

COMPRESSOR DEFINITION

| | |
|---------------------------|---------------------------|
| Designation | F F110HAK |
| Nominal Voltage/Frequency | 220-230 V 50-60 Hz |
| Engineering Number | 513201009 |

A - APPLICATION / LIMIT WORKING CONDITIONS

| | | | |
|------------------------------------|-----------------------------------|-----------------------------------|--------------|
| 1 Type | Hermetic reciprocating compressor | | |
| 2 Refrigerant | R-134a | | |
| 3 Nominal voltage and frequency | 220-230 / 50-60 | [V / Hz] | |
| 4 Application type | Low-Medium Back Pressure | | |
| 4.1 Evaporating temperature range | -35°C to -5°C | (-31°F to 23°F) | |
| 5 Motor type | RSIR/CSIR | | |
| 6 Starting torque | LST - Low Starting Torque | | |
| 7 Expansion device | Capillary tube | | |
| 8 Compressor cooling | | Operating voltage range | |
| | | 50 Hz | 60 Hz |
| 8.1 LBP (32°C Ambient temperature) | Static/Fan | 187 to 244 V | 187 to 242 V |
| 8.2 LBP (43°C Ambient temperature) | Static/Fan | 187 to 244 V | 187 to 242 V |
| 8.3 HBP (32°C Ambient temperature) | - | - | - |
| 8.4 HBP (43°C Ambient temperature) | - | - | - |
| 9 Maximum condensing temperature | | | |
| 9.1 Operating | 14.2 | [kgf/cm ²] (202 psig) | / °C - °F |
| 9.2 Peak | 15.9 | [kgf/cm ²] (226 psig) | / °C - °F |
| 10 Maximum winding temperature | 130 | [°C] | |

B - MECHANICAL DATA

| | | |
|-------------------------------|---------------|--|
| 1 Commercial designation | 1/3 | [hp] |
| 2 Displacement | 9.04 | [cm ³] (0.552 cu.in) |
| 2.1 Bore [mm] | 24.000 | |
| 2.2 Stroke [mm] | 20.000 | |
| 3 Lubricant charge | 280 | [ml] (9.47 fl.oz.) |
| 3.1 Lubricants approved | | |
| 3.2 Lubricants type/viscosity | ESTER / ISO22 | |
| 4 Weight (with oil charge) | 10.85 | [kg] (23.92 lb.) |
| 5 Nitrogen charge | 0.2 to 0.3 | [kgf/cm ²] (2.84 to 4.27 psig) |

C - ELETRICAL DATA

| | | |
|--|---------------------------------------|------------------------------------|
| 1 Nominal Voltage/Frequency/Number of Phases | 220-230 V 50-60 Hz 1 ~ (Single phase) | |
| 2 Starting device type | Current Relay | |
| 2.1 Starting device | 213516035/213516043 | |
| 3 Start capacitor | 53-64(230) | [µF(VAC minimum)] |
| 4 Run capacitor | - | [µF(VAC minimum)] |
| 5 Motor protection | 4TM757KFBYY-53 | |
| 6 Start winding resistance | 28.15 | [Ω at 25°C (77°F)] +/- 8% |
| 7 Run winding resistance | 7.15 | [Ω at 25°C (77°F)] +/- 8% |
| 8 LRA - Locked rotor amperage (50/60 Hz) | 18.00/17.50 | [A] - Measured according to UL 984 |
| 9 FLA - Full load amperage L/MBP (50/60 Hz) | 2.50/2.20 | [A] - Measured according to UL 984 |
| 10 FLA - Full Load Amperage HBP (50/60 Hz) | - | [A] - Measured according to UL 984 |
| 11 Approval boards certification | | |

D - PERFORMANCE - CHECK POINT DATA

| | | | | | | | | |
|-------------------------------|----------|-----|-----------------------------|-------------------------------|--|---------------------------|--|-------|
| TEST CONDITIONS: @220V50Hz | | | ASHRAELBP32 Static | | Evaporating temperature (Condensing temperature | | -23.3°C (-9.94°F) 54.4°C (129.92°F) | |
| Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | |
| [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| 850 | 214 | 249 | 191 | 1.73 | 4.83 | 4.45 | 1.12 | 1.30 |

| | | | | | | | | |
|-------------------------------|----------|-----|-----------------------------|-------------------------------|--|---------------------------|--|-------|
| TEST CONDITIONS: @220V60Hz | | | ASHRAELBP32 Static | | Evaporating temperature (Condensing temperature | | -23.3°C (-9.94°F) 54.4°C (129.92°F) | |
| Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | |
| [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| 1030 | 260 | 302 | 212 | 1.54 | 5.85 | 4.86 | 1.22 | 1.42 |

E - PERFORMANCE - CURVES

| | | | | | | | | | |
|-------------------------------|----------------------------|----------|--------------------|-----------------------------|--|-------------------------|---------------------------|-----------|-------|
| TEST CONDITIONS: @220V50Hz | | | ASHRAE32 Static | | (Condensing temperature 45°C (+113°F)) | | | | |
| Evaporating temperature | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | |
| °C (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -35 (-31) | 431 | 109 | 126 | 135 | 1.67 | 2.44 | 3.18 | 0.80 | 0.93 |
| -30 (-22) | 601 | 152 | 176 | 155 | 1.70 | 3.41 | 3.88 | 0.98 | 1.14 |
| -25 (-13) | 834 | 210 | 244 | 178 | 1.73 | 4.73 | 4.69 | 1.18 | 1.37 |
| -20 (- 4) | 1123 | 283 | 329 | 201 | 1.77 | 6.39 | 5.58 | 1.41 | 1.64 |
| -15 (+ 5) | 1466 | 370 | 430 | 225 | 1.82 | 8.37 | 6.53 | 1.64 | 1.91 |
| -10 (+14) | 1858 | 468 | 544 | 248 | 1.88 | 10.64 | 7.50 | 1.89 | 2.20 |
| -5 (+23) | 2294 | 578 | 672 | 271 | 1.95 | 13.20 | 8.47 | 2.14 | 2.48 |

| | | | | | | | | | |
|-------------------------------|----------------------------|----------|--------------------|-----------------------------|--|-------------------------|---------------------------|-----------|-------|
| TEST CONDITIONS: @220V50Hz | | | ASHRAE32 Static | | (Condensing temperature 55°C (+131°F)) | | | | |
| Evaporating temperature | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | |
| °C (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -35 (-31) | 358 | 90 | 105 | 133 | 1.67 | 2.03 | 2.73 | 0.69 | 0.80 |
| -30 (-22) | 521 | 131 | 153 | 155 | 1.70 | 2.95 | 3.40 | 0.86 | 1.00 |
| -25 (-13) | 744 | 188 | 218 | 180 | 1.74 | 4.23 | 4.14 | 1.04 | 1.21 |
| -20 (- 4) | 1025 | 258 | 300 | 207 | 1.78 | 5.83 | 4.93 | 1.24 | 1.44 |
| -15 (+ 5) | 1358 | 342 | 398 | 236 | 1.85 | 7.75 | 5.74 | 1.45 | 1.68 |
| -10 (+14) | 1738 | 438 | 509 | 265 | 1.93 | 9.96 | 6.56 | 1.65 | 1.92 |
| -5 (+23) | 2162 | 545 | 634 | 294 | 2.02 | 12.44 | 7.34 | 1.85 | 2.15 |

E - PERFORMANCE - CURVES

| TEST CONDITIONS: @220V50Hz | | ASHRAE32 Static | | | (Condensing temperature 65°C (+149°F)) | | | | | |
|-------------------------------|----------------------------|--------------------|---------|-----------------------------|---|-------------------------|---------------------------|--------|----------|-----------|
| Evaporating temperature | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | | |
| | °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] |
| -35 | (-31) | 276 | 70 | 81 | 123 | 1.65 | 1.56 | 2.23 | 0.56 | 0.65 |
| -30 | (-22) | 425 | 107 | 125 | 148 | 1.68 | 2.41 | 2.88 | 0.73 | 0.84 |
| -25 | (-13) | 635 | 160 | 186 | 177 | 1.73 | 3.61 | 3.58 | 0.90 | 1.05 |
| -20 | (- 4) | 901 | 227 | 264 | 210 | 1.79 | 5.13 | 4.29 | 1.08 | 1.26 |
| -15 | (+ 5) | 1218 | 307 | 357 | 244 | 1.87 | 6.95 | 5.00 | 1.26 | 1.47 |
| -10 | (+14) | 1582 | 399 | 464 | 280 | 1.96 | 9.06 | 5.67 | 1.43 | 1.66 |
| -5 | (+23) | 1989 | 501 | 583 | 317 | 2.08 | 11.44 | 6.28 | 1.58 | 1.84 |

| TEST CONDITIONS: @220V60Hz | | ASHRAE32 Static | | | (Condensing temperature 45°C (+113°F)) | | | | | |
|-------------------------------|----------------------------|--------------------|---------|-----------------------------|---|-------------------------|---------------------------|--------|----------|-----------|
| Evaporating temperature | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | | |
| | °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] |
| -35 | (-31) | 514 | 130 | 151 | 140 | 1.36 | 2.91 | 3.66 | 0.92 | 1.07 |
| -30 | (-22) | 766 | 193 | 224 | 168 | 1.43 | 4.34 | 4.56 | 1.15 | 1.34 |
| -25 | (-13) | 1044 | 263 | 306 | 197 | 1.50 | 5.93 | 5.34 | 1.34 | 1.56 |
| -20 | (- 4) | 1363 | 343 | 399 | 226 | 1.59 | 7.76 | 6.05 | 1.52 | 1.77 |
| -15 | (+ 5) | 1734 | 437 | 508 | 257 | 1.69 | 9.90 | 6.76 | 1.70 | 1.98 |
| -10 | (+14) | 2169 | 547 | 636 | 288 | 1.80 | 12.43 | 7.52 | 1.89 | 2.20 |
| -5 | (+23) | 2683 | 676 | 786 | 319 | 1.92 | 15.43 | 8.39 | 2.11 | 2.46 |

| TEST CONDITIONS: @220V60Hz | | ASHRAE32 Static | | | (Condensing temperature 55°C (+131°F)) | | | | | |
|-------------------------------|----------------------------|--------------------|---------|-----------------------------|---|-------------------------|---------------------------|--------|----------|-----------|
| Evaporating temperature | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | | |
| | °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] |
| -35 | (-31) | 384 | 97 | 113 | 129 | 1.33 | 2.17 | 3.00 | 0.76 | 0.88 |
| -30 | (-22) | 636 | 160 | 186 | 161 | 1.41 | 3.61 | 3.91 | 0.98 | 1.15 |
| -25 | (-13) | 915 | 231 | 268 | 195 | 1.49 | 5.20 | 4.67 | 1.18 | 1.37 |
| -20 | (- 4) | 1234 | 311 | 362 | 231 | 1.60 | 7.02 | 5.33 | 1.34 | 1.56 |
| -15 | (+ 5) | 1605 | 405 | 470 | 269 | 1.73 | 9.16 | 5.96 | 1.50 | 1.75 |
| -10 | (+14) | 2042 | 515 | 598 | 308 | 1.87 | 11.70 | 6.61 | 1.66 | 1.94 |
| -5 | (+23) | 2555 | 644 | 749 | 349 | 2.03 | 14.70 | 7.34 | 1.85 | 2.15 |

E - PERFORMANCE - CURVES

| TEST CONDITIONS: @220V60Hz | | ASHRAE32 Static | | | (Condensing temperature 65°C (+149°F)) | | | | | |
|-------------------------------|-------|----------------------------|----------|-----|---|-------------------------------|-------------------------|---------------------------|-----------|-------|
| Evaporating temperature | | Cooling capacity +/- 5% | | | Power consumption +/- 5% | Current consumption +/- 5% | Gas flow rate +/- 5% | EFFICIENCY RATE +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -35 | (-31) | 297 | 75 | 87 | 119 | 1.31 | 1.68 | 2.52 | 0.63 | 0.74 |
| -30 | (-22) | 540 | 136 | 158 | 155 | 1.38 | 3.06 | 3.44 | 0.87 | 1.01 |
| -25 | (-13) | 810 | 204 | 237 | 193 | 1.48 | 4.60 | 4.18 | 1.05 | 1.23 |
| -20 | (- 4) | 1120 | 282 | 328 | 234 | 1.60 | 6.37 | 4.80 | 1.21 | 1.41 |
| -15 | (+ 5) | 1482 | 373 | 434 | 278 | 1.75 | 8.46 | 5.34 | 1.35 | 1.57 |
| -10 | (+14) | 1909 | 481 | 559 | 324 | 1.93 | 10.94 | 5.88 | 1.48 | 1.72 |
| -5 | (+23) | 2414 | 608 | 707 | 372 | 2.13 | 13.88 | 6.48 | 1.63 | 1.90 |

F - EXTERNAL CHARACTERISTICS

| | | | |
|-------------------------|-------------------------------|------|--------------------------|
| 1 Base plate | Universal EG/F/AMEM version 2 | | |
| 2 Tray holder | No | | |
| 3 Connectors | | | |
| 3.1 SUCTION | 6.5 +0.12/-0.08 | [mm] | (0.256" +0.005"/-0.003") |
| 3.1.1 Material | Copper | | |
| 3.1.2 Shape | Slanted | | |
| 3.2 DISCHARGE | 4.94 +0.08/-0.08 | [mm] | (0.194" +0.003"/-0.003") |
| 3.2.1 Material | Copper | | |
| 3.2.2 Shape | Straight | | |
| 3.3 PROCESS | 6.5 +0.12/-0.08 | [mm] | (0.256" +0.005"/-0.003") |
| 3.3.1 Material | Copper | | |
| 3.3.2 Shape | Slanted | | |
| 3.4 Oil cooler (Copper) | No | [mm] | |
| 3.5 Connector sealing | Rubber Plugs | | |