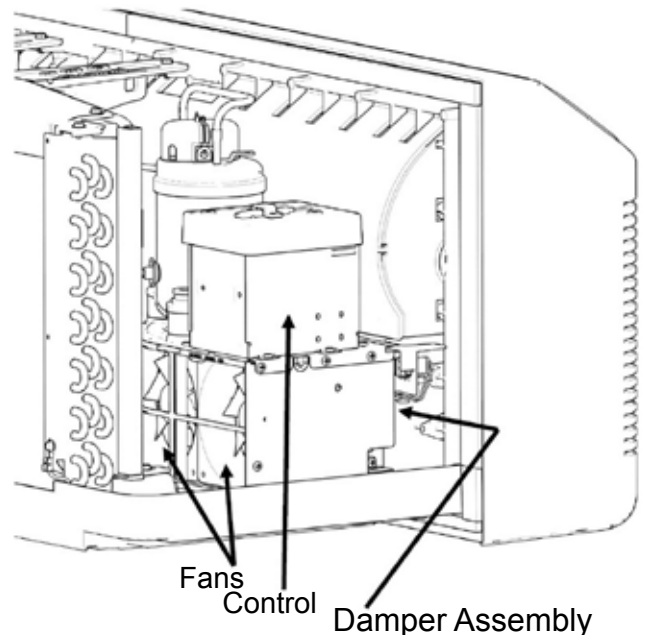


## Make Up Air Module

The hospitality industry has many building and occupancy codes they must follow. One of those codes is for introducing fresh air into guest spaces. Past codes allowed fresh air to pass under the entry door or a separate vent into the room. Some GE Appliances Zonelines have a fresh air feature built into the product, this feature is called a Make Up Air Module. The feature includes a self-contained sealed system and control module with a motorized duct door system. This feature allows outdoor air to be conditioned and enter the room through a ducted bulkhead assembly.

The MUAM is designed to turn the compressor off when outdoor temperature is below 50°F or if relative humidity is lower than 55%. It will turn on when relative humidity is above 55%. The module is automatically turned on and off by the microcontroller contained within the module's electrical box.

The system is comprised of two components which are the MUAM and the damper door. The MUAM is attached to the base pan and includes all sealed system components, fans and controls for the MUAM. The damper door is an assembly that is separate from the module and is installed in the bulkhead opening.



Please refer to **Auxiliary Set Button** in the **Operations** section of the guide to turn the MUAM On or Off.

(Continued next page)

As viewed from the front, the MUAM is located on the left side and located on the back side of the bulkhead. Some models may have a replaceable filter. Most properties will have their own maintenance personnel do this replacement.

When the Zoneline is first powered, the MUAM cycles on and the damper assembly door closes, then two variable speed fans turn on. The fans run for approximately 30 seconds (speed will change) with the door closed. The MUAM monitors the fans running with door closed. After 30 seconds, the damper door opens and the control is able to detect a change in fan operation. The control is able to detect the air resistance when door is open and closed through current draw. If the control does not see a change, the damper door is considered inoperative in either open or closed position and will set a Fault Code of 24 (replace the damper assembly). If the control detects a bad fan condition, a Fault Code of 23 will be logged (replace the module). After 30 seconds, the compressor will cycle on (if temperature and humidity requirements have been met). If the control detects the sealed system is not operating correctly, Fault Code 23 will be set and the module will need to be replaced. Located within the MUAM control box are a microcontroller, outdoor thermistor, sealed system thermistor and humidity sensor. MUAM components (except for damper assembly) are not available separately requiring the module to be replaced.

The module is secured with two screws and tabbed into a base plate mounted to the base pan. Some new zoning regulations require that incoming air be conditioned.

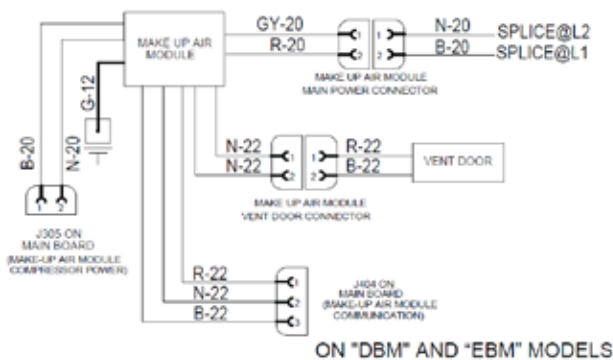
If troubleshooting the Make-Up Air Module with an amp probe, the amperage should be between .75 and 1-amp, measured on the **blue** wire of the Make-Up Air Module harness. This is dependent upon the line voltage.



If for some reason the customer doesn't want to use the MUAM and complains of air coming through the Zoneline, a panel can be ordered and installed (**Part #:** WP76X21320) to block the outside opening.

Connections on the main control to the MUAM are through J305 and J404 connectors located on the back of the control.

### DIGITAL MAKE UP AIR MODULE (MUAM)

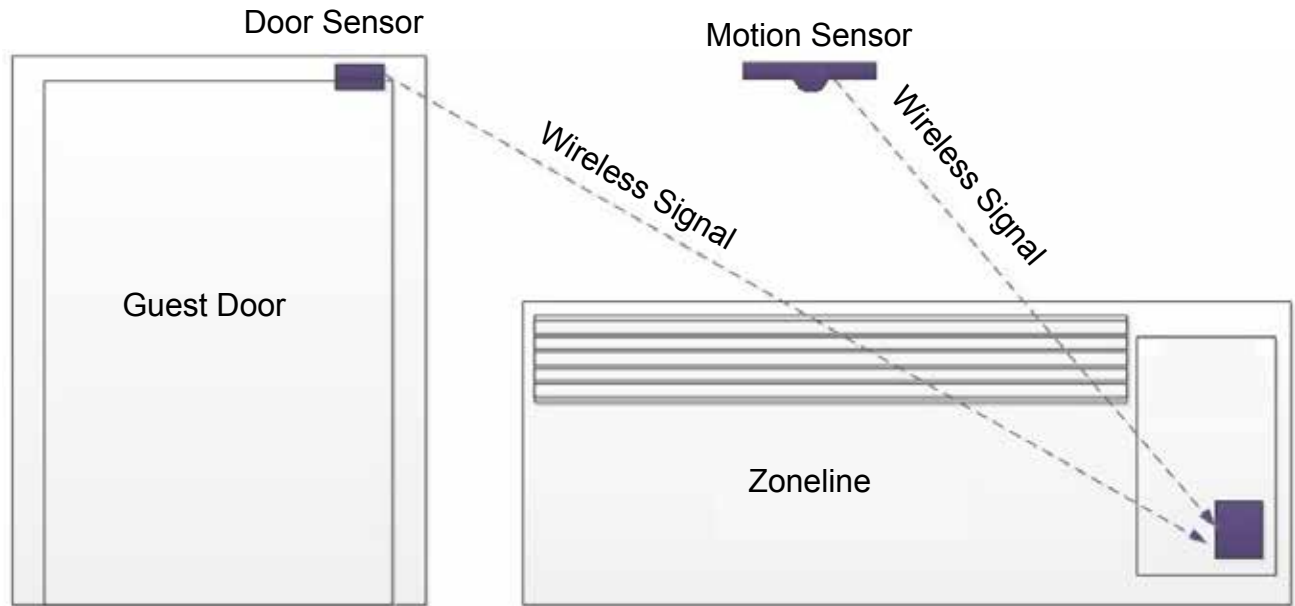


(Continued next page)



### Occupancy Sensors (optional)\*

A wireless door sensor (located on guest entry door) and motion sensor (ceiling or wall mount) communicate to the Zoneline through a Setback Module. The three components work collectively to determine whether the room is occupied or vacant. When the guest room door is opened and motion is sensed, the MUAM will turn on and remain running (depending outdoor temperature and humidity). When the door is opened again (the guest is exiting the room) and no motion is detected within five minutes, the MUAM will turn off. If someone is in the room and motion is detected or the door is again opened the MUAM will cycle back on.



### CDC (Central Desk Control) (optional)\*

The CDC input on Zoneline is an occupancy control option which is operated by the Property Management. A field provided switch wired to the CDC connector can open/close the circuit to stop operation of the Zoneline when closed, and when open the Zoneline is operational. The CDC connector can be used with an occupancy detection system to, instead, control the operation of the MUAM. Such a system is optional and is enabled through the Aux menu. It should be noted that if an occupancy detection system is enabled with a digital Make Up Air (\*DBM and \*EBM) Model, Central Desk Control cannot be used at the same time.

If the occupancy system is the suspect failure (confirm that Auxiliary Settings are turned on, see **Auxiliary Controls** section and **Auxiliary Set Button** section), the diagnosis can be verified by unplugging the CDC connector. With the Zoneline turned off, the fans will be heard. If the fans cannot be heard, enter Service Mode to turn the fan speed higher to verify operation.

\*Occupancy Sensors and CDC are Optional accessories, only one may be used.

# Sealed System

Features may vary depending model number throughout this Service Guide.

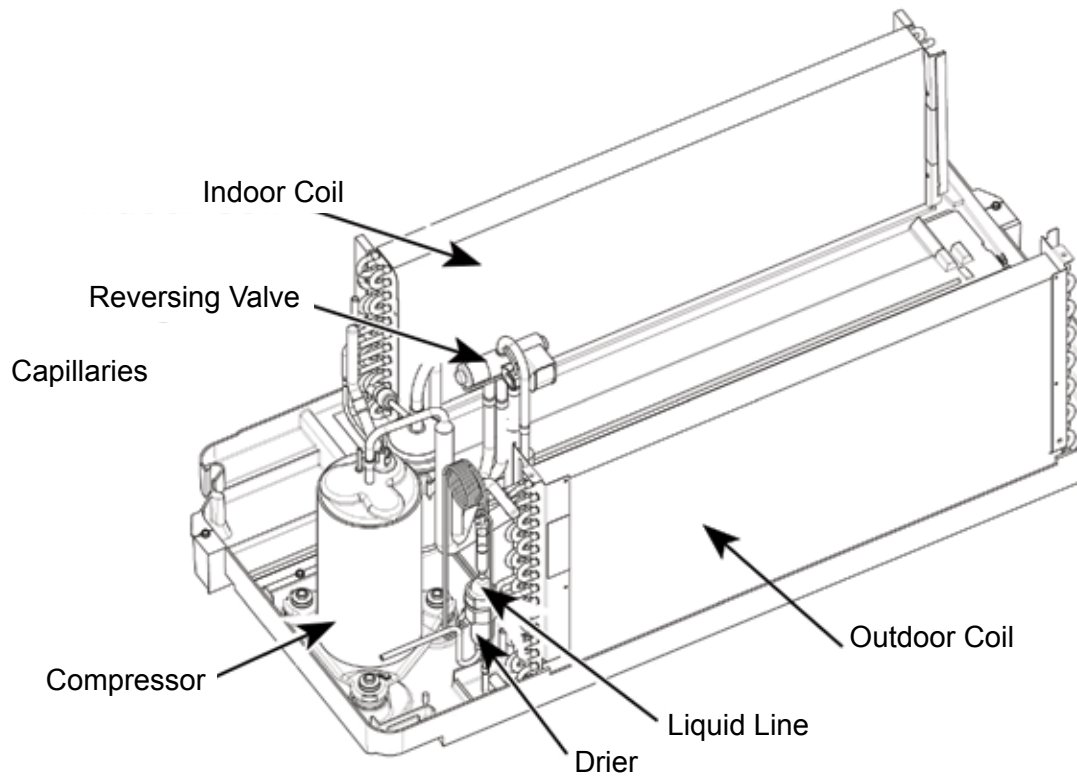
As with any refrigeration system, Zonelines have an indoor coil, outdoor coil, compressor and refrigerant metering device (capillary tubes). A drier is part of the sealed system now included from the factory.

Additionally, on heat pump models (AZ65), a reversing valve to switch the flow of refrigerant and a check valve to balance the system are parts of the sealed system.

A "tank" or receiver is part of some sealed systems in the Zoneline models. The tank allows for expansion of the refrigerant where required.

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

Complete (cooling only) sealed system with all other components removed.



Install a new drier in the liquid line tube between the outdoor coil and the capillaries.

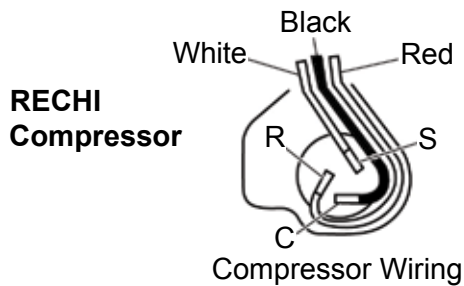
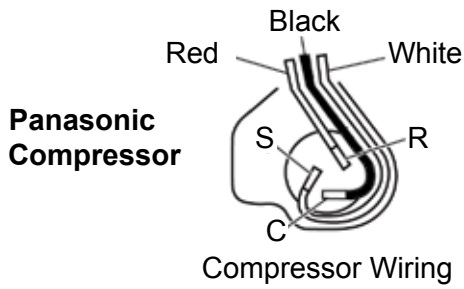
## Compressor

### Wiring: Compressor Check

**CAUTION: Risk of injury. Keep head clear of terminal area when cover is removed.**

Keep head clear of terminal area when cover is removed.

Check windings first. If open or grounded, **DO NOT** apply power to the compressor terminals.



### Compressor Resistance

Resistance spec is reported as room temperature readings.

BTU/Size V	Run	Start
7K/230V	5.139±7% Ω	6.032±7% Ω
7K/265V	6.747±7% Ω	4.680±7% Ω
9K/230V	3.319±7% Ω	2.635±7% Ω
9K/265V	4.503±7% Ω	3.298±7% Ω
12K/230V	2.526±7% Ω	2.313±7% Ω
12K/265V	3.296±7% Ω	2.505±7% Ω
15K/230V	2.227±7% Ω	3.093±7% Ω
15K/265V	2.840±7% Ω	3.225±7% Ω

### Capacitor Microfarads

BTU	Microfarads
7k	15 uF +/- 5%
9k	30 uF +/- 5%
12k and 15k	30 uF +/- 5%

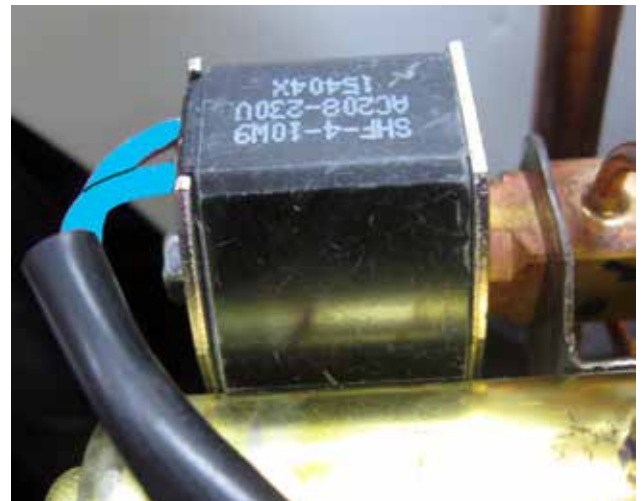
## Reversing Valve

On heat pump models, the refrigerant flow direction is controlled by the reversing valve assembly. In the cooling mode, the main board supplies line voltage to the solenoid coil, which causes the valve to switch flow direction. With no voltage applied to the solenoid coil, the valve will be in the heating mode.



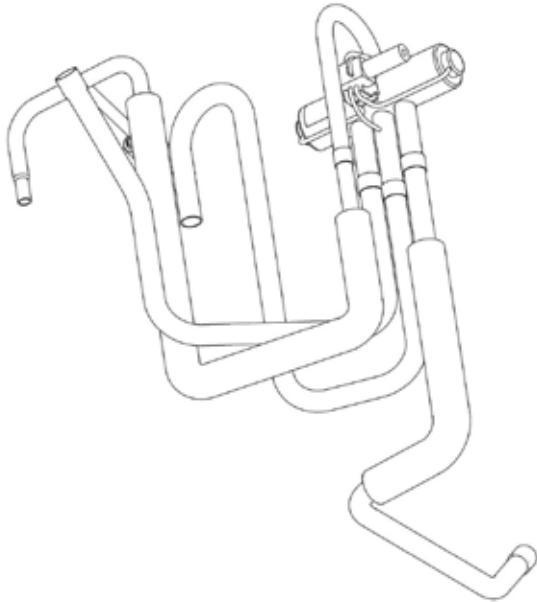
*\*Shown with solenoid removed.*

### Reversing Valve Solenoid Coil



The solenoid coil attaches to the valve body with a 5/16-in. hex-head bolt. The 265-volt coil has **blue** wires and measures approximately ~ 3.23k ohms.

## Service Replacement Valve Assembly



**NOTE:** Reversing valve assemblies will come complete with tubing, so excess heat will not be applied to the valve body.

## Tank

On 7k and 9k heat pump models, a receiver tank is included in the sealed system. This tank is soldered to the outdoor coil return line tube.



## Check Valve

The check valve allows the flow of refrigerant one way unimpeded, but in heat pump mode it closes and forces the refrigerant to go through an additional length of capillary tube. This helps balance the refrigerant system.



**NOTE:** Care must be taken when soldering in the new check valve. Thermal paste and a damp rag must be used on the middle portion of the assembly to prevent thermal damage to the internal check ball assembly.

## Sealed System Common

### Drier

All Zonelines will now have a drier factory installed. The drier must be replaced anytime sealed system repairs are performed.

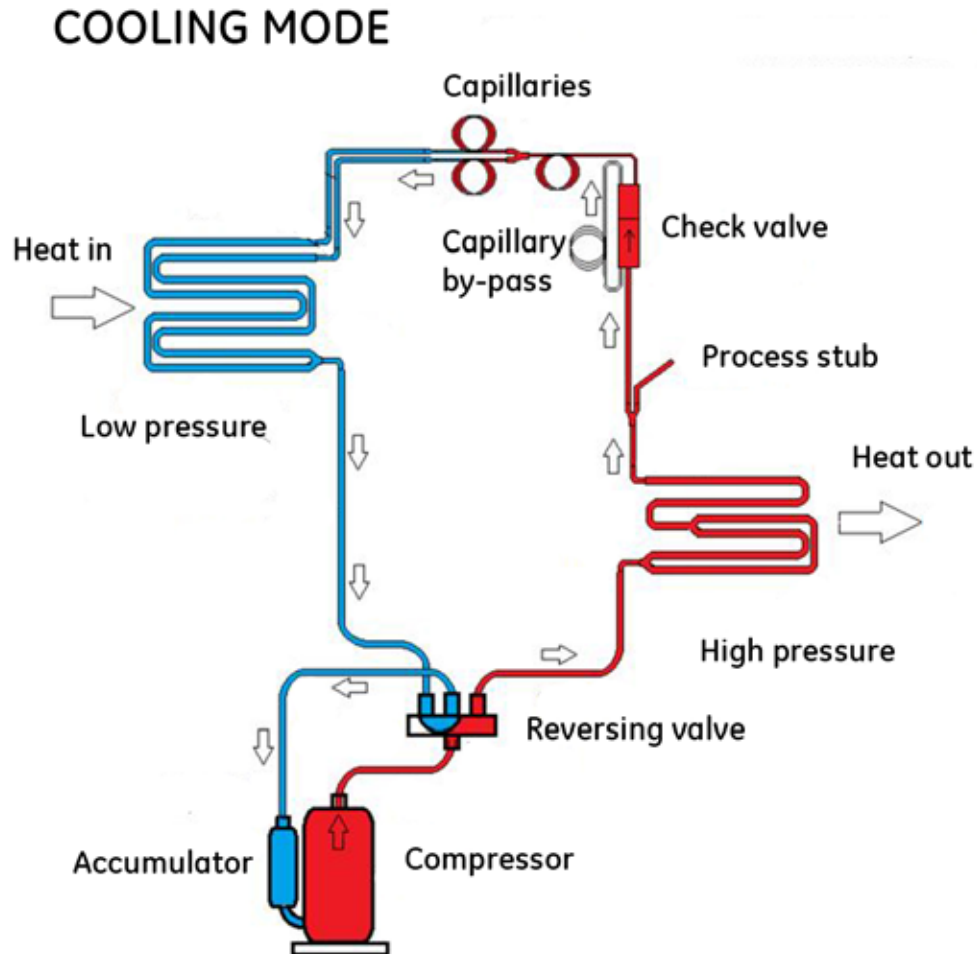
**NOTE:** Driers are vacuum packed and should only be opened when it is being installed. Driers opened and left to the open air become saturated and should be discarded if not used within 45 minutes.



**Heat Pump Drier Kit**  
(includes check valve, drier, capillary jumper and process stub)

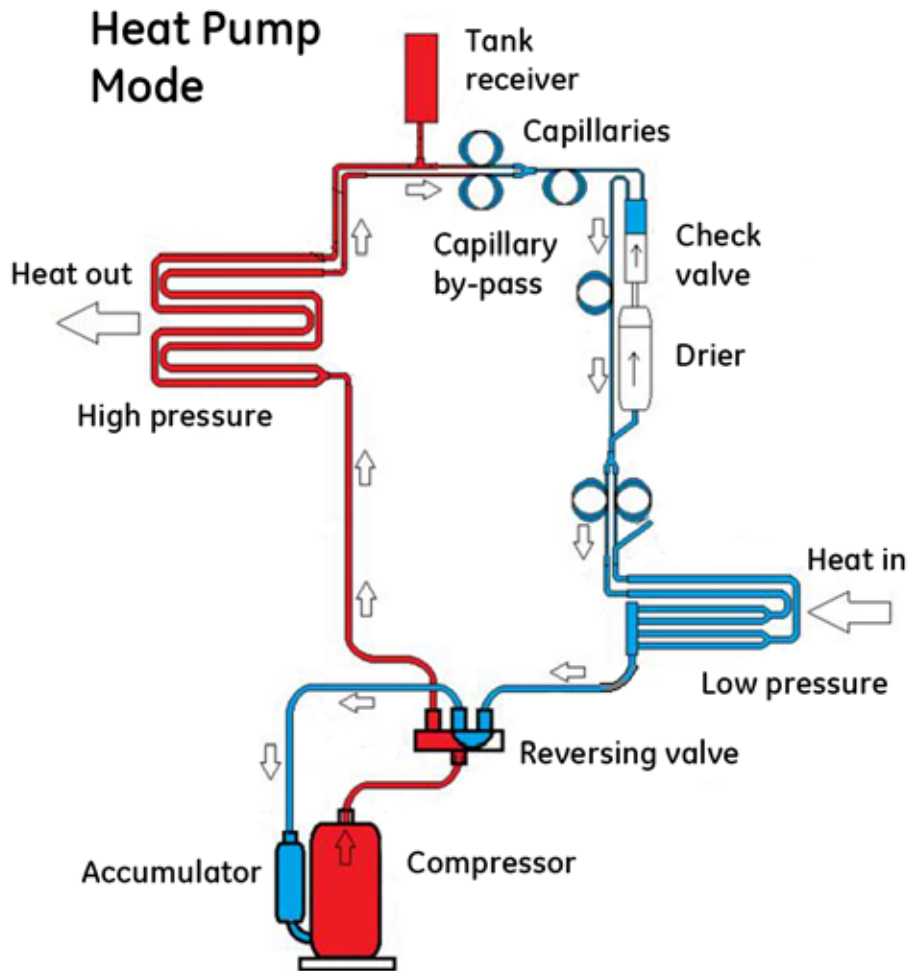
# Sealed System: Refrigerant Flow Cooling

Features may vary depending on model number throughout this Service Guide.

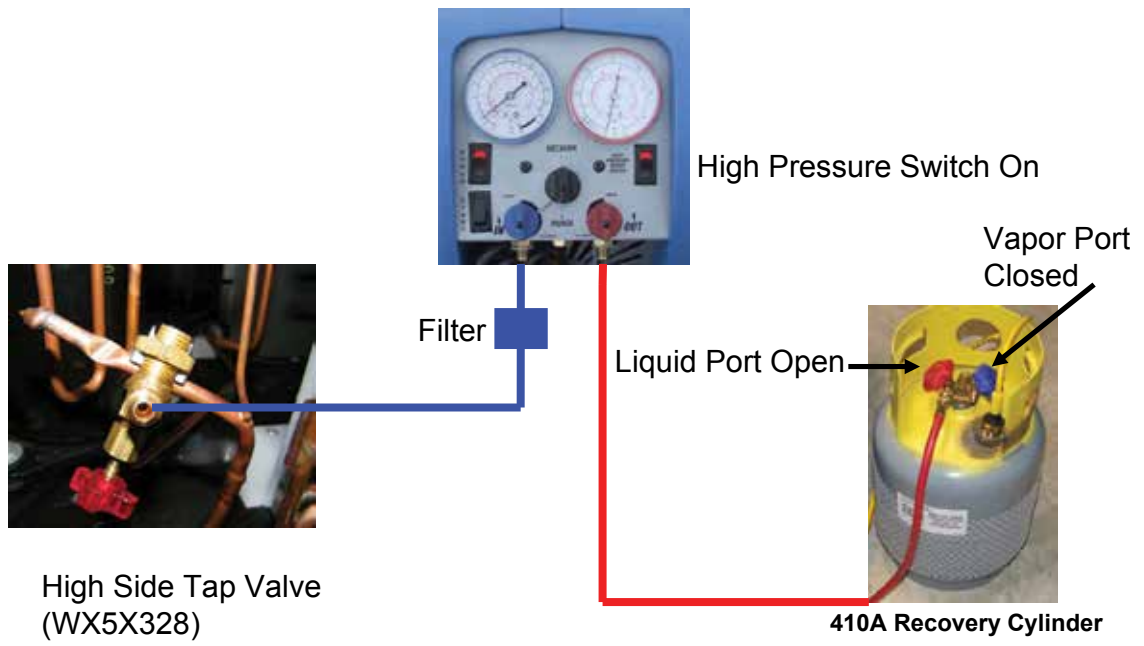


# Sealed System – Refrigerant Flow Heating

Features may vary depending on model number throughout this Service Guide.



# Recovery Process

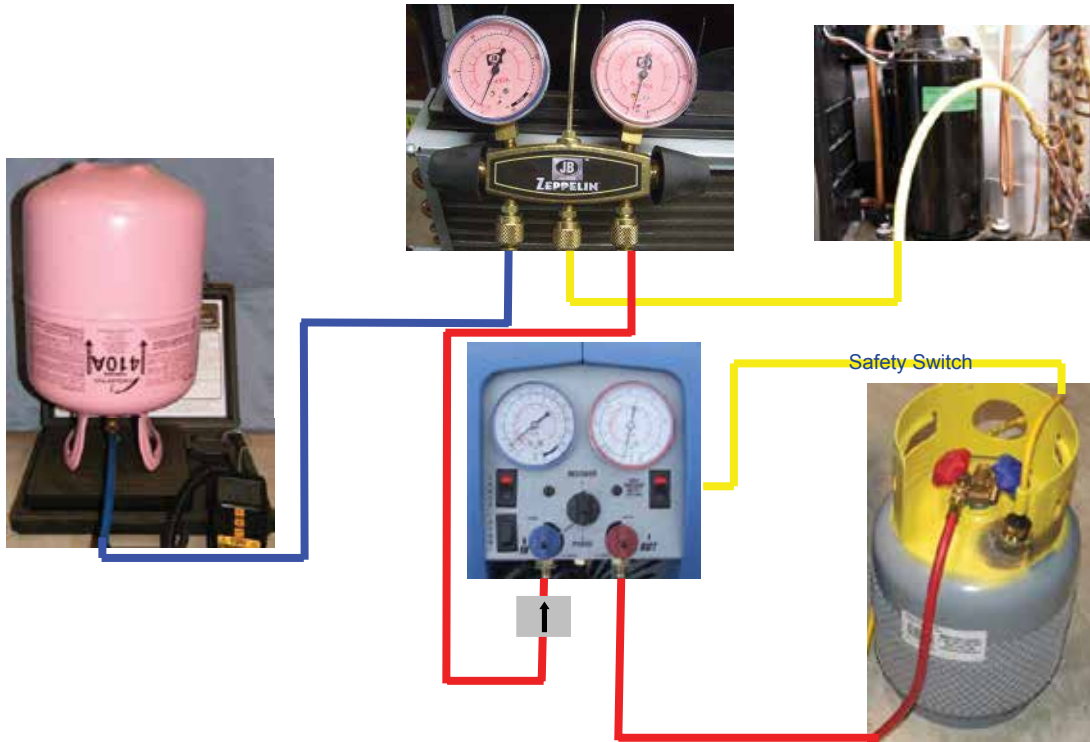


## Recovery Hose Hook-Ups

Complete charging and recovery information for R410A is available in Service Guide 31-9192.



# Charging Summary



Charging Hose Hook-Ups

Complete charging and recovery information for R410A is available in Service Guide 31-9192.

## Refrigerant Charge

Model	R410a (oz)
AZ45E07EACW5	29 oz
AZ45E09EACW5	36 oz
AZ45E12EACW5	31 oz
AZ45E15EACW5	35 oz
AZ65H07EACW5	29 oz
AZ65H07EADW5	29 oz
AZ65H07EBMW5	29 oz
AZ65H09EACW5	36 oz
AZ65H09EADW5	36 oz
AZ65H09EBMW5	36 oz
AZ65H12EACW5	37 oz
AZ65H12EADW5	37 oz
AZ65H12EBMW5	37 oz
AZ65H15EACW5	35 oz
AZ65H15EADW5	36 oz
AZ65H15EADW5	





## New Accessories

<b>RAK204D15C</b>	Sub-Base, 208/230-v, 15-A, w/ Power Cord
<b>RAK204D20C</b>	Sub-Base, 208/230-v, 20-A, w/ Power Cord
<b>RAK204D30C</b>	Sub-Base, 208/230-v, 30-A, w/ Power Cord
<b>RAK204E15C</b>	Sub-Base, 265-v, 15-A, w/ Power Cord
<b>RAK204E20C</b>	Sub-Base, 265-v, 20-A, w/ Power Cord
<b>RAK204E30C</b>	Sub-Base, 265-v, 30-A, w/ Power Cord
<b>RAK315P</b>	LCDI Power Cord, 208/230-v, 15-A
<b>RAK320P</b>	LCDI Power Cord, 208/230-v, 20-A
<b>RAK330P</b>	LCDI Power Cord, 208/230-v, 30-A
<b>RAK315SP</b>	Short, non-LCDI Sub-base Power Cord, 208/230-v, 15A, includes junction box
<b>RAK320SP</b>	Short, non-LCDI Sub-base Power Cord, 208/230-v, 20A, includes junction box
<b>RAK330SP</b>	Short, non-LCDI Sub-base Power Cord, 208/230-v, 30A, includes junction box
<b>RAK315D</b>	Direct Connect Pigtail, 208/230-v, 15-A, includes junction box
<b>RAK320D</b>	Direct Connect Pigtail, 208/230-v, 20-A, includes junction box
<b>RAK330D</b>	Direct Connect Pigtail, 208/230-v, 30-A, includes junction box
<b>RAK515P</b>	Short Power Cord, 265-v, 15-A
<b>RAK520P</b>	Short Power Cord, 265-v, 20-A
<b>RAK530P</b>	Short Power Cord, 265-v, 30-A
<b>RAK515D</b>	Direct Connect Pigtail, 265-v, 15-A
<b>RAK520D</b>	Direct Connect Pigtail, 265-v, 20-A
<b>RAK530D</b>	Direct Connect Pigtail, 265-v, 30-A
<b>RAK6053</b>	Duct Adaptor for AZ45/65 series Zonelines
<b>RAK7013</b>	Duct Adaptor for AZ45/65 series Zonelines, Repl. AP6 A_B Zonelines
<b>RAK7023</b>	Duct transition for AZ45/65 series Zonelines, repl. AZC first gen Sanyo models
<b>RAA64</b>	Room Front Air Filters for AZ45/65 series Zonelines (10 pairs per box)
<b>RAF454</b>	Room Front for AZ45/65 series Zonelines
<b>RAKCDC</b>	3-pin connector for CDC and External Fan applications
<b>RAK4002D</b>	Electrical junction box for direct connection applications
<b>RAB7116B</b>	16-in. deep steel wall sleeve, color change
<b>RAB7124B</b>	24-in. deep steel wall sleeve, color change
<b>RAB7118B</b>	18-in. deep wall sleeve, color change
<b>RAB7120B</b>	20-in. deep wall sleeve, color change

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