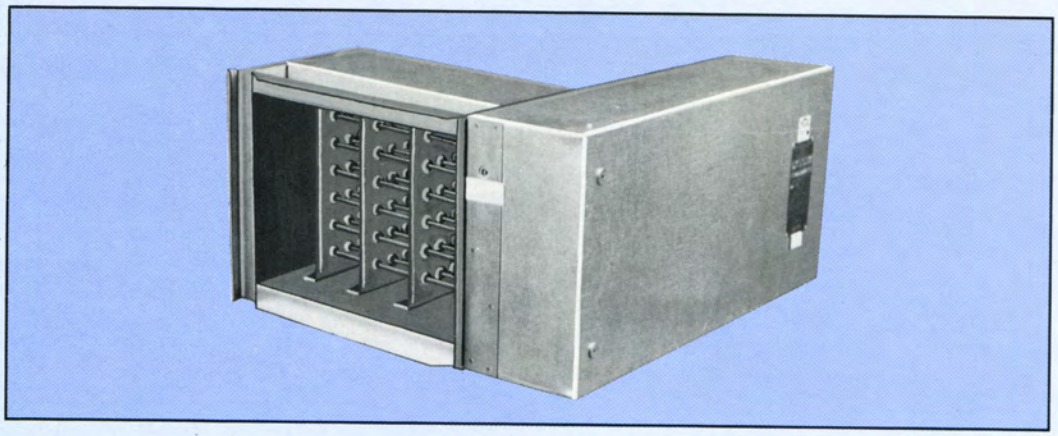
Accessories — Electric Reheat Coil – Models AX–C and AY–C



The Carnes Electric Coil is available on the single duct terminal units. Electric coils meet all applicable requirements of the National Electric Code (NEC) and are of UL or ETL listed construction. Heater frames and boxes are constructed of 20 gauge or heavier galvanized steel. Factory pre-wiring of components eliminates costly field installation. A specific wiring diagram is furnished for every heater regardless of the options.

Standard Features Include:

- Automatic Reset Primary Thermal Cutout
- Replaceable Secondary Thermal Cutout
- De-energizing Magnetic Contactors (As Required)
- Power Terminal Block
- Control Terminal Block
- Air Flow Interlock Switch
- P/E Switches (Pneumatic Controls Only)
- Transformer for 24 Volt Controls (Electric, Electronic, or Pneumatic 480 volt/3 phase, 3 wire supply only)
- 80/20 Ni-CH Wire
- Slip-and-Drive Construction
- 45 Watts/in² Density

Optional Features:

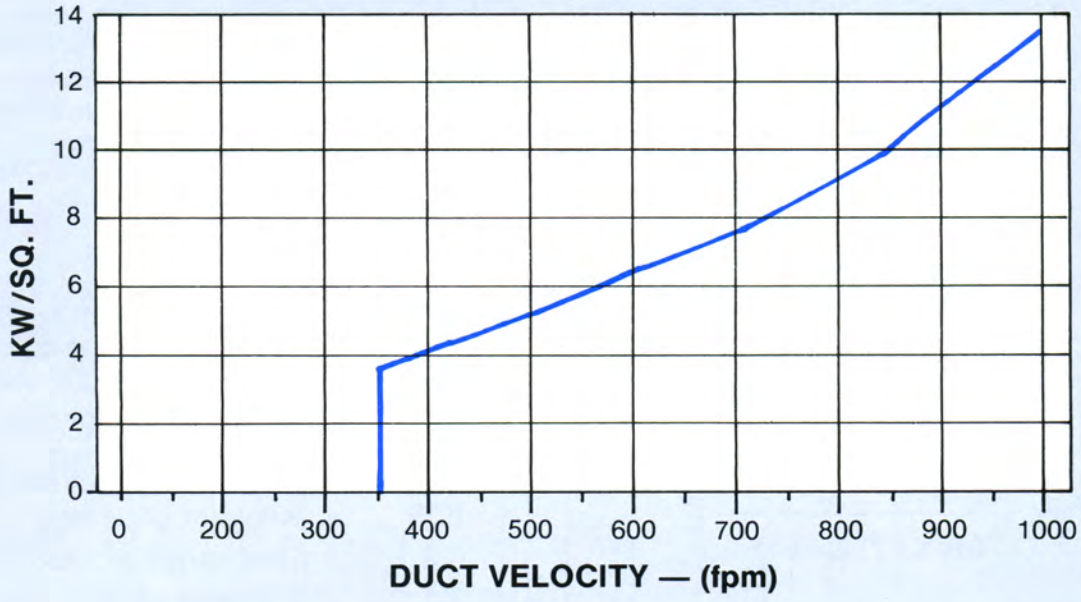
- Single Point Connection *(Heater Mounted to unit)*
- Disconnect Switch
- Fusing
- Mercury Contactors

ENGINEERING DATA — Electric Reheat Coil

1. Conversion: 1KW = **3413 BTU**
2. Load Requirement: KW = $\frac{\text{Cubic Feet per Min. x Temperature Rise}}{3160}$
3. *Temperature Rise: T.R. = $\frac{\text{Kw x 3160}}{\text{Cubic Feet per Min.}}$
4. Ohm's Law: Watts = $\frac{(\text{Volts})^2}{\text{Resistance}}$ = **Volts x Amps**
5. Line Current, 1 Phase: Amps = $\frac{\text{Watts}}{\text{Volts}}$
6. Line Current, 3 Phase: Amps = $\frac{\text{Watts}}{\text{1.73 x Volts}}$
7. Pressure Drop: Inches H_2O = $\frac{\text{KW/ft}^2}{760} \times \left(\frac{\text{Velocity in FPM}}{500}\right)^2$
8. Maximum Discharge Air Temperature = **105° F**

**Maximum heater discharge temperature should not exceed 105° F to avoid nuisance tripping.*

HEATER DESIGN
MINIMUM AIR FLOW REQUIREMENTS



***Minimum and Maximum Allowable Kw for Model AVEC Single Duct Throttling Unit.**

1 PHASE LINE VOLTAGE HEATERS

AVEC SIZE H x W		MIN. KW ALL SIZES	05/06 7½ x 12	07/08 10 x 12	10 12½ x 14	12 15 x 16	14 17½ x 20	16 17½ x 24	18/24 17½ x 32
120 VOLT 1 PHASE	1 STEP	.5	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	2 STEPS	.8	5.7	5.7	5.7	5.7	5.7	5.7	5.7
	3 STEPS	1.2	5.7	5.7	5.7	5.7	5.7	5.7	5.7
		MAXIMUM KW ALLOWED WITHOUT FUSING: 5.7 KW							
208 VOLT 1 PHASE	1 STEP	.7	6.1	8.1	9.9	9.9	9.9	9.9	9.9
	2 STEPS	1.3	6.1	8.1	9.9	9.9	9.9	9.9	9.9
	3 STEPS	2.0	6.1	8.1	9.9	9.9	9.9	9.9	9.9
		MAXIMUM KW ALLOWED WITHOUT FUSING: 9.9 KW							
240 VOLT 1 PHASE	1 STEP	.8	6.1	8.1	11.5	11.5	11.5	11.5	11.5
	2 STEPS	1.5	6.1	8.1	11.5	11.5	11.5	11.5	11.5
	3 STEPS	2.3	6.1	8.1	11.5	11.5	11.5	11.5	11.5
		MAXIMUM KW ALLOWED WITHOUT FUSING: 11.5 KW							
277 VOLT 1 PHASE	1 STEP	.9	6.1	8.1	11.9	13.2	13.2	13.2	13.2
	2 STEPS	1.8	6.1	8.1	11.9	13.2	13.2	13.2	13.2
	3 STEPS	2.6	6.1	8.1	11.9	13.2	13.2	13.2	13.2
		MAXIMUM KW ALLOWED WITHOUT FUSING: 13.2 KW							
480 VOLT 1 PHASE	1 STEP	1.5	6.1	8.1	11.9	16.3	23.0	23.0	23.0
	2 STEPS	3.0	6.1	8.1	11.9	16.3	23.0	23.0	23.0
	3 STEPS	4.5	6.1	8.1	11.9	16.3	23.0	23.0	23.0
		MAXIMUM KW ALLOWED WITHOUT FUSING: 23.0 KW							

3 PHASE LINE VOLTAGE HEATERS

AVEC SIZE H x W		MIN. KW ALL SIZES	05/06 7½ x 12	07/08 10 x 12	10 12½ x 14	12 15 x 16	14 17½ x 20	16 17½ x 24	18/24 17½ x 32
208 VOLT 3 PHASE	1 STEP	1.2	6.1	8.1	11.9	16.3	17.2	17.2	17.2
	2 STEPS	2.3	6.1	8.1	11.9	16.3	17.2	17.2	17.2
	3 STEPS	3.4	6.1	8.1	11.9	16.3	17.2	17.2	17.2
		MAXIMUM KW ALLOWED WITHOUT FUSING: 17.2 KW							
240 VOLT 3 PHASE	1 STEP	1.3	6.1	8.1	11.9	16.3	19.9	19.9	19.9
	2 STEPS	2.6	6.1	8.1	11.9	16.3	19.9	19.9	19.9
	3 STEPS	3.9	6.1	8.1	11.9	16.3	19.9	19.9	19.9
		MAXIMUM KW ALLOWED WITHOUT FUSING: 19.9 KW							
480 VOLT 3 PHASE	1 STEP	2.6	6.1	8.1	11.9	16.3	23.9	28.7	39.9
	2 STEPS	5.2	6.1	8.1	11.9	16.3	23.9	28.7	39.9
	3 STEPS	7.8	N/A	N/A	11.9	16.3	23.9	28.7	39.9
		MAXIMUM KW ALLOWED WITHOUT FUSING: 39.9 KW							

N/A = Heater is not available in this size and/or number of steps at this voltage.

** Based on dimensional constraints of the heater.*

Electric heaters are of the open coil design. Each heater is furnished with two over-temperature safety devices serviceable and replaceable in the terminal box without removing the heater from the duct. The primary safety device is a disc type automatic reset that will de-energize the heater on over-temperature and automatically bring the heat back on when the surrounding temperature has cooled. The second safety device is a heat limiter in the power lines that will open the circuit and disconnect the elements if the primary safety device should fail.

Elements are constructed of 80/20 Ni-CH wire. Elements are suspended by staetite ceramic bushings which are held in place by 20 gauge brackets.

Electric heaters exceeding 48 amperes of line current must have fusing for over current protection as required by NEC and UL. A disconnecting means must be provided within sight of the heater and furnished per the electrical specification. It must be designed so that all power and/or control lines to the heater control panel will be disabled wihen the hinged access panel is opened.

The minimum air flow velocity through the electric heater based on the discharge duct area (ft^2) is determined by:

$$V_{fpm} = \frac{KW \times 3200}{Area \times (T2 - T1)}$$

V_{fpm}	=	minimum air velocity
Area	=	Sq. Ft. of duct area
KW	=	Kilowatt of heater
T2	=	Discharge air (105°F max.)
T1	=	Entering air

Calculation is based on typical entering air of 55° F. wet bulb temperature and 72° F. dry bulb temperature.

Since an electric duct heater has a constant BTU output as long as the heater is energized, a minimum air velocity must be maintained throught the heater. Proper air flow will prevent over-temperature causing nuisance tripping and will maintain element life expectancy. The velocity of air flow in the duct is determined by the formula:

VELOCITY = CFM ÷ DUCT AREA

and can be compared to the minimum air flow velocity recommended by the application as indicated on each heater.

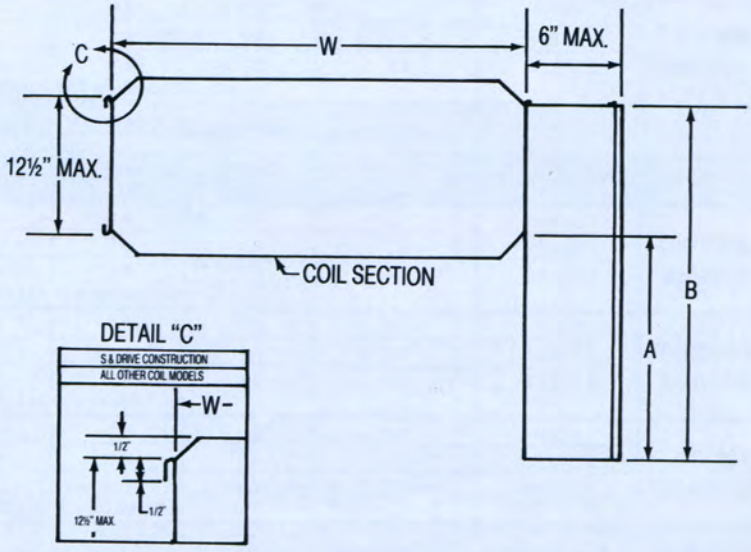
The electric heaters supplied with the model AVEC terminal units are suitable for a zero clearance between the heater and combustible material. Electric heaters are shipped uninsulated with slip and drive connections for easy installation into duct work.

The inlet and outlet air temperature should be selected within the temperature limitations of the heater. The maximum discharge air temperature is 105°F. The electric heater is an open coil design and should be mounted in a horizontal position maintaining proper air flow direction.

DIMENSIONAL DATA — Models AX–C and AY–C

DIMENSIONS LISTED IN INCHES			
Coil Size Code	Height x Width H x W	Overhang A*	Panel Door B*
A	7½ x 12	19½	32
B	10 x 12	19½	32
F	12½ x 14	19½	32
H	15 x 16	19½	32
L	17½ x 20	29½	42
M	17½ x 24	39½	52
T	17½ x 32	32½	45

NOTE: * *All "A" and "B" dimensions are maximum (not to exceed) and may be less than those shown.*



CONTROL VOLTAGE SELECTION

24 VOLT
— For use with all electric controlled units and all 480v/1 phase supply.
— For use with pneumatic AVEC 480v/3 phase, 3 wire supply.

120 VOLT
— For use with all pneumatic units at 120v supply.
— For use with all pneumatic units at 208v/3 phase, 4 wire supply

208 VOLT
— For use with all pneumatic units at 208v/1 phase supply.
— For use with pneumatic AVEC 208v/3 phase, 3 wire supply.

240 VOLT
— For use with all pneumatic units at 240v/1 phase supply.
— For use with pneumatic units at 240v/3 phase, 3 wire supply.

277 VOLT
— For use with all pneumatic units at 277v supply.
— For use with all pneumatic units at 480v/3 phase, 4 wire supply.

MODEL NUMBERING SYSTEM — Model AX–C and AY–C

MODEL NUMBER | DESIGN SERIES | *SIZE | HAND | K W RATING | ELECTRICAL | OPTIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	X	C	C	B	R	0	3	5	1	1	2	0		

A - AIR TERMINAL

X - SHIPPED SEPARATELY
Y - ATTACHED/WIRED

TYPE
C - THROTTLING UNIT ELECTRIC/ELECTRONIC CONTROLS (For Model AVEC)
D - THROTTLING UNIT PNEUMATIC CONTROLS
(Normally Open P/E Connection)
(For Model AVEC w/Reverse Acting Thermostat)
E - THROTTLING UNIT PNEUMATIC CONTROLS
(Normally Closed P/E Connection)
(For Model AVEC w/Direct Acting Thermostat)

*SIZE CODE
A
B
F
H
L
M
T
*See Chart Below

00 to 50 K. W.

LAST DIGIT IS 1/10 K. W.
0 - 0
1 - 1
2 - 2
3 - 3
4 - 4
5 - 5
6 - 6
7 - 7
8 - 8
9 - 9

SUPPLY VOLTAGE
1 - 120
2 - 208
3 - 240
4 - 480
5 - 277

PHASE
1 - SINGLE
3 - THREE

STAGE(S)
1
2
3

CONTROL VOLTAGE
0 - 24
1 - 120
2 - 208
3 - 240
5 - 277

CONTACTORS
G - MERCURY DE-ENERGIZING CONTACTORS

DISCONNECTS/FUSING
D - DOOR LOCKING DISCONNECT SWITCH w/FUSING
J - FUSING
S - DOOR LOCKING DISCONNECT SWITCH
P - PANEL MOUNTED DISCONNECT
F - PANEL MOUNTED DISCONNECT w/FUSING

HAND OF CONTROL PANEL L - LEFT R - RIGHT	
CONTROL UNIT CONTROL & DAMPER ARRANGEMENT	HAND OF CONTROL PANEL
1	R
2	L
3	R
4	L
5	R
6	L
7	R
8	L

*COIL SIZE CODE SELECTION

COIL SIZE CODE	SIZE AVEC
A	05/06
B	07/08
F	10
H	12
L	14
M	16
T	18/24