

CASCADE17-0244Y3

R134a

48 V DC

VARIABLE SPEED



Brushless DC Variable Speed Compressor Technical Data Sheet

General Information

| | | |
|-------------------------------------|-------------|------------------|
| Compressor Part Number (Stationary) | CASCADE0004 | (140 per pallet) |
| Compressor Part Number (Mobile) | CASCADE1004 | (140 per pallet) |
| Compressor Drawing | DCMX17 | |
| 24V Controller Part Number | 030F0152 | |
| 24V Controller Part Number | 030F0189 | |
| 48V Controller Part Number | 030F0137 | |
| 48V Controller Part Number | 030F0192 | |
| 48V Controller Part Number | 030F0175 | |
| Wiring Diagram Drawing | DEMXX0028 | |

Application Information

| | |
|------------------------------|--------------------------------------|
| Application | LBP/MBP/HBP |
| Refrigerant | R134a |
| Evaporator Temperature Range | -40° F to 59° F (-40° C to 15° C) |
| Condenser Temperature Range | 80° F to 150° F (26.7° C to 65.6° C) |

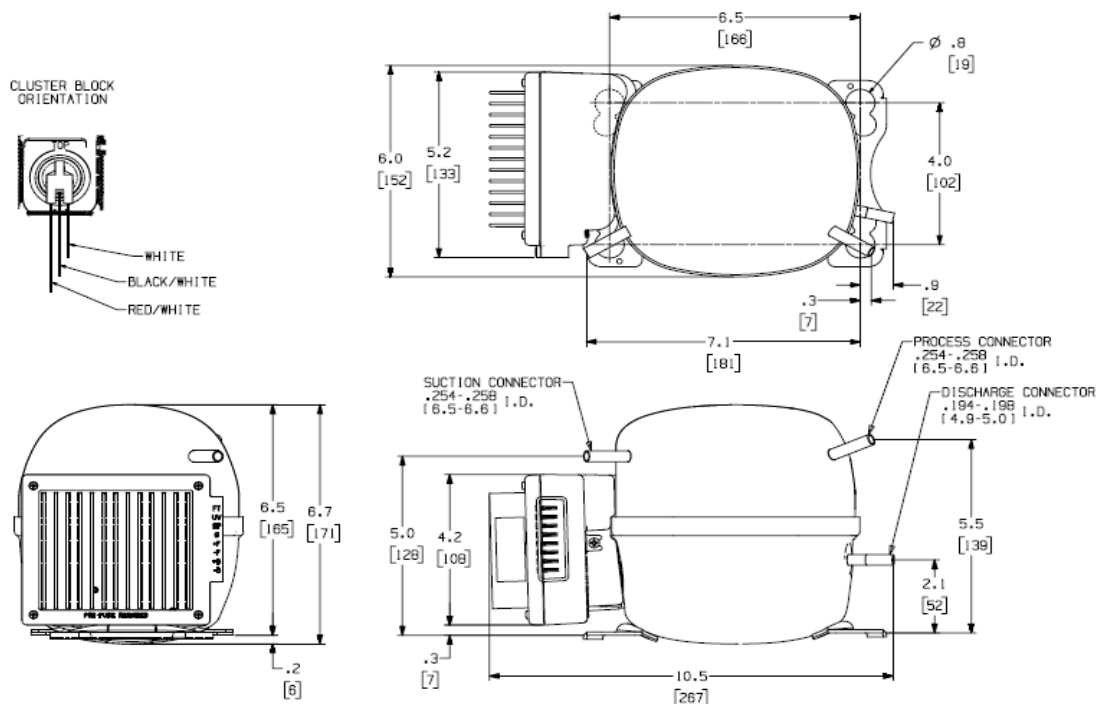
Design

| | |
|--------------------------------|---|
| Displacement | 4.00 cm ³ (0.244 in ³) |
| Oil Quantity | 270 ml |
| Oil Type | POE 32cSt |
| Weight - Compressor/Controller | 6.67 kg / 14.7 lb |

Battery Protection

| | 24V | | | 48V | | |
|------------------------|------|---------|------|------|---------|------|
| | Min. | Nominal | Max. | Min. | Nominal | Max. |
| Under Voltage Shutdown | 18.0 | 19.0 | 20.0 | 34.0 | 36.0 | 37.0 |
| Over Voltage Shutdown | 29.0 | 30.0 | 31.0 | 59.0 | 60.0 | 61.0 |

Compressor Dimensions



*ALTERNATE MOUNTING: 6.7" [171] L x 2.8" [70] W, Ø.64" [16]

Compressor Rating Data

LBP

| <u>Specification</u> | <u>ASHRAE</u> | <u>CECOMAF</u> | <u>SPEER</u> |
|-----------------------------|------------------|------------------|------------------|
| Voltage (VDC) | 48 | 48 | 48 |
| RPM | 4200 | 4200 | 4200 |
| Evap. Temp. (°F/°C) | -10°F / -23.3°C | -13°F / -25.0°C | -10°F / -23.3°C |
| Cond. Temp. (°F/°C) | 130°F / 54.4°C | 131°F / 55.0°C | 105°F / 40.6°C |
| Ambient Temp. (°F/°C) | 90°F / 32.2°C | 90°F / 32.2°C | 90°F / 32.2°C |
| Suction Temp. (°F/°C) | 90°F / 32.2°C | 90°F / 32.2°C | 90°F / 32.2°C |
| Liquid Temp. (°F/°C) | 90°F / 32.2°C | 131°F / 55.0°C | 90°F / 32.2°C |
| Cooling Capacity (BTU/watt) | 478.60 / 140.264 | 332.14 / 97.3406 | 580.79 / 170.213 |
| Power (watt) | 96.00 | 100.80 | 100.80 |
| Current (amp) | 2.00 | 2.10 | 2.10 |
| Efficiency (EER/COP) | 4.99 / 1.46 | 3.30 / 0.97 | 5.76 / 1.69 |

MBP

| <u>Specification</u> | <u>ASHRAE</u> | <u>ARI</u> |
|-----------------------------|-------------------|------------------|
| Voltage (VDC) | 48 | 48 |
| RPM | 4200 | 4200 |
| Evap. Temp. (°F/°C) | 20°F / -6.7°C | 20°F / -6.7°C |
| Cond. Temp. (°F/°C) | 130°F / 54.4°C | 120°F / 48.9°C |
| Ambient Temp. (°F/°C) | 95°F / 35.0°C | 95°F / 35.0°C |
| Suction Temp. (°F/°C) | 95°F / 35.0°C | 40°F / 4.4°C |
| Liquid Temp. (°F/°C) | 115°F / 46.1°C | 120°F / 48.9°C |
| Cooling Capacity (BTU/watt) | 1175.80 / 344.593 | 989.27 / 289.926 |
| Power (watt) | 177.60 | 172.80 |
| Current (amp) | 3.70 | 3.60 |
| Efficiency (EER/COP) | 6.62 / 1.94 | 5.72 / 1.68 |

HBP

| <u>Specification</u> | <u>ASHRAE</u> | <u>ARI</u> |
|-----------------------------|------------------|------------------|
| Voltage (VDC) | 48 | 48 |
| RPM | 4040 | 4000 |
| Evap. Temp. (°F/°C) | 45°F / 7.2°C | 45°F / 7.2°C |
| Cond. Temp. (°F/°C) | 130°F / 54.4°C | 130°F / 54.4°C |
| Ambient Temp. (°F/°C) | 95°F / 35.0°C | 95°F / 35.0°C |
| Suction Temp. (°F/°C) | 95°F / 35.0°C | 65°F / 18.3°C |
| Liquid Temp. (°F/°C) | 115°F / 46.1°C | 115°F / 46.1°C |
| Cooling Capacity (BTU/watt) | 1960.77 / 574.64 | 1832.93 / 537.18 |
| Power (watt) | 240.00 | 240.00 |
| Current (amp) | 5.00 | 5.00 |
| Efficiency (EER/COP) | 8.17 / 2.39 | 7.64 / 2.24 |

Cooling Capacity (24V) - ARI HBP **BTU/hr (Watt)**

| RPM | Evaporator Temperature | | | | | | | | | | | | | |
|------|------------------------|--------|------|--------|------|-------|------|-------|------|-------|------|--------|------|--------|
| | 20°F | (-7°C) | 30°F | (-1°C) | 35°F | (2°C) | 40°F | (4°C) | 45°F | (7°C) | 50°F | (10°C) | 55°F | (13°C) |
| 1800 | 388 | (114) | 554 | (162) | 641 | (188) | 730 | (214) | 821 | (240) | 913 | (267) | 1005 | (294) |
| 2400 | 541 | (158) | 746 | (219) | 854 | (250) | 966 | (283) | 1079 | (316) | 1194 | (350) | 1310 | (384) |
| 3000 | 743 | (218) | 980 | (287) | 1106 | (324) | 1235 | (362) | 1367 | (400) | 1501 | (440) | 1637 | (479) |
| 3600 | 934 | (273) | 1195 | (350) | 1333 | (391) | 1476 | (432) | 1623 | (475) | 1772 | (519) | 1924 | (563) |
| 4200 | 1052 | (308) | 1329 | (389) | 1477 | (433) | 1629 | (477) | 1786 | (523) | 1947 | (570) | 2110 | (618) |

Power Consumption (24V) - ARI HBP **Watt** **Current (24V) - ARI HBP** **Amp**

| RPM | Evaporator Temperature | | | | | | | Evaporator Temperature | | | | | | |
|------|------------------------|------|------|------|------|------|------|------------------------|------|------|------|-------|-------|-------|
| | 20°F | 30°F | 35°F | 40°F | 45°F | 50°F | 55°F | 20°F | 30°F | 35°F | 40°F | 45°F | 50°F | 55°F |
| 1800 | 83 | 92 | 97 | 101 | 106 | 110 | 114 | 3.45 | 3.85 | 4.04 | 4.22 | 4.40 | 4.57 | 4.73 |
| 2400 | 105 | 115 | 121 | 126 | 131 | 136 | 142 | 4.37 | 4.81 | 5.02 | 5.24 | 5.46 | 5.68 | 5.91 |
| 3000 | 129 | 143 | 150 | 157 | 165 | 173 | 181 | 5.38 | 5.94 | 6.24 | 6.54 | 6.86 | 7.19 | 7.54 |
| 3600 | 155 | 174 | 184 | 195 | 206 | 218 | 230 | 6.44 | 7.24 | 7.67 | 8.12 | 8.59 | 9.08 | 9.59 |
| 4200 | 181 | 209 | 224 | 239 | 255 | 272 | 290 | 7.56 | 8.70 | 9.32 | 9.96 | 10.63 | 11.33 | 12.07 |

Efficiency (24V) - ARI HBP **BTU/hr/W (W/W)**

| RPM | Evaporator Temperature | | | | | | | | | | | | | |
|------|------------------------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| | 20°F | (-7°C) | 30°F | (-1°C) | 35°F | (2°C) | 40°F | (4°C) | 45°F | (7°C) | 50°F | (10°C) | 55°F | (13°C) |
| 1800 | 4.69 | (1.37) | 5.99 | (1.75) | 6.61 | (1.93) | 7.20 | (2.11) | 7.78 | (2.28) | 8.33 | (2.44) | 8.85 | (2.59) |
| 2400 | 5.15 | (1.51) | 6.47 | (1.89) | 7.09 | (2.08) | 7.68 | (2.25) | 8.24 | (2.41) | 8.76 | (2.56) | 9.24 | (2.71) |
| 3000 | 5.76 | (1.69) | 6.87 | (2.01) | 7.39 | (2.16) | 7.86 | (2.30) | 8.30 | (2.43) | 8.70 | (2.55) | 9.05 | (2.65) |
| 3600 | 6.04 | (1.77) | 6.87 | (2.01) | 7.24 | (2.12) | 7.57 | (2.22) | 7.87 | (2.31) | 8.13 | (2.38) | 8.36 | (2.45) |
| 4200 | 5.80 | (1.70) | 6.36 | (1.86) | 6.60 | (1.93) | 6.82 | (2.00) | 7.00 | (2.05) | 7.16 | (2.10) | 7.29 | (2.13) |

* all points are at 35°C (95°F) ambient, 18.33°C (65°F) suction temperature, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (24V) - ARI HBP

| Coefficient | Capacity (BTU/Hr) | Power (Watts) | Current (Amperes) | Mass Flow (Lbs/Hr) |
|-------------|-------------------|---------------|-------------------|--------------------|
| C1 | -1.107663E+03 | 3.943455E+02 | 1.643106E+01 | -9.435642E+00 |
| C2 | -1.300685E+00 | -1.223476E-01 | -5.097817E-03 | -2.856467E-02 |
| C3 | 2.056291E-04 | 2.942926E-05 | 1.226219E-06 | 4.165405E-06 |
| C4 | -4.706144E-08 | -2.445508E-10 | -1.018962E-11 | -7.435971E-10 |
| C5 | -7.624835E+01 | -3.826043E+00 | -1.594184E-01 | -1.222140E+00 |
| C6 | 1.678044E-01 | 4.168358E-02 | 1.736816E-03 | 2.490090E-03 |
| C7 | -8.433469E-04 | 3.524107E-05 | 1.468377E-06 | -1.285188E-05 |
| C8 | 7.156981E+01 | -7.588050E+00 | -3.161687E-01 | 1.008043E+00 |
| C9 | -8.933099E-01 | 5.706575E-02 | 2.377740E-03 | -1.319664E-02 |
| C10 | 3.539651E-03 | -1.815833E-04 | -7.565971E-06 | 5.237502E-05 |
| C11 | -4.128949E-04 | -3.801532E-05 | -1.583972E-06 | -6.920254E-06 |
| C12 | -4.984281E-08 | 6.986678E-09 | 2.911116E-10 | -6.890584E-10 |
| C13 | -1.084624E-06 | 2.132993E-07 | 8.887472E-09 | -1.178531E-08 |
| C14 | 2.881196E-06 | -3.587806E-08 | -1.494920E-09 | 4.619442E-08 |
| C15 | 1.522813E-02 | 3.822661E-03 | 1.592776E-04 | 2.726404E-04 |
| C16 | 1.794408E-02 | 1.206820E-03 | 5.028417E-05 | 3.516805E-04 |
| C17 | 1.602984E+00 | 2.213781E-02 | 9.224086E-04 | 2.472096E-02 |
| C18 | 5.350873E-06 | -5.583706E-07 | -2.326544E-08 | 7.283940E-08 |
| C19 | 1.647996E-04 | -2.041318E-05 | -8.505493E-07 | 1.970873E-06 |
| C20 | 1.730062E-06 | -2.468870E-07 | -1.028696E-08 | 1.989592E-08 |
| C21 | -1.230301E-04 | 1.131317E-06 | 4.713821E-08 | -1.980280E-06 |
| C22 | -6.058412E-04 | -4.793339E-04 | -1.997224E-05 | -6.546663E-06 |
| C23 | -8.010951E-03 | 2.484762E-04 | 1.035318E-05 | -1.213048E-04 |

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3^2 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$

Cooling Capacity (48V) - ARI HBP **BTU/hr (Watt)**

| RPM | Evaporator Temperature | | | | | | | | | | | | | |
|------|------------------------|--------|------|--------|------|-------|------|-------|------|-------|------|--------|------|--------|
| | 20°F | (-7°C) | 30°F | (-1°C) | 35°F | (2°C) | 40°F | (4°C) | 45°F | (7°C) | 50°F | (10°C) | 55°F | (13°C) |
| 1800 | 388 | (114) | 554 | (162) | 641 | (188) | 730 | (214) | 821 | (240) | 913 | (267) | 1005 | (294) |
| 2400 | 541 | (158) | 746 | (219) | 854 | (250) | 966 | (283) | 1079 | (316) | 1194 | (350) | 1310 | (384) |
| 3000 | 743 | (218) | 980 | (287) | 1106 | (324) | 1235 | (362) | 1367 | (400) | 1501 | (440) | 1637 | (479) |
| 3600 | 934 | (273) | 1195 | (350) | 1333 | (391) | 1476 | (432) | 1623 | (475) | 1772 | (519) | 1924 | (563) |
| 4200 | 1052 | (308) | 1329 | (389) | 1477 | (433) | 1629 | (477) | 1786 | (523) | 1947 | (570) | 2110 | (618) |

Power Consumption (48V) - ARI HBP **Watt** **Current (48V) - ARI HBP** **Amp**

| RPM | Evaporator Temperature | | | | | | | Evaporator Temperature | | | | | | |
|------|------------------------|------|------|------|------|------|------|------------------------|------|------|------|------|------|------|
| | 20°F | 30°F | 35°F | 40°F | 45°F | 50°F | 55°F | 20°F | 30°F | 35°F | 40°F | 45°F | 50°F | 55°F |
| 1800 | 81 | 91 | 95 | 99 | 103 | 107 | 111 | 1.69 | 1.89 | 1.98 | 2.07 | 2.16 | 2.24 | 2.32 |
| 2400 | 103 | 113 | 118 | 123 | 128 | 134 | 139 | 2.14 | 2.36 | 2.46 | 2.57 | 2.68 | 2.79 | 2.90 |
| 3000 | 127 | 140 | 147 | 154 | 161 | 169 | 177 | 2.64 | 2.91 | 3.06 | 3.21 | 3.36 | 3.53 | 3.70 |
| 3600 | 152 | 171 | 181 | 191 | 202 | 214 | 226 | 3.16 | 3.55 | 3.76 | 3.98 | 4.21 | 4.45 | 4.70 |
| 4200 | 178 | 205 | 219 | 234 | 250 | 267 | 284 | 3.71 | 4.27 | 4.57 | 4.88 | 5.21 | 5.56 | 5.92 |

Efficiency (48V) - ARI HBP **BTU/hr/W (W/W)**

| RPM | Evaporator Temperature | | | | | | | | | | | | | |
|------|------------------------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| | 20°F | (-7°C) | 30°F | (-1°C) | 35°F | (2°C) | 40°F | (4°C) | 45°F | (7°C) | 50°F | (10°C) | 55°F | (13°C) |
| 1800 | 4.79 | (1.40) | 6.82 | (2.00) | 6.74 | (1.97) | 7.35 | (2.15) | 7.93 | (2.32) | 8.49 | (2.49) | 9.03 | (2.64) |
| 2400 | 5.25 | (1.54) | 7.25 | (2.12) | 7.23 | (2.12) | 7.83 | (2.29) | 8.40 | (2.46) | 8.93 | (2.61) | 9.42 | (2.76) |
| 3000 | 5.87 | (1.72) | 7.75 | (2.27) | 7.53 | (2.21) | 8.02 | (2.35) | 8.46 | (2.48) | 8.87 | (2.60) | 9.23 | (2.70) |
| 3600 | 6.16 | (1.80) | 7.88 | (2.31) | 7.38 | (2.16) | 7.72 | (2.26) | 8.03 | (2.35) | 8.29 | (2.43) | 8.52 | (2.50) |
| 4200 | 5.91 | (1.73) | 7.47 | (2.19) | 6.73 | (1.97) | 6.95 | (2.04) | 7.14 | (2.09) | 7.30 | (2.14) | 7.43 | (2.18) |

* all points are at 35°C (95°F) ambient, 18.33°C (65°F) suction temperature, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ARI HBP

| Coefficient | Capacity (BTU/Hr) | Power (Watts) | Current (Amperes) | Mass Flow (Lbs/Hr) |
|-------------|-------------------|---------------|-------------------|--------------------|
| C1 | -1.107663E+03 | 3.867253E+02 | 8.056776E+00 | -9.435642E+00 |
| C2 | -1.300685E+00 | -1.199834E-01 | -2.499654E-03 | -2.856467E-02 |
| C3 | 2.056291E-04 | 2.886058E-05 | 6.012621E-07 | 4.165405E-06 |
| C4 | -4.706144E-08 | -2.398252E-10 | -4.996360E-12 | -7.435971E-10 |
| C5 | -7.624835E+01 | -3.752109E+00 | -7.816894E-02 | -1.222140E+00 |
| C6 | 1.678044E-01 | 4.087810E-02 | 8.516272E-04 | 2.490090E-03 |
| C7 | -8.433469E-04 | 3.456008E-05 | 7.200013E-07 | -1.285188E-05 |
| C8 | 7.156981E+01 | -7.441421E+00 | -1.550296E-01 | 1.008043E+00 |
| C9 | -8.933099E-01 | 5.596303E-02 | 1.165896E-03 | -1.319664E-02 |
| C10 | 3.539651E-03 | -1.780744E-04 | -3.709884E-06 | 5.237502E-05 |
| C11 | -4.128949E-04 | -3.728073E-05 | -7.766818E-07 | -6.920254E-06 |
| C12 | -4.984281E-08 | 6.851670E-09 | 1.427431E-10 | -6.890584E-10 |
| C13 | -1.084624E-06 | 2.091776E-07 | 4.357867E-09 | -1.178531E-08 |
| C14 | 2.881196E-06 | -3.518476E-08 | -7.330161E-10 | 4.619442E-08 |
| C15 | 1.522813E-02 | 3.748794E-03 | 7.809986E-05 | 2.726404E-04 |
| C16 | 1.794408E-02 | 1.183500E-03 | 2.465625E-05 | 3.516805E-04 |
| C17 | 1.602984E+00 | 2.171003E-02 | 4.522921E-04 | 2.472096E-02 |
| C18 | 5.350873E-06 | -5.475808E-07 | -1.140793E-08 | 7.283940E-08 |
| C19 | 1.647996E-04 | -2.001873E-05 | -4.170568E-07 | 1.970873E-06 |
| C20 | 1.730062E-06 | -2.421162E-07 | -5.044087E-09 | 1.989592E-08 |
| C21 | -1.230301E-04 | 1.109455E-06 | 2.311366E-08 | -1.980280E-06 |
| C22 | -6.058412E-04 | -4.700714E-04 | -9.793154E-06 | -6.546663E-06 |
| C23 | -8.010951E-03 | 2.436747E-04 | 5.076557E-06 | -1.213048E-04 |

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3^2 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$

Cooling Capacity (48V) - ASHRAE LBP **BTU/hr (Watt)**

| RPM | Evaporator Temperature | | | | | | | | | | | |
|------|------------------------|-----------------|-----------------|-----------------|---------------|-------------|----------------|-----------|--|--|--|--|
| | -40°F (-40°C) | -30°F (-34.4°C) | -20°F (-28.9°C) | -10°F (-23.3°C) | 0°F (-17.8°C) | 5°F (-15°C) | 10°F (-12.2°C) | | | | | |
| 1800 | | | | | 224 (66) | 291 (85) | 336 (98) | 389 (114) | | | | |
| 2400 | | | | 211 (62) | 287 (84) | 387 (113) | 448 (131) | 519 (152) | | | | |
| 3000 | | | | 250 (73) | 352 (103) | 480 (141) | 556 (163) | 642 (188) | | | | |
| 3600 | | | 190 (56) | 293 (86) | 416 (122) | 567 (166) | 655 (192) | 754 (221) | | | | |
| 4200 | 115 (34) | 218 (64) | 335 (98) | 474 (139) | 643 (188) | 742 (217) | 851 (249) | | | | | |

Power Consumption (48V) - ASHRAE LBP **Watt** **Current (48V) - ASHRAE LBP** **Amp**

| RPM | Evaporator Temperature | | | | | | | Evaporator Temperature | | | | | | |
|------|------------------------|-------|-------|-------|-----|-----|------|------------------------|-------|-------|-------|------|------|------|
| | -40°F | -30°F | -20°F | -10°F | 0°F | 5°F | 10°F | -40°F | -30°F | -20°F | -10°F | 0°F | 5°F | 10°F |
| 1800 | | | | 52 | 61 | 65 | 70 | | | | 1.08 | 1.26 | 1.36 | 1.46 |
| 2400 | | | 51 | 61 | 73 | 80 | 87 | | | 1.06 | 1.27 | 1.53 | 1.67 | 1.81 |
| 3000 | | | 65 | 78 | 94 | 103 | 111 | | | 1.35 | 1.62 | 1.96 | 2.14 | 2.32 |
| 3600 | | 67 | 78 | 95 | 114 | 125 | 136 | | 1.39 | 1.64 | 1.98 | 2.38 | 2.60 | 2.82 |
| 4200 | 62 | 70 | 84 | 103 | 126 | 139 | 152 | 1.28 | 1.45 | 1.75 | 2.15 | 2.63 | 2.89 | 3.16 |

Efficiency (48V) - ASHRAE LBP **BTU/hr/W (W/W)**

| RPM | Evaporator Temperature | | | | | | | | | | | |
|------|------------------------|-----------------|-----------------|-----------------|---------------|-------------|----------------|-------------|--|--|--|--|
| | -40°F (-40°C) | -30°F (-34.4°C) | -20°F (-28.9°C) | -10°F (-23.3°C) | 0°F (-17.8°C) | 5°F (-15°C) | 10°F (-12.2°C) | | | | | |
| 1800 | | | | | 4.33 (1.27) | 4.81 (1.41) | 5.14 (1.51) | 5.56 (1.63) | | | | |
| 2400 | | | | 4.16 (1.22) | 4.71 (1.38) | 5.27 (1.54) | 5.61 (1.64) | 5.99 (1.75) | | | | |
| 3000 | | | | 3.87 (1.13) | 4.52 (1.32) | 5.11 (1.50) | 5.43 (1.59) | 5.77 (1.69) | | | | |
| 3600 | | | 3.14 (0.92) | 3.73 (1.09) | 4.39 (1.28) | 4.96 (1.45) | 5.25 (1.54) | 5.56 (1.63) | | | | |
| 4200 | 1.86 (0.54) | 3.54 (1.04) | 3.98 (1.17) | 4.58 (1.34) | 5.09 (1.49) | 5.34 (1.57) | 5.61 (1.64) | | | | | |

* all points are at 32.2°C (90°F) ambient, 32.2°C (90°F) suction temperature, 22.2°C (40°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ASHRAE LBP

| Coefficient | Capacity (BTU/Hr) | Power (Watts) | Current (Amperes) | Mass Flow (Lbs/Hr) |
|-------------|-------------------|---------------|-------------------|--------------------|
| C1 | -2.547054E+03 | -3.036632E+02 | -6.326316E+00 | -2.342292E+01 |
| C2 | 4.987582E-01 | -1.605865E-01 | -3.345553E-03 | 1.728096E-03 |
| C3 | 9.362233E-06 | 6.367320E-05 | 1.326525E-06 | 5.473245E-07 |
| C4 | -2.837561E-09 | -6.159523E-09 | -1.283234E-10 | -6.642374E-11 |
| C5 | -4.254589E+01 | -2.755570E+00 | -5.740770E-02 | -3.667257E-01 |
| C6 | -4.441378E-01 | -3.683323E-03 | -7.673591E-05 | -3.078851E-03 |
| C7 | 1.399703E-03 | -2.179030E-04 | -4.539647E-06 | 1.242304E-05 |
| C8 | 6.508722E+01 | 1.180764E+01 | 2.459926E-01 | 6.481843E-01 |
| C9 | -5.344578E-01 | -9.988720E-02 | -2.080983E-03 | -5.536291E-03 |
| C10 | 1.430443E-03 | 2.754962E-04 | 5.739505E-06 | 1.532788E-05 |
| C11 | -1.469962E-04 | -1.814527E-05 | -3.780264E-07 | -9.073597E-07 |
| C12 | -2.598711E-08 | -3.316082E-09 | -6.908504E-11 | -2.740751E-10 |
| C13 | -2.120923E-06 | 5.282828E-08 | 1.100589E-09 | -1.516205E-08 |
| C14 | 9.978631E-07 | 1.825728E-07 | 3.803599E-09 | 9.080226E-09 |
| C15 | 1.069448E-02 | -6.938251E-05 | -1.445469E-06 | 6.879179E-05 |
| C16 | -4.323958E-03 | 1.635109E-04 | 3.406476E-06 | -6.941694E-06 |
| C17 | 8.294697E-01 | 8.297505E-02 | 1.728647E-03 | 7.531413E-03 |
| C18 | 2.708422E-06 | 4.259270E-07 | 8.873479E-09 | 2.817112E-08 |
| C19 | 2.934421E-04 | -2.968540E-06 | -6.184458E-08 | 2.376943E-06 |
| C20 | 5.616030E-08 | -6.585853E-08 | -1.372053E-09 | -5.985467E-10 |
| C21 | 1.128300E-05 | 6.652567E-07 | 1.385951E-08 | 3.692176E-09 |
| C22 | 4.331387E-03 | -8.795197E-06 | -1.832333E-07 | 3.052683E-05 |
| C23 | -4.156540E-03 | -4.894060E-04 | -1.019596E-05 | -3.993008E-05 |

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3^2 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t (°F)$
 $X_3 = C_t (°F)$

Controller Features

- 4 pole sensor-less variable speed BLDC motor controller
- 420W maximum output power
- 030F0137 & 030F0175: 39 - 60 VDC input range, 030F0152: 19 - 30 VDC input range
- 1800 – 4200 rpm speed
- 1.0 - 4.75V analog speed set input (resistor programmable for fixed speed)
- 030F0137 & 030F0152: 0°C to 45°C operating temperature
- 030F0175 (LBP/MBP): 0°C to 55°C operating temperature (min. fan cooling / airflow across heatsink is 1.5 m/s)
- 030F0175 (HBP): 0°C to 46.1°C operating temperature (min. fan cooling / airflow across heatsink is 3 m/s)
- Under/Over voltage shutdown (resistor programmable under voltage thresholds)
- Locked rotor detection
- Thermal shutdown – for power devices
- Over current shutdown – for power devices
- Low speed shutdown
- TTL Fault output
- Pulsed Fault Output (030F0189 & 030F0192 only)
- LED fault indicator
- Fan output, +12VDC @ 0.5A with voltage detection
- Reverse polarity protection

Optional Fixed Resistor Speed Chart

| Resistor Value | Motor Speed | 48V ONLY |
|----------------|-------------|----------|
| OHMS | [RPM] | |
| 0 | 3000 | |
| 200 | 1800 | |
| 242 | 1900 | |
| 287 | 2000 | |
| 388 | 2200 | |
| 510 | 2400 | |
| 659 | 2600 | |
| 847 | 2800 | |
| 1090 | 3000 | |
| 1.4k | 3200 | |
| 1.88k | 3400 | |
| 2.58k | 3600 | |
| 3.8k | 3800 | |
| 6.36k | 4000 | |
| 15.3k | 4200 | |

LED Fault Indicator Output

| | |
|------------------------|-----------|
| Motor Fault | 1 Flash |
| Under Voltage | 2 Flashes |
| Over Voltage | 3 Flashes |
| Over Temperature | 4 Flashes |
| Over Current/Power | 5 Flashes |
| Fan Voltage Error | 6 Flashes |
| General Hardware Error | 7 Flashes |
| System Integrity Fault | 8 Flashes |

Use the formula below to find the resistor value needed to achieve a specific speed for the controller.

$$934960 - 806 * \text{Speed_Desired}$$

$$\text{Speed_Desired} - 4360$$

