FPM(A,B)N(C,U) Horizontal Fan Coil Units

Service and Maintenance Instructions

NOTE: Read the entire instruction manual before starting the installation.

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SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing and work gloves. Have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and the current editions of the National Electrical Code (NEC) NFPA 70.

In Canada, refer to the current editions of the Canadian Electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instruction manuals, be alert to the potential for personal injury.

Understand the signal words **DANGER**, **WARNING**, and **CAUTION**. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which **will** result in severe personal injury or death. **WARNING** signifies hazards which **could** result in personal injury or death. **CAUTION** is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

⚠ WARNING

UNIT OPERATION AND SAFERTY HAZARD

Failure to follow this warning could result in personal injury or death.

Puron (R-410A) systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410 equipment. Ensure service equipment is rated for R-410.

INTRODUCTION

FPM(A,B)N(C,U) Fan Coils are designed for horizontal orientation and are suitable for ceiling installations. The FPM(A,B)NC models are cased and configured from the factory for bottom return applications. FPM(A,B)NU models are uncased. Both units are available with field-installed electric heat. Units are used indoors as the fan coil for split-system heat pumps or air conditioners.

FPMAN(C,U) units are factory-equipped with a piston refrigerant metering device and are available in 18,000 through 36,000 Btuh nominal cooling capacities. FPMBN(C,U) are factory-equipped with a TXV refrigerant metering device and are available in 18,000 through 30,000 Btuh nominal cooling capacities.

The coil is equipped with sweat-type connections and is vapor-charged with dry nitrogen.

Units are designed for horizontal applications only. Local codes may limit this free-air-return type unit to installation in single-level applications.

FAN COIL DESCRIPTION AND TROUBLESHOOTING

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Before installation or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

FAN MOTOR

The motor is three-speed direct drive. High-speed lead is black, medium-speed lead is red, low-speed lead is blue, and common lead is purple. Be sure proper blower speed has been selected.

The motor is turned on through two different routes. The first occurs when thermostat calls for the fan in cooling, heat pump, or fan-only mode. A 24-Vac signal is sent to relay, causing relay to close its normally open contacts, turning fan on.

The second occurs when there is a call for electric heat. A 24-Vac signal is sent to heater sequencer/relay, causing it to close, directing 230V through the normally closed contact of fan relay, turning fan on. The fan remains on until sequencer/relay opens.

If motor does run, test motor for an open winding or a winding shorted to motor case. If either is present, replace motor.

ELECTRIC HEATER SERVICE

Service can be completed with heater in place. Shut off power before servicing.

A. Limit Switch

Refer to Electric Heater Kit Function and Troubleshooting section of this manual.

B. Relay

Refer to Electric Heater Kit Function and Troubleshooting section of this manual.

C. Transformer

A 40-VA transformer supplies 24-V power for control circuit. Check for 208/230V on primary side of transformer. If present, check for 24V on secondary side.

NOTE: Transformer is fused. Do not short circuit.

D. Fan Relay

Relay coil is 24-V. Check for proper control voltage. Replace relay if faulty.

CLEANING OR REPLACING REFRIGERANT FLOW-CONTROL DEVICE

The FPMAN(C,U) piston can be removed and cleaned if believed to be plugged. This unit's piston is unique and replacements are available from RCD.

The filter drier should be located on the liquid line at the indoor unit to prevent particulate from plugging the piston.

SEQUENCE OF OPERATION

A. Condensing Unit

COOLING

When thermostat calls for cooling, the circuit between R and G is complete and FR is energized. The normally open contacts close causing blower to operate.

The circuit between R and Y is also complete. This completed circuit causes contactor in outdoor unit to close which starts compressor and outdoor fan.

HEATING

When thermostat calls for heating and FAN switch is set on AUTO, the circuit between R and W is complete. The heater relay is energized which closes contacts of relay. This completed circuit energizes all heating elements HTR and blower motor.

B. Heat Pump

COOLING

On a call for cooling, the thermostat makes circuits R-O, R-Y, and R-G. Circuit R-O energizes reversing valve, switching it to cooling position. Circuit R-Y energizes contactor starting outdoor fan motor and compressor. Circuit R-G energizes indoor unit blower relay starting indoor blower motor.

When thermostat is satisfied, its contacts open de-energizing contactor reversing valve and blower relay. This stops compressor and fan motors.

HEATING

On a call for heating, the thermostat makes circuits R-Y and R-G. Circuit R-Y energizes contactor starting outdoor fan motor and compressor. Circuit R-G energizes indoor blower relay starting blower motor.

Should temperature continue to fall, R-W circuit is made through second-stage room thermostat bulb. Circuit R-W energizes a relay bringing on supplemental electric heat.

Circuit R-W also energizes the compressor lockout relay which breaks the R-Y circuit. This prevents the simultaneous operation of the heat pump and electric heater.

When thermostat is satisfied, its contacts open, de-energizing contactor and relay. All heaters and motors should stop.

ELECTRIC HEATER FUNCTION AND TROUBLESHOOTING

This section describes EHK3 series electric heaters by examining functional operation of this heater.

Service can be completed with heater in place. Shut off power before servicing.

DESCRIPTION OF ELECTRIC HEATER COMPONENTS

A. Limit Switch

The limit switch is a temperature sensitive control that's function is to prevent system from overheating in abnormal conditions. The temperature settings often vary from heater to heater due to variations in airflow patterns and element radiant heat conditions.

The devices are sized to remain on-line under heat pump conditions (115° F air off coil) and minimum CFM, but trip to prevent outlet air conditions above 200° F or excessive component or duct temperatures. The device itself consists of a bimetallic disc, which when overheated "snaps through" to open a normally closed high-voltage, high-current switch. When system temperatures cool sufficiently, the switch will automatically reset to its closed position. Normal failure mode for this switch is open.

If a limit switch has been determined to be defective, NEVER BYPASS THE LIMIT SWITCH. When replacing limit switch, ensure that it is replaced with a limit switch of identical opening temperature and closing differential. Limits switches are typically color-coded to identify their range.

B. Relay

The relays used on these heat kits utilize rectifier boards that sit atop the double pole relays. The rectifier board converts the 24AC signal into a DC current to drive relay. This heater control system does not incorporate any time delays. The fan motor is interconnected to one of the heater elements, this ensures fan operation during heater operation.

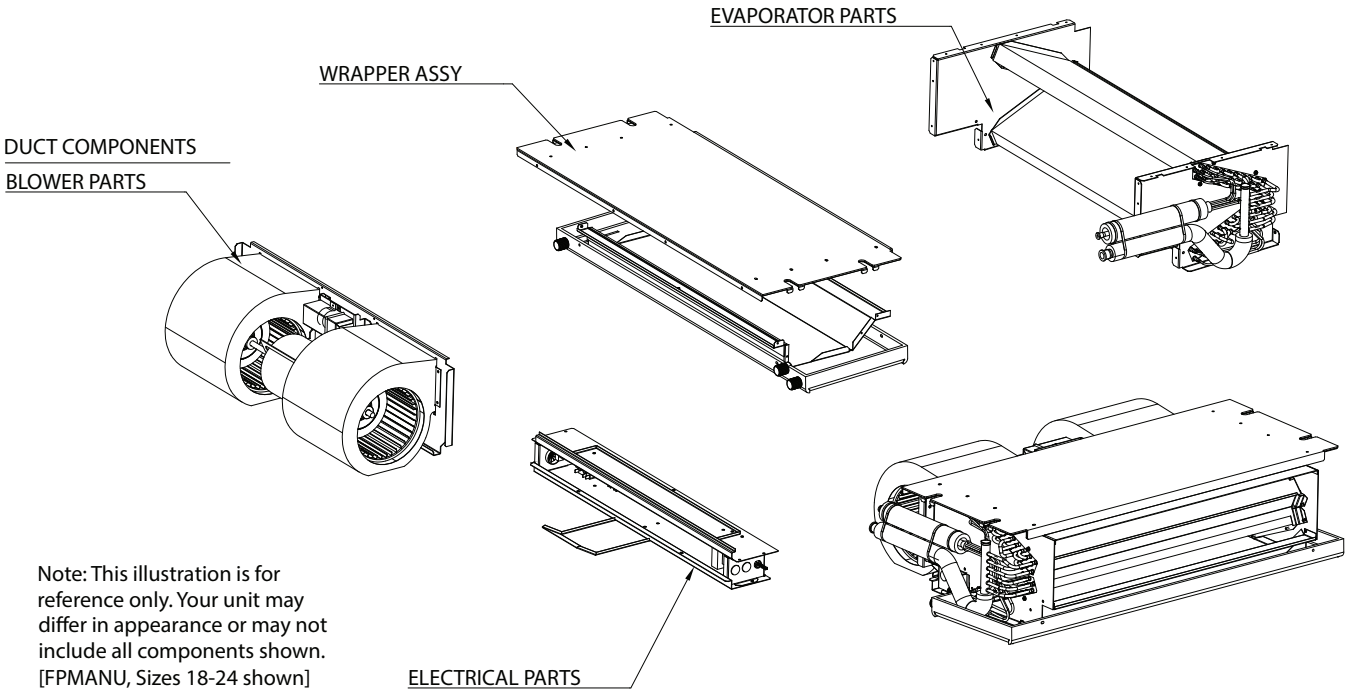


Fig. 1 - Exploded View

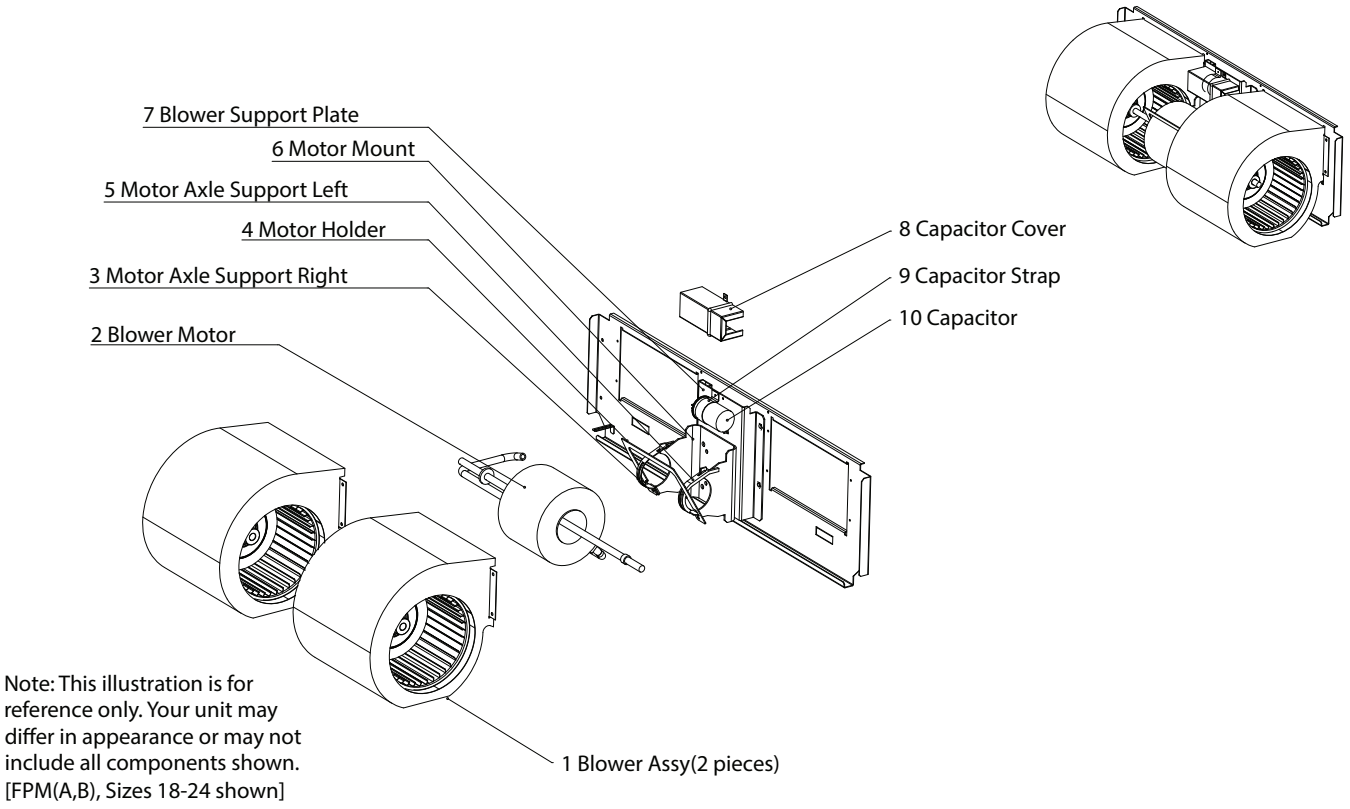
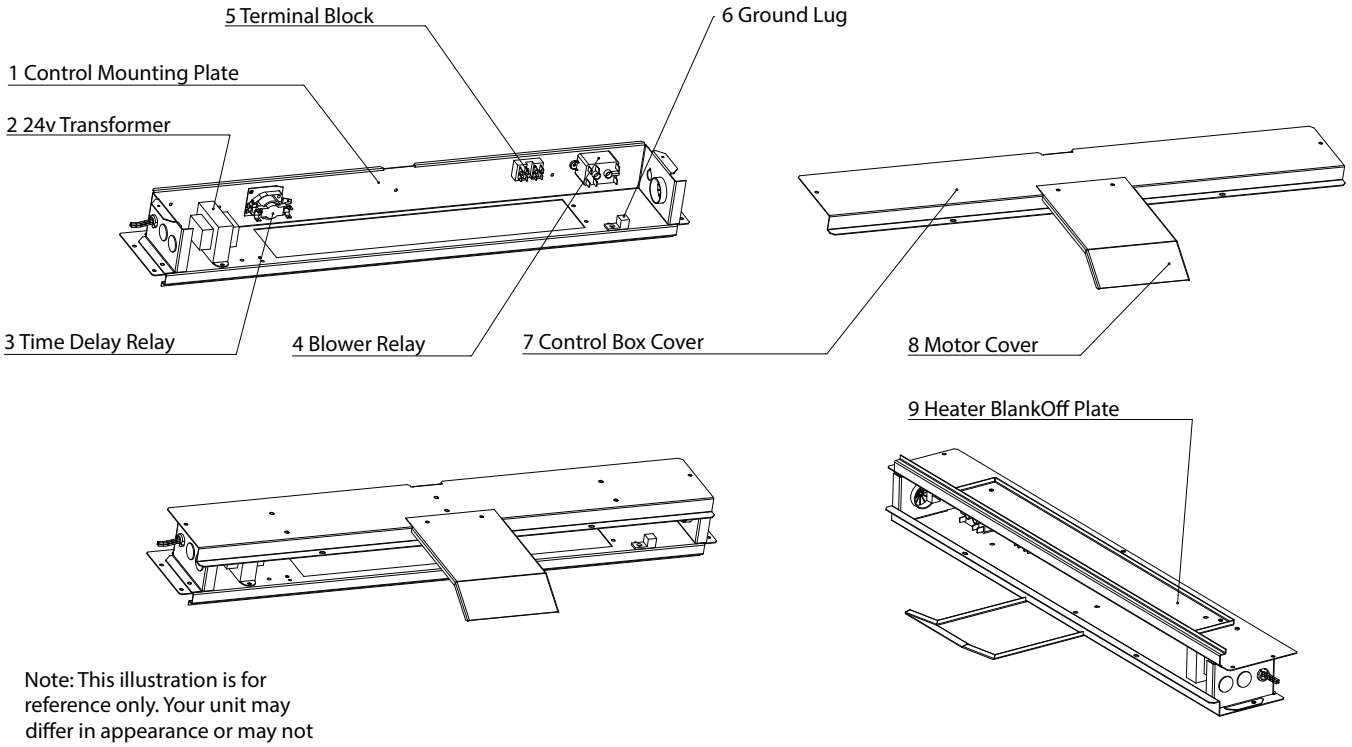


Fig. 2 - Blower Parts



Note: This illustration is for reference only. Your unit may differ in appearance or may not include all components shown. [FPM(A,B), Sizes 18-24 shown]

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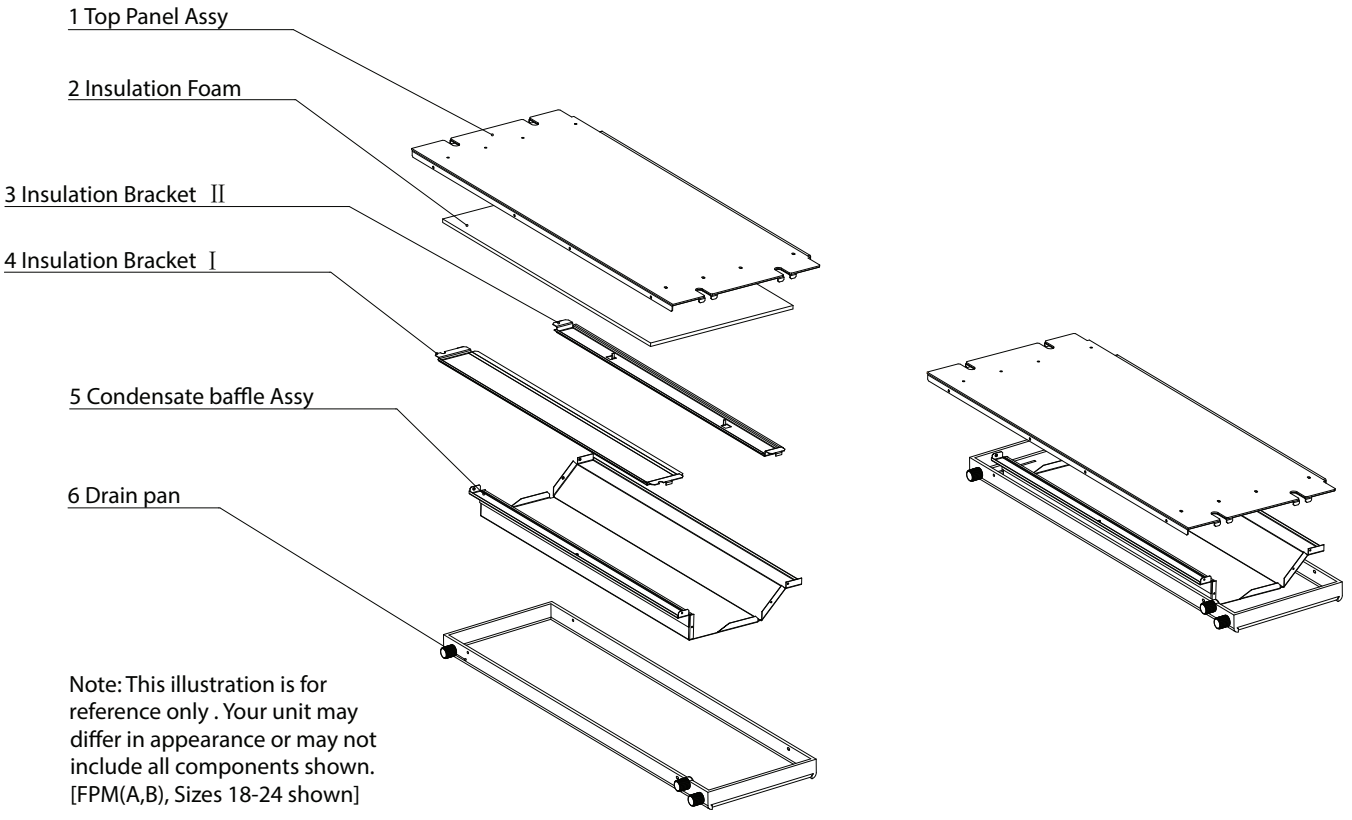
Fig. 3 - Electrical Parts



Note: This illustration is for reference only . Your unit may differ in appearance or may not include all components shown. [FPM(A,B), Sizes 18-24 shown]

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Fig. 4 - Internal Case

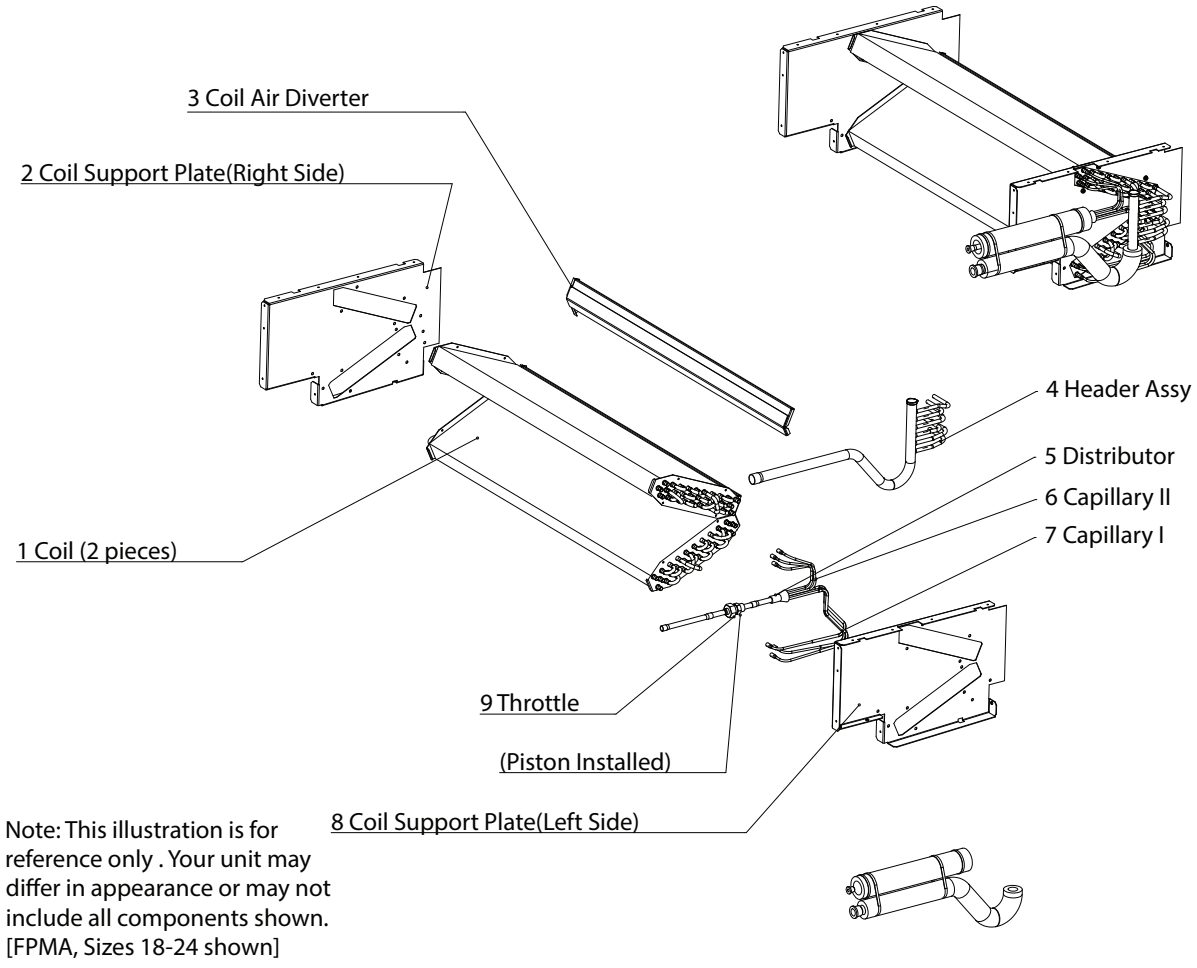

Fig. 5 - Coil Parts

CARE AND MAINTENANCE

The minimum maintenance requirements for this equipment are as follows:

1. Inspect and clean or replace air filter each month or as required.
2. Inspect cooling coil, drain pan, and condensate drain each cooling season for cleanliness. Clean as necessary.
3. Inspect blower motor and wheel for cleanliness each heating and cooling season. Clean as necessary.
4. Inspect electrical connections for tightness and controls for proper operation each heating and cooling season. Service as necessary.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

A. Air Filter

The air filter should be replaced as needed.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Never operate unit without a filter.

B. Cooling Coil, Drain Pan, and Condensate Drain

The cooling coil is easily cleaned when it is dry. Inspect coil and clean (if necessary) before each cooling season. To check or clean cooling coil, remove blower/heater access panel to gain full access to cooling coil. If coil is coated with dirt or lint, vacuum with a soft brush attachment.

Be careful not to bend coil fins. If coil is coated with oil or grease, clean it with a mild detergent and water solution. Rinse coil with clear water.

Be careful not to splash water onto insulation.

Inspect drain pan and condensate drain at same time cooling coil is checked. Clean drain pan and condensate drain by removing any foreign matter from pan. Flush pan and drain tube with clear water.

If drain tube is restricted, it can generally be cleared by high-pressure water. Cut plastic line and work outside condensate pan and away from coil to clear drain tube.

NOTE: There MUST be a trap in condensate line. Trap must be at least 3-in. deep, not higher than the bottom of unit condensate drain opening, and pitched downward to an open drain or sump.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage.

Do not use caustic household drain cleaners in the condensate pan or near the coil. Drain cleaners can quickly destroy a coil.

C. Disconnecting the Control Box Assembly

1. Disconnect power.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

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Before installation or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

2. Remove control box cover (four screws).

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Fig. 6 - Control Box Cover Removal

3. Remove control box assembly (five screws). If there is not enough slack in field wiring (high and low voltage), it is recommended to disconnect field wiring.

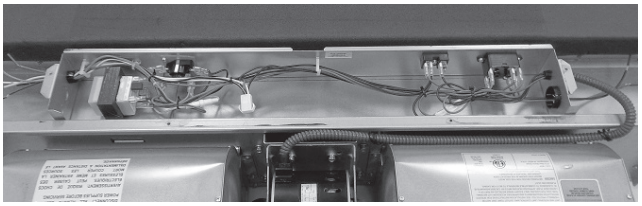

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Fig. 7 - Control Box Removal

D. Disconnecting the Blower Assembly

1. Disconnect power.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Before installation or servicing system, always turn off main power to system. There may be more than one disconnect switch. Turn off accessory heater power if applicable. Lock out and tag switch with a suitable warning label.

2. Remove control box cover (four screws). (See Fig. 6.)
3. Disconnect the (four) blower-motor power wires, noting connection locations. (See Fig. 7.)
4. Loosen the conduit holding ties.

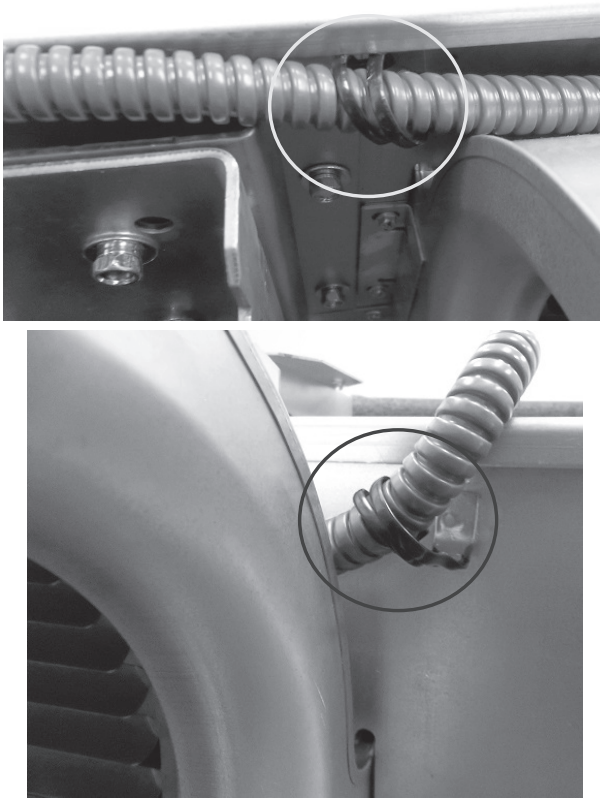

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Fig. 8 - Conduit Holding Ties

5. Remove the four outer screws that attach the blower support plate to each evaporator coil support.

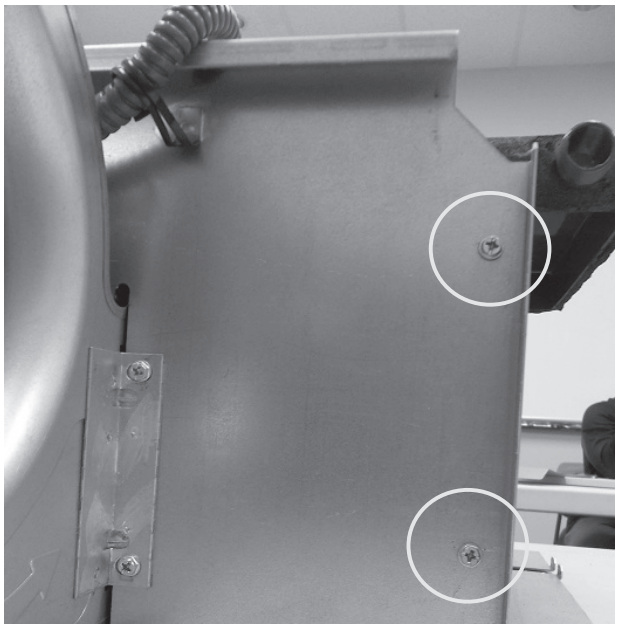

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Fig. 9 - Blower Support Plate Screws

6. Remove the two middle screws above/behind the blower motor that's attached to the top plate.

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution may result in personal injury.

After removing the sixth and final screw in Step 6, the blower assembly will be completely disconnected from the unit. Be ready to lower the blower assembly.

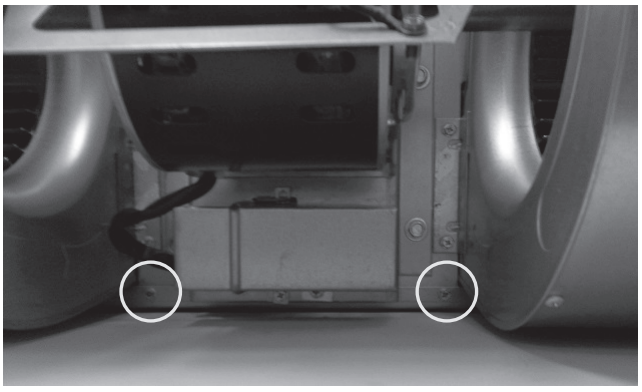

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Fig. 10 - Remove Middle Screws

E. Servicing the Fan Motor

1. After removing the blower housing from the unit, disconnect ground wire from screw on grounding bracket.

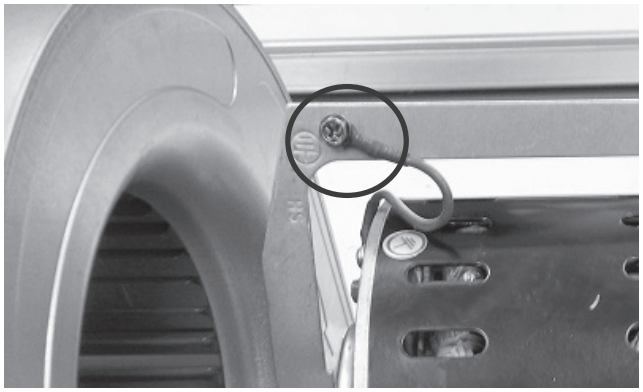

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Fig. 11 - Disconnect Ground Wire

2. Remove grounding bracket from motor-mount assembly. At this point, the clamp brackets will be loose and can be removed.

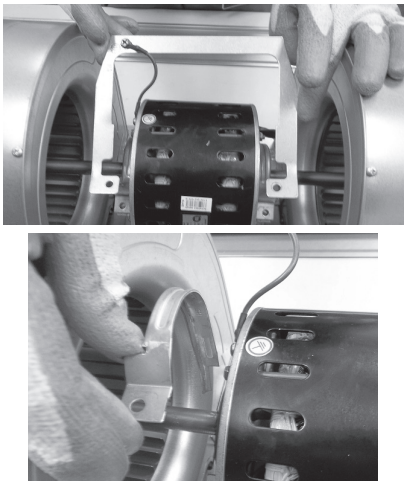

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Fig. 12 - Remove Grounding Bracket

3. Remove capacitor cover.

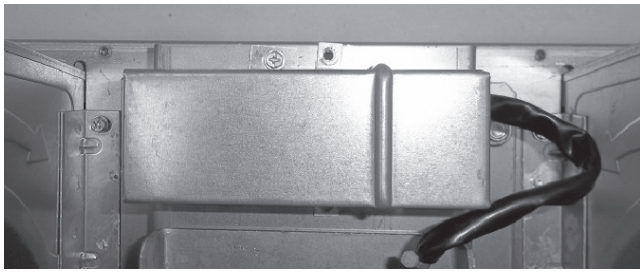

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Fig. 13 - Capacitor Cover

4. Disconnect capacitor leads from capacitor.

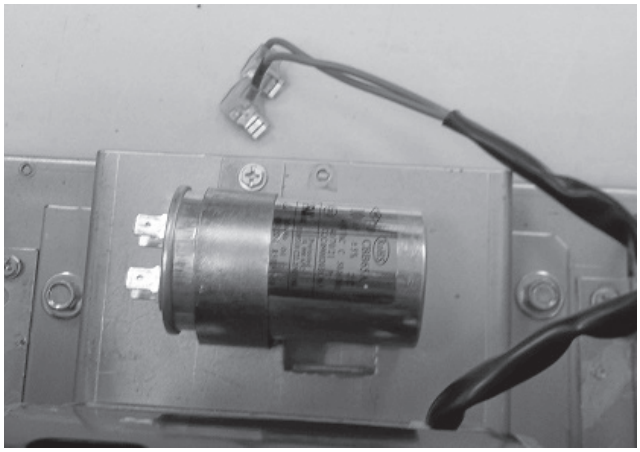

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Fig. 14 - Capacitor Leads

5. Loosen blower-wheel set screws from each motor shaft, accessing them through the blades of the blower wheels, with a Phillips screwdriver.

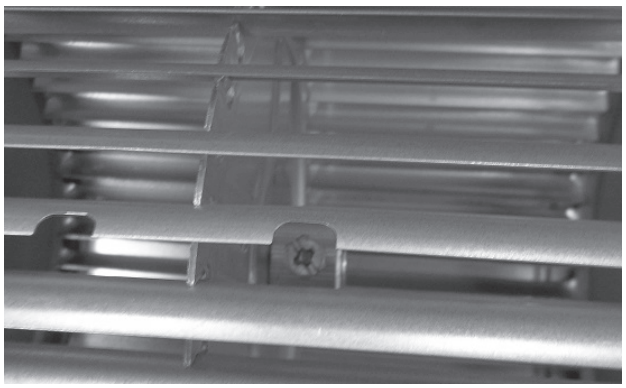

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Fig. 15 - Loosen Blower Set Screw

6. Disconnect one of the blower housings by removing the four housing screws.

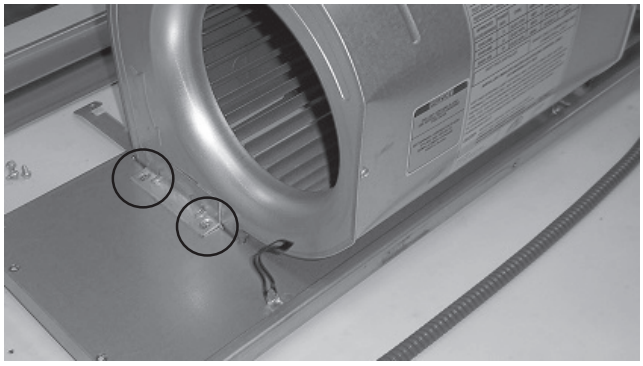

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Fig. 16 - Disconnect Blower Houosing

7. Remove housing from support plate and motor shaft.

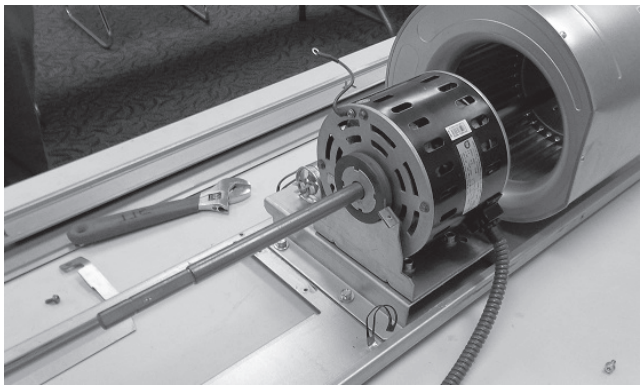

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Fig. 17 - Remove Blower Housing

8. Pull motor out of second housing, which can remain attached to the support plate.

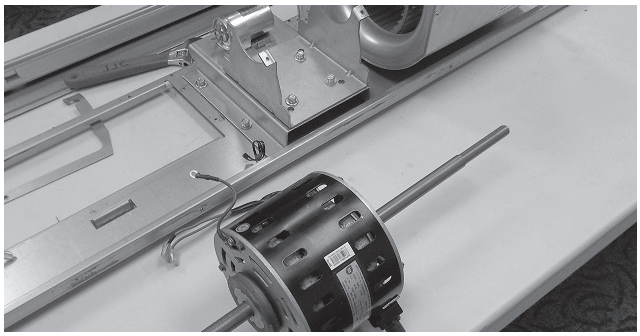

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Fig. 18 - Remove Motor from Second Housing

9. Reverse these steps to reinstall.

F. Cleaning the A-Coil

The A-coil can be accessed for cleaning by removing either the control box assembly or the blower assembly. (Refer to those previous instructions.)

G. Removing the Drain Pan

1. Disconnect condensate drains, if necessary.
2. Remove the four screws located near the corners. (See Fig. 19)
3. Lower drain pan from unit.

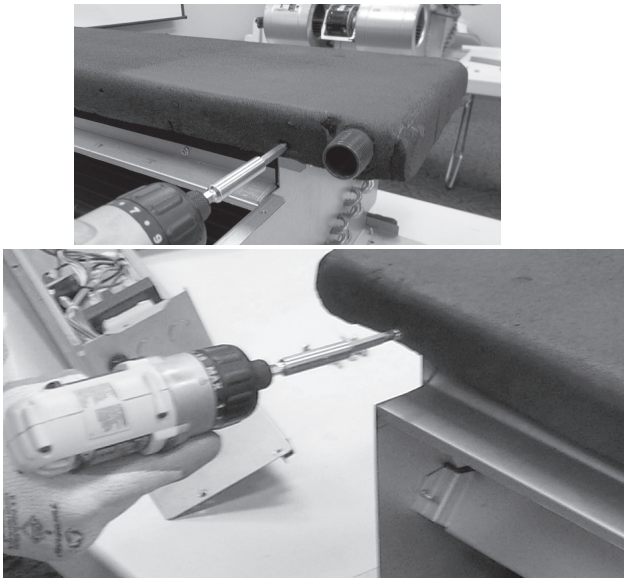

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Fig. 19 - Removing Condensate Pan

H. Changing the A-Coil

1. Disconnect power.
2. Disconnect field wiring (low and high voltage).
3. Disconnect condensate drain.
4. Remove entire fan coil unit from installation location.
5. Remove control box assembly. (See previous instructions.)
6. Remove blower assembly (See previous instructions.)
7. Remove drain pan (see previous) to the top plate.
8. From top of unit, remove the ten screws holding the coil assembly to the top plate.

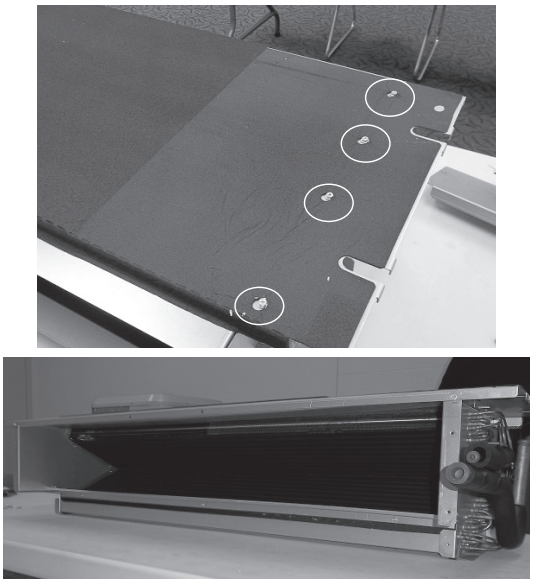

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Fig. 20 - Remove Top-Plate Screws

9. Remove the top plate and insulation.

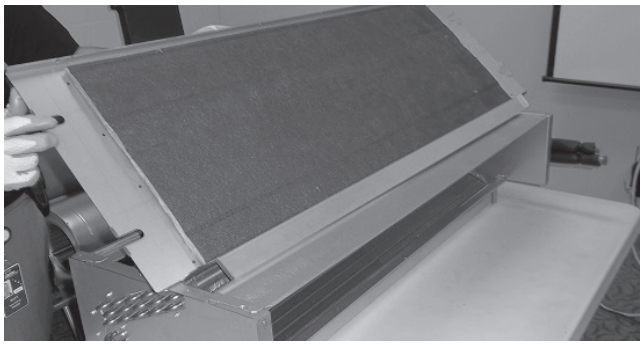

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Fig. 21 - Top Plate and Insulation

10. Remove the two insulation support brackets.

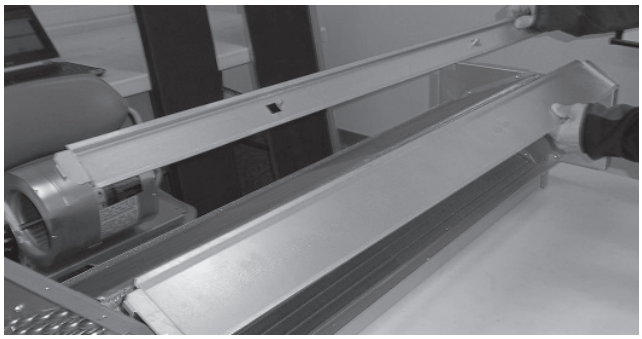

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Fig. 22 - Insulation Support Brackets

11. On bottom of unit, remove the eight screws attaching the condensate baffle assembly to the side coil supports.

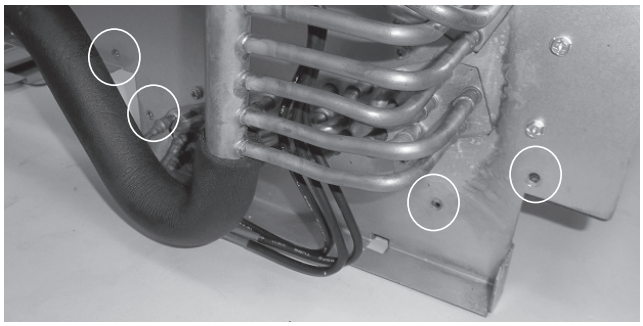

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Fig. 23 - Condensate Baffle Screws

12. Remove condensate baffle assembly.

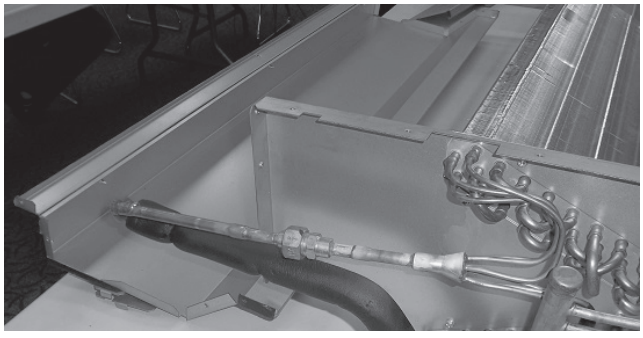

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Fig. 24 - Remove Condensate Baffle Assembly

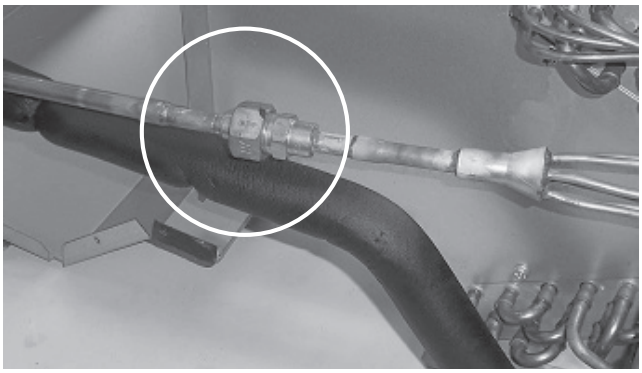
I. Refrigerant Metering Device

The refrigerant metering device is located on the side of the fan coil unit, in-line with the liquid refrigerant line .

FPMAN(C,U) Fan coils are shipped with a piston metering device designed for the most common outdoor unit matches. The piston included with the fan coil is unique to this product and cannot be replaced with the piston shipped with the outdoor unit. Refer to AHRI ratings to check if your combination can use the piston shipped with the unit or requires an accessory TXV.

FPMBN(C,U) Fan Coils are shipped with a TXV metering device.

Use two wrenches to remove the nut from the piston body or to remove the TXV.



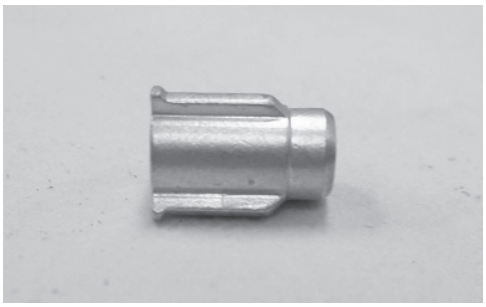


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Fig. 25 - Metering Device Location / Piston (FPMA Units)