

### COMPRESSOR DEFINITION

Designation	<b>F F110HAK</b>
Nominal Voltage/Frequency	<b>220-230 V 50-60 Hz</b>
Engineering Number	<b>513200809</b>

### 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	198 to 244 V	198 to 244 V
8.2 LBP (43°C Ambient temperature)	Static/Fan	198 to 244 V	198 to 244 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 <sup>2</sup> ] (202 psig)	/ °C - °F
9.2 Peak	15.9	[kgf/cm <sup>2</sup> ] (226 psig)	/ °C - °F
10 Maximum winding temperature	130	[ °C ]	

### B - MECHANICAL DATA

1 Commercial designation	1/3	[hp]
2 Displacement	9.04	[cm <sup>3</sup> ] (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)	11.42	[kg] (25.18 lb.)
5 Nitrogen charge	0.2 to 0.3	[kgf/cm <sup>2</sup> ] (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	CP4TMF210L61A2	
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	CCC - IRAM - VDE	

### 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]	[W/W]
-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]	[W/W]
-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]	[W/W]
-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	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		