

COMPRESSOR DEFINITION

Designation	FMF T415U
Nominal Voltage/Frequency	230 V 53-167 Hz
Engineering Number	513805006

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 -		
4.1 Evaporating temperature range	-40°C to 0°C	(-40°F to 32°F)	
5 Motor type	BPM		
6 Starting torque	LST/HST - Low/High 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)	-	-	-
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 1/4	[hp]
2 Displacement	14.77	[cm ³] (0.901 cu.in)
2.1 Bore [mm]	28.000	
2.2 Stroke [mm]	24.000	
3 Lubricant charge	430	[ml] (14.54 fl.oz.)
3.1 Lubricants approved		
3.2 Lubricants type/viscosity	ALQUILB / ISO22	
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 - ELECTRICAL DATA

1 Nominal Voltage/Frequency/Number of Phases	230 V 53-167Hz 3 ~ (Three phase)	
2 Starting device type	Inverter	
2.1 Starting device	CF10B01 N 0.1 X	
3 Start capacitor	-	[µF(VAC minimum)]
4 Run capacitor	-	[µF(VAC minimum)]
5 Motor protection	CF10B01 N 0.1 XX A Y	
6 Start winding resistance	3.79	[Ω at 25°C (77°F)] +/- 8%
7 Run winding resistance	3.79	[Ω at 25°C (77°F)] +/- 8%
8 LRA - Locked rotor amperage (50/60 Hz)	7.00/7.00	[A] - Measured according to UL 984
9 FLA - Full load amperage L/MBP (50/60 Hz)	3.40/3.40	[A] - Measured according to UL 984
10 FLA - Full Load Amperage HBP (50/60 Hz)	3.40/3.40	[A] - Measured according to UL 984
11 Approval boards certification	CE - UKCA - UL - VDE	

D - PERFORMANCE - CHECK POINT DATA

TEST CONDITIONS: @115V1600RPM			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]
1564	394	458	259	3.32	4.66	6.04	1.52	1.77

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]
2238	564	656	364	4.53	6.66	6.15	1.55	1.80

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]
2765	697	810	449	5.59	8.23	6.16	1.55	1.81

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]
3286	828	963	546	6.47	9.78	6.02	1.52	1.76

TEST CONDITIONS: @115V5000RPM			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]
4307	1085	1262	764	8.92	12.82	5.64	1.42	1.65

E - PERFORMANCE - CURVES

TEST CONDITIONS: @115V1600RPM		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]
-40	(-40)	760	192	223	133	1.10	2.24	5.71	1.44	1.67
-35	(-31)	998	251	292	158	1.34	2.95	6.31	1.59	1.85
-30	(-22)	1257	317	368	180	1.55	3.73	6.98	1.76	2.05
-25	(-13)	1550	391	454	201	1.72	4.61	7.75	1.95	2.27
-20	(- 4)	1889	476	553	220	1.88	5.64	8.63	2.17	2.53
-15	(+ 5)	2287	576	670	237	2.02	6.85	9.66	2.43	2.83
-10	(+14)	2757	695	808	254	2.15	8.30	10.86	2.74	3.18
-5	(+23)	3311	834	970	270	2.27	10.02	12.26	3.09	3.59
0	(+32)	3961	998	1161	285	2.39	12.04	13.88	3.50	4.07

TEST CONDITIONS: @115V1600RPM		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]
-40	(-40)	702	177	206	138	1.24	2.07	5.13	1.29	1.50
-35	(-31)	947	239	278	167	1.47	2.80	5.64	1.42	1.65
-30	(-22)	1208	304	354	196	1.68	3.58	6.16	1.55	1.80
-25	(-13)	1497	377	439	222	1.87	4.45	6.72	1.69	1.97
-20	(- 4)	1827	460	535	248	2.06	5.45	7.35	1.85	2.15
-15	(+ 5)	2211	557	648	273	2.24	6.62	8.07	2.03	2.36
-10	(+14)	2661	671	780	297	2.43	8.01	8.91	2.25	2.61
-5	(+23)	3190	804	935	322	2.63	9.65	9.90	2.49	2.90
0	(+32)	3810	960	1116	346	2.84	11.58	11.06	2.79	3.24

TEST CONDITIONS: @115V1600RPM		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]
-40	(-40)	660	166	193	144	1.27	1.95	4.59	1.16	1.35
-35	(-31)	916	231	269	179	1.51	2.71	5.09	1.28	1.49
-30	(-22)	1184	298	347	214	1.74	3.51	5.54	1.40	1.62
-25	(-13)	1474	371	432	248	1.97	4.38	5.98	1.51	1.75
-20	(- 4)	1800	454	527	281	2.21	5.37	6.44	1.62	1.89
-15	(+ 5)	2174	548	637	314	2.46	6.51	6.94	1.75	2.03
-10	(+14)	2609	657	765	347	2.72	7.85	7.51	1.89	2.20
-5	(+23)	3118	786	914	381	3.02	9.43	8.17	2.06	2.39
0	(+32)	3712	935	1088	415	3.34	11.28	8.95	2.25	2.62

E - PERFORMANCE - CURVES

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]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1354	341	397	251	1.99	4.00	5.38	1.36	1.58
-35	(-31)	1737	438	509	289	2.33	5.14	6.00	1.51	1.76
-30	(-22)	2184	550	640	328	2.63	6.48	6.67	1.68	1.95
-25	(-13)	2709	683	794	367	2.92	8.06	7.39	1.86	2.17
-20	(- 4)	3326	838	975	407	3.20	9.92	8.19	2.06	2.40
-15	(+ 5)	4049	1020	1187	447	3.49	12.13	9.07	2.28	2.66
-10	(+14)	4892	1233	1433	487	3.79	14.72	10.05	2.53	2.94
-5	(+23)	5868	1479	1720	526	4.10	17.75	11.15	2.81	3.27
0	(+32)	6992	1762	2049	564	4.45	21.26	12.38	3.12	3.63

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]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1245	314	365	253	2.16	3.67	4.94	1.24	1.45
-35	(-31)	1643	414	482	298	2.51	4.86	5.50	1.38	1.61
-30	(-22)	2100	529	615	345	2.84	6.23	6.07	1.53	1.78
-25	(-13)	2630	663	771	393	3.16	7.82	6.68	1.68	1.96
-20	(- 4)	3246	818	951	441	3.48	9.68	7.35	1.85	2.15
-15	(+ 5)	3962	998	1161	490	3.80	11.87	8.07	2.03	2.37
-10	(+14)	4791	1207	1404	539	4.13	14.42	8.88	2.24	2.60
-5	(+23)	5749	1449	1685	587	4.49	17.39	9.78	2.46	2.87
0	(+32)	6848	1726	2007	636	4.88	20.82	10.79	2.72	3.16

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)	1174	296	344	261	2.14	3.47	4.51	1.14	1.32
-35	(-31)	1573	396	461	313	2.55	4.65	5.01	1.26	1.47
-30	(-22)	2024	510	593	368	2.94	6.00	5.51	1.39	1.61
-25	(-13)	2542	641	745	424	3.33	7.56	6.02	1.52	1.76
-20	(- 4)	3141	792	920	480	3.71	9.37	6.56	1.65	1.92
-15	(+ 5)	3834	966	1123	538	4.10	11.48	7.14	1.80	2.09
-10	(+14)	4635	1168	1358	596	4.51	13.94	7.78	1.96	2.28
-5	(+23)	5558	1401	1629	654	4.95	16.81	8.49	2.14	2.49
0	(+32)	6617	1667	1939	712	5.42	20.11	9.28	2.34	2.72

E - PERFORMANCE - CURVES

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 35°C (+95°F))					
@115V3600RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 5%	+/- 5%	+/- 7%	
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	1619	408	474	305	2.36	4.78	5.31	1.34	1.56	
-35 (-31)	2045	515	599	345	2.74	6.05	5.94	1.50	1.74	
-30 (-22)	2572	648	754	392	3.12	7.63	6.56	1.65	1.92	
-25 (-13)	3206	808	939	445	3.51	9.53	7.21	1.82	2.11	
-20 (- 4)	3954	996	1159	501	3.90	11.80	7.89	1.99	2.31	
-15 (+ 5)	4823	1215	1413	560	4.30	14.45	8.62	2.17	2.53	
-10 (+14)	5819	1466	1705	618	4.71	17.52	9.42	2.38	2.76	
-5 (+23)	6950	1751	2036	674	5.14	21.02	10.31	2.60	3.02	
0 (+32)	8221	2072	2409	727	5.58	25.00	11.31	2.85	3.31	

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 45°C (+113°F))					
@115V3600RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 5%	+/- 5%	+/- 7%	
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	1503	379	440	308	2.58	4.44	4.88	1.23	1.43	
-35 (-31)	1944	490	570	358	3.00	5.75	5.42	1.37	1.59	
-30 (-22)	2480	625	727	416	3.41	7.35	5.96	1.50	1.75	
-25 (-13)	3117	785	913	478	3.82	9.27	6.51	1.64	1.91	
-20 (- 4)	3862	973	1132	544	4.24	11.52	7.09	1.79	2.08	
-15 (+ 5)	4722	1190	1384	611	4.66	14.14	7.72	1.95	2.26	
-10 (+14)	5703	1437	1671	678	5.09	17.16	8.41	2.12	2.46	
-5 (+23)	6813	1717	1996	743	5.54	20.60	9.17	2.31	2.69	
0 (+32)	8058	2031	2361	804	6.00	24.49	10.03	2.53	2.94	

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 55°C (+131°F))					
@115V3600RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 5%	+/- 5%	+/- 7%	
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	1389	350	407	307	2.48	4.10	4.52	1.14	1.32	
-35 (-31)	1835	462	538	367	2.97	5.43	5.00	1.26	1.47	
-30 (-22)	2370	597	695	434	3.45	7.03	5.47	1.38	1.60	
-25 (-13)	3001	756	879	505	3.94	8.92	5.95	1.50	1.74	
-20 (- 4)	3733	941	1094	580	4.42	11.14	6.44	1.62	1.89	
-15 (+ 5)	4575	1153	1341	656	4.91	13.70	6.97	1.76	2.04	
-10 (+14)	5532	1394	1621	731	5.41	16.64	7.56	1.91	2.22	
-5 (+23)	6611	1666	1937	804	5.92	19.99	8.22	2.07	2.41	
0 (+32)	7820	1971	2291	873	6.44	23.77	8.96	2.26	2.63	

E - PERFORMANCE - CURVES

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 35°C (+95°F))					
@115V5000RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 7%			
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	2004	505	587	425	3.08	5.92	4.76	1.20	1.40	
-35 (-31)	2735	689	801	479	3.89	8.09	5.66	1.43	1.66	
-30 (-22)	3536	891	1036	563	4.60	10.48	6.23	1.57	1.82	
-25 (-13)	4386	1105	1285	660	5.19	13.04	6.61	1.66	1.94	
-20 (- 4)	5265	1327	1543	754	5.67	15.71	6.95	1.75	2.04	
-15 (+ 5)	6151	1550	1802	828	6.04	18.43	7.42	1.87	2.18	
-10 (+14)	7025	1770	2058	867	6.29	21.14	8.17	2.06	2.39	
-5 (+23)	7864	1982	2304	854	6.42	23.78	9.35	2.36	2.74	
0 (+32)	8649	2180	2534	772	6.42	26.30	11.11	2.80	3.25	

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 45°C (+113°F))					
@115V5000RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 7%			
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	2012	507	590	441	3.39	5.94	4.55	1.15	1.33	
-35 (-31)	2702	681	792	503	4.19	7.99	5.38	1.36	1.58	
-30 (-22)	3461	872	1014	593	4.87	10.26	5.87	1.48	1.72	
-25 (-13)	4269	1076	1251	695	5.45	12.70	6.16	1.55	1.81	
-20 (- 4)	5106	1287	1496	794	5.92	15.24	6.41	1.62	1.88	
-15 (+ 5)	5950	1499	1743	873	6.27	17.83	6.77	1.71	1.98	
-10 (+14)	6781	1709	1987	915	6.51	20.40	7.39	1.86	2.17	
-5 (+23)	7578	1910	2221	905	6.63	22.91	8.44	2.13	2.47	
0 (+32)	8320	2097	2438	825	6.62	25.29	10.05	2.53	2.94	

TEST CONDITIONS:		ASHRAE32			(Condensing temperature 55°C (+131°F))					
@115V5000RPM		Fan								
Evaporating temperature	Cooling capacity (Qe)			Input power (We)	Electric current	Mass flow rate	Efficiency EER & COP			
	+/- 5%						+/- 7%			
°C (°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]	
-40 (-40)	1886	475	553	452	3.37	5.57	4.11	1.04	1.20	
-35 (-31)	2510	633	736	521	4.15	7.42	4.89	1.23	1.43	
-30 (-22)	3205	808	939	617	4.82	9.50	5.30	1.34	1.55	
-25 (-13)	3948	995	1157	726	5.38	11.74	5.51	1.39	1.62	
-20 (- 4)	4720	1189	1383	829	5.84	14.08	5.67	1.43	1.66	
-15 (+ 5)	5499	1386	1611	912	6.18	16.47	5.93	1.49	1.74	
-10 (+14)	6264	1579	1836	958	6.41	18.84	6.44	1.62	1.89	
-5 (+23)	6996	1763	2050	950	6.53	21.15	7.35	1.85	2.15	
0 (+32)	7672	1933	2248	873	6.52	23.32	8.83	2.22	2.59	

F - EXTERNAL CHARACTERISTICS

1 Base plate	Japanese Standard		
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		