

READ AND SAVE THESE INSTRUCTIONS

CARNES®

**INSTALLATION and OPERATION MANUAL
FOR
VAV
THROTTLING UNITS**

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**Models AVCD, AVWE, AVED, ABBD, ABWD,
ADCC and ADCD**

INSPECT UNIT

UNPACKING AND INSPECTION

1. Open shipping carton or crate and check for concealed shipping damage. Report damage immediately to the carrier that delivered the unit.
2. Inspect the unit for loose or missing components.
3. Optional accessories may be packed within the unit or in the same shipping carton.

GENERAL

1. Each VAV unit and accessory is shipped with an identification label showing the Carnes order number, unit item number from the order, unit model number, maximum and minimum CFM settings on terminal units with pressure independent control options, and unit tagging (or mark).

CARNES® CARNES COMPANY, VERONA, WI	
ORDER	ITEM
MODEL	
MAX. CFM/MIN. CFM	
MARK	

INSTALLATION

MOUNTING

1. Units are to be supported in a horizontal and level position. For convenience, it is suggested that the units be installed prior to installation of the ceiling tile grid system.
2. Avoid abrupt transitions or duct turns at the inlet of the unit that would alter the cross-section area.
3. A minimum of **three** duct diameters of straight duct upstream of inlet sensor is recommended. (i.e., 6" inlet dia. = 18" or more straight upstream duct.) *Figure 1*
4. Close coupling the terminal unit inlet to the side of the main duct is **NOT** recommended. *Figure 2*
5. The control unit must be mounted such that the velocity sensor is at the inlet of the terminal unit, upstream of the damper blade.
6. Dual duct units may have a velocity sensor mounted downstream at the discharge opening. The dual duct unit should be mounted with the two inlets upstream of the damper blades.
7. The diameter of the inlet duct in inches must be equal to the listed inlet collar diameter of the terminal unit.
8. A minimum clearance of six inches (6") is required at the top discharge opening (by-pass) on Models ABB and ABW.
9. All control enclosures require adequate clearance to allow for field adjustments and service.
10. Terminal units may be provided with optional hanger brackets which are suitable for supporting the terminal unit by wire hangers or threaded rods.
11. Strap hangers may be used for supporting the units when hanger brackets are not provided.

Figure 1

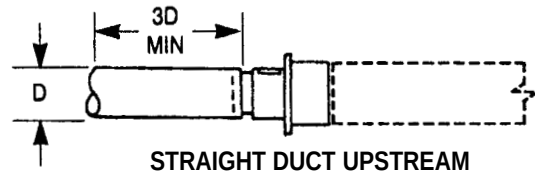
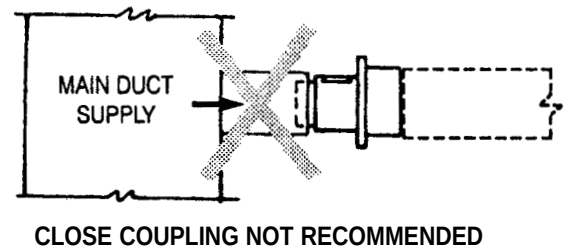


Figure 2



CAUTION: Do not install hangers so as to impair the movement or performance of control components.

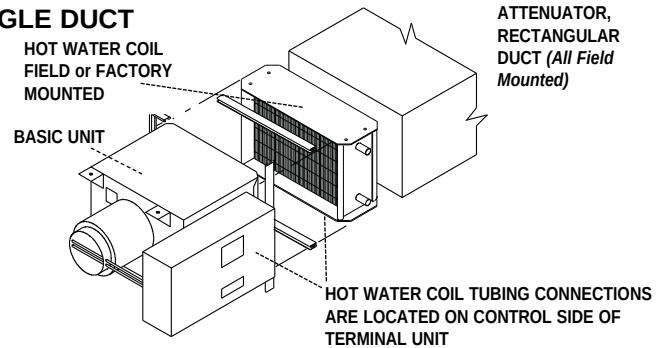
CAUTION: Do not install hangers with screws into the uninsulated coil casing. Permanent coil damage may result.

CAUTION: Do not install hangers so as to impair or restrict the movement of the slide balancing damper on By-Pass terminal units. (Models ABB & ABW).

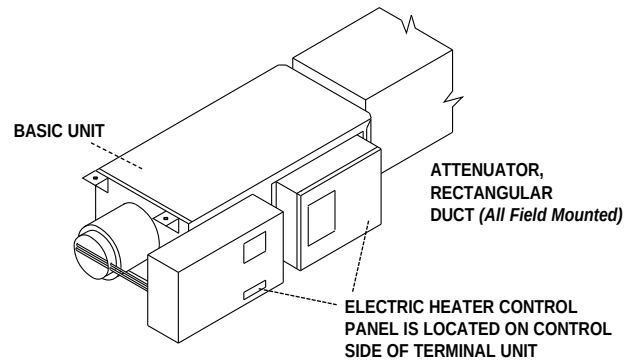
DUCT CONNECTIONS

1. Units are provided with slip and drive discharge duct connections.
2. It is suggested that discharge ductwork be lined with a minimum of 1/2" thick, 1-1/2 lb. density fiberglass insulation with an erosion resistant surface in accordance with NFPA 90A (non-residential type air conditioning and ventilating systems) to provide both thermal and acoustical insulation.
3. Attenuators are field mounted with slip and drive cleats provided by others.
4. Sealing of duct work to preclude air leaks should be done in accordance with the job specifications.
5. It is recommended that flexible ductwork connected to the inlet be secured using compression band. Rigid duct should be slipped over the inlet, secured in place with sheet metal screws, and sealed in accordance with the job specifications.

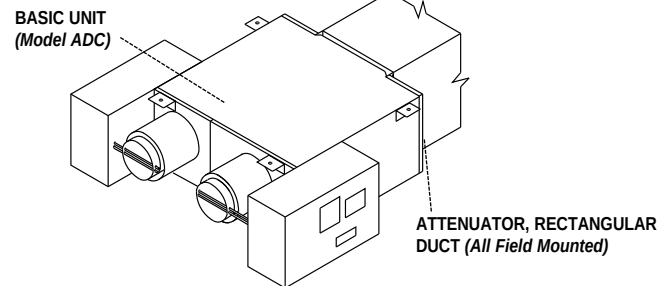
SINGLE DUCT



SINGLE DUCT WITH ELECTRIC REHEAT



DUAL DUCT



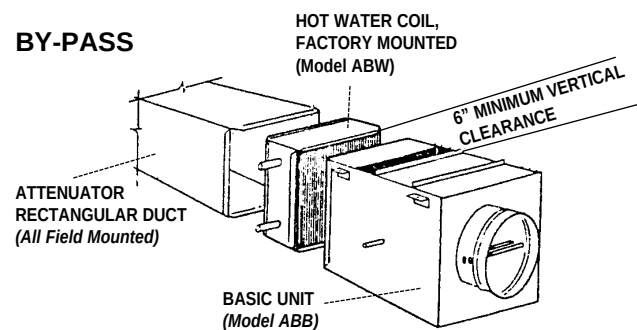
BALANCING THE MODELS ABB and ABW BY-PASS TERMINAL UNITS

I. SYSTEM BALANCING

Prior to setting design flow conditions at each unit the by-pass slide dampers must be balanced against downstream duct resistance.

1. Adjust all thermostats for full cooling so that there is a maximum air flow to the zone.
2. Using the two air flow pressure taps at each unit, green (high pressure) and yellow (low pressure), read and record the air flow pressure to the zone (this value may be in excess of design flow requirements).
3. After this reading has been taken, adjust the thermostat for full heat (full by-pass position).
4. When unit is in full by-pass position, adjust the by-pass slide damper so that the pressure reading is the same as it was for full cooling to the zone.
5. Continue this procedure at each ABB and ABW unit.

BY-PASS



II. SYSTEM DESIGN FLOWS

Once the by-pass slide dampers have been balanced, then the zone design flow conditions can be set.

1. Again, adjust zone thermostats to full cool (maximum air flow to the zone).
2. Adjust actuator to the maximum CFM as measured at the diffusers.
3. Adjust zone thermostat to full heat (minimum air flow to zone).
4. Adjust actuator to the minimum CFM as measured at the diffusers.
5. Continue this procedure at each ABB and ABW unit.

HOT WATER COIL CONNECTIONS

Hot water coils are factory mounted to the control unit with coil connections on the same side of the terminal units as the damper controls.

1. Hot water coil casings are uninsulated. Insulation requirements must be field applied with material supplied by others.
2. Water supply valve should be installed on the bottom coil connection. (Coil shall fill from the bottom.)

3. Coil tubes are suitable for sweat connections to the field water pipe system.
4. Hot water coils may be reversed in the field by removing the slip and drive cleats and rotating the coil water connections to the other side and reinstalling the slip and drive cleats.

CAUTION: Plumbing heat sink methods should be used when soldering near existing joints.

ELECTRIC DUCT HEATER CONNECTIONS

Electric duct heaters may be shipped attached or loose from the terminal unit.

1. When shipped factory mounted to the terminal unit, the electric heater control panel is on the same side of the terminal unit as the damper controls.
2. When shipped loose for field mounting, the electric heater should be mounted as indicated by the "AIR-FLOW" arrow and the "UP" arrow on the electric heater control panel cover.
3. Electric duct heater casings are uninsulated. Insulation requirements must be field applied with material supplied by others.

CAUTION: Do not mount electric heaters upside down. Heater will not function properly and may overheat causing a serious fire hazard.

CAUTION: Maximum heater discharge temperature must not exceed 125°F to avoid nuisance tripping.
Discharge Temperature = [(KW x 3160) / CFM] + Entering Air Temperature.

ELECTRICAL CONNECTIONS

CAUTION: All sources of supply power must be disconnected before working on this equipment. More than one disconnect may be required to de-energize equipment.

1. Electric duct heater wiring should be done in accordance with local codes and job specifications.
2. Follow the wiring/piping diagram found on the side of the unit or the inside of the electric heater control panel cover.
3. Supply connections must be made using wires rated for 75°C minimum. DO NOT USE ALUMINUM CONDUCTORS.
4. If supply connections are for 250 volts or greater, all wiring must be insulated for 600V.
5. All field and factory made connections should be checked for tightness before operation.

6. Size wiring conductors for 125% of rated combined load.

$$\text{Single Phase Line Current} = \frac{\text{KW} \times 1000}{\text{Voltage}}$$

$$\text{Three Phase Line Current} = \frac{\text{KW} \times 1000}{1.73 \times \text{Voltage}}$$

7. The following table shows the maximum current for the supply overcurrent protection device.

Maximum Unit Amperage	Maximum Overcurrent Device Rating
12	15
16	20
20	25
24	30
28	35
32	40
36	45
40	50
48	60



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