

▼ Model ABB

The Carnes Model ABB by-pass unit, provides variable air volume to individual zones while by-passing the unneeded air to the ceiling plenum for recirculation or ducted.

Although zone air volumes in small buildings may vary greatly, the cost of fan controls many times cannot be justified. Zone variable air volumes are realized with the by-pass unit while the supply fan delivers a constant CFM.

The ABB can be ordered for reverse or direct acting pneumatic thermostats or electric thermostats. Zone thermostats directly control the by-pass damper assuring that only the air that is needed is delivered to the zone.

Downstream duct work pressure losses can be matched by adjusting an integral by-pass balancing damper.

Features Include:

- Air flow capacities from full shut-off to zone to 3,650 CFM.
- Pneumatic or electric controls.
- Low pressure drop.
- Low sound levels.
- Low leakage damper design.
- Thermally and acoustically insulated casing.
- Open-end discharge provided with slip and drive connection for easy installation.
- Balancing damper in by-pass is standard.
- Tri-Averaging air flow sensor at inlet of unit.
- Optional hanger brackets.
- Optional control enclosure.
- Optional internal foil coated insulation.

Available Modules:

- Basic Control Unit — **Model ABB**
- Sound Attenuator — **Model AXA**



IAQ Insulation
Available



A Participating Member
in the AHRI 880
Certification Program

Discharge and Radiated (NC) Noise Criteria

| Inlet Unit Size (Inches) | CFM | Minimum Pressure Drop (Damper Full Open) | | Min. ΔP_s (Damper Full Open) | | 1.0" ΔP_s | | 1.5" ΔP_s | | 3.0" ΔP_s | |
|--------------------------|------|--|------------------------------|--------------------------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|
| | | Min. ΔP_s Basic Unit | Min. ΔP_t Basic Unit | Dis. NC Unit | Rad. NC Unit | Dis. NC Unit | Rad. NC Unit | Dis. NC Unit | Rad. NC Unit | Dis. NC Unit | Rad. NC Unit |
| | | | | | | | | | | | |
| 6 | 75 | .048 | .057 | — | — | — | 10 | 12 | 13 | 13 | 18 |
| | 100 | .106 | .122 | — | — | 11 | 14 | 13 | 15 | 23 | 20 |
| | 150 | .231 | .267 | — | — | 14 | 15 | 18 | 18 | 23 | 22 |
| | 200 | .416 | .480 | — | — | 15 | 12 | 19 | 20 | 24 | 23 |
| | 250 | .601 | .701 | 11 | — | 11 | 10 | 23 | 19 | 27 | 25 |
| 7 | 75 | .030 | .035 | — | — | — | 13 | 14 | 18 | 21 | 22 |
| | 100 | .056 | .064 | — | — | — | 14 | 14 | 18 | 21 | 26 |
| | 200 | .223 | .257 | — | — | 12 | 15 | 15 | 20 | 24 | 26 |
| | 300 | .410 | .537 | — | — | 14 | 15 | 19 | 19 | 24 | 26 |
| | 350 | .634 | .738 | — | 11 | 14 | 13 | 19 | 20 | 24 | 26 |
| 8 | 100 | .035 | .041 | — | — | 10 | 16 | 17 | 21 | 23 | 28 |
| | 200 | .129 | .147 | — | — | 14 | 20 | 17 | 22 | 25 | 28 |
| | 300 | .266 | .307 | — | — | 16 | 20 | 19 | 24 | 25 | 28 |
| | 400 | .459 | .532 | — | — | 16 | 19 | 21 | 24 | 26 | 30 |
| | 500 | .705 | .818 | — | 14 | 10 | 16 | 22 | 24 | 28 | 31 |
| 10 | 150 | .025 | .029 | — | — | 15 | 13 | 21 | 16 | 21 | 21 |
| | 250 | .064 | .075 | — | — | 17 | 14 | 21 | 18 | 27 | 23 |
| | 400 | .159 | .187 | — | — | 17 | 15 | 23 | 21 | 29 | 25 |
| | 600 | .347 | .411 | — | 10 | 17 | 16 | 22 | 21 | 31 | 31 |
| | 750 | .543 | .643 | 10 | 15 | 16 | 18 | 22 | 23 | 31 | 31 |
| 12 | 215 | .039 | .043 | — | — | 16 | 12 | 18 | 17 | 26 | 22 |
| | 400 | .105 | .122 | — | — | 17 | 15 | 19 | 20 | 27 | 25 |
| | 600 | .193 | .231 | — | — | 19 | 19 | 22 | 25 | 28 | 31 |
| | 900 | .422 | .507 | — | — | 19 | 20 | 24 | 26 | 29 | 36 |
| | 1150 | .675 | .814 | 12 | 15 | 22 | 20 | 24 | 25 | 30 | 36 |
| 14 | 300 | .026 | .030 | — | — | 14 | 13 | 19 | 19 | 27 | 26 |
| | 500 | .068 | .079 | — | — | 15 | 16 | 18 | 20 | 27 | 26 |
| | 800 | .172 | .201 | — | — | 17 | 16 | 21 | 22 | 28 | 28 |
| | 1200 | .388 | .454 | — | 10 | 11 | 16 | 18 | 23 | 31 | 31 |
| | 1550 | .634 | .744 | 12 | 17 | 12 | 19 | 17 | 23 | 30 | 36 |
| 16 | 390 | .032 | .036 | — | — | 10 | 13 | 14 | 16 | 22 | 23 |
| | 800 | .081 | .197 | — | — | 14 | 15 | 17 | 19 | 23 | 24 |
| | 1200 | .252 | .289 | — | — | 14 | 16 | 19 | 20 | 27 | 27 |
| | 1800 | .548 | .631 | 14 | 14 | 14 | 17 | 19 | 22 | 28 | 31 |
| | 2100 | .726 | .839 | 18 | 19 | 16 | 18 | 21 | 24 | 30 | 32 |
| 18 | 550 | .029 | .033 | — | — | 17 | 23 | 21 | 26 | 28 | 34 |
| | 1100 | .112 | .126 | — | — | 16 | 23 | 19 | 26 | 31 | 34 |
| | 1650 | .267 | .300 | — | — | 15 | 22 | 22 | 27 | 30 | 35 |
| | 2200 | .503 | .561 | 10 | 14 | 15 | 22 | 22 | 27 | 33 | 35 |
| | 2750 | .784 | .875 | 17 | 19 | 18 | 24 | 22 | 27 | 33 | 36 |
| 24 | 750 | .023 | .026 | — | — | 16 | 22 | 19 | 25 | 27 | 33 |
| | 1500 | .092 | .103 | — | — | 17 | 23 | 22 | 27 | 30 | 36 |
| | 2200 | .213 | .237 | — | — | 17 | 24 | 24 | 28 | 33 | 36 |
| | 2950 | .378 | .420 | — | 14 | 18 | 24 | 23 | 30 | 34 | 37 |
| | 3650 | .594 | .659 | 15 | 20 | 19 | 24 | 24 | 30 | 34 | 39 |

- NOTES:**
1. ΔP_s static pressure difference from inlet to discharge.
 2. ΔP_s is the minimum pressure required to deliver CFM shown with the primary damper in wide open position.
 3. ΔP_t is the total pressure difference from inlet to discharge.
 4. Dash (—) indicates NC level less than 10.

NC levels are derived from tests conducted in accordance with AHRI Standard 880-2008 and are calculated in accordance with AHRI Standard 885-2008 as application data based on the following:

Discharge NC levels are based on —

- a) 5 foot rectangular duct lined with 1" fiberglass insulation.
- b) 5 foot lined flex duct (8" diameter).
- c) Flow division.
- d) Space effect factor (2400 ft³) at 5 feet from outlet.
- e) End reflection.
- f) Environmental adjustment factor.

Radiated NC levels are based on—

- a) Plenum / ceiling effect - 5/8" mineral fiber tile, 35 lb / ft³ - 3 foot plenum.
- b) Environmental adjustment factor.

Discharge Sound Power

| Inlet Unit Size (Inches) | CFM | Minimum Δ Ps | | | | | | | 1.0" Δ Ps | | | | | | | 1.5" Δ Ps | | | | | | | 3.0" Δ Ps | | | | | | |
|--------------------------|------|---------------------------------|---------|---------|---------|----------|----------|----------|---------------------------------|---------|---------|----------|----------|----------|---------|---------------------------------|---------|----------|----------|----------|---------|---------|---------------------------------|----------|----------|----------|--|--|--|
| | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | |
| | | Δ Ps | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | | | |
| 6 | 75 | .048 | 40 | 32 | 27 | 25 | 23 | 21 | 54 | 51 | 53 | 51 | 48 | 44 | 56 | 52 | 55 | 54 | 53 | 49 | 59 | 55 | 58 | 59 | 61 | 48 | | | |
| | 100 | .106 | 42 | 34 | 32 | 27 | 23 | 21 | 56 | 54 | 54 | 51 | 49 | 45 | 57 | 55 | 56 | 55 | 54 | 50 | 61 | 58 | 59 | 61 | 63 | 60 | | | |
| | 150 | .231 | 49 | 43 | 40 | 30 | 26 | 23 | 59 | 56 | 56 | 49 | 47 | 44 | 61 | 60 | 60 | 55 | 54 | 50 | 65 | 63 | 62 | 61 | 63 | 60 | | | |
| | 200 | .416 | 55 | 48 | 47 | 39 | 34 | 27 | 61 | 56 | 53 | 45 | 45 | 42 | 63 | 61 | 60 | 53 | 52 | 49 | 67 | 65 | 65 | 61 | 64 | 60 | | | |
| | 250 | .601 | 58 | 49 | 48 | 43 | 39 | 35 | 58 | 49 | 48 | 46 | 48 | 47 | 67 | 59 | 55 | 48 | 49 | 47 | 67 | 67 | 66 | 61 | 62 | 59 | | | |
| 7 | 75 | .030 | 36 | 29 | 24 | 22 | 20 | 20 | 51 | 50 | 49 | 48 | 47 | 45 | 52 | 53 | 52 | 53 | 53 | 51 | 51 | 51 | 55 | 58 | 59 | 58 | | | |
| | 100 | .056 | 36 | 29 | 26 | 22 | 20 | 20 | 51 | 51 | 50 | 49 | 48 | 46 | 52 | 53 | 53 | 53 | 53 | 51 | 54 | 56 | 57 | 58 | 59 | 58 | | | |
| | 200 | .223 | 48 | 43 | 40 | 33 | 25 | 22 | 57 | 55 | 52 | 49 | 49 | 46 | 58 | 57 | 55 | 54 | 54 | 52 | 59 | 59 | 59 | 60 | 62 | 61 | | | |
| | 300 | .410 | 54 | 49 | 47 | 40 | 36 | 28 | 59 | 56 | 52 | 47 | 47 | 43 | 61 | 61 | 57 | 54 | 53 | 51 | 65 | 63 | 62 | 61 | 62 | 61 | | | |
| | 350 | .634 | 54 | 49 | 47 | 40 | 36 | 28 | 59 | 56 | 52 | 47 | 47 | 43 | 61 | 61 | 57 | 54 | 53 | 51 | 65 | 63 | 62 | 61 | 62 | 61 | | | |
| 8 | 100 | .035 | 39 | 31 | 26 | 24 | 22 | 21 | 54 | 53 | 53 | 50 | 50 | 47 | 55 | 55 | 55 | 54 | 54 | 54 | 64 | 62 | 60 | 59 | 58 | 60 | | | |
| | 200 | .129 | 42 | 35 | 34 | 27 | 22 | 21 | 57 | 56 | 56 | 51 | 50 | 47 | 60 | 59 | 59 | 55 | 54 | 53 | 64 | 64 | 64 | 61 | 61 | 62 | | | |
| | 300 | .266 | 49 | 43 | 41 | 33 | 26 | 23 | 61 | 58 | 56 | 50 | 49 | 47 | 63 | 61 | 61 | 56 | 55 | 53 | 67 | 66 | 66 | 62 | 62 | 62 | | | |
| | 400 | .459 | 54 | 48 | 47 | 40 | 35 | 29 | 62 | 59 | 57 | 49 | 49 | 46 | 64 | 63 | 61 | 55 | 55 | 53 | 69 | 67 | 67 | 63 | 62 | 62 | | | |
| | 500 | .705 | 59 | 53 | 50 | 45 | 41 | 37 | 59 | 53 | 50 | 45 | 44 | 41 | 66 | 64 | 60 | 53 | 54 | 50 | 70 | 69 | 67 | 63 | 62 | 62 | | | |
| 10 | 150 | .025 | 37 | 30 | 24 | 22 | 20 | 20 | 54 | 57 | 51 | 48 | 47 | 43 | 58 | 62 | 56 | 52 | 51 | 48 | 58 | 62 | 58 | 58 | 57 | 53 | | | |
| | 250 | .064 | 37 | 33 | 30 | 24 | 20 | 20 | 57 | 59 | 54 | 49 | 48 | 44 | 61 | 62 | 57 | 53 | 52 | 49 | 62 | 67 | 63 | 60 | 59 | 57 | | | |
| | 400 | .159 | 42 | 42 | 39 | 33 | 23 | 20 | 62 | 60 | 56 | 51 | 48 | 44 | 66 | 65 | 60 | 55 | 53 | 49 | 69 | 70 | 66 | 61 | 60 | 57 | | | |
| | 600 | .347 | 53 | 50 | 48 | 42 | 34 | 28 | 64 | 60 | 55 | 51 | 49 | 45 | 68 | 64 | 60 | 56 | 53 | 50 | 74 | 72 | 69 | 64 | 62 | 59 | | | |
| | 750 | .543 | 59 | 55 | 52 | 48 | 39 | 35 | 63 | 60 | 55 | 51 | 48 | 44 | 69 | 65 | 60 | 56 | 54 | 50 | 75 | 73 | 68 | 74 | 62 | 58 | | | |
| 12 | 215 | .039 | 44 | 36 | 41 | 38 | 34 | 32 | 55 | 58 | 55 | 55 | 50 | 48 | 56 | 60 | 58 | 59 | 55 | 53 | 59 | 65 | 65 | 65 | 64 | 63 | | | |
| | 400 | .105 | 43 | 40 | 41 | 38 | 34 | 32 | 57 | 60 | 56 | 55 | 51 | 48 | 58 | 62 | 60 | 60 | 56 | 54 | 63 | 66 | 66 | 65 | 65 | 63 | | | |
| | 600 | .193 | 48 | 42 | 41 | 38 | 34 | 32 | 60 | 62 | 57 | 57 | 51 | 49 | 61 | 64 | 61 | 60 | 56 | 54 | 65 | 67 | 68 | 66 | 65 | 64 | | | |
| | 900 | .422 | 53 | 50 | 47 | 42 | 37 | 34 | 64 | 63 | 59 | 62 | 52 | 49 | 66 | 67 | 63 | 63 | 57 | 55 | 69 | 71 | 70 | 68 | 66 | 64 | | | |
| | 1150 | .675 | 61 | 57 | 55 | 48 | 42 | 38 | 65 | 65 | 60 | 60 | 52 | 49 | 68 | 67 | 64 | 64 | 57 | 54 | 72 | 72 | 70 | 69 | 67 | 64 | | | |
| 14 | 300 | .026 | 33 | 24 | 20 | 17 | 17 | 18 | 55 | 56 | 50 | 50 | 50 | 46 | 59 | 61 | 53 | 54 | 54 | 52 | 66 | 67 | 61 | 61 | 61 | 59 | | | |
| | 500 | .068 | 40 | 35 | 30 | 23 | 21 | 20 | 58 | 58 | 52 | 51 | 50 | 47 | 60 | 61 | 55 | 55 | 55 | 52 | 68 | 68 | 62 | 62 | 62 | 60 | | | |
| | 800 | .172 | 44 | 41 | 37 | 31 | 23 | 20 | 61 | 61 | 53 | 51 | 50 | 47 | 62 | 64 | 58 | 55 | 55 | 52 | 70 | 70 | 65 | 63 | 63 | 61 | | | |
| | 1200 | .388 | 53 | 50 | 45 | 41 | 35 | 30 | 61 | 56 | 53 | 51 | 50 | 47 | 65 | 62 | 58 | 55 | 56 | 53 | 72 | 73 | 67 | 64 | 63 | 61 | | | |
| | 1550 | .634 | 60 | 57 | 51 | 47 | 42 | 38 | 63 | 57 | 53 | 51 | 50 | 47 | 66 | 61 | 57 | 55 | 55 | 53 | 76 | 72 | 67 | 64 | 64 | 61 | | | |
| 16 | 390 | .032 | 40 | 32 | 21 | 20 | 21 | 18 | 54 | 52 | 53 | 49 | 48 | 46 | 59 | 56 | 54 | 53 | 52 | 50 | 66 | 64 | 59 | 62 | 58 | 58 | | | |
| | 800 | .081 | 42 | 40 | 36 | 30 | 20 | 18 | 59 | 58 | 55 | 52 | 50 | 49 | 62 | 61 | 58 | 57 | 54 | 53 | 69 | 66 | 63 | 63 | 61 | 59 | | | |
| | 1200 | .252 | 50 | 48 | 45 | 38 | 30 | 23 | 61 | 58 | 56 | 52 | 51 | 49 | 65 | 63 | 59 | 57 | 56 | 54 | 71 | 69 | 65 | 66 | 63 | 61 | | | |
| | 1800 | .548 | 60 | 58 | 53 | 48 | 41 | 37 | 63 | 58 | 54 | 51 | 50 | 47 | 67 | 63 | 59 | 56 | 55 | 53 | 75 | 70 | 67 | 65 | 64 | 62 | | | |
| | 2100 | .726 | 64 | 62 | 57 | 52 | 45 | 42 | 65 | 60 | 56 | 53 | 50 | 47 | 68 | 64 | 59 | 56 | 55 | 53 | 76 | 72 | 67 | 65 | 63 | 61 | | | |
| 18 | 550 | .029 | 40 | 26 | 19 | 16 | 15 | 18 | 57 | 58 | 55 | 56 | 58 | 53 | 61 | 61 | 58 | 59 | 63 | 57 | 66 | 65 | 63 | 64 | 63 | 64 | | | |
| | 1100 | .112 | 40 | 30 | 23 | 20 | 18 | 18 | 61 | 60 | 56 | 56 | 53 | 51 | 64 | 63 | 60 | 60 | 62 | 55 | 68 | 68 | 66 | 66 | 66 | 68 | | | |
| | 1650 | .267 | 50 | 45 | 36 | 32 | 32 | 24 | 63 | 59 | 56 | 55 | 53 | 50 | 69 | 65 | 61 | 60 | 58 | 55 | 72 | 72 | 68 | 66 | 64 | 63 | | | |
| | 2200 | .503 | 56 | 55 | 45 | 40 | 39 | 34 | 64 | 59 | 57 | 56 | 54 | 49 | 68 | 65 | 61 | 60 | 58 | 55 | 75 | 74 | 69 | 67 | 64 | 63 | | | |
| | 2750 | .784 | 62 | 61 | 53 | 47 | 45 | 39 | 66 | 62 | 60 | 56 | 53 | 50 | 70 | 65 | 62 | 60 | 59 | 57 | 76 | 74 | 70 | 68 | 65 | 63 | | | |
| 24 | 750 | .023 | 39 | 25 | 20 | 19 | 17 | 17 | 61 | 60 | 57 | 54 | 48 | 44 | 63 | 63 | 60 | 57 | 52 | 49 | 67 | 69 | 66 | 64 | 60 | 57 | | | |
| | 1500 | .092 | 41 | 35 | 30 | 23 | 20 | 19 | 64 | 61 | 58 | 56 | 50 | 46 | 66 | 65 | 62 | 60 | 54 | 51 | 73 | 72 | 69 | 67 | 61 | 60 | | | |
| | 2200 | .213 | 50 | 45 | 42 | 36 | 29 | 22 | 65 | 61 | 59 | 56 | 51 | 48 | 70 | 67 | 63 | 61 | 56 | 53 | 76 | 74 | 70 | 68 | 63 | 60 | | | |
| | 2950 | .378 | 58 | 53 | 49 | 44 | 38 | 32 | 67 | 62 | 58 | 56 | 52 | 49 | 71 | 66 | 63 | 61 | 57 | 54 | 79 | 75 | 72 | 69 | 64 | 61 | | | |
| | 3650 | .594 | 64 | 59 | 55 | 50 | 44 | 39 | 69 | 63 | 59 | 55 | 50 | 47 | 72 | 67 | 64 | 61 | 57 | 53 | 80 | 75 | 72 | 69 | 65 | 62 | | | |

- NOTES:**
1. Based on tests conducted in accordance with AHRI Standard 880-2008.
 2. Δ Ps static pressure difference from inlet to discharge.
 3. Δ Ps is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



A Participating Member in the AHRI 880 Certification Program

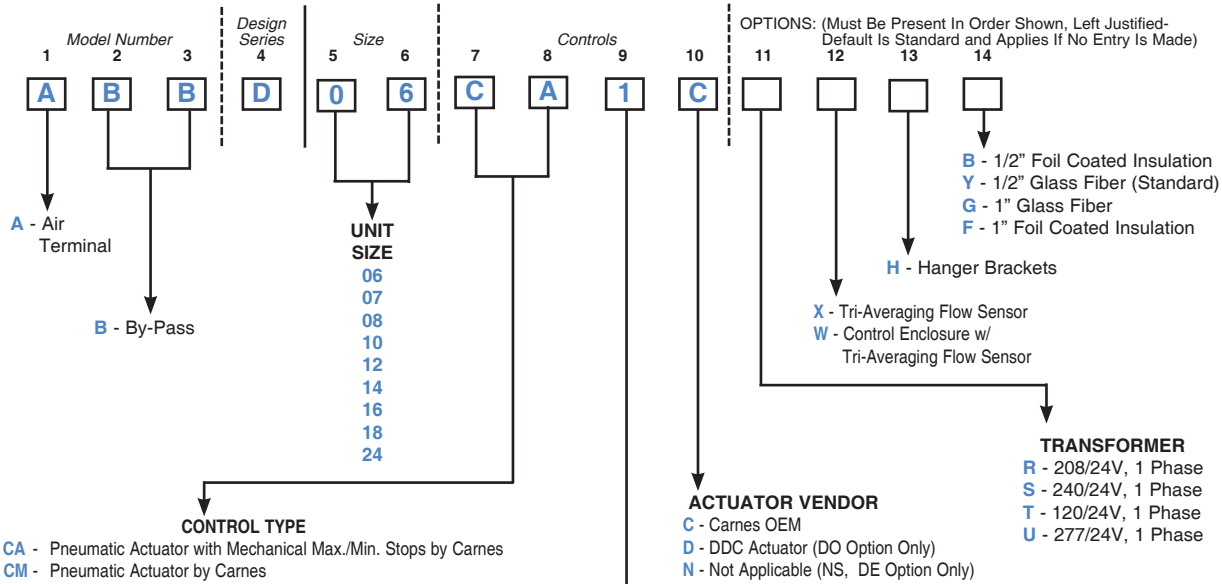
Radiated Sound Power

| Inlet Unit Size (Inches) | CFM | Δ Ps | Minimum Δ Ps | | | | | | | 1.0" Δ Ps | | | | | | | 1.5" Δ Ps | | | | | | | 3.0" Δ Ps | | | | | | |
|--------------------------|------|------|---------------------------------|---------|---------|----------|----------|----------|---------|---------------------------------|---------|----------|----------|----------|---------|---------|---------------------------------|----------|----------|----------|---------|---------|---------|---------------------------------|----------|----------|--|--|--|--|
| | | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | | Sound Power (db) by Octave Band | | | | | | |
| | | | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | (2) 125 | (3) 250 | (4) 500 | (5) 1000 | (6) 2000 | (7) 4000 | | | | |
| 6 | 75 | .048 | 38 | 26 | 18 | 17 | 19 | 22 | 46 | 38 | 37 | 37 | 35 | 30 | 47 | 41 | 39 | 41 | 39 | 35 | 51 | 46 | 43 | 46 | 45 | 43 | | | | |
| | 100 | .106 | 38 | 27 | 20 | 17 | 19 | 22 | 46 | 41 | 41 | 40 | 38 | 34 | 49 | 43 | 40 | 43 | 42 | 39 | 53 | 47 | 44 | 48 | 47 | 45 | | | | |
| | 150 | .231 | 41 | 33 | 27 | 20 | 20 | 23 | 48 | 44 | 42 | 39 | 36 | 32 | 51 | 47 | 44 | 44 | 43 | 40 | 56 | 50 | 47 | 50 | 50 | 48 | | | | |
| | 200 | .416 | 48 | 37 | 33 | 23 | 22 | 24 | 50 | 45 | 39 | 35 | 33 | 31 | 53 | 49 | 46 | 43 | 41 | 38 | 57 | 52 | 49 | 51 | 51 | 49 | | | | |
| | 250 | .601 | 49 | 40 | 36 | 29 | 26 | 24 | 49 | 41 | 37 | 33 | 33 | 32 | 55 | 50 | 45 | 43 | 42 | 37 | 59 | 54 | 51 | 47 | 48 | 48 | | | | |
| 7 | 75 | .030 | 40 | 26 | 18 | 17 | 19 | 22 | 41 | 40 | 40 | 41 | 41 | 39 | 41 | 39 | 42 | 46 | 47 | 45 | 41 | 41 | 44 | 50 | 52 | 50 | | | | |
| | 100 | .056 | 40 | 26 | 18 | 17 | 19 | 22 | 43 | 41 | 41 | 42 | 41 | 39 | 44 | 43 | 44 | 46 | 47 | 45 | 41 | 43 | 46 | 53 | 56 | 54 | | | | |
| | 200 | .223 | 40 | 33 | 26 | 19 | 19 | 22 | 48 | 45 | 42 | 42 | 41 | 38 | 48 | 47 | 46 | 46 | 47 | 44 | 49 | 48 | 49 | 53 | 56 | 54 | | | | |
| | 300 | .410 | 47 | 40 | 35 | 26 | 24 | 23 | 49 | 46 | 42 | 40 | 39 | 36 | 51 | 50 | 45 | 46 | 47 | 44 | 52 | 52 | 50 | 53 | 56 | 54 | | | | |
| | 350 | .634 | 50 | 44 | 38 | 31 | 27 | 25 | 50 | 44 | 40 | 36 | 35 | 32 | 52 | 50 | 46 | 46 | 46 | 43 | 54 | 55 | 52 | 52 | 55 | 54 | | | | |
| 8 | 100 | .035 | 40 | 25 | 18 | 17 | 19 | 22 | 50 | 42 | 43 | 43 | 42 | 40 | 51 | 45 | 47 | 48 | 47 | 44 | 58 | 53 | 54 | 55 | 53 | 52 | | | | |
| | 200 | .129 | 41 | 29 | 23 | 23 | 22 | 22 | 50 | 45 | 46 | 43 | 42 | 39 | 51 | 48 | 48 | 48 | 46 | 44 | 58 | 53 | 54 | 55 | 53 | 52 | | | | |
| | 300 | .266 | 43 | 34 | 28 | 23 | 21 | 22 | 51 | 48 | 46 | 43 | 42 | 38 | 53 | 50 | 50 | 48 | 46 | 44 | 58 | 53 | 54 | 55 | 53 | 52 | | | | |
| | 400 | .459 | 47 | 41 | 35 | 30 | 26 | 23 | 53 | 49 | 45 | 42 | 40 | 36 | 55 | 52 | 50 | 47 | 46 | 43 | 59 | 56 | 55 | 55 | 53 | 52 | | | | |
| | 500 | .705 | 52 | 46 | 41 | 35 | 30 | 26 | 52 | 46 | 43 | 38 | 34 | 31 | 56 | 53 | 50 | 46 | 46 | 42 | 60 | 58 | 56 | 55 | 53 | 51 | | | | |
| 10 | 150 | .025 | 37 | 24 | 19 | 17 | 19 | 22 | 46 | 43 | 39 | 41 | 40 | 40 | 48 | 47 | 42 | 44 | 44 | 45 | 50 | 48 | 46 | 49 | 51 | 52 | | | | |
| | 250 | .064 | 37 | 27 | 20 | 17 | 19 | 22 | 49 | 45 | 41 | 40 | 38 | 39 | 52 | 47 | 44 | 44 | 43 | 45 | 53 | 52 | 49 | 50 | 51 | 52 | | | | |
| | 400 | .159 | 41 | 38 | 28 | 23 | 21 | 22 | 54 | 48 | 42 | 41 | 38 | 39 | 56 | 52 | 47 | 45 | 43 | 45 | 59 | 56 | 51 | 51 | 51 | 52 | | | | |
| | 600 | .347 | 50 | 44 | 37 | 30 | 24 | 23 | 55 | 48 | 43 | 41 | 39 | 40 | 58 | 53 | 47 | 45 | 43 | 45 | 62 | 61 | 56 | 52 | 51 | 52 | | | | |
| | 750 | .543 | 54 | 48 | 42 | 36 | 30 | 25 | 57 | 49 | 44 | 41 | 39 | 37 | 61 | 53 | 47 | 45 | 43 | 44 | 64 | 61 | 56 | 53 | 51 | 52 | | | | |
| 12 | 215 | .039 | 37 | 27 | 19 | 17 | 19 | 22 | 45 | 42 | 39 | 40 | 40 | 39 | 46 | 45 | 43 | 45 | 43 | 36 | 49 | 49 | 48 | 50 | 52 | 52 | | | | |
| | 400 | .105 | 37 | 29 | 22 | 20 | 19 | 22 | 50 | 48 | 42 | 41 | 40 | 40 | 51 | 51 | 46 | 45 | 45 | 44 | 56 | 53 | 51 | 51 | 53 | 52 | | | | |
| | 600 | .193 | 42 | 36 | 28 | 23 | 20 | 22 | 53 | 51 | 45 | 42 | 41 | 40 | 55 | 56 | 51 | 46 | 45 | 44 | 58 | 57 | 56 | 52 | 53 | 52 | | | | |
| | 900 | .422 | 50 | 43 | 36 | 33 | 27 | 24 | 53 | 49 | 46 | 44 | 41 | 40 | 58 | 55 | 52 | 49 | 46 | 44 | 63 | 63 | 61 | 56 | 53 | 52 | | | | |
| | 1150 | .675 | 55 | 48 | 41 | 38 | 33 | 28 | 55 | 49 | 46 | 45 | 42 | 40 | 59 | 55 | 51 | 49 | 46 | 45 | 66 | 63 | 61 | 58 | 54 | 52 | | | | |
| 14 | 300 | .026 | 45 | 37 | 33 | 30 | 31 | 29 | 48 | 43 | 40 | 38 | 38 | 40 | 53 | 47 | 45 | 43 | 43 | 43 | 58 | 55 | 52 | 49 | 50 | 50 | | | | |
| | 500 | .068 | 45 | 37 | 33 | 30 | 31 | 29 | 51 | 46 | 43 | 39 | 39 | 40 | 53 | 50 | 46 | 43 | 43 | 43 | 60 | 56 | 52 | 50 | 50 | 50 | | | | |
| | 800 | .172 | 45 | 37 | 34 | 30 | 31 | 31 | 54 | 46 | 43 | 39 | 39 | 40 | 57 | 52 | 48 | 44 | 43 | 43 | 62 | 58 | 54 | 50 | 50 | 50 | | | | |
| | 1200 | .388 | 49 | 40 | 37 | 33 | 32 | 31 | 55 | 47 | 43 | 41 | 39 | 39 | 61 | 53 | 48 | 44 | 43 | 43 | 65 | 61 | 56 | 52 | 50 | 50 | | | | |
| | 1550 | .634 | 56 | 46 | 42 | 36 | 34 | 32 | 57 | 49 | 45 | 42 | 40 | 38 | 61 | 54 | 48 | 45 | 44 | 42 | 71 | 62 | 56 | 52 | 51 | 51 | | | | |
| 16 | 390 | .032 | 40 | 25 | 20 | 18 | 19 | 22 | 48 | 41 | 40 | 39 | 37 | 36 | 51 | 43 | 42 | 44 | 41 | 38 | 55 | 50 | 47 | 51 | 49 | 49 | | | | |
| | 800 | .081 | 40 | 27 | 23 | 20 | 20 | 25 | 51 | 46 | 42 | 41 | 38 | 36 | 54 | 50 | 45 | 47 | 43 | 38 | 60 | 54 | 50 | 52 | 50 | 49 | | | | |
| | 1200 | .252 | 43 | 34 | 30 | 29 | 23 | 22 | 55 | 48 | 43 | 41 | 38 | 37 | 57 | 52 | 46 | 47 | 43 | 41 | 62 | 58 | 53 | 54 | 51 | 49 | | | | |
| | 1800 | .548 | 54 | 46 | 40 | 38 | 32 | 28 | 56 | 48 | 42 | 41 | 38 | 36 | 60 | 53 | 47 | 46 | 43 | 41 | 67 | 61 | 54 | 54 | 51 | 50 | | | | |
| | 2100 | .726 | 58 | 50 | 44 | 42 | 37 | 33 | 57 | 49 | 43 | 41 | 39 | 36 | 62 | 53 | 47 | 46 | 43 | 41 | 68 | 61 | 54 | 54 | 51 | 50 | | | | |
| 18 | 550 | .029 | 42 | 31 | 19 | 17 | 19 | 21 | 50 | 49 | 49 | 47 | 44 | 42 | 56 | 54 | 52 | 50 | 49 | 47 | 59 | 58 | 59 | 58 | 55 | 56 | | | | |
| | 1100 | .112 | 43 | 34 | 25 | 22 | 22 | 22 | 55 | 51 | 49 | 46 | 44 | 42 | 56 | 55 | 52 | 50 | 49 | 47 | 62 | 60 | 59 | 58 | 56 | 56 | | | | |
| | 1650 | .267 | 44 | 37 | 28 | 21 | 22 | 21 | 57 | 52 | 48 | 46 | 43 | 41 | 61 | 56 | 53 | 50 | 49 | 47 | 65 | 62 | 60 | 58 | 56 | 56 | | | | |
| | 2200 | .503 | 52 | 47 | 36 | 30 | 26 | 23 | 58 | 53 | 48 | 46 | 42 | 39 | 61 | 56 | 53 | 50 | 48 | 46 | 70 | 64 | 60 | 58 | 56 | 56 | | | | |
| | 2750 | .784 | 58 | 51 | 43 | 36 | 31 | 27 | 60 | 56 | 50 | 45 | 40 | 37 | 63 | 58 | 53 | 50 | 47 | 45 | 71 | 65 | 61 | 58 | 56 | 56 | | | | |
| 24 | 750 | .023 | 40 | 31 | 25 | 19 | 21 | 22 | 53 | 51 | 48 | 47 | 47 | 49 | 56 | 53 | 51 | 51 | 52 | 54 | 63 | 60 | 58 | 58 | 59 | 60 | | | | |
| | 1500 | .092 | 46 | 33 | 26 | 19 | 21 | 22 | 58 | 52 | 49 | 45 | 45 | 47 | 60 | 56 | 53 | 50 | 51 | 53 | 67 | 62 | 61 | 58 | 59 | 60 | | | | |
| | 2200 | .213 | 44 | 37 | 32 | 25 | 21 | 21 | 58 | 53 | 50 | 46 | 45 | 46 | 63 | 57 | 54 | 51 | 50 | 52 | 69 | 65 | 61 | 58 | 59 | 60 | | | | |
| | 2950 | .378 | 54 | 45 | 40 | 34 | 26 | 22 | 60 | 54 | 50 | 45 | 46 | 38 | 63 | 58 | 55 | 51 | 50 | 52 | 72 | 66 | 62 | 58 | 58 | 60 | | | | |
| | 3650 | .594 | 59 | 51 | 46 | 41 | 33 | 27 | 61 | 55 | 49 | 45 | 43 | 42 | 65 | 59 | 55 | 51 | 50 | 51 | 73 | 66 | 62 | 59 | 58 | 59 | | | | |

- NOTES: 1. Based on tests conducted in accordance with AHRI Standard 880-2008.
 2. Δ Ps static pressure difference from inlet to discharge.
 3. Δ Ps is the minimum pressure required to deliver CFM shown with primary damper in wide open position.



A Participating Member in the AHRI 880 Certification Program



- CONTROL TYPE**
- CA - Pneumatic Actuator with Mechanical Max./Min. Stops by Carnes
 - CM - Pneumatic Actuator by Carnes
 - CE - Pneumatic Actuator by Carnes, Reset Controller by Carnes
 - CX - Pneumatic Actuator by Carnes (Multi-function) Reset Controller by Carnes
 - EA - Electric Actuator by Carnes (Enclosure Included)
 - EB - Electric Actuator by Carnes, Changeover Thermostat by Carnes (Enclosure Included)
 - ET - Analog Electronic Velocity Controller with Integral Damper Actuator (Enclosure Included)
 - EL - Analog Electronic Velocity Controller with Integral Damper Actuator and Cooling/Heating Changeover (Enclosure Included)
 - DD - SimplyVAV, DDC by Carnes
 - DC - SimplyVAV, DDC by Carnes with Heat/Cool Changeover
 - DO - DDC Provided by Others, Mounted and Wired by Carnes, w/Carnes Inlet Sensor, w/ 3/8" Damper Shaft, w/Enclosure
 - DE - No Damper Controls. Enclosure with Carnes Inlet Sensor, w/Bare 3/8" Damper Shaft
 - MA - Manual Damper by Carnes
 - NS - No Damper Controls, w/Carnes Inlet Sensor, w/Bare 3/8" Damper Shaft (No Enclosure)
- ** EL control sequence requires the AXWCB wall stat in lieu of the standard AXWCA.
- Minimum setting cannot be zero with these controls. Duct sensor needs at least 20% of maximum rated CFM to sense duct air temperature.

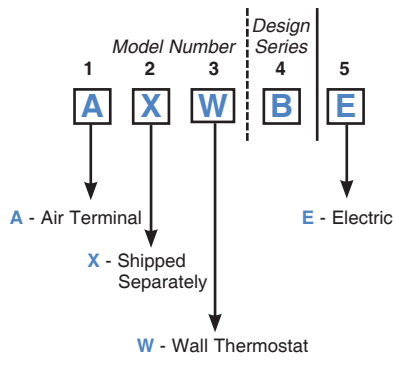
- CONTROLS, DAMPERS AND COIL ARRANGEMENTS**
- *1 - Normally Open - Right Hand Controls (All Electric/Electronic/Manual Control Types/DO, DE, NS) (All Pneumatic Control Types for Reverse Acting Thermostat)
 - *2 - Normally Open - Left Hand Controls (All Electric/Electronic/Manual Control Types/DO, DE, NS) (All Pneumatic Control Types for Reverse Acting Thermostat)
 - 3 - Normally Closed - Right Hand Controls (All Pneumatic Control Types for Direct Acting Thermostat)
 - 4 - Normally Closed - Left Hand Controls (All Pneumatic Control Types for Direct Acting Thermostat)
 - 5 - Normally Open - Right Hand Controls (All Pneumatic Control Types for Direct Acting Thermostat)
 - 6 - Normally Open - Left Hand Controls (All Pneumatic Control Types for Direct Acting Thermostat)
 - 7 - Normally Closed - Right Hand Controls (All Pneumatic Control Types for Reverse Acting Thermostat)
 - 8 - Normally Closed - Left Hand Controls (All Pneumatic Control Types for Reverse Acting Thermostat)

Left Hand Units:
CCW to by-pass
Right Hand Units:
CW to by-pass

* Electric, Electronic and DDC Units **DO NOT** fail open. '1' or '2' is used for Right or Left Hand Only. Electric/Electronic Units are shipped with the Damper in the Open Position.

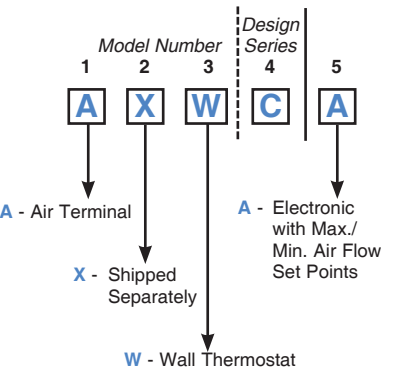
NOTE: Hand of controls is determined by facing the averaging flow sensor (inlet of the unit) with the supply air hitting the back of your head.

Electric Thermostat



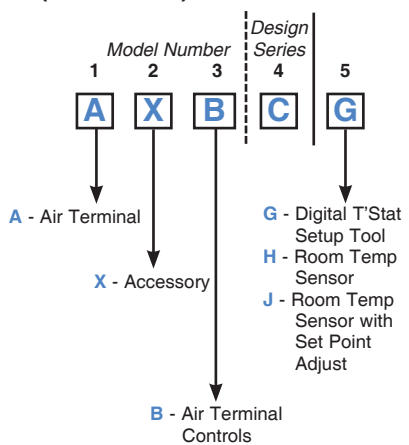
A Carnes Electric Thermostat **must be ordered** with the Electric EA and EB Control Options.

Electronic Thermostat

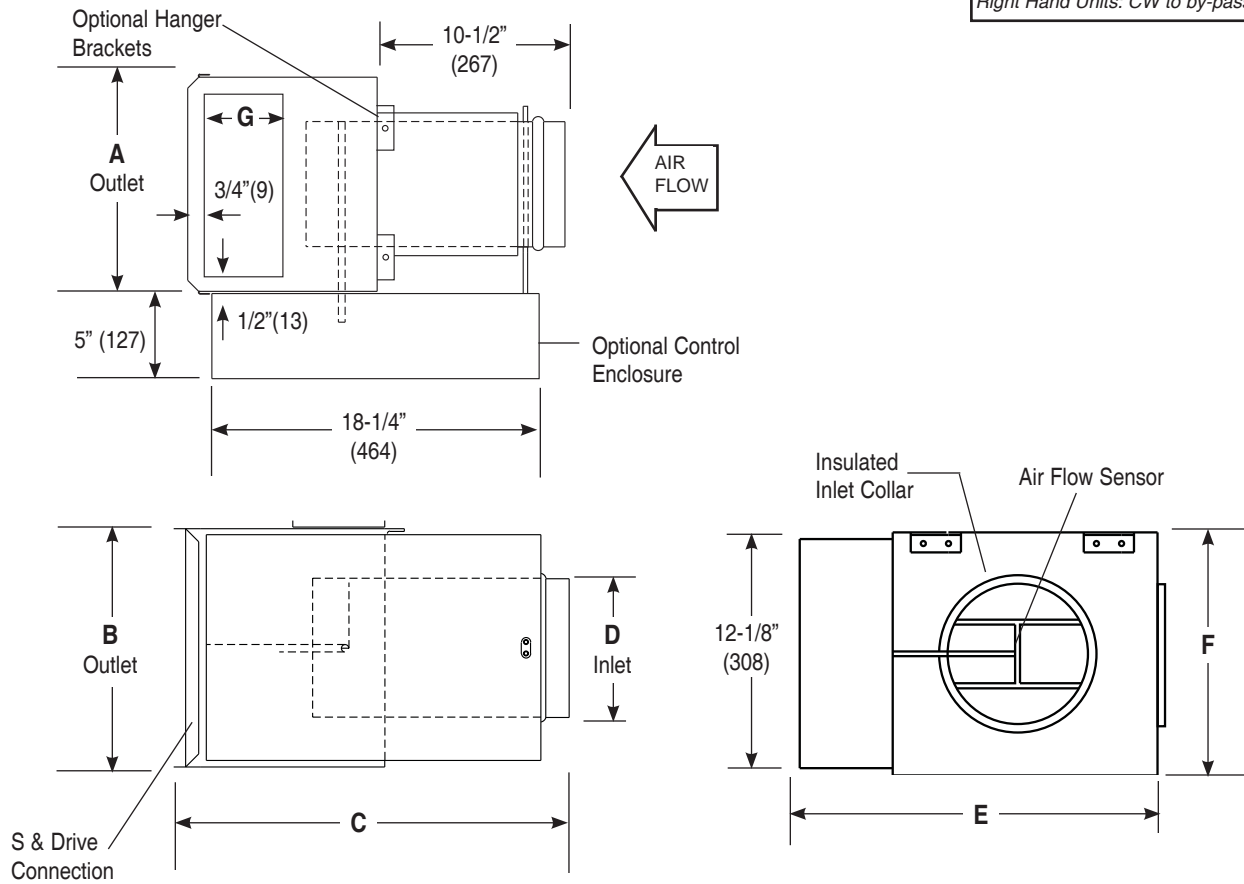


A Carnes Electronic Thermostat **must be ordered** with the ET Electronic Control Option.

Direct Digital Control (DD/DC/DM)



Left Hand Units: CCW to by-pass
Right Hand Units: CW to by-pass



DIMENSIONS LISTED IN INCHES (Millimeters)

| Unit Size | CFM (L/s) Range | OUTLET | | C | INLET | | E | F | G |
|-----------|--------------------|-------------|-----------------|-----------------|----------------------------|-------------|-----------------|----------------|---|
| | | A | B | | D | D | | | |
| 06 | 0-250 (0-118) | 12 (305) | 10 (254) | 20-1/2 (521) | 5-7/8 (149) | 17 (432) | 10-1/8 (257) | 4-3/4 (121) | |
| 07 | 0-350 (0-165) | 12 (305) | 10 (254) | 20-1/2 (521) | 6-7/8 (175) | 17 (432) | 10-1/8 (257) | 4-3/4 (121) | |
| 08 | 0-500 (0-236) | 12 (305) | 10 (254) | 20-1/2 (521) | 7-7/8 (200) | 17 (432) | 10-1/8 (257) | 4-3/4 (121) | |
| 10 | 0-750 (0-354) | 14 (356) | 12-1/2 (318) | 22-1/2 (572) | 9-7/8 (251) | 19 (483) | 12-5/8 (320) | 5-3/4 (146) | |
| 12 | 0-1150 (0-543) | 16 (406) | 15 (381) | 22-1/2 (572) | 11-7/8 (302) | 21 (533) | 15-1/8 (381) | 5-3/4 (146) | |
| 14 | 0-1550 (0-732) | 20 (508) | 17-1/2 (445) | 26-1/2 (673) | 13-7/8 (352) | 25 (635) | 17-5/8 (447) | 7-3/4 (197) | |
| 16 | 0-2100 (0-990) | 24 (610) | 17-1/2 (445) | 27-1/2 (699) | 15-7/8 (403) | 29 (737) | 17-5/8 (447) | 7-3/4 (197) | |
| 18 | 0-2750 (0-1298) | 32 (813) | 17-1/2 (445) | 27-1/2 (699) | 15-7/8x17-7/8 (403x454) | 37 (940) | 17-5/8 (447) | 7-3/4 (197) | |
| 24 | 0-3650 (0-1722) | 32 (813) | 17-1/2 (445) | 27-1/2 (699) | 15-7/8x23-7/8 (403x607) | 37 (940) | 17-5/8 (447) | 7-3/4 (197) | |