

COMPRESSOR DEFINITION

Designation	FMF T213U
Nominal Voltage/Frequency	230 V 60-150 Hz
Engineering Number	513805009

A - APPLICATION / LIMIT WORKING CONDITIONS

1 Type	Hermetic reciprocating compressor		
2 Refrigerant	R-290		
3 Nominal voltage and frequency	230 / 60-150	[V / Hz]	
4 Application type	Low Back Pressure R290		
4.1 Evaporating temperature range	-40°C to -10°C	(-40°F to 14°F)	
5 Motor type	BPM		
6 Starting torque	HST - Hight starting torque		
7 Expansion device	Capillary tube or Expansion valve		
8 Compressor cooling	Operating voltage range		
		50 Hz	60 Hz
8.1 LBP (32°C Ambient temperature)	Fan	103 to 140 V	103 to 140 V
8.2 LBP (43°C Ambient temperature)	Fan	103 to 140 V	103 to 140 V
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	12.92	[cm ³] (0.788 cu.in)
2.1 Bore [mm]	28.000	
2.2 Stroke [mm]	21.000	
3 Lubricant charge	430	[ml] (14.54 fl.oz.)
3.1 Lubricants approved		
3.2 Lubricants type/viscosity	ALQUILB / ISO22	
4 Weight (with oil charge)	10.8	[kg] (23.81 lb.)
5 Nitrogen charge	0.2 to 0.3	[kgf/cm ²] (2.84 to 4.27 psig)

C - ELECTRICAL DATA

1 Nominal Voltage/Frequency/Number of Phases	230 V 60-150 Hz 3 ~ (Three phase)	
2 Starting device type	Inverter	
2.1 Starting device	CF05D01 N XX XX	
3 Start capacitor	-	[µF(VAC minimum)]
4 Run capacitor	-	[µF(VAC minimum)]
5 Motor protection	INVERTER CF05D01 N X	
6 Start winding resistance	4.60	[Ω at 25°C (77°F)] +/- 8%
7 Run winding resistance	4.60	[Ω at 25°C (77°F)] +/- 8%
8 LRA - Locked rotor amperage (50/60 Hz)	6.15	[A] - Measured according to UL 984
9 FLA - Full load amperage L/MBP (50/60 Hz)	6.15	[A] - Measured according to UL 984
10 FLA - Full Load Amperage HBP (50/60 Hz)	6.15	[A] - Measured according to UL 984
11 Approval boards certification	CE - TUV - UKCA - UL	

D - PERFORMANCE - CHECK POINT DATA

TEST CONDITIONS: @115V1800RPM			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature)		-23.3°C (-9.94°F) 54.4°C (129.92°F)	
Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
1413	356	414	223	2.90	4.21	6.33	1.60	1.85

TEST CONDITIONS: @115V2400RPM			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature)		-23.3°C (-9.94°F) 54.4°C (129.92°F)	
Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
1877	473	550	293	3.74	5.59	6.40	1.61	1.88

TEST CONDITIONS: @115V3000RPM			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature)		-23.3°C (-9.94°F) 54.4°C (129.92°F)	
Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
2365	596	693	371	4.65	7.04	6.37	1.61	1.87

TEST CONDITIONS: @115V3600RPM			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature)		-23.3°C (-9.94°F) 54.4°C (129.92°F)	
Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
2713	684	795	436	5.40	8.08	6.22	1.57	1.82

TEST CONDITIONS: @115V4500RPM			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature)		-23.3°C (-9.94°F) 54.4°C (129.92°F)	
Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
3248	818	952	539	6.53	9.67	6.03	1.52	1.77

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V1800RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[W]	[A]
-40	(-40)	646	163	189	119	1.74	1.91	5.40	1.36	1.58
-35	(-31)	820	207	240	139	2.28	2.43	5.92	1.49	1.74
-30	(-22)	1090	275	319	160	2.69	3.23	6.78	1.71	1.99
-25	(-13)	1429	360	419	181	2.98	4.25	7.87	1.98	2.30
-20	(- 4)	1813	457	531	200	3.12	5.41	9.10	2.29	2.67
-15	(+ 5)	2214	558	649	214	3.09	6.63	10.39	2.62	3.04
-10	(+14)	2607	657	764	223	2.89	7.85	11.64	2.93	3.41

TEST CONDITIONS: @115V1800RPM		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[W]	[A]
-40	(-40)	629	159	184	125	1.60	1.86	5.01	1.26	1.47
-35	(-31)	789	199	231	148	2.06	2.33	5.36	1.35	1.57
-30	(-22)	1046	264	307	173	2.46	3.10	6.01	1.51	1.76
-25	(-13)	1375	347	403	199	2.79	4.09	6.85	1.73	2.01
-20	(- 4)	1750	441	513	224	3.02	5.22	7.79	1.96	2.28
-15	(+ 5)	2144	540	628	247	3.15	6.42	8.74	2.20	2.56
-10	(+14)	2533	638	742	265	3.15	7.62	9.61	2.42	2.81

TEST CONDITIONS: @115V1800RPM		ASHRAE32 Fan			(Condensing temperature 55°C (+131°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[W]	[A]
-40	(-40)	566	143	166	129	1.61	1.67	4.38	1.10	1.28
-35	(-31)	714	180	209	154	2.02	2.11	4.69	1.18	1.37
-30	(-22)	961	242	282	183	2.41	2.85	5.25	1.32	1.54
-25	(-13)	1282	323	376	214	2.79	3.81	5.96	1.50	1.75
-20	(- 4)	1651	416	484	244	3.12	4.92	6.73	1.70	1.97
-15	(+ 5)	2041	514	598	274	3.41	6.11	7.47	1.88	2.19
-10	(+14)	2428	612	711	300	3.63	7.30	8.08	2.04	2.37

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V1800RPM		ASHRAE32 Fan			(Condensing temperature 65°C (+149°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	458	115	134	132	1.80	1.35	3.42	0.86	1.00
-35	(-31)	596	150	175	158	2.15	1.76	3.81	0.96	1.12
-30	(-22)	836	211	245	190	2.55	2.48	4.41	1.11	1.29
-25	(-13)	1151	290	337	224	2.98	3.42	5.11	1.29	1.50
-20	(- 4)	1516	382	444	260	3.43	4.52	5.84	1.47	1.71
-15	(+ 5)	1905	480	558	295	3.88	5.70	6.48	1.63	1.90
-10	(+14)	2292	578	672	329	4.32	6.89	6.96	1.75	2.04

TEST CONDITIONS: @115V3000RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	1123	283	329	207	2.63	3.32	5.37	1.35	1.57
-35	(-31)	1370	345	402	234	3.29	4.05	5.90	1.49	1.73
-30	(-22)	1764	445	517	267	3.87	5.23	6.64	1.67	1.94
-25	(-13)	2276	574	667	302	4.35	6.77	7.53	1.90	2.21
-20	(- 4)	2879	726	844	337	4.70	8.59	8.55	2.16	2.51
-15	(+ 5)	3546	894	1039	367	4.89	10.62	9.67	2.44	2.83
-10	(+14)	4250	1071	1245	390	4.90	12.79	10.85	2.73	3.18

TEST CONDITIONS: @115V3000RPM		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	1002	253	294	211	2.70	2.96	4.77	1.20	1.40
-35	(-31)	1304	329	382	248	3.33	3.86	5.28	1.33	1.55
-30	(-22)	1738	438	509	291	3.93	5.16	5.94	1.50	1.74
-25	(-13)	2278	574	667	336	4.46	6.77	6.74	1.70	1.97
-20	(- 4)	2894	729	848	379	4.91	8.64	7.62	1.92	2.23
-15	(+ 5)	3562	898	1044	417	5.25	10.67	8.57	2.16	2.51
-10	(+14)	4253	1072	1246	447	5.46	12.79	9.54	2.40	2.80

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V3000RPM		ASHRAE32 Fan			(Condensing temperature 55°C (+131°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40 (-40)	877	221	257	209	2.71	2.59	4.24	1.07	1.24	
-35 (-31)	1195	301	350	254	3.29	3.53	4.73	1.19	1.39	
-30 (-22)	1631	411	478	304	3.88	4.84	5.34	1.35	1.57	
-25 (-13)	2159	544	633	355	4.45	6.42	6.04	1.52	1.77	
-20 (- 4)	2752	693	806	404	4.98	8.21	6.80	1.71	1.99	
-15 (+ 5)	3381	852	991	447	5.45	10.13	7.58	1.91	2.22	
-10 (+14)	4021	1013	1178	481	5.83	12.09	8.35	2.11	2.45	

TEST CONDITIONS: @115V3000RPM		ASHRAE32 Fan			(Condensing temperature 65°C (+149°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40 (-40)	746	188	219	201	2.67	2.20	3.67	0.92	1.07	
-35 (-31)	1041	262	305	252	3.18	3.08	4.15	1.05	1.22	
-30 (-22)	1442	363	423	306	3.74	4.28	4.72	1.19	1.38	
-25 (-13)	1921	484	563	360	4.32	5.71	5.34	1.35	1.56	
-20 (- 4)	2451	618	718	411	4.92	7.31	5.98	1.51	1.75	
-15 (+ 5)	3005	757	880	456	5.49	9.00	6.61	1.67	1.94	
-10 (+14)	3555	896	1042	492	6.02	10.69	7.19	1.81	2.11	

TEST CONDITIONS: @115V3600RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40 (-40)	1325	334	388	250	3.12	3.92	5.25	1.32	1.54	
-35 (-31)	1557	392	456	271	3.75	4.61	5.82	1.47	1.71	
-30 (-22)	2031	512	595	312	4.46	6.02	6.54	1.65	1.92	
-25 (-13)	2683	676	786	362	5.15	7.98	7.38	1.86	2.16	
-20 (- 4)	3450	869	1011	415	5.72	10.30	8.31	2.09	2.43	
-15 (+ 5)	4270	1076	1251	460	6.07	12.79	9.30	2.34	2.72	
-10 (+14)	5078	1280	1488	491	6.08	15.28	10.33	2.60	3.03	

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V3600RPM		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature		Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1156	291	339	249	3.14	3.41	4.63	1.17	1.36
-35	(-31)	1471	371	431	287	3.75	4.35	5.16	1.30	1.51
-30	(-22)	1988	501	583	340	4.47	5.90	5.83	1.47	1.71
-25	(-13)	2645	667	775	398	5.20	7.87	6.59	1.66	1.93
-20	(- 4)	3378	851	990	454	5.84	10.08	7.43	1.87	2.18
-15	(+ 5)	4125	1039	1209	499	6.28	12.35	8.31	2.09	2.43
-10	(+14)	4822	1215	1413	525	6.42	14.50	9.20	2.32	2.70

TEST CONDITIONS: @115V3600RPM		ASHRAE32 Fan			(Condensing temperature 55°C (+131°F))					
Evaporating temperature		Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1031	260	302	249	3.39	3.04	4.17	1.05	1.22
-35	(-31)	1372	346	402	297	3.87	4.06	4.65	1.17	1.36
-30	(-22)	1876	473	550	356	4.50	5.56	5.24	1.32	1.54
-25	(-13)	2481	625	727	417	5.17	7.38	5.91	1.49	1.73
-20	(- 4)	3124	787	915	471	5.78	9.32	6.63	1.67	1.94
-15	(+ 5)	3740	943	1096	510	6.22	11.20	7.37	1.86	2.16
-10	(+14)	4268	1076	1251	525	6.39	12.84	8.10	2.04	2.37

TEST CONDITIONS: @115V3600RPM		ASHRAE32 Fan			(Condensing temperature 65°C (+149°F))					
Evaporating temperature		Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	951	240	279	250	3.86	2.81	3.78	0.95	1.11
-35	(-31)	1261	318	369	303	4.12	3.73	4.19	1.05	1.23
-30	(-22)	1695	427	497	362	4.56	5.03	4.68	1.18	1.37
-25	(-13)	2192	552	642	419	5.07	6.51	5.22	1.32	1.53
-20	(- 4)	2686	677	787	465	5.55	8.01	5.80	1.46	1.70
-15	(+ 5)	3116	785	913	491	5.89	9.33	6.39	1.61	1.87
-10	(+14)	3419	862	1002	490	5.99	10.29	6.94	1.75	2.03

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V4500RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	1606	405	471	319	3.88	4.75	5.01	1.26	1.47
-35	(-31)	1969	496	577	362	4.84	5.82	5.52	1.39	1.62
-30	(-22)	2563	646	751	417	5.72	7.60	6.15	1.55	1.80
-25	(-13)	3297	831	966	473	6.42	9.81	6.91	1.74	2.02
-20	(- 4)	4080	1028	1195	520	6.87	12.18	7.79	1.96	2.28
-15	(+ 5)	4821	1215	1413	549	6.97	14.45	8.79	2.22	2.58
-10	(+14)	5431	1369	1591	549	6.63	16.34	9.93	2.50	2.91

TEST CONDITIONS: @115V4500RPM		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	1504	379	441	329	4.09	4.44	4.52	1.14	1.32
-35	(-31)	1937	488	568	388	5.02	5.73	5.04	1.27	1.48
-30	(-22)	2539	640	744	451	5.85	7.53	5.64	1.42	1.65
-25	(-13)	3219	811	943	508	6.49	9.57	6.33	1.59	1.85
-20	(- 4)	3886	979	1139	548	6.85	11.60	7.09	1.79	2.08
-15	(+ 5)	4449	1121	1304	562	6.85	13.32	7.95	2.00	2.33
-10	(+14)	4818	1214	1412	539	6.40	14.49	8.90	2.24	2.61

TEST CONDITIONS: @115V4500RPM		ASHRAE32 Fan			(Condensing temperature 55°C (+131°F))					
Evaporating temperature	Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%			
	°C	(°F)	[Btu/h]				[kcal/h]	[W]	[Btu/Wh]	[kcal/Wh]
-40	(-40)	1296	327	380	316	3.97	3.83	4.06	1.02	1.19
-35	(-31)	1799	453	527	393	4.92	5.32	4.60	1.16	1.35
-30	(-22)	2408	607	706	466	5.75	7.14	5.17	1.30	1.51
-25	(-13)	3032	764	889	525	6.37	9.02	5.78	1.46	1.69
-20	(- 4)	3582	903	1050	559	6.69	10.69	6.44	1.62	1.89
-15	(+ 5)	3966	999	1162	558	6.64	11.87	7.15	1.80	2.10
-10	(+14)	4093	1031	1199	513	6.11	12.31	7.91	1.99	2.32

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V4500RPM		ASHRAE32 Fan			(Condensing temperature 65°C (+149°F))					
Evaporating temperature		Cooling capacity (Qe) +/- 5%			Input power (We) +/- 5%	Electric current +/- 5%	Mass flow rate +/- 5%	Efficiency EER & COP +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	983	248	288	281	3.54	2.90	3.56	0.90	1.04
-35	(-31)	1554	392	455	377	4.55	4.60	4.10	1.03	1.20
-30	(-22)	2169	547	636	461	5.42	6.43	4.65	1.17	1.36
-25	(-13)	2737	690	802	523	6.06	8.14	5.20	1.31	1.52
-20	(- 4)	3169	799	929	552	6.39	9.45	5.75	1.45	1.68
-15	(+ 5)	3372	850	988	538	6.32	10.09	6.31	1.59	1.85
-10	(+14)	3257	821	954	472	5.76	9.80	6.89	1.74	2.02

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		