GENERAL
Furnish and install Carnes Intermittent or Constant Volume Fan Terminal Units of the size, capacity, and performance as shown on the plans.

PERFORMANCE
The air pressure drop through the terminal units shall not exceed values tabulated on the job schedule. Sound levels of the terminal unit shall be **AHRI Certified** and rated in accordance with **Standard 880-2008**. An AHRI Label shall be attached to each unit prior to shipment.

CONSTRUCTION
The valve assembly is to be constructed from galvanized steel with the damper mechanically fastened to a 3/8" shaft and isolated from the casing to eliminate the possibility of damper binding due to shipping or handling damage. The damper shaft is to rotate in oil impregnated sintered bronze bearings at three points for support and long life. Shaft shall be clearly marked on the end to indicate damper position. The terminal unit casing is to be 22 gauge galvanized steel (20 gauge for Q-Series).

CONTROL VALVE
The valve shall be sealed for minimum leakage. The throttling damper on Models AC and AS are to be of a sandwich design incorporating a solid sheet of Volara®, type A gasket material sandwiched between two halves of reinforced galvanized steel. The average valve leakage of all unit sizes combined shall not exceed 1% at 3" inlet static pressure. Control valves shall be (Normally open) (Normally closed) as required.

INSULATION
Insulation for fan terminal units shall be 1" thick (1/2" for Low Profile and Underfloor). All insulation shall be 1.5 lb./cu. ft. dual density fiberglass liner (2.0 lb./cu. ft. for Low Profile and Underfloor). The surface of the insulation shall conform to **UL Test 181** for erosion resistance. The insulation must be **UL** listed and meet **NFPA 90A** requirements for 250°F continuous temperature.

FOIL COATED INSULATION
The foil faced insulation shall be 1" thick (1/2" for Low Profile and Underfloor) dual density fiberglass with a .001", fiber reinforced aluminum foil on the matted face. The insulation must be **UL** listed conforming to **UL Test 181** for erosion resistance and must meet **NFPA 90A** requirements for 250°F continuous temperature. **Also available are 1/2" closed cell foam and dual wall with solid or perforated inner liner.**

PNEUMATIC CONTROL
Pneumatic actuators shall be furnished and mounted by the terminal unit manufacturer. The actuators shall be pivoted to protect against side forces throughout the full stroke. Thermostat shall be by others.
Provide **pressure independent pneumatic** volume control to maintain constant air volume regardless of duct pressure changes at air flows from minimum to maximum required by the zone. This action is to be instantaneous rather than having to wait for the thermostat to respond. External controls permit field adjustment of air volume. As a standard, the Carnes reset volume controller is offered for use with reverse or direct acting thermostat and a normally open or a normally closed damper. Compressed consumption of the control shall not exceed 30 SCIM (0.017 SCFM) at 20 P. S. I.

ELECTRONIC CONTROL (Analog)
Provide **pressure independent analog electronic** control to maintain constant air volume regardless of duct static pressure changes at all air flows from minimum to maximum required by the zone thermostat. Thermostat with integral maximum and minimum air flow set points shall be provided by the terminal unit manufacturer. A line voltage to 24 volt transformer shall be provided by the terminal unit manufacturer.

DDC ELECTRONIC CONTROLLER
The DDC control supplier must coordinate with the VAV manufacturer and will send the control devices to the VAV manufacturer to be factory mounted and wired. Calibration of DDC controls by control supplier.

CONTROLS ENCLOSURE
Provide a galvanized steel enclosure with a removable cover for protection of control components.

BALANCING
Terminal units shall have a calibration chart for the purpose of measuring air flow.

HOT WATER COIL
Hot water coil shall be Slip and Drive connected as an integral part of the terminal unit. If insulation is required, it must be field supplied and installed. Coils shall be constructed using 1/2" O. D. copper tubes, 1-1/4" x 1.08" (per row) rippled aluminum fins 0.005" thick. Fin spacing shall be 10 F. P. I. Coil connections shall be either right or left hand. All hot water coils to be pre-tested under water at 350 P. S. I.

ELECTRIC HEATERS
Each electric heater will have an integral air flow interlock, automatic reset primary thermal cutout, resetable secondary thermal cutout, door interlocking disconnect switch, 80/20 Ni-Ch element wire. P/E switches shall be included with pneumatic controls. Disconnecting magnetic contactors and a 24 volt control transformer shall be included with electronic controls. The electric heater will be available with 1 or 2 stages.

FAN TERMINAL UNIT MOTORS
Fan terminal unit motors shall be thermally protected, Permanent Split Capacitor or ECM type, single phase, fractional horsepower motors. All fan motors shall be specifically designed for use with an SCR for fan speed adjustment and balancing air flow. The SCR shall have a minimum voltage stop to ensure that the motor will not operate in a stall mode.