

SIERRA04-0982Y3
R134a / R513A / R1234yf
48/72 VDC
VARIABLE SPEED



Brushless DC Variable Speed Compressor Technical Data Sheet

General Information

Compressor Part Number	SIERRA00220	1/2" ID Suction - 5/16" ID Discharge
Compressor Drawing	DCMX33-002	M5 Threaded Terminal Connections
Controller Options (37-60V)	025F0158, 025F0152	
Controller Options (60-97V)	025F0139, 025F0164	
Controller Options (55-110V)	025F0140-04, 025F0391	
Wiring Diagram Drawing	See controller section on website	

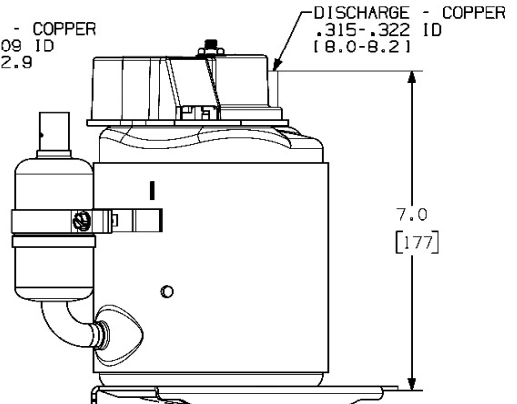
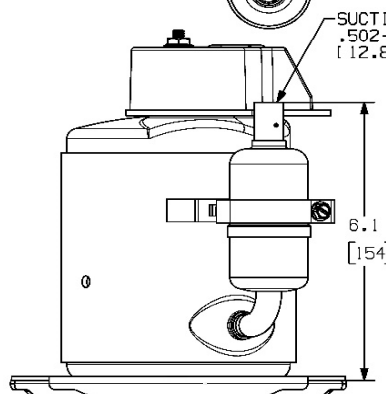
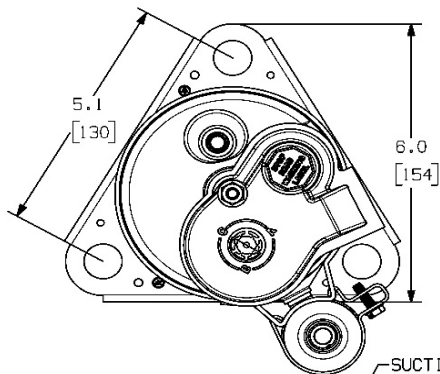
Application Information

Application	HBP, A/C
Refrigerant	R134a, R513A, R1234yf
Evaporator Temperature Range	-23.3°C to 12.8°C (-10°F to 55°F)
Condenser Temperature Range	26.7°C to 65.6°C (80°F to 150°F)
Maximum Discharge Temperature	130 °C (265 °F)
Maximum Compression Ratio	8:1
Minimum Airflow Over Compressor	425 cfm @ 6" from Outside Diameter of Housing

Design

Displacement	16.1 cm ³ (0.982 in ³)
Oil Quantity	290 cc
Oil Type	PVE 68cSt
Weight	6.4 kg / 14.1 lb

Compressor Dimensions



Packaging Options

- Single Pack (add -SP suffix to part number when ordering)
- Pallet Pack (25 piece multiples)

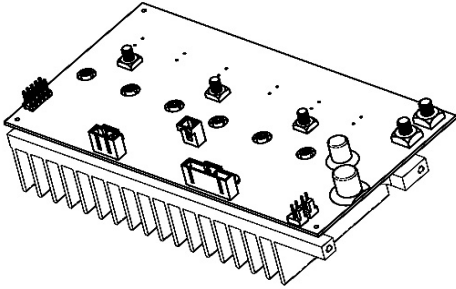
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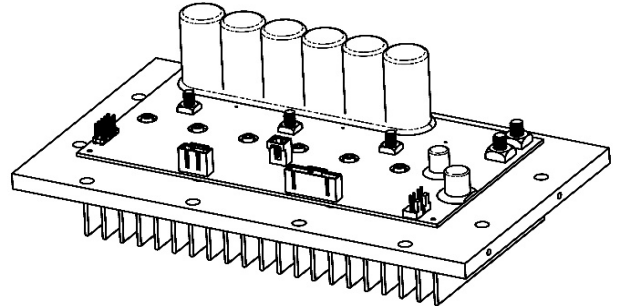


Controller Configurations (37-60V)

Custom controllers and configurations available



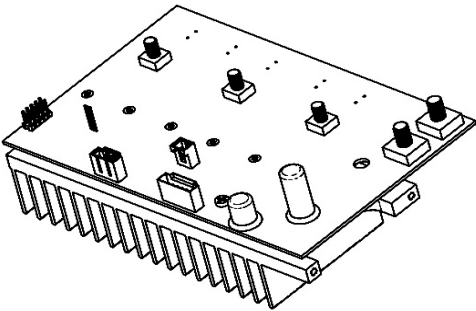
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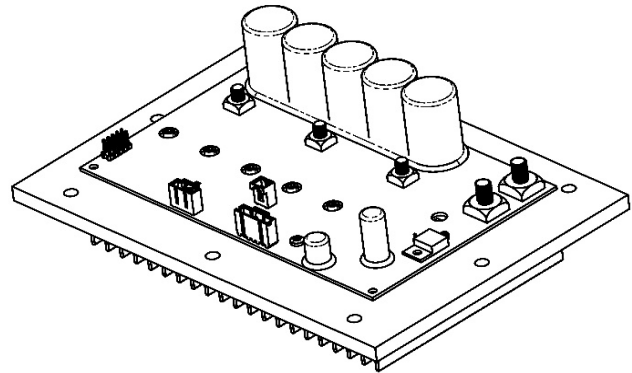
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Controller Configurations (60-97V)

Custom controllers and configurations available



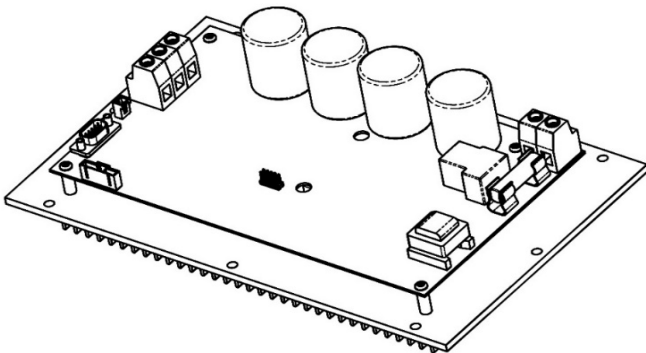
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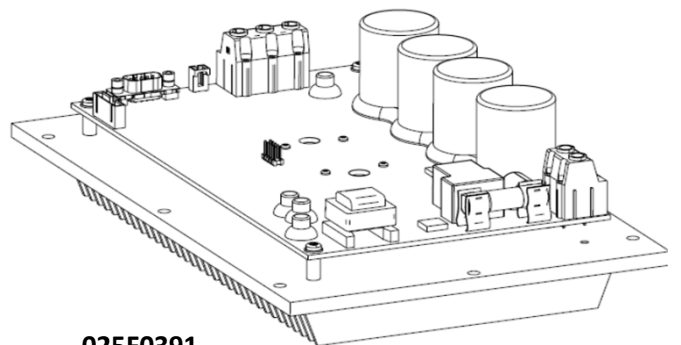
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Controller Configurations (55-110V)

Custom controllers and configurations available



025F0140-04



025F0391

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Cooling Capacity (48V) - ARI HBP - R134a / R513A BTU/hr (Watt)

RPM	Evaporator Temperature											
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)					
1800	1046	1955	2309	2725	3301	3680	4678					
3000	2100	3545	4270	5127	6213	6872	8484					
4200	2719	4707	5808	7109	8709	9651	11880					
5400	3230	5770	7251	9001	11119	12346	15196					

Power Consumption (48V) - ARI HBP - R134a / R513A Watt Current (48V) - ARI HBP - R134a / R513A Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
1800	268	353	413	462	486	482	436	5.59	7.36	8.60	9.63	10.11	10.05	9.09
3000	519	547	598	652	693	704	696	10.81	11.40	12.46	13.58	14.44	14.67	14.49
4200	769	764	818	888	959	990	1031	16.03	15.91	17.04	18.51	19.98	20.62	21.48
5400	1041	1026	1094	1193	1305	1361	1464	21.70	21.37	22.80	24.85	27.19	28.36	30.49

Efficiency (48V) - ARI HBP - R134a / R513A BTU/hr/W (W/W)

RPM	Evaporator Temperature											
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)					
1800	3.90	5.54	5.59	5.90	6.80	7.63	10.72					
3000	4.05	6.48	7.14	7.86	8.96	9.76	12.19					
4200	3.53	6.16	7.10	8.00	9.08	9.75	11.52					
5400	3.10	5.63	6.63	7.55	8.52	9.07	10.38					

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ARI HBP - R134a / R513A

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	-1.416978E+04	-2.128255E+03	-4.433864E+01	-2.034164E+02
C2	2.918585E+00	5.521844E-01	1.150384E-02	2.796228E-02
C3	-3.031178E-04	-3.546302E-05	-7.388130E-07	-2.825652E-06
C4	3.168748E-08	2.118055E-09	4.412615E-11	2.498261E-10
C5	2.547616E+02	1.521475E+01	3.169740E-01	1.281964E+00
C6	-7.186143E-01	8.490544E-01	1.768863E-02	7.525860E-03
C7	1.620815E-02	-2.680224E-03	-5.583800E-05	1.188066E-04
C8	3.203621E+02	3.377443E+01	7.036339E-01	4.763349E+00
C9	-2.534614E+00	-1.154303E-01	-2.404799E-03	-3.839735E-02
C10	6.128652E-03	-1.649049E-04	-3.435518E-06	9.837328E-05
C11	1.517656E-03	1.777112E-05	3.702318E-07	1.433789E-05
C12	3.295947E-08	5.749842E-09	1.197884E-10	4.227007E-10
C13	-2.017177E-07	2.032969E-06	4.235352E-08	2.606284E-08
C14	-7.799236E-06	-6.166845E-07	-1.284759E-08	-7.249366E-08
C15	-4.387516E-02	3.785971E-03	7.887441E-05	-2.738471E-04
C16	-1.033664E-02	-6.494045E-03	-1.352926E-04	-7.651051E-05
C17	-4.463238E+00	-5.848855E-01	-1.218511E-02	-2.882155E-02
C18	-4.140785E-06	-3.411428E-07	-7.107141E-09	-5.668466E-08
C19	3.143432E-04	-2.090427E-04	-4.355056E-06	1.314290E-06
C20	-1.015077E-06	1.563879E-07	3.258081E-09	-3.070176E-09
C21	6.080003E-05	3.000230E-05	6.250480E-07	4.219426E-07
C22	-3.537261E-03	-6.446179E-03	-1.342954E-04	-1.108327E-04
C23	1.952243E-02	4.248811E-03	8.851689E-05	1.413719E-04

Performance Equation

$$Y = C_1 + C_2 x_1 + C_3 x_1^2 + C_4 x_1^3 + C_5 x_2 + C_6 x_2^2 + C_7 x_2^3 + C_8 x_3 + C_9 x_3^2 + C_{10} x_3^3 + C_{11} x_1 x_2 x_3 + C_{12} x_1^2 x_2 x_3 + C_{13} x_1 x_2^2 x_3 + C_{14} x_1 x_2 x_3^2 + C_{15} x_1 x_2^2 + C_{16} x_1 x_3 + C_{17} x_2 x_3 + C_{18} x_1^2 x_2 + C_{19} x_1 x_2^2 + C_{20} x_1^2 x_3 + C_{21} x_1 x_3^2 + C_{22} x_2^2 x_3 + C_{23} x_2 x_3^2$$

x₁ = RPM
 x₂ = E_t (°F)
 x₃ = C_t (°F)

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Cooling Capacity (48V) - ARI HBP - R1234yf BTU/hr (Watt)

RPM	Evaporator Temperature											
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)					
1800	982 (288)	1835 (537)	2167 (635)	2558 (749)	3099 (908)	3455 (1012)	4392 (1286)					
3000	1972 (577)	3328 (975)	4008 (1174)	4813 (1410)	5832 (1708)	6451 (1889)	7964 (2332)					
4200	2552 (748)	4419 (1294)	5452 (1597)	6674 (1955)	8176 (2394)	9060 (2653)	11153 (3266)					
5400	3032 (888)	5417 (1586)	6806 (1993)	8450 (2475)	10438 (3057)	11589 (3394)	14266 (4178)					

Power Consumption (48V) - ARI HBP - R1234yf Watt Current (48V) - ARI HBP - R1234yf Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
1800	281	369	432	483	508	504	456	5.84	7.69	8.99	10.07	10.58	10.51	9.51
3000	543	572	625	682	725	736	728	11.31	11.92	13.03	14.20	15.10	15.34	15.16
4200	805	799	855	929	1003	1035	1078	16.76	16.64	17.82	19.35	20.89	21.56	22.46
5400	1089	1072	1144	1247	1365	1423	1531	22.69	22.34	23.84	25.99	28.43	29.65	31.89

Efficiency (48V) - ARI HBP - R1234yf BTU/hr/W (W/W)

RPM	Evaporator Temperature											
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)					
1800	3.50 (1.02)	4.97 (1.45)	5.02 (1.47)	5.29 (1.55)	6.10 (1.79)	6.85 (2.01)	9.63 (2.82)					
3000	3.63 (1.06)	5.82 (1.70)	6.41 (1.88)	7.06 (2.07)	8.05 (2.36)	8.76 (2.57)	10.95 (3.21)					
4200	3.17 (0.93)	5.53 (1.62)	6.38 (1.87)	7.18 (2.10)	8.15 (2.39)	8.75 (2.56)	10.35 (3.03)					
5400	2.78 (0.82)	5.05 (1.48)	5.95 (1.74)	6.77 (1.98)	7.65 (2.24)	8.14 (2.38)	9.32 (2.73)					

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ARI HBP - R1234yf

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	-1.330191E+04	-2.225590E+03	-4.636647E+01	-2.471842E+02
C2	2.739828E+00	5.774386E-01	1.202997E-02	3.397874E-02
C3	-2.845525E-04	-3.708493E-05	-7.726027E-07	-3.433629E-06
C4	2.974669E-08	2.214925E-09	4.614426E-11	3.035795E-10
C5	2.391580E+02	1.591060E+01	3.314708E-01	1.557796E+00
C6	-6.746008E-01	8.878860E-01	1.849762E-02	9.145150E-03
C7	1.521543E-02	-2.802804E-03	-5.839175E-05	1.443694E-04
C8	3.007406E+02	3.531910E+01	7.358146E-01	5.788247E+00
C9	-2.379374E+00	-1.207096E-01	-2.514782E-03	-4.665905E-02
C10	5.753285E-03	-1.724468E-04	-3.592641E-06	1.195396E-04
C11	1.424703E-03	1.858389E-05	3.871643E-07	1.742288E-05
C12	3.094077E-08	6.012811E-09	1.252669E-10	5.136504E-10
C13	-1.893629E-07	2.125947E-06	4.429056E-08	3.167061E-08
C14	-7.321550E-06	-6.448886E-07	-1.343518E-08	-8.809164E-08
C15	-4.118791E-02	3.959123E-03	8.248173E-05	-3.327690E-04
C16	-9.703546E-03	-6.791051E-03	-1.414802E-04	-9.297277E-05
C17	-4.189874E+00	-6.116353E-01	-1.274240E-02	-3.502289E-02
C18	-3.887171E-06	-3.567450E-07	-7.432187E-09	-6.888112E-08
C19	2.950903E-04	-2.186033E-04	-4.554235E-06	1.597077E-06
C20	-9.529061E-07	1.635403E-07	3.407089E-09	-3.730766E-09
C21	5.707616E-05	3.137446E-05	6.536346E-07	5.127292E-07
C22	-3.320612E-03	-6.740995E-03	-1.404374E-04	-1.346798E-04
C23	1.832672E-02	4.443131E-03	9.256522E-05	1.717900E-04

Performance Equation

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

$x_1 = \text{RPM}$
 $x_2 = E_t \text{ (°F)}$
 $x_3 = C_t \text{ (°F)}$

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Cooling Capacity (72V) - ARI HBP - R134a / R513A BTU/hr (Watt)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
3600	2443	(716)	4159	(1218)	5071	(1485)	6150	(1801)	7492	(2194)	8293	(2429)	10212	(2991)
4500	2844	(833)	4969	(1455)	6164	(1805)	7578	(2219)	9307	(2726)	10320	(3022)	12704	(3721)
5500	3278	(960)	5865	(1718)	7377	(2160)	9165	(2684)	11326	(3317)	12577	(3683)	15479	(4534)
6500	3885	(1138)	6938	(2032)	8770	(2569)	10936	(3203)	13532	(3963)	15022	(4400)	18446	(5402)

Power Consumption (72V) - ARI HBP - R134a / R513A Watt Current (72V) - ARI HBP - R134a / R513A Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
3600	754	764	824	895	959	983	1000	10.48	10.61	11.44	12.43	13.32	13.65	13.89
4500	979	967	1034	1123	1217	1260	1325	13.60	13.43	14.35	15.60	16.90	17.50	18.40
5500	1251	1232	1315	1434	1570	1639	1766	17.37	17.11	18.26	19.92	21.81	22.76	24.52
6500	1559	1553	1662	1820	2008	2108	2306	21.65	21.58	23.09	25.28	27.89	29.27	32.02

Efficiency (72V) - ARI HBP - R134a / R513A BTU/hr/W (W/W)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
3600	3.24	(0.95)	5.44	(1.59)	6.15	(1.80)	6.87	(2.01)	7.81	(2.29)	8.44	(2.47)	10.21	(2.99)
4500	2.90	(0.85)	5.14	(1.50)	5.96	(1.75)	6.75	(1.98)	7.65	(2.24)	8.19	(2.40)	9.59	(2.81)
5500	2.62	(0.77)	4.76	(1.39)	5.61	(1.64)	6.39	(1.87)	7.21	(2.11)	7.67	(2.25)	8.77	(2.57)
6500	2.49	(0.73)	4.47	(1.31)	5.28	(1.55)	6.01	(1.76)	6.74	(1.97)	7.13	(2.09)	8.00	(2.34)

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (72V) - ARI HBP - R134a / R513A

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	-1.416978E+04	-2.497412E+03	-3.121767E+01	-2.034164E+02
C2	2.918585E+00	6.479640E-01	8.099553E-03	2.796228E-02
C3	-3.031178E-04	-4.161429E-05	-5.201786E-07	-2.825652E-06
C4	3.168748E-08	2.485444E-09	3.106805E-11	2.498261E-10
C5	2.547616E+02	1.785383E+01	2.231732E-01	1.281964E+00
C6	-7.186143E-01	9.963280E-01	1.245410E-02	7.525860E-03
C7	1.620815E-02	-3.145125E-03	-3.931406E-05	1.188066E-04
C8	3.203621E+02	3.963278E+01	4.954102E-01	4.763349E+00
C9	-2.534614E+00	-1.354523E-01	-1.693157E-03	-3.839735E-02
C10	6.128652E-03	-1.935090E-04	-2.418855E-06	9.837328E-05
C11	1.517656E-03	2.085356E-05	2.606713E-07	1.433789E-05
C12	3.295947E-08	6.747187E-09	8.433981E-11	4.227007E-10
C13	-2.017177E-07	2.385599E-06	2.981999E-08	2.606284E-08
C14	-7.799236E-06	-7.236519E-07	-9.045655E-09	-7.249366E-08
C15	-4.387516E-02	4.442675E-03	5.553333E-05	-2.738471E-04
C16	-1.033664E-02	-7.620475E-03	-9.525598E-05	-7.651051E-05
C17	-4.463238E+00	-6.863372E-01	-8.579221E-03	-2.882155E-02
C18	-4.140785E-06	-4.003162E-07	-5.003949E-09	-5.668466E-08
C19	3.143432E-04	-2.453024E-04	-3.066280E-06	1.314290E-06
C20	-1.015077E-06	1.835143E-07	2.293929E-09	-3.070176E-09
C21	6.080003E-05	3.520638E-05	4.400799E-07	4.219426E-07
C22	-3.537261E-03	-7.564307E-03	-9.455384E-05	-1.108327E-04
C23	1.952243E-02	4.985792E-03	6.232242E-05	1.413719E-04

Performance Equation

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

$x_1 = \text{RPM}$
 $x_2 = E_t \text{ (°F)}$
 $x_3 = C_t \text{ (°F)}$

SIERRA04-0982Y3

Cooling Capacity (72V) - ARI HBP - R1234yf BTU/hr (Watt)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
3600	2294	3904	4761	5773	7033	7785	9587	(672)	(1143)	(1394)	(2060)	(2280)	(2808)
4500	2670	4665	5787	7114	8737	9688	11926	(782)	(1366)	(1695)	(2559)	(2837)	(3493)
5500	3077	5505	6925	8603	10632	11806	14531	(901)	(1612)	(2028)	(3114)	(3458)	(4256)
6500	3647	6513	8233	10266	12703	14102	17316	(1068)	(1908)	(2411)	(3720)	(4130)	(5072)

Power Consumption (72V) - ARI HBP - R1234yf Watt Current (72V) - ARI HBP - R1234yf Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
3600	789	799	862	936	1003	1028	1046	10.96	11.10	11.97	13.00	13.93	14.27	14.53
4500	1024	1011	1081	1175	1273	1317	1385	14.22	14.05	15.01	16.31	17.68	18.30	19.24
5500	1308	1289	1375	1500	1642	1714	1847	18.16	17.90	19.10	20.83	22.81	23.80	25.65
6500	1630	1625	1738	1903	2100	2204	2411	22.64	22.56	24.14	26.43	29.17	30.61	33.49

Efficiency (72V) - ARI HBP - R134a / R513A BTU/hr/W (W/W)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
3600	2.91	4.89	5.53	6.17	7.01	7.58	9.16	(0.85)	(1.43)	(1.62)	(2.05)	(2.22)	(2.68)
4500	2.61	4.61	5.35	6.06	6.86	7.35	8.61	(0.76)	(1.35)	(1.57)	(2.01)	(2.15)	(2.52)
5500	2.35	4.27	5.04	5.74	6.47	6.89	7.87	(0.69)	(1.25)	(1.47)	(1.90)	(2.02)	(2.30)
6500	2.24	4.01	4.74	5.39	6.05	6.40	7.18	(0.66)	(1.17)	(1.39)	(1.77)	(1.87)	(2.10)

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (72V) - ARI HBP - R1234yf

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	-1.330191E+04	-2.611631E+03	-3.627266E+01	-2.471842E+02
C2	2.739828E+00	6.775987E-01	9.411093E-03	3.397874E-02
C3	-2.845525E-04	-4.351753E-05	-6.044101E-07	-3.433629E-06
C4	2.974669E-08	2.599116E-09	3.609884E-11	3.035795E-10
C5	2.391580E+02	1.867037E+01	2.593108E-01	1.557796E+00
C6	-6.746008E-01	1.041895E+00	1.447077E-02	9.145150E-03
C7	1.521543E-02	-3.288967E-03	-4.568010E-05	1.443694E-04
C8	3.007406E+02	4.144539E+01	5.756304E-01	5.788247E+00
C9	-2.379374E+00	-1.416472E-01	-1.967322E-03	-4.665905E-02
C10	5.753285E-03	-2.023591E-04	-2.810543E-06	1.195396E-04
C11	1.424703E-03	2.180730E-05	3.028792E-07	1.742288E-05
C12	3.094077E-08	7.055771E-09	9.799681E-11	5.136504E-10
C13	-1.893629E-07	2.494705E-06	3.464868E-08	3.167061E-08
C14	-7.321550E-06	-7.567482E-07	-1.051039E-08	-8.809164E-08
C15	-4.118791E-02	4.645861E-03	6.452585E-05	-3.327690E-04
C16	-9.703546E-03	-7.968998E-03	-1.106805E-04	-9.297277E-05
C17	-4.189874E+00	-7.177269E-01	-9.968429E-03	-3.502289E-02
C18	-3.887171E-06	-4.186247E-07	-5.814231E-09	-6.888112E-08
C19	2.950903E-04	-2.565213E-04	-3.562796E-06	1.597077E-06
C20	-9.529061E-07	1.919073E-07	2.665379E-09	-3.730766E-09
C21	5.707616E-05	3.681654E-05	5.113409E-07	5.127292E-07
C22	-3.320612E-03	-7.910261E-03	-1.098647E-04	-1.346798E-04
C23	1.832672E-02	5.213817E-03	7.241413E-05	1.717900E-04

Performance Equation

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

$x_1 = \text{RPM}$
 $x_2 = E_t \text{ (°F)}$
 $x_3 = C_t \text{ (°F)}$