

Single Duct VAV Terminals

Receiving Inspection

Prior to removing the shipping material, visually inspect the packing materials. There should be a black plastic strip wrapped in the clear plastic shrink wrap. If this black plastic strip is missing, the shipment may have been repacked by the shipper and you should make note of this on the shipping documents and inform the delivering carrier.

After unpacking the terminal, check it for shipping damage. If any shipping damage is found, report it immediately to the delivering carrier. Store units in a clean, dry location prior to installation.

Units with controls are not recommended for use in ambient temperatures greater than 95°F. For protection of controls, do not store in ambient temperatures greater than 135°F.

Caution: Do not use the flow sensor, connecting tubing, or damper shaft as a lift point. Damage to the flow sensor or controls may result.

Hanging/Installation Requirements

Unless local building codes require hangers, the smaller size basic single duct terminals may be light enough to be supported by the ductwork itself. However, when accessory modules, such as DDC controls, hot water coils, or sound attenuators are included, the single duct terminal should be supported directly. Straps screwed directly into the side of the terminal, trapeze hangers, or the method prescribed for the rectangular duct on the job specifications may be used (See Figure 1, page 1).

The 500 PH Series Single Duct Terminal is not suitable for outdoor use.

Important: If equipped with pneumatic controls, the orientation of the terminal is critical. The pneumatic controls must be mounted right side up. The single duct unit must be level within + or - 10 degrees of horizontal, both parallel to the air flow and at the right angle of air flow. The control side of the terminal is labeled with an arrow indicating UP. Unless otherwise noted, most analog and digital controls may be installed in any orientation. Check with the local representative for verification.

Minimum clearance For Access

Single Duct Air Terminals require sufficient space to allow servicing of the actuator, controls and single electric power hook-up (if applicable). Horizontal clearance requirements is dependent upon access panel dimensions which are indicated on the appropriate submittals (for control panel enclosure access a minimum of 18" is recommended. See the appropriate submittal for control panel location).

NOTE: These clearance recommendations are not meant to preclude NEC requirements or local building codes

Connecting Ductwork

Slip each inlet duct over the inlet collar of the terminal. Fasten and seal the connection by the method prescribed by the job specification.

The diameter of the inlet duct "D" in inches must be equal to the listed size.

be fitted to a size 8 terminal. The inlet collar of the terminal is made 1/8 inch smaller than listed size in order to fit inside the duct.

Note: Do not insert duct work inside the inlet collar of the assembly. Inlet duct should be installed in accordance with SMACNA guidelines. If a single point electronic velocity sensor is installed, it is recommended that the installer provide three to five diameters of straight duct at the terminal inlet.

The outlet end of the terminal is designed for use with slip and drive duct connections (flanged outlets optional). A rectangular duct the size of the terminal outlet should be attached.

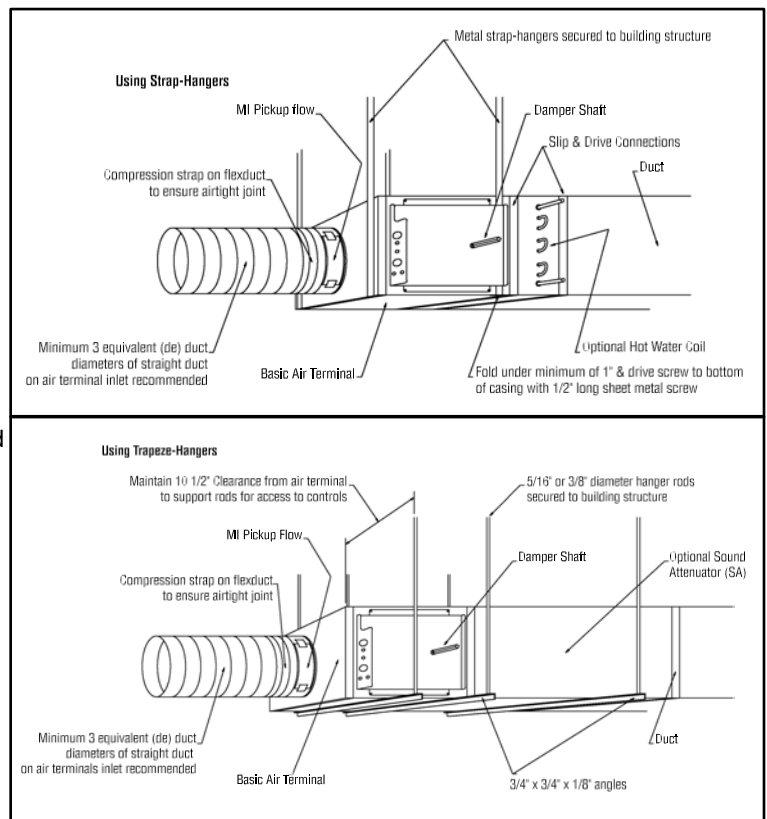


Figure 1. Suggested Mounting Methods.

Field Electrical Wiring

- All field wiring must comply with the local codes and with the National Electrical Code (ANSI/NFPA 70-2002).
- When applicable, electrical, control and piping diagrams are shown on labels attached to the exterior of the single duct unit.
- Use copper conductors only!
- All terminal units must be properly grounded per NEC 424-14 and 250.
- Always check product label for voltage and current data to determine the proper wire size and current protection.
- The control cabinet contains live electrical parts! Contacting these parts with the power applied may cause serious injury or death. The control cover must be closed prior to applying electric power to the unit.
- These recommendations are not meant to preclude NEC requirements or local building codes that may be applicable, which are the responsibility of the installing contractor.

500PH Single Duct Terminal Units With Electric Heat

- Always inspect the electric coils for damage prior to installing the single duct unit.
- All electric heaters if provided by Performance Aire are balanced by kW per stage. The installing electrician should rotate these heater stages by phase in order to help balance the building electric load.
- See above wiring instructions.
- The "up" orientation must be followed

500P Single Duct Terminal Units With Hot Water Coils

- Always inspect the hot water coils for damage prior to installing the single duct unit.
- CAUTION: The copper tubing should not be used as lift points.
- The hot water coil casing is field insulated.
- The hot water coils do not have a drip pan and are not suitable for use as cooling coils.

Controls

Detailed information regarding connection, start-up and operating procedures for controls provided by PERFORMANCE AIRE are available from your local representative. For information on controls by other manufacturers, contact that manufacturer's local branch or dealer.

Important: Units with digital controls, if factory programmed, incorporate specific communication addresses. Installing the terminal in a different location than noted on unit label and building plans may result in excessive start-up labor.

Labeling

Series 500PH Single Duct Air Terminals are shipped from the factory with up to seven different information labels (not all labels pertain to all single duct units depending upon the type of insulation and the final ship to state).

- 1) Control Label – affixed to the single duct terminal casing. Shows piping/wiring diagram and control sequence number and fusing (if applicable).
- 2) Calibration Label – affixed to the single duct terminal casing. Shows air flow calibration data and control settings (if applicable).
- 3) I.D. Label – affixed to the single duct terminal casing. Shows tagging information, customer order number, ETL Logo, PERFORMANCE AIRE Logo, etc.
- 4) ARI Certification Label on Single Duct Terminal Unit – identifies applicable industry test standard and certifies unit is in compliance.
- 5) ARI Certification Label on Hot Water Coils – identifies applicable industry test standard and certifies hot water coil compliance (if hot water coil is ordered as an accessory).
- 6) Fiberglass Label – identifies insulation type for units shipped to California.
- 7) Orientation label – identifies the proper air flow direction and the top of the unit.

500PH Flow Sensor

Series 500PH Single Duct Air Terminals are shipped with a factory installed pressure differential flow sensor installed in primary inlet. See Figure 2, page 4 for the calibration curve. Model BP terminals offer an optional downstream sensor for field installation at minimum of 3 ft downstream of box discharge.

TROUBLESHOOTING

Investigating Noise Complaints

Noise from a terminal can be due to a variety of conditions, and can be difficult to eliminate. The first step is to isolate the type, source and direction. Generally, noise heard at the air outlet is considered a discharge type. Noise heard through the ceiling is considered a radiated noise. For detailed information concerning noise transmission in buildings see ARI Standard 885-98, PROCEDURE FOR ESTIMATING OCCUPIED SPACE SOUND LEVELS IN THE APPLICATION OF AIR TERMINALS AND AIR OUTLETS.

Discharge Noise

Usually caused by high static or little to no internal duct lining downstream of the terminal. Can sometimes be caused by the air outlet itself. Air outlet generated sounds can be reduced by reducing flow or increasing air outlet size. Reducing static pressure, or flow, or adding additional attenuation materials will reduce discharge sounds from the terminal unit. Sometimes, moving the flex duct between the terminal and air outlet so the air must make an additional turn will help with the discharge sound.

Radiated Noise

Radiated noise is most commonly associated with fan powered terminal units.

Controls Contact

Contact your Performance Aire representative for information concerning controls provided by Performance Aire. For controls provided by others, contact the local control representative for assistance.

Electric Duct Heater

If the heater does not operate:

- ☐ Check electric power into the unit, and verify that the wiring agrees with the label diagram located on the terminal unit casing.
- ☐ Verify that the unit is installed properly (i.e., according to the air flow orientation label). Review the wiring diagram supplied with the heater to verify the field wiring is correct and of the proper gauge and that the heater is properly grounded.

If the heater cycles on and off:

- ☐ Verify that the airflow is uniformly distributed across the face of the heater. Check for obstructions in the duct, or insufficient air flow (CFM) (see label for minimum CFM).

If conditioned space fails to warm-up:

- ☐ Make certain that the heater controls and the thermostat are compatible and wired properly. Relocate the thermostat if it is located in a position that is too warm.

If conditioned space overheats:

- ☐ Make certain that the heater controls and the thermostat are compatible and wired properly. Relocate the thermostat if it is located in a position that is too cool. Verify that the air distribution to the space is appropriate for the required thermal load.

!!!CAUTION!!! – USE EXTREME CARE IF TESTING THE ELECTRIC HEATER WITH THE POWER ON!
The control cabinet contains live electrical parts! Contacting these parts with the power applied may cause serious injury or death.

!!!CAUTION!!! – THIS UNIT SHOULD BE SERVICED BY A LICENSED ELECTRICIAN OR A SIMILARLY QUALIFIED ELECTRICAL SERVICE TECHNICIAN!

Specific Electric Heat Troubleshooting Procedures:

Warning: On all troubleshooting that requires you to work inside the heater wiring casing, disconnect power first! Jumpers are used for diagnostic purposes only – remove all jumpers prior to returning unit to operation.

| Possible Cause | Solution |
|---|--|
| Power not properly connected to the heater. | With a voltmeter, check the power wiring terminals to insure the proper voltage is available to the element side of the power terminal block or to the field side of the disconnect switch, power fusing, or circuit breakers. If proper voltage is not present, check the terminal studs for proper wiring and check the power source for power. |
| Disconnect switch, toggle switch, or circuit breaker set to OFF | Set switch circuit breakers to the ON position. |
| Power fuses are blown or circuit breakers have tripped. | Replace fuses with the same type and amperage as those provided with the heater, or reset circuit breaker by first setting the breaker to the OFF position, and then resetting it to the ON position. With an ammeter, check amperage draw on the power lines. For heaters with fusing, amperage draw should not exceed the fuse. For heaters with circuit breakers, amperage should not exceed the rated value. If the amperage draw is excessive, check the power supply as described above for proper voltage. If the fuse/circuit breaker trips upon application of power, check for a short. If no short is present and the power supply wiring/voltage is correct, contact the factory for further assistance. |
| Manual reset switch has been tripped. | Push manual reset button. Manual reset is usually located in the control cabinet near the bottom of the element header. |
| Air static switch is not engaging. | Jumper out the air static switch by connecting the lead attached to the normally open stud, to the normally closed stud. If heater operates, the problem may be the air static switch. Disconnect the pneumatic tubing from the pitot tube located in the control cabinet. Attach a magnehelic gauge to the pitot tube. Available static pressure at the pitot tube should be ≤ -0.03 " S.P. or $\geq +0.03$ " S.P. If the available static pressure is in the dead band between these two ranges, the switch will not engage and some method must be devised to increase the available static pressure. If sufficient static pressure is available, check to insure the pneumatic tube is connected to the correct port of the switch. For negative pressure, connect to the low port. For positive pressure, connect to the high port. If the air static switch still fails to operate, contact the factory for a replacement switch. |
| Automatic reset switch bad. | Allow the duct temperature to cool below 90°F. If the heater does not operate, jumper out the automatic reset switch. If the heater now operates, contact the factory for a replacement switch. Manual reset switch Allow the duct temperature to cool below 90°F. If the heater does not operate, do the following: <ul style="list-style-type: none"> • On heaters with the manual reset installed in the power wiring, jumper out the manual reset switch. If the heater now operates, contact the factory for a replacement switch. • On heaters with the manual reset located in the backup contactor circuit, jumper out the manual reset switch. If the backup contactor now engages, contact the factory for a replacement switch. If the backup contactor fails to operate, the problem is in the backup contactor holding coils. Use an ohmmeter to check the continuity of the holding coils. Contact the factory for a replacement of any contactor with faulty holding coils. |
| Step controller malfunction. | Jumper out each step of the step controller. If contactor engages, the trouble is in the step controller. Refer to the literature provided with the step controller for proper power and wiring. If wiring appears to be correct, contact the factory for assistance. |
| SCR controller malfunction. | Refer to the literature provided with the SCR controller for proper power and wiring. If wiring appears to be correct, contact the factory for assistance. |
| Possible: Nuisance Tripping of Reset Switches | |
| POSSIBLE CAUSE | SOLUTION |
| Insufficient air flow across the heating elements | The minimum allowable air flow across the heating coils is 70 CFM/kW. Unless this minimum air flow is met, the leaving air temperature will be greater than the set point of the high temperature limit switches. This will cause nuisance tripping of the reset switches. Reset the minimum air flow across the coils to the minimum listed value. If further assistance is needed, contact the factory |

