

*RR, *RM, *RS



Installation, Operation, and Maintenance Instructions

WARNING TO INSTALLER, SERVICE PERSONNEL, AND OWNER


Altering the product, improper installation, or replacing parts with unauthorized parts voids all warranty or implied warranty and may result in adverse operational performance or possible hazardous conditions to service personnel and occupants. Company employees or contractors are not authorized to waive this warning.


- NOTES:
- *Read the entire installation instruction manual before starting the installation.*
 - *These instructions are intended as a general guide and do not supersede national, state, or local codes in any way.*
 - *These instructions must be left with the property owner.*


SAFETY CONSIDERATIONS


Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified licensed installer, service agency, or your distributor for information or assistance. The qualified licensed installer or service 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 and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. 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.

Recognize safety information. This is the general safety-alert symbol . When you see this symbol on the unit and in instruction manuals, be alert to

the potential for personal injury or damage to equipment. The lightning bolt symbol  signifies an electrical shock hazard.

 **WARNING:** *This WARNING signifies general hazards which could result in personal injury or death.*

 **WARNING:** *This WARNING signifies electrical shock hazards which could result in personal injury or death.*


 **CAUTION:** *CAUTION is used to identify unsafe practices which would result in product and property damage.*

NOTE: *NOTE is used to highlight suggestions which may result in enhanced installation, reliability, or operation.*


GENERAL

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.

 **WARNINGS:**

- 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 the air handler 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 these air handlers 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.

All models are designed for indoor installation only. The installation of this unit, field wiring, duct system, and other related equipment must conform to the requirements the National Electric Code, ANSI/NFPA No. 70 (latest edition) in the United States, as well as any state laws and local codes. Local authorities having jurisdiction should be consulted before installation is made. Such applicable regulations take precedence over the general instructions contained in this manual.

INTRODUCTION

Model nomenclature for the air handlers described in this installation instructions are as follows:

RR - Furred-in, single unit designed for concealed applications along room walls or corners.

RM - Furred-in master component to be coupled through risers to corresponding slave unit.

RS - Furred-in slave component coupled to master, but with all independent controls and valving.

The air handler units are designed for vertical, “stacked”, applications with nominal air capacities of 300 through 1200 CFM. Models incorporate a positive slope metal or plastic removable drain pan with 3/4” copper drain coupling. Optional equipment includes, multiple coil combinations in three, four, and five row water coils, multiple supply grille and riser position combinations, fresh air inlets and multiple combinations of valve packages. Two pipe heating and cooling, two pipe with auxiliary electric heat are available with manual or automatic changeovers controls with two types of thermostat options.

INSTALLATION PRECAUTIONS



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.

Installation of this the air handler 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 that the air handler 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 valve packages or other components, heat shields or wet rags are required to prevent damage.
- When the air handler 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.
- Check unit prior to operation to ensure that the condensate water will drain toward the drain connection.
- Be sure that the drain pan is free from foreign material prior to start up.
- 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.



WARNING: Never use the risers to lift the units. Risers are fitted loosely within expansion guides and attached to coil feed pipes which can be damaged.



CAUTION: When securing drywall or other wall treatments to this cabinet take care to avoid penetration into the coil, manifolding or electrical wiring by fasteners which could cause flooding or an electrical shock hazard.

AIR HANDLER UNIT

The installer must adhere strictly to all local and national code requirements pertaining to the installation of this equipment. These units are designed for installation in a vertical position. 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.

Access must be provided for servicing the unit. If this access is provided by a removable wall panel, ample space must be allowed for removal of the blower and to provide access to electrical and plumbing controls.

CHECK EQUIPMENT Unpack unit and move to final location. Remove packaging taking care not to damage unit. Inspect air handler unit for damage prior to installation. File a claim with shipping company if shipment is damaged. Carefully inspect blower for rough handling that can cause misalignment or shaft damage. Check to make sure the valve packages have not been damaged during shipment. Check ID tags for riser tier, floor, and room numbers then ensure proper placement before proceeding with the installation. Blow out risers if protective caps are missing and cover again with tape or foil.

INSTALLING AIR HANDLER



CAUTION: Extreme caution must be taken that no internal damage will result if screws or holes are drilled into the cabinet. Failure to follow this CAUTION could result in product damage and minor personal injury.



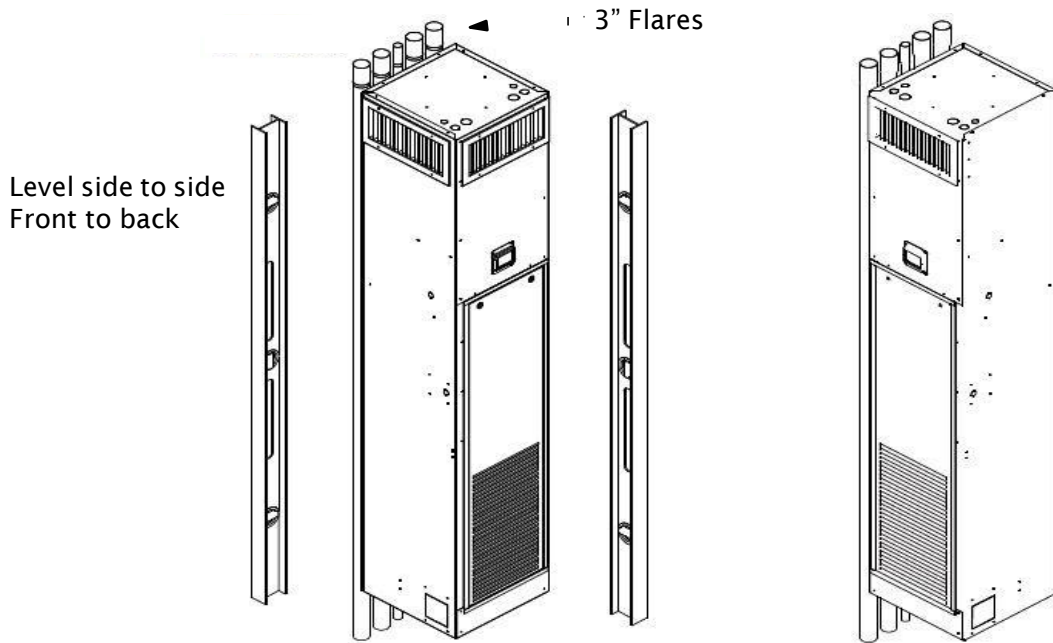
CAUTION: The unit should be leveled in such a way that there is slope toward the condensate drain pan nipple to assure positive drainage. This is taken care of if the unit is level and plumb.

SET UNITS IN PLACE

Begin on the lowest floor and progress upward floor by floor to the top. Remove bottom protective caps and top caps from unit below. Tip unit over riser chase hole in the building floor. As the unit righted, align the risers with the unit below. If required, then install isolator pads, field supplied, beneath the four corners of the cabinet now.

ATTACH UNIT RISERS

Each riser has a 3" flared opening at the top to accommodate the riser of the unit on the next floor. An insertion of 2" is normal. Bottoming would create a form of preloading which is undesirable. If, due to building characteristics, an extension is required to mate to the previous unit, or the next, then install it now. Level unit to ensure proper condensate drainage. Make plumb in directions and then anchor to the building using the lag screws or bolts. After all units in a vertical column are anchored make unit to unit riser connections. First, center each riser on the cabinet opening. Get as vertical a placement as the riser chase will allow. A minimum insertion depth of 1" is required into each flare of previous unit riser. Now solder to seal union using silfos or appropriate high temperature alloy.



WARNING: Do not use soft, low temperature solders like 50-50, 60-40 or 85-15. With copper expansion and contraction this type of bond will fail.

ANCHOR RISERS AS REQUIRED

Risers are not to be rigidly attached to each air handler cabinet. They need to be free to expand and contract as temperatures vary within the pipe and riser chase. They do, however, need to be fastened to the building at strategic points along the column length. Building code will describe frequency and type. Reference ASME B31.9 or similar.

The units are designed to allow movement of +/- 1" (2" total) under normal circumstances. Expansion loops will be required in each riser if the calculated movement is in excess of 2". Expansion loops are described and formulated by the ASHRAE HVAC Systems and Equipment handbook and Copper.org

NOTE: *Expansion loop design and placement is a function of and best prescribed by consulting and design engineers.*

PERFORM HYDROSTATIC TESTING

After all solder joints are made and all risers appropriately anchored perform hydrostatic testing for leaks.

Vent all individual coils while checking for signs of leakage within each cabinet using the manual header vents provided.

Once testing is complete, continue to insulate all unions just brazed so that insulation is now covering all riser surfaces. If required by fire code seal riser chase openings using correct fire rated materials now.

ELECTRICAL



WARNINGS: **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.

NOTE: *Before proceeding with electrical connections, make certain that supply voltage, frequency, and phase are as specified on unit rating plate. Be sure that electrical service provided by the utility is sufficient to handle the additional load imposed by this equipment. See unit wiring label for proper field high and low voltage wiring. Make all electrical connections in accordance with NEC and any local codes or ordinances that may apply. Use copper wire only.*

LINE-VOLTAGE CONNECTIONS

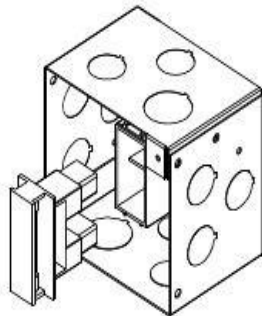
All units have wiring diagrams and nameplate data to provide information required for necessary field wiring.

A 4" x 4" electrical box is standard on all units for proper connection of power supply.

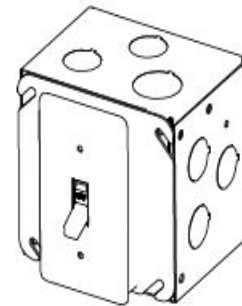
Unit must be permanently grounded in accordance with NEC and local codes.

Check all factory wiring per unit wiring diagram and inspect factory wiring connections to be sure none were loosened in transit or installation.

J-box with disconnect
120V/240V w/electric
heat



J-Box with toggle
switch. Units w/o
electric heat & 277V
w/electric heat



WARNING: Service and maintenance to internal components and wiring must not be performed until the main disconnect switch is turned off. Any remote mounted devices such as thermostats that have been furnished by the manufacturer 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 electrical shock causing personal injury, death or damage to components and will void all warranties



WARNING: The cabinet must have an uninterrupted or unbroken ground according to NEC, ANSI/NFPA 70 and local codes to minimize personal injury if an electrical fault should occur. The ground may consist of electrical wire or metal conduit when installed in accordance with existing electrical codes. (See Ground/Conduit Note below.) Failure to follow this warning could result in an electrical shock, fire, or death.

NOTE: *Use agency listed conduit and conduit connector to connect supply wire(s) to unit and obtain proper grounding. If conduit connection uses reducing washers, a separate ground wire must be used.*

Route field power supply to the junction box at the front of the return air opening. Install in accordance with the unit wiring diagram and all applicable codes. Standard controls are mounted on a 4" x 4" square junction box on the front of the cabinet where provision has been made for sheet rock installation.

These units may be 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.

FRAMING AND FINISHING

Models RR, RM and RS all have factory enclosures suitable for normally accepted wall coverings. If Sheetrock is the covering of choice then low profile sheetmetal screws are needed.

RR Models with the optional exposed cabinet panels are intended for installations that do not require wall coverings. Special care should be taken during the installation process to avoid damage to painted panels.



CAUTION: Do not apply sheetmetal screws or nails where they can penetrate the coil, risers, drain pan or electrical conduits. If possible secure at the corners of the cabinet once component placement is verified.

Ensure that sheetrock dust and debris do not enter the unit during construction and finishing. This will compromise the performance, general cleanliness of the cabinet and draining ability.

Use care when making openings for the supply grilles to avoid debris penetration into the cabinet. It is not likely but possible to contact the power cables in the corners where the conduit knockouts are placed, so take care to avoid these as well. Once done cover these openings so as to avoid wall finishings from being sprayed or otherwise flung into the cabinet.



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FINAL PREPARATION

Install thermostats and perform any other final wiring required.

Vacuum dirt and debris from cabinet interior and check blower housing and wheel.

Give the blower wheel a quick spin to verify freedom of movement.

Verify that drain pan is clear and all connections tight. Pour a pint of water into the pan and see that it drains away. This can be best done by temporarily removing the air filter and slowly pouring the water through the slots ahead of the coil. Replace air filter when done.

Make one last air purging of the coil and related piping. Make sure service valves are now open and that motorized valves are set to automatic.

If equipped with a balance valve in the return line then set it for the required flow.

Check the filter for direction and seating ahead of the coil.

Install and set the return and supply grilles which are shipped separately.



CONDENSATION

After installation and prior to startup care must be taken to avoid condensation problems within units which are allowed to cool down below room air dew point, remain at high humidity and have little or no fan operation.

It can literally rain inside of these cabinets and create havoc if not addressed. Automatic waterflow valves address this issue and their use is recommended by the manufacturer. They allow the cold water to bypass a coil that is not in use with no air circulation. Two and three way automatic valves accomplish this task.

If the system has been installed without the benefit of an automatic water flow control valve, constant fan operation or a positive coil shut off when not in operation, then it is the responsibility of the installing contractor to properly start up the system in such a way as to avoid any such problem and the buildings engineer's responsibility there after.

PRE-STARTUP CHECKS


WARNINGS:

- Electrically ground air handler. Connect ground wire to ground terminal marked "GND". 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.

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 the air handler 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.


CAUTION:

High efficiency brushless DC motors are wired with power applied at all times. Low voltage thermostat demand will control its use. Refer to unit Wiring Diagram for proper wiring connections.

START UP

Cooling Season

The requirement here is to lower the water temperature gradually while avoiding the introduction of high humidity air into the building. Generally, here are the steps:

- 1) In the spring or early summer start chilled water at about 70 degrees Fahrenheit. Set the fan speed control at low to medium fan speed on all participating air handlers.
- 2) Make sure the building is closed to outside air circulation.
- 3) Reduce chilled water temperature at a rate of 2 Fahrenheit degrees per day until design temperature is reached.

MAINTENANCE



WARNING: Service and maintenance to internal components and wiring must not be performed until the main disconnect switch is turned off. Failure to do so will result in electrical shock causing personal injury or death.

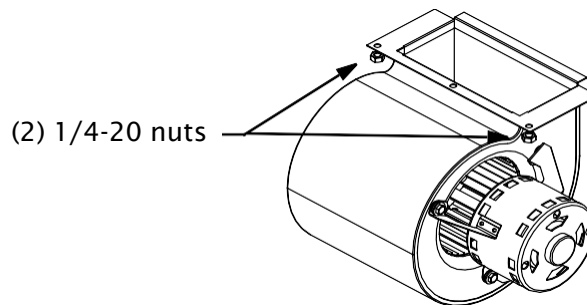
NOTE: *For continuing high performance, and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. To achieve maximum performance and service life of each piece of equipment a formal schedule of regular maintenance should be established and maintained by a certified contractor. The following is provided as a recommended maintenance schedule.*

MONTHLY CHECK LIST

Inspect the unit air filters. Clean or replace as required.
 Inspect the drain pan to be sure it is clean to permit the flow of condensate through the drain lines.
 Inspect the supply and return air grilles for dust and fiber accumulation.

YEARLY CHECK LIST

Clean the blower motor and oil if required.
 Inspect the air handler unit casing for corrosion and loose fasteners.
 Inspect the blower wheel and housing for cleanliness and/or looseness. Clean if necessary. Adjust and tighten if necessary.
 Inspect all coil connections for leaks. Inspect the coil fins for excessive dirt or damage. Clean or repair if required.
 Inspect all hoses for any wear or decay. Replace if necessary or replace every 7 years.
 Inspect electrical connections for tightness and controls for proper operating each heating and cooling season.
 If strainers are installed in the valve packages, clean per manufactures directions.



BLOWER ASSEMBLY

The Blower 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.
 Check the blower wheel for accumulation of dirt, debris or filter fibers. Clean with brush and/or high pressure air.
Blower Housing Removal:
 Disconnect fan harness, from the motor, with the quick release tab on the connector at the right end of the motor. Be prepared to support the weight of the blower housing and motor. Remove two nuts in the front of the blower housing assembly to release the fan from the blower deck above. Rotate down and then pull assembly out.

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.

To replace filter, remove return air grille, move filter forward and then lift up and out.



CAUTION:

Never operate unit without a filter or with filter not fully seated. Damage to blower motor or coil can result. Failure to follow this CAUTION could result in personal injury or product and property damage.

COIL

Any dust or other contaminants which accumulate on the heat transfer surfaces interferes with the air flow and impairs heat transfer.

Coil Cleaning:

Remove return air grille and filter, then brush fins up and down, not side to side, with a stiff bristle brush. Follow with a vacuum cleaner.

This method is preferred over compressed air since the dirt can be driven deeper into the coil with no benefit.

Replace filter or preferably install a new one and then the return air grille once finished.

STEEL BRAIDED HOSES

- Inspect hoses under pressure. Check for strain, be it severe tension, twisting or too small a bend radius.
- Check for drips or incursion of subsequently installed equipment or structures. These can affect the hoses ability to absorb movement or reduce required bend radii.
- Immediately relieve pressure and replace hose assembly if visual inspection shows damage to the exterior braid such as fraying or broken wires.

Replace Steel Braided Hoses every 7 years.

DRAIN PIPING

The drain should always be:

- Connected or piped to an acceptable disposal point sloped away from the unit at least 1/8-inch per foot.
- Checked before summer operation.
- Periodically checked during summer operation.

Drain Check

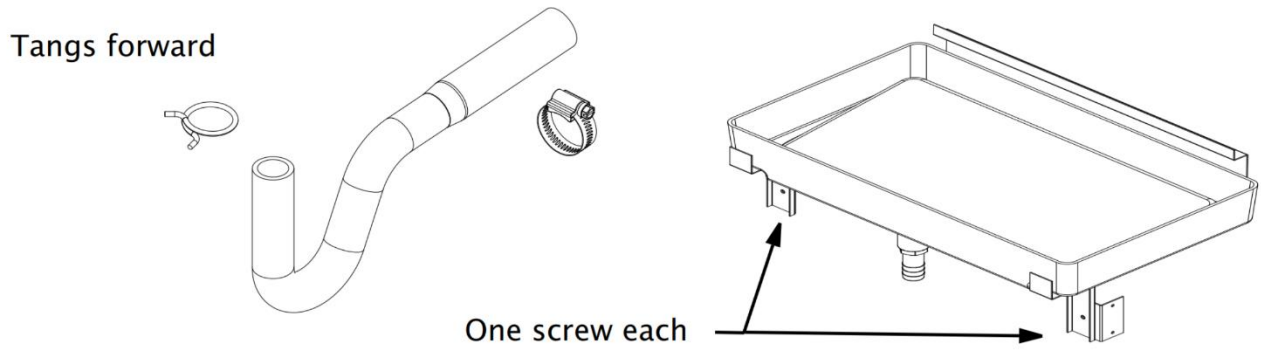
Check drain pan and "P" trap at the beginning of each cooling season since it is possible for dust and debris to fall into the unit through the supply grille. The rubber "P" trap is secured to the drain pan nipple and drain riser by way of two clamps, one spring and one worm gear, which can be opened with pliers adjusted for a maximum grasp and a 5/16" nut driver.

The drain pan is removed by unscrewing the two mounting brackets on the sides of the cabinet. Set the brackets aside. Disconnect the "P" trap from the drain pan. By pulling down and then up remove the drain pan first. Observe the

“P” trap insertion depth on the drain riser and save this information for reinstallation. Remove “P” trap.

Material will naturally settle to the bottom of the trap so wash thoroughly in a utility container or sink with soap and water.

When ready, preattach the “P” trap to the drain riser using the worm gear clamp and the depth setting observed above. Slip the spring clamp over the drain pan end of the hose a few inches back from this end with the clamp tangs facing forward. Replace the pan in its cradle and secure the brackets. Reattach the hose to the drain pan and secure by sliding the clamp back in place.



**MAINTENANCE
UPDATES**

For continuing high performance, and to minimize possible failure, it is essential that periodic maintenance be performed on this equipment.

Contact Factory for current Maintenance Program Information.



P.O. BOX 270969, Dallas, TX 75227

www.firstco.com or www.ae-air.com

The manufacturer works to continually improve its products. It reserves the right to change design and specifications without notice.

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