

▼ **ELECTRIC CONTROL OPTIONS**

All of the electric control options listed are pressure dependent. Pressure dependent controls require field calibration of air flow according to the job system conditions.

EA Control Option - The EA control option includes a 24 VAC Carnes electric actuator to control the VAV terminal unit damper for cooling applications. The EA control works in conjunction with a 24 VAC power transformer and a 24 VAC wall mounted thermostat.

EB Control Option - The EB control option includes a 24 VAC Carnes electric actuator and a unit mounted, field adjustable change over thermostat. The temperature sensing bulb of the change over thermostat mounted upstream of the terminal unit damper causes a switching action to change the damper rotation when the duct temperature reaches the change over temperature setting. The EB control option works in conjunction with a 24 VAC power transformer and a 24 VAC wall mounted thermostat.

ER Control Option - The ER control option includes a 24 VAC Carnes electric actuator and a single end switch for energizing a single stage of electric heat, a solenoid hot water valve, or a baseboard type heat. The end switch is activated by a field adjustable cam. The ER control option works in conjunction with a 24 VAC power transformer and a 24 VAC wall mounted thermostat.

EK Control Option - The EK control option includes a 24 VAC Carnes electric actuator and two end switches for energizing up to two stages of electric heat, or other type of reheat sequencing. The end switches are activated by field adjustable cams. The ER control option work in conjunction with a 24 VAC power transformer and a 24 VAC wall mounted thermostat.

▼ **ELECTRIC CONTROL COMPATIBILITY**

The following electric control options are available for Carnes air terminal units. Use this table to determine the compatibility of the control option and the air terminal unit selected.

CTRL OPT.	CONTROL OPTION DESCRIPTION	SINGLE DUCT UNITS					DUAL DUCT ADCC	RETROFIT	FAN UNITS	
		AVC	AVW	AVE	ABB	ABW			ARR	AS
		EA	ELECTRIC ACTUATOR BY CARNES WITH MECHANICAL MAX./MIN. STOPS	X			X			X
EB	ELECTRIC ACTUATOR BY CARNES WITH MECHANICAL MAX./MIN. STOPS AND CHANGEOVER THERMOSTAT BY CARNES	X			X			X		
ER	ELECTRIC ACTUATOR BY CARNES WITH MECHANICAL MAX./MIN. STOPS AND ONE (1) REHEAT SWITCH		X	X		X				
EK	ELECTRIC ACTUATOR BY CARNES WITH MECHANICAL MAX./MIN. STOPS AND TWO (2) REHEAT SWITCHES		X	X		X				

PRESSURE DEPENDENT

SEQUENCE OF OPERATION FOR ELECTRIC CONTROLS

Pressure Dependent Control - On a call for less cooling, a signal is sent directly from the electric room thermostat to the electric 24 VAC damper actuator to rotate the damper to a reduced air flow position.

On a call for more cooling, a signal is sent directly from the electric thermostat to the 24 VAC damper actuator to rotate the damper to an increased air flow position.

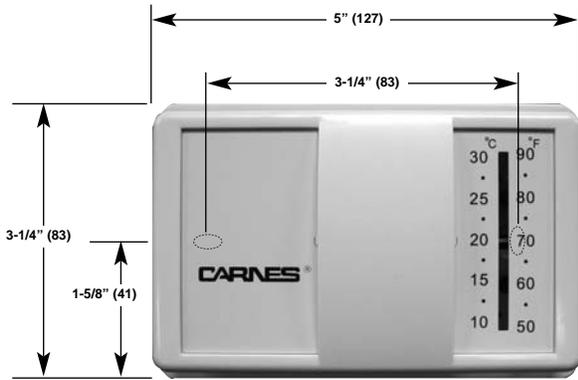
Units with pressure dependent electric controls are shipped with the volume damper in the open position.

The pressure dependent control options are available with optional limit switches for reheat control or with an optional unit mounted changeover thermostat for proving morning warm-up operation.

The pressure dependent control options include adjustable mechanical stops for maximum and minimum air flow settings. Pressure dependent air flow settings are field set according to the job system conditions.

Terminal Unit Controls

AXWBE LOW VOLTAGE THERMOSTAT SPECIFICATIONS



Electrical Rating: Input voltage 30 VAC maximum, 50/60 H.

Contact Rating: 1 Amp @ 24 VAC.

Switching: SPDT, bimetal sensing element operates reed relays.

Temperature Adjustment: External lever type.

Temperature Scale Range: 50°F to 90°F (10°C to 32°C)

Deadband (Control Span): 3°F (1.7°C)

Ambient Temperature: (Shipping) -40°F to 150°F (-40°C to 65°C)

Mounting: Horizontal mounting directly to wall surface or electrical outlet box. Precise leveling is not required. 4-wire electrical connection.

ELECTRIC ACTUATOR SPECIFICATIONS

Control Voltage: 24 VAC, 60 Hz.

Power Consumption: 4 Watts

Input Motor Current: 250 milliamps maximum @ rated voltage.

Microswitch Rating: 3 Amps @ 120 VAC

Drive Speed: 0.042 RPM (15° /Minute)

Ambient Temperature: 20°F to 120°F

Minimum Torques @ Rated Voltage:

<i>Start:</i>	30 inch-pounds
<i>Running:</i>	57 inch-pounds
<i>Stall:</i>	64 inch-pounds
<i>Rated Force @ stall:</i>	98 pounds

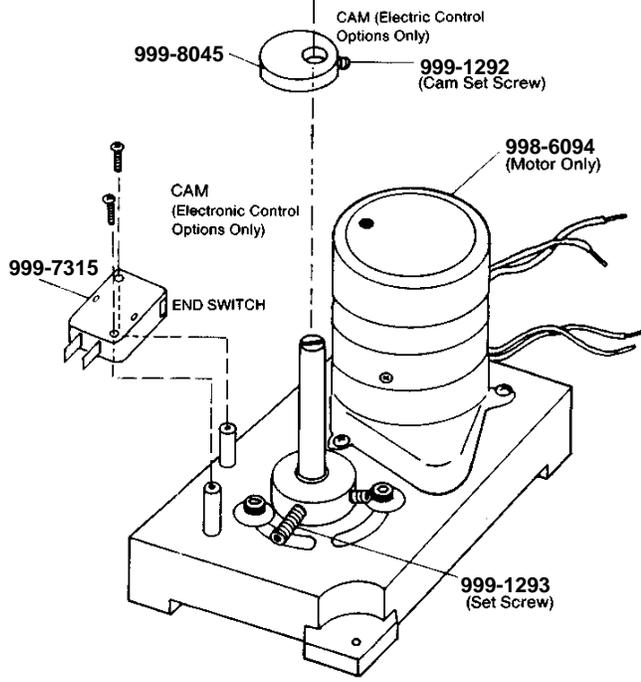
CONSTRUCTION

Gear Box Housing: Black Nylon 6/6, reinforced with 33% glass fiber.

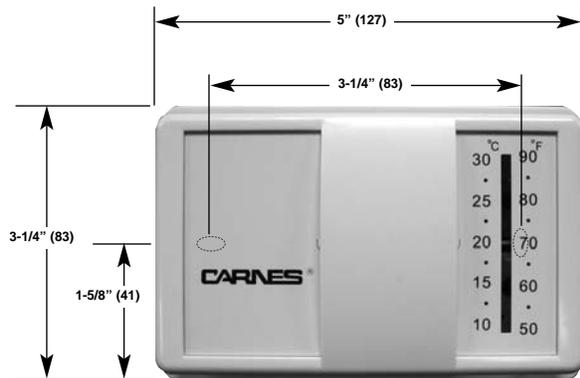
Gearing: Nickel iron or steel.

Drive Motor: 24 volt AC, 60 Hz, 4 watt, 1 RPM, reversible, can be indefinitely stalled without damage, hardened steel pinion for maximum life.

Mounting: Actuator is secured to the side of the terminal unit through two mounting holes in the housing. Fully adjustable stops to restrict damper travel from 0° to 90°. Slips directly over 3/8" shaft.



Terminal Unit Controls



AXWBE LOW VOLTAGE THERMOSTAT

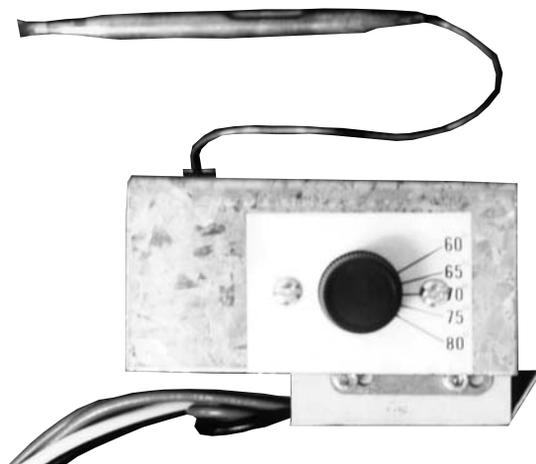
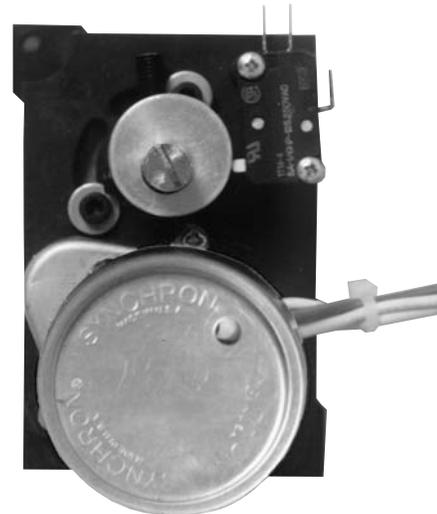
For use with EA, EB, ER and EK electric control options

The Model AXWBE thermostat is used with the Carnes actuator to provide a pressure dependent control sequence. The AXWBE thermostat provides three position control; drive motor to open damper, drive motor to close damper, and deadband. On a change in temperature, the AXWBE drives the actuator to satisfy the set point condition, then opens the circuit to the actuator. The actuator remains in this position until there is a further temperature change at the thermostat.

ELECTRIC ACTUATOR

For cooling only, pressure dependent applications. Carnes externally powered terminal units feature an electric actuator with field adjustable minimum and maximum damper position stops as standard. The electric actuator is composed of two 24 volt, 5 watt synchronous motors driving through a speed reduction gear train. This allows the damper to drive from the full open position to the full closed position in approximately 6 minutes under normal operation.

For pressure dependent control with reheat, round lobed cam(s) and one or two end switches are used to energize heating controls.



CHANGEOVER THERMOSTAT

The changeover thermostat option is used in conjunction with the zone thermostat. The changeover thermostat reverses the action to the zone thermostat when warm air is supplied to the terminal unit. The change over thermostat is field adjustable from 60°F to 80°F.

COMPONENTS WHICH DO NOT EFFECT PERFORMANCE ARE SUBJECT TO CHANGE