Chilled Water DOAS
Fan Powered Terminal Units
MINIMUM VENTILATION CONTROL
The DOAS unit provides the Designer, Owner and Occupant with a series fan powered terminal unit which includes an integral chilled water sensible only coil at the plenum air inlet. The primary air inlet is sized to provide conditioned, dehumidified air from a DOAS (dedicated outside air system) air handler, continuously measuring and controlling to minimum ventilation rates. The coil provides sensible cooling capacity and control at the zone level.

Optional hot water reheat is available to meet comfort needs without additional secondary systems.

APPLICATION SPECIFIC COILS
Care must be taken when sizing DOAS terminal units and coils to ensure proper operation and reliable occupant comfort. Johnson Controls manufactures the chilled and hot water coils allowing for flexibility for job specific design requirements.

INTEGRAL DRIP TRAY
Factory installed drip tray in case sensible cooling coil temporarily experiences non-design conditions.

ENERGY EFFICIENT SOLUTIONS
ECM motors are standard to optimize fan energy use with latest energy efficient motor technology. Available with a remote or manual speed adjustment for addressing multiple control strategies.

PATENTED FlowStar™ INLET SENSOR
The industry’s best – FlowStar™ is a multi-axis center averaging airflow sensor with external balancing taps.

• Dedicated Outdoor Air Supply
• Primary Air Inlet Connection with FlowStar™ Probe
• Non-Condensing Cooling Coil
  (sensible cooling)
• Hot Water (Option)
• Integral Drip Tray
<table>
<thead>
<tr>
<th>MODEL</th>
<th>UNIT SIZE</th>
<th>FAN CFM</th>
<th>OUTSIDE AIR (25%) CFM</th>
<th>OUTSIDE AIR (25%) MIN ? Ps</th>
<th>FAN HP</th>
<th>VOLTS</th>
<th>F.L.A.</th>
<th>3-PHASE NEUTRAL AMPS</th>
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</tbody>
</table>

NOTES:

1. Min. ΔPs is the static pressure difference across the primary air valve with the damper wide open. All losses (including optional hot water coil) are handled by the unit fan and need not be considered for primary air performance calculations.

2. Performance data obtained from tests conducted in accordance with ARI Standard 880.

3. Calculate wire feeder size and max. over current protective device per NEC and local code requirements. Recommended fuse type shall be UL Class RK5, J, CC or other motor rated fuse.

4. Neutral harmonic current contribution for each 3-phase balanced load of motors at full speed.

5. Includes factory provided 2mH choke for power factor correction on 3/4 hp, 120v and 1 hp, 120v motors.
<table>
<thead>
<tr>
<th>FAN CFM</th>
<th>OUTSIDE AIR</th>
<th>RADIATED SOUND POWER 1.0&quot; INLET ΔPs</th>
<th>DISCHARGE SOUND POWER 1.0&quot; INLET ΔPs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% CFM Min. ΔPs FULL OCTAVE BAND, Hz</td>
<td>125 250 500 1000 2000 4000</td>
<td>125 250 500 1000 2000 4000</td>
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<tr>
<td>200</td>
<td>0% 0 -</td>
<td>50 51 49 44 32 25</td>
<td>58 55 54 50 46 38</td>
</tr>
<tr>
<td></td>
<td>15% 30 0.01</td>
<td>51 51 49 44 33 33</td>
<td>58 56 55 53 49 41</td>
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<td>25% 50 0.01</td>
<td>52 52 50 45 34 34</td>
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</tr>
<tr>
<td>300</td>
<td>0% 0 -</td>
<td>50 51 50 45 33 26</td>
<td>63 60 59 57 54 49</td>
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<td>15% 45 0.01</td>
<td>51 51 50 46 36 35</td>
<td>69 66 64 62 59 56</td>
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<tr>
<td></td>
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<tr>
<td>500</td>
<td>0% 0 -</td>
<td>55 54 54 50 38 31</td>
<td></td>
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<td>15% 75 0.01</td>
<td>55 54 54 50 39 37</td>
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<td>25% 125 0.01</td>
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</tr>
<tr>
<td>700</td>
<td>0% 0 -</td>
<td>61 57 58 55 44 37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15% 105 0.01</td>
<td>61 58 58 56 45 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25% 175 0.02</td>
<td>62 59 59 56 47 42</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>0% 0 -</td>
<td>64 59 59 57 46 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15% 120 0.01</td>
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<td></td>
<td>25% 200 0.02</td>
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<td>1000</td>
<td>0% 0 -</td>
<td>68 63 62 60 52 45</td>
<td>75 73 69 68 65 64</td>
</tr>
<tr>
<td></td>
<td>15% 150 0.01</td>
<td>68 63 62 60 52 45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25% 250 0.04</td>
<td>68 63 62 60 52 45</td>
<td></td>
</tr>
</tbody>
</table>

1. MIN. ΔPs IS THE STATIC PRESSURE DIFFERENCE ACROSS THE PRIMARY AIR VALVE WITH THE DAMPER WIDE OPEN.

2. SOUND LEVELS ARE EXPRESSED IN DECIBELS, dB re: \( 1 \times 10^{-12} \) WATTS.

3. FAN EXTERNAL STATIC PRESSURE IS 0.25 INCHES w.g.

4. PERFORMANCE DATA OBTAINED FROM TESTS CONDUCTED IN ACCORDANCE WITH ARI STANDARD 880.

5. DISCHARGE DATA IS CORRECTED TO INCLUDE DUCT END REFLECTION ENERGY PER AHRI 880.
<table>
<thead>
<tr>
<th>FAN CFM</th>
<th>OUTSIDE AIR</th>
<th>RADIATED SOUND POWER</th>
<th>DISCHARGE SOUND POWER</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>CFM</td>
<td>Min. ΔPs</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>250</td>
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<tr>
<td></td>
<td>15%</td>
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<td>0.01</td>
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<td>25%</td>
<td>75</td>
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<tr>
<td>500</td>
<td>0%</td>
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<tr>
<td></td>
<td>15%</td>
<td>75</td>
<td>0.01</td>
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<td></td>
<td>25%</td>
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<td>0.01</td>
</tr>
<tr>
<td>700</td>
<td>0%</td>
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</tr>
<tr>
<td></td>
<td>15%</td>
<td>105</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>175</td>
<td>0.02</td>
</tr>
<tr>
<td>800</td>
<td>0%</td>
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<td></td>
<td>15%</td>
<td>120</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
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<td>1000</td>
<td>0%</td>
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<td>-</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td>150</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>250</td>
<td>0.04</td>
</tr>
</tbody>
</table>

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2. SOUND LEVELS ARE EXPRESSED IN DECIBELS, dB re: 1 X 10^-12 WATTS.

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5. DISCHARGE DATA IS CORRECTED TO INCLUDE DUCT END REFLECTION ENERGY PER AHRI 880.
<table>
<thead>
<tr>
<th>FAN CFM</th>
<th>Outside Air %</th>
<th>CFM</th>
<th>Radiated Sound Power</th>
<th>Discharge Sound Power</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td>Full Octave Band, Hz</td>
<td>Full Octave Band, Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>125 250 500 1000 2000 4000</td>
<td>125 250 500 1000 2000 4000</td>
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<tr>
<td>400</td>
<td>0 0</td>
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<td>50 200</td>
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<td>46 41 34</td>
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</tr>
<tr>
<td>600</td>
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<td>56 55 53</td>
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<td>62 64 60</td>
<td>57 54 46</td>
<td>71 68 67 69 65 62</td>
</tr>
<tr>
<td></td>
<td>25 300</td>
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<td>40 550</td>
<td>68 68 66</td>
<td>60 57 51</td>
<td>74 71 71 72 69 68</td>
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</table>

1. FAN EXTERNAL STATIC PRESSURE IS 0.25 INCHES W.G.

2. OA INLET STATIC PRESSURE IS 1.0 INCHES W.G.
   RADIATED SOUND POWER VALUES ARE UP TO 1dB LOWER @ 0.5”
   AND UP TO 1 dB HIGHER @ 1.5” W.G. STATIC PRESSURE

3. PERFORMANCE DATA OBTAINED FROM TESTS CONDUCTED IN
   ACCORDANCE WITH AHRI STANDARD 880

4. DISCHARGE SOUND POWER ADJUSTED FOR DUCT END REFLECTION
   LOSS AS REQUIRED BY AHRI 880

5. SOUND POWER LEVELS, Lw, ARE EXPRESSED IN DECIBELS,
   dB re: 1 X 10^-12
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<thead>
<tr>
<th>FAN CFM</th>
<th>Outside Air</th>
<th>Radiated Sound Power</th>
<th>Discharge Sound Power</th>
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<td>%</td>
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<td>500</td>
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</tr>
</tbody>
</table>

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ECM MOTOR DATA

<table>
<thead>
<tr>
<th>HP</th>
<th>VOLTAGE</th>
<th>AMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3</td>
<td>277</td>
<td>2.6</td>
</tr>
</tbody>
</table>

1. USE FLA (FULL LOAD AMPS) TO CALCULATE WIRE FEEDER SIZE AND MAXIMUM OVER CURRENT PROTECTIVE DEVICE PER NEC AND LOCAL CODE REQUIREMENTS. RECOMMENDED FUSE TYPE SHALL BE RK5, J, CC OR OTHER MOTOR RATED FUSE.

The performance shown is rated to include a 4 row 14FPI cooling coil, and 1" thick clean pleated filter. Additional rows and/or optional hot water coil require addition of associated pressure drop to specified E.S.P. To confirm fan performance.

Valid selection is made anywhere in the non-shaded area.
ECM MOTOR DATA

<table>
<thead>
<tr>
<th>HP</th>
<th>VOLTAGE</th>
<th>AMPS¹</th>
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</table>

1. USE FLA (FULL LOAD AMPS) TO CALCULATE WIRE FEEDER SIZE AND MAXIMUM OVER CURRENT PROTECTIVE DEVICE PER NEC AND LOCAL CODE REQUIREMENTS. RECOMMENDED FUSE TYPE SHALL BE RK5, J, CC OR OTHER MOTOR RATED FUSE.

![Graph showing E.S.P. (Euros per gallon) vs. Airflow (scfm) with lines for different voltages (3.7V, 4.9V, 6.4V, 7.7V, 9.9V).]

VALID SELECTION IS MADE ANYWHERE IN THE NON-SHADED AREA.

PERFORMANCE SHOWN IS RATED TO INCLUDE A 8 ROW, 12 FPI COOLING COIL AND 1” CLEAN PLEATED FILTER. ADDITIONAL PRESSURE DROP ASSOCIATED WITH OPTIONAL HOT WATER COIL AND/OR DIFFERENT COOLING COIL CONSTRUCTION MUST BE ADDED TO SPECIFIED E.S.P. TO CONFIRM PERFORMANCE.
### ECM MOTOR DATA

<table>
<thead>
<tr>
<th>HP</th>
<th>VOLTAGE</th>
<th>AMPS¹</th>
<th>3-PHASE NEUTRAL AMPS²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>120</td>
<td>7.7</td>
<td>13.3</td>
</tr>
<tr>
<td>1/2</td>
<td>208</td>
<td>5.0</td>
<td>8.6</td>
</tr>
<tr>
<td>1/2</td>
<td>277</td>
<td>4.1</td>
<td>7.1</td>
</tr>
</tbody>
</table>

1. Use FLA (Full Load Amps) to calculate wire feeder size and maximum over current protective device per NEC and local code requirements. Recommended fuse type shall be UL Class RK5, J, CC or other motor rated fuse.

2. Neutral harmonic current contribution for each 3-phase balanced load of motors at full speed.

---

The performance shown is rated to include a six row 12 FPI cooling coil, a one row 10 FPI heating coil, and a 1” thick clean pleated filter.
1. Use FLA (Full Load Amps) to calculate wire feeder size and maximum over current protective device per NEC and local code requirements. Recommended fuse type shall be UL Class RK5, J, CC or other motor rated fuse.

2. Neutral harmonic current contribution for each 3–phase balanced load of motors at full speed.

The performance shown is rated to include a six row 12 FPI cooling coil, a one row 10 FPI heating coil, and a 1” thick clean pleated filter.
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<thead>
<tr>
<th>Model</th>
<th>Drawing Type</th>
<th>Drawing #</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCL-CC-X Size 0608</td>
<td>Construction 4, 6, or 8 Row Cooling Coil</td>
<td>LH 06-75008, RH 06-75031</td>
</tr>
<tr>
<td></td>
<td>Cooling Only</td>
<td>LH 06-75026, RH 06-75032</td>
</tr>
<tr>
<td></td>
<td>With 1R HWC</td>
<td>LH 06-75023, RH 06-75033</td>
</tr>
<tr>
<td></td>
<td>With EH</td>
<td>LH 06-75029, RH 06-75034</td>
</tr>
<tr>
<td>TCL-CC-X Size 0609</td>
<td>Construction 4, 6, or 8 Row Cooling Coil</td>
<td>LH 06-75027, RH 06-75035</td>
</tr>
<tr>
<td></td>
<td>Cooling Only</td>
<td>LH 06-75028, RH 06-75030</td>
</tr>
<tr>
<td></td>
<td>With 1R HWC</td>
<td>LH 06-75034, RH 06-75035</td>
</tr>
<tr>
<td></td>
<td>With EH</td>
<td>LH 06-75029, RH 06-75034</td>
</tr>
<tr>
<td>TCS-CC-X Size 0619</td>
<td>Construction 6 Row Cooling Coil</td>
<td>LH 06-75015, RH 06-75016</td>
</tr>
<tr>
<td></td>
<td>Cooling Only</td>
<td>LH 06-75017, RH 06-75018</td>
</tr>
<tr>
<td></td>
<td>With 1R HWC</td>
<td>LH 06-75019, RH 06-75020</td>
</tr>
<tr>
<td>TCS-CC-X Size 0621</td>
<td>Construction 6 Row Cooling Coil</td>
<td>LH 06-75010, RH 06-75011</td>
</tr>
<tr>
<td></td>
<td>Cooling Only</td>
<td>LH 06-75009, RH 06-75019</td>
</tr>
<tr>
<td></td>
<td>With 1R HWC</td>
<td>LH 06-75022, RH 06-75021</td>
</tr>
</tbody>
</table>
Standard Construction:
2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
8. Full top and bottom access provided to main unit casing.
9. Side access to control enclosure.
10. Filter size is 9 [229] X 36 [914] X 1 [25].
11. Cooling coil has copper tubing with aluminum fins. Manual air vent & bleed valve not shown.
12. Integral Drip tray is non-insulated, 1/2" deep, with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
13. A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.

General Notes:
① Control enclosure is standard with electronic controls.
② Check all national and local codes for required clearance.
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2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
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**General Notes:**

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**SPECIFICATIONS**

<table>
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<tr>
<th>Unit Size</th>
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General Notes:
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2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
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General Notes:
1. Control enclosure is standard with electronic controls.
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### Standard Construction:

2. Unit and primary inlet valve and electric heater casings constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
8. Full top and bottom access provided to main unit casing.
9. Side access to control enclosure.
10. Filter size is 9 [229] x 36 [914] x 1 [25].
11. Cooling coil has copper tubing with aluminum fins. Manual air vent & bleed valve not shown.
12. Integral Drip tray is non-insulated, 1/2" deep, with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
13. A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
15. Requires 8" flange duct connection at outlet.

### General Notes:

1. Control enclosure is standard with electronic controls.
2. Check all national and local codes for required clearance.

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**MODELS:**

- TCL—CC—EH—X SIZE 0608 WITH ELECTRIC HEAT
- LEFT HAND UNIT

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**DRAWING:**

- SHEET 01 OF 02

---

**SCALE:**

- 1/8" = 1'-0"
Standard Construction:

2. Unit and primary inlet valve and electric heater casings constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
8. Full top and bottom access provided to main unit casing.
9. Side access to control enclosure.
10. Filter size is 9 [229] X 36 [914] X 1 [25].
11. Cooling coil has copper tubing with aluminum fins. Manual air vent & bleed valve not shown.
12. Integral Drip tray is non-insulated, 1/2" deep, with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
13. A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
15. Requires 3/8" flange duct connection at outlet.

General Notes:

① Control enclosure is standard with electronic controls.
② Check all national and local codes for required clearance.
Standard Construction:
2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
8. Full top and bottom access provided to main unit casing.
9. Side access to control enclosure.
11. Cooling coil has copper tubing with aluminum fins. Manual air vent & bleed valve not shown.
12. Integral Drip tray is non-insulated, 1/2" deep, with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
13. A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
14. Downstream duct work must match outlet dimensions +1/4 / -0.

General Notes:
1. Control enclosure is standard with electronic controls.
2. Check all national and local codes for required clearance.

SPECIFICATIONS

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MODEL TCL-CC-X XX09, COOLING ONLY, LEFT HAND
Standard Construction:
2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
8. Full top and bottom access provided to main unit casing.
9. Side access to control enclosure.
11. Cooling coil has copper tubing with aluminum fins. Manual air vent & bleed valve not shown.
12. Integral drip tray is non-insulated, 1/2" deep, with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
13. A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
14. Down stream duct work must match outlet dimensions +1/4 / -0.

General Notes:
① Control enclosure is standard with electronic controls.
② Check all national and local codes for required clearance.
Standard Construction:
2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
4. Single point power connection provided.
5. ECM fan motor with remote or manual speed adjustment.
6. Motor isolated from the fan housing.
7. Unit assembly is ETL listed in accordance with UL/ANSI 1995 / CSA c22.2.
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14. Downstream duct work must match outlet dimensions +1/4" / -0".

General Notes:
1. Control enclosure is standard with electronic controls.
2. Check all national and local codes for required clearance.

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14. Down stream duct work must match outlet dimensions +1/4" / - 0".

General Notes:
① Control enclosure is standard with electronic controls.
② Check all national and local codes for required clearance.

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**SPECIFICATIONS**
Standard Construction:

2. Unit and primary inlet valve constructed from minimum 22 gauge galvanized steel meeting 125 hour salt spray requirements per ASTM B117.
3. Casing insulation complies with UL181 and NFPA 90A and is installed with no raw edges in the airstream.
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   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
14. Down stream duct work must match outlet dimensions +1/4 / -0.

General Notes:

① Control enclosure is standard with electronic controls.
② Check all national and local codes for required clearance.
Standard Construction:

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   B) Inlet & outlet collars should be externally insulated by others (in the field) if required.
14. Downstream duct work must match outlet dimensions +1/4" -0.

General Notes:

1. Control enclosure is standard with electronic controls.
2. Check all national and local codes for required clearance.
CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel. Casing—22 gauge; Bottom access—22 gauge; Air Valve Casing—22 gauge.
2. INSULATION: 3/4" thick, 4.0 P.C.F. skin, dual density, fiberglass.
3. FILTER: Pleated disposable media (17" x 28" x 1"). Filter access is from the front.
4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 1/2” NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream. 
   B) Inlet and outlet collars should be externally insulated by others (in the field) if required.
6. DRIP TRAY: Non insulated 1” deep with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
7. ACCESS PANELS: All bottom access panels are removable and use quarter turn fasteners, including electrical access.
CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel. Casing—22 gauge; Bottom access — 22 gauge; Air Valve Casing — 22 gauge.
2. INSULATION: 3/4" thick, 4.0 P.C.F. skin, dual density, fiberglass.
3. FILTER: 1" Pleated disposable media (17" x 28" x 1"). Filter access is from the front.
4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 1/2" NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
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   HEATING COIL: Copper tubing with aluminum fins, Inlet/Outlet 1/2” NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
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7. ACCESS PANELS: All bottom access panels are removable and use quarter turn fasteners, including electrical access.
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1. MATERIAL: Galvanized steel. Casing –22 gauge; Bottom access – 22 gauge; Air Valve Casing – 22 gauge.

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   HEATING COIL: Copper tubing with aluminum fins, Inlet/Outlet 1/2” NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).

5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.

   B) Inlet and outlet collars should be externally insulated by others (in the field) if required.

6. DRIP TRAY: Non insulated 1” deep with no drain connection per customer request. Customer is responsible for condensate management, should it occur.

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1. MATERIAL: Galvanized steel. Casing – 22 gauge; Bottom access – 22 gauge; Air Valve Casing – 22 gauge.
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3. FILTER: Pleated disposable media (22" x 28" x 1"). Filter access is from the front.
4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 3/4" NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
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6. DRIP TRAY: Non insulated 1" deep with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
7. ACCESS PANELS: All bottom access panels are removable and use quarter turn fasteners, including electrical access.
CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel. Casing—22 gauge; Bottom access — 22 gauge; Air Valve Casing — 22 gauge.

2. INSULATION: 3/4” thick, 4.0 P.C.F. skin, dual density, fiberglass.

3. FILTER: 1” Pleated disposable media (22” x 28” x 1”). Filter access is from the front.

4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 3/4” NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).

5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
      B) Inlet and outlet collars should be externally insulated by others (in the field) if required.

6. DRIP TRAY: Non insulated 1” deep with no drain connection per customer request. Customer is responsible for condensate management, should it occur.

7. ACCESS PANELS: All bottom access panels are removable and use quarter turn fasteners, including electrical access.
CONSTRUCTION NOTES:

1. MATERIAL: Galvanized steel. Casing—22 gauge; Bottom access — 22 gauge; Air Valve Casing — 22 gauge.
2. INSULATION: 3/4" thick, 4.0 P.C.F. skin, dual density, fiberglass.
3. FILTER: Pleated disposable media (22" x 28" x 1"). Filter access is from the front.
4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 3/4" NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
   HEATING COIL: Copper tubing with aluminum fins, Inlet/Outlet 1/2" NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).
5. INSTALLATION: A) If internal insulation is utilized in the downstream ductwork, the insulation must be secured in such a manner that no raw insulation edges are exposed to the airstream.
   B) Inlet and outlet collars should be externally insulated by others (in the field) if required.
6. DRIP TRAY: Non insulated 1" deep with no drain connection per customer request. Customer is responsible for condensate management, should it occur.
7. ACCESS PANELS: All bottom access panels are removable and use quarter turn fasteners, including electrical access.
CONSTRUCTION NOTES:
1. MATERIAL: Galvanized steel. Casing—22 gauge; Bottom access — 22 gauge; Air Valve Casing — 22 gauge.
2. INSULATION: 3/4” thick, 4.0 P.C.F. skin, dual density, fiberglass.
3. FILTER: 1” Pleated disposable media (22” x 28” x 1”). Filter access is from the front.
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2. INSULATION: 3/4" thick, 4.0 P.C.F. skin, dual density, fiberglass.

3. FILTER: Pleated disposable media (17" x 35" x 1"). Filter access is from the front.

4. COOLING COIL: Copper tubing with aluminum fins, Inlet/Outlet 3/4" NPSM, ANSI B2.2, straight thread water connections (bottom inlet/top outlet); manual air vent & bleed valve (not shown).

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DOAS Series Flow Fan Powered Terminal Guide

Specifications

GENERAL
Furnish and install Johnson Controls Model TCL-CC-X (Low Height), TCS-CC-X (Standard Height), Series Flow Constant Volume Fan Powered Terminals of the sizes and capacities scheduled. Units shall be ETL listed. Terminals with electric heat shall be listed as an assembly.

The entire unit shall be designed and built as a single unit. Field-assembled components or built-up terminals employing components from multiple manufacturers are not acceptable.

CONSTRUCTION
Terminals shall be constructed of not less than 20-gauge galvanized steel, able to withstand a 125 hour salt spray test per ASTM B-117. Casing shall have bottom access to gain access to the cooling coil, primary air valve, and fan assembly. The opening shall be sufficiently large to allow complete removal of the fan if necessary. All appurtenances including control assemblies, control enclosures, sensible chilled water coils, hot water heating coils, and electric heating coils shall not extend beyond the top or bottom of the unit casing.

(Optional: Provide quarter-turn bottom access panel fasteners.)

FIBERGLASS INSULATION (Standard for TCS-CC-X)
Casing shall be internally lined with 3/4” thick fiberglass insulation rated for a maximum air velocity of 5000 f.p.m. Maximum thermal conductivity shall be .24 (BTU • in) / (hr • ft2 • °F). Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.

CLOSED CELL INSULATION (Standard for TCL-CC-X; Option for TCS-CC-X)
Casing shall be internally lined with [1/2” thick Model TCL-CC-X] [3/4” thick Model TCS-CC-X] Elastomeric Closed Cell Foam Insulation and shall conform to UL 181 for erosion, NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Polyethylene insulation is not acceptable.

PRIMARY AIR VALVE
Rectangular shaped primary air valves shall consist of minimum 18-gauge galvanized steel. Cylindrically shaped primary air valves shall consist of minimum 22-gauge galvanized steel and include embossment rings for rigidity. The damper blade shall be connected to a solid shaft by means of an integral molded sleeve which does not require screw or bolt fasteners. The shaft shall be manufactured of a low thermal conducting composite material, and include a molded damper position indicator visible from the exterior of the unit. The damper shall pivot in self-lubricating bearings. The valve assembly shall include internal mechanical stops for both full open and closed positions. The damper blade seal shall be secured without use of adhesives. The air valve leakage shall not exceed 1% of maximum inlet rated airflow at 3” W.G. inlet pressure for cylindrical valves. Rectangular valve leakage shall not exceed 2% of maximum inlet rated airflow at 3” W.G. inlet pressure.

PRIMARY AIRFLOW SENSOR
For inlet diameters 6” or greater, the differential pressure airflow sensor shall traverse the duct along two perpendicular diameters. Cylindrically shaped inlets shall utilize the equal cross sectional area or log-linear traverse method. Single axis sensor shall not be acceptable for duct diameters 6” or larger. A minimum of 12 total pressure sensing points shall be utilized. The total pressure inputs shall be averaged using a pressure chamber located at the center of the sensor. A sensor that delivers the differential pressure signal from one end of the sensor is not acceptable. The sensor shall output an amplified differential pressure signal that is at least 2.3 times the equivalent velocity pressure signal obtained from a conventional pitot tube. The sensor shall develop a differential pressure of 0.015” w.g. at an air velocity of < 325 FPM. Documentation shall be submitted which substantiates this requirement. Balancing taps and airflow calibration charts shall be provided for field airflow measurements.
DOAS Series Flow Fan Powered Terminal Guide
Specifications

FAN ASSEMBLY
The unit fan shall utilize a forward curved, dynamically balanced, galvanized wheel with a direct drive motor. The fan motor shall be un-pluggable from the electrical leads at the motor case for simplified removal. The motor shall be mounted to the fan housing using rubber grommets to minimize vibration transfer.

Fan motor shall be ECM™. Motor shall be brushless DC controlled by an integral controller / inverter that operates the wound stator and senses rotor position to electronically commutate the stator. Motor shall be permanent magnet type with near-zero rotor losses designed for synchronous rotation. The motor shall utilize permanently lubricated ball bearings. Motor shall maintain minimum 70% efficiency over the entire operating range. Motor speed control shall be accomplished through a PWM (pulse width modulation) controller specifically designed for compatibility with the ECM™. The speed controller shall have terminals for field verification of fan capacity utilizing a digital volt meter. A calibration graph shall be supplied indicating Fan CFM verses DC Volts.

CHILLED WATER SENSIBLE COOLING COIL & DRIP TRAY
Terminal shall include an integral chilled water sensible cooling coil. The coil shall be manufactured by the terminal unit manufacturer and shall have a minimum 22-gauge galvanized sheet metal casing. Coil shall be constructed of aluminum fins with full fin collars mechanically fixed to copper tubes to assure accurate fin spacing and maximum heat transfer. A galvanized steel drip tray shall be provided, factory installed underneath the sensible cooling coil. Each coil shall be hydrostatically tested at 450 PSIG, and rated for a maximum 300 PSIG working pressure at 200°F.

HOT WATER COIL
Terminal shall include an integral hot water coil where indicated on the plans. The coil shall be manufactured by the terminal unit manufacturer and shall have a minimum 22-gauge galvanized sheet metal casing. Coil shall be constructed of aluminum fins with full fin collars mechanically fixed to copper tubes to assure accurate fin spacing and maximum heat transfer. Each coil shall be hydrostatically tested at 450 PSIG, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall incorporate a built in, flush mounted access plate, allowing bottom access to coil.

ELECTRIC HEAT (TCL Only)
Terminal shall include an integral electric heater where indicated on the plans. Heater shall be manufactured by the terminal unit manufacturer. The heater cabinet shall be constructed of not less than 20-gauge galvanized steel. Heater shall have a hinged access panel for entry to the controls.

Heater shall be furnished with all controls necessary for safe operation and full compliance with UL 1995 and National Electric Code requirements. Heater shall have a single point electrical connection (optional: door interlocking fused disconnect switch). It shall include magnetic contactors (optional: staged solid state relays), (optional: airflow switch), primary disc-type automatic reset high temperature limit, secondary high limit(s), Ni-Chrome elements and fusing per UL and NEC. Heater shall have complete wiring diagram with label indicating power requirement and kW output. Heater shall be interlocked with fan terminal so as to preclude operation of the heater when the fan is not running.

ELECTRICAL
Terminals shall have a single point power connection. (Optional: toggle disconnect and motor fusing for units without electric heat).

FILTERS
Terminals shall include a filter rack and 1" thick disposable fiberglass filter (optional: MERV 8 filter).

CONTROLS COORDINATION
Furnish a NEMA 1 control enclosure with 24-volt transformer and factory mount and wire DDC controller and primary air damper actuator provided by automatic temperature control contractor. [Model TCS-CC-X, primary air actuator must be separate component and NOT integral to the controller.]

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