ZCC092 through 150

The ZCC 7.5, 8.5, 10 and 12.5 ton (092, 102, 120, 150) packaged electric units are available in standard cooling efficiency.

All ZCC units are designed to accept any of several different energy management thermostat control systems with minimum field wiring. Factory or field provided control options connect to the unit with jack plugs. When ”plugged in” the controls become an integral part of the unit wiring.

Optional electric heat is field-installed. Electric heat operates in single or multiple stages depending on the kW input size. 7.5kW to 60kW heat sections are available for ZCC units.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

⚠WARNING

To prevent serious injury or death:

1-Lock-out/tag out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance, disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are Set to the “OFF” position before performing maintenance.

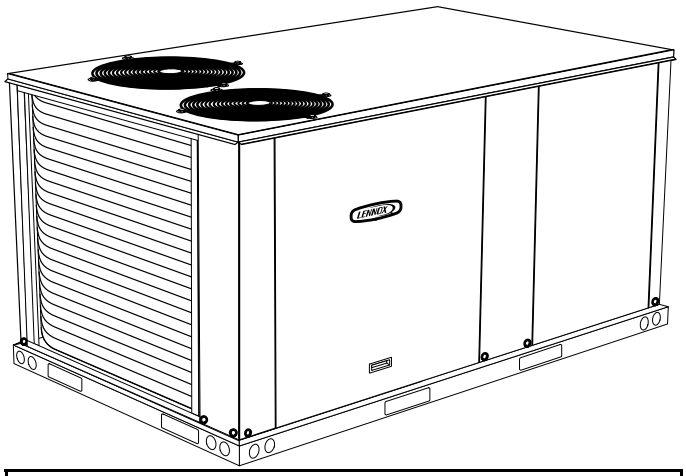
3- Always keep hands, hair, clothing, jewelery, tools, etc.,c away from moving parts.

⚠WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent service agency.

⚠CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.



⚠WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	X	X	X	X
	Copper	**76W27**	X	X	X	X
Corrosion Protection		Factory	O	O	O	O
Drain Pan Overflow Switch		**99W59**	X	X	X	X
Low Ambient Kit (Includes Compressor Crankcase Heater)	208/230V-3ph	**10Z35**	X	X		
	460V-3ph	**10Z36**	X	X		
	575V-3ph	**10Z37**	X	X		
	208/230V-3ph	**10Z50**			X	X
	460V-3ph	**10Z51**			X	X
	575V-3ph	**10Z52**			X	X
Refrigerant Type		R-410A	O	O	O	O
BLOWER - SUPPLY AIR						
Blower Motors	Belt Drive - 2 hp	Factory	O	O	O	O
	Belt Drive - 3 hp	Factory	O	O	O	O
	Belt Drive - 5 hp	Factory	O	O	O	O
Drive Kits See Blower Data Tables for selection	Kit #1 590-890 rpm	Factory	O	O	O	O
	Kit #2 800-1105 rpm	Factory	O	O	O	O
	Kit #3 795-1195 rpm	Factory	O	O	O	O
	Kit #4 730-970 rpm	Factory	O	O	O	O
	Kit #5 940-1200 rpm	Factory	O	O	O	O
	Kit #6 1015-1300 rpm	Factory	O	O	O	O
	Kit #10 900-1135 rpm	Factory	O	O	O	O
	Kit #11 1040-1315 rpm	Factory	O	O	O	O
	Kit #12 1125-1425 rpm	Factory	O	O	O	O
CABINET						
Combination Coil/Hail Guards		**12X21**	X	X	X	X
CONTROLS						

NOTE - See Conventional Thermostat Control Systems on page 10 for Additional Options.

NOTE - Catalog numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
INDOOR AIR QUALITY						
Air Filters						
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		**Y3063**	X	X	X	X
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**87N53**	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		**87N52**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)		**90N43**	X	X	X	X
ELECTRICAL						
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O
Bottom Power Entry Kit		**11H66**	X	X	X	X
ELECTRIC HEAT						
7.5 kW	208/240V-3ph	**10Y97**	X	X		
	460V-3ph	**10Y98**	X	X		
	575V-3ph	**10Y99**	X	X		
15 kW	208/240V-3ph	**10Z01**	X	X	X	X
	460V-3ph	**10Z03**	X	X	X	X
	575V-3ph	**10Z04**	X	X	X	X
22.5 kW	208/240V-3ph	**10Z05**	X	X	X	X
	460V-3ph	**10Z06**	X	X	X	X
	575V-3ph	**10Z07**	X	X	X	X
30 kW	208/240V-3ph	**10Z08**	X	X	X	X
	460V-3ph	**10Z09**	X	X	X	X
	575V-3ph	**10Z10**	X	X	X	X
45 kW	208/240V-3ph	**10Z11**	X	X	X	X
	460V-3ph	**10Z12**	X	X	X	X
	575V-3ph	**10Z13**	X	X	X	X
60 kW	208/240V-3ph	**10Z14**			X	X
	460V-3ph	**10Z15**			X	X
	575V-3ph	**10Z16**			X	X
ELECTRIC HEAT ACCESSORIES						
Unit Fuse Block (required) - See Electrical/Electric Heat Tables for Selection			X	X	X	X

NOTE - Catalog numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
ECONOMIZER						
Standard Economizer (Not for Title 24)						
Standard Downflow Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods		**24K57**	X	X	X	X
Standard Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods		**24K58**	X	X	X	X
Standard Economizer Controls (Not for Title 24)						
Single Enthalpy Control		**21Z09**	X	X	X	X
Differential Enthalpy Control (order 2)		**21Z09**	X	X	X	X
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Downflow Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods		**24F99**	OX	OX	OX	OX
High Performance Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods		**24G01**	X	X	X	X
High Performance Economizer Controls						
Single Enthalpy Control		**24G11**	X	X	X	X
Differential Enthalpy Control (order 2) (Not for Title 24)		**24G11**	X	X	X	X
Economizer Accessories						
WLAN Stick (For High Performance Economizer only)		**23K58**	X	X	X	X
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood						
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood		**53K04**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers						
Motorized Dampers with outdoor air hood		**14G36**	X	X	X	X
Manual Dampers with outdoor air hood		**14G37**	X	X	X	X
POWER EXHAUST						
Standard Static (Downflow)	208/230V-3ph	**10Z70**	X	X	X	X
	460V-3ph	**10Z71**	X	X	X	X
Standard Static (Horizontal)	208/230V-3ph	**24E01**	X	X	X	X
	460V-3ph	**28E01**	X	X	X	X
575V Transformer Kit	575V-3ph	**59E02**	X	X	X	X
NOTE - Order 575V Transformer Kit with 208/230V Power Exhaust Fan for 575V applications. Order two kits for downflow models, order one kit for horizontal models.						
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**10Z25**	X	X	X	X
14 in. height		**10Z26**	X	X	X	X
18 in. height		**10Z27**	X	X	X	X
24 in. height		**10Z28**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	**13K61**	X			
	RTD11-135S	**13K62**		X	X	
	RTD11-185S	**13K63**				X
Flush - Order one	FD11-95S	**13K56**	X			
	FD11-135S	**13K57**		X	X	
	FD11-185S	**13K58**				X
NOTE - Ceiling Diffuser Transitions are not furnished and must be field fabricated.						

NOTE - Catalog numbers shown are for ordering field installed accessories.

OX - Configure To Order (Factory Installed) or Field Installed

O = Configure To Order (Factory Installed)

X = Field Installed

SPECIFICATIONS

General Data		Nominal Tonnage	7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
		Model Number	ZCC092S4M	ZCC102S4M	ZCC120S4M	ZCC150S4M
		Efficiency Type	Standard	Standard	Standard	Standard
		Blower Type	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume
Cooling Performance		Gross Cooling Capacity - Btuh	89,700	100,200	118,200	140,200
		[1] Net Cooling Capacity - Btuh	88,000	98,000	115,000	136,000
		AHRI Rated Air Flow - cfm	2400	2800	3200	3800
		Total Unit Power - kW	7.8	8.8	10.2	12.1
		[1] EER (Btuh/Watt)	11.2	11.2	11.2	11.0
		[1] IEER (Btuh/Watt)	14.8	14.8	14.8	14.2
Refrigerant Charge Furnished		Refrigerant Type	R-410A	R-410A	R-410A	R-410A
		Circuit 1	5 lbs. 14 oz.	5 lbs. 10 oz.	5 lbs. 1 oz.	7 lbs. 0 oz.
		Circuit 2	3 lbs. 4 oz.	3 lbs. 6 oz.	5 lbs. 4 oz.	6 lbs. 1 oz.
Electric Heat Available			7.5,15,22.5,30 & 45 kW		15, 22.5, 30, 45 and 60 KW	
Compressor Type (number)			(1) Two-Stage Scroll, (1) Single-Stage Scroll			
Outdoor Coils		Net face area (total) - sq. ft.	20.9	20.9	28.0	28.0
		Number of rows	1	1	1	1
		Fins per inch	23	23	23	20
Outdoor Coil Fans		Motor - (No.) hp	(2) 1/3	(2) 1/3	(2) 1/2	(2) 1/2
		Motor rpm	1075	1075	1075	1075
		Total Motor watts	740	740	930	950
		Diameter - (No.) in.	(2) 24	(2) 24	(2) 24	(2) 24
		Number of blades	3	3	3	3
		Total Air volume - cfm	8800	8800	9600	9600
Indoor Coils		Net face area (total) - sq. ft.	13.54	13.54	13.54	13.54
		Tube diameter - in.	3/8	3/8	3/8	3/8
		Number of rows	3	3	4	4
		Fins per inch	14	14	14	14
		Drain connection - Number and size	(1) 1 in. NPT coupling			
		Expansion device type	Circuit 1 - Balanced Port Thermostatic Expansion Valve, removable element head Circuit 2 - Refrigerant Metering Orifice			Both Circuits - Balanced Port Thermostatic Expansion Valve, removable element head
[2] Indoor Blower and Drive Selection		Nominal motor output	2 hp, 3 hp, 5 hp			
		Motor - Drive kit number	2 hp **Kit 1** 590-890 rpm **Kit 2** 800-1105 rpm **Kit 3** 795-1195 rpm 3 hp **Kit 4** 730-970 rpm **Kit 5** 940-1200 rpm **Kit 6** 1015-1300 rpm 5 hp **Kit 10** 900-1135 rpm **Kit 11** 1040-1315 rpm **Kit 12** 1125-1425 rpm			
		Blower wheel nominal diameter x width - in.	(1) 15 X 15			
Filters		Type of filter	Disposable			
		Number and size - in.	(4) 20 x 24 x 2			
Electrical characteristics			208/230V, 460V or 575V - 60 hertz - 3 phase			

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[2] Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Motor service factor limit - 1.0.

ZCC092S4M - ZCC102S4M − BASE UNIT

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.

2 − Any factory installed options air resistance (heat section, economizer, etc.)

3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 8 for blower motors and drives and air resistance for wet coil and options/accessories.

Minimum Air Volume Required For Use With Optional Electric Heat:

15 kW, 22.5 kW- 2065 cfm; 30 kW - 2250 cfm; 45 kW - 2625 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	535	0.28	596	0.49	660	0.69	724	0.87	788	1.00	851	1.11	913	1.23	971	1.37	1025	1.52	1076	1.69	1124	1.86	- - -	- - -	- - -	- - -
2250	552	0.43	613	0.63	675	0.81	738	0.98	802	1.11	864	1.22	925	1.36	982	1.51	1036	1.68	1085	1.85	1133	2.04	1180	2.23	1228	2.44
2500	570	0.57	630	0.76	692	0.94	754	1.10	817	1.22	879	1.35	939	1.51	995	1.67	1047	1.85	1096	2.04	1143	2.23	1190	2.43	1239	2.65
2750	589	0.72	648	0.91	709	1.08	772	1.22	833	1.36	894	1.50	954	1.67	1009	1.85	1059	2.04	1108	2.24	1154	2.44	1202	2.65	1251	2.87
3000	608	0.87	668	1.05	729	1.22	791	1.37	852	1.51	912	1.67	970	1.85	1023	2.05	1073	2.25	1120	2.46	1167	2.67	1215	2.89	1265	3.11
3250	629	1.03	688	1.21	749	1.37	811	1.52	871	1.68	930	1.86	987	2.06	1039	2.27	1088	2.49	1134	2.70	1181	2.92	1229	3.14	1279	3.37
3500	651	1.20	710	1.38	772	1.54	833	1.70	892	1.88	950	2.07	1004	2.28	1055	2.51	1103	2.74	1150	2.96	1196	3.19	1245	3.42	1295	3.65
3750	674	1.36	734	1.56	796	1.73	856	1.90	914	2.10	970	2.30	1023	2.53	1072	2.78	1120	3.02	1166	3.25	1213	3.47	1262	3.71	1313	3.95
4000	699	1.55	761	1.76	822	1.94	880	2.12	936	2.33	991	2.56	1042	2.81	1090	3.07	1137	3.31	1183	3.55	1231	3.78	1281	4.03	1333	4.28
4250	726	1.77	789	1.98	849	2.16	904	2.37	959	2.59	1012	2.84	1062	3.11	1109	3.38	1156	3.63	1202	3.87	1251	4.11	1302	4.37	1354	4.63
4500	756	2.01	818	2.22	875	2.41	929	2.63	983	2.88	1034	3.15	1082	3.44	1129	3.71	1175	3.96	1222	4.21	1271	4.46	1323	4.72	1376	5.00
4750	788	2.27	848	2.47	902	2.68	955	2.92	1006	3.20	1056	3.50	1104	3.79	1150	4.06	1196	4.32	1243	4.57	1293	4.83	1345	5.09	1399	5.37
5000	822	2.54	878	2.75	929	2.98	980	3.25	1031	3.56	1079	3.87	1126	4.16	1172	4.44	1218	4.70	1266	4.95	1315	5.20	1367	5.47	1421	5.74

ZCC120S4M - ZCC150S4M − BASE UNIT

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE. FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.

2 − Any factory installed options air resistance (heat section, economizer, etc.)

3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)

Then determine from blower table blower motor output required.

See page 8 for blower motors and drives and air resistance for wet coil and options/accessories.

Minimum Air Volume Required For Use With Optional Electric Heat:

15 kW, 22.5 kW - 2065 cfm; 30 kW - 2250 cfm; 45 kW - 2625 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	542	0.43	602	0.60	664	0.75	732	0.89	802	1.02	869	1.15	927	1.27	979	1.41	1029	1.57	1079	1.75	1129	1.95	1179	2.15	1230	2.37
2250	560	0.55	619	0.71	681	0.86	748	1.00	817	1.14	882	1.27	939	1.41	991	1.57	1041	1.74	1090	1.93	1140	2.13	1190	2.35	1241	2.57
2500	579	0.68	637	0.83	699	0.98	766	1.12	834	1.26	897	1.41	953	1.57	1005	1.74	1054	1.92	1103	2.12	1152	2.33	1202	2.55	1254	2.79
2750	599	0.81	657	0.97	719	1.11	785	1.25	851	1.41	913	1.57	968	1.74	1020	1.93	1068	2.13	1116	2.34	1165	2.56	1215	2.78	1268	3.01
3000	620	0.95	678	1.11	741	1.25	806	1.40	870	1.58	930	1.75	985	1.94	1036	2.14	1084	2.36	1131	2.58	1180	2.80	1230	3.02	1283	3.26
3250	643	1.10	701	1.26	764	1.41	828	1.57	891	1.76	950	1.95	1003	2.16	1053	2.38	1100	2.61	1148	2.83	1196	3.06	1246	3.29	1299	3.52
3500	667	1.26	726	1.43	788	1.58	851	1.77	913	1.97	970	2.17	1023	2.41	1071	2.65	1118	2.88	1165	3.11	1213	3.33	1264	3.57	1317	3.81
3750	693	1.44	752	1.61	813	1.78	876	1.98	936	2.20	992	2.43	1043	2.68	1091	2.93	1137	3.17	1183	3.40	1232	3.64	1284	3.88	1338	4.13
4000	720	1.65	779	1.82	840	2.00	902	2.22	961	2.46	1015	2.71	1064	2.98	1111	3.24	1156	3.48	1203	3.72	1253	3.96	1305	4.22	1359	4.48
4250	748	1.86	807	2.04	868	2.24	929	2.48	986	2.75	1038	3.02	1086	3.30	1132	3.57	1177	3.81	1224	4.05	1274	4.31	1327	4.57	1382	4.85
4500	778	2.09	837	2.28	898	2.51	957	2.78	1012	3.07	1062	3.37	1108	3.65	1154	3.92	1199	4.17	1247	4.41	1297	4.67	1350	4.94	1405	5.22
4750	809	2.34	868	2.56	929	2.82	986	3.12	1038	3.43	1087	3.74	1132	4.03	1177	4.29	1223	4.54	1270	4.79	1321	5.04	1374	5.31	1428	5.58
5000	841	2.62	901	2.87	960	3.17	1015	3.50	1065	3.83	1112	4.14	1157	4.43	1201	4.69	1247	4.94	1295	5.18	1345	5.42	1398	5.68	---	---
5250	875	2.93	935	3.23	992	3.56	1044	3.91	1092	4.26	1138	4.57	1182	4.85	1226	5.10	1272	5.34	1320	5.57	---	---	---	---	---	---
5500	911	3.30	969	3.63	1024	4.00	1074	4.37	1120	4.71	1165	5.02	1208	5.29	1253	5.53	---	---	---	---	---	---	---	---	---	---
5750	948	3.71	1004	4.08	1056	4.48	1104	4.85	1148	5.19	1192	5.49	1235	5.74	---	---	---	---	---	---	---	---	---	---	---	---
6000	985	4.18	1039	4.59	1088	5.00	1134	5.37	1177	5.69	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6250	1022	4.70	1073	5.14	1120	5.54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Drive Kit Number	RPM Range
2	1	590 - 890
2	2	800 - 1105
2	3	795 - 1195
3	4	730 - 970
3	5	940 - 1200
3	6	1015 - 1300
5	10	900 - 1135
5	11	1040 - 1315
5	12	1125 - 1425

NOTE - Using total air volume and system static pressure requirements determine from blower performance tables rpm and motor output required. Maximum usable output of motors furnished are shown. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Motor service factor limit - 1.0.

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3575
0.05	3405
0.10	3550
0.15	3245
0.20	3115
0.25	3020
0.30	2900
0.35	2785

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Electric Heat	Economizer	Filters	
	092, 102	120, 150			MERV 8	MERV 13
1750	0.03	0.04	0.03	0.03	0.01	0.03
2000	0.04	0.05	0.03	0.05	0.01	0.03
2250	0.05	0.06	0.04	0.06	0.01	0.04
2500	0.05	0.07	0.04	0.08	0.01	0.05
2750	0.06	0.08	0.05	0.09	0.02	0.05
3000	0.07	0.09	0.06	0.11	0.02	0.06
3250	0.08	0.10	0.06	0.13	0.02	0.06
3500	0.09	0.11	0.09	0.15	0.03	0.07
3750	0.10	0.13	0.09	0.17	0.03	0.08
4000	0.11	0.14	0.09	0.19	0.04	0.08
4250	0.13	0.15	0.13	0.21	0.04	0.09
4500	0.14	0.17	0.14	0.24	0.04	0.09
4750	0.15	0.18	0.17	0.26	0.05	0.10
5000	0.16	0.20	0.20	0.29	0.06	0.10
5250	0.17	0.22	0.22	0.32	0.06	0.11
5500	0.19	0.23	0.25	0.34	0.07	0.12
5750	0.20	0.25	0.31	0.37	0.07	0.12
6000	0.22	0.27	0.33	0.40	0.08	0.13

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

Unit Size	RTD11 Step-Down Diffuser				FD11 Flush Diffuser
	Air Volume cfm	2 Ends Open	1 Side, 2 Ends Open	All Ends & Sides Open	
092 Models	2400	0.21	0.18	0.15	0.14
	2600	0.24	0.21	0.18	0.17
	2800	0.27	0.24	0.21	0.20
	3000	0.32	0.29	0.25	0.25
	3200	0.41	0.37	0.32	0.31
	3400	0.50	0.45	0.39	0.37
	3600	0.61	0.54	0.48	0.44
	3800	0.73	0.63	0.57	0.51
102 & 120 Models	3600	0.36	0.28	0.23	0.15
	3800	0.40	0.32	0.26	0.18
	4000	0.44	0.36	0.29	0.21
	4200	0.49	0.40	0.33	0.24
	4400	0.54	0.44	0.37	0.27
	4600	0.60	0.49	0.42	0.31
	4800	0.65	0.53	0.46	0.35
	5000	0.69	0.58	0.50	0.39
	5200	0.75	0.62	0.54	0.43
150 Models	4200	0.22	0.19	0.16	0.10
	4400	0.28	0.24	0.20	0.12
	4600	0.34	0.29	0.24	0.15
	4800	0.40	0.34	0.29	0.19
	5000	0.46	0.39	0.34	0.23
	5200	0.52	0.44	0.39	0.27
	5400	0.58	0.49	0.43	0.31
	5600	0.64	0.54	0.47	0.35
	5800	0.70	0.59	0.51	0.39

CEILING DIFFUSER AIR THROW DATA

Model No.	Air Volume	[1] Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
092 Models	2600	24 - 29	19 - 24
	2800	25 - 30	20 - 28
	3000	27 - 33	21 - 29
	3200	28 - 35	22 - 29
	3400	30 - 37	22 - 30
102, 120 Models	3600	25 - 33	22 - 29
	3800	27 - 35	22 - 30
	4000	29- 37	24 - 33
	4200	32 - 40	26 - 35
	4400	34 - 42	28 - 37
150 Models	5600	39 - 49	28 - 37
	5800	42 - 51	29 - 38
	6000	44 - 54	40 - 50
	6200	45 - 55	42 - 51
	6400	46 - 55	43 - 52
	6600	47 - 56	45 - 56

[1] Throw is the horizontal or vertical distance an air stream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 50 ft. per minute. Four sides open.

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

		Model No.	ZCC092S4M								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		14			6.5			4.9		
	Locked Rotor Amps		93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps		9			5.6			3.8		
	Locked Rotor Amps		71			38			36.5		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		2.4			1.3			1		
	Total		4.8			2.6			2		
Power Exhaust (2) 0.5 HP	Full Load Amps		4.4			1.7			1.7		
	Total		8.8			3.4			3.4		
Indoor Blower Motor	Horsepower		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	50	60	25	25	30	15	20	20
	With (2) 0.5 HP Power Exhaust		60	60	70	25	30	35	20	20	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only		39	42	49	20	22	25	15	16	19
	With (2) 0.5 HP Power Exhaust		48	51	58	24	25	28	19	20	22

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	50	50	60	60	25	25	30	15	20	20
		15 kW	50	60	60	60	60	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	39	39	42	42	49	49	20	22	25	15	16	19
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**7.5 kW**	60	60	60	60	70	70	25	30	35	20	20	25
		15 kW	60	70	70	70	80	80	35	35	40	30	30	30
		22.5 kW	80	90	90	100	100	100	45	45	50	35	40	40
		30 kW	100	125	110	125	125	125	60	60	60	45	50	50
		45 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**7.5 kW**	48	48	51	51	58	58	24	25	28	19	20	22
		15 kW	60	66	64	70	71	77	32	33	37	26	28	30
		22.5 kW	80	89	83	92	91	100	43	45	48	35	37	39
		30 kW	99	111	103	115	111	123	54	56	59	44	46	48
		45 kW	138	156	142	160	150	168	77	78	82	62	64	67

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

	Model No.		**ZCC102S4M**										
[1] **Voltage - 60Hz**			**208/230V - 3 Ph**			**460V - 3 Ph**			**575V - 3 Ph**				
Compressor 1 (Non-Inverter)	Rated Load Amps		14			6.5			4.9				
	Locked Rotor Amps		93			60			41				
Compressor 2 (Non-Inverter)	Rated Load Amps		13.1			6.1			4.4				
	Locked Rotor Amps		83.1			41			33				
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		2.4			1.3			1				
	Total		4.8			2.6			2				
Power Exhaust (2) 0.5 HP	Full Load Amps		4.4			1.7			1.7				
	Total		8.8			3.4			3.4				
Indoor Blower Motor	Horsepower		2	3	5	2	3	5	2	3	5		
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1		
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		50	60	60	25	25	30	20	20	25		
	With (2) 0.5 HP Power Exhaust		60	60	70	30	30	35	20	20	25		
[3] Minimum Circuit Ampacity (MCA)	Unit Only		43	46	53	21	22	25	16	17	19		
	With (2) 0.5 HP Power Exhaust		52	55	62	24	26	29	19	20	23		

ELECTRIC HEAT DATA

Electric Heat Voltage			**208V**	**240V**	**208V**	**240V**	**208V**	**240V**	**480V**	**480V**	**480V**	**600V**	**600V**	**600V**
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**7.5 kW**	50	50	60	60	60	60	25	25	30	20	20	25
		15 kW	50	60	60	60	60	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**7.5 kW**	43	43	46	46	53	53	21	22	25	16	17	19
		15 kW	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**7.5 kW**	60	60	60	60	70	70	30	30	35	20	20	25
		15 kW	60	70	70	70	80	80	35	35	40	30	30	30
		22.5 kW	80	90	90	100	100	100	45	45	50	35	40	40
		30 kW	100	125	110	125	125	125	60	60	60	45	50	50
		45 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**7.5 kW**	52	52	55	55	62	62	24	26	29	19	20	23
		15 kW	60	66	64	70	71	77	32	33	37	26	28	30
		22.5 kW	80	89	83	92	91	100	43	45	48	35	37	39
		30 kW	99	111	103	115	111	123	54	56	59	44	46	48
		45 kW	138	156	142	160	150	168	77	78	82	62	64	67

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

		Model No.	ZCC120S4M								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		14			6.5			4.9		
	Locked Rotor Amps		93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps		16			7.8			5.7		
	Locked Rotor Amps		110			52			38.9		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		3			1.5			1.2		
	Total		6			3			2.4		
Power Exhaust (2) 0.5 HP	Full Load Amps		4.4			1.7			1.7		
	Total		8.8			3.4			3.4		
Indoor Blower Motor	Horsepower		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		60	60	70	30	30	30	20	20	25
	With (2) 0.5 HP Power Exhaust		70	70	80	30	35	35	25	25	30
[3] Minimum Circuit Ampacity (MCA)	Unit Only		48	51	57	23	25	27	18	19	21
	With (2) 0.5 HP Power Exhaust		57	60	66	27	28	31	21	22	25

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	60	60	60	60	70	70	30	30	35	25	25	30
		22.5 kW	70	80	80	90	80	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	49	55	53	59	60	66	27	29	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**15 kW**	70	70	70	70	80	80	35	35	40	30	30	30
		22.5 kW	80	90	90	100	100	100	45	45	50	35	40	40
		30 kW	100	125	110	125	125	125	60	60	60	45	50	50
		45 kW	150	175	150	175	150	175	80	80	90	70	70	70
		60 kW	150	175	150	175	175	200	90	90	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**15 kW**	60	66	64	70	71	77	32	33	37	26	28	30
		22.5 kW	80	89	83	92	91	100	43	45	48	35	37	39
		30 kW	99	111	103	115	111	123	54	56	59	44	46	48
		45 kW	138	156	142	160	150	168	77	78	82	62	64	67
		60 kW	146	165	150	169	157	177	81	83	86	66	67	70

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

		Model No.	ZCC0150S4M								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps		17.6			8.5			6.3		
	Locked Rotor Amps		136			66.1			55.3		
Compressor 2 (Non-Inverter)	Rated Load Amps		22.4			10.6			7.7		
	Locked Rotor Amps		149			75			54		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)		3			1.5			1.2		
	Total		6			3			2.4		
Power Exhaust (2) 0.5 HP	Full Load Amps		4.4			1.7			1.7		
	Total		8.8			3.4			3.4		
Indoor Blower Motor	Horsepower		2	3	5	2	3	5	2	3	5
	Full Load Amps		7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only		80	80	90	35	40	40	25	25	30
	With (2) 0.5 HP Power Exhaust		90	90	90	40	40	45	30	30	35
[3] Minimum Circuit Ampacity (MCA)	Unit Only		60	63	69	29	30	33	22	23	25
	With (2) 0.5 HP Power Exhaust		68	71	78	32	33	36	25	26	28

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat	**15 kW**	80	80	80	80	90	90	35	40	40	25	25	30
		22.5 kW	80	80	80	90	90	90	40	40	45	35	35	35
		30 kW	90	100	100	110	100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	150	175	80	80	80	60	60	70
		60 kW	150	175	150	175	150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat	**15 kW**	60	60	63	63	69	69	29	30	33	22	23	26
		22.5 kW	69	78	72	81	80	89	39	40	44	31	32	35
		30 kW	88	100	92	104	100	112	50	52	55	40	41	44
		45 kW	127	145	131	149	139	157	72	74	78	58	60	62
		60 kW	135	154	139	158	146	166	77	79	82	62	63	66
[2] Maximum Overcurrent Protection (MOCP)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**15 kW**	90	90	90	90	90	90	40	40	45	30	30	35
		22.5 kW	90	90	90	100	100	100	45	45	50	35	40	40
		30 kW	100	125	110	125	125	125	60	60	60	45	50	50
		45 kW	150	175	150	175	150	175	80	80	90	70	70	70
		60 kW	150	175	150	175	175	200	90	90	90	70	70	70
[3] Minimum Circuit Ampacity (MCA)	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	**15 kW**	68	68	71	71	78	78	32	33	37	26	28	30
		22.5 kW	80	89	83	92	91	100	43	45	48	35	37	39
		30 kW	99	111	103	115	111	123	54	56	59	44	46	48
		45 kW	138	156	142	160	150	168	77	78	82	62	64	67
		60 kW	146	165	150	169	157	177	81	83	86	66	67	70

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] Extremes of operating range are plus and minus 10% of line voltage.

[2] HACR type breaker or fuse.

[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

[4] Factory installed circuit breaker not available.

ELECTRICAL ACCESSORIES - DISCONNECTS

7.5 TON | ZCC092S4M

Motor Horsepower	2		3		5		2	3	5	2	3	5
Electric Heat Voltage	208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
Unit Only	10Z41	10Z41	10Z41	10Z41	10Z41	10Z41	10Z39	10Z39	10Z39	10Z38	10Z38	10Z38
Unit + Power Exhaust	10Z41	10Z41	10Z41	10Z41	10Z42	10Z42	10Z39	10Z39	10Z40	10Z38	10Z38	10Z39

8.5 TON | ZCC102S4M

Motor Horsepower	2		3		5		2	3	5	2	3	5
Electric Heat Voltage	208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
Unit Only	10Z41	10Z41	10Z41	10Z41	10Z41	10Z41	10Z39	10Z39	10Z39	10Z38	10Z38	10Z39
Unit + Power Exhaust	10Z41	10Z41	10Z41	10Z41	10Z42	10Z42	10Z39	10Z39	10Z40	10Z38	10Z39	10Z39

10 TON | ZCC120S4M

Motor Horsepower	2		3		5		2	3	5	2	3	5
Electric Heat Voltage	208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
Unit Only	10Z41	10Z41	10Z41	10Z41	10Z41	10Z41	10Z39	10Z39	10Z40	10Z38	10Z38	10Z39
Unit + Power Exhaust	10Z41	10Z41	10Z41	10Z41	10Z42	10Z42	10Z40	10Z40	10Z40	10Z38	10Z39	10Z39

12.5 TON | ZCC0150S4M

Motor Horsepower	2		3		5		2	3	5	2	3	5
Electric Heat Voltage	208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
Unit Only	10Z42	10Z42	10Z42	10Z42	10Z42	10Z42	10Z39	10Z39	10Z40	10Z39	10Z39	10Z39
Unit + Power Exhaust	10Z42	10Z42	10Z42	10Z42	10Z42	10Z42	10Z40	10Z40	10Z40	10Z39	10Z39	10Z39

ELECTRIC HEAT CAPACITIES

Volts Input	7.5 kW			15 kW			22.5 kW			30 kW			45 kW			60 kW		
	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages	kW Input	Btuh Output	No. of Stages
208	5.6	19,100	1	11.3	38,600	1	16.9	57,700	2	22.5	76,800	2	33.8	115,300	2	45.0	153,600	2
220	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
230	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
240	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
440	6.9	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
460	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
480	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2
550	6.3	21,500	1	12.6	43,000	1	18.9	64,500	2	25.2	86,000	2	37.8	129,000	2	50.4	172,000	2
575	6.9	23,600	1	13.8	47,100	1	20.7	70,700	2	27.5	93,900	2	41.3	141,000	2	55.1	188,000	2
600	7.5	25,600	1	15.0	51,200	1	22.5	76,800	2	30.0	102,400	2	45.0	153,600	2	60.0	204,800	2

ZCC PARTS ARRANGEMENT

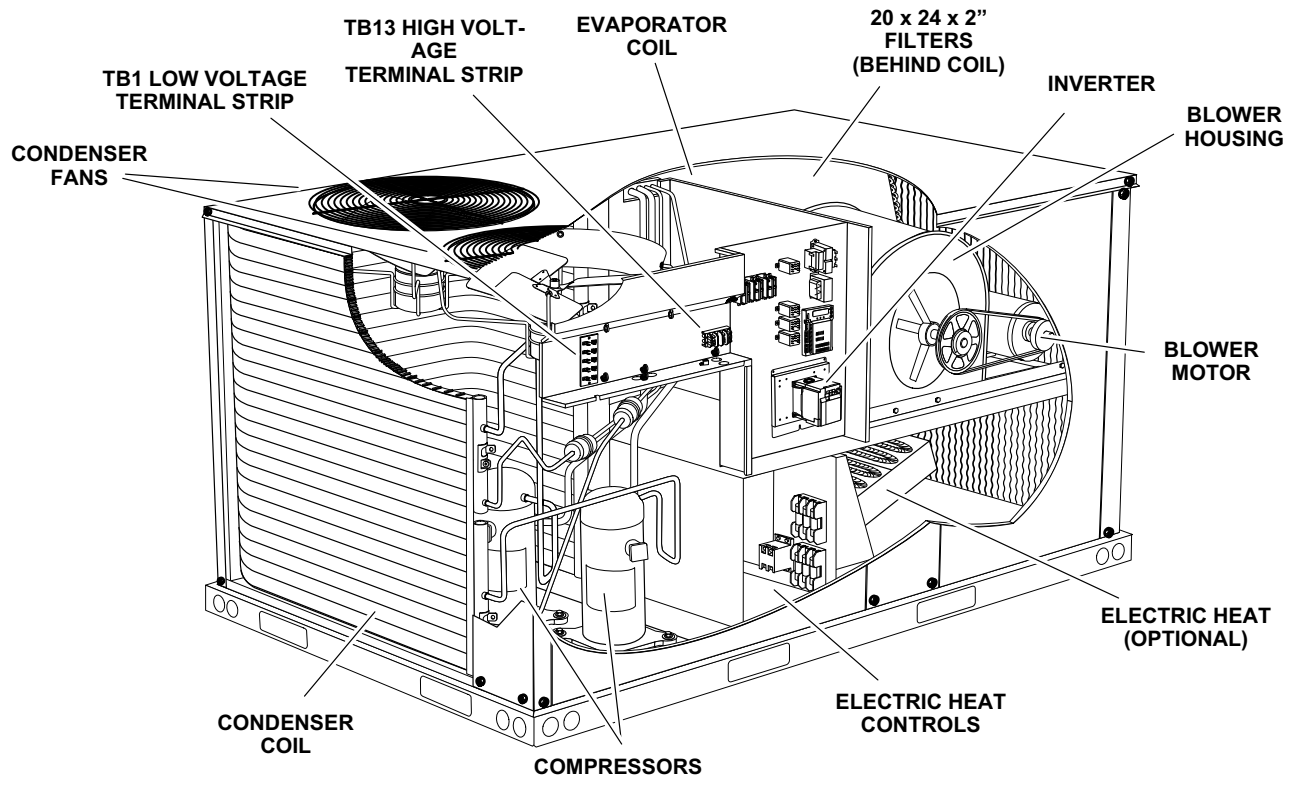


FIGURE 1

ZCC CONTROL BOX

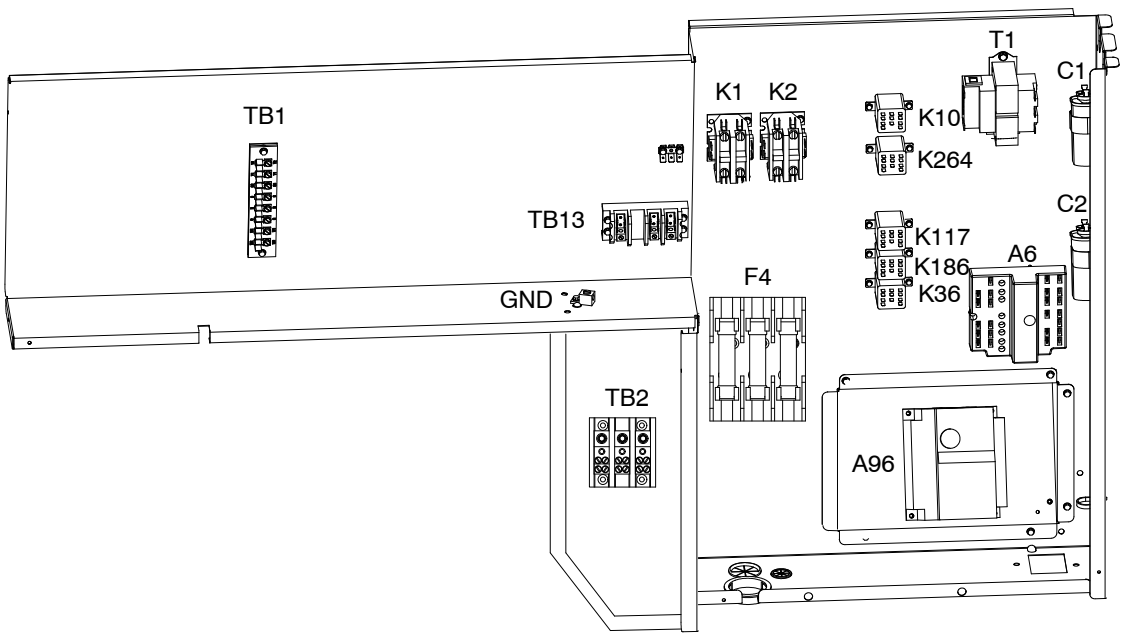


FIGURE 2

I-UNIT COMPONENTS

ELECTROSTATIC DISCHARGE (ESD)

Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

All 7.5 through 12.5 ton (26.3 through 44 kW) units are configure to order units (CTO). The ZCC unit components are shown in figure 1. All units come standard with removable unit panels. All L1, L2 and L3 wiring is color coded; L1 is red, L2 is yellow and L3 is blue.

A-Control Box Components

ZCC control box components are shown in figure 2.

1-Control Transformer T1 all units

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

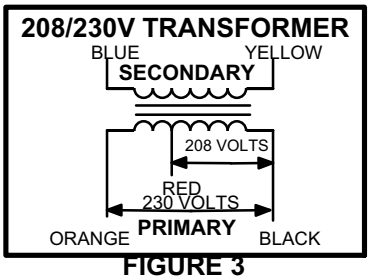


FIGURE 3

2-Terminal Strip TB1

All indoor thermostat connections will be to TB1 located in the control area. For thermostats without “occupied “ and “unoccupied” modes, a factory installed jumper across terminals R and OC should be in place.

3-Condenser Fan Capacitors C1 & C2

Fan capacitors C1 and C2 are used to assist in the start up of condenser fans B4 and B5. Ratings will be on side of capacitor or outdoor fan motor nameplate.

4-Compressor Contactor K1 & K2

All compressor contactors are two-pole, double-break contactors with 24VAC coils. In all ZCC units, K1 and K2 energize compressors B1 and B2 in response to thermostat demand.

5-Variable Speed Drive VFD A96

Units are equipped with a factory-installed supply air inverter (VFD). During cooling, the blower will operate at one of three speeds depending on the demand. When demand is low, the blower will operate at low speed. When demand is higher, the blower will operate at either medium or high speed depending on the cooling demand.

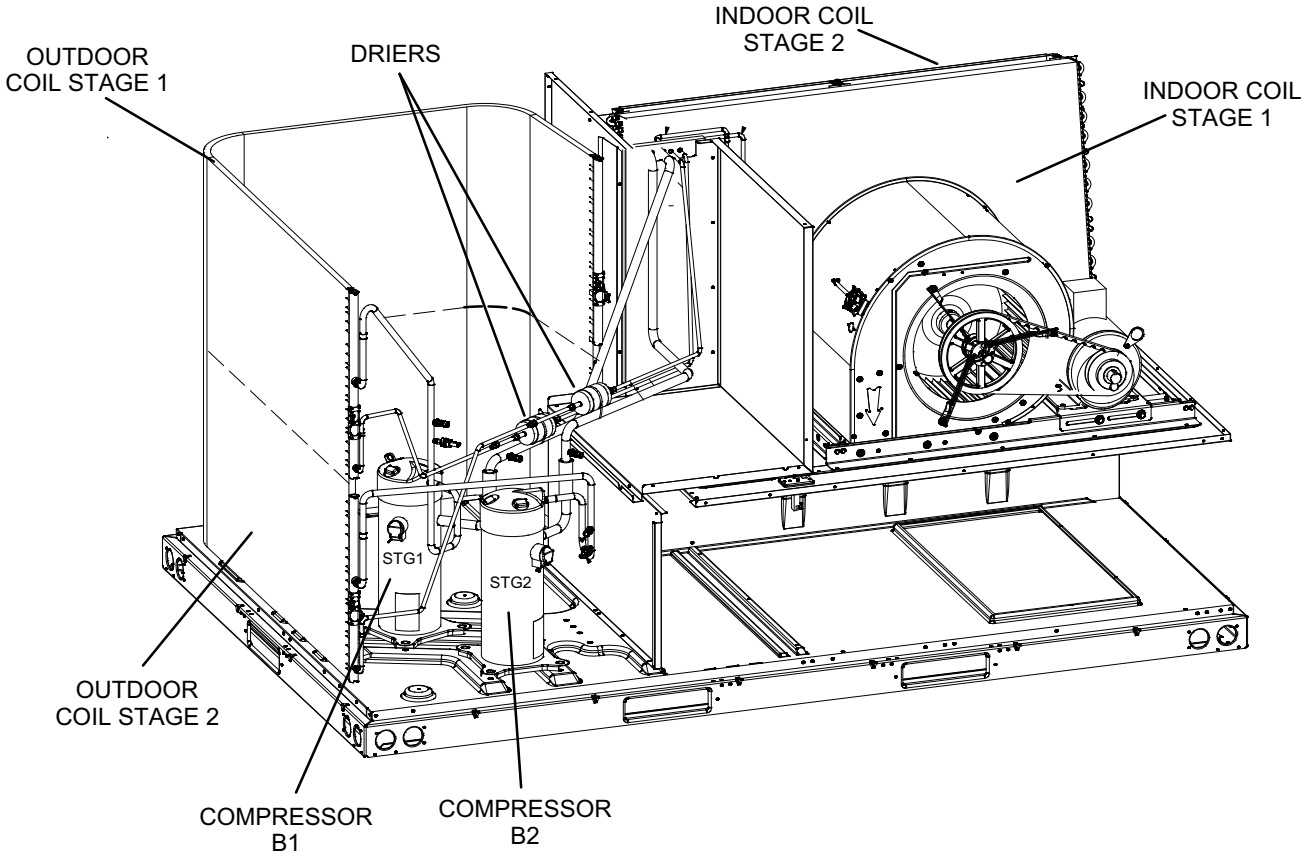
6-Condenser Fan Relay K10

Outdoor fan relay K10 is a DPDT relay with a 24VAC coil. K10 energizes condenser fans B4 and B5.

7-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a DPDT relay with a 24VAC coil. K65 is used in all ZCC units equipped with the optional power exhaust dampers. K65 is energized by the economizer enthalpy control A6, after the economizer dampers reach 50% open (adjustable) When K65 closes, exhaust fan B10 is energized.

ZCC PLUMBING AND COMPRESSOR CIRCUITS DETAIL



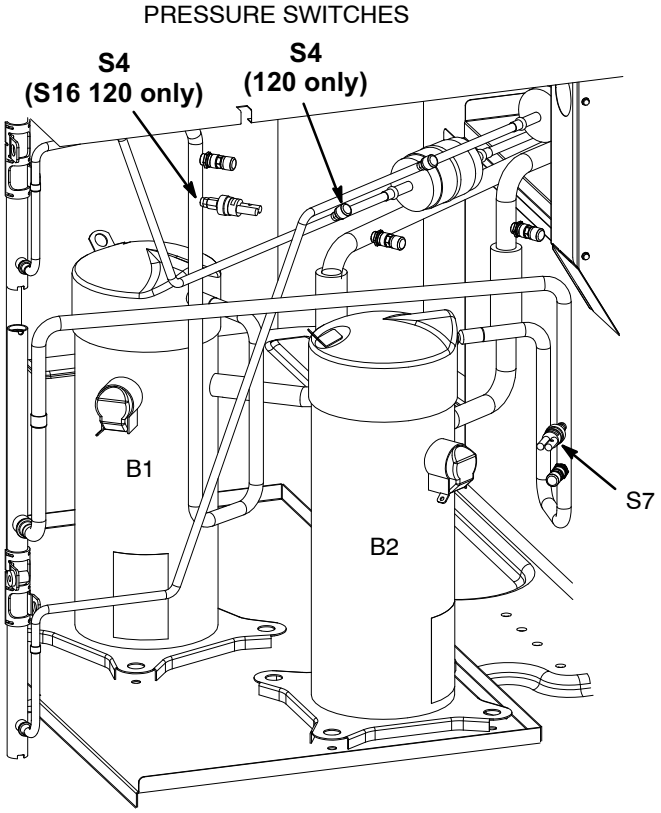


FIGURE 4

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figure 4. Two draw-through type condenser fans are used in ZCC092/150 units. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field-installed economizer. The evaporators are row-split. Circuit #2 is directly behind the filter rack and on 150 units is equipped with a TXV, 092,102,120 models use a fixed metering device. Circuit #1 is located after circuit #2 on the same evaporator slab. Circuit #1 always is equipped with a TXV. Each evaporator is also equipped with enhanced fins and rifled tubing.

In all units each compressor is protected by S4 and S7 high pressure switches (on each circuit). Low ambient switches (S11, S84) are available as an option for additional compressor protection. Each compressor is protected by a crankcase heater.

1-Compressors B1 and B2

All ZCC092/150 units use two scroll compressors. however Circuit #1 B1 uses a 2-stage or 2-step compressor. Circuit #2 or B2 uses a fixed capacity compressor. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective cover over terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Each compressor is energized by a corresponding compressor contactor.

***NOTE**-Refer to the wiring diagram section for specific unit operation.*

If Interlink compressor replacement is necessary, call 1-800-453-6669.

⚠ IMPORTANT

Some scroll compressors have an internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system rises above 40 psig. DO NOT REPLACE COMPRESSOR.

2-High Pressure Switches S4 and S7

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise.

S4 (first circuit) and S7 (second circuit)are located in the compressor discharge line and wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate). -120 Units have the S4 high pressure switch located in the liquid line before the filter drier.

3-Low Ambient Switches S11 & S84 (optional)

The low ambient switch is an auto-reset SPST N.O. pressure switch which allows for mechanical cooling operation at low outdoor temperatures. In all models a switch is located in each liquid line prior to the indoor coil section.

In the ZCC092/150, S11 and S84 are wired in parallel with outdoor fan relay K10.

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fans are energized. When liquid pressure in both refrigerant circuits drops to 240 ± 10 psig (1655 ± 69 kPa), the switches open and the condenser fans are de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

4-Crankcase Heaters HR1, HR2

092-150S units use belly band heaters. Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor manufacturer. The power to crankcase heaters is routed through the N.C. Contacts on K10 Outdoor Fan Motor Relay.

C-Blower Compartment

All units are equipped with belt drive blowers.

1-Blower Wheels

All ZCC092/150 units have one 15 in. x 15 in. (381 mm x 381 mm) blower wheel.

2-Indoor Blower Motor B3

All units use three-phase single-speed blower motors. CFM adjustments are made by adjusting the motor pulley (sheave). Motors are equipped with sealed ball bearings. All motor specifications are listed in the SPECIFICATIONS (table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit. Blower speed is controlled by the VFD and will operate the blower depending on which thermostat signals in one of three speeds G,Y1 = 40Hz, Y2 = 55Hz, Y3,W1,W2 = 60Hz.

OPERATION / ADJUSTMENT

A-Three Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and rotation and operation.

NOTE- The VFD that drives the blower motor will automatically correct for incorrect phasing. Do not assume correct blower rotation with correct phasing.

Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1- Observe suction and discharge pressures and blower rotation on unit start-up.

If pressure differential is not observed or blower rotation is not correct:

2- Suction pressure must drop, discharge pressure must rise.

3- Disconnect all remote electrical power supplies.

4- Reverse any two field-installed wires connected to the line side of K3, TB2 or F4. Do not reverse wires at blower contactor or compressors.

5- Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

B-Blower Operation

Initiate blower demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1- Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2- With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

C-Blower Access

The blower assembly is secured to a sliding frame which allows the blower motor to be pulled out of the unit. See figure 5.

1- Loosen the reusable wire tie which secures the blower wiring to the blower motor mounting plate.

2- Remove and retain screws on either side of sliding frame. Pull frame toward outside of unit.

3- Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location on the blower motor base using the wire tie.

4- Replace retained screws on either side of the sliding frame.

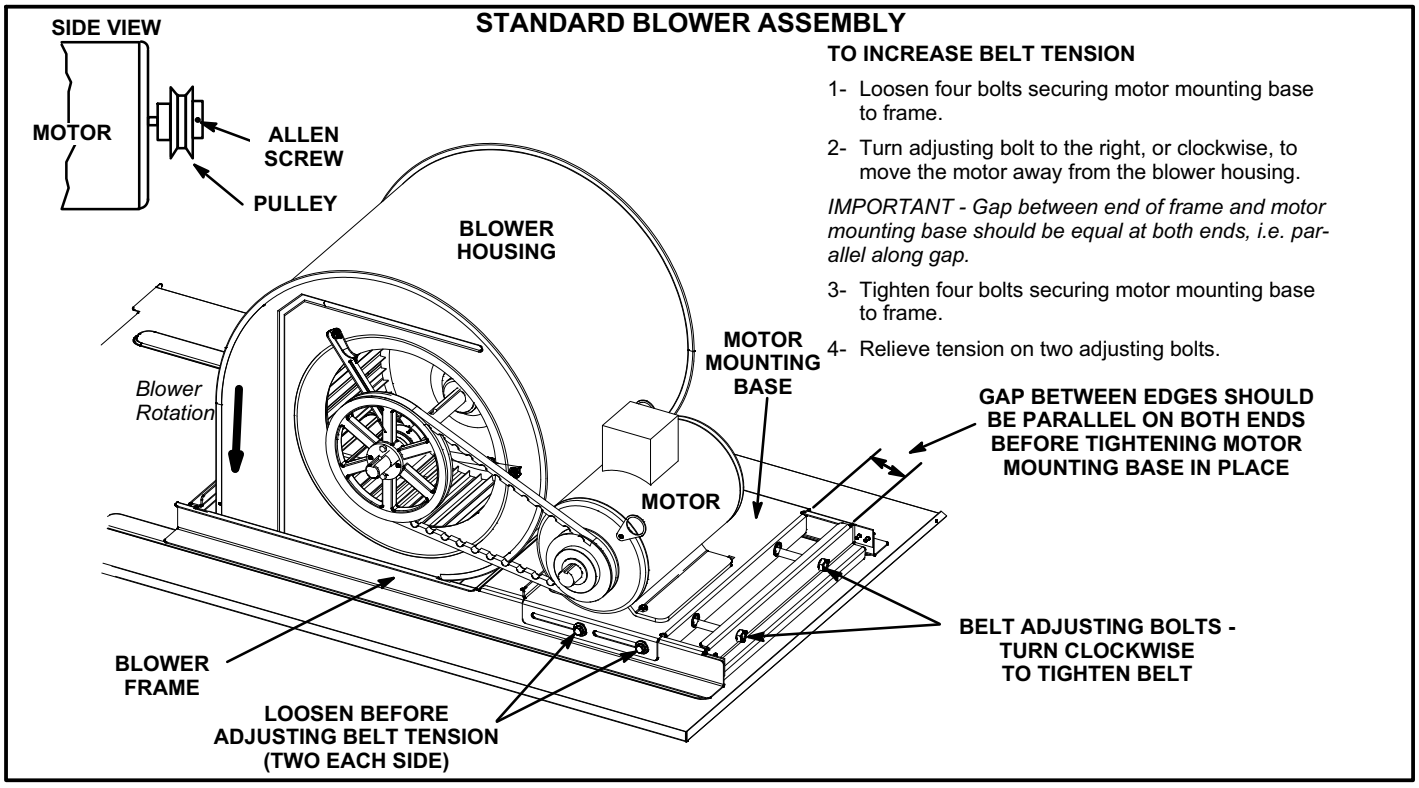


FIGURE 5

D-Determining Unit CFM

NOTE - *Units equipped a Variable Frequency Drive (VFD) are designed to operate on balanced, three-phase power. Operating units on unbalanced three-phase power will reduce the reliability of all electrical components in the unit. Unbalanced power is a result of the power delivery system supplied by the local utility company. Factory-installed inverters are sized to drive blower motors with an equivalent current rating using balanced three-phase power. If unbalanced three-phase power is supplied; the installer must replace the existing factory-installed inverter with an inverter that has a higher current rating to allow for the imbalance. Refer to the installation instructions for additional information and available replacements*.

1- The following measurements must be made with a dry indoor coil and air filters in place.

Units Equipped With An Inverter -
Initiate high speed blower without a cooling demand. Disconnect high pressure switches S4 and S7. Run the blower with Y1, Y2 **and** Y3 demands.

2- Measure the indoor blower shaft RPM.

3- With all access panels in place, measure static pressure external to unit (from supply to return). Blower performance data is based on static pressure readings taken in locations shown in figure 6.

Note - Static pressure readings can vary if not taken where shown.

4- Referring to page 13, 14, or 15, use static pressure and RPM readings to determine unit CFM. Use pages 16 and 17 when installing units with any of the optional accessories listed.

5- The blower RPM can be adjusted at the motor pulley. Loosen Allen screw and turn adjustable pulley clockwise to increase CFM. Turn counterclockwise to decrease CFM. See figure 5. Do not exceed minimum and maximum number of pulley turns as shown in table 1.

6- *Units Equipped With An Inverter -*
Reconnect high pressure switches S4 and S7.

TABLE 1
MINIMUM AND MAXIMUM PULLEY ADJUSTMENT

Belt	Minimum Turns Open	Maximum Turns Open
A Section	0	5
B Section	1*	6

*No minimum number of turns open when B belt is used on pulleys 6" O.D. or larger.

E-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat in the pulley grooves. Make sure blower and motor pulleys are aligned as shown in figure 7.

1- Loosen four bolts securing motor base to mounting frame. See figure 5.

2- *To increase belt tension -*
Turn both adjusting bolts to the right, or clockwise, to move the motor outward and tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -
Turn the adjusting bolts to the left, or counterclockwise to loosen belt tension.

IMPORTANT - Align top edges of blower motor base and mounting frame base parallel before tightening two bolts on the other side of base. Motor shaft and blower shaft must be parallel.

3- Tighten two bolts on each side of the motor mounting base. This secures the mounting base to the frame.

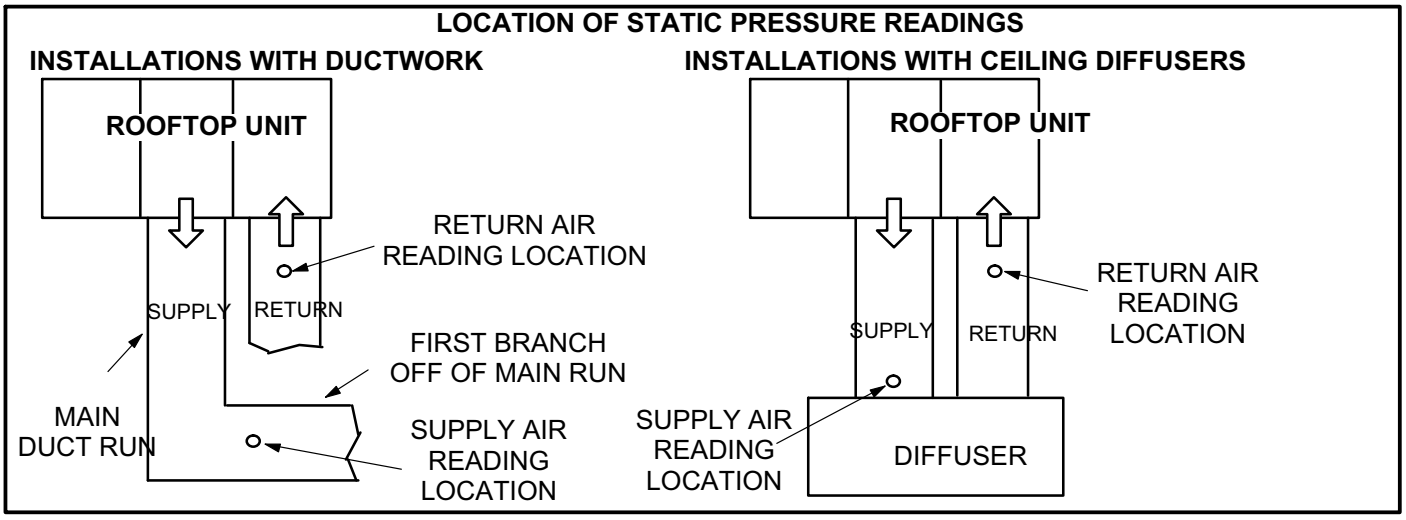


FIGURE 6

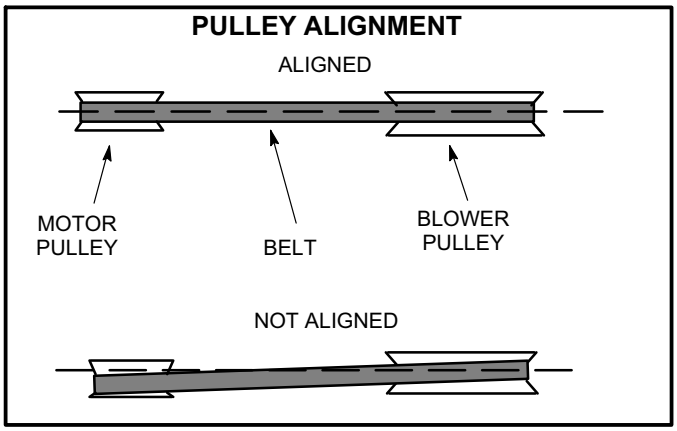


FIGURE 7

F-Check Belt Tension

Overtensioning belts shortens belt and bearing life. Check belt tension as follows:

1- Measure span length X. See figure 8.

2- Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 1.5mm per 100mm of span length.

Example: Deflection distance of a 40" span would be 40/64" or 5/8".

Example: Deflection distance of a 400mm span would be 6mm.

3- Measure belt deflection force. For a new 2 and 3hp belt, the deflection force should be 5.0-7.0 lbs. (35-48kPa). For a new 5hp belt, the deflection force should be 7-10lbs. (48-69kPa).

A force below these values indicates an undertensioned belt. A force above these values indicates an overtensioned belt.

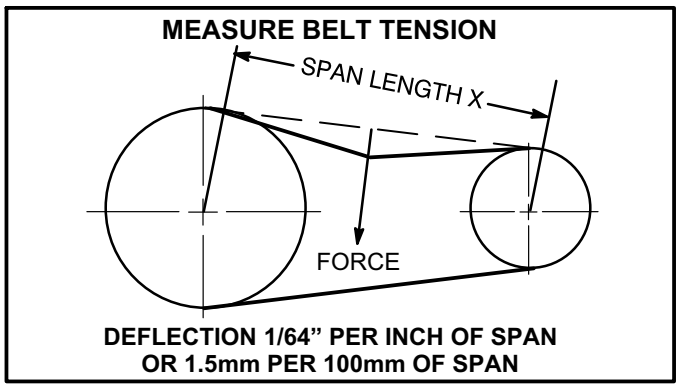


FIGURE 8

F-Field-Furnished Blower Drives

For field-furnished blower drives, use pages 13 through 17 to determine BHP and RPM required. Reference table 2 for drive component manufacturer's numbers.

TABLE 2
MANUFACTURER'S NUMBERS

DRIVE NO.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELT	
	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.
1	1VP34x7/8	31K6901	AK61x1	100244-20	A44	44L5501
2	1VP40x7/8	79J0301	AK59x1	31K6801	AX45	100245-23
3	1VP34x7/8	31K6901	AK46x1	100244-17	A41	100245-18
4	1VP44x7/8	P-8-1488	AK74x1	100244-21	AX48	100245-50
5	1VP50x7/8	P-8-2187	AK69x1	37L4701	AX48	100245-50
6	1VP50x7/8	P-8-2187	AK64x1	12L2501	AX46	31K7101
10	1VP50x1-1/8	P-8-1977	BK77x1	49K4001	BX50	100245-49
11	1VP50x1-1/8	P-8-1977	BK67x1	100244-24	BX46	100245-48
12	1VP50x1-1/8	P-8-1977	BK62x1	100244-23	BX46	100245-48

D-Optional Electric Heat Components

Table 3 shows electric heat fuse ratings. See Options/Accessories section (see table of contents) for ZCC to EHA match-ups. See Electrical/Electric Heat Data section (see table of contents) of this manual for electrical ratings and capacities.

All electric heat sections consist of electric heating elements exposed directly to the air stream. See figure 12. EHA parts arrangement is shown in figures 12 and 11. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil. The coils in the K15 and K16 contactors are energized by a W2 thermostat demand and K9. Contactor K15 energizes the first stage heating elements, while K16 energizes the second stage heating elements.

2-High Temperature Limits S15 (Primary)

S15 is a SPST normally closed auto-reset thermostat located on the back panel of the electric heat section below the heating elements. S15 is the high temperature limit for the electric heat section. When S15 opens, indicating a problem in the system, contactor K15 is de-energized. When K15 is de-energized, first stage and all subsequent stages of heat are de-energized. For EHA102/150 units, the electric heat section thermostat is factory set to open at 170°F ± 5°F (76°C ± 2.8°C) on a temperature rise and automatically reset at 130°F ± 6°F (54.4°C ± 3.3°C) on a temperature fall. For EHA100 units, the electric heat section thermostat is factory set to open at 160°F ± 5°F (71.0°C ± 2.8°C) on a temperature rise and automatically reset at 120°F ± 6°F (49.0°C ± 3.3°C) on a temperature fall. The thermostat is not adjustable.

3-High Temperature Limit S20, S157, S158, S15, S160 & S161 (Secondary)

Limits are SPST normally closed manual-reset thermostat . Like the primary temperature limit, S20 is wired in series with the first stage contactor coil (K15) and second stage contactor coil (K16). When S20 opens, contactors (K15, K16) are de-energized. When the contactors are de-energized, first stage and all subsequent stages of heat are de-energized. The thermostat is factory set to open at 220°F ± 6°F (104°C ± 3.3°C) on a temperature rise and can be manually reset when temperature falls below 160°F (71.0°C).

4-Terminal Block TB2

Terminal block TB2 is used for single point power installations only. TB2 distributes L1, L2 and L3 power to TB3. Units with multi-point power connections will not use TB2.

5-Terminal Block TB3

Electric heat line voltage connections are made to terminal block TB3 located in the upper left corner of the electric heat vestibule. TB3 distributes power to the electric heat components.

6-Heating Elements HE1 through HE6

Heating elements are composed of helix wound bare nichrome wire exposed directly to the air stream. Three elements are connected in a three-phase arrangement. The elements in 208/230V units are connected in a “Delta” arrangement. Elements in 460 and 575V units are connected in “Wye” arrangement. Each stage is energized independently by the corresponding contactors located on the electric heat vestibule panel. Once energized, heat transfer is instantaneous. High temperature protection is provided by primary and redundant high temperature limits and overcurrent protection is provided by fuses.

7-Fuse F3

Fuse F3, is housed in a fuse block which holds three fuses. Each fuse is connected in series with each leg of electric heat. Figure 11 and table 3 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F4 - 1, 2.

8-Unit Fuse Block F4

Three line voltage fuses F4 provide short circuit and ground fault protection to all cooling components in the ZCC units with electric heat. The fuses are rated in accordance with the amperage of the cooling components.

ELECTRIC HEAT CONTROL ASSEMBLY

1-Electric Heat Relay K9

All ZCC series units with electric heat use an electric heat relay K9. K9 is a N.O. DPDT pilot relay intended to electrically isolate the unit's 24V circuit from the electric heat 24V circuit. K9 is energized by the thermostat TB1-W1 AND TB1-W2 signals on ZCC and by CMC1 Defrost control and TB1 on ZHC units. See figures 9 and 10 location of the J2/P2 harness and Figure 11 for location of the K9 relay on the electric heat vest-panel.

J2 / P2 JACK PLUG CONNECTIONS

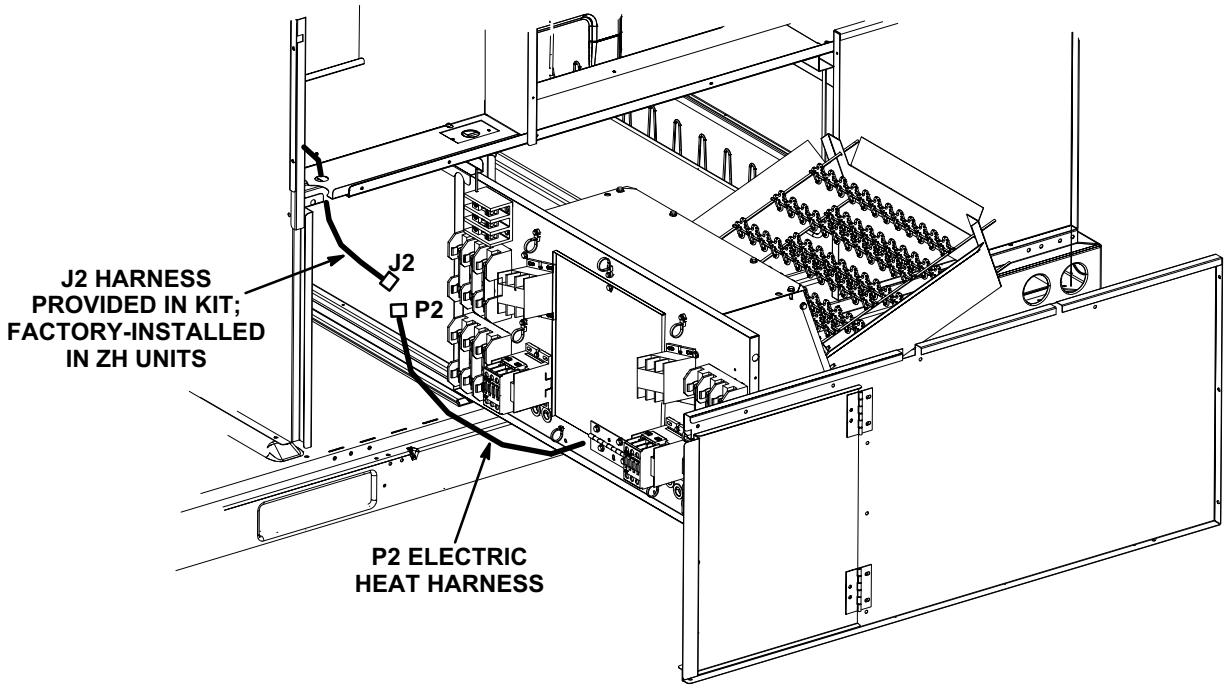


FIGURE 9

SINGLE DISCONNECT INSTALLATIONS

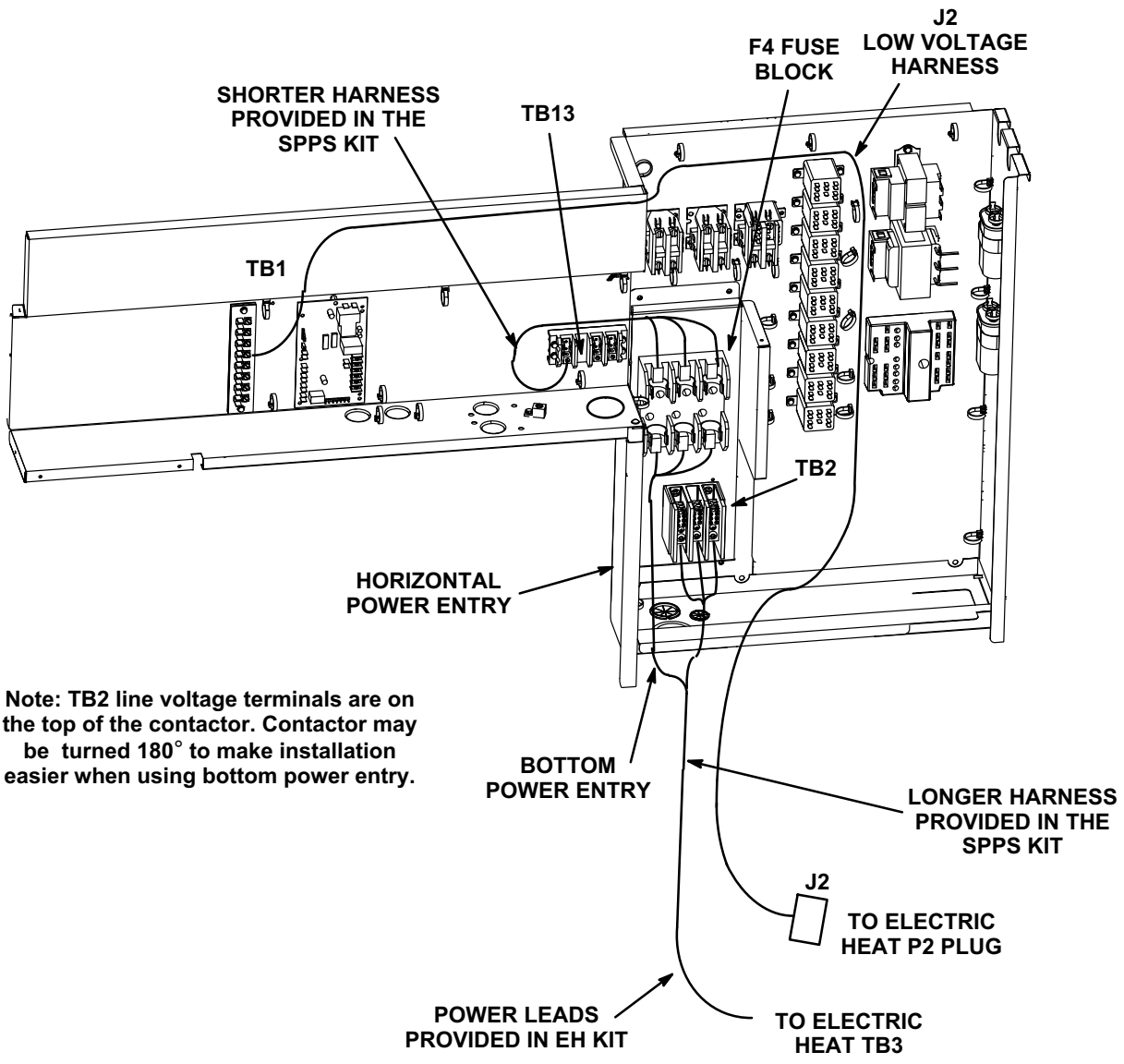


FIGURE 10

ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

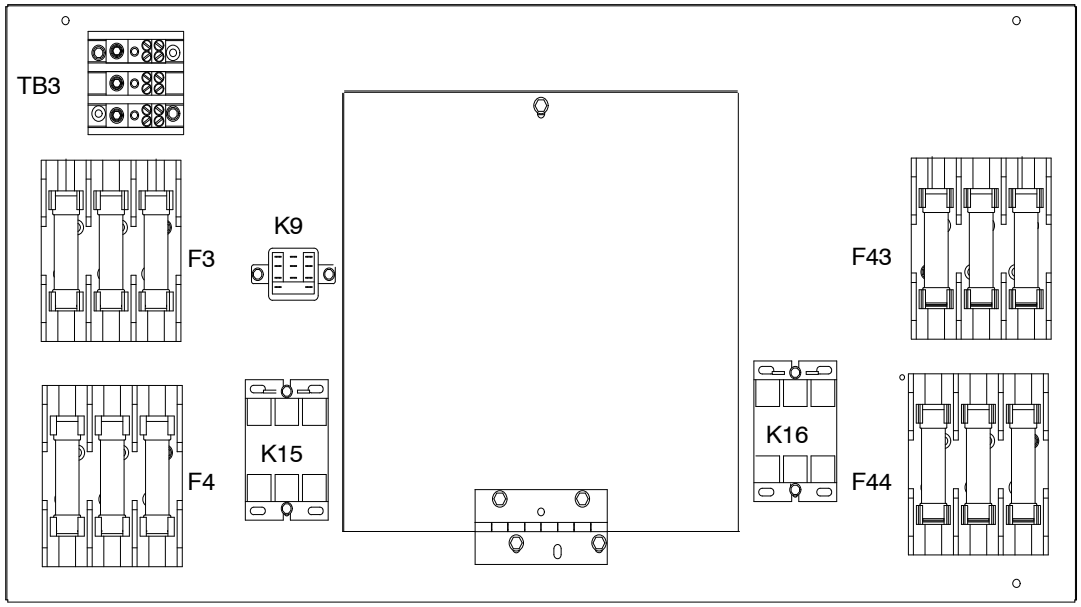


FIGURE 11

EHA 7.5, 15, 22.5, 30, 45, 60KW
ELECTRIC HEAT SECTION PARTS ARRANGEMENT

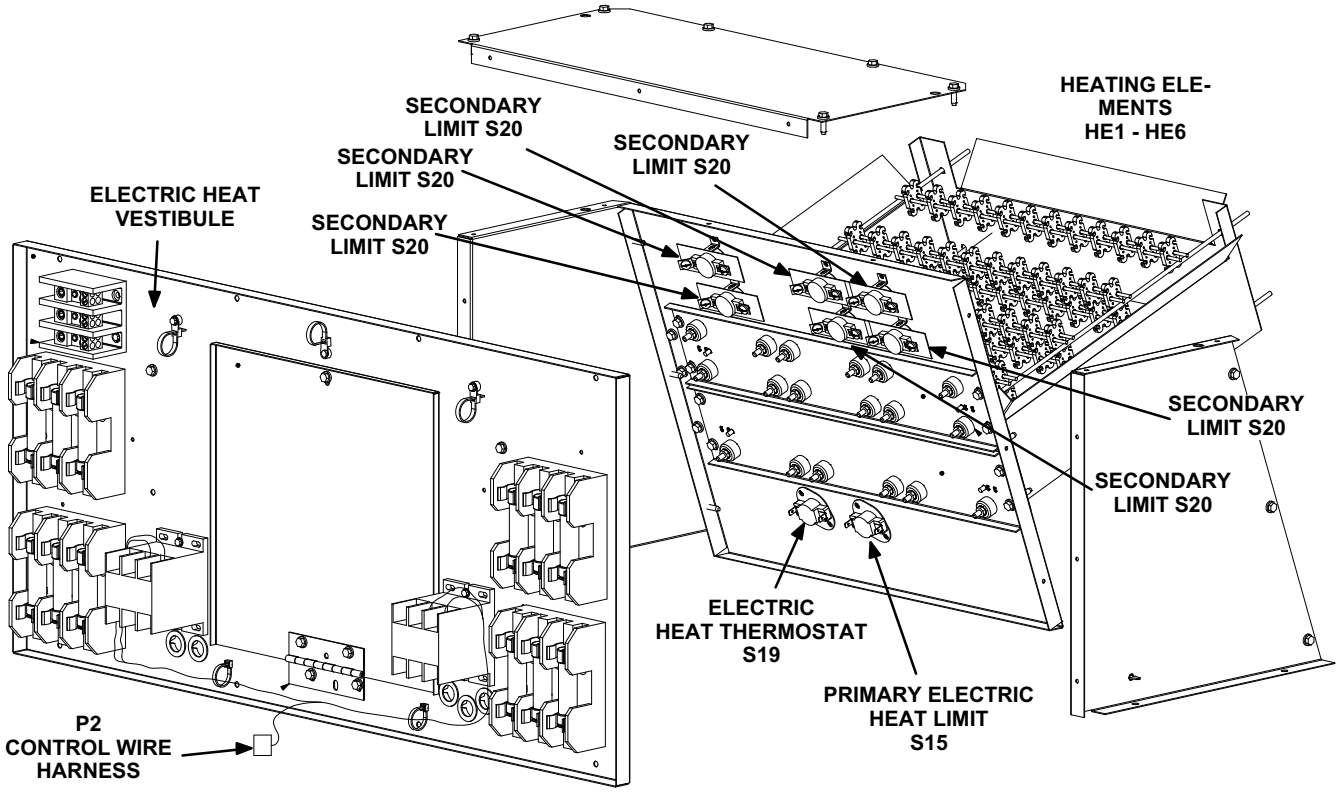


FIGURE 12

TABLE 3

ZCC/ZCH ELECTRIC HEAT SECTION FUSE RATING					
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**			
		F3 - 1	**F3 - 2**	**F3 - 3**	**F3 - 4**
EHO075-7.5	208/230V	25 Amp 250V	-----	-----	-----
	460V	15 Amp 600V	-----	-----	-----
	575V	10 Amp 600V	-----	-----	-----
EHO150-1	208/230V	50 Amp 250V	-----	-----	-----
	460V	25 Amp 600V	-----	-----	-----
	575V	20 Amp 600V	-----	-----	-----
EHO225-1	208/230V	50 Amp250V	-----	-----	25 Amp 250V
	460V	25 Amp 600V	-----	-----	15 Amp 600V
	575V	20 Amp 600V	-----	-----	10 Amp 600V
EHO300-1	208/230V	50 Amp 250V	-----	-----	50 Amp 250V
	460V	25 Amp 600V	-----	-----	25 Amp 600V
	575V	20 Amp 600V	-----	-----	20 Amp 600V
EHO450-1	208/230V	50 Amp 250V	-----	60 Amp 250V	60 Amp 250V
	460V	25 Amp 600V	-----	-----	50 Amp 600V
	575V	20 Amp 600V	-----	-----	40 Amp 600V
EHO600-1	208/230V	60 Amp 250V	60 Amp 250V	60 Amp 250V	60 Amp 250V
	460V	50 Amp 600V	-----	-----	50 Amp 600V
	575V	40 Amp 600V	-----	-----	40 Amp 600V

II-PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (Z1CURB40B, Z1CURB41B, Z1CURB42B, or Z1CURB43B).

III-STARTUP - OPERATION

A-Preliminary and Seasonal Checks

1- Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2- Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit compressor access panel.

3- Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4- Check voltage at the disconnect switch. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5- Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6- Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B-Cooling Startup

Operation

1- Initiate first and second stage cooling demands according to instructions provided with thermostat.

2- *No Economizer Installed in Unit -*
A first-stage cooling demand (Y1) will energize compressor 1 and both condenser fans. An increased cooling demand (Y2) will energize compressor 2.

Units Equipped With Economizer -
When outdoor air is acceptable, a first-stage cooling demand (Y1) will energize the economizer. An increased cooling demand (Y2) will energize compressor 1 and both condenser fans. When outdoor air is not acceptable unit will operate as though no economizer is installed.

3- Units contain two refrigerant circuits or stages. See figure 13.

4- Each refrigerant circuit is separately charged with R-410A refrigerant. See unit rating plate for correct amount of charge.

5- Refer to section IV CHARGING for proper method to check refrigerant charge.

C-Safety or Emergency Shutdown

Turn off power to unit. Close manual and main ga valves.

Three Phase Scroll Compressor Voltage Phasing

Three phase power supplied to the unit disconnect switch must be phased sequentially to ensure the scroll compressor and indoor blower rotate in the correct direction. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1- Observe suction and discharge pressures and blower rotation on unit start-up.

2- Suction pressure must drop, discharge pressure must rise and blower rotation must match rotation marking.

If pressure differential is not observed or blower rotation is not correct:

3- Disconnect all remote electrical power supplies.

4- Reverse any two field-installed wires connected to the line side of K2 contactor or disconnect switch if installed. Do not reverse wires at blower contactor.

5- Make sure the connections are tight.

Discharge and suction pressures should operate at their normal start-up ranges.

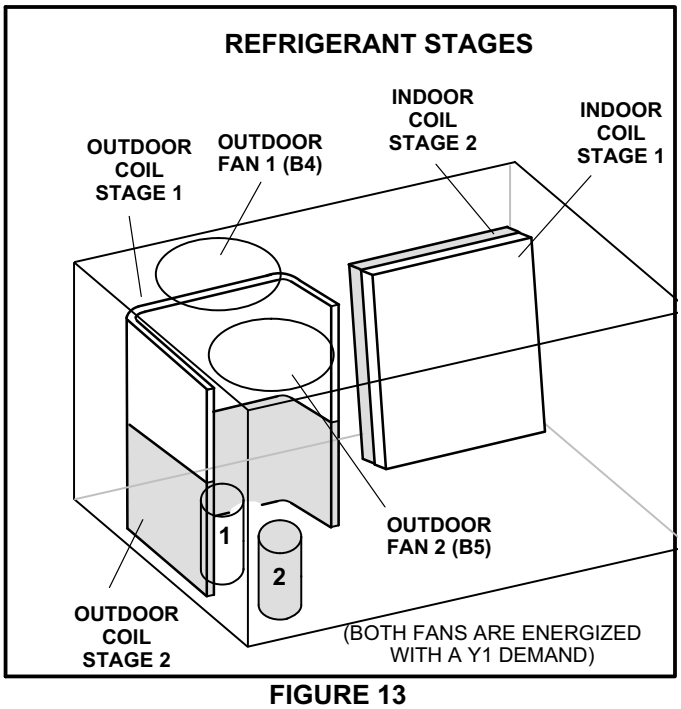


FIGURE 13

IV-CHARGING

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

WARNING-Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, *reclaim the charge, evacuate the system,* and *add required nameplate charge.*

*NOTE - System charging is not recommended below 60°F (15°C). In temperatures below 60°F (15°C), the charge **must** be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

IMPORTANT - Charge unit in standard cooling mode.

1- Make sure outdoor coil is clean. Attach gauge manifolds and fit access panel in place with manifold tubing routed outside of unit near bottom corner of panel. Operate unit at full CFM in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure all outdoor air dampers are closed.

2- Check each system separately with all stages operating. Compare the normal operating pressures (see tables 4 - 7) to the pressures obtained from the gauges. Check unit components if there are significant differences.

3- Measure the outdoor ambient temperature and the suction pressure. Refer to the appropriate circuit charging curve to determine a target liquid temperature.

Note - Pressures are listed for sea level applications.

4- Use the same thermometer to accurately measure the liquid temperature (in the outdoor section).

- If measured liquid temperature is higher than the target liquid temperature, add refrigerant to the system.
- If measured liquid temperature is lower than the target liquid temperature, recover some refrigerant from the system.

5- Add or remove charge in increments. Allow the system to stabilize each time refrigerant is added or removed.

6- Continue the process until measured liquid temperature agrees with the target liquid temperature. Do not go below the target liquid temperature when adjusting charge. Note that suction pressure can change as charge is adjusted.

7- Example ZC 092S Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 100.5°F. For a measured liquid temperature of 106°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 4

ZG/ZC 092S Normal Operating Pressures - 581153-01												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	99	248	101	287	103	338	106	398	110	466	114	536
	109	247	109	290	111	336	127	368	117	463	122	531
	126	256	128	295	151	348	133	389	134	454	139	520
	143	268	147	305	155	352	156	396	159	446	165	506
Circuit 2	118	246	122	282	125	323	127	368	131	418	140	477
	124	250	129	287	125	323	135	373	140	424	125	510
	136	262	141	298	147	340	152	386	157	438	161	492
	151	279	156	314	161	371	168	405	172	457	181	517

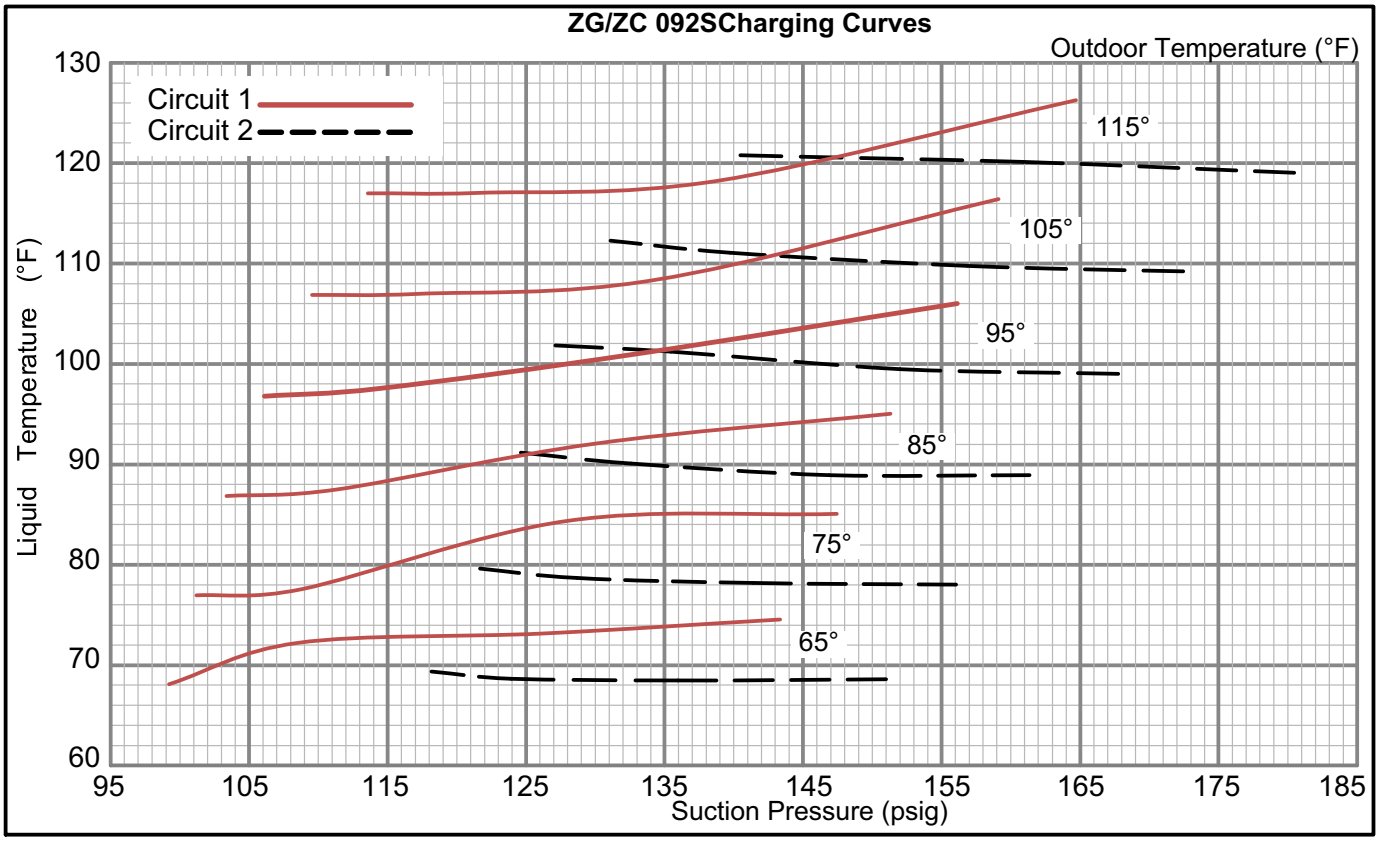


TABLE 5

ZG/ZC102S Normal Operating Pressures 581154-01												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	105	248	107	283	110	327	113	374	116	427	119	482
	113	254	116	288	117	330	124	396	124	432	128	491
	128	261	132	298	154	355	140	389	143	442	145	499
	145	274	149	310	155	352	158	400	162	454	165	508
Circuit 2	115	259	118	303	121	347	124	396	128	447	140	510
	121	261	126	308	129	351	133	403	136	452	125	510
	135	277	140	319	160	377	150	412	153	464	159	522
	148	290	154	332	161	371	166	425	171	477	176	535

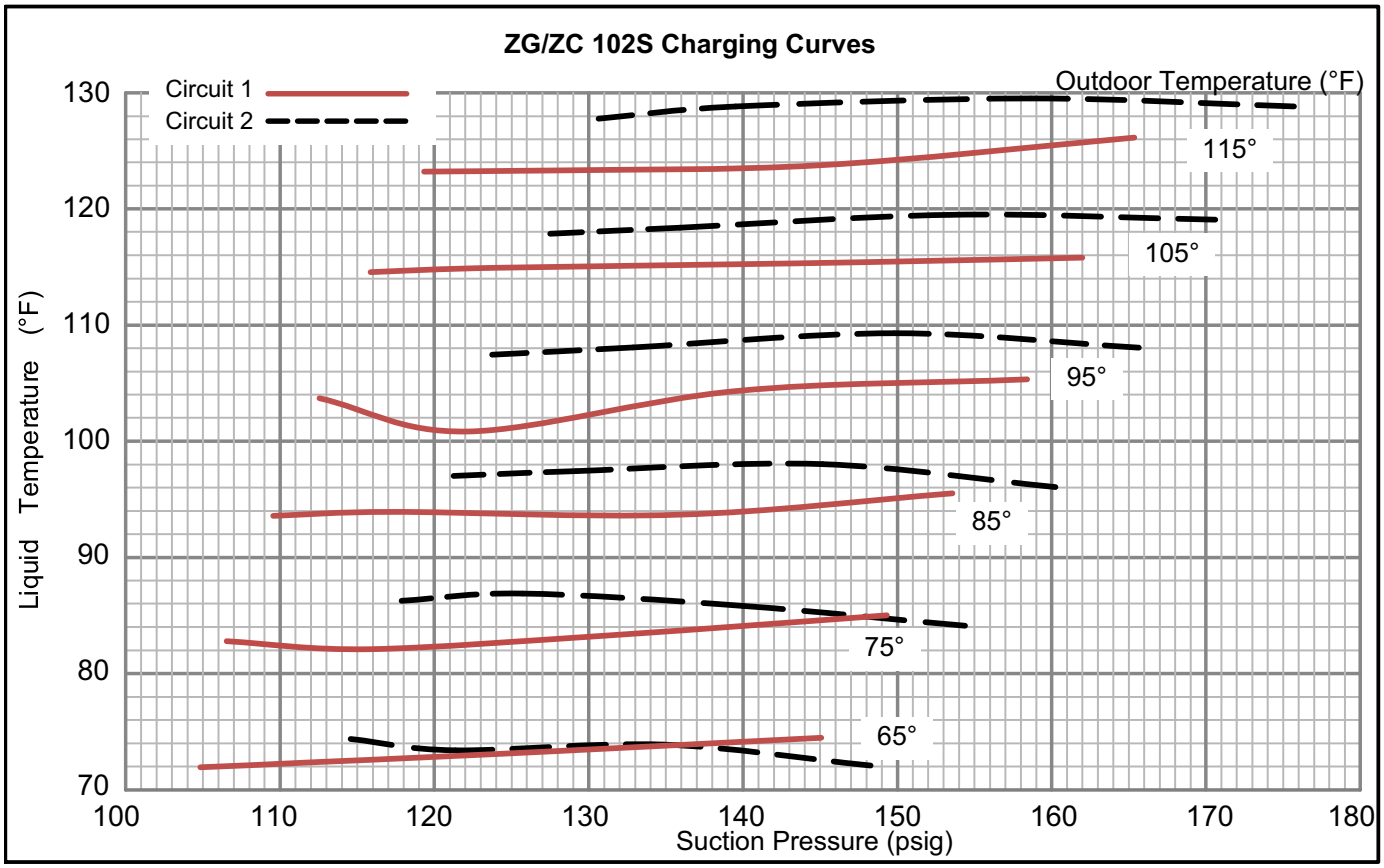


TABLE 6

ZG/ZC 120S Normal Operating Pressures - 581155-01												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	102	252	105	296	108	323	111	369	114	420	117	476
	110	257	113	297	115	327	125	389	122	422	125	478
	124	271	133	311	132	337	136	385	138	429	142	490
	136	281	145	329	151	350	155	397	160	447	164	501
Circuit 2	111	254	117	297	122	344	125	389	128	439	131	493
	116	263	123	304	129	348	133	393	136	442	139	497
	127	286	135	321	145	365	149	412	153	452	157	510
	137	296	148	342	161	390	166	436	171	485	175	538

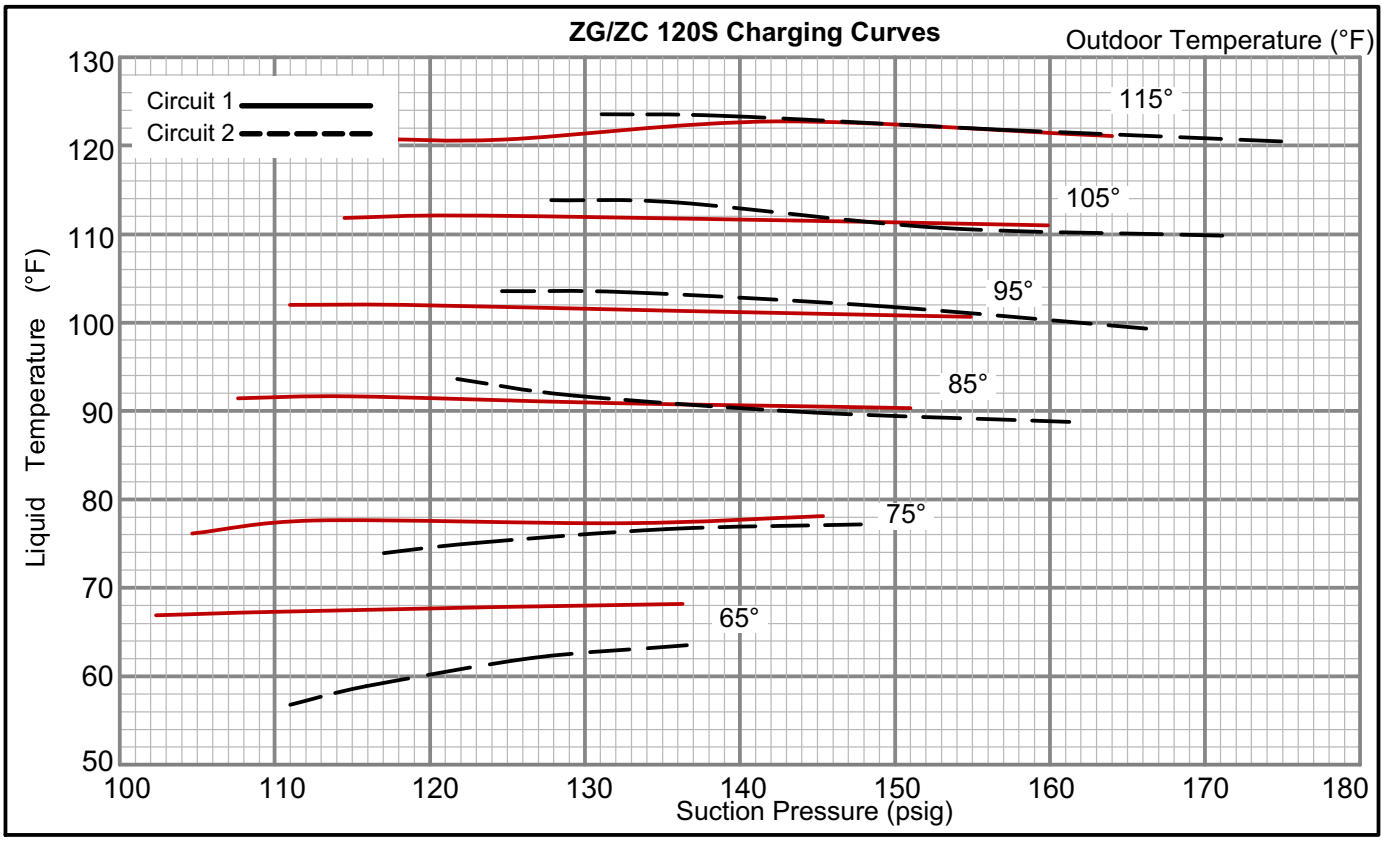
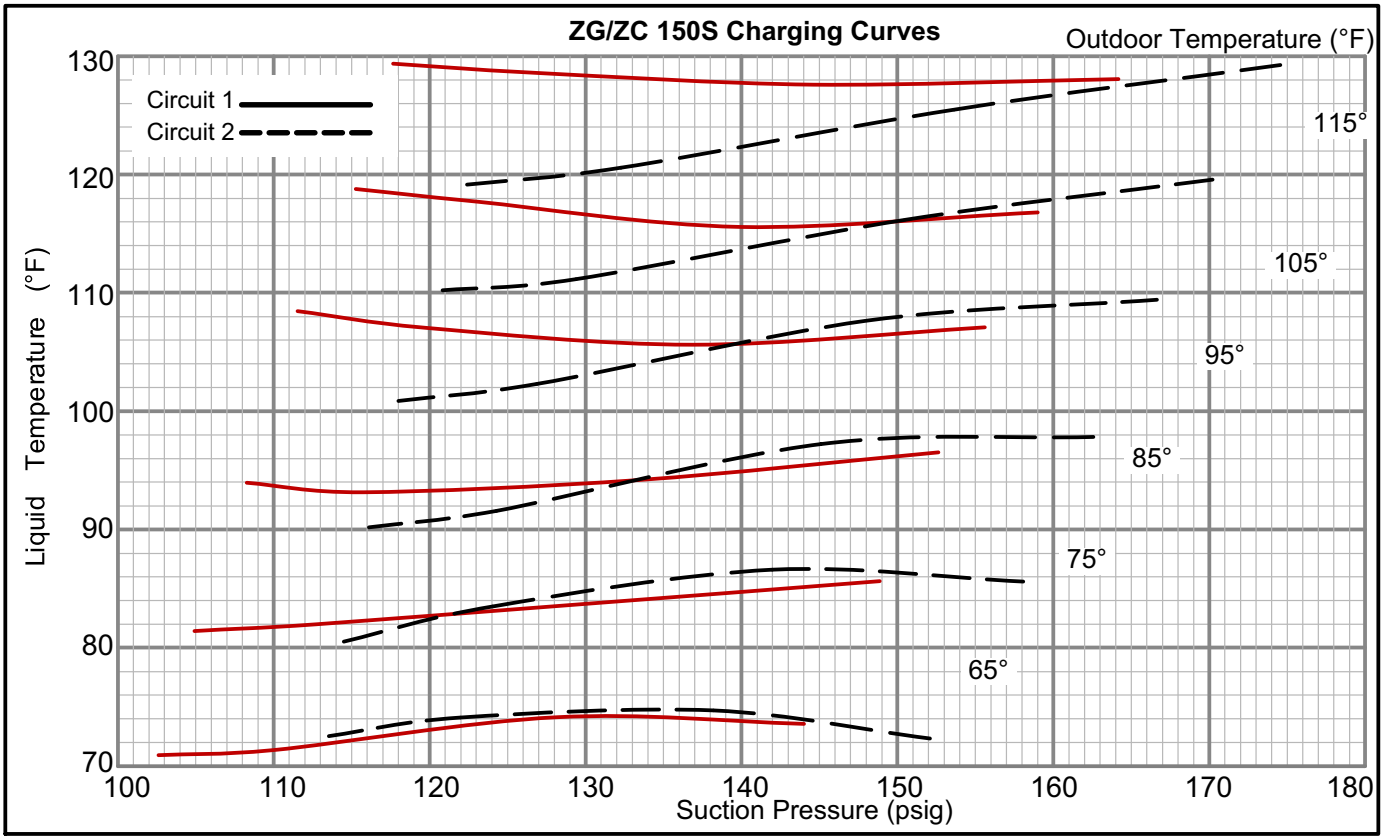


TABLE 7

ZG/ZC150S Normal Operating Pressures 581159-01												
	Outdoor Coil Entering Air Temperature											
	65 °F		75 °F		85 °F		95 °F		105 °F		115 °F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	103	247	105	288	108	330	112	381	115	437	118	488
	110	252	113	294	116	337	118	414	123	444	127	497
	128	259	130	302	133	348	137	403	140	458	145	515
	144	273	149	313	153	359	156	413	159	467	164	535
Circuit 2	114	270	115	313	116	360	118	414	121	469	122	527
	122	276	124	318	124	365	127	421	129	473	132	530
	138	289	142	329	145	375	148	428	150	479	154	538
	152	301	158	345	163	391	167	440	170	490	175	550



V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

ZCC units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See section IV- CHARGING.

NOTE-*When unit is properly charged discharge line pressures should approximate those in tables 4 through 7.*

VI-MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

A-Filters

Units are equipped with 20 X 24 X 2" temporary filters which must be replaced prior to building occupation. Refer to local codes or appropriate jurisdiction for approved filters.

To change filters, open filter access panel on back side of unit. See figure 14. Lift filter stop to remove filters. See figure 15.

⚠WARNING

Units are shipped from the factory with temporary filters. Replace filters before building is occupied. Damage to unit could result if filters are not replaced with approved filters. Refer to appropriate codes.

Approved filters should be checked monthly and replaced when necessary. Take note of air flow direction marking on filter frame when reinstalling filters. See figure 15.

NOTE-*Filters must be U.L.C. certified or equivalent for use in Canada.*

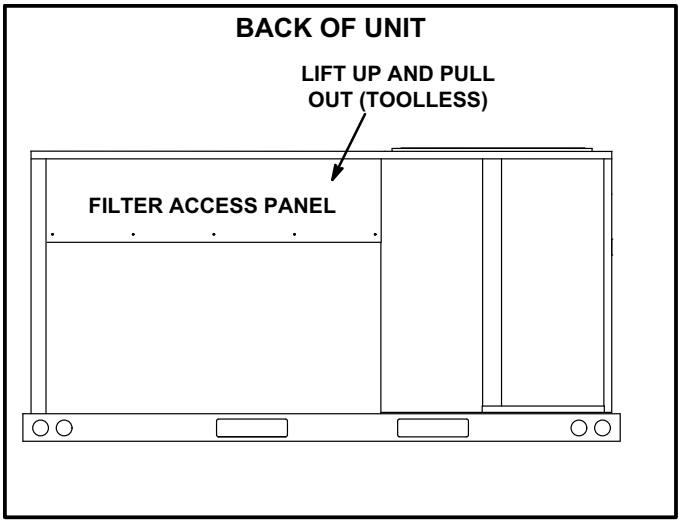


FIGURE 14

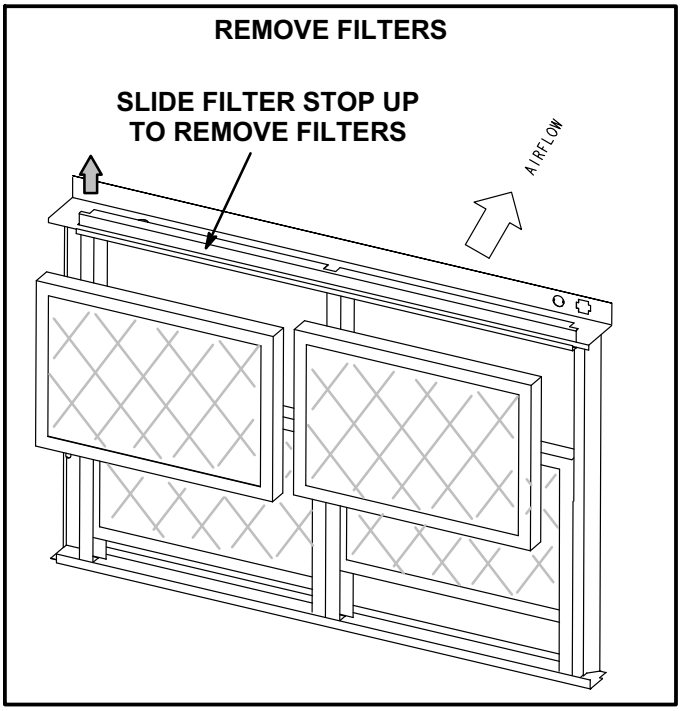


FIGURE 15

B-Lubrication

All motors are lubricated at the factory. No further lubrication is required.

C-Evaporator Coil

Inspect and clean coil at beginning of each cooling season. Clean using mild detergent or commercial coil cleanser. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet.

D-Condenser Coil

Clean condenser coil annually with water and inspect monthly during the cooling season.

Note - Do not use commercial coil cleaner on the all aluminum coil. Using anything other than water could result in corrosion and/or leaks.

Clean the all-aluminum coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45° angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between the fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage.

E-Supply Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

VII-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the ZCC units. OPTIONAL ACCESSORIES section (see table of contents) show specific size per unit.

A-Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the Z1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the ZCC units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled Z1CURB mounting frame is shown in figure 16. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 17. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

Transitions are field-provided.

C-Supply and Return Diffusers

Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all ZCC units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

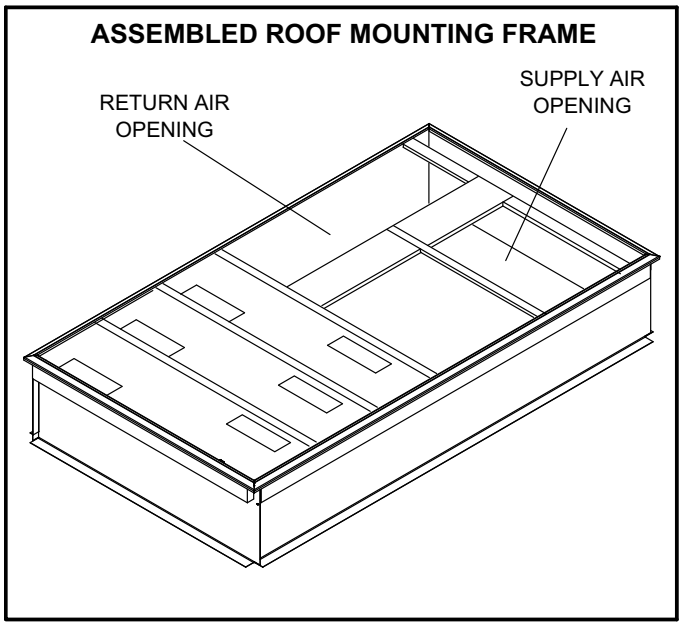


FIGURE 16

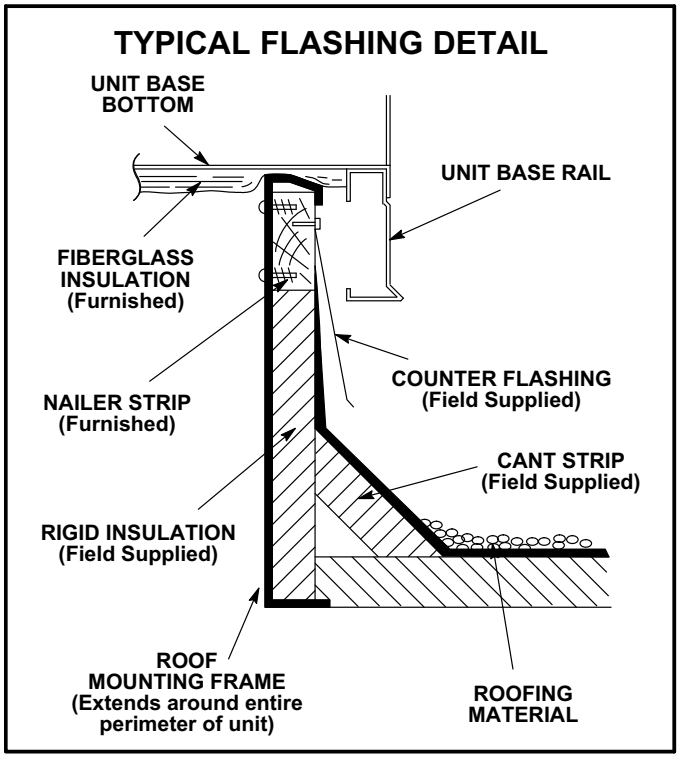


FIGURE 17

D-Economizer (Field or Factory Installed)

NOTE - *The following is an example of one economizer used. See Engineering Handbook for other economizers used and refer to the applicable economizer installation instruction for more detail.*

Economizers use outdoor air for free cooling when temperature and/or humidity is suitable. See figure 18.

The mixed air temperature sensor (R1) measures the supply air sensible temperature. See figure 19. The outdoor air sensible control is the default economizer control. An outdoor air single sensible sensor, S175, is also provided. See table 8 for outdoor and return air (OA and RA) sensor options. Refer to instructions provided with sensors for installation.

An IAQ sensor is used when demand control ventilation (DCV) is specified. Damper minimum position can be set lower than traditional minimum air requirements resulting in cost savings. The IAQ sensor allows the A6 to open dampers to traditional ventilation requirements as room occupancy (CO_2) increases.

TABLE 8

Sensors	Dampers will modulate to 55°F discharge air (RT6) when:
Single OA Sensible	OA temperature (S175) is lower than free cooling setpoint.
Single OA Sensible	OA temperature and humidity (A7) is lower than free cooling setpoint.
Differential Enthalpy - 1 in OA and 1 in RA	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).
IAQ Sensor	CO_2 sensed (A63) is higher than CO_2 setpoint.

ECONOMIZER

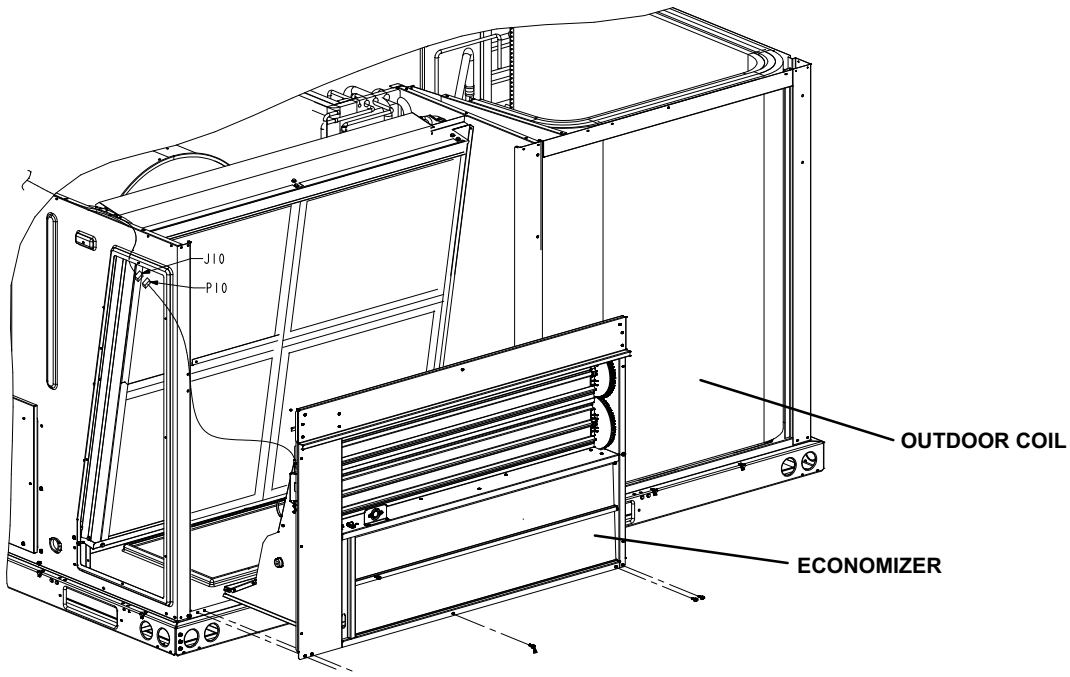


FIGURE 18

MIXED AIR SENSOR (R1) LOCATION

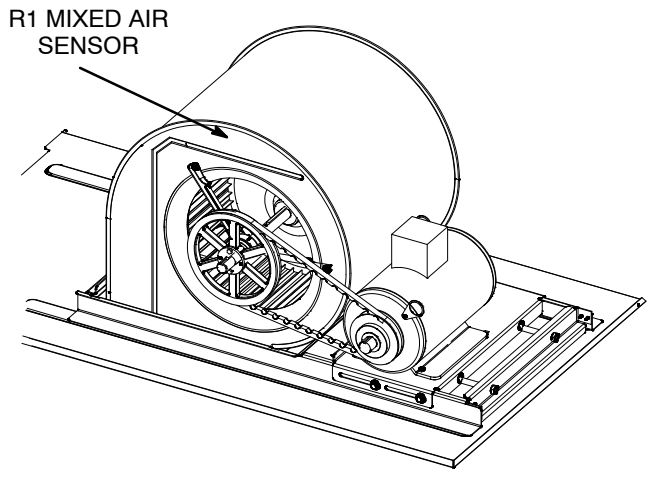


FIGURE 19

A6 Enthalpy Control LED'S

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling.

When an optional IAQ sensor is installed, a steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See figure 20.

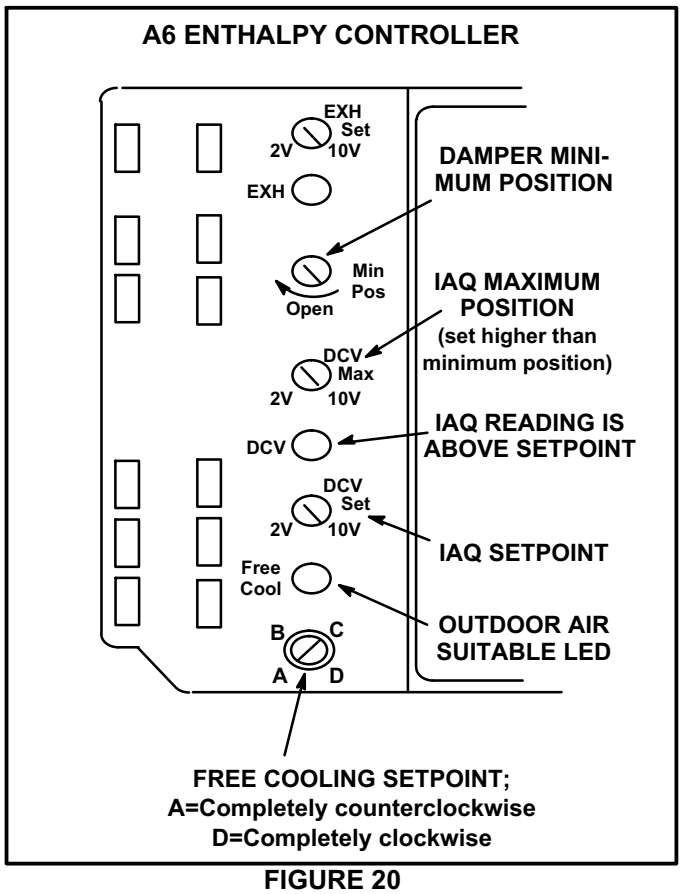


FIGURE 20

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in table 9. Setting A is recommended. See figure 20. At setting A, free cooling will be energized when outdoor air is approximately 73°F (23°C) and 50% relative humidity. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be energized at 70°F (21°C) and 50% relative humidity.

When an optional A62 differential sensor is installed, turn A6 enthalpy control free cooling setpoint potentiometer completely clockwise to position “D”.

TABLE 9
ENTHALPY CONTROL SETPOINTS

Control Setting	Free Cooling Setpoint At 50% RH
A	73° F (23° C)
B	70° F (21° C)
C	67° F (19° C)
D	63° F (17° C)

Damper Minimum Position

NOTE - A jumper is factory-installed between TB1 R and OC terminals to maintain occupied status (allowing minimum fresh air). When using an electronic thermostat or energy management system with an occupied/unoccupied feature, remove jumper.

1- Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature.

2- Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

Note - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified. Dampers will open to DCV MAX setting (if CO2 is above setpoint) to meet traditional ventilation requirements.

3- Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).

4- Measure return air temperature. Mark that point on the top line of chart 1 and label the point “B” (74°F, 23°C shown).

5- Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point “C” (70°F, 21°C shown).

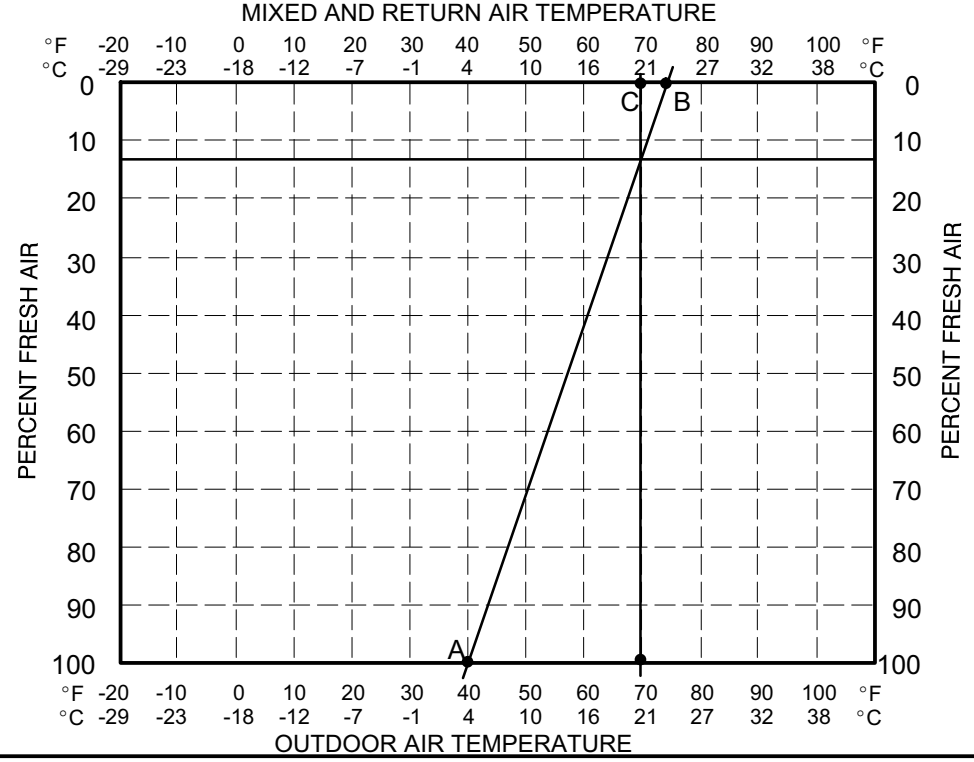
6- Draw a straight line between points A and B.

7- Draw a vertical line through point C.

8- Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.

9- If fresh air percentage is less than desired, adjust MIN POS SET potentiometer higher. If fresh air percentage is more than desired, adjust MIN POS SET potentiometer lower. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

CHART 1
CALCULATE MINIMUM FRESH AIR PERCENTAGE



DCV Set and Max Settings

Adjust settings when an optional IAQ sensor is installed.

The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO_2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to figure 20.

The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO_2 rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to figure 20.

Note - DCV Max must be set higher than economizer minimum position setting for proper demand control ventilation.

Economizer Operation

The occupied time period is determined by the thermostat or energy management system.

Outdoor Air Not Suitable:

During the unoccupied time period dampers are closed.

During the occupied time period a cooling demand will open dampers to minimum position and mechanical cooling functions normally.

During the occupied time period dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability).

Outdoor Air Suitable:

See table 10 for economizer operation with a standard two-stage thermostat.

During the occupied period, dampers will open to DCV MAX when IAQ reading is above setpoint (regardless of thermostat demand or outdoor air suitability). DCV MAX will NOT override damper full-open position. When an R1 mixed air sensor for modulating dampers is installed, DCV MAX may override damper free cooling position when occupancy is high and outdoor air temperatures are low. If R1 senses discharge air temperature below 45°F (7°C), dampers will move to minimum position until discharge air temperature rises to 48°F (9°C).

TABLE 10

ECONOMIZER OPERATION - OUTDOOR AIR IS **SUITABLE** FOR FREE COOLING -- FREE COOL LED “ON”

THERMOSTAT DEMAND	DAMPER POSITION		MECHANICAL COOLING
	UNOCCUPIED	**OCCUPIED**	
OFF	CLOSED	CLOSED	NO
G	CLOSED	MINIMUM	NO
Y1	OPEN*	OPEN*	NO
Y2	OPEN*	OPEN*	STAGE 1

** Dampers will open to maintain 55°F (13°C) supply air when an R1 mixed air sensor is installed.*

POWER EXHAUST FANS

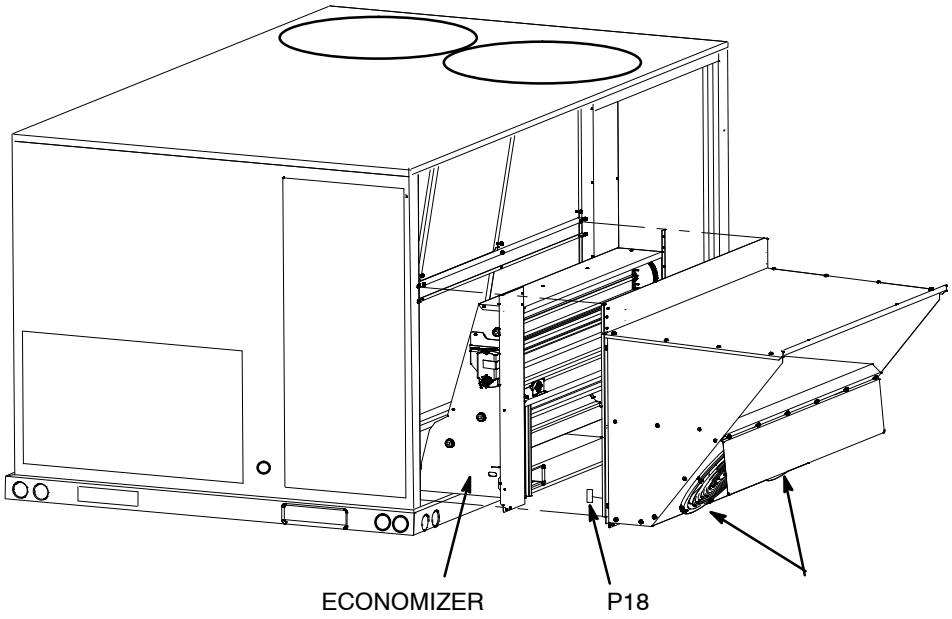


FIGURE 21

Standard Economizer Down Flow and Horizontal

The standard economizer is used with ZC,ZG,ZH 092-150 units in downflow air discharge applications. Economizer dampers will modulate to maintain 55°F (13°C) supply air when outdoor air is suitable. The mixed air temperature sensor measures the supply air sensible temperature. An outdoor air sensor is used to determine whether outdoor air is suitable for free cooling. The outdoor air sensor is factory-installed in all economizers. Other outdoor and return air (OA and RA) sensor options are available to determine whether outdoor air is suitable for free.

Wiring

1- The economizer control module is located below the actuator for shipping. Relocate the control to the unit control box, see Figure 23.

2- Route the control wires to unit terminal block (TB1) and connect these wires to TB1 as following (see Figure 23):
•Connect all female terminals to TB1 - Pink (24V) to R; Grey (GND) to ground; Yel (Cool 1) to Y1; and Blue (Cool 2) to Y2.
•Disconnect the factory installed terminals at TB1, Y1 and Y2. Connect these terminals to control male terminal Y1 and Y2

3- Attach the control harness jack (J142) to prewired harness plug (P142).

4- At economizer/filter compartment, attach economizer plug(P10) to prewired harness jack (J10). See Figure 18.

5- Connect any optional sensors as shown in Figure 22..

6- If optional power exhaust is used, wire according to instructions provided with power exhaust. See Figure 22.

7- Apply wiring diagram to the control panel.

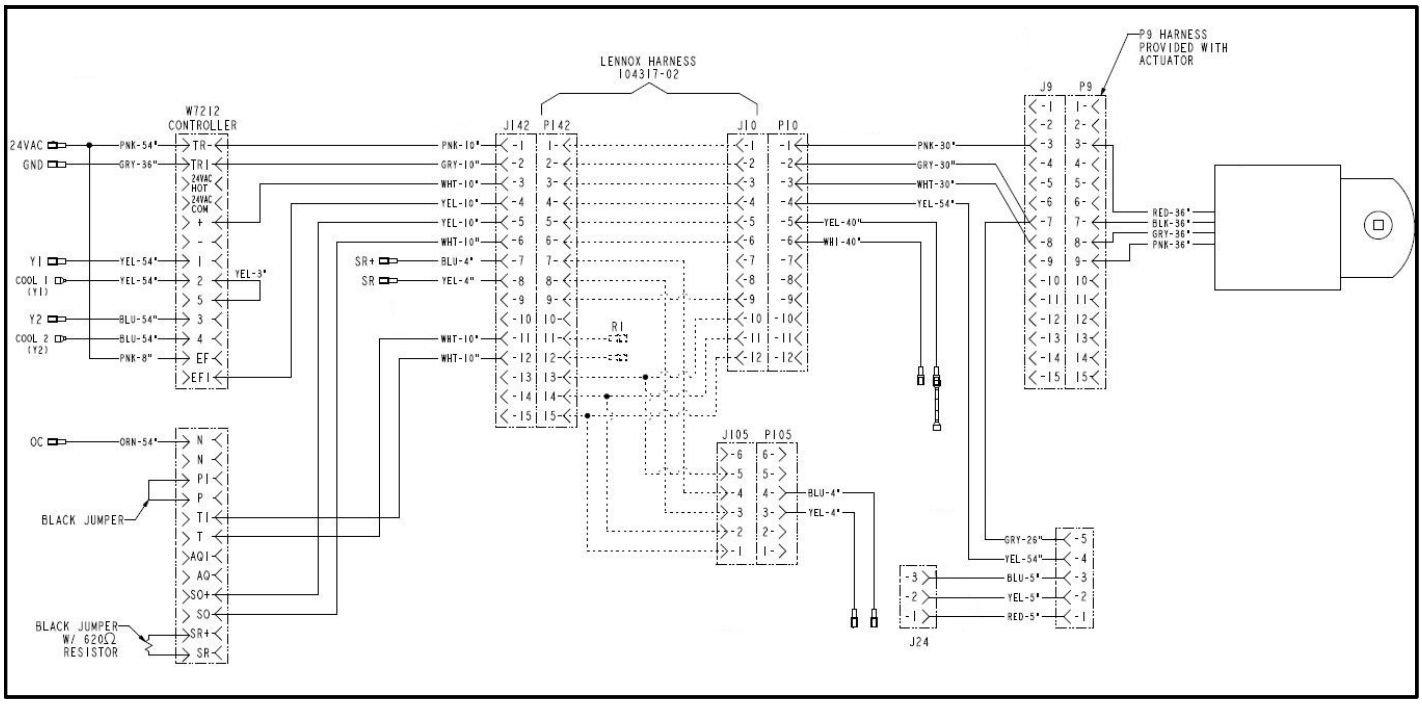


FIGURE 22

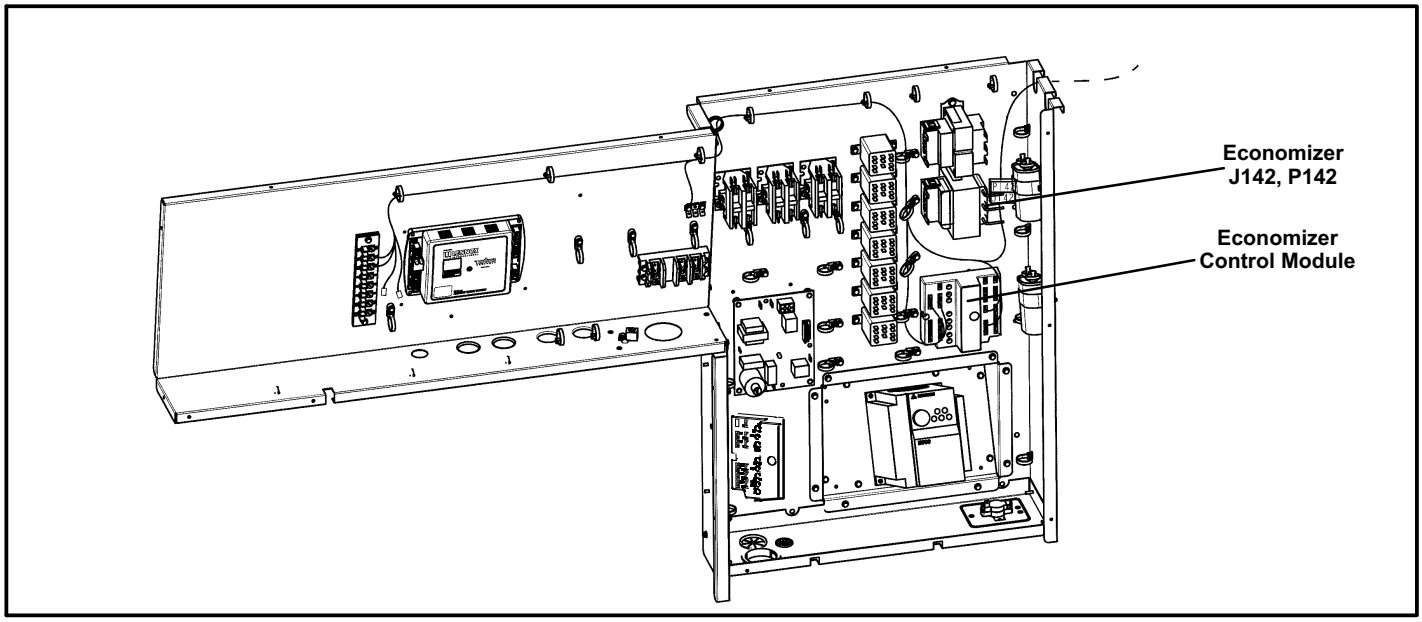


FIGURE 23

E-Power Exhaust Fan

The power exhaust fan (PEF) requires an optional gravity exhaust damper and economizer and is used in downflow applications only. See figure 21. The PEF provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

Power Exhaust Setpoint Adjustment

Locate the A6 enthalpy control in the control area. The EXH SET potentiometer is factory-set at approximately 50% of the dial range. See figure 24. Power exhaust fans will be energized 30 seconds after dampers are 50% open. Adjust the EXH SET potentiometer higher (clockwise toward 10V) to energize fans when dampers are further open. Adjust the EXH SET potentiometer lower (counterclockwise toward 2V) to energize fans when dampers are further closed. (Thirty-second delay allows dampers to partially open before exhaust fan starts.)

F-Drain Pan Overflow Switch S149 (option)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.O. overflow switch is controlled by K220 and DL46 relays, located in the unit control panel. When the overflow switch closes, 24VAC power is interrupted and after a five-second delay unit compressors are de-energized. Once the condensate level drops below the set level, the switch will open. After a five-minute delay the compressor will be energized.

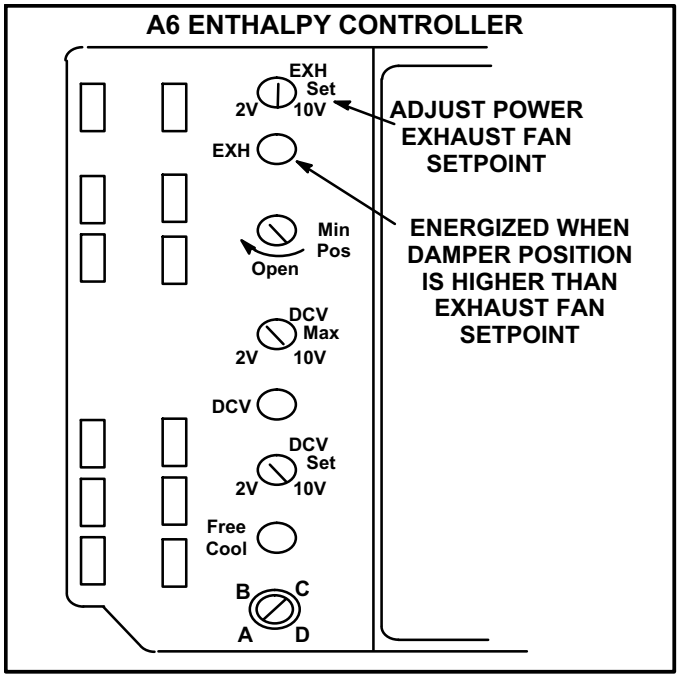
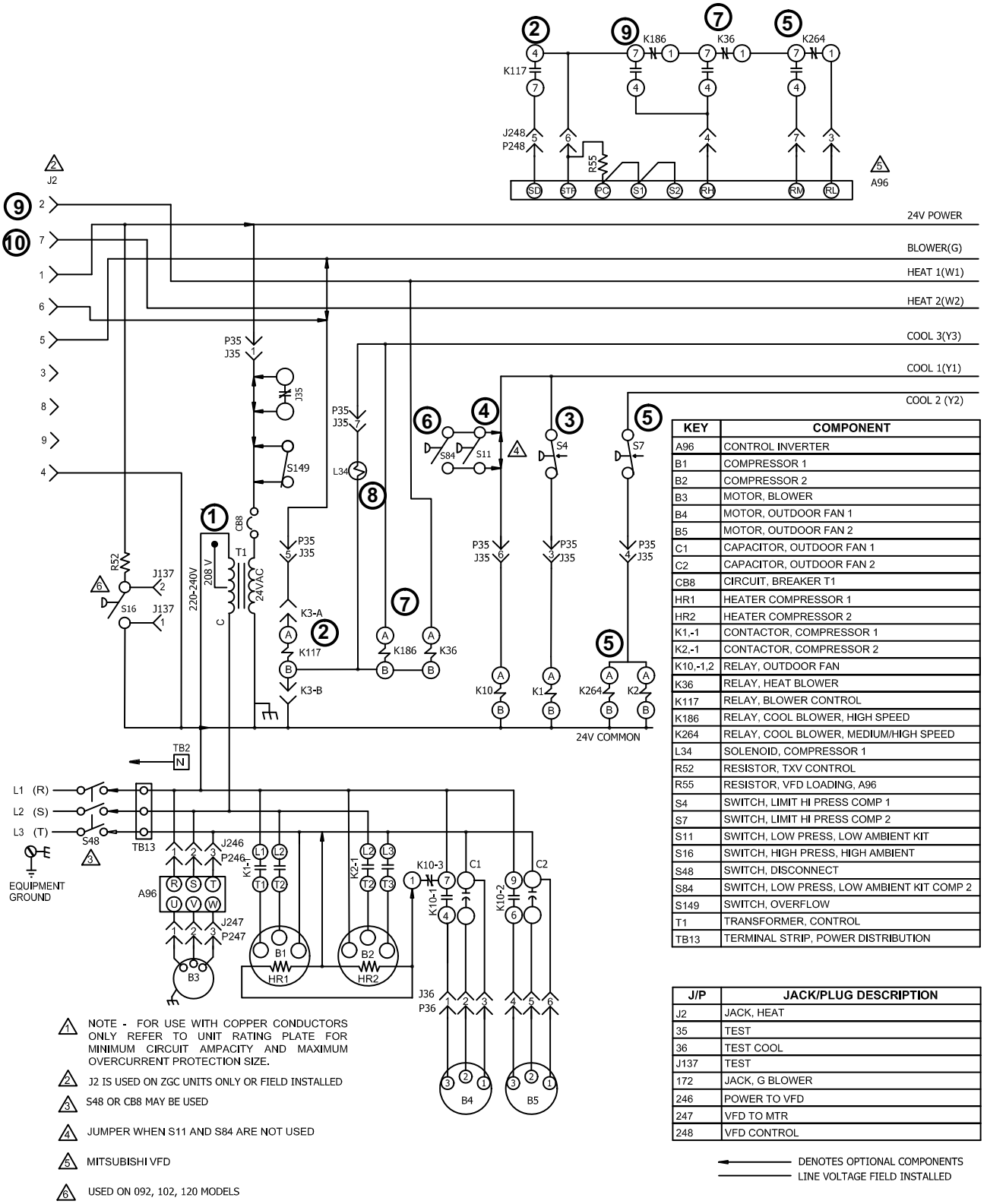


FIGURE 24

ZCC092/150 UNIT DIAGRAM



KEY	COMPONENT
A96	CONTROL INVERTER
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
CB8	CIRCUIT, BREAKER T1
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K10,-1,2	RELAY, OUTDOOR FAN
K36	RELAY, HEAT BLOWER
K117	RELAY, BLOWER CONTROL
K186	RELAY, COOL BLOWER, HIGH SPEED
K264	RELAY, COOL BLOWER, MEDIUM/HIGH SPEED
L34	SOLENOID, COMPRESSOR 1
R52	RESISTOR, TXV CONTROL
R55	RESISTOR, VFD LOADING, A96
S4	SWITCH, LIMIT HI PRESS COMP 1
S7	SWITCH, LIMIT HI PRESS COMP 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT
S16	SWITCH, HIGH PRESS, HIGH AMBIENT
S48	SWITCH, DISCONNECT
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S149	SWITCH, OVERFLOW
T1	TRANSFORMER, CONTROL
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	JACK/PLUG DESCRIPTION
J2	JACK, HEAT
35	TEST
36	TEST COOL
J137	TEST
172	JACK, G BLOWER
246	POWER TO VFD
247	VFD TO MTR
248	VFD CONTROL

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

1. NOTE - FOR USE WITH COPPER CONDUCTORS ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
2. J2 IS USED ON ZGC UNITS ONLY OR FIELD INSTALLED
3. S48 OR CB8 MAY BE USED
4. JUMPER WHEN S11 AND S84 ARE NOT USED
5. MITSUBISHI VFD
6. USED ON 092, 102, 120 MODELS

NOTE - IF ANY WIRE IN THIS APPLIANCE IS REPLACED IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, TERMINATION AND INSULATION THICKNESS

WARNING - ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES

DISCONNECT ALL POWER BEFORE SERVICING.

2022/09	WIRING DIAGRAM 538305-01	09/22
COOLING - MSAV		
ZCC, ZGC - 092, 102, 120, 150 - G, J, Y		
SECTION B		REV. 0
Supersedes 537722-01	New Form No. 538305-01	

ZCC092/150 Sequence of Operation

Power:

1- Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to terminal strip TB1. TB1 provides 24VAC to the unit cooling, heating and blower controls.

Blower Operation:

2- Indoor thermostat terminal G energizes blower relay K117 with 24VAC. N.O. K117 closes, connecting SD to STF and RL on the A96 VFD Inverter Controller. RL sets inverter speed to Low or 40 Hz.

1st Stage Cooling (compressor B1 low capacity)

3- First stage cooling demand Y1 and G are energized by the thermostat. G energizes blower. 24VAC is routed through TB1 passing N.C. high pressure switch S4. Compressor contactor K1 is energized. N.O. contacts K1 close energizing B1 two-step compressor into the lower capacity, or step-one.

4- Optional N.O. low ambient switch S11 closes to energize condenser fan relay K10. N.O. contacts K10-1 and K10-2 close energizing condenser fans B4 and B5. N.C. contacts K10-3 open de-energizing crankcase heaters HR1 and HR2.

2nd Stage Cooling (compressor B2 is energized)

5- Second stage cooling demand 24VAC is routed through TB1 and proves N.C. high pressure switch S7. Compressor contactor K2 is energized. N.O. K2 contacts close energizing compressor B2. In addition to the Compressor Contactor K2, the K264 Medium Blower speed N.O. closes connecting RD to RM on the A96 VFD inverter controller. Changing the A96 VFD to operate at Medium Speed or 55 Hz.

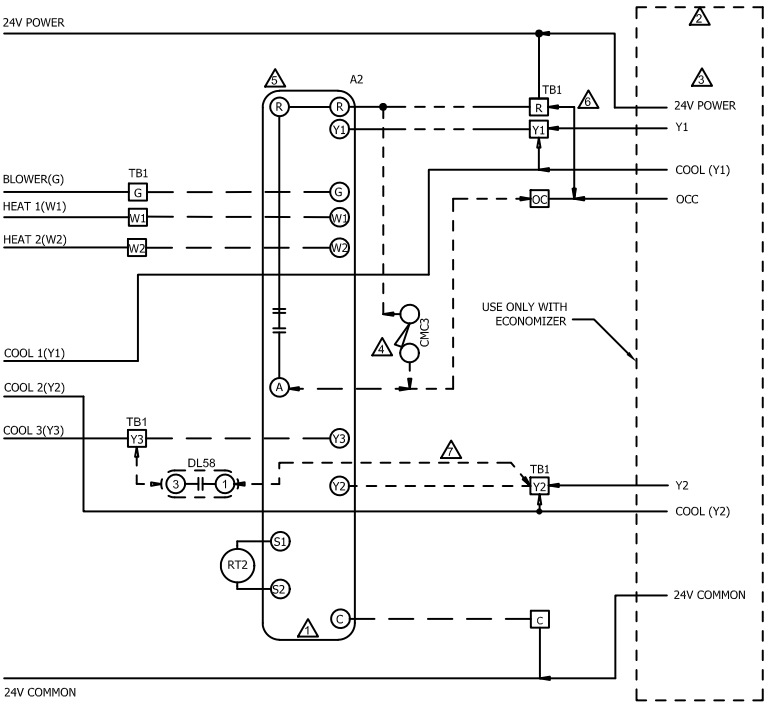
6- Optional N.O. low ambient switch S84 closes to energizing condenser fan relay K10. N.O. contacts K10-1 and K10-2 close energizing condenser fans B4 and B5. N.C. contacts K10-3 open de-energizing crankcase heaters HR1 and HR2.

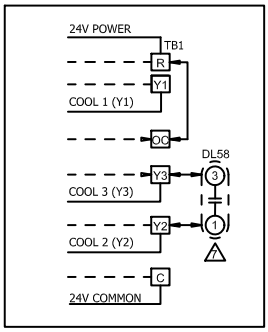
3rd Stage Cooling (compressor B1 High Capacity)

7- Third Stage cooling demand Y3 24VAC is routed through TB1 and energizes N.O. contacts on K36 relay connecting SD to RH on the A96 VFD inverter controller. Changing the A96 VFD to operate at High Speed or 60Hz.

8- Third Stage cooling demand Y3 24VAC is routed through TB1 and energizes L34 2-Stage Solenoid for Compressor B1. Compressor B1 is now operating at high-capacity.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT





CONNECTION SCHEME FOR ZCC, ZGC AND ZHC 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
CMC3	CLOCK, TIME
DL58	ADJUSTABLE TIMER, STAGE UP
K65	RELAY, EXHAUST FAN
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
TB1	TERMINAL STRIP, CLASS II VOLTAGE

1. THERMOSTAT SUPPLIED BY USER
2. OPTIONAL WIRING FOR UNITS WITH ECONOMIZER
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
5. TOUCHSCREEN THERMOSTAT
6. REMOVE JUMPER BETWEEN TB1-R AND TB1-OCP WHEN USING A NITE SETBACK THERMOSTAT
7. INSTALL DL58 ADJUSTABLE STAGE UP TIMER AS SHOWN BETWEEN Y2 AND Y3 IF THERMOSTAT DOES NOT HAVE A COOL 3. TYPICAL TIME DELAY IS 15-30 MINUTES

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

2022/09	WIRING DIAGRAM 538308-01	09/22
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT (RAIDER B)		
SECTION C		REV 0
Supersedes 537673-01	New Form No. 538308-01	

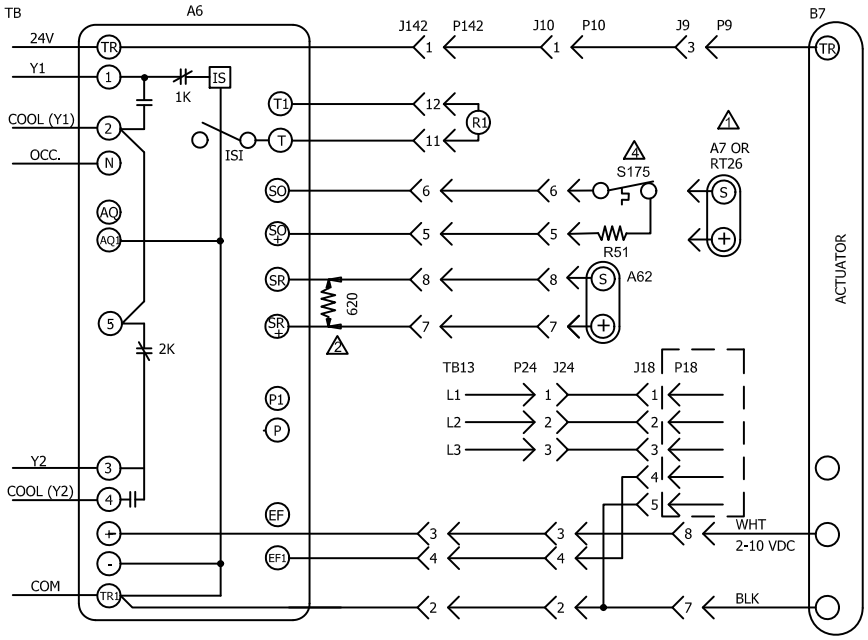
POWER:

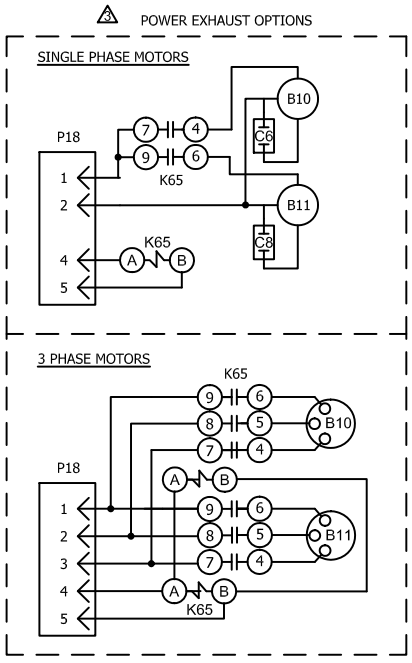
1- Terminal strip TB1 energizes thermostat components with 24VAC.

OPERATION:

2- TB1 receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G, OCP). The 24VAC signal from TB1 energizes the appropriate components for heat or cool demand.

ECONOMIZER STANDARD EFFICIENCY





KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
B7	MOTOR-DAMPER, ECONOMIZER
B10	POWER EXHAUST FAN 1
B11	POWER EXHAUST FAN 2
B43	MOTOR-EXHAUST DAMPER
C6	CAPACITOR, EXHAUST FAN 1
C8	CAPACITOR, EXHAUST FAN 2
K65	RELAY, EXHAUST FAN
R1	MIXED AIR SENSOR
R51	RESISTOR-SENSIBLE 820 OHM
RT26	SENSOR-OUTDOOR AIR TEMP
S175	THERMOSTAT-SENSIBLE TEMP 55-70F
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	DESCRIPTION
9	ECONOMIZER, MOTOR
10	ECONOMIZER
18	EXHAUST FAN COMPT.
24	EXHAUST FAN
142	ECONOMIZER HARNESS

1. RT26 OR A7 CAN BE USED IN PLACE OF S175 SENSOR. REMOVE R51 RESISTOR IF REPLACING S175 WITH RT26 OR A7
2. IF USING A DIFFERENTIAL ENTHALPY SENSOR, REMOVE 620 OHM RESISTOR
3. OPTION: POWER EXHAUST
4. REPLACE S175 WITH A7 OR RT26 AS OPTIONAL.

04/14	WIRING DIAGRAM 537674-01	04/14
ACCESSORIES		
ECONOMIZER		
SECTION D		REV. 0
Supersedes	New Form No. 537674-01	

SEQUENCE OF OPERATION

POWER:

1- Terminal strip TB1 energizes the economizer components with 24VAC.

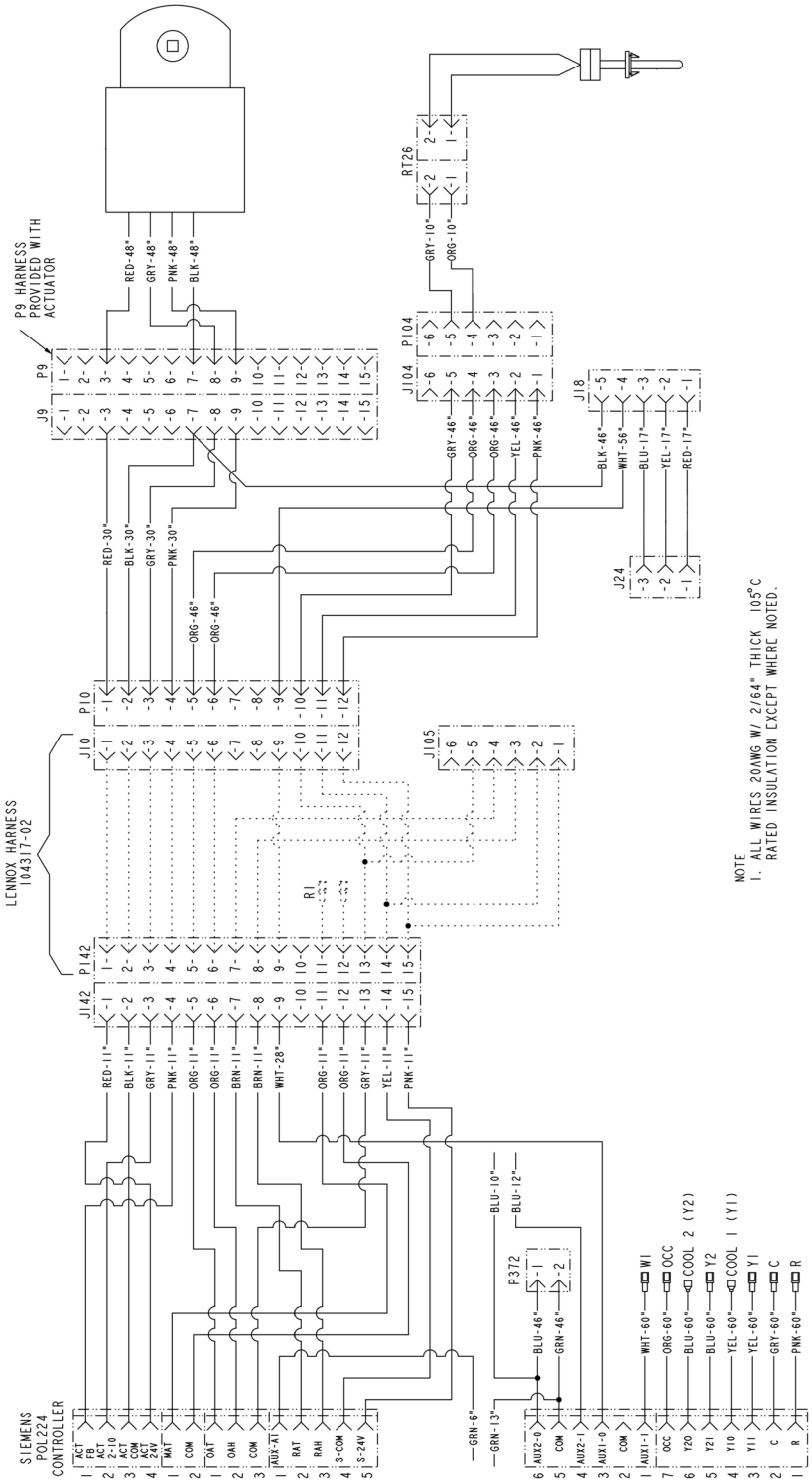
OPERATION:

2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

4- The damper actuator provides 2 to 10 VDC position feedback.

ECONOMIZER HIGH PERFORMANCE / LOW LEAK



SEQUENCE OF OPERATION

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OPERATION:

2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

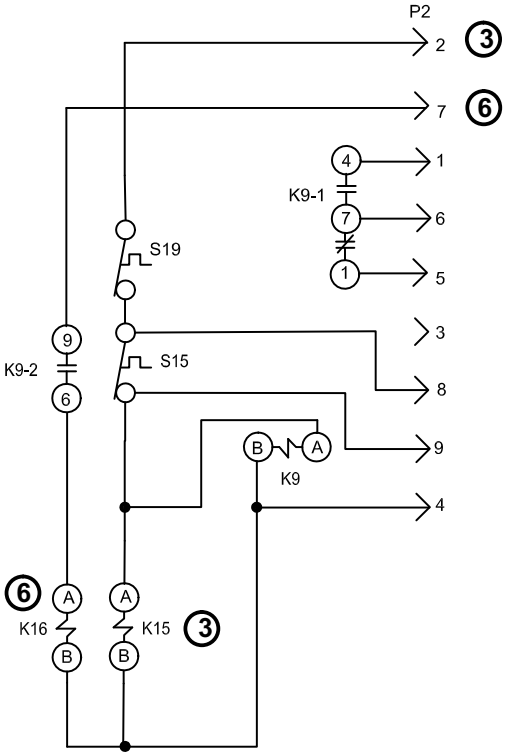
3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

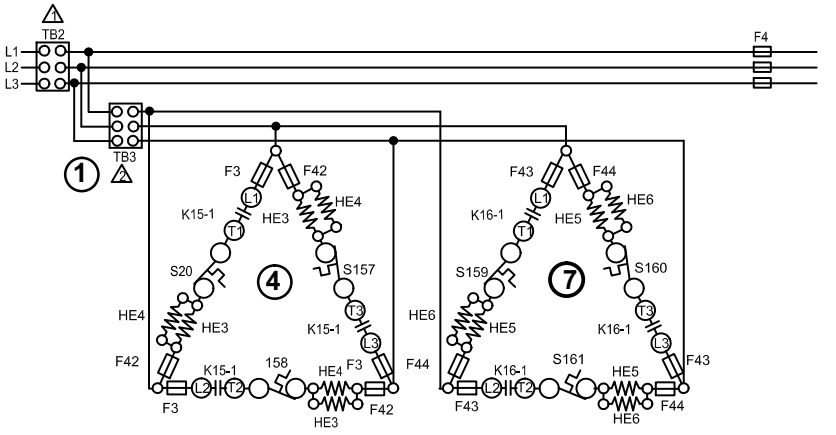
4- The damper actuator provides 2 to 10 VDC position feedback.

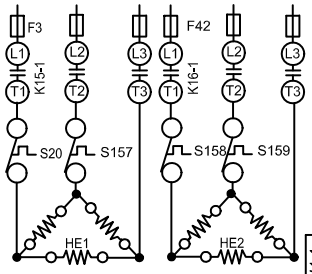
EHA-7.5, 15, 22.5, 30, 45 & 60kW Y VOLTAGE
ZCC SERIES UNITS

KEY	DESCRIPTION
F3	FUSE, ELECTRIC HEAT 1
F4	FUSE, UNIT
F42	FUSE, ELECTRIC HEAT 2
F43	FUSE, ELECTRIC HEAT 3
F44	FUSE, ELECTRIC HEAT 4
HE1	ELEMENT, ELECTRIC HEAT 1
HE2	ELEMENT, ELECTRIC HEAT 2
HE3	ELEMENT, ELECTRIC HEAT 3
HE4	ELEMENT, ELECTRIC HEAT 4
HE5	ELEMENT, ELECTRIC HEAT 5
HE6	ELEMENT, ELECTRIC HEAT 6
K9-1,2	RELAY, HEAT

K15-1	CONTACTOR, ELECTRIC HEAT 1
K16-1	CONTACTOR, ELECTRIC HEAT 2
P2	PLUG, UNIT HEAT
S15	SWITCH, LIMIT PRIMARY ELECTRIC HEAT
S19	THERMOSTAT, ELECTRIC HEAT LIMIT
S20	SWITCH, LIMIT SECONDARY ELEC. HEAT 1 (NO RESET)
S157	SWITCH, LIMIT SECONDARY ELEC. HEAT 2 (NO RESET)
S158	SWITCH, LIMIT SECONDARY ELEC. HEAT 3 (NO RESET)
S159	SWITCH, LIMIT SECONDARY ELEC. HEAT 4 (NO RESET)
S160	SWITCH, LIMIT SECONDARY ELEC. HEAT 5 (NO RESET)
S161	SWITCH, LIMIT SECONDARY ELEC. HEAT 6 (NO RESET)
TB2	TERMINAL STRIP, UNIT
TB3	TERMINAL STRIP, ELECTRC HEAT







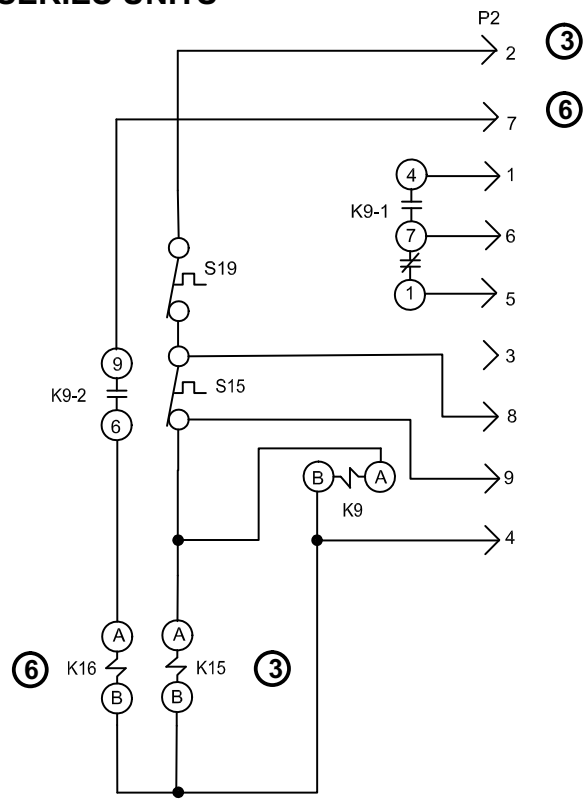
1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS

KW	HE1	HE2	HE3	HE4	HE5	HE6
7.5	7.5					
15	15					
22.5	15	7.5				
30	15	15				
45	15				15	15
60			15	15	15	15

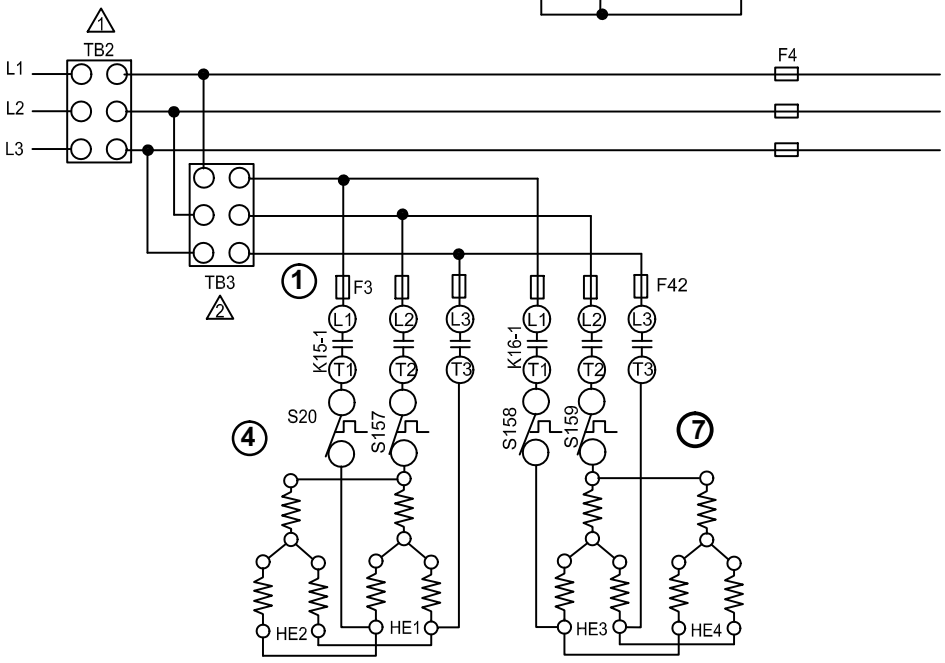
04/14	WIRING DIAGRAM 537690-01	04/14
	HEATING - ELECTRIC	
	7.5, 15, 22.5, 30, 45, 60 - Y	
	SECTION A	REV 0
Supersedes	New Form No. 537690-01	

EHA-7.5, 15, 22.5, 30, 45 & 60kW G, J VOLTAGE
ZCC SERIES UNITS

KEY	COMPONENT
F3	FUSE-ELECTRIC HEAT
F4	FUSE-UNIT
F42	FUSE-ELECTRIC HEAT 2
HE1	ELEMENT-ELECTRIC HEAT 1
HE2	ELEMENT-ELECTRIC HEAT 2
HE3	ELEMENT-ELECTRIC HEAT 3
HE4	ELEMENT-ELECTRIC HEAT 4
K9,-1, 2	RELAY-HEAT
K15,-1	CONTACTOR-ELECTRIC HT 1
K16,-1	CONTACTOR-ELECTRIC HT 2
P2	PLUG-HEAT
S15	SWITCH LIMIT, PRIMARY, ELECT HT
S19	THERMOSTAT-ELECTRIC HEAT LIMIT
S20	SWITCH-LIMIT, SECONDARY ELECT HT 1 (NO RESET)
S157	SWITCH LIMIT, SECONDARY ELECT HT 2 (NO RESET)
S158	SWITCH LIMIT, SECONDARY ELECT HT 3 (NO RESET)
S159	SWITCH LIMIT, SECONDARY ELECT HT 4 (NO RESET)
TB2	TERMINAL STRIP-UNIT
TB3	TERMINAL STRIP-ELECTRIC HEAT



1 TB2,S48 OR CB10 MAY BE USED
2 TB3 IS USED ON SOME UNITS



KW	HE1	HE2	HE3	HE4
7.5	7.5			
15	15			
22.5	15		7.5	
30	15		15	
45	15		15	15
60	15	15	15	15

04/14	WIRING DIAGRAM 537691-01	04/14
HEATING-ELECTRIC		
7.5, 15, 22.5, 30, 45, 60 - G, J		
SECTION A		REV. 0
Supersedes	New Form No. 537691-01	

Sequence of Operation - EHA 7.5, 15, 22.5, 30, 45, 60 kW - Y and G, J, M

NOTE: This sequence of operation is for all Electric Heat kW ratings Y through J voltages. Each step of operation is numbered and can be followed in sequence on the diagrams. Operation for G, J, and M voltages will be the same.

HEATING ELEMENTS:

1- Terminal Strip TB3 is energized when the unit disconnect closes. TB3 supplies line voltage to electric heat elements HE1 through HE6. Each element is protected by fuse F3, F42, F43, or F44.

FIRST STAGE HEAT:

2- Heating demand initiates at W1 in thermostat.

3- 24VAC W1 signal is routed from the thermostat through TB1 and P2-2. After S15 N.C. primary limit and S19 limit is proved, the electric heat 1 contactor K15 is energized.

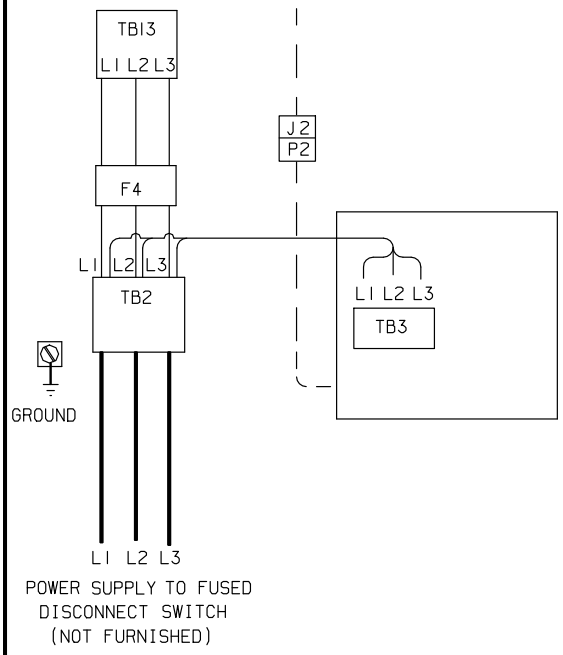
4- If S20 and S157 (S158 on Y-volt units) secondary electric heat limits remain closed, HE1 and HE2 (HE3 and HE4 on Y-volt units) electric heat is energized.

SECOND STAGE HEAT:

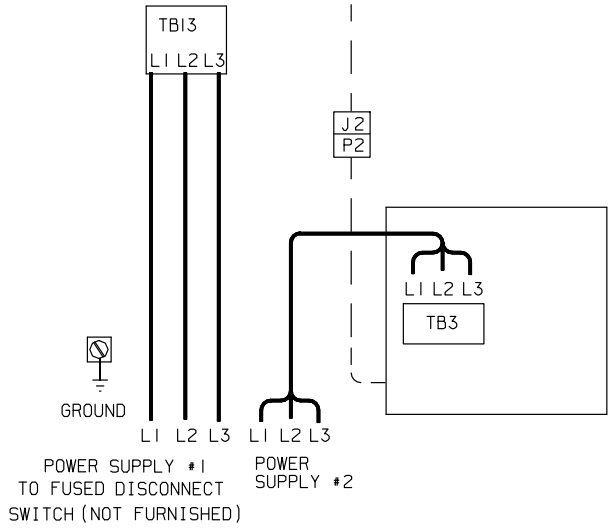
5- Heating demand initiates at W2 in thermostat.

6- 24VAC W2 signal is routed from the thermostat through TB1 and P2-7. Electric heat contactor K16 is energized.

7- If S158 and S159 (S159, S160 and S161 on Y-volt units) secondary electric heat limits remain closed, HE3 and HE4 electric heat is energized.

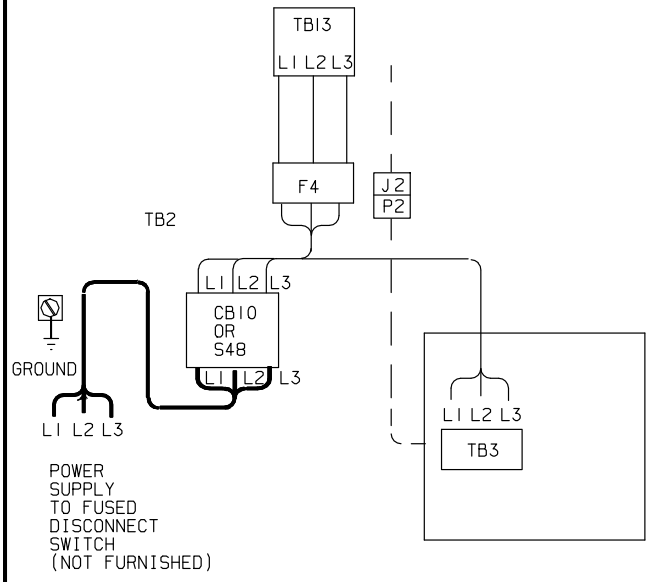


SINGLE POWER SUPPLY - NO CB10 OR S48

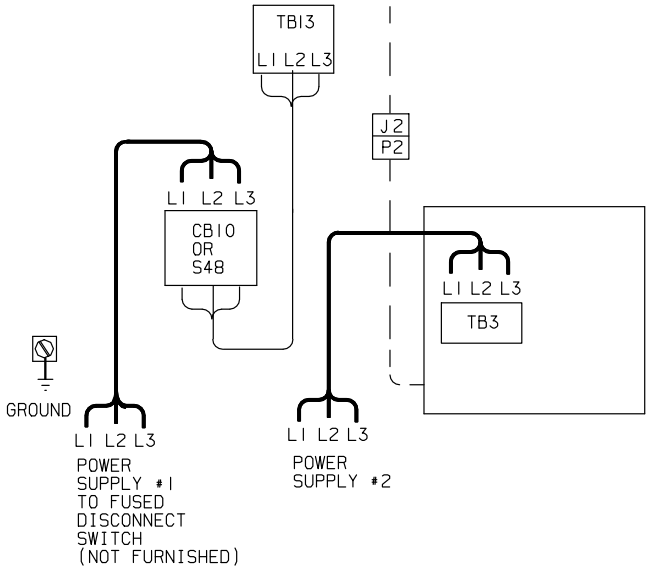


MULTIPLE POWER SUPPLY - NO CB10/S48

CB10-Circuit Breaker
F4- SPPS Terminal Block
J2- Low Voltage Control Harness
J3- Electric Heat Control Harness
S48- Disconnect
TB2- SPPS Terminal Block
TB3- Electric Heat Terminal Block
TB13- Unit Terminal Block



SINGLE POWER SUPPLY WITH CB10/S48



MULTIPLE POWER SUPPLY WITH CB10/S48