

### COMPRESSOR DEFINITION

Designation	<b>VES A5U</b>
Nominal Voltage/Frequency	<b>230 V 53-133 Hz</b>
Engineering Number	<b>513907433</b>

### A - APPLICATION / LIMIT WORKING CONDITIONS

1 Type	Hermetic reciprocating compressor		
2 Refrigerant	R-290		
3 Nominal voltage and frequency	230 / 53-133	[ 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	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)	Fan	198 to 255 V	198 to 255 V
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 <sup>2</sup> ] (262 psig)	/ °C - °F
9.2 Peak	20.6	[kgf/cm <sup>2</sup> ] (293 psig)	/ °C - °F
10 Maximum winding temperature	130	[ °C ]	

### B - MECHANICAL DATA

1 Commercial designation	1/5	[hp]
2 Displacement	5.19	[cm <sup>3</sup> ] (0.317 cu.in)
2.1 Bore [mm]	21.000	
2.2 Stroke [mm]	15.000	
3 Lubricant charge	200	[ml] (6.76 fl.oz.)
3.1 Lubricants approved		
3.2 Lubricants type/viscosity	ESTER / ISO22	
4 Weight (with oil charge)	5.8	[kg] (12.79 lb.)
5 Nitrogen charge	-	[kgf/cm <sup>2</sup> ]

### C - ELETRICAL DATA

1 Nominal Voltage/Frequency/Number of Phases	230 V 53-133 Hz 3 ~ (Three phase)	
2 Starting device type	Inverter	
2.1 Starting device	VES 2456 XX X X	
3 Start capacitor	-	[μF(VAC minimum)]
4 Run capacitor	-	[μF(VAC minimum)]
5 Motor protection	INVERTER VESF 2456 X	
6 Start winding resistance	11.50	[Ω at 25°C (77°F)] +/- 8%
7 Run winding resistance	11.50	[Ω at 25°C (77°F)] +/- 8%
8 LRA - Locked rotor amperage (40/150 Hz)	2.10/2.10	[A] - Measured according to UL 984
9 FLA - Full load amperage L/MBP (40/150 Hz)	2.10/2.10	[A] - Measured according to UL 984
10 FLA - Full Load Amperage HBP (40/150 Hz)	-	[A] - Measured according to UL 984
11 Approval boards certification	CCC	

### D - PERFORMANCE - CHECK POINT DATA

TEST CONDITIONS: @220V2000RPM			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]
530	134	155	99	0.84	1.58	5.35	1.35	1.57

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]
825	208	242	147	1.09	2.46	5.61	1.41	1.64

### E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V1600RPM			ASHRAE32 Fan		(Condensing temperature 35°C (+95°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]
-40	(-40)	208	52	61	42	0.32	0.61	5.00	1.26	1.46
-35	(-31)	273	69	80	51	0.41	0.81	5.39	1.36	1.58
-30	(-22)	347	87	102	59	0.48	1.03	5.91	1.49	1.73
-25	(-13)	436	110	128	66	0.53	1.30	6.61	1.66	1.94
-20	(- 4)	545	137	160	72	0.57	1.63	7.53	1.90	2.21
-15	(+ 5)	682	172	200	78	0.61	2.04	8.75	2.20	2.56
-10	(+14)	852	215	250	83	0.64	2.56	10.31	2.60	3.02

TEST CONDITIONS: @220V1600RPM			ASHRAE32 Fan		(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]
-40	(-40)	182	46	53	45	0.35	0.54	4.16	1.05	1.22
-35	(-31)	250	63	73	54	0.43	0.74	4.69	1.18	1.37
-30	(-22)	325	82	95	62	0.50	0.96	5.21	1.31	1.53
-25	(-13)	412	104	121	71	0.56	1.23	5.77	1.46	1.69
-20	(- 4)	519	131	152	80	0.62	1.55	6.45	1.62	1.89
-15	(+ 5)	650	164	190	89	0.68	1.95	7.28	1.83	2.13
-10	(+14)	813	205	238	97	0.75	2.45	8.32	2.10	2.44

### E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V1600RPM		ASHRAE32 Fan			(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]
-40	(-40)	117	29	34	44	0.36	0.34	2.77	0.70	0.81
-35	(-31)	196	49	57	54	0.44	0.58	3.59	0.91	1.05
-30	(-22)	280	71	82	65	0.52	0.83	4.28	1.08	1.25
-25	(-13)	375	95	110	77	0.60	1.12	4.88	1.23	1.43
-20	(- 4)	487	123	143	90	0.68	1.45	5.45	1.37	1.60
-15	(+ 5)	622	157	182	103	0.78	1.86	6.06	1.53	1.78
-10	(+14)	786	198	230	116	0.89	2.37	6.75	1.70	1.98

TEST CONDITIONS: @220V2000RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°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]
-40	(-40)	267	67	78	54	0.42	0.79	4.92	1.24	1.44
-35	(-31)	343	86	101	63	0.50	1.02	5.46	1.38	1.60
-30	(-22)	437	110	128	72	0.57	1.30	6.09	1.53	1.78
-25	(-13)	551	139	161	80	0.63	1.64	6.85	1.72	2.01
-20	(- 4)	686	173	201	89	0.68	2.05	7.76	1.96	2.27
-15	(+ 5)	845	213	248	96	0.73	2.53	8.87	2.24	2.60
-10	(+14)	1031	260	302	101	0.78	3.10	10.21	2.57	2.99

TEST CONDITIONS: @220V2000RPM		ASHRAE32 Fan			(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]
-40	(-40)	231	58	68	55	0.43	0.68	4.26	1.07	1.25
-35	(-31)	315	79	92	65	0.52	0.93	4.84	1.22	1.42
-30	(-22)	416	105	122	76	0.60	1.23	5.45	1.37	1.60
-25	(-13)	537	135	157	87	0.68	1.60	6.12	1.54	1.79
-20	(- 4)	681	172	199	98	0.75	2.03	6.88	1.73	2.02
-15	(+ 5)	848	214	248	109	0.83	2.54	7.76	1.96	2.28
-10	(+14)	1042	262	305	118	0.91	3.13	8.81	2.22	2.58

### E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V2000RPM		ASHRAE32 Fan			(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]
-40	(-40)	190	48	56	54	0.42	0.56	3.41	0.86	1.00
-35	(-31)	269	68	79	66	0.52	0.80	4.04	1.02	1.18
-30	(-22)	366	92	107	80	0.62	1.09	4.62	1.16	1.35
-25	(-13)	483	122	142	93	0.71	1.44	5.20	1.31	1.52
-20	(- 4)	622	157	182	108	0.81	1.85	5.80	1.46	1.70
-15	(+ 5)	785	198	230	121	0.91	2.35	6.46	1.63	1.89
-10	(+14)	975	246	286	135	1.02	2.93	7.22	1.82	2.11

TEST CONDITIONS: @220V3000RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°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]
-40	(-40)	450	113	132	84	0.68	1.33	5.08	1.28	1.49
-35	(-31)	511	129	150	95	0.74	1.51	5.39	1.36	1.58
-30	(-22)	639	161	187	107	0.82	1.90	6.02	1.52	1.76
-25	(-13)	827	208	242	120	0.92	2.46	6.93	1.75	2.03
-20	(- 4)	1068	269	313	132	1.02	3.19	8.08	2.04	2.37
-15	(+ 5)	1356	342	397	144	1.11	4.06	9.44	2.38	2.77
-10	(+14)	1684	424	493	154	1.19	5.07	10.96	2.76	3.21

TEST CONDITIONS: @220V3000RPM		ASHRAE32 Fan			(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]
-40	(-40)	430	108	126	85	0.69	1.27	4.84	1.22	1.42
-35	(-31)	498	125	146	99	0.77	1.47	5.06	1.28	1.48
-30	(-22)	626	158	183	114	0.88	1.86	5.54	1.40	1.62
-25	(-13)	808	204	237	129	1.00	2.40	6.24	1.57	1.83
-20	(- 4)	1037	261	304	145	1.13	3.09	7.11	1.79	2.08
-15	(+ 5)	1307	329	383	161	1.25	3.91	8.12	2.05	2.38
-10	(+14)	1611	406	472	175	1.37	4.85	9.22	2.32	2.70

### E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V3000RPM		ASHRAE32 Fan			(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]
-40	(-40)	379	96	111	85	0.67	1.12	4.21	1.06	1.23
-35	(-31)	453	114	133	101	0.77	1.34	4.47	1.13	1.31
-30	(-22)	581	146	170	119	0.90	1.72	4.92	1.24	1.44
-25	(-13)	757	191	222	137	1.04	2.25	5.52	1.39	1.62
-20	(- 4)	975	246	286	156	1.20	2.91	6.23	1.57	1.82
-15	(+ 5)	1227	309	360	176	1.37	3.67	7.00	1.76	2.05
-10	(+14)	1508	380	442	194	1.53	4.54	7.80	1.96	2.28

TEST CONDITIONS: @220V4000RPM		ASHRAE32 Fan			(Condensing temperature 35°C (+95°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]
-40	(-40)	635	160	186	123	1.00	1.88	4.79	1.21	1.40
-35	(-31)	699	176	205	129	1.00	2.07	5.44	1.37	1.59
-30	(-22)	874	220	256	144	1.11	2.59	6.14	1.55	1.80
-25	(-13)	1139	287	334	165	1.29	3.39	6.90	1.74	2.02
-20	(- 4)	1475	372	432	189	1.50	4.40	7.76	1.95	2.27
-15	(+ 5)	1860	469	545	213	1.70	5.57	8.72	2.20	2.56
-10	(+14)	2274	573	666	232	1.84	6.84	9.81	2.47	2.88

TEST CONDITIONS: @220V4000RPM		ASHRAE32 Fan			(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]
-40	(-40)	593	149	174	126	1.08	1.75	4.35	1.10	1.27
-35	(-31)	677	171	198	135	1.09	2.00	4.98	1.25	1.46
-30	(-22)	854	215	250	153	1.20	2.53	5.64	1.42	1.65
-25	(-13)	1103	278	323	174	1.36	3.28	6.35	1.60	1.86
-20	(- 4)	1403	354	411	197	1.54	4.19	7.13	1.80	2.09
-15	(+ 5)	1735	437	508	217	1.70	5.20	8.01	2.02	2.35
-10	(+14)	2077	524	609	232	1.79	6.25	9.00	2.27	2.64

### E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V4000RPM		ASHRAE32 Fan			(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]
-40	(-40)	466	117	137	114	0.95	1.37	3.90	0.98	1.14
-35	(-31)	585	147	171	133	1.02	1.73	4.43	1.12	1.30
-30	(-22)	778	196	228	157	1.19	2.31	4.98	1.25	1.46
-25	(-13)	1025	258	300	183	1.40	3.05	5.56	1.40	1.63
-20	(- 4)	1305	329	382	209	1.61	3.89	6.20	1.56	1.82
-15	(+ 5)	1598	403	468	231	1.79	4.78	6.92	1.74	2.03
-10	(+14)	1883	475	552	244	1.90	5.66	7.74	1.95	2.27

### F - EXTERNAL CHARACTERISTICS

1 Base plate	European Standard VES		
2 Tray holder	No		
3 Connectors			
3.1 SUCTION	6.2 +0.05/+0.05	[mm]	(0.244" +0.002"/+0.002")
3.1.1 Material	Copper		
3.1.2 Shape	Slanted 63° up + 5° to Front		
3.2 DISCHARGE	4.9 +0.10/-0.05	[mm]	(0.193" +0.004"/-0.002")
3.2.1 Material	Copper		
3.2.2 Shape	Slanted 30° up + 24° to Back		
3.3 PROCESS	6.2 +0.05/+0.05	[mm]	(0.244" +0.002"/+0.002")
3.3.1 Material	Copper		
3.3.2 Shape	Slanted 47° up + 59° to Back		
3.4 Oil cooler (Copper)	No	[mm]	
3.5 Connector sealing	Rubber Plugs		