

HEPAir

Operations and Installation Manual

Model: _____

Serial: _____

Date Shipped: _____

1. Product Description

The *HEPAir* is a self-contained air conditioning unit using R-134a refrigerant. *HEPAir* was designed primarily for ease of installation, operation and service. Conditioned air is discharged to the room while condenser air is discharged above the ceiling. The unit is designed for use in a clean room, where environmental and tight tolerance conditions are required. The unit can equally be applied to any area where ceiling mounted air conditioning is required.

A typical *HEPAir* is 47.5" X 23.5" X 14.5" (1/2 ton and 1 ton models) and 47.5" X 23.5" X 18.5" (2 ton model) and is hung independently of the suspended ceiling. *HEPAir* is available in 115/1/60, 208-230/1/60 or 220-240/1/50 power. Standard units are hard wired, but a cord and plug may be provided as an option. Nominal unit capacities of ½, 1 ton and 2 ton are offered.

Available options include PID digital controllers for precise applications, electric re-heat coils and humidifiers.

The *HEPAir* is ETL IAW UL/CSA 1995 approved.

2. Receiving

A fork lift or pallet jack should be used to move the units from the delivery truck. Each *HEPAir* unit is shipped in an individual cardboard box that may be used for lifting, **at the designated handhold areas**, after removal from the truck.

Unpack and thoroughly inspect the *HEPAir* unit and all of the optional equipment supplied for damage upon receipt of shipment. A packing slip, supplied with the shipment, has a clear description of what was shipped from the factory. Check this against the components received to ensure that the shipment matches what was ordered.

If a shipment arrives damaged or incomplete, note all damages on the bill of lading, notify the shipping company

immediately and file a claim. Do not return the shipment to *HEPAir*.

If this procedure is not followed, the freight company may reject the claim and the consignee will suffer the loss.

NOTE: The packaging of the *HEPAir* unit is designed to protect it during shipment. However, it is not intended to be strong enough to withstand the use of a fork truck without using the skid provided.

3. Preparation for Installation

Review the configuration sheet supplied with the unit before attaching any auxiliary options to the *HEPAir*. This sheet shows which panels are to be left open, which have ducts, filters, etc.

Remove panels from any openings that require filter frames or ductwork, if not already open. Make sure that all fan blades move freely and that there are no loose foreign objects in any of the air paths.

Attach all duct collars and filter racks using #10 sheet metal screws, per the configuration sheet.

If mounting the *HEPAir* to a fan filter unit, proceed to step 4, otherwise skip to step 5.

4. Preparation of Fan Filter Unit

The *HEPAir*, is designed to connect to allow connection to all major brands of FFU's. Your *HEPAir* has been provided with connection brackets that are specific to the type of FFU noted on the configuration sheet. **Only use the brackets provided by *HEPAir*. Any substitution of these brackets or misuse may result in severe damage. It is important to thoroughly read the installation instructions provided with your particular FFU before proceeding.**

The following instructions are general FFU installation guidelines.

It is highly recommended that FFU's be insulated with material provided by the FFU manufacturer to reduce losses.

Remove the pre-filter from the filter frame on top of the FFU. This should not be used when mounting to the *HEPAir*. Ensure that the fan, in the FFU, operates properly.

Attach the self adhesive gasket, provided with the *HEPAir*, to edge of pre-filter frame and attach brackets as show in section X of this manual.

Use proper lifting and support equipment to lift the *HEPAir* and prevent damage to either the *HEPAir* or FFU.

Place *HEPAir* unit on top of FFU and attach brackets to *HEPAir*, as shown.

5. Unit Installation

The *HEPAir* unit should be hung from an overhead support of adequate strength by 4 lengths of 3/8" #16 all-thread attached to the corners of the unit. The *HEPAir*, without FFU, weighs approximately 250lbs.

The all-thread should be positioned to allow the unit to hang within the 2'x4' opening of a suspended ceiling grid without imposing any sideways or downward stresses on the ceiling grid.

Jam nuts should be used to prevent loosening of the all thread while the unit is operating. The unit must be leveled during suspension.

NOTE: Inadequate leveling of the unit may prevent proper drainage and could result in water overflow. The unit must be level to within +/- 1/4" end to end and side to side prior to operation.

6. Ductwork Connection

It is highly recommended that all ductwork be insulated to reduce cooling losses and prevent sweating.

All ductwork designed for the application can

be attached to the pre-installed duct collars and pre-filter frames once the unit has been securely hung and leveled.

The evaporator fan moves a maximum of 800CFM and the condenser fan moves a maximum of 500 CFM for the ½ ton and 1 ton and 800 CFM for the 2 ton. The external static capacity of both the evaporator and condenser fans is 0.1"wg. Size all ductwork connected to these fans not to exceed 0.1"wg, with losses.

7. Water and Drain Connection

Condensate from the evaporator coil is piped to the condensing section of the unit where, in a standard air-cooled unit, it is evaporated and removed by the condenser air. A condensate drain is not normally required.

If the *HEPAir* has been supplied with a humidifier, it is necessary to plumb a water supply and drain to the unit. The humidifier is located in the mixing chamber of the *HEPAir* and is accessible from the top of the unit.

NOTE: Please review the humidifier manufacturer installation instructions before proceeding.

A water supply line, 1/4" in diameter, should be connected to the inlet port of the humidifier via a compression pipe-fitting. A drawing of the humidifier, to locate the inlet and drain fitting, is included on page XX. It is suggested that a water supply shutoff valve be placed near the *HEPAir* unit for servicing of the humidifier unit. The water supply may be regular water except in cases where a DI humidifier was ordered.

A 7/8" drain is required. See drawing on page XX. The drain line can be sweated to the stub or a flexible drain line may be connected via hose clamps.

Drain piping needs to withstand 212degF and may require special pipe. See manufacturer's installation instructions for details.

8. Sensor / Controls Connection

Units that have been ordered with a low voltage thermostat have been pre-wired with 25ft of low voltage wire. If the wire must be run inside a wall or if additional wire is required, note the position of the wires and disconnect at the thermostat, not the *HEPAir*. Wires should be put back in the same positions on the thermostat after the appropriate modifications are made.

If multiple units are run with a single thermostat, "pig tails" are provided at the top of the *HEPAir* unit to facilitate field wiring. A schematic showing proper connection is shown on page XX. Thermostat manuals are included and should be reviewed before proceeding.

HEPAir units with either electric re-heat or humidification are provided with Proportional Integral and Derivative (PID) controllers. All controllers are internally pre-wired to the unit and "pig tails" are provided out the top of the unit to facilitate wiring of the sensor to the controller. All sensors and controllers are low voltage, 10Vdc and 24Vac respectively. It is important that all control wires be shielded and not installed near power lines for proper operation.

Manuals for the controller and sensor(s) are provided with the unit and schematics are shown on pages XX-XX for the different options using PID controllers.

NOTE: The temperature controllers are factory set at 68.0 degF and humidity controllers set at 50% RH. If the room requirements are different reset the set point after installation and hookup of electrical power.

9. Electrical Wiring

CAUTION: Before applying power to *HEPAir* unit make sure that the unit master switch is in the OFF position.

All electrical wiring must be run according to NEC and local codes. Check the unit serial plate for circuit ampacity and breaker size.

Some units may require auxiliary circuits to power options such as re-heaters and humidifiers. The power required for any options is noted on the auxiliary serial plate.

Fan filter units, if used, require separate circuits and should be wired in accordance with the manufacturer's installation manual.

The main electrical panel is located in the compressor section of the unit. Schematics showing the main power layout and terminal board layout are included on pages XX-XX.

Supply voltage to the unit should be checked prior to electrical hookup.

Power cannot fall below 110V for the 115V unit or 198V for the 208V unit or damage to the compressor will occur.

Power should be applied to the *HEPAir* via dedicated circuits.

If a cord and plug is supplied with the unit, connect the plug to a properly sized line to handle the voltage and current required by the *HEPAir* unit (found on serial plate). Do not use any extension cords to connect the units.

10. Unit Start-up

Check to make sure that all ducts, filters, electrical connections and guards on the *HEPAir* are secure before applying power. If the unit has a thermostat, set the desired temperature to 60 degF. Follow thermostat manufacturer's instructions.

Turn on the master switch for approximately 10 seconds and then turn OFF. If the unit turns on, repeat this step 3 times and then leave the switch in the ON position. If it does not turn on with the ON switch, turn the switch to off, unplug and check all electrical connections.

Once the unit is running, check the

evaporator and condenser fans for proper rotation and that they are clear from obstruction. Check the unit for any unusual noise or vibrations.

Check that the compressor is running and that it is free from severe rattle or vibration.

Check that the PID controllers (if provided) have power and that they are reading properly. If a controller has power but reads SBER or LLER, consult the controller and sensor manuals.

If a fan filter unit is being used, apply power to the unit, in accordance with the manufacturer's guidelines.

Once the *HEPAir*(s) and FFU(s) are running, using a calibrated probe, verify that the readings on the thermostat and/or controller(s) is accurate. If the controller(s) do not match the measurements in the room, consult the manual for instructions on how to calibrate the controller.

11. Air Balancing

Before attempting to balance the airflow throughout the system, refer to the airflow schematic provided. The airflow pattern in this diagram is specific to your application and should be followed to ensure correct operation of the *HEPAir* and your room.

In some applications, it may be necessary to consult a professional air balancer to achieve the specified performance. **Failure to set up the *HEPAir*, per the airflow schematic and configuration sheet, will result in poor system performance.**

The evaporator fan control is located near the inlet to the condenser fan. This increases or decreases airflow through the evaporator coil, by varying the fan speed.

12. System Checkout

After balancing the airflow to specification or desired fan speed, check that the thermostat

or controller(s) are set to the requirements of the room.

If you are using a PID controller, it is recommended to put the controller into auto tuning mode after completion of setup. Refer to the controller manual for details. Let the *HEPAir* unit run for at least a 24hr period before final verification of the system. This will allow the refrigeration system to settle out and give the controllers enough time to auto tune.

13. Cleaning and Maintenance

If the inlet airway to the condenser is unfiltered, it is recommended that the coil be cleaned every 3–4 months, depending on conditions. Access can be gained through either the side panels or the top of the unit. Use care when cleaning the coil as the fins are very sharp.

If the condenser inlet has a filter, it is recommended that the filter be changed every 1-2 months, depending on conditions.

If a filter has been provided with the unit for the evaporator inlet air, the filter should be changed every month to prevent the loss of airflow and unit capacity reduction.

The evaporator coil should be checked every 6 months to ensure that no debris has logged in the coil. Gain access to the evaporator coil through the top of the unit or sides.

The drain pan under the evaporator coil should be checked every 3-4 months to ensure that water is draining properly and that debris is not blocking the drain hole in the pan. Access to the pan can be gained through any of the mix air chamber panels.

Consult the specific manuals for the options purchased for manufacturer's recommended maintenance schedule.