Installation, Operation, & Maintenance

IOM 6702
Rev.B 07/25

FWA-AQ
SERIES FAN COIL UNITS

ATTENTION:

Read all instructions thoroughly and retain all manuals for future reference.

C ETL LISTED US
Intertek

COPYRIGHT

WARNING

Altering the product or replacing parts with non-authorized factory parts voids all warranty or implied warranty and may result in adverse operational performance and/or a possible hazardous condition to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning.

TABLE OF CONTENTS

SAFETY CONSIDERATIONS

READ THE ENTIRE MANUAL BEFORE STARTING THE INSTALLATION.

1. Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury damage.
2. Consult a qualified licensed installer, service agency, or your distributor for information assistance. The qualified licensed installer or service agency must use factory-authorized kits or accessories when servicing this product.
3. Refer to the individual instructions packaged with kits or accessories when installing.
4. Follow all safety codes.
5. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

This appliance is not to be used 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.
Children should be supervised to ensure that they do not play with the appliance
Use adequate personal protection equipment when installing and performing maintenance. After switching off and locking-out an electrical disconnect, verify a safe condition with an electrical tester. Discharge a capacitor before handling any PSC motor and wiring. Use eye protection, cut resistant gloves and sleeves to protect against metal edges and screws.

RECOGNIZE THE FOLLOWING SAFETY NOTATIONS THROUGHOUT THIS MANUAL AND POSTED ON THE EQUIPMENT:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate personal injury

WARNING

Indicates a potentially hazardous situation or unsafe practices that could result in severe personal injury or death and/or damage to property

IMPORTANT

Suggests important procedure steps to insure proper installation, reliability, or operation

WARNING

ELECTRIC SHOCK HAZARD

This warning signifies potential electrical shock hazards that could result in personal injury or death.

NOTE

Used to highlight suggestions, which may result in enhanced installation, reliability or operation

SAFTEY ACKNOWLEDGMENTS

NOTE

This unit may be installed at altitudes up to 10,000 ft. (3048 m)

WARNING

These instructions are intended to aid qualified, licensed, service personnel in proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death

CAUTION

All appropriate personal protection equipment should be worn when servicing or maintaining this unit. Personal injury can result from sharp metal edges, moving parts, and hot or cold surfaces.

WARNING

Do not exceed 400 psig (27.6 bar) pressure in the water coil

WARNING

Do not exceed 180° F (82° C) water temperature in the coil

WARNING

ELECTRIC SHOCK HAZARD

Disconnect all power supplies before servicing. Lock out/tag out to prevent accidental electrical shock.

WARNING

Always wear eye protection.

- When fan coil is operating, some components are operating at high speeds. Do not touch rotating items with any object
- Return and secure all electrical and service access panels in their proper place.
- Clear surrounding area of all tools, equipment and debris.

Check the entire unit to ensure its cleanliness

GENERAL INFORMATION

The manufacturer does not warrant equipment subjected to abuse. Metal chips, dust, drywall tape, paint overspray, etc. can void warranties and liability for equipment failure, personal injury, and property damage.

The manufacturer assumes no responsibility for equipment installed in violation of any code requirement.

WARNING

Always wear eye protection when working on equipment.

- Before servicing unit, always turn off all power to unit. There may be more than one disconnect switch. Electrical shock can cause personal injury or death.
- When fan coil is operating, some components are operating at high speeds. Personal injury can result from touching these items with any object.
- All electrical and service access panels must be secured in their proper place before operating equipment.
- Clear surrounding area of all tools, equipment and debris before operating unit.

CAUTION

Unit must not be operated during building construction due to excessive airborne dust and debris. Also, the unit must never run under any circumstances without an air filter in place.

These instructions give information for installation of FWA-AQ fan coil units only. For other related equipment, refer to the manufacturer's instructions.
Material in this shipment has been inspected at the factory and released to the transportation agency in good condition. When received, a visual inspection of all cartons should be made immediately. Any evidence of rough handling or apparent damage should be noted on the delivery receipt and the material inspected in the presence of the carrier's representative. If damage is found, a claim should be filed against the carrier immediately.

Extreme caution must be taken that no internal damage will result if screws or holes are drilled into the cabinet.

NOTE

State of MA.-248 CMR code of the state of MA. requires a pump timer (60 seconds on every 6 hours). See diagram.

WARNING

Some units are very heavy. Use two or more people when moving and installing these units. Failure to do so could result in personal injury or death. Contact with metal edges and corners while applying excessive force can result in personal injury. Use gloves when handling equipment. Use caution during installation or while servicing equipment.

WARNING

Hot water can cause scalding. If hot water coil is connected to domestic potable water a hot water mixing valve can be applied to the system to temper domestic water draw.

Installation of this fan coil should be performed only by a licensed contractor to ensure proper installation and the safety of the installer. Observe the following precautions for typical installations:

- Always use proper tools and equipment.
- No wiring or other work should be attempted without first ensuring fan coil is completely disconnected from the power source and locked out. Always verify that a good permanent, uninterrupted ground connection exists prior to energizing any power sources.
- Always review the nameplate and wiring diagram on each unit for proper voltage and control configurations. This information is determined from the components and wiring of the unit and may vary from unit to unit.
- When soldering or brazing to the unit, it is recommended to have a fire extinguisher readily available. When soldering close to water valves or other components, heat shields or wet rags are required to prevent damage.
- When the fan coil unit is in operation components are rotating at high speeds.
- Units must be installed level or angled toward the drain nipple to ensure proper drainage and operation.

GENERAL INFORMATION CONTINUED

- Check unit prior to operation to ensure that the condensate water will drain toward the drain connection. An overflow drain or an auxiliary drain pan under the fan coil may be required as a back up to a clogged primary drain.
- On the units with plastic drain pans DO NOT tighten more than hand tight.
- Check filter media installation to ensure that it is installed correctly. Use the directional arrows or other information on the filter to determine the proper flow direction.
- Ensure air distribution system does not exceed the external static rating of the unit.

Insulation is installed in indoor equipment to provide a barrier between outside air conditions surrounding the unit and the varying conditions inside the unit. If the insulating barrier is damaged, the surrounding ambient air will affect the inside surface temperature of the cabinet. The temperature/ humidity difference between the inside and outside can cause condensation to form on the inside and outside of the cabinet which leads to sheet metal corrosion and subsequently component failure.

Damaged insulation must be repaired or replaced before the unit is placed back into operation. Insulation loses its insulation value when wet, damaged, separated, or torn.

NOTE

These fan coil units are designed for quiet operation, however, all air conditioning equipment will transfer some amount of noise to the conditioned space. This should be taken into consideration when planning the location of the equipment.

FAN COIL UNIT

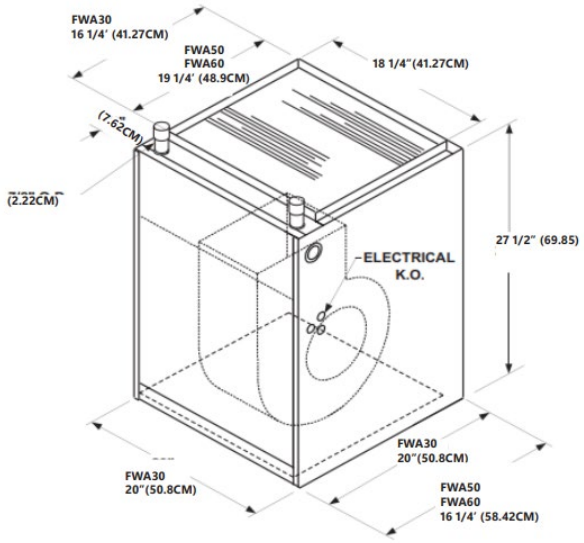

Figure 1 Unit Dimensions

The installer must adhere strictly to all local and national code requirements pertaining to the installation of this equipment. These units are designed to be installed vertically in the up flow position by the following mounting means:
All units are designed for indoor use only, and are agency listed for installation with zero clearance to combustible materials. This includes the fan coil cabinet, discharge plenum, and connecting ducts. Sufficient clearance must be provided at the front of the fan coil to allow access to electrical controls and removal of the motor /blower assembly for servicing. This clearance distance should be approximately the same as the depth dimension of the fan coil unit.

MOUNTING

FWA units are designed to be installed vertically in the up flow position.

It is important to ensure that the fan coils are securely mounted and the structure is sufficient to support the weight of the equipment. All anchors for mounting the equipment must be placed and sized to ensure a safe and durable installation

FAN COIL UNIT CONTINUED

HUNG ON CLOSET WALL

Fan coil is equipped with a flange on the rear top plate to allow hanging of the fan coil either on a field fabricated wall bracket or on the bracket manufactured by First Co.

It is recommended that sound isolating material be installed to prevent any undesired transfer of sound.

CLOSET PLATFORM

Fan coil is to be set on a platform and secured by screws or nails. Sufficient space for return airflow is required under the platform.

MAINTAINING LOW AIR LEAKAGE RATE

During installation, ensure that all grommets and gaskets remain intact on all surfaces as shipped with the unit. Any knockouts, penetrations, and holes that were exposed must be sealed to prevent air leakage. All access panels and covers must be flush with each other and the cabinet. With these requirements satisfied, the unit will maintain and achieve less than 2% air flow leakage when tested in accordance with ASHRAE Standard 193.

AIR DISTRIBUTION DUCTS

All duct work must be installed in accordance with National Fire Protection Association Codes 90A and 90B. Supply and return duct system must be adequately sized to meet the system's air requirements and static pressure capabilities. Ducts should be adequately insulated to prevent condensation during the cooling cycle and to minimize heat loss during the heating cycle. The ducts should be insulated with a minimum of 1-inch insulation with a vapor barrier in conditioned areas or 2-inches minimum in unconditioned areas. All return air must be filtered to prevent dirt buildup on the coil surface. If there is no ducted return, applicable installation codes may limit the unit to installation only in a single story residence. In many cases it is acceptable to use ducting of the same size as the fan coil connections. However, unique arrangements or long duct runs must be confirmed by a local professional. The manufacturer will not be responsible for misapplied equipment.

ELECTRICAL

WARNING

ELECTRIC SHOCK HAZARD

- Disconnect all power supplies before servicing; lock out/tag out to prevent accidental electrical shock. Note: there may be multiple power sources.
- Use copper conductors only.
- install all parts and panels before operating.
- Failure to follow these warnings can result in injury or death.

All wiring must comply with local and national code requirements. Units are provided with wiring diagrams and nameplate data to provide information required for necessary field wiring.

These units are provided with a Class 2 transformer for 24-volt control circuits. Should any add-on equipment also have a Class 2 transformer furnished, care must be taken to prevent interconnecting outputs of the two transformers by using a thermostat with isolating contacts.

Field installed electrical wiring supplying power to this unit and / or electric heaters must include a disconnect device at the unit.

WARNING

ELECTRIC SHOCK HAZARD

Units with ECM motors have line voltage power applied at all times. Make sure power is disconnected before servicing.

HOT WATER COIL PIPING

HOT WATER COIL PIPING PRECAUTIONS

1. Flush all field piping prior to connection to remove all debris.
2. Use wet cotton rags to cool valve bodies when soldering.
3. Open all valves (mid-way for hand valves, manually open on motorized valves) prior to soldering.
4. When soldering to bronze or brass, heat the piping while in the socket/cup and begin introducing the solder when the flux boils rapidly. Avoid direct flame into the solder joint.
5. Heat can only be applied to the cup of the valve body for a minimal time before damage occurs (even with the use of wet rags).
6. Avoid rapid quenching of solder joints as this will produce joints of inferior quality
7. Provisions must be made for expansion and contraction of piping systems. All horizontal and vertical risers, including runouts, must be able to withstand significant movement with temperature changes. Failure to do so will result in damage and failure of piping, fittings and valves throughout the building.
8. All piping made in the field should be installed with consideration of additional space for any electrical routing that may be required.
9. Connect all piping per accepted industry standards and observe all regulations governing installation of piping systems.
10. When all connections are complete, pressure test system. Repair any solder joint leaks and gently tighten any leaking valve packing nuts and piping accessories, as required.

ELECTRICAL OVERCURRENT PROTECTION

HACR type breakers are recommended. Other overcurrent protection devices that comply with applicable codes are acceptable

Refer to the figure 2 for typical piping for tank type Aqua Therm System.

The hot water coil connections are 3/4 inch nominal (7/8” OD) copper. The hot water supply to the fan coil should be on the right when facing the fan coil upright and from the front.

WARNING

An expansion tank may be required if a back-flow preventer is installed in the system.

All piping between the water heater and fan coil unit should be 3/4” nominal (7/8” OD) copper pipe to prevent excessive head pressure loss. If copper or other piping material is used the installer must calculate its pressures drop and size pipe and overall length accordingly to match the performance of the circulator. Maximum GPM through the coil is 4.5 GPM.

NOTE

A water heater is designed to produce hot water. Hot water represents a serious safety hazard due to potential scalding. The temperature of water normally required to provide space heating (135 to 140 degrees) may be hotter than certain codes allow for domestic hot water. An “anti-scald valve” can be installed in the hot water piping that would allow the domestic water to be supplied at a lower temperature than the space heating water. These can be obtained locally and should be installed according to the manufacturer’s installation instructions.

It is also recommended that all piping be adequately insulated to prevent freezing when piping is run in an unconditioned space.

Solder Connections - All copper joints in the water lines must be made with low temperature - non lead solder.

"T" Connections (at the water heater)-Water lines to and from the fan coil unit must be taken from the horizontal connection of the "T" fittings in the vertical hot and cold water supply lines at the water heater. This ensures that any air in the system will be purged each time water is used in the dwelling. See figure 4.

Isolation Valves - Two valves are recommended to be installed within the circulating loop to permit servicing of the system if required and to assist in purging the system.

HOT WATER COIL PIPING CONTINUED

NOTE

Hot water coil freeze protection is available for applications where the fan coil is located in ambient air locations (attics, crawl spaces, etc.) or within structures that may be unoccupied during freezing conditions. Consult the factory for additional information.

CAUTION

Hydronic systems are not designed to hold pressurized air and should only be tested with water. Pressurizing system with air could damage equipment.

CAUTION

When connecting piping to fan coil units, do not bend or reposition the coil header tubing for alignment purposes. This could cause a tubing fracture resulting in a water leak when pressure is applied to the system.

PRE-STARTUP CHECKS

WARNING

- Electrically ground fan coil. Connect ground wire to ground terminal marked with the protective earth (ground) symbol. Failure to do so can result in injury or death.
- Do not touch any rotating component with any object. Damage to the equipment and personal injury can occur.

CAUTION

Any device such as a fan switch or thermostat that has been furnished by the factory for field installation must be wired in strict accordance with the wiring diagram that is supplied with the unit. Failure to do so could result in damage to components and will void all warranties.

Before start-up, all of the components should be given a thorough check. Optimal operation of this equipment requires cleanliness. Often after installation of this equipment additional construction activities occur. Care must be taken to protect the equipment from debris during these construction phases.

Prior to starting the unit:

1. Ensure supply voltage matches nameplate data.
2. Ensure unit is properly grounded.
3. With power off, check blower wheel set-screws for tightness and ensure blower wheels rotate freely and quietly.
4. Ensure fan coil is properly and securely installed.
5. Ensure unit is sloped toward drain line.
6. Ensure unit will be accessible for servicing.
7. Ensure condensate line is properly sized, run, trapped, pitched and tested.
8. Ensure all cabinet openings and wiring connections have been sealed.
9. Ensure a clean filter is in place and of adequate size.
10. Ensure all access panels are in place and secured
11. Check that the water coil, valves and piping have been leak checked and insulated as required.
12. Ensure that all air has been vented from the water coil.

HEATING CYCLE START-UP

1. Fill the water heater. Open a hot water faucet while filling the water heater to vent the air. When the tank is full and all the air is purged, close the faucet.
2. Ignite the water heater and set the thermostat to 140 degrees.
3. Purge the air handler's hot water coil and lines. Close valve number 1 and open valve number 2 (See figure 2). Next, open the air bleed valve. When all of the air is purged from the lines close valve number 2 and open valve number 1. After all the air is purged from the coil and lines, open both valve number 1 and 2 and close the air bleed valve.

NOTE

It may require purging several gallons of water so either have a bucket available or a means of discarding the water.

WARNING

To prevent damage, the fan coil unit should not be energized for heating until the hot water coil and all the water lines have been purged of air.

HEATING CYCLE START-UP CONTINUED

4. Switch the room thermostat to the "Heat" position and raise the temperature setting to a position approximately ten degrees above room temperature.

NOTE

The door switch must be activated to operate the unit.

The pump should energize and begin circulating the hot water through the coil. If the pump is operating properly and the water temperature in the water heater has reached the set point, then the hot water inlet at the fan coil unit will be hot. If the pump is running but hot water is not circulating, open the air bleed valve long enough to purge any remaining air from the hot water lines and coil. This will allow the pump to begin circulating hot water.

5. The water heater thermostat should be adjusted so that the water temperature entering the hot water coil is as close to 140 degrees as possible with the system energized and operating long enough for all temperatures to stabilize.

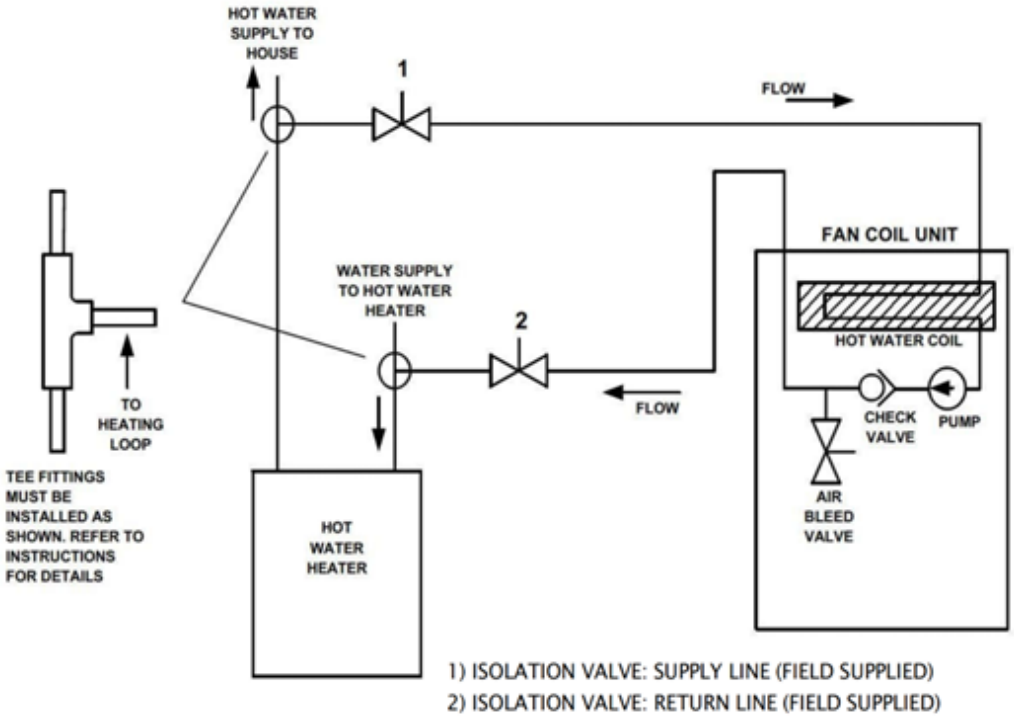

Figure 2 Typical Piping Schematic

WIRING DIAGRAM

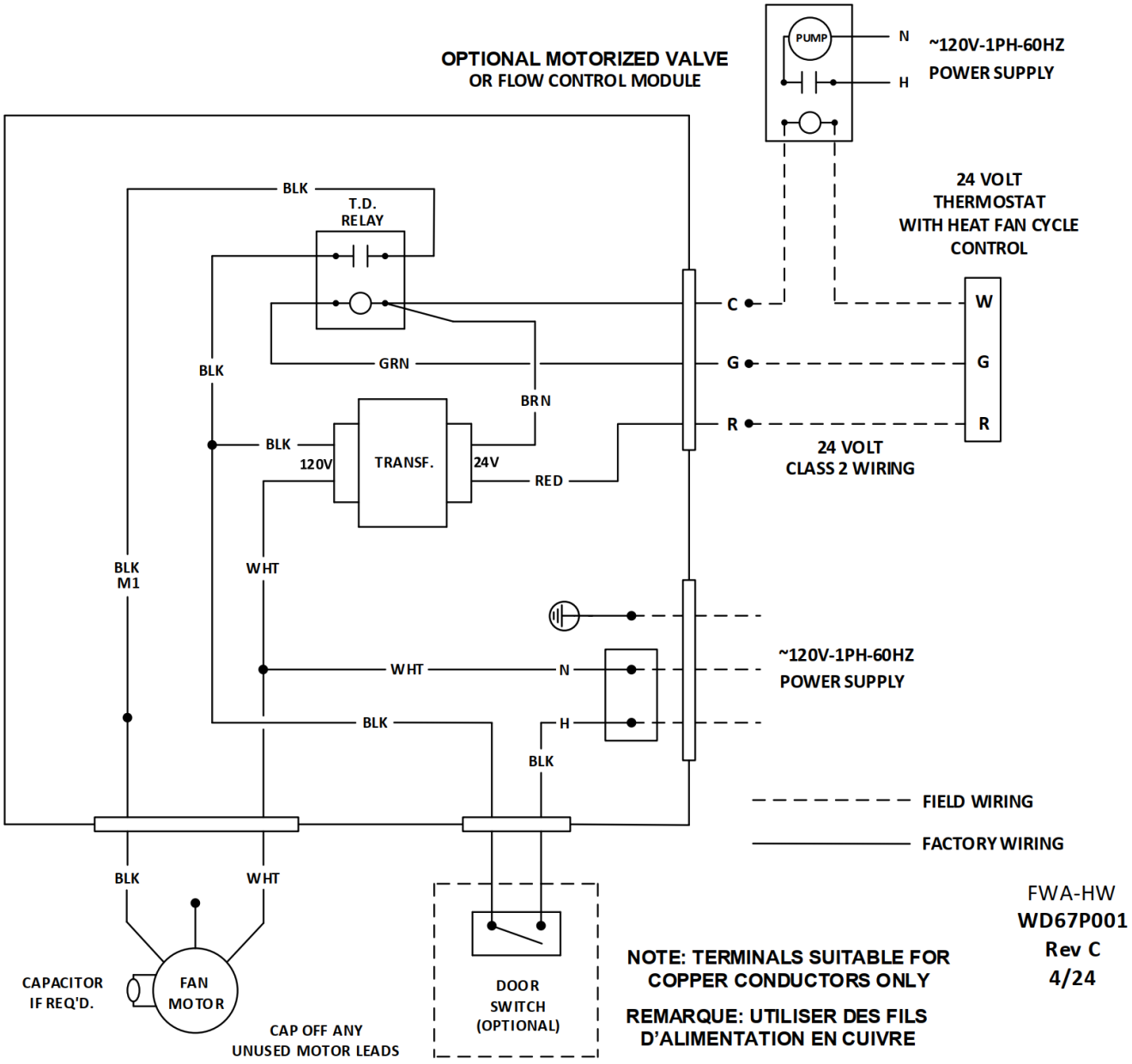

Figure 3 WD67P001

WIRING DIAGRAM CONTINUED

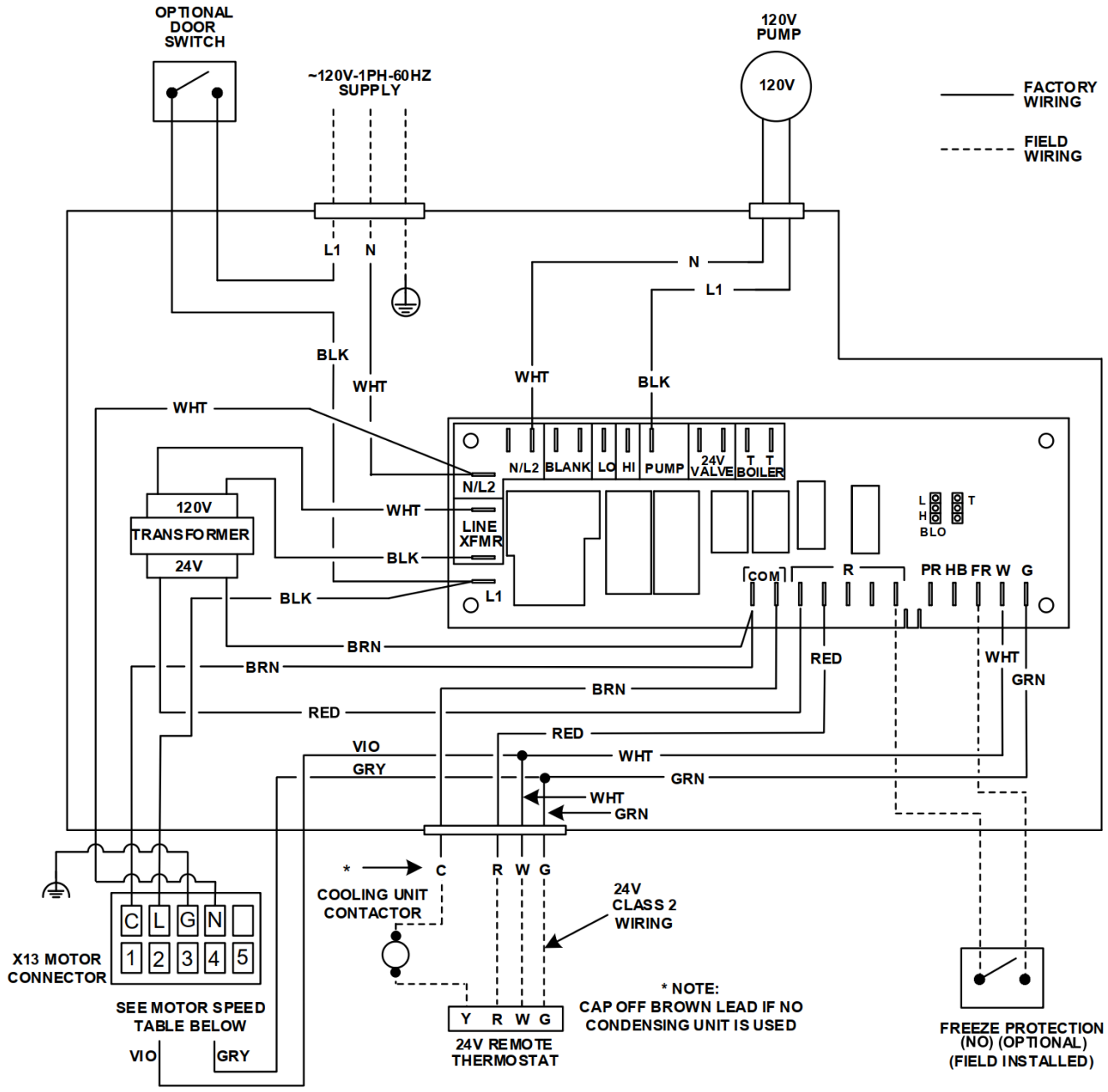

Figure 4 WD67X001

PUMP REPLACEMENT

Disconnect electrical power before servicing the unit. To replace the circulator pump, close the isolation valves and relieve the water pressure within the heating loop. Disconnect the pump's 115 volt power lines within the control box and remove the four hex head screws securing the pump motor to the pump's volute.

Reverse the above steps for reassembling the pump, however make sure that the pump or volute has the rubber O-ring in place before assembling.

CHECK VALVE REPLACEMENT

Disconnect electrical power before servicing the unit.

To replace the internal check valve, close the isolation valves and relieve the water pressure within the heating loop. Remove the four hex head screws securing the pump motor to the pump's volute and remove. The check valve is located in the volute.

Rotate the check valve to release and remove from the volute.

Reverse the above steps for reinstalling a check valve, however make sure that the pump or volute has the rubber O-ring in place before assembling.

MAINTENANCE

FAN

The fan should be inspected and cleaned annually, in conjunction with maintenance of the motor and bearings. It is important to keep the wheels clean in order to avoid imbalance and vibration.

MOTOR

Check motor connections to ensure that they are secure and made in accordance with the wiring diagram.

The blower motor should be cleaned annually.

WARNING

Units with ECM motors have line voltage power applied at all times. Make sure power is disconnected before servicing.

FILTER

The air filter should be cleaned or replaced every 30 days or more frequently if severe conditions exist. Always replace the filter with the same type as originally furnished.

COIL

Any dust or other contaminants which accumulate on the heat transfer surfaces interferes with the air flow and impairs heat transfer. The coil must be kept clean by any of the following methods.

- Cleaning with low-pressure compressed air.
- Flushing or rinsing with water (a detergent is advisable for greasy surfaces).

PREVENTATIVE MAINTENANCE

To achieve maximum performance and service life of each piece of equipment, a formal schedule of regular maintenance should be established and maintained.

MAINTENANCE UPDATES

Contact Factory for Maintenance Program Information.

TROUBLESHOOTING (MOST LIKELY PROBLEMS AND CAUSES)

Important: For system to operate properly power should be turned ON and all shut-off valves should be OPEN.

PUMP DOES NOT RUN:

These pumps may sometimes “stick”due to non - use and fail to start. Before replacing pump:

- Turn off power. Remove large screw plug in end of pump motor and turn shaft several times with a small screw-driver. Replace plug and start system. Pump should start.
- If pump has to be replaced, first shut off all isolation valves between the water heater and air handler and re-live the city water pressure by opening the air purge valve. Then remove the four "allen" head screws that attach the pump motor to the pump volute rather than un-soldering the entire pump assembly.

PUMP IS NOISY:

Air may still be in the heating loop. Re-purge the system as described under “start-up procedure".

WATER HEATER T & P VALVE “WEEPING”:

This situation usually occurs in those systems located in areas where local codes require the installation of a “backflow preventer” in the cold water supply line to the water heater. This situation is caused by the expansion of the water when heated. An expansion tank may be required to solve this problem. Contact local plumbing authorities for assistance.

HOT WATER CIRCULATES THROUGH HOT WATER COIL DURING COOLING CYCLE:

Check valve may be stuck open allowing "thermosyphoning" (circulation) of hot water.

INSUFFICIENT OR NO HEAT:

1. Air still in heating loop. Re-purge system.
2. Inlet and outlet piping connections at the air handler may be piped backwards.(See "Hot water piping".)
3. Water heater thermostat not turned up high enough.
4. Water heater thermostat not calibrated properly.
5. Restricted or improperly installed dip tube in water heater.
6. Restriction somewhere in heating loop. Confirm that no other check valves or devices have been installed in the heating loop except as supplied by First Co.

NOTE

Some water heaters come with two factory installed check valves located on the space heating connections. Since the circulating pump in the Aqua Therm® system may not be able to open these valves in addition to the Aqua Therm® check valve, these two valves should be removed before installation.

7. Air handler or hot water coil not large enough.
8. Water heater not large enough

MASSACHUSETTS COMBO SYSTEM LAYOUT

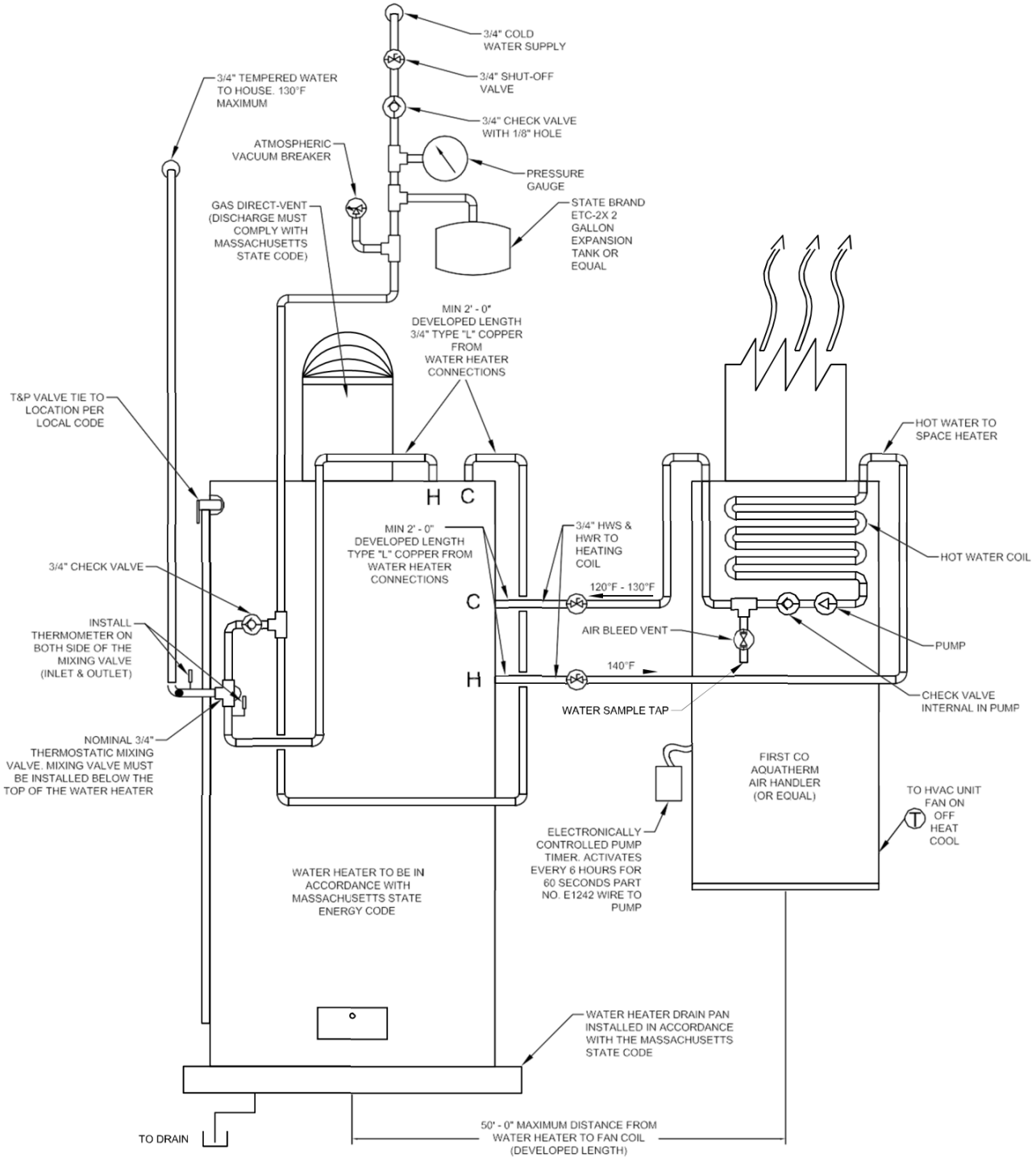

Figure 5 Massachusetts Combo System Layout

NOTES

P.O. Box 270969 Dallas, TX 75227
www.firstco.com or www.ae-air.com