A1
REFRIGERANT

AAC AEC SERIES

Ceiling Mount Air Handler, Copper Coil (Electric Heat)

INSTALLATION GUIDE & OPERATION MANUAL

R410A REFRIGERANT CEILING MOUNT AIR HANDLERS

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1. IMPORTANT SAFETY INSTRUCTION

Potential safety hazards are alerted using the following symbols. The symbol is used in conjunction with terms that indicate the intensity of the hazard. It is the responsibility of the owner and the installer to read and comply with the safety information and the instructions accompanying these symbols.


Read the precautions in this manual carefully before operating the unit.


Read the instructions in this manual carefully before operating the unit.


Read the instructions in this manual carefully before servicing the unit.


Read the instructions in this manual carefully before wiring the unit.


Warning or Caution

⚠ WARNING **This symbol indicates a potentially hazardous situation, which if not avoided, could result in serious injury, serious injury, property damage, product damage or death.**

⚠ CAUTION **This symbol indicates a potentially hazardous situation, which if not avoided, may result in moderate injury or property damage.**

⚠ WARNING **Certified technicians or those individuals meeting the requirements specified by NATE may use this information. Property and product damage or personal injury hazard may occur without such background.**

This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.

Product designed and manufactured to permit installation in accordance with local and national building codes. It is the installer's responsibility to ensure that the product is installed in strict compliance with the aforementioned codes. Manufacturer assumes no responsibility for damage (personal, product or property) caused due to installations violating regulations.

⚠ WARNING **Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury, or death.**

⚠ WARNING **Unit is not approved for outdoor installations.**

⚠ WARNING **HAZARDOUS VOLTAGE!**
Failure to follow this warning could result in property damage, severe personal injury, or death.

Disconnect ALL electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

⚠ WARNING **The unit is designed for operation with 208/240 V, single phase, 60 Hz power supply. Aspen will not be responsible for damages caused due to modification of the unit to operate with alternative power sources.**

⚠ WARNING **When this unit is installed in an enclosed area, such as a garage or utility room with any Carbon Monoxide producing devices (i.e. automobile, space heater, water heater etc.) ensure that the enclosed area is properly ventilated.**

⚠ WARNING **This product designed and manufactured to permit installation in accordance with local and national building codes. It is the installer's responsibility to ensure that product is installed in strict compliance with national and local codes. Manufacturer takes no responsibility for damage (personal, product or property) caused due to installations violating regulations. Installation of this unit shall be made in accordance with the National Electric Code, NFPA No. 90A and 90B, and any other local codes or utilities requirements.**

⚠ WARNING **Do not bypass safety devices.**

⚠ WARNING **PRESSURIZED REFRIGERANT!**
Failure to follow this warning could result in personal injury. System contains oil and refrigerant under high pressure. Recover refrigerant before openingthe system. Do not use non-approved refrigerants or refrigerant substitutes or refrigerant additives.

⚠ WARNING **If any hot work is to be conducted on the refrigerating equipment or an associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.**

⚠ CAUTION **Only factory authorized kits and accessories should be used when installing or modifying this unit unless it is so noted in these instructions. Some localities may require a licensed installer/service personnel.**

⚠ WARNING **This product can expose you to chemicals including lead, which are known to the State of Californnia to cause cancer and birth defects or other reproductive harm. For more information go to www.65Warnings.ca.gov**

⚠ WARNING **Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.**

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn. Be aware that refrigerants may not contain an odor.

- This appliance shall be installed in accordance with national wiring regulations.
- The of the space necessary for correct installation of the appliance including the minimum permissible distance to adjacent structures is specified in Section 4 of this manual under "INSTALLATION INSTRUCTIONS AND CLEARANCES".
- For air handlers with supplementary heaters, the minimum clearance from the appliance to combustible surfaces is specified in Section 4 of this manual under "INSTALLATION INSTRUCTIONS AND CLEARANCES", the equipment was tested for 0" clearance.
- A wiring diagram with clear indication of the connections to external control devices and supply cord can be found in Section 16 of this manual
- The range of external static pressure at which the appliance was tested (add-on heat pumps and ducted appliances with supplementary heaters only) is available in Section 12 of this manual.
- The method of connecting the appliance to the electrical supply and interconnection of separate components is detailed in Section 11, LOW VOLTAGE CONNECTIONS and in Section 17, WIRING DIAGRAMS
- None of the components in this product family are designed or approved to be suitable for outdoor use.
- Refer to Section 15 of this manual for details of Electric Heat Kits that may be used in conjunction with the appliance, field installed heater kit fitting/ installation instructions are supplied with the heater kits.

This Air Handler unit is a PARTIAL UNIT AIR CONDITIONER, complying with PARTIAL UNIT requirements of Standard UL 60335-2-40/CSA 22.2 NO. 60335-2-40, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this Standard.

This appliance is not intended for use at altitudes exceeding 2,000 meters.

2. INTRODUCTION & GENERAL INFORMATION

The AAC & AEC air handlers are versatile horizontal ceiling mount units. These air handlers have the following standard features:

- **APPLICATION VERSATILITY:** Built in mounting tabs for ceiling or furrdown mounting. Louvered ceiling access panel has separate frame that attaches to ceiling joists. Solid access panel available for use with end return installations.

Can be AHRI matched with most brands of air conditioners or heat pumps outdoor sections R22 or R410a REFRIGERANT when proper metering device is used.

- **MOTOR:** The ***AEC*** air handler is equipped with constant torque ECM speeds and torques are controlled by software embedded in the motor to maintain constant torque. Motors are pre-programmed at the factory. The ***AAC*** is equipped with direct drive multi-speed blowers circulate air quietly and efficiently. Two speed motors allow for precise air volume selection. Motor speeds can be easily selected via motor terminals. Blowers mounted on rails so they can be easily removed for service.
- **CABINET:** ***(AAC / AEC)*** Sturdy, galvanized steel cabinet with knockout for duct return. The cabinet is fully insulated with 1/2" faced insulation to prevent sweating, to encapsulate glass fibers, and to provide excellent R-value. Stick pins ensure insulation remains in place. Less than 2% air leakage from cabinet when tested in accordance with ASHRAE standard 193. Unit must be installed according to Aspen installation instructions.
- **MODULAR ELECTRIC HEAT KITS:** Heat kits available with terminal blocks. Available in 3, 5, 8, & 10 KW. Models with electric heat include sequencers and temperature limit switches for safe, efficient operation. Easily accessible controls for quick service. Disconnect does not protrude through the wall panel.
- **BLOWER:** Direct drive multi-speed blowers circulate air quietly and efficiently. Motor speeds can be easily selected via motor terminals.
- **ELECTRONIC CIRCUIT BOARD:** Electronic circuit board provides 30 sec. ON/OFF blower time delay extracting more heat/cool from the coil.
- **DX Coil:** High-efficiency rifled copper tubes/enhanced aluminum fins provide maximum heat transfer. All coils are immersion tested at 500 psi pressure decay, mass spectrometer, then Nitrogen pressurized and factory sealed optimal system integrity and long-term reliability.

Available with either orifice or TXV metering device. Field-installable TXVs are also available.

Galvanized metal drain pan with bottom primary and secondary drain connections or alternate right side primary. All connections 3/4" NPT. Access door allows for coil cleaning.

- **WARRANTY:** Five-year limited parts warranty.

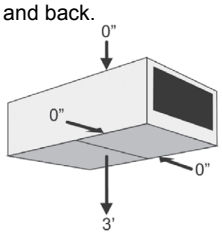
3. INSPECTION

On receiving the product, visually inspect it for any major shipping related damages. Shipping damages are the carrier's responsibility. Inspect the product labels to verify the model number and options are in accordance with your order. Manufacturer will not accept damage claims for incorrectly shipped product.

4. INSTALLATION PREPARATION AND CLEARANCES

The AAC & AEC series of horizontal ceiling mount air handlers are designed for zero clearance installation on the sides and back.

FIGURE 4.1
INSTALLATION CLEARANCE



4.1. CLEARANCES

This unit is designed for zero clearance installation on three sides and adequate clearance to provide access for service in the front. A minimum of 2.5-3.5 ft clearance is recommended on the front of the unit (Fig 4.1).

4.2. AIR HANDLER ORIENTATION

If the unit is to be installed in garages, warehouses or other areas where they may be subjected to physical damage, adequate protective barriers must be installed. Unit MUST be installed 18" away from source of ignition.

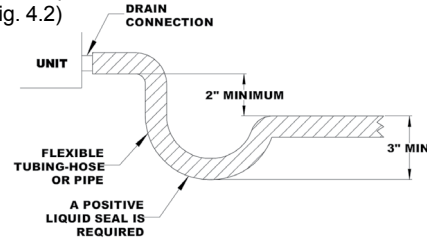
If the unit is located in a high humidity area like attics or unconditioned garage; the air handler casing might experience nuisance sweating. In such installation scenarios, wrapping the casing with a 2" fiberglass insulation with vapor barrier SHOULD be used.

4.3. CONDENSATE DRAIN

⚠ CAUTION **Drain lines from the auxiliary drain pan should NOT be connected to the primary drain line of the coil.**

The drain lines must be installed with 1/4" per foot pitch to provide free drainage. A condensate trap MUST be installed on the primary drain line to ensure proper drainage of the condensate. The trap must be installed in the drain line below the bottom of the drain pan (Fig. 4.2)

FIGURE 4.2
CONDENSATE DRAIN TRAP



⚠ CAUTION **Since coil is upstream of the blower, all drains MUST be trapped or sealed. Failure to do so will result in condensate overflow from the drain pan. Aspen will NOT be responsible for any damages resulting from failure to follow these instructions.**

⚠ CAUTION **If the drain pan is constructed of nylon or plastic; use Teflon tape to connect the drain lines to the threads in the drain pan. DO NOT USE SOLVENT BASED PIPE DOPE. THIS WILL REDUCE THE LIFE OF THE PAN.**

The drain pan has primary and secondary drain connections. If a secondary drain line is required, it should be run separately from the primary and should terminate in a highly visible location.

Condensate disposal through the secondary drain line indicates that the primary drain line is plugged and needs cleaning. If a secondary drain line will not be provided, plug the secondary drain. Drain plugs are NOT to be reused without plumbers' tape or putty. Drain line connection should be finger tightened, then turned no more than one complete turn as needed to ensure a firm connection. DO NOT overtighten connection or damage may occur.

4.3. DUCTWORK

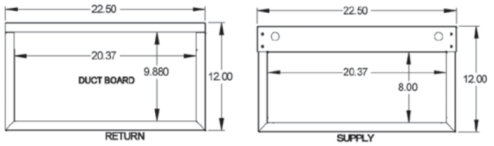
Duct systems should be installed in accordance with standards for air-conditioning systems, National Fire Protection Association Pamphlet No. 90A or 90B. They should be sized in accordance with National Environmental System Contractors Association Manual K, or whichever is applicable.

On any job, non-flammable flexible collars should be used for the return air and discharge connections to prevent transmission of vibration (Fig 4.3). Although these units have been specially designed for quiet vibration-free operation, air ducts can act as soundboards, can, if poorly installed, amplify the slightest vibration to the annoyance level.

All main supply and return air drops should be properly sized as determined by the designer of the duct system and should not necessarily be the size of the duct flange openings of the unit. (The duct size should never be smaller than the flange openings of the air handler supply and return air openings.)

It is recommended that wherever supply and return air sheet metal ducts pass through unconditioned areas, they be insulated to prevent excessive heat loss during heating operation. When applied in conjunction with summer air conditioning, sheet metal duct routed through unconditioned areas should be insulated and have an outside vapor barrier to prevent formation of condensation.

FIGURE 4.4.1
SUPPLY/RETURN OPENING SIZES



5. INSTALLATION

⚠ CAUTION **Ensure that the unit is adequately sized. The tonnage of the outdoor unit should never exceed the tonnage of this unit.**

⚠ WARNING **The coil was manufactured with a dry nitrogen precharge. Release the pressure through the Schrader valve test port prior to installation. If holding pressure is not present, return coil to distributor for exchange.**

⚠ CAUTION **Some Aspen coils may include a Schrader valve on the suction manifold. Ensure that the Schrader valve and valve core (where present) are protected from heat during brazing and installation to prevent leakage. Use a core removal tool to temporarily remove the core when brazing. Replace the core once brazing is completed.**

⚠ CAUTION **Insulation on the suction line MUST extend into the cabinet and continue as far as possible to eliminate condensate dripping onto the access door.**

- ✓ Clean coil fins with degreasing agent or mild detergent and rinse fins clean prior to installation.
- ✓ The refrigerant line sizes should be selected according to the recommendations of the outdoor unit manufacturer.
- ✓ Care must be taken to ensure all connection joints are burr-free and clean. Failure to do so may increase chances of a leak. It is recommended to use a pipe cutter to remove the spun closed end of the suction line.
- ✓ To reduce air leakage, rubber grommets may be present where the lines pass through the coil case. To avoid damage, remove grommets prior to brazing by sliding over the lines. Use a quenching cloth or allow the lines to cool before reinstalling the grommets.
- ✓ Use of wet rags/quenching cloth is highly recommended to prevent weld-related damages to the casing and Schrader valve (if present)

6.1. MOUNTING AIR HANDLER

This unit is installed in a horizontal only position. Units may, without field modification, be positioned for ceiling joist installation using the 1/2inch offset mounting tabs located along the front edge of the unit, or back mounting tabs as shown in Fig 6.1.1 below:

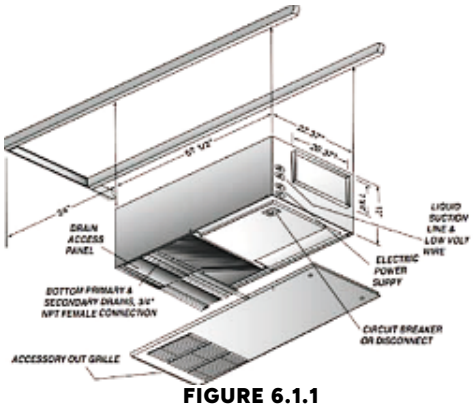
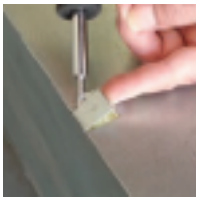


FIGURE 6.1.1
CEILING JOIST INSTALLATION

1. Bend up mounting tabs on top or bottom of the unit depending on how it is to be mounted.

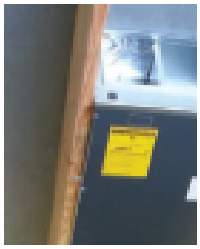



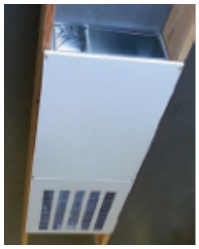
2. Screw the unit to the ceiling frames to mount from above or below.




Below are images of the Air Handler unit mounted:


MOUNTED FROM ABOVE


MOUNTED FROM BELOW


SHOWN WITH OPTIONAL RETURN AIR GRILLE

6.4. LEFT HAND REFRIGERANT PIPING CONVERSION

1. Remove the bottom door.
2. Cut tie wrap and remove suction line insulation.
3. Re-install suction line on the right and stub-out and tie wrap.
4. Replace right hand cabinet bushing with left hand bushing and vice versa.
5. Cut suction line tube and braze line inside cabinet.
6. Bend a 180-degree elbow on the liquid line stub-out.
7. Run liquid line inside cabinet.
8. Braze liquid line inside cabinet.
9. Be sure the suction line insulation extends into the cabinet and part drain pan as far as possible. Failure to adhere to this requirement will result in condensation dripping onto the ceiling or access door.

6. CONNECTING REFRIGERANT LINES

⚠ WARNING **The coil was manufactured with a dry nitrogen precharge. Release the pressure through the Schrader valve test port prior to installation. If holding pressure is not present, return coil to distributor for exchange.**

⚠ NOTICE **Refrigerant tubing must be routed to allow accessibility for service and maintenance of the unit.**

Pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure

Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected. **REFER TO SECTION 13 FOR SYSTEM CHARGING INSTRUCTIONS.**

Clean coil fins with degreasing agent or mild detergent and rinse fins clean prior to installation. **REFER TO SECTION 5 OF THIS MANUAL FOR COIL CLEANING / MAINTENANCE GUIDANCE.**

The refrigerant line sizes should be selected according to the recommendations of the outdoor unit manufacturer.

Care must be taken to ensure all connection joints are burr-free and clean. Failure to do so may increase chances of a leak. It is recommended to use a pipe cutter to remove the spun closed end of the suction line.

To reduce air leakage, rubber grommets may be present where the lines pass through the coil case. To avoid damage, remove grommets prior to brazing by sliding over the lines. Use a quenching cloth or allow the lines to cool before reinstalling the grommets.

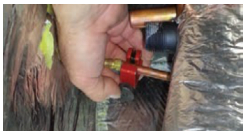
Use of wet rags/quenching cloth is highly recommended to prevent weld-related damage to the casing and Schrader valve (if present).

⚠ WARNING **The coils may include a Schrader valve on the suction manifold. Ensure that the Schrader valve and valve core (where present) are protected from heat to prevent leakage.**

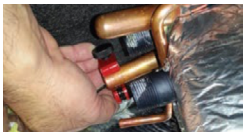
1. Release nitrogen holding charge by depressing the Shrader Valve at the liquid line connection on the air handler. If no gas releases from the air handler, contact distributor regarding potential leak.



2. Cut off Shrader Valve fitting at the liquid line connection. Use a tubing cutter for this step. Clean the burr from the cut tubing to reduce the chance of future leaks. Connect the liquid line to the tubing at the indoor unit.



3. Use tubing cutter to remove the spun end from the suction line connection at the air handler. Clean the burr from the cut tubing to reduce the chance of future leaks.



4. To avoid heat damage to grommets where present, remove these prior to brazing by sliding them over the refrigerant lines and out of the way.

5. Check to determine if the evaporator coil has a Schrader fitting on the suction manifold. If yes, remove the valve core to prevent heat damage during brazing. Replace the valve core once the piping has cooled.



6. If the air handler has a TXV metering device, remove the sensing bulb from the suction line prior to brazing to prevent heat damage from occurring. Replace the sensing bulb once the piping has cooled.



7. Flow nitrogen through the piping when brazing.

8. Braze both refrigerant line connections using proper brazing procedures.

9. When all line connections are brazed, perform a proper system evacuation procedure per the outdoor unit manufacturer instructions.



10. Seal the penetration openings where the line-set piping enters the air handler cabinet.

7. CONNECTING DUCTING

1. Secure air ducting to the supply side of the sir handler. Canvas connectors are recommended for reducing potential noise transmission.

2. If the bottom return air opening is being used, remove the bottom panel, If a front return is being used, this panel will remain in place (Fig 8.1).

3. Secure the return air ducting to the air handler cabinet if this option is used.



FIGURE 7.1

8. METERING DEVICES/LIQUID LINE CONNECTION

Aspen coils are available with two types of expansion / metering devices: a) flowrator / fixed orifice piston, or b) TXV. The following instructions are separated into sections by metering device.

7.1 FLOWRATOR / PISTON OR FIXED ORIFICE

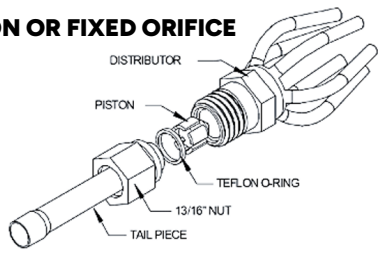


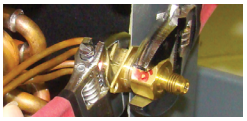
FIGURE 7.1
FLOWRATOR ASSEMBLY COMPONENTS

CAUTION **Use Piston sizes recommended by the outdoor unit manufacturer whenever possible. The piston should be sized according to the capacity of the outdoor unit.**

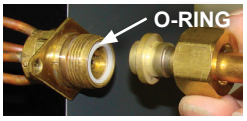
WARNING **Failure to install the proper piston can lead to poor system performance and possible compressor damage.**

8.2.1. INSTALLATION OF PISTON / FIXED ORIFICE

NOTE: Photos are for basic illustration / reference purposes only. Actual equipment configuration may differ from that shown.

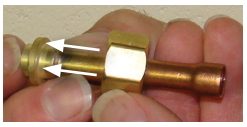


I-1. Disassemble the flowrator body using two wrenches. Unscrew the body with a counterclockwise motion.



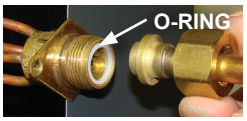
I-2. Replace the Teflon O-ring (located between the halves). Discard Schrader if present.

CAUTION **Be aware of the Teflon O-ring. Be sure to replace the O-ring to attain a proper seal. (The Teflon O-ring is located between the two halves of the flowrator).**



I-3. Slide the attachment nut onto the liquid line stub out.

I-4. Braze the stub-out portion to the liquid line and let cool.



I-5. Taking care that the white Teflon seal is still in place inside the flowrator body, firmly seat the stub and screw the attachment nut to flowrator body.

I-6. Tighten nut using no more than 10 ft-lbs of torque. A flare nut open end wrench is recommended to evenly distribute the force across all six sides of the nut to ensure piston body is not deformed.

8.3.1. PISTON REPLACEMENT

NOTE: Photos are for basic illustration / reference purposes only. Actual equipment configuration may differ from that shown.



FIGURE 8.3.1

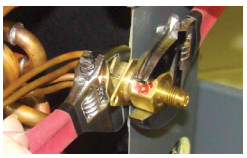
During some installations, a piston change may be required. If so, the installer MUST change the piston. Use piston sizes recommended by the outdoor unit manufacturer. If a sizing chart is not available, use the piston size chart provided below to size the required piston. The size of the piston is stamped on the piston body (Fig 8.3.1).

Use the chart below when matching coil with an outdoor unit with a different nominal capacity than the coil.

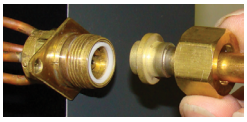
Outdoor Unit Capacity	Orifice Size	
°F D.B.	R22	R410A
12,000	0.041	-
18,000	0.055	0.049
24,000	0.059	0.055
30,000	0.068	0.059
36,000	0.074	0.068
48,000	0.080	0.074
42,000	0.084	0.080
60,000	0.092	0.089

II-1. Evacuate the system as per manufacturer guidelines and recommendations.

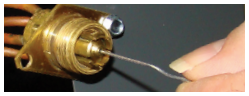
II-2. Turn the 13/16” nut once to release any residual pressure in the coil.



II-3. After ensuring that the coil is free of any residual pressure, disassemble the flowrator body completely using two wrenches. Take great care not to distort the feeder tubes. The wrench used to clasp the nut should be turned in counterclockwise direction to unscrew the nut.



II-4. Slide the 13/16” nut over the line-set and separate the two halves of the flowrator.



II-5. Pull the piston out using a small wire or pick. Verify the piston size (size is typically stamped on the body of the piston - Fig 7.6). If a different piston size is required by the outdoor unit manufacturer, re place the piston using the small wire provided with the piston kit.



II-6. Replace the piston with one of the correct size. Do not force the new piston into the body. Make sure the piston moves freely in body.

⚠ CAUTION **Pay close attention to the piston orientation. The pointed end of the piston MUST go into the distributor body, towards the coil. Failure to ensure this orientation will cause the piston to be bypassed during operation which might damage the outdoor unit.**

II-7. Assemble the two halves correctly and ensure that the Teflon O-ring is present between the two halves (See I-5). Slide the 13/16" nut onto the distributor body.

⚠ CAUTION **Be aware of the Teflon O-ring. Be sure to replace the O-ring to attain a proper seal. (The Teflon O-ring is located between the two halves of the flowrator).**

II-8. Tighten the nut to a torque of approximately 10 ft-lbs. ***Do NOT over-tighten the nut.*** Over-tightening could crack the nut and/or impede the piston movement during operation.

II-9. If present, slide the rubber grommet back to position to prevent air leakage.

8.2 TXV COILS

⚠ WARNING **The sensing bulb and TXV body MUST be protected from overheating during brazing. The sensing bulb and TXV body must be covered using a quench cloth or wet cloth when brazing. Pointing the brazing flame away from the valve and sensing bulb provide partial protection only.**

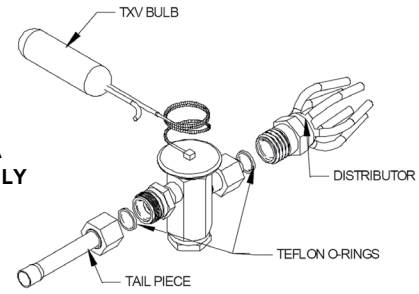


FIGURE 8.2
COMPONENTS OF A TYPICAL TXV ASSEMBLY

⚠ WARNING **Ensure that the TXV selected is compatible with the refrigerant used in the outdoor system. The TXV body is marked with R410a, or R22.**

⚠ WARNING **The valves should be sized according to the capacity of the outdoor unit. Failure to install the right valve can lead to poor performance and possible compressor damage.**

I. TXV BULB HORIZONTAL MOUNTING

The orientation and location of the TXV bulb has a major influence on the system performance.

⚠ WARNING **Ensure that the TXV bulb is in direct contact with the suction/vapor line. Gap between the bulb and tube should be avoided. Failure to do so will impair the proper functioning of the TXV valve.**

It is recommended that the TXV bulb be installed parallel to the ground (on a horizontal plane). The bulb position should be at 2 o'clock or 10 o'clock. Fig. 8.12 shows the recommended position for the TXV bulb installation in the horizontal plane.

BULB POSITION AT 2 O'CLOCK OR 10 O'CLOCK

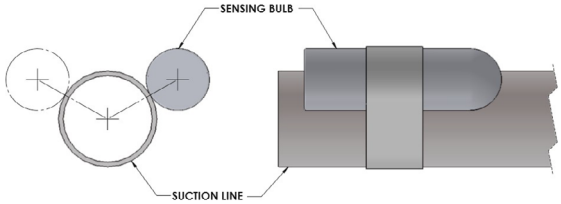


FIGURE 8.12 - RECOMMENDED LOCATION FOR HORIZONTAL TXV BULB MOUNT

The TXV sensing bulb SHOULD be mounted on the suction line approximately 6" from the TXV or coil housing using the metal clamp provided. In order to obtain a good temperature reading and correct superheat control, the TXV sensing bulb must conform to ALL of the following criteria:

1. The sensing bulb MUST be in direct and continuous contact with the suction line.
2. The sensing bulb should be mounted horizontally on the suction line.
3. The sensing bulb MUST be mounted at the 2 o'clock or 10 o'clock position on the circumference of the suction line.
4. The sensing bulb MUST be insulated from outside air.

A properly mounted sensing bulb will prevent false readings caused by liquid refrigerant that may have formed inside the suction/vapor line. Insulation will protect the sensing bulb from false readings due to contact with warm air.

II. TXV BULB VERTICAL MOUNTING

As recommended in Section 8.1, the TXV sensing bulb should be mounted in a horizontal plane in relation to the suction/vapor line. However, some installation configurations may require that the sensing bulb be mounted vertically. In this instance, place the bulb opposite the piping wall being hit by refrigerant and oil leaving the distributor tubes, and with capillary tubes directed upwards as shown in Fig. 8.2.2.

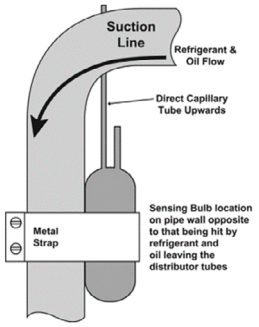


FIGURE 8.2.2
RECOMMENDED LOCATION FOR VERTICAL TXV BULB MOUNT

⚠ CAUTION **If the TXV sensing bulb is mounted vertically; the capillary MUST be directed upwards. The bulb must be mounted on the wall opposite to that being directly hit by the refrigerant and oil leaving the distributor tubes.**

8.2.3. FIELD-INSTALLED TXV RETROFIT

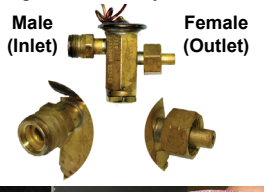
NOTE: Photos are for basic illustration / reference purposes only. Actual equipment configuration may differ from that shown.

⚠ WARNING **Do not attempt to touch brazed joints while hot. Severe burns may result.**

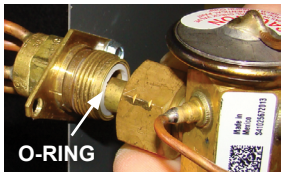
When installing an expansion valve, it is not necessary to slide the coil out of the housing.

For disassembly and piston removal refer to section 8A-1

III-1. Inspect the TXV box to confirm that the valve is compatible with the refrigerant in the system.



III-2. Remove the valve from the box and note the location of the inlet side (threaded male port) and the outlet side (female swivel nut port).

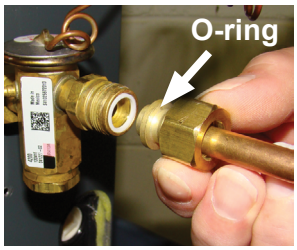


III-3. After ensuring that the Teflon O-ring seal is still in place inside the flowrator body, screw the female swivel nut onto the flowrator body.

III-4. Slide the attachment nut onto the liquid line stub out (See 8A, I-3)

III-5. Braze the stub-out portion to the liquid line and let cool.

III-6. Remove the additional Teflon O-ring seal from the box and place on the shoulder just inside the TXV inlet port. Screw the nut attached to the stub-out portion of the flowrator body onto the inlet port of the TXV.



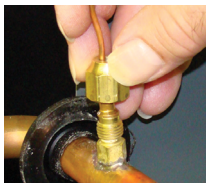
III-7. Tighten all connections taking care to use proper back up. Tighten the nut to a torque of approximately 10-30 ft-lbs.

III-8. Remove the valve identification sticker from the valve and place it adjacent to the Aspen model number on unit name plate.

III-9A. Some Aspen coils come with a Schrader valve on the suction line. If a Schrader port is present:



A. Remove the valve stem from the Schrader port mounted on the suction line.



B. Screw flare nut on TXV equalization tube onto the Schrader valve stem.

III-9B. In some cases, a suction line Schrader port may not be present. ***If a Schrader port is NOT present:***



A. Install a field-supplied braze-on Schrader valve like that shown on the suction line near the intended sending bulb mounting location. Follow valve manufacturer instructions and recommendations for installation.

B. Attach equalizer tube to valve as described in section III-9a above.

III-10. Mount the sensing bulb as described in section B-I or 9B-II.

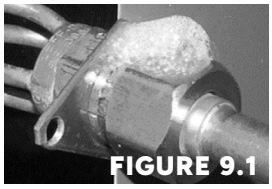
⚠ CAUTION **When handling or manipulating the equalizer tube, take great care not to kink or make extreme bends in the tubing.**

⚠ CAUTION **Using a non-bleed expansion valve may require the use of a hard-start kit. Follow the outdoor unit manufacturer's guidelines.**

9. LEAK CHECK / STANDING PRESSURE TEST / VACUUM TEST

9.1 STANDING PRESSURE TEST

1. Following outdoor unit manufacturer instructions and recommendations, Using dry nitrogen or dry helium, pressurize the field piping and indoor coil to the lower of the maximum operating pressures listed on the nameplates of the indoor and outdoor units (likely 600 psi).
2. The test pressure after removal of the pressure source shall be maintained for at least one (1) hour no decrease of pressure indicated by the test gauge, with the test gauge resolution not exceeding 30 psi.
3. Check for leaks by using a soapy solution at each field-made brazed joint and screw-on line connections. A leak will produce bubbles in the soap solution. No refrigerant shall be used for pressure testing to detect leaks.
4. If any leaks are discovered, remove nitrogen pressure and repair leaks. Repeat steps 1-3.


FIGURE 9.1

9.2 VACUUM TEST

Important: Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are completed.

1. Evacuate until the micron gauge reads no higher than 350 microns, then close off the valve to the vacuum pump.
2. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute and 1500 microns in ten (10) minutes.
3. Once evacuation is complete, blank off the vacuum pump and micron gauge, and close the valve on the manifold gauge set.
4. All procedures for charging the system with refrigerant shall be according to the instructions provided by the manufacturer of the outdoor unit.

Important: Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

After charging the system, all indoor field-made joints of the field piping shall be checked for refrigerant leaks using an electronic leak detector calibrated for R410a or R22 (depending on the application) having a sensitivity of 5 grams per year or better.

With no leaks or weak connections present, evacuate the system and charge as per the outdoor unit manufacturer instructions and specifications.

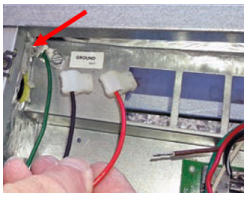
10. ELECTRICAL LINE VOLTAGE CONNECTIONS

⚠ WARNING **Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury, or death.**

⚠ WARNING **Before obtaining access to terminals, all supply circuits must be disconnected.**

⚠ WARNING **A fused disconnect switch must be field provided for the unit to be in compliance with UL 60335-2-40 Clause 7.12.2.**

These units are designed for a single phase 208/240 volts, 60 HZ power supply. Wire selection and wiring must be in accordance with the latest edition of the National Electric Code, or in Canada the Canadian electrical Code, and local codes to determine correct wire sizing. Unit terminals are designed to accommodate copper and aluminum wiring. If aluminum wiring is used: All applicable local and national codes must be followed, please observe special precautions relative to sizing, wire connections and corrosion protection.


FIGURE 11.1

All models with 3, 5, 8 or 10 kW electric heaters are arranged for single circuit connections. Not intended for simultaneous operation of electric heat and reverse cycle heating. Refer to the top part of wiring diagram at the end of this guide for detailed information.

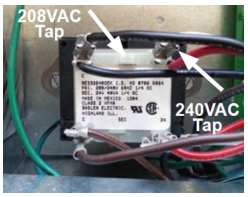


FIGURE 11.1

Line voltage wiring should be routed through the access holes at the top of the air handler. To minimize air leakage, seat the wiring entry point on the outside of the unit. Proper electrical conduit connection fittings should be used. Connect the power wiring to the line side connections on the air handler. The electrical ground wire should be connected to the grounding lug. Ensure both the field supplied ground wire and air handler GREEN ground wire are both secured to the grounding lug of the air handler (Fig 10.1).

11. LOW VOLTAGE CONNECTIONS

A 24 V power supply is provided by an internally wired low voltage transformer that is standard on all models.

If the line voltage being supplied to the air handler is 208-volt single phase, the line voltage tap on the low voltage transformer needs to be moved from the 240-volt tap to the 208-volt tap. If this is not done, the secondary output voltage of the transformer will be too low (Fig 10.2.)

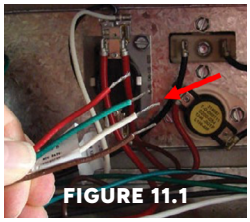
Connect the field wiring at the pigtails supplied with the air handler as speci-

fied in Wiring Diagram, 17.1 &17.2.

NOTICE **All wiring must comply with local and national electrical code requirements. Read and heed all unit caution labels.**

11.1 SINGLE STAGE COOLING WITH ELECTRIC HEAT

The air handler comes factory setup for a single stage cooling system. If factory installed accessory electric heaters are preinstalled, the unit will also have a low voltage wire for the electric heat (Fig 11.1.1).


FIGURE 11.1

See the Wiring Diagrams in section 17 - shows the typical electrical connections required for A/C only and heat pump application.

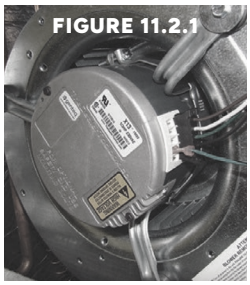
During cooling mode operation, the indoor blower G wire will energize a time delay relay inside the air handler. After a short time delay period, the time delay relay will send out a 24-volt signal to the low voltage terminal on the motor. Fan delay periods are 7 seconds ON delay and 65 seconds OFF delay. (See wiring in Section 17)

The Y wire from the thermostat is not connected at the air handler. This wire goes directly to the outdoor unit 24 volt wiring to turn on the outdoor condensing unit when a call for cooling takes place. The 24-volt common for the outdoor unit circuits is connected at the air handler Brown wire.

The electric heater low voltage wiring W terminal is wired directly from the thermostat to the air handler. The blower will delay on a heat call ON for a period of 5 seconds. The OFF-delay period is 60 seconds.

Final air volume adjustments should be made by referencing total external static pressure (see Section 12).

11.2 TWO STAGE CONDENSING UNITS


FIGURE 11.2.1

If the outdoor condensing unit is a two stage model, a field provided Y2 wire can be connected to the constant torque ECM motor using an electrical spade connector. The number 4 and 5 terminals on the more are speed taps that will increase the blower speed for second stage cooling operation. Both the G and Y2 terminals will be energized at the time during a call for second stage blower speed operation. The motor will run at the speed where the Y2 wire is connected (Fig 11.2.1)

12. AIR VOLUME ADJUSTMENT

Air volume needs to be set to the level recommended by the outdoor unit equipment manufacturer. Most systems will require around 400 CFM of indoor air for every 1 ton of system cooling capacity. The air volume must be set prior to attempting system charge.

The AAC air handler is equipped with a PSC type motor. The speed of this motor is set by placing the appropriate winding lead wire on the “MTR” terminal of the control board. Unused motor winding leads are to be placed on the “BLANK” terminals on the control board. The air volume level produced by the air handlers at varying external static pressure levels is shown in Table 12.1.

The AEC air handler is equipped with a constant torque ECM Motor. This motor will try to maintain proper motor torque to achieve programmed air volume levels at varying levels of external static pressure. The air volume level produced by the air handlers at varying external static pressure levels is shown in Table 12.2.

Use a Magnehelic Gauge with a 1” scale and two static pressure tips to measure the static pressure during the air volume adjustment procedure. The high port static pressure tip should be placed in the supply duct near the outlet of the air handler. The low port static pressure tip should be placed in the return air duct near the entrance to the air handler. The factory provided air filter should be in place inside of the air handler.

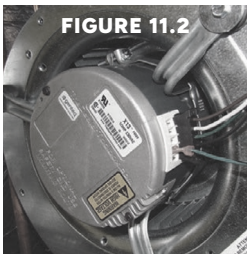
TABLE 12.1 - AEC SERIES BLOWER DATA

MODEL	SPEED TAP	CFM VS EXTERNAL STATIC* (WET COIL)				
		0.1	0.2	0.3	0.4	0.5
AEC 18/24	T1	890	830	780	730	680
	T2	750	680	640	600	560
	T3	600	565	539	502	480
	T4	750	830	780	730	560
	T5	890	680	640	600	680
AEC 30/36/37	T1	1220	1160	1110	1070	1010
	T2	1110	1075	1040	1010	980
	T3	898	873	853	827	800
	T4	1110	1075	1040	1010	980
	T5	1220	1160	1110	1070	1010

TABLE 12.2 - AAC SERIES BLOWER DATA

MODEL	SPEED TAP	CFM VS EXTERNAL STATIC* (WET COIL)				
		0.1	0.2	0.3	0.4	0.5
AAC 18/24	LOW	890	850	820	790	760
	HIGH	1020	990	975	940	890
AAC 30/36	LOW	1115	1070	1010	960	900
	HIGH	1230	1170	1120	1050	980
AAC 37	LOW	1075	1030	970	820	960
	HIGH	1190	1130	1080	1010	940

1. Select a starting speed tap from the CFM table. The blower motor has selectable speed taps labeled 1 through 5 (Fig. 12.2). The speed taps are energized by 24 volts received from the time delay relay. When two stage cooling units are used, both the first and second stage fan speed taps will be energized at the same time. The motor will run at the speed generated at the highest motor speed tap.


FIGURE 11.2

2. Call for fan only operation at the thermostat.
3. Read the external static pressure level on the Magnehelic gauge.
4. Make speed tap selection changes to get the air volume as close as possible to the required level.
5. If the static pressure is above 0.5” w.c., excessive turbulence or duct friction needs to be reduced. (Obstructions in the duct system can also cause excessive static pressure.)
6. When proper air volume is established, move on to the charging procedure.

13. SYSTEM CHARGING

WARNING **Units designed for use with R410a or R22 refrigerant MUST be charged with R410a or R22 refrigerant.**

CAUTION **An improperly charged system will likely cause loss in system performance and may damage the compressor.**

CAUTION **Refer to outdoor unit manufacturer charging guidelines and recommendations. The recommendations given below are general in nature and are NOT to supersede outdoor unit manufacturer specifications.**

CAUTION **Refer to outdoor unit manufacturer charging guidelines and recommendations. The recommendations given below are general in nature and are NOT to supersede outdoor unit manufacturer specifications.**

Where addition of charge is required to complete installation, instructions on how to determine the additional REFRIGERANT CHARGE and how to complete the REFRIGERANT CHARGE on the label provided by the outdoor unit manufacturer adjacent to the nameplate if the compressor bearing unit. Interconnecting refrigerant piping length and diameter shall be taken into consideration.

1. Bring airflow up to the maximum CFM possible according to Table.
2. Evacuate refrigeration system to micron level required by outdoor unit manufacturer.
3. Release system charge from outdoor unit and call for cooling.
4. Use outdoor unit equipment manufacturer specific charging charts if available and make proper charge adjustment based upon outdoor unit instructions.
5. If outdoor unit instructions and charts are not available, use Aspen provided charts. Make certain indoor air temperature is near comfort level setpoint 75F, prior to establishing superheat and subcooling levels.

13.1. TXV COILS:

If the unit is equipped with a **fixed TXV**, add refrigerant until the subcooling measures at the outdoor unit liquid line matches the subcooling recommendations of the outdoor manufacturer. If the charge is unavailable charge the unit to a subcooling value of 8°F +/- 1°F.

If the unit is equipped with an **adjustable TXV**, add refrigerant until the subcooling measures at the outdoor unit liquid line matches the subcooling recommendations of the outdoor manufacturer. If the charge is unavailable charge the unit to a subcooling value of 8°F +/- 1°F.

⚠ NOTICE **When adjusting the TXV, the valve stem or adjusting screw should not be adjusted more than a 1/4 turn at a time. To adjust superheat, turn the valve stem clockwise to increase and counterclockwise to decrease.**

13.1.1. If subcooling and superheat are low, adjust TXV to 8°F +/- 1°F superheat, then check subcooling.

13.1.2. If subcooling is low and superheat is high, add charge to raise subcooling to 8°F +/- 1°F then check superheat.

13.1.3. If subcooling and superheat are high, adjust TXV valve to 8°F +/- 1°F superheat, then check subcooling.

13.1.4. If subcooling is high and superheat is low, adjust TXV valve to 8°F +/- 1°F superheat and remove charge to lower the subcooling to 8°F +/- 1°F.

The TXV should NOT be adjusted at light load / ambient conditions of 60°F or below.

13.2. FIXED ORIFICE / PISTON - FLOWRATOR COILS

Add refrigerant until the superheat measured at the outdoor unit suction/ vapor line matches the superheat from the chart below.

Outdoor Temp	Superheat		
°F D.B.	Min.	Nom.	Max.
65	30	35	40
70	26	30	34
75	21	25	29
80	17	20	23
85	12	15	18
90	8	10	12
95	4	5	7
100			

14. ELECTRIC HEAT

This air handler is available with factory installed 3kW to 10 kW electric heater kits ONLY. Refer to this product's Specification Sheet for electric heater kit electrical data. If replacing this option, the ONLY heat kits that are permitted to be used are the G(C,T)S & G(C,T)M series. Refer to the air handler unit's Serial & Rating plate or this product's Specification Sheets to determine the heat kits. No other accessory heat kit besides G(C,T)S/M series may be installed in these air handlers. Not intended for simultaneous operation of electric heat and reverse cycle heating. See the following tables:

TABLE 14.1 - AEC ELECTRIC HEAT KITS

MODEL	HEAT KIT	SPEED TAP	MIN. REQUIRED FOR EHK
AEC 18/24	G(C,T)S03	T4	600
	G(C,T)S05	T4	600
	G(C,T)S08	T5	730
	G(C,T)S10	T5	730
AEC 30/36/37	G(C,T)M03	T4	1010
	G(C,T)M05	T4	1010
	G(C,T)M08	T5	1070
	G(C,T)M10	T5	1070

TABLE 14.2 - AAC ELECTRIC HEAT KITS

MODEL	HEAT KIT	SPEED TAP	MIN. REQUIRED FOR EHK
AAC 18/24	G(C,T)S03	T4	790
	G(C,T)S05	T4	790
	G(C,T)S08	T5	940
	G(C,T)S10	T5	940
AAC 30/36/37	G(C,T)M03	T4	960
	G(C,T)M05	T4	960
	G(C,T)M08	T5	1050
	G(C,T)M10	T5	1050

15. START-UP

To properly check the unit's operation, the installer should have an electrical current measuring device (0-10amp Amprobe, Fluke) air pressure measuring device (0-1.0 in slope gauge), and a temperature measuring device (0-200F thermometer).

Install the Amprobe to measure blower current, the slope gauge to measure static air pressure at the units and the temperature device to measure unit supply and return air temperature. Before taking measurements, be sure that all registers, grilles and dampers are open or set to their proper positions. Be sure that clean filters are in place. Temperature measuring device must be installed to obtain average temperature at both inlet and outlet. For outlet, measure temperature of each main trunk at a location far enough away to avoid heater radiation and read the average temperatures. See Section 12 CFM Tables for the CFM that should be achieved at various external static pressures.

16. FINAL SYSTEM CHECKOUT

16.1. Make certain all cabinet openings are properly sealed and any grommets moved during installation are moved into proper place.

16.2. With cooling system operating, check for condensate leakage.

16.3. Perform leak detection inspection of refrigerant circuit and connecting piping.

16.4. Secure all panels.

17. WIRING DIAGRAMS

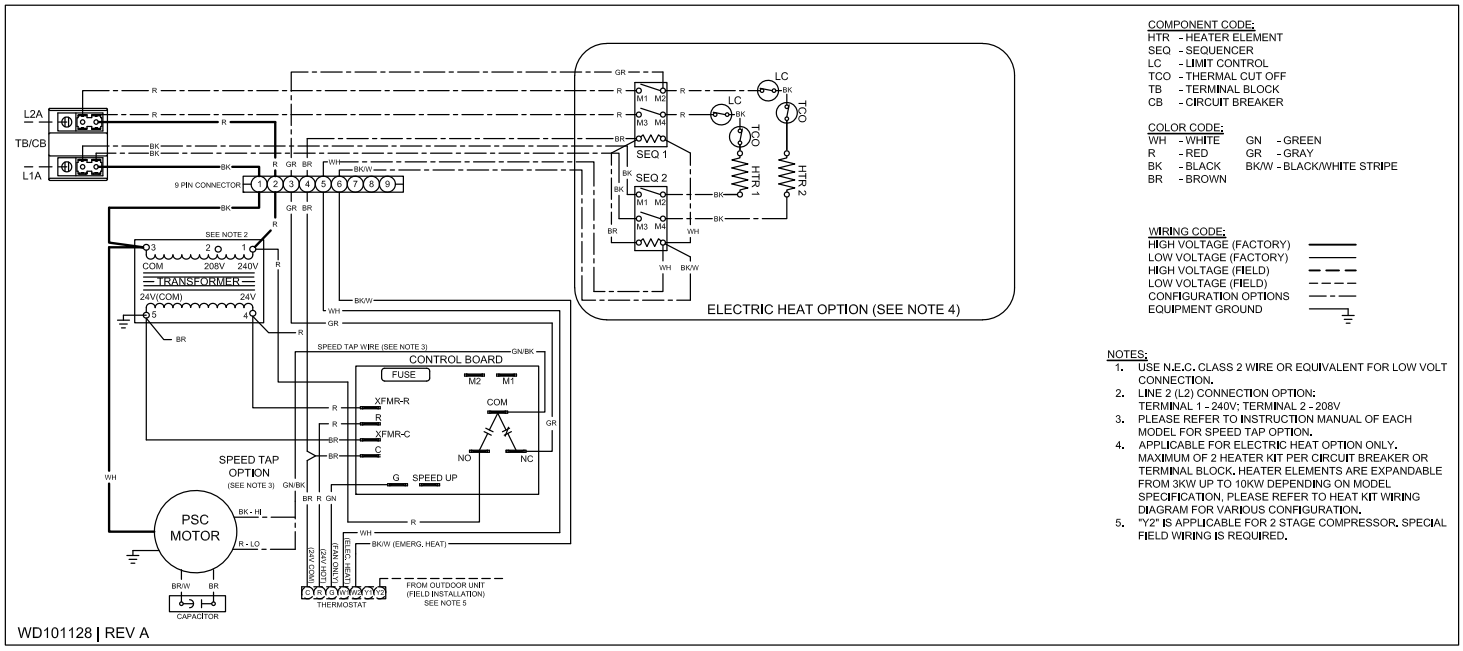


FIGURE 17.1 - PSC MOTOR

NOTE: Wiring Diagram is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

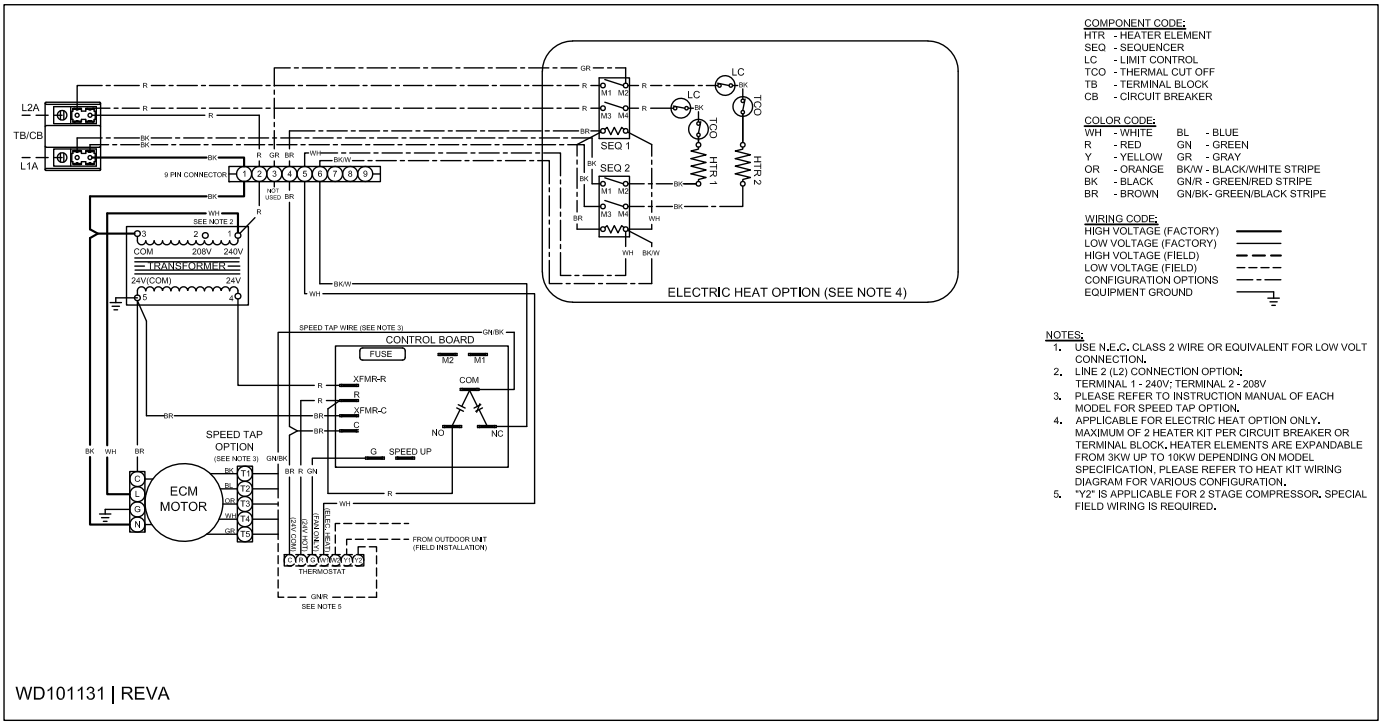


FIGURE 17.2 - ECM MOTOR

NOTE: Wiring Diagram is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

SCAN QR CODE TO VISIT ASPEN'S WEBSITE

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