VTC1424U-MD5C

VARIABLE SPEED COMPRESSOR

250V / 83-150Hz / R-290

GENERAL DATA	
Compressor Model	VTC1424U-MD5C
Compressor Drawing - Universal Mounting Brackets	DCVTC052
Dual Voltage Inverter (TAL™)[1]	030F0228
Inverter Drawing	DGMX0086
Wiring Diagram	DEMX0056

1 Usage with 030F0228 approved under IEC 60335-1 Ed. 5 and IEC 60335-2-34 Ed. 5.2 with Annex AA and locked rotor.

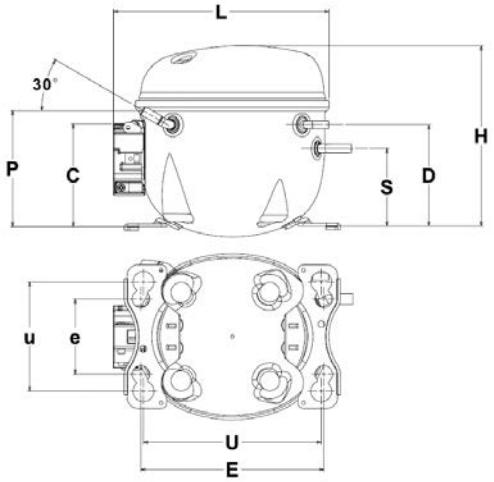
APPLICATION DATA	
Application (Commercial Reference)	LBP (1/2 – 3/4 hp)
Speed Range	2500 – 4500 rpm
Cooling Capacity Range[2]	1818 – 3126 BTU/h
Maximum Efficiency[2]	5.37 BTU/Wh
Refrigerant	R-290
Evaporator Temperature Range[3]	-40°C to -15°C (-40°F to +5°F)
Speed Range	2500 – 4500 rpm
Starting Torque[3]	Low Starting Torque (LST)
Cooling System	Fan Cooling (3 m/s)
Expansion Device[3]	Capillary Tube

2 Data for ASHRAE32 condition.

3 Compressor must be used in refrigeration systems with capillary tube only. See Section "Compressor Envelope Operation" for additional information.

DESIGN INFORMATION	
Displacement	12.47 cm^3 (0.76 in^3)
Oil Type / Quantity	170 ml / POE 32 cSt
Compressor Weight	7.45 kg
Motor Technology	PMSM

COMPRESSOR DIMENSIONS[4]



4 Drawing only for reference. Other options may be available. Universal mounting brackets

Dimension	mm	in
L	200	7.88
H	167	6.59
C	95.6	3.76
P	108	4.25
D	94	3.70
S	72	2.84
E	170	6.69
e	70	2.76
U	165	6.50
u	101.6	4.00

Process tube

I.D.:6.50±0.50mm – Depth: 16.0±1.0mm – Copper

Discharge tube

I.D.:4.97±0.50mm – Depth: 16.0±1.0mm – Copper

Suction tube

I.D.:6.50±0.50mm – Depth: 16.0±1.0mm – Copper

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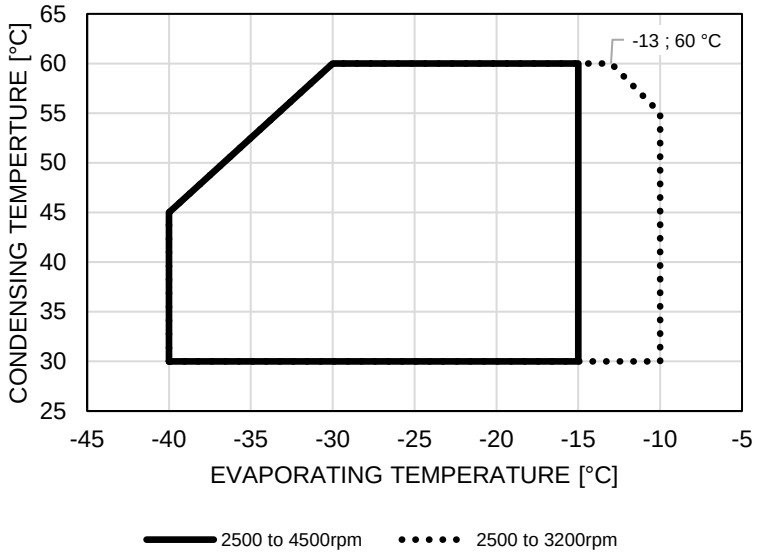
THE VARIABLE SPEED COMPRESSOR CAN NOT BE CONNECTED DIRECTLY TO THE MAINS.
THE COMPRESSOR MUST BE USED WITH THE APPROPRIATE TECUMSEH VARIABLE SPEED INVERTER.

COMPRESSOR OPERATING ENVELOPE



Notes: High and low-side pressures must be self-equalized to start the compressor properly (135 / 135 PSIA maximum).

COMPRESSOR PERFORMANCE

ASHRAE32 (1)(2) – 220V / 60Hz (030F0228 CONTROLLER)

	COND. TEMP.		EVAP. TEMP.		COOLING CAPACITY		POWER	CURRENT	EFFICIENCY	
RPM	**°C**	**(°F)**	**°C**	**(°F)**	**BTU/h**	**(W)**	**W**	**A**	**EER**	**(COP)**
2500	54.4	(130)	-23.3	(-10)	1818	(533)	346.7	2.85	5.24	(1.54)
3000	54.4	(130)	-23.3	(-10)	2184	(640)	406.3	3.32	5.37	(1.58)
3600	54.4	(130)	-23.3	(-10)	2505	(734)	468.5	3.71	5.35	(1.57)
4000	54.4	(130)	-23.3	(-10)	2674	(784)	505.2	4.02	5.29	(1.55)
4500	54.4	(130)	-23.3	(-10)	3126	(916)	604.3	4.57	5.17	(1.52)

(1) Test condition with Ambient: 32.2°C (90°F); Return Gas: 32.2°C (90°F); Liquid: 32.2°C (90°F).
(2) Tolerance for cooling capacity, input current and input power are ±5%. Tolerance for efficiency is ±7%.

EN12900 (1)(2) – 220V / 50Hz (030F0228 CONTROLLER)

	COND. TEMP.		EVAP. TEMP.		COOLING CAPACITY		POWER	CURRENT	EFFICIENCY	
RPM	**°C**	**(°F)**	**°C**	**(°F)**	**BTU/h**	**(W)**	**W**	**A**	**EER**	**(COP)**
2500	40	(104)	-35	(-31)	968	(284)	207.5	1.74	4.67	(1.37)
3000	40	(104)	-35	(-31)	1155	(339)	247.8	2.00	4.66	(1.37)
3600	40	(104)	-35	(-31)	1377	(404)	300.9	2.38	4.58	(1.34)
4000	40	(104)	-35	(-31)	1486	(436)	331.4	2.68	4.48	(1.31)
4500	40	(104)	-35	(-31)	1624	(476)	375.0	2.95	4.33	(1.27)

(1) Test condition with Ambient: 32°C (90°F); Return Gas: 20°C (68°F); Subcooling: 0 K.
(2) Tolerance for cooling capacity, input current and input power are ±5%. Tolerance for efficiency is ±7%.

APPLICATION CONDITION 1 (1)(2) – 220V / 60Hz (030F0228 CONTROLLER)

	COND. TEMP.		EVAP. TEMP.		COOLING CAPACITY		POWER	CURRENT	EFFICIENCY	
RPM	**°C**	**(°F)**	**°C**	**(°F)**	**BTU/h**	**(W)**	**W**	**A**	**EER**	**(COP)**
2500	35	(95)	-25	(-13)	1920	(562)	287.7	2.49	6.67	(1.95)
3000	35	(95)	-25	(-13)	2223	(651)	334.0	2.87	6.66	(1.95)
3600	35	(95)	-25	(-13)	2553	(748)	390.0	3.34	6.55	(1.92)
4000	35	(95)	-25	(-13)	2767	(810)	427.6	3.65	6.47	(1.89)
4500	35	(95)	-25	(-13)	3041	(890)	474.9	4.04	6.40	(1.87)

(1) Test condition with Ambient: 32.2°C (90°F); Return Gas: 32.2°C (90°F); Liquid: 32.2°C (90°F).
(2) Tolerance for cooling capacity, input current and input power are ±5%. Tolerance for efficiency is ±7%.

VTC1424U-MD5C

ASHRAE32 PERFORMANCE CURVE COEFFICIENTS – 030F0228				
COEFFICIENT	**COOLING CAPACITY**	**POWER**	**CURRENT**	**MASS FLOW**
C_n	**BTU/h**	**W**	**A**	**lb/h**
C_1	9.763944215119E+03	2.388841243610E+03	1.983072389412E+01	7.608921659132E+01
C_2	1.522718258886E+00	-2.213684113049E-01	-1.804624266242E-03	1.028316122142E-02
C_3	-5.986039356991E-05	4.004889363139E-05	3.326048992904E-07	-4.210097855362E-07
C_4	2.273011185067E-08	1.164104586418E-15	-2.892739188049E-13	1.514911946153E-10
C_5	1.328749809898E+02	2.173095327755E+01	1.790050790951E-01	8.990188178577E-01
C_6	2.139503894157E+00	1.521347515997E-01	1.262821767936E-03	1.626671363724E-02
C_7	3.058653928141E-02	1.875180992415E-03	1.546910101313E-05	2.452435668200E-04
C_8	-5.569562819805E+02	-1.371155956611E+02	-1.134232047130E+00	-4.404115635465E+00
C_9	1.079302645329E+01	2.839034391571E+00	2.351399499580E-02	8.630547471785E-02
C_{10}	-7.270319278063E-02	-1.918915453227E-02	-1.590737783761E-04	-5.818811415679E-04
C_{11}	9.961079728669E-04	3.954582147756E-04	3.254549724330E-06	5.944519446466E-06
C_{12}	-1.625604625281E-07	-2.374867930839E-08	-1.988781320825E-10	-1.064578182266E-09
C_{13}	-3.498532342716E-06	1.107642044426E-06	8.950511072557E-09	-3.359951673962E-08
C_{14}	-3.078503147957E-06	-1.903803803383E-06	-1.559389962123E-08	-1.906533577192E-08
C_{15}	1.480662457561E-02	-1.434889841437E-02	-1.181911590820E-04	1.356451690029E-04
C_{16}	2.395945835178E-02	8.140818267407E-03	6.673177819927E-05	1.610060219797E-04
C_{17}	-2.100882618106E+00	-5.218112256989E-01	-4.270297627272E-03	-1.328431652200E-02
C_{18}	9.470646621162E-06	1.858922482432E-06	1.538509179551E-08	6.204831321951E-08
C_{19}	8.869191431740E-04	-1.313178190715E-05	-1.077192077511E-07	6.524666774650E-06
C_{20}	-2.959794086274E-06	-3.913487756362E-07	-3.293118628536E-09	-1.934711188042E-08
C_{21}	-1.496102521656E-04	-5.027756225129E-05	-4.097117457663E-07	-1.060240312767E-06
C_{22}	-1.228209156960E-02	-3.123717718267E-03	-2.569174938348E-05	-7.005696772788E-05
C_{23}	2.471081907061E-03	3.087063934800E-03	2.511495054414E-05	1.536776255762E-05

PERFORMANCE CURVE EQUATION

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2 + C_{16} X_1 X_3 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

INPUTS

X_1 = Motor speed (rpm)

X_2 = Evaporating temperature (°C)

X_3 = Condensing temperature (°C)

EN12900 PERFORMANCE CURVE COEFFICIENTS – 030F0228

COEFFICIENT	COOLING CAPACITY	POWER	CURRENT	MASS FLOW
C_n	BTU/h	W	A	lb/h
C_1	-3.216032036662E+03	2.788721448019E+03	2.315483785421E+01	-1.229130315781E+01
C_2	3.132538490929E+00	-2.195399719221E-01	-1.797296616445E-03	1.674493422217E-02
C_3	-1.206446182513E-04	4.994422130898E-05	4.159306115946E-07	-7.819200991787E-07
C_4	1.998137820766E-08	1.197020476522E-15	-4.074931553152E-13	1.558708478895E-10
C_5	-4.712173348665E+01	2.117605704069E+01	1.747144203764E-01	-3.628067036334E-02
C_6	-5.394002925968E-01	2.529074897103E-01	2.096777957124E-03	2.322813213191E-03
C_7	-3.182612115999E-03	3.442231716124E-03	2.844284363992E-05	3.886721177573E-05
C_8	1.400623181481E+02	-1.598808570583E+02	-1.323097776258E+00	4.760266078229E-01
C_9	-2.191326872256E+00	3.355378798333E+00	2.779136663992E-02	-6.709076773632E-03
C_{10}	7.595688637053E-03	-2.320385165661E-02	-1.923044349909E-04	-4.139827999072E-06
C_{11}	-5.788818581891E-04	3.281028733682E-04	2.702320887893E-06	2.501488226780E-06
C_{12}	-4.444874462927E-08	-2.695513781213E-08	-2.259019705135E-10	-3.945445746299E-10
C_{13}	-1.027233891127E-05	1.105285156093E-06	8.899157990544E-09	-1.573618498783E-08
C_{14}	5.361136510285E-07	-9.407242241299E-07	-7.667743166101E-09	-1.087324468310E-08
C_{15}	8.244976586957E-02	-1.398073260941E-02	-1.152508989710E-04	3.874881309898E-04
C_{16}	-2.705634865015E-02	6.116148315300E-03	5.017089572323E-05	-5.204164402528E-06
C_{17}	1.839896903490E+00	-3.393799262849E-01	-2.772467262957E-03	6.213843254955E-03
C_{18}	3.226448917663E-06	2.134709650325E-06	1.767351048644E-08	2.712138954115E-08
C_{19}	1.257635766857E-03	-1.007882676316E-05	-8.182816908152E-08	7.368969709067E-06
C_{20}	-1.451444412195E-06	-4.891410415198E-07	-4.119850085717E-09	-1.506135147232E-08
C_{21}	1.383186769459E-04	-2.079592065751E-05	-1.669858420150E-07	5.327993050086E-07
C_{22}	-6.158389826879E-03	-3.385017396548E-03	-2.780998796574E-05	-1.089495418585E-04
C_{23}	-2.668427988829E-02	6.799215066167E-04	5.306245506986E-06	-1.597765582417E-04

PERFORMANCE CURVE EQUATION

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2 + C_{16} X_1 X_3 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

INPUTS

X_1 = Motor speed (rpm)

X_2 = Evaporating temperature (°C)

X_3 = Condensing temperature (°C)

Tecumseh Products Company
Tecumseh do Brasil Ltda.
Rua Ray Wesley Herrick, 700 – Jardim Jockey Club
São Carlos, SP - CEP 13565-090
Phone (16) 3363-7000 / (16) 3363-3000