

COMPRESSOR DEFINITION

Designation	FMF D413UE
Nominal Voltage/Frequency	230 V 53-167 Hz
Engineering Number	513805013

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		