

LOW PROFILE FAN POWERED TERMINAL UNIT
Constant Volume - Series Flow

UL Listed 1/2" insulation conforms to **UL Test 181** and **NFPA 90A**.

Fan motor.

Sturdy 22 gauge galvanized steel construction.

Casing has removable bottom access panel for servicing internal parts.

Fan control enclosure. (Standard)

Plenum air filter rack. (Filter Optional)

Damper control enclosure. (Standard)

Thermally insulated inlet collar.

3/8" damper shaft rotates in three oil impregnated sintered bronze bearings. Slot in damper shaft to indicate damper position.

Calibration chart for flow measuring and balancing.

Tri-Averaging inlet sensor amplifies velocity pressure signals for air flow measuring and pressure independent flow control.

Electronic damper controls shown. (Pneumatic available)

Fan contactor. (Standard)

Toggle disconnect. (Optional)

SCR fan speed control. (Standard)

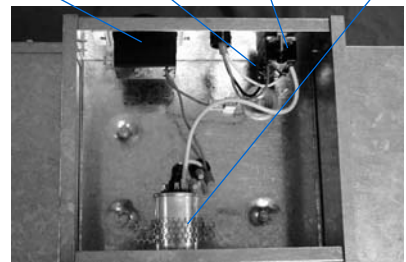
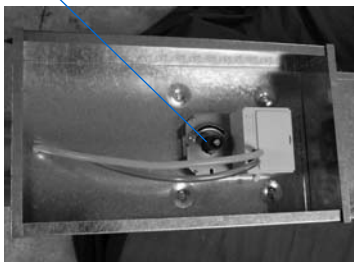
Capacitor. (Standard)



OPTIONAL ETL LISTING

Integral air flow switch. Not shown. (Included with Carnes controls only)

Transformer. Not shown (Optional).



INSIDE CONTROLS ENCLOSURE

CONSTANT VOLUME FAN TERMINALS

- From the job specification or schedule, determine the Maximum and Minimum primary CFM requirement for each zone.
- Refer to the fan curves located under the Performance Data Section of this catalog.
- Select a Fan Size from these curves, making sure that the fan selected can deliver the Maximum Primary CFM at a given downstream external static pressure [ESP]. Downstream ESP consists of ductwork, flex, coils etc. NOTE: For proper operation, it is recommended that the downstream ESP be at least 0.20" WG.
- Units must be selected to operate within the minimum and maximum range of the fan curves. Fan speed controllers [SCR] are provided as standard to allow air flow adjustments and balancing.
- Inlet size is predetermined according to the Fan Size selected for constant volume units. See Quick Selection Table.
- After a Fan Size is selected, refer to the Primary Air Inlet Parameter chart Table. Make sure that the Minimum primary CFM is within the ranges shown for Pneumatic or Electronic controls.
- Sound Level: Refer to the sound section of this catalog to determine if the unit selected meets the required NC or Db levels specified.
- Pressure Drop: Refer to the performance section of this catalog to determine the air differential pressure [ΔPs]. ΔPs is the static pressure difference from the inlet to discharge and does not include hot water or electric coils. See coil selection for Ps of these devices.
- Heating Coils: For units that require hot water or electric heat refer to the appropriate sections of this catalog for performance data.
- Controls: See Control Section for Terminal Unit Controls and the sequence of operation as specified.

INTERMITTENT VOLUME FAN TERMINALS

- From the job specification or schedule, determine the Maximum and Minimum primary CFM requirement for each zone.
- Select a unit size within the Maximum and Minimum primary CFM range. Maximum CFM should not exceed the maximum rating shown. [Maximum rating based on approximately 3000 FPM]. Minimum CFM should be selected within the pneumatic or electronic minimum CFM ranges shown. [A minimum of 0 CFM is also acceptable if specified].
- Evaluate the fan CFM requirement for each unit and refer to the Fan Curves of this catalog. Note: Actual heating CFM = fan CFM + minimum primary CFM.
- Select a Fan Size from these curves, making sure that the fan selected can deliver the desired CFM at a given downstream external static pressure [ESP]. Downstream ESP consists of ductwork, flex, coils, etc. Note: For proper operation, it is recommended that the downstream ESP be at least 0.20" WG.
- Units must be selected to operate within the minimum and maximum range of the fan curves. Fan speed controllers [SCR] are provided as standard to allow air flow adjustments and balancing.
- After the Fan and Inlet Size is determined refer to the Quick Selection Table to make sure that your selection is available. You will notice that there are many Fan and Inlet size combinations shown for intermittent fan terminals [AS units].
- Sound Level: Refer to the sound section of this catalog to determine if the unit selected meets the required NC or dB levels specified.
- Pressure Drop: Refer to the performance section of this catalog to determine the air differential pressure [ΔPs]. ΔPs is the static pressure difference from the inlet to discharge and does not include hot water or electric coils. See coil selection for ΔPs of these devices.
- Heating Coils: For units that require hot water or electric heat refer to the appropriate sections of this catalog for performance data. Note: Actual heating CFM = fan CFM + minimum primary CFM.
- Controls: See Control Section for Terminal Unit Controls and the sequence of operation as specified.

Typical Sequence of Operation – Intermittent Volume

Central fan on – Day (occupied) operation.

When the central system fan is "on", the intermittent fan unit operates as a standard throttling control unit for cooling loads. As the cooling load diminishes the control valve throttles to a minimum or closed position, the fan is energized by the P/E switch for pneumatic controls or an electric contactor for electronic controls to draw in warm plenum air. Thermostat is calling for heat.

Central fan off – Night (unoccupied) operation.

When the central system fan is "off", on a call for less cooling, the primary air supply valve closes. The unit fan is then turned on and off by the P/E switch for pneumatic controls or an electric contactor for electronic controls on demands for heat and not heat respectively.

CAUTION: For electronically controlled unit, a minimum CFM value other than zero may cause the damper to drive open when the central system is off.

Typical Sequence of Operation – Constant Volume

Central fan on – Day (occupied) operation.

When the central system fan is "on" and a positive pressure of at least .10 IWC is present at the primary air inlet, the unit air flow switch senses this pressure and keeps the fan on all the time by overriding the unit P/E switch action with pneumatic controls or electric contactor with electronic controls.

Central fan off – Night (unoccupied) operation.

When the central system fan is "off" at 0.0 to negative pressure is present at the primary air inlet. The air flow switch senses the negative pressure and is taken out of the circuit. The unit fan is then turned off by the P/E switch with pneumatic controls or electric contactor with electronic controls.

CAUTION: For electronically controlled unit, a minimum CFM value other than zero may cause the damper to drive open when the central system is off.

QUICK SELECTION TABLE

INTERMITTENT AND CONSTANT VOLUME FAN TERMINALS (Low Profile Design)

Model	Unit Size	Fan Size	Inlet Size (In.)	Motor HP	Full Load Amps 120V	Full Load Amps 277V	Maximum Primary Air Flow	Minimum Primary Air Flow (Pneumatic)	Minimum Primary Air Flow (Electronic)	Maximum Fan CFM 0.25" wg
Low Profile AS_H Units	L1	A	5	1/6	2.0	1.0	350	0 or 75	0 or 45	300
	L2	A	6	1/6	2.0	1.0	500	0 or 110	0 or 65	300
	L3	A	7	1/6	2.4	1.0	700	0 or 140	0 or 85	300
	L2	B	6	1/6	2.0	1.0	500	0 or 110	0 or 65	430
	L3	B	7	1/6	2.0	1.0	700	0 or 140	0 or 85	430
	L4	B	8	1/4	5.3	2.0	1000	0 or 185	0 or 105	430
	L3	C	7	1/6	2.0	1.0	700	0 or 140	0 or 85	660
	L4	C	8	1/4	5.3	2.0	1000	0 or 185	0 or 105	660
	L4	D	8	1/4	5.3	2.0	1000	0 or 185	0 or 105	985
	L5	D	8	1/4	6.3	2.3	1000	0 or 185	0 or 105	1030
	L6	D	10	1/2	7.5	3.0	1500	0 or 300	0 or 155	1030
L6	E	10	1/2	7.5	3.0	1500	0 or 300	0 or 155	1460	
Low Profile AC_H Units	L1	A	5	1/6	2.6	1.1	350	0 or 75	0 or 45	295
	L2	B	6	1/6	2.6	1.1	500	0 or 110	0 or 65	420
	L3	C	7	1/6	2.6	1.1	700	0 or 140	0 or 85	680
	L4	D	8	1/4	5.6	1.9	1000	0 or 185	0 or 105	1000
	L5	E	10	1/4	7.6	2.8	1500	0 or 300	0 or 155	1500

PRIMARY AIR INLET PARAMETERS (Pressure Independent Control)

Inlet Diameter	Rated CFM	Pneumatic Minimum CFM Range	Electronic Minimum CFM Range
5"	350	∅ or *75-140	∅ or *45-140
6"	500	∅ or *110-200	∅ or *65-200
7"	700	∅ or *140-280	∅ or *85-280
8"	1000	∅ or *185-400	∅ or *105-400
10"	1500	∅ or *300-600	∅ or *155-600

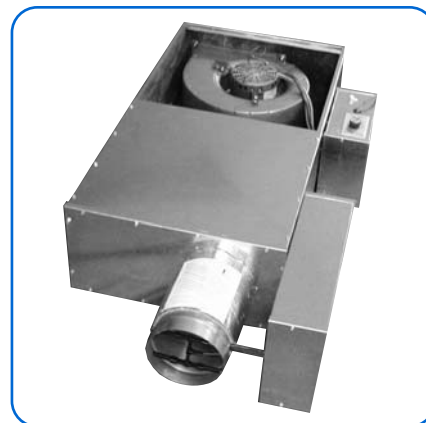
*See Note 2.

- NOTES:**
1. Rated CFM is based on a maximum inlet velocity of approximately 3000 FPM.
 2. Minimum CFM selection below this value (except 0) with pressure independent control may provide less than optimum control characteristics. (Minimum CFM values for the ASE, ACE units will vary with a change in electric coil KW. See Electric Coil Section to calculate minimum air flow.)
 3. CFM selections out of the recommended maximum or minimum ranges shown may result in less than optimum control.
 4. Minimum CFM selection is recommended to be 40% of maximum rated CFM or less.
 5. Maximum CFM selection is recommended to be 60% of maximum rated CFM or more.

Models **ACF w/o Reheat**
 ACW w/ Hot Water Reheat
 ACE w/ Electric Reheat

The **Carnes** low profile constant volume fan terminal unit provides constant air volume to the space while retaining the advantages of a variable air volume system.

The primary air control assembly operates in the same manner as a standard throttling control valve when cooling loads are high. As cooling loads diminish the integral blower induces warm ceiling plenum air to maintain constant air volume.



Features Include:

- Air flow capacities to 1500 CFM.
- Durable 22 gauge galvanized steel casing construction.
- Access panel for internal components.
- Standard inlet sizes and flange or slip and drive discharge connections.
- Forward curved centrifugal type fan assemblies with 120 or 277 volt, single phase, fractional horsepower PSC motors.
- Low leakage primary air damper design.
- Secondary air filter rack.
- Performance data based on tests conducted in accordance with AHRI Standard 880-2008.
- Pressure independent pneumatic or electronic controls available.
- Field adjustable P/E switch with pneumatic controls.
- Averaging type velocity sensor and calibration chart for measuring air flow through the primary air damper.
- Insulation is 1/2" thick, 2.0lb. dual density fiberglass with surface treated to prevent air erosion, UL listed and meets NFPA 90A requirements.
- Optional primary air controls enclosure.
- Optional one to four row hot water coils (Model ACW). Coil is factory attached to the unit discharge.
- Optional one or two stage electric reheat coils (Model ACE). Coil is factory attached to unit discharge or shipped separately for field mounting.
- Optional secondary air filters, Class I (re-usable) or Class II (throw away).
- Optional foil coated insulation (Hospital, Laboratory, etc. applications).
- Optional ETL listing.

Available Modules:

- Basic control unit — **Model ACF.**
- Basic control unit with hot water coil — **Model ACW.**
- Basic control unit with electric coil — **Model ACE.**



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