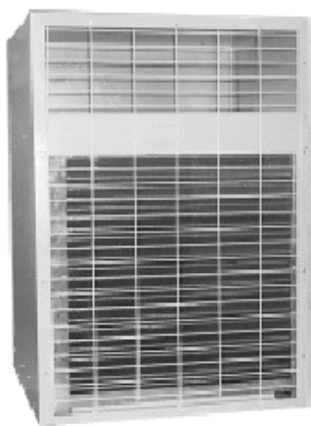
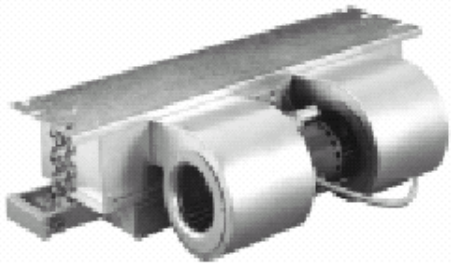
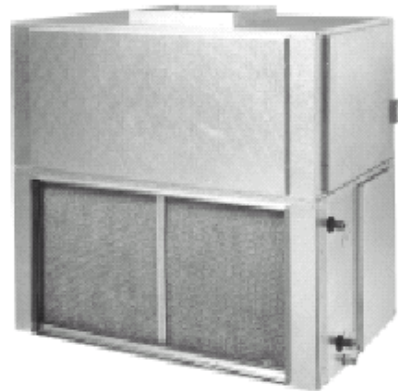


# *First Co. Products*



## **Recommended Maintenance Program**

PM1193

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**\*\*WARNING TO INSTALLER, SERVICE PERSONNEL AND OWNER\*\***

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 safety condition to service personnel and occupants. Company employees and/or contractors are not authorized to waive this warning. Current **Maintenance Program** is available at [www.firstco.com](http://www.firstco.com) under "Product Information".

**\*\*Publication Update Notice\*\***

In keeping with it's policy of continuous progress and product improvement, First Co. reserves the right to make changes without notice.  
Visit the First Co. web site at [www.firstco.com](http://www.firstco.com) for the latest update of this publication.

## INTRODUCTION

All heating, ventilation, and air conditioning systems deteriorate with normal use. No HVAC system is maintenance-free. If these systems are not maintained at peak efficiency then premature failure will occur.

Preventive maintenance (PM), when performed regularly, will contribute directly to: increased equipment life, consistent equipment efficiency/operation and customer satisfaction.

First Co. requires that preventive maintenance be done on a regular basis as described in this publication by a licensed HVAC technician. A log must be maintained and all receipts should be retained for each piece of equipment documenting the maintenance and repair done to the equipment to preserve the equipment warranty and to be able to track any abnormal conditions or problems associated with the equipment. Failure to maintain proper documentation will void factory warranties and result in reduced product life.

## GENERAL PRECAUTIONS

All installation, service and maintenance procedures must be performed in accordance with all local and national code requirements pertaining to this equipment.

Always review the nameplate 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.

Thermostats and other control devices must be checked for proper operation and compatibility with this equipment.

**Caution:** Units not installed in accordance with provided instructions may experience condensate overflow conditions leading to possible structural and cosmetic damage to the building. A secondary pan or overflow protection device must be used for any installation over a finished ceiling or any other surface that could be damaged by water.

Low outdoor ambient conditions can cause a DX coil to operate below freezing and can freeze the hot water coil if no protection is present. The use of a freeze protector control can help prevent this occurrence. First Co. recommends this device on all such installations.

All water coils on closed loop systems should incorporate a safety device or glycol to prevent the possible freezing of the coil.

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.

**Caution:** Failure to protect coils from freezing may result in extensive water damage to the structure.

## SAFETY CONSIDERATIONS

- Improper installation, adjustment, alteration, service, maintenance or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury, death or property damage.
- Observe all warning and caution notices in this document and those posted on the equipment.
- Wear safety glasses, gloves and protective clothing.
- Do not operate this equipment or apply electrical power without panels in place.
- Normal system operation will cause some components and surfaces to become hot and can cause burns.
- Rotating fan blades can cause personal injury.
- Before installing, modifying or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than one disconnect switch. Lock out and tag switches with a suitable warning label. Electrical shock can cause personal injury or death.
- All electrical power should be turned off when servicing or repairing electrical components. Extreme caution should be observed when trouble shooting electrical components when power is applied. Observe all warning notices posted on equipment.
- The unit cabinet must have an unbroken ground 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. Failure to follow this warning can result in an electric shock, fire or death.
- To avoid personal injury or death, do not supply power to unit with compressor terminal cover removed.
- Refrigeration system contains refrigerant under pressure.
- R-410A systems operate at higher pressures than former R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.
- R-410A can become combustible if mixed with air at elevated temperature and/or pressure. Failure to follow this warning could result in property damage, personal injury or death.
- To prevent compressor damage or personal injury, do not overcharge the system with refrigerant or operate unit in a vacuum or at negative pressure.
- Extreme caution must be observed when handling refrigerant. Wear appropriate protective clothing to prevent injury to bare skin due to extreme low refrigerant temperature.
- When servicing equipment do not vent refrigerant to the atmosphere. Recover all refrigerant before performing any service to the refrigerant system.
- Never intentionally release refrigerant in a confined space. Even the safest refrigerant can still displace enough oxygen to cause suffocation. Set up ventilation equipment, like a portable fan, in areas where possible release would result in high concentrations.

## General

### ***Unit Installation***

- Inspect unit mounting to ensure safety and integrity.
- Inspect unit for corrosion or rusting. Repair or replace parts as necessary.
- Inspect supply and return air connections for tightness and alignment.
- Inspect field installed refrigerant lines for proper insulation and integrity.
- Inspect unit for proper pitch toward condensate drain nipple.

*Annually*

### ***Functional testing***

- Cycle through both heating and cooling modes for normal operation.
- Check total amperage draw against nameplate for minimums as well as maximums.
- Check refrigerant levels and recharge if needed.

*Annually*

## Coils

### ***Cleaning***

- Clean coils by brushing, blowing, vacuuming or pressure washing.
- Use an industry name brand NON-ACID coil cleaner as necessary.

*Annually*

*Every 2 yrs as required*

### ***Fins***

- Check fins for damage, use fin comb to straighten and smooth damaged or bent fins.

*Annually*

### ***Refrigerant Piping***

- Check for leaks, tightness of fittings or corrosion. On direct expansion(DX) coils use a halogen detector or similar device.
- Check accessible portion of the suction line to ensure that the insulation is intact and sealed at all joints to prevent condensate water damage.
- Check for air bypass around coil. Seal where necessary.

*Annually*

## Motor / Blowers (All)

### *Mount*

- Inspect mount for damage, cracks or corrosion.
- Ensure all bolts are in place and tightened.

*Annually*

### *Motor*

- Check running amps against nameplate information.
- Check capacitors for proper sizing relative to motor nameplate.
- Lubricate motor and blower bearings if required.
- Check motor for excessive heating and proper ventilation. Clear ventilation openings with compressed air as needed.
- Check for noise and worn bearings. Repair or replace as required.

*Annually*

### *Blower Wheel*

- Check hub set screw for tightness.
- Spin fan to making sure that there is no binding or interference.
- Clean fan to ensure balanced operation.
- Check blades or any moving part for cracks or excessive wear.

*Annually*

## Belt Drive Blower Assembly

- Check bearing collar set screws for tightness.
- Check for grease zerks and lubricate where possible.
- Check vibration eliminators and replace if needed.
- Check belts for tension and general wear conditions. Replace if necessary. With multibelt drives replace as matched sets only.
- Check pulley alignment and adjust if needed. Check set screw tightness and woodruff key positioning on all pulleys.

*Annually*

## Electronically Commutated Motors (ECM)

### *Variable Speed and Constant Torque*

- See Electronically Commutated Motors page 16.

*Annually*

## Drain Pan and Condensate Removal

- Check the drain pan for foreign materials that could block proper drainage. Clean as necessary.
- Check that the p-trap and condensate piping are clear and open to flow. Blow out or chase with a suitable clearing device to ensure this.
- Check piping integrity for condition and serviceability.
- Check to see that a positive downward slope exists with the piping between the drain pan and where it empties.
- Check drainage by pouring water into the pan and verifying operation.
- Check drain pan for detrimental rust, leaks and proper insulation to prevent sweating. Replace if necessary.
- Check for pan structural integrity. Heavy flaking rust indicates need for pan replacement.
- Treat drain pans with an EPA approved biocide as conditions warrant it.
- If present check safety switches for proper operation.

*Annually*

**Replace drain pan**

*8 years*

## Electrical

### *Wiring Compartment*

- Check electrical connections for tightness.
- Check all components for evidence of arcing, overheating or deterioration. Replace if necessary.
- Check components for proper mounting and tightness.
- Check all relays for proper operation. Replace as needed.
- Check the cabinet ground connection for tightness and presence of corrosion. Clean if necessary.

*Annually*

### *Electric Resistance Heating Coils*

- Check resistance heating coils for open circuits by isolating one of the wire feeds attached to the ceramic terminals. Replace if necessary.
- Check the thermal cutout switches and fuses for open circuits. Replace if necessary.
- Check the lay of the heating elements to avoid grounding or row to row short circuits.

*Annually*

## Filters

- Check filters for proper sizing and if facing in the correct airflow direction.
- Replace filters once a month or more if in a high use area. Record on filter log.
- Permanent filters should be cleaned once a month.

*Monthly*

### **Merv Filters**

- High efficiency pleated air filters use a much denser filter media which enables the filter to capture smaller contaminant particles. Due to this design, the static resistance (IN. W.G.) across the filter is considerably increased at the same CFM compared to standard filter media. This increased static pressure drop must be accounted for in the air handler's system design and will reduce the systems airflow unless a larger filter face area is used.

## Hydronic (Water) Coils -

- Check for presence and proper operation of freeze stats on water coils.

*Annually*

***Warning: Lack of safety protection during an adverse or unexpected operating condition can cause water coil to freeze and result in extensive water damage to the building.***

- Check both hot and chilled water piping for proper insulation to avoid heat loss or sweating.
- Check fittings, valves and stems for leakage and corrosion. Reset seats and seals by rotating all valves through their entire range of movement and then back to their original setting.
- Check all piping connections and fittings for general condition or excessive corrosion. Replace parts as required.
- Check entire air handler assembly for opportunities to sweat or accumulate condensate. Repair as necessary.
- Check cabinet for air leakage and seal wherever necessary.

## Steel Braided Hoses-

### ***Hoses integral to the air handler or accessory hose kits***

- 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.

*Annually*

***Replace Steel Braided Hoses***

*7 years*

## General

### ***Unit installation***

- Check wall mount and ensure mount integrity.
- Check seal between the cabinet and the wall to ensure that there is no air or water leakage.
- Check inside of unit and remove dirt and contaminants (including bird nests and insect infestations) which may cause interference with unit operation.
- Check unit base and other outdoor exposed surfaces for corrosion. Prep and paint or replace parts as required. This step is critical to prevent staining to the exterior surface of the building.
- Check unit base to ensure structural integrity.
- Check unit to ensure that the base is pitched forward sufficient to force rain water to flow to the outside.

*Annually*

### ***Refrigerant Piping***

- Check for leaks, tightness of fittings and corrosion. Use a halogen detector or similar device.
- Check accessible portion of the suction line to ensure that the insulation is intact and sealed at all joints to prevent condensate water damage.

*Annually*

### ***Pressure / Temperature Readings***

- Operate unit for 15 minutes until it stabilizes. Record high and low side temperatures, pressures and system superheat. Correct system charge as required.

*Annually*

## Compressor

### ***Wiring Connections***

- Check wires and connections for evidence of arcing, overheating and deterioration. Replace wires and/or connectors as required.

*Annually*

### ***Running Amps***

- Check against nameplate information.

*Annually*

### ***Mounting Feet***

- Check for secure compressor mounting - replace as required.

*Annually*

### ***Refrigerant Connection***

- Check for leaks and inspect solder/braze joints. Use a halogen detector or similar device.

*Annually*

## Condenser Coil

### *Cleaning*

- Clean coils by brushing, blowing, vacuuming or pressure washing.
- Use an industry name brand NON-ACID coil cleaner as necessary.

*Annually*  
*Every 2 yrs as required*

### *Fins*

- Check fins for damage, use fin comb to straighten and smooth damaged or bent fins.

*Annually*

## Condenser Fan Blade / Wheel

### *Mount*

- Inspect mount for damage, cracks or corrosion.
- Ensure all bolts are in place and tightened.

*Annually*

### *Motor*

- Check running amps against nameplate information.
- Lubricate motor if required.

*Annually*

### *Fan Blade / Wheel*

- Check hub set screw for tightness.
- Spin fan to making sure that there is no binding or interference.
- Clean fan to ensure balanced operation.
- If blower wheel or fan blades are rusted or corroded - replace.

*Annually*

## Wiring Compartment

### *Connections*

- Check wires and connections for evidence of arcing, overheating and deterioration. Replace wires and/or connectors as required.
- Check supply wires for secure connections and ensure that a good ground exists.

*Annually*

### *Wires*

- Check for connector integrity.
- Check for evidence of insulation breakdown - repair or replace as required.

*Annually*

### *Capacitor*

- Check case and wire connection integrity.
- Ensure that capacitance rating matches nameplate.

*Annually*

### Contactor

#### Operation

- Check for evidence of fouled or burned contacts - replace as required.
- Check for proper operation when 24 volts is applied.

*Annually*

### Heat Pump Units

#### Functional Test

- Run system through both heating and cooling cycle per installation instruction. Check for proper sequence and performance.

*Annually*

#### Reversing Valve

- Check for proper operation.
- Inspect coil for evidence of cracks in the plastic case - replace as required.

*Annually*

#### Defrost Control

- Check wires and connections for evidence of arcing, overheating and deterioration. Replace wires and/or connectors as required.
- Test for proper operation of defrost control - refer to installation instructions for procedure.

*Annually*

#### Drain Pan Heater

- Check heater case and connections for cracks or corrosion - replace as required.
- Check that the heater is functioning properly.

*Annually*

#### Drain Pan

- Check pan to ensure that there are no leaks.
- Check for pan structural integrity. Heavy flaking rust indicates need for pan replacement.
- Check that the drain line is not clogged and is capable of condensate removal.

*Annually*

#### Crankcase Heater (if applicable)

- Check heater case and connections for cracks or corrosion - replace as required.
- Check that the heater is functioning properly.

*Annually*

#### Accumulator

- Inspect joints and body for corrosion which can cause vessel failure - replace as required.

*Annually*

## General

### *Unit Installation*

- Check wall sleeve and ensure mount integrity.
- Check wall sleeve to ensure that the base is pitched forward sufficient to force rain water to flow to the outside.
- Check seal between the wall sleeve and the wall to ensure that there is no air or water leakage.
- Check to ensure that the unit is fully engaged into the wall sleeve and that all seals are intact and there is no air or water leakage.
- Check inside of unit and remove dirt and contaminants (including bird nests and insect infestations) which may cause interference with unit operation.
- Check unit base, wall sleeve and other outdoor exposed surfaces for corrosion. Prep and paint or replace parts as required. This step is critical to prevent staining to the exterior surface of the building.
- Check unit and wall sleeve to ensure structural integrity.
- Inspect supply and return air connections for tightness and alignment.

*Annually*

## Functional testing

### *All*

- Run system through both heating and cooling cycle per installation instruction. Check for proper sequence and performance.
- Check total amperage draw against nameplate for minimums as well as maximums.

*Annually*

### *Heat Pump*

#### *Reversing Valve*

- Check for proper operation.
- Inspect coil for evidence of cracks in the plastic case - replace as required.

*Annually*

#### *Crankcase Heater (if applicable)*

- Check heater case and connections for cracks or corrosion - replace as required.
- Check that the heater is functioning properly.

*Annually*

#### *Accumulator*

- Inspect joints and body for corrosion which can cause vessel failure - replace as required.

*Annually*

## Compressor

### Wiring Connections

- Check wires and connections for evidence of arcing, overheating and deterioration. Replace wires and/or connectors as required.

*Annually*

### Running Amps

- Check against nameplate information.

*Annually*

### Mounting Feet

- Check for secure compressor mounting - replace as required

*Annually*

### Refrigerant Connection

- Check for leaking, tightness of fittings or corrosion. Use a halogen detector or similar device.

*Annually*

## Coils

### Cleaning

- Clean coils by brushing, blowing, vacuuming or pressure washing.
- Use an industry name brand NON-ACID coil cleaner as necessary.

*Annually*

### Fins

- Check fins for damage, use fin comb to straighten and smooth damaged or bent fins.

*Annually*

### Refrigerant Connection Piping

- Check for leaks, tightness of fittings or corrosion. Use a halogen detector or similar device.
- Check for air bypass around coil. Seal where necessary.

*Annually*

## Motor / Blower / Fans

### Mount

- Inspect mount for damage, cracks or corrosion.
- Ensure all bolts are in place and tightened.

*Annually*

### Motor

- Check running amps against nameplate information.
- Check capacitors for proper sizing relative to motor name plate.
- Check for noise and worn bearings. Repair or replace as required.

*Annually*

## **Motor / Blower / Fans - continued**

### ***Fan Blade / Blower Wheel***

- Check hub set screw for tightness.
- Spin fans to making sure that there is no binding or interference.
- Clean fans to ensure balanced operation.
- Check blades or any moving part for cracks or excessive wear.
- Check blades for dust or any foreign material build up and clean if needed.

*Annually*

## **Drain Pan and Condensate Removal**

- Check the drain pan for foreign materials that could block proper drainage. Clean as necessary.
- Check that condensate and p-trap piping is clear and open to flow. Blow out or chase with a suitable clearing device to ensure this.
- Check piping integrity for condition and serviceability.
- Check to see that a positive downward slope exists with the piping between the wall sleeve drain pan and where it empties.
- Check drainage by pouring water into the pan and verifying operation.
- Check drain pan for detrimental rust, leaks and proper insulation to prevent sweating. Replace if necessary.
- Check for pan structural integrity. Heavy flaking rust indicates need for pan replacement..
- Treat drain pans with an EPA approved biocide as conditions warrant it.
- If present check safety switches for proper operation.

*Annually*

### **Replace drain pan**

*8 years*

## **Electrical**

### ***Wiring Compartment***

- Check electrical connections for tightness.
- Check all components for evidence of arcing, overheating or deterioration. Replace if necessary.
- Check components for proper mounting and tightness.
- Check all relays for proper operation. Replace as needed.
- Check the cabinet ground connection for tightness and presence of corrosion. Clean if necessary.

*Annually*

## Electrical

### *Resistance Heating Coil*

- Check resistance heating coils for open circuits by isolating one of the wire feeds attached to the ceramic terminals. Replace if necessary.
- Check the thermal cutout switches and fuses for open circuits. Replace if necessary
- Check the lay of the heating elements to avoid grounding or row to row short circuits.

*Annually*

## Filters

- Check filters for proper sizing and if facing in the correct airflow direction.
- Replace filters once a month or more if in a high use area.

*Monthly*

## Hot Water Coils

- Check for presence and proper operation of freeze stats on water coils.

*Annually*

**Warning:** *Lack of safety protection can result in frozen coils and severe water damage. See "Hoses" page 8.*

- Check fittings, valves and stems for leakage and corrosion. Reset seats and seals by rotating all valves through their entire range of movement and then back to their original setting.
- Check all piping connections and fittings for general condition or excessive corrosion.

## Water Source Units

- For all applications, 50 degree F minimum entering water temperature and sufficient water flow is required to prevent freezing. If operating below 50 degrees then anti-freeze solution is required. Check dilution rate to ensure the best protection.

*Annually*

- When anti-freeze is used in the loop, ensure that it is compatible with the Teflon tape or sealants used.

*Adding or Replacing*

- Check condensate overflow sensor for proper operation and adjust its position if required. Clean and flush drain pan as needed to avoid blockages.

*Annually*

- Do not allow hoses to rest against building structural components. Compressor vibration may be transmitted through the hoses to the structure. Check placement so as to avoid its occurrence. **See "Hoses" page 8.**

*Annually*

## ECM (Brushless DC motors)

- High efficiency brushless DC motors are wired with power applied at all times. Low voltage (24V) thermostat demand and/or circuit board algorithms will control their start-up and speed selections. Check wiring connections per unit wiring diagram and ensure that connections are solid and correct. Refer to unit wiring diagram for detail wiring information.
- For Genteq ECM Service Guide information (formerly known as GE or Regal Beloit), goto: [www.theDealerToolbox.com](http://www.theDealerToolbox.com).

*Annually*



