

COMPRESSOR DEFINITION

| | |
|---------------------------|------------------------|
| Designation | FMF D413UE |
| Nominal Voltage/Frequency | 230 V 53-167 Hz |
| Engineering Number | 513805015 |

A - APPLICATION / LIMIT WORKING CONDITIONS

| | | | |
|------------------------------------|---|-----------------------------------|-----------|
| 1 Type | Hermetic reciprocating compressor | | |
| 2 Refrigerant | R-290 | | |
| 3 Nominal voltage and frequency | 230 / 53-167 | [V / Hz] | |
| 4 Application type | Low-Medium Back Pressure (Light Commercial - Curves until T.Evap -4 | | |
| 4.1 Evaporating temperature range | -40°C to 0°C | (-40°F to 32°F) | |
| 5 Motor type | BPM | | |
| 6 Starting torque | LST/HST - Low/Hight starting sorque | | |
| 7 Expantion device | Capillary tube or Expansion valve | | |
| 8 Compressor cooling | | Operating voltage range | |
| | | 50 Hz | 60 Hz |
| 8.1 LBP (32°C Ambient temperature) | - | - | - |
| 8.2 LBP (43°C Ambient temperature) | - | - | - |
| 8.3 HBP (32°C Ambient temperature) | - | - | - |
| 8.4 HBP (43°C Ambient temperature) | - | - | - |
| 9 Maximum condensing temperature | | | |
| 9.1 Operating | 18.4 | [kgf/cm ²] (262 psig) | / °C - °F |
| 9.2 Peak | 20.6 | [kgf/cm ²] (293 psig) | / °C - °F |
| 10 Maximum winding temperature | 130 | [°C] | |

B - MECHANICAL DATA

| | | |
|-------------------------------|---------------|--|
| 1 Commercial designation | 1 | [hp] |
| 2 Displacement | 10.85 | [cm ³] (0.662 cu.in) |
| 2.1 Bore [mm] | 24.000 | |
| 2.2 Stroke [mm] | 24.000 | |
| 3 Lubricant charge | 430 | [ml] (14.54 fl.oz.) |
| 3.1 Lubricants approved | | |
| 3.2 Lubricants type/viscosity | ESTER / ISO10 | |
| 4 Weight (with oil charge) | 10.87 | [kg] (23.96 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 | 230 V 53-167Hz 3 ~ (Three phase) | |
| 2 Starting device type | Inverter | |
| 2.1 Starting device | CF10C01 M 0.1 X | |
| 3 Start capacitor | - | [μF(VAC minimum)] |
| 4 Run capacitor | - | [μF(VAC minimum)] |
| 5 Motor protection | CF10C01 M 0.1 XX A Y | |
| 6 Start winding resistance | 4.30 | [Ω at 25°C (77°F)] +/- 8% |
| 7 Run winding resistance | 4.30 | [Ω at 25°C (77°F)] +/- 8% |
| 8 LRA - Locked rotor amperage (50/60 Hz) | 6.50/6.50 | [A] - Measured according to UL 984 |
| 9 FLA - Full load amperage L/MBP (50/60 Hz) | 2.00 | [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 | VDE | |

D - PERFORMANCE - CHECK POINT DATA

| | | | | | | | | |
|---|----------|-----|-----------------------------|-------------------------------|--|--|-----------|-------|
| TEST CONDITIONS: @220V1600RPM | | | ASHRAELBP32 Fan | | 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] |
| 1107 | 279 | 324 | 170 | 0.91 | 3.29 | 6.52 | 1.64 | 1.91 |

| | | | | | | | | |
|---|----------|-----|-----------------------------|-------------------------------|--|--|-----------|-------|
| TEST CONDITIONS: @220V2400RPM | | | ASHRAELBP32 Fan | | 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] |
| 1640 | 413 | 481 | 249 | 1.24 | 4.88 | 6.59 | 1.66 | 1.93 |

| | | | | | | | | |
|---|----------|-----|-----------------------------|-------------------------------|--|--|-----------|-------|
| TEST CONDITIONS: @220V3000RPM | | | ASHRAELBP32 Fan | | 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] |
| 2025 | 510 | 593 | 309 | 1.50 | 6.03 | 6.55 | 1.65 | 1.92 |

| | | | | | | | | |
|---|----------|-----|-----------------------------|-------------------------------|--|--|-----------|-------|
| TEST CONDITIONS: @220V3600RPM | | | ASHRAELBP32 Fan | | 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] |
| 2435 | 614 | 714 | 377 | 1.79 | 7.25 | 6.47 | 1.63 | 1.90 |

| | | | | | | | | |
|---|----------|-----|-----------------------------|-------------------------------|--|--|-----------|-------|
| TEST CONDITIONS: @220V5000RPM | | | ASHRAELBP32 Fan | | 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] |
| 3243 | 817 | 950 | 529 | 2.48 | 9.65 | 6.13 | 1.54 | 1.80 |

E - PERFORMANCE - CURVES

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 35°C (+95°F)) | | | | | |
|-------------------------|-------|------------------|----------|-----|---------------------------------------|---------------------|---------------|-----------------|-----------|-------|
| @220V1600RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 571 | 144 | 167 | 97 | 0.59 | 1.69 | 5.89 | 1.49 | 1.73 |
| -35 | (-31) | 728 | 183 | 213 | 110 | 0.65 | 2.15 | 6.61 | 1.67 | 1.94 |
| -30 | (-22) | 909 | 229 | 266 | 123 | 0.72 | 2.70 | 7.40 | 1.87 | 2.17 |
| -25 | (-13) | 1121 | 283 | 329 | 135 | 0.77 | 3.33 | 8.30 | 2.09 | 2.43 |
| -20 | (- 4) | 1369 | 345 | 401 | 147 | 0.83 | 4.09 | 9.33 | 2.35 | 2.73 |
| -15 | (+ 5) | 1660 | 418 | 486 | 158 | 0.88 | 4.97 | 10.54 | 2.66 | 3.09 |
| -10 | (+14) | 1998 | 504 | 586 | 168 | 0.92 | 6.01 | 11.95 | 3.01 | 3.50 |
| -5 | (+23) | 2391 | 603 | 701 | 176 | 0.96 | 7.23 | 13.61 | 3.43 | 3.99 |
| 0 | (+32) | 2844 | 717 | 833 | 183 | 0.99 | 8.65 | 15.54 | 3.91 | 4.55 |

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 45°C (+113°F)) | | | | | |
|-------------------------|-------|------------------|----------|-----|--|---------------------|---------------|-----------------|-----------|-------|
| @220V1600RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 539 | 136 | 158 | 100 | 0.59 | 1.59 | 5.39 | 1.36 | 1.58 |
| -35 | (-31) | 698 | 176 | 204 | 117 | 0.69 | 2.06 | 5.95 | 1.50 | 1.74 |
| -30 | (-22) | 879 | 221 | 257 | 134 | 0.78 | 2.61 | 6.55 | 1.65 | 1.92 |
| -25 | (-13) | 1088 | 274 | 319 | 151 | 0.86 | 3.23 | 7.22 | 1.82 | 2.12 |
| -20 | (- 4) | 1331 | 335 | 390 | 166 | 0.94 | 3.97 | 8.01 | 2.02 | 2.35 |
| -15 | (+ 5) | 1615 | 407 | 473 | 180 | 1.00 | 4.84 | 8.94 | 2.25 | 2.62 |
| -10 | (+14) | 1944 | 490 | 570 | 193 | 1.05 | 5.85 | 10.06 | 2.53 | 2.95 |
| -5 | (+23) | 2326 | 586 | 681 | 204 | 1.10 | 7.03 | 11.38 | 2.87 | 3.34 |
| 0 | (+32) | 2765 | 697 | 810 | 213 | 1.12 | 8.41 | 12.96 | 3.27 | 3.80 |

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 55°C (+131°F)) | | | | | |
|-------------------------|-------|------------------|----------|-----|--|---------------------|---------------|-----------------|-----------|-------|
| @220V1600RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 489 | 123 | 143 | 102 | 0.57 | 1.44 | 4.80 | 1.21 | 1.41 |
| -35 | (-31) | 652 | 164 | 191 | 123 | 0.71 | 1.93 | 5.29 | 1.33 | 1.55 |
| -30 | (-22) | 835 | 210 | 245 | 145 | 0.84 | 2.48 | 5.79 | 1.46 | 1.70 |
| -25 | (-13) | 1044 | 263 | 306 | 165 | 0.96 | 3.11 | 6.34 | 1.60 | 1.86 |
| -20 | (- 4) | 1286 | 324 | 377 | 184 | 1.06 | 3.84 | 6.98 | 1.76 | 2.05 |
| -15 | (+ 5) | 1565 | 394 | 459 | 202 | 1.15 | 4.69 | 7.74 | 1.95 | 2.27 |
| -10 | (+14) | 1888 | 476 | 553 | 218 | 1.22 | 5.68 | 8.65 | 2.18 | 2.53 |
| -5 | (+23) | 2261 | 570 | 662 | 232 | 1.28 | 6.84 | 9.74 | 2.46 | 2.85 |
| 0 | (+32) | 2689 | 678 | 788 | 243 | 1.31 | 8.17 | 11.06 | 2.79 | 3.24 |

E - PERFORMANCE - CURVES

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 35°C (+95°F)) | | | | | |
|-------------------------|-------|------------------|----------|------|---------------------------------------|---------------------|---------------|-----------------|-----------|-------|
| @220V3000RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 1004 | 253 | 294 | 179 | 0.86 | 2.97 | 5.61 | 1.41 | 1.64 |
| -35 | (-31) | 1295 | 326 | 379 | 205 | 1.07 | 3.83 | 6.30 | 1.59 | 1.85 |
| -30 | (-22) | 1633 | 412 | 479 | 231 | 1.22 | 4.84 | 7.08 | 1.78 | 2.07 |
| -25 | (-13) | 2029 | 511 | 595 | 256 | 1.33 | 6.04 | 7.95 | 2.00 | 2.33 |
| -20 | (- 4) | 2495 | 629 | 731 | 280 | 1.41 | 7.44 | 8.93 | 2.25 | 2.62 |
| -15 | (+ 5) | 3039 | 766 | 890 | 304 | 1.48 | 9.10 | 10.02 | 2.52 | 2.93 |
| -10 | (+14) | 3673 | 925 | 1076 | 327 | 1.56 | 11.05 | 11.22 | 2.83 | 3.29 |
| -5 | (+23) | 4406 | 1110 | 1291 | 351 | 1.66 | 13.33 | 12.55 | 3.16 | 3.68 |
| 0 | (+32) | 5250 | 1323 | 1538 | 374 | 1.81 | 15.96 | 14.02 | 3.53 | 4.11 |

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 45°C (+113°F)) | | | | | |
|-------------------------|-------|------------------|----------|------|--|---------------------|---------------|-----------------|-----------|-------|
| @220V3000RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 942 | 237 | 276 | 186 | 0.95 | 2.78 | 5.07 | 1.28 | 1.49 |
| -35 | (-31) | 1236 | 311 | 362 | 218 | 1.20 | 3.66 | 5.67 | 1.43 | 1.66 |
| -30 | (-22) | 1575 | 397 | 462 | 248 | 1.38 | 4.67 | 6.32 | 1.59 | 1.85 |
| -25 | (-13) | 1970 | 496 | 577 | 279 | 1.52 | 5.86 | 7.05 | 1.78 | 2.07 |
| -20 | (- 4) | 2432 | 613 | 713 | 309 | 1.62 | 7.25 | 7.85 | 1.98 | 2.30 |
| -15 | (+ 5) | 2970 | 748 | 870 | 339 | 1.72 | 8.90 | 8.74 | 2.20 | 2.56 |
| -10 | (+14) | 3595 | 906 | 1053 | 370 | 1.82 | 10.82 | 9.71 | 2.45 | 2.85 |
| -5 | (+23) | 4318 | 1088 | 1265 | 400 | 1.94 | 13.06 | 10.79 | 2.72 | 3.16 |
| 0 | (+32) | 5149 | 1298 | 1509 | 431 | 2.11 | 15.65 | 11.97 | 3.02 | 3.51 |

| TEST CONDITIONS: | | ASHRAE32 | | | (Condensing temperature 55°C (+131°F)) | | | | | |
|-------------------------|-------|------------------|----------|------|--|---------------------|---------------|-----------------|-----------|-------|
| @220V3000RPM | | Fan | | | | | | | | |
| Evaporating temperature | | Cooling capacity | | | Power consumption | Current consumption | Gas flow rate | EFFICIENCY RATE | | |
| | | +/- 5% | | | +/- 5% | +/- 5% | +/- 5% | +/- 7% | | |
| °C | (°F) | [Btu/h] | [kcal/h] | [W] | [W] | [A] | [kg/h] | [Btu/Wh] | [kcal/Wh] | [W/W] |
| -40 | (-40) | 894 | 225 | 262 | 192 | 1.00 | 2.64 | 4.66 | 1.18 | 1.37 |
| -35 | (-31) | 1184 | 298 | 347 | 227 | 1.28 | 3.50 | 5.20 | 1.31 | 1.52 |
| -30 | (-22) | 1517 | 382 | 444 | 263 | 1.48 | 4.50 | 5.78 | 1.46 | 1.69 |
| -25 | (-13) | 1903 | 479 | 558 | 298 | 1.64 | 5.66 | 6.39 | 1.61 | 1.87 |
| -20 | (- 4) | 2353 | 593 | 689 | 334 | 1.76 | 7.02 | 7.06 | 1.78 | 2.07 |
| -15 | (+ 5) | 2878 | 725 | 843 | 370 | 1.87 | 8.62 | 7.78 | 1.96 | 2.28 |
| -10 | (+14) | 3487 | 879 | 1022 | 407 | 1.98 | 10.49 | 8.57 | 2.16 | 2.51 |
| -5 | (+23) | 4192 | 1056 | 1228 | 444 | 2.12 | 12.67 | 9.43 | 2.38 | 2.76 |
| 0 | (+32) | 5002 | 1260 | 1466 | 482 | 2.29 | 15.20 | 10.37 | 2.61 | 3.04 |

F - EXTERNAL CHARACTERISTICS

| | | | |
|-------------------------|-------------------------------|------|--------------------------|
| 1 Base plate | Universal EG/F/AMEM version 2 | | |
| 2 Tray holder | No | | |
| 3 Connectors | | | |
| 3.1 SUCTION | 8.2 +0.12/-0.08 | [mm] | (0.323" +0.005"/-0.003") |
| 3.1.1 Material | Copper | | |
| 3.1.2 Shape | Straight | | |
| 3.2 DISCHARGE | 6.5 +0.12/-0.08 | [mm] | (0.256" +0.005"/-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 | Straight | | |
| 3.4 Oil cooler (Copper) | No | [mm] | |
| 3.5 Connector sealing | Rubber Plugs | | |