



**INSTALLATION, OPERATION AND MAINTENANCE MANUAL**

**VERTICAL STACKED FAN COIL UNITS**

**ATTENTION:**

READ THIS MANUAL AND ALL LABELS ATTACHED TO THE UNIT(S) CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THE UNIT(S)! CHECK UNIT DATA PLATE FOR ELECTRICAL SPECIFICATIONS AND MAKE CERTAIN THAT THEY AGREE WITH THOSE AT THE POINT OF INSTALLATION.

**WARNING:**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

**INSTALLER'S RESPONSIBILITY**

**INSTALLER PLEASE NOTE:**

This equipment has been tested and inspected. It has been shipped free from defects from our factory. However, during shipment and installation, problems such as loose wires, leaks or loose fasteners may occur. IT IS THE INSTALLER'S RESPONSIBILITY TO INSPECT AND CORRECT ANY PROBLEMS OF THIS NATURE THAT MAY BE FOUND.

**INDEX**

SAFETY PRECAUTIONS .....	2
RECEIVING and INSPECTION .....	3
HANDLING and INSTALLING .....	3
INSTALLATION of SINGLE and MASTER UNITS .....	4
GENERAL .....	6
NORMAL OPERATION & MAINTENANCE .....	6
REPLACEMENT PARTS .....	8
LIMITED WARRANTY .....	8

# IMPORTANT SAFETY PRECAUTIONS

## SAFETY CONSIDERATIONS

The equipment covered by this manual is designed for safe and reliable operation when installed, operated and maintained within its' design specifications. To avoid personal injury or damage to equipment or property during installation, operation and maintenance of this equipment, it is essential that these functions be performed by qualified, experienced personal using good judgment and safe practices. See the following cautionary statements.

### DANGER

**ELECTRICAL SHOCK HAZARDS.** All power must be disconnected prior to installation and servicing of this equipment. More than one power source may be present. Disconnect all power sources to avoid electrocution or shock injuries.

**MOVING PARTS HAZARDS.** Power must be disconnected from the motor and blower prior to opening access panels. Motors can start automatically, and more than one power source may be present. Disconnect all power and control circuits prior to servicing to avoid serious crushing or dismembering injuries.

**HOT PARTS HAZARDS.** Hot water and steam heating coils operate at temperatures that will cause severe burn injury. Some systems will continue to allow circulation of hot water, even with all control circuits de-energized. Before performing service at or near any heating coil, piping, or valve package component, disconnect all power and close all isolation valves, and allow the equipment to cool. As previously mentioned, more than one power source may be present.

Electric resistance heating elements may start automatically. Disconnect all power and control circuits, and allow the elements to cool before servicing. Again, more than one power source may be present.

### WARNING

Check that rigging and lifting equipment can safely support the unit assembly and component weights.

All assemblies must be adequately secured during lifting and rigging by temporary supports and restraints until equipment is permanently fastened and set in its final location.

All unit temporary and permanent supports must be capable of safely supporting the equipment's weight and any additional live or dead loads that may be encountered. All supports must be designed to meet applicable local codes and ordinances.

All fastening devices must be designed to mechanically lock the assembly in place without the capability of loosening or breaking away due to system operation and vibration.

### CAUTION

Secure all dampers when servicing damper, actuator or linkages. Dampers may activate automatically, disconnect control circuits to avoid injury.

Protect adjacent flammable materials when brazing. Use flame and heat protection barriers where needed. Have fire extinguisher available and ready for immediate use.

Never wear bulky or loose fitting clothing when working on any mechanical equipment. Gloves should only be worn when required for proper protection from heat or other possible injury. Safety glasses or goggles should always be worn when drilling, cutting or working with chemicals such as refrigerants or lubricants.

Never pressurize any equipment beyond specified test pressures. Always pressure test with some fluid or inert gas such as clear water or dry nitrogen on refrigeration systems to avoid possible damage or injury in the event of a leak or component failure during testing.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service or operation of any equipment.

# RECEIPT AND INSTALLATION

AIRTHERM fan coils are designed and built to give long trouble free operation. By following proper installation, operation and maintenance procedures and practices.

These fan coils are protected by a 1-year warranty from shipment date, against defects in workmanship and material. All steps in this manual must be followed for warranty to be in effect. Review and understand this manual prior to actual work being performed on equipment. Contact your local sales representative or factory before proceeding if any questions arise.

## RECEIVING AND INSPECTION

All shipments are F.O.B. factory, it is the receiving parties responsibility to inspect the equipment upon arrival. The Bill of Lading should be marked with any obvious damage to packaging or contents. A claim should be filed with the carrier.

After determining condition of the unit exterior, unpack each unit and check for hidden damage. Also check that "ship loose" items such as grilles, thermostats, etc. are accounted for. Again any hidden damage or missing items will require that a claim be filled with the carrier.

AIRTHERM fan coils are monitored throughout the manufacturing process for quality control. During shipment it is not uncommon for items to loosen or shift. Inspect all moving parts for alignment; check nuts and bolts for security. Minor adjustments may be required. Piping riser ends should also be checked for any damage caused in shipment.

At the time of receipt, the equipment type and arrangement should be verified against the order documents. Should any discrepancy be found, the local Sales Representative should be notified immediately so that the proper action may be instituted. Should any questions arise concerning warranty repairs, the factory must be notified **BEFORE** any corrective action is taken. Where local repairs or alterations can be accomplished, the factory must be fully informed as to the extent and expected cost of those repairs before work is begun. Where factory operations are required, the factory must be contacted for authorization to return equipment and a Return Goods Authorization (RGA) will be issued. Unauthorized return shipments of equipment and shipments not marked with an authorization number will be refused. In addition, the manufacturer will not accept any claims for unauthorized expenses.

**IMPORTANT! DO NOT USE RISER PIPES TO LIFT UNIT. DAMAGE WILL OCCUR.**

## HANDLING AND INSTALLING

AIRTHERM fan coils are sturdy in both construction and design. Care should be taken during handling to ensure no pressure or force is applied to coil, risers, piping or drain stubs. **DO NOT USE RISERS TO LIFT UNIT.** Handle units by the exterior cabinet. Avoid impact that may damage internal components.

This equipment is not designed for outdoor use or storage. Never store or install where it may be subjected to an environment such as rain, snow, extreme temperatures or chemicals.

During and after installation, special care must be taken to prevent foreign material such as paint, plaster and drywall dust from being deposited in the drain pan, electric heater, motor and blower wheels. Failure to do so may have serious adverse effects on unit operation and in the case of the heater, motor and blower assembly may result in immediate or premature failure. All manufacturers' warranties are void if foreign material is allowed to be deposited on the heater, motor or blower wheels of any unit. Some units and/or job conditions may require some form of temporary covering during construction.

Condensate pan is internally sloped toward drain connection. Make assurance that unit is level and plumb. Level the unit to insure proper coil operation and condensate drainage. After units are positioned and risers centered in pipe chase, plumb the unit in two directions, using unit casing as a reference. Avoid any interference with wiring, coil connections, drain pan and structural components inside the cabinet while using bolts or lag screws to anchor the unit to the building.

### NOTE:

Drain pans are sloped and cross broke for positive flow to the drain line. A U.L. mandated relief notch is located at the rear of the drain pan. Should drain line become blocked, condensate may drip into the bottom of the unit and cause moisture damage. It is the responsibility of the installing contractor to provide additional means to protect property from damage if this condition should occur.

After mounting the unit, it is then ready for the various service connections such as water, drain and electrical. At this time it should be verified that the proper types of service are actually provided to the unit. On those units requiring chilled water and/or hot water, the proper line size and water temperature should be available to the unit. The electrical service to the unit should be compared to the unit nameplate to verify compatibility. The routing and sizing of all piping, and the type and sizing of all wiring and other electrical components such as circuit breakers, disconnect switches, etc. should be determined by the individual job requirements and should not be based on the size and/or type of connection provided on the equipment. All installations should be made in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

**CAUTION:** Residues and loose particles resulting from manufacturing and field piping techniques such as joint compound, soldering flux and metal shavings may be in the piping system. The cleanliness of the system should be considered prior to hookup to some type of water systems.

## **INSTALLATION OF SINGLE AND MASTER UNITS**

When installing Master units, exercise care to prevent damage to the protruding coil stubs on either side or rear of the unit. Allow ample space to connect and insulate piping to the coil stubs.

1. Place the unit in a horizontal position on the floor.
2. Vertical Stacked units are designed to absorb  $\pm \frac{1}{2}$ " of riser movement. To insure this tolerance, all lateral piping from the coil and drain must be centered in the cabinet openings. Position the pipes, if necessary, by tapping gently with a wood block. Risers extending 6" above the top of the cabinet are properly centered in the slots.
3. Measure the distance from the bottom of the unit (floor line) to the swaged female connections on the unit below. (If isolator pads are used beneath the unit, allowances must be made for their thickness). Allow a minimum 1" insertion into the swaged connection.  
Standard riser length is 9' 0". Use riser extension pieces when riser length greater than 9' is required.
4. Cut measured riser tubes and condensate line if necessary. De-burr, clean and apply flux. Piping risers are marked Supply, Return and Drain.
5. Tip unit over riser hole in floor guiding male riser stub into swaged connections of unit below.
6. Force flexible pipe insulation away from joints as far as possible and clamp temporarily.
7. Solder supply and return risers (and riser extensions when used) according to standard trade practices and requirements. Join PVC drain riser (and extension) with coupling using PVC solvent cement after cleaning with methyl ethyl ketone (or solder if copper).

**NOTE:** the installing contractor must secure The Building Riser System at some point in the building. If riser systems exceed the unit plus or minus expansion or contraction allowance, the installing contractor must provide additional compensation provisions.

8. Install interconnecting piping and insulation (if required) to the coil stubs on the master unit. This material is to be provided by the contractor.

**CAUTION: The unit must be protected against heat damage during the soldering operation!**

9. Connect the drain hose, provided in the slave unit, to the master unit drain line at the bottom of the unit.
10. Connect the electrical supply for the slave unit through the appropriate knockouts on the side or rear of the unit. All wiring materials are to be furnished by the contractor and installed in accordance with the latest national and local electrical codes.
11. Install the slave unit lining up the supply piping, drain and electrical conduit with the appropriate holes in the slave unit. Slide the slave unit into place, taking up the slack on the drain hose as the unit is moved into its final location.
12. Make the final supply piping connections to the piping package inside of the slave unit. Connect the drain line to the drain pan on the fan platform and wire the electrical supply to the control box in the bottom of the unit.
13. After all connections are completed, and prior to insulating and furring-in of any riser or piping connections, the system should be tested for leaks. Since some components are not designed to hold pressure with a gas, hydronic systems should be tested with clear water. Care should be taken to completely drain the system, or otherwise protect it from freezing in cold weather.

**CAUTION:** Standard operating pressure is 200 PSIG maximum. Field test pressure must not exceed 300 PSIG maximum. Some optional or special unit piping components may have lower pressure ratings than the standard unit. All valve and piping component pressure ratings must be verified before applying test pressure to the unit.

**CAUTION:** All water coils and unit piping must be protected from freezing after initial filling with water. Unit coils and piping may still hold enough water to cause damage when exposed to freezing temperatures, even after the system is drained.

14. Open the supply (left) hand valve to the coil and manually vent the coil. Both vent and valves are accessible through the discharge opening or service panel. After purging air, manually close air vent and open return (right) hand valve.

**NOTE: Packing nuts may come loose after factory testing. It is recommended that these packing nuts be re-tightened in the field as part of the installation procedure.**

In the event that leaking or defective components are discovered, the Sales Representative must be notified **BEFORE** any repairs are attempted. All leaks should be repaired before proceeding with the installation.

After all risers and piping are installed and pressure tested, all riser joints must have the insulation joint sealed, and all other piping must be insulated in compliance with the project specifications. All chilled water risers, piping and drain valves must be insulated or located over a drain pan, to prevent damage from condensation. This includes factory and field piping inside the unit cabinet.

The drain should always be connected and piped to an acceptable disposal point. For proper moisture carry-off, the drain piping should be sloped away from the unit at least 1/8" per foot. A drain trap is integral to the unit and is necessary for odor containment. The drain riser and piping must be installed to avoid pinching or kinking the drain tube.

Any required piping or riser penetration fire blocking is the responsibility of the installer. All penetrations for piping and risers should be sealed with materials and techniques suitable for all governing codes and ordinances.

15. All electrical wiring to the unit should be in accordance with the latest national and local codes. Unit internal wiring is terminated in the electrical control box located inside the bottom of the unit.
16. Install unit-operating controls.

For unit mounted controls the cabinet is equipped with a plaster ring. Installer to field mount controls furnished. Control is then mounted to ring.

**NOTE:** In fastening furring to cabinet it is recommended that an adhesive be used. Nails, screws or other fastening means are not recommended due to possibility of their penetrating internal wiring or a functional part inside the unit.

For units designated for remote mounted controls, the three-speed fan control requires a single gang electrical box. Thermostats will require a single gang box arrangement. Details for mounting are furnished with thermostats. A wiring diagram covering the control system and unit wiring is affixed to each cabinet front.

The fan motor(s) should never be controlled by any wiring or device other than the factory furnished switch or thermostat/switch combination, without factory authorization.

All field wiring should be done in accordance with governing codes and ordinances. Any modifications of the unit wiring without factory authorization will result in voiding of all factory warranties and will nullify any agency listings.

Manufacturer assumes no responsibility for any damage and/or injuries from any improperly field installed or wired component.

17. Ductwork beyond the unit is the responsibility of the installer and should be in accordance with the latest standards of the NATIONAL FIRE PROTECTION ASSOCIATION for the INSTALLATION FOR AIR CONDITIONING AND VENTILATING SYSTEMS and WARM AIR HEATING AND AIR CONDITIONING SYSTEMS.

If not included on the unit or furnished from the factory, supply and return grilles should be provided as recommended in the product catalog.

All units must be installed in non-hazardous areas. Zero clearance to combustible materials is allowed.

Units provided with outside air for ventilation should have some form of low temperature protection to prevent coil freeze-up.

The safest method of freeze protection is to use glycol in the proper percent solution for the coldest expected air temperature.

Flexible duct connections should be used on all air handling equipment. All ductwork and insulation should be installed to allow proper access to all components for service and repair such as filters, motor/blower assemblies, etc.

18. Pertinent data regarding unit air deliveries, coil capacities, static pressures, etc. may be found in the Vertical Stacked Fan Coil Unit Engineering Manual.
19. AIRTHERM units are supplied with discharge opening knockouts for field selectable arrangements. After the proper configuration is determined, clip the holding tabs, remove blank and cutout insulation. After furring material is in place, attach grilles to units using screws provided.

The manufacturer assumes no responsibility for undesirable system operation due to improper field design, equipment or component selection, and/or installation of ductwork, grilles and other related components.

## GENERAL

The initial step in any start-up operation should be a final visual inspection. All equipment, ductwork and piping should be inspected to verify that all systems are complete and properly installed and mounted, and that no construction debris or foreign articles such as paper or drink cans are left in the units.

Each unit should be checked for loose wires, free blower wheel operation and loose or missing access panels or doors. Except as required during start-up and balancing operations, no fan coil units should be operated without all the proper ductwork attached, supply and return grilles in place and all access doors and panels in place and secure. A clean filter of the proper size and type must also be installed. Failure to do so could result in damage to the equipment or building and furnishings, and/or void all manufacturers' warranties.

The building must be completely finished including doors, windows and insulation. All internal walls and doors should be in place and in the normal position. In some cases the interior decorations, curtains and furniture may influence overall system performance by blocking return or supply openings. The entire building should be as complete as possible before beginning any system balancing. Operation of the unit during construction is not recommended since construction dust will foul filters and coils and can seriously degrade unit performance.

### NOTE:

If the fan is shut off for extended periods and chilled water is being circulated, condensation may occur on the exterior parts of the unit, as well as insulated riser pipes. To prevent condensation, it is recommended that a valve be used to stop water flow when the fan is off.

## NORMAL OPERATION & PERIODIC MAINTENANCE

### GENERAL

Each unit on a job will have its own unique operating environment and conditions that may dictate maintenance schedule for that unit that is different from other equipment on the job. A formal schedule of regular maintenance and a individual log should be established and maintained. This will help to achieve the maximum performance and service life of each unit on the job.

**Information regarding safety precautions contained in the preface at the beginning of the manual should be followed during any service and maintenance operations.**

For more detailed information concerning service operations, consult you Sales Representative or the Factory.

### FILTERS

Disposable filters should be replaced a minimum of once per heating and cooling season. Washable filters should be cleaned a minimum of twice during the cooling season and once during the heating season. If due to extreme circumstances or unit location, excessive accumulation is noted, filters should be changed or cleaned more often. The unit filter is accessible by removing the filter (return air) panel.

### COILS

Coils may be cleaned by brushing the entering air face between fins with a soft brush. Brushing should be followed by cleaning with a vacuum cleaner. If a compressed air source is available, the coil may also be cleaned by blowing air through the coil fins from the leaving air face. Vacuuming should again follow this procedure.

## **BLOWER/MOTOR ASSEMBLY**

The control sequence determines fan operation and may vary from unit to unit. Consult unit-wiring diagram for individual operating characteristics. All motors contain internal automatic reset thermal overloads and permanent sealed bearings that require no oiling.

The motor/blower assembly can be removed by sliding the entire assembly from the unit on the rail system. Quick disconnect plug allows for assembly to be removed to maintenance area for servicing.

Blower and motor should be kept dust and dirt free for proper operation. Accumulated dust or dirt can cause unbalancing to occur, thus resulting in damage to components. Use caution when cleaning as to not disturb factory balance weights.

## **ELECTRIC RESISTANCE HEATER ASSEMBLY**

Electric resistance heaters typically require no normal periodic maintenance when unit air filters are changed properly. The most important operating condition for an electric heater is proper airflow. Poorly distributed or insufficient airflow over the element will result in element overheating. This condition may result in the heater cycling on the high limit thermal cutout. Open coil strip heaters have an automatic reset switch with a back-up high limit thermal switch. High limit thermal switches must be replaced once the circuit has been broken. The high limit thermal cutout device is a safety device only and is not intended for continuous operation. With proper unit application and operation, the high limit thermal cutout will not deactivate the heater. This device only operates when some problem exists and **ANY** condition that causes high limit cutout to trip **MUST** be corrected immediately.

**CAUTION: Window treatments and drapes must not be positioned to allow obstruction of return air or discharge grilles.**

After proper airflow and supply power are assured, regular filter maintenance is important to provide clean air over the heater. Dirt that is allowed to deposit on the heating element will cause hot spots and eventual element burn-through. These hot spots will normally not be enough to trip the thermal high limit and may not be evident until actual heater element failure.

## **ELECTRICAL WIRING and CONTROLS**

The electrical operation of each unit is determined by the components and wiring of the unit and may vary from unit to unit. Refer to the wiring diagram for the actual type of controls provided on each unit.

The integrity of all electrical connections should be verified at least twice during the first year of operation. Thermostats may become clogged with dust and lint and should be periodically inspected and cleaned to provide reliable operation.

When replacing any components such as fuses, contactors, or relays, use only the exact type, size and voltage component as furnished from the factory. Any deviation without factory authorization could result in personal injury or damage to the unit and will void all factory warranties. All repair work should be done in such a manner as to maintain the equipment in compliance with governing codes and ordinances or testing agency listings.

## **DRAIN LINE**

The drain line should be checked before initial start-up and at the beginning of each cooling season to assure the drain trap and line are clear. All drains should be clear of debris so that condensate will flow easily.

Periodic checks of the drain should be made during the cooling season to maintain a free flowing condensate. Should the growth of algae and/or bacteria be a concern, consult an air conditioning and refrigeration supply organization familiar with local conditions for chemicals available to control these agents.

## **DRAIN PAN**

The drain pan is designed for positive condensate removal. When the unit is properly installed it is impossible for water to pool in the drain pan. Check pan to be sure it is free of dirt. If drain line becomes clogged, pan will allow condensate to overflow into the bottom of the unit. This condition may cause damage to surrounding property and furnishings.

## REPLACEMENT PARTS

Whenever possible factory replacement parts should be used. This will insure performance, operating characteristics, and agency listings are maintained.

Contact your local sales representative to order parts.

Contact your local sales representative or the factory before attempting any unit modifications. Any modifications not authorized by the factory could result in personnel injury and damage to the unit and could void all factory warranties.

When ordering, specify unit size, serial number and part. If replacement electric valves are required, specify valve nameplate data.

On warranty replacements, in addition to the information previously listed, the AIRTHERM Order Number that appears on the unit nameplate is required. Contact the factory for authorization to return any defective parts replaced in warranty. All shipments returned to the factory **MUST** be marked with a Return Authorization Number.

## LIMITED WARRANTY

Products are guaranteed against defects in material and workmanship to the extent that any product returned, with prior permission, and with transportation prepaid, to the factory and found to be defective, within one year from the date of installation, or 18 months from the date of shipment, will be repaired or replaced, and returned F.O.B. factory.

Under no conditions shall AIRTHERM be held liable for consequential damages or installation or repair costs.

Products of other manufacture, assembled with or accessory to these products, are subject to the warranty of their manufacturer. AIRTHERM reserves the right to make changes in design or dimensions, to add or eliminate products without prior notice.



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