ZCA/ZCB092 through 150

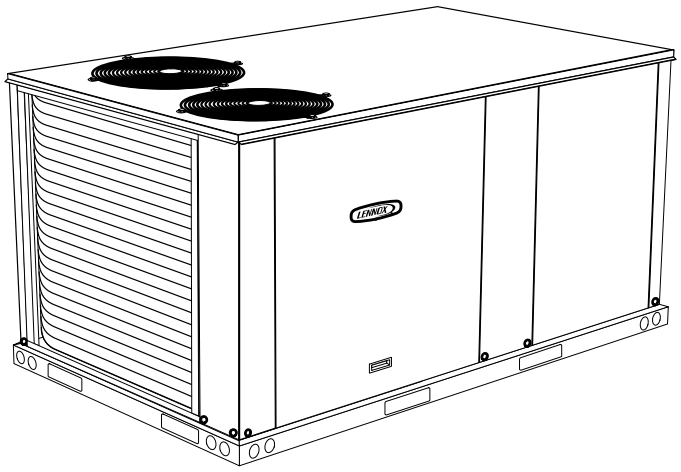
The ZCA/ZCB 7.5, 8.5, 10 and 12.5 ton (092, 102, 120, 150) packaged electric units are available in standard cooling efficiency.

All ZCA/ZCB 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 ZCA/ZCB 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

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.

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.

⚠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	Model Number	Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC - C1TRAP20AD2	76W26	X	X	X	X
	Copper - C1TRAP10AD2	76W27	X	X	X	X
Corrosion Protection		Factory	O	O	O	O
Drain Pan Overflow Switch	Z1SNSR90A1	99W59	X	X	X	X
Low Ambient Kit (Includes Compressor Crankcase Heater)	208/230V-3ph - Z1LOAM02B-1Y	10Z35	X	X		
	460V-3ph - Z1LOAM02B-1G	10Z36	X	X		
	575V-3ph - Z1LOAM02B-1J	10Z37	X	X		
	208/230V-3ph - Z1LOAM12B-1Y	10Z50			X	X
	460V-3ph - Z1LOAM12B-1G	10Z51			X	X
	575V-3ph - Z1LOAM12B-1J	10Z52			X	X
Refrigerant Type		R-410A	O	O	O	O
BLOWER - SUPPLY AIR						
Blower Option	CAV (Constant Air Volume)	Factory	O	O	O	O
	MSAV® (Multi-Stage Air Volume)	Factory	O	O	O	O
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	Z1GARD52B-1	12X21	X	X	X	X
CONTROLS						
	L Connection® Building Automation System	- - -	X	X	X	X
BACnet®	K0CTRL31B-1	96W15	X	X	X	X
BACnet® Thermostat with Display	K0SNSR01FF1	97W23	X	X	X	X
BACnet® Thermostat without Display	K0SNSR00FF1	97W24	X	X	X	X
Novar® 2051	K0CTRL30B-1	96W12	OX	OX	OX	OX
Plenum Cable (75 ft.)	K0MISC00FF1	97W25	X	X	X	X

NOTE - Catalog and model 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	Model Number	Catalog Number	Unit Model No 092	102	120	150
INDOOR AIR QUALITY						
Air Filters						
Healthy Climate® High Efficiency Air Filters	MERV 8 - Z1FLTR15B-1	14C35	X	X	X	X
20 x 24 x 2 (Order 4 per unit)	MERV 13 - Z1FLTR40B-1	14C36	X	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	C1FLTR30B-1-	Y3063	X	X	X	X
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	77N39	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	87N53	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	87N52	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	87N54	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications	C0MISC19AE1-	85L43	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)	C0MISC16AE1-	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	Z1PEKT01B-1	11H66	X	X	X	X
ELECTRIC HEAT						
7.5 kW	208/230V-3ph - Z1EH0075B-1Y	10Y97	X	X		
	460V-3ph - Z1EH0075B-1G	10Y98	X	X		
	575V-3ph - Z1EH0075B-1J	10Y99	X	X		
15 kW	208/230V-3ph - Z1EH0150B-1Y	10Z01	X	X	X	X
	460V-3ph - Z1EH0150B-1G	10Z03	X	X	X	X
	575V-3ph - Z1EH0150B-1J	10Z04	X	X	X	X
22.5 kW	208/230V-3ph - Z1EH0225B-1Y	10Z05	X	X	X	X
	460V-3ph - Z1EH0225B-1G	10Z06	X	X	X	X
	575V-3ph - Z1EH0225B-1J	10Z07	X	X	X	X
30 kW	208/230V-3ph - Z1EH0300B-1Y	10Z08	X	X	X	X
	460V-3ph - Z1EH0300B-1G	10Z09	X	X	X	X
	575V-3ph - Z1EH0300B-1J	10Z10	X	X	X	X
45 kW	208/230V-3ph - Z1EH0450B-1Y	10Z11	X	X	X	X
	460V-3ph - Z1EH0450B-1G	10Z12	X	X	X	X
	575V-3ph - Z1EH0450B-1J	10Z13	X	X	X	X
60 kW	208/230V-3ph - Z1EH0600B-1Y	10Z14			X	X
	460V-3ph - Z1EH0600B-1G	10Z15			X	X
	575V-3ph - Z1EH0600B-1J	10Z16			X	X
ELECTRIC HEAT ACCESSORIES						
Unit Fuse Block (required) - See Electrical/Electric Heat Tables for Selection			X	X	X	X

NOTE - Catalog and model 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	Model Number	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	Z1ECON30B-1	10Z29	OX	OX	OX	OX
Standard Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	Z1ECON16B-1	11G98	X	X	X	X
Standard Economizer Controls (Not for Title 24)						
Single Enthalpy Control	C1SNSR64FF1	53W64	X	X	X	X
Differential Enthalpy Control (order 2)	C1SNSR64FF1	53W64	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	Z1ECON32B-1	12B44	OX	OX	OX	OX
High Performance Horizontal Economizer with Single Temperature Control - With Barometric Relief Dampers and Air Hoods	Z1ECON33B-1	12B46	X	X	X	X
High Performance Economizer Controls (Not for Title 24)						
Single Enthalpy Control	C1SNSR61FF1	11G21	X	X	X	X
Differential Enthalpy Control (order 2)	C1SNSR61FF1	11G21	X	X	X	X
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood						
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood	LAGEDH03/15	53K04	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers						
Motorized Dampers with outdoor air hood	Z1DAMP20B-2	14G36	X	X	X	X
Manual Dampers with outdoor air hood	Z1DAMP10B-2	14G37	X	X	X	X
POWER EXHAUST						
Standard Static (Downflow)	208/230V-3ph - Z1PWRE10B-1Y	10Z70	X	X	X	X
	460V-3ph - Z1PWRE10B-1G	10Z71	X	X	X	X
Standard Static (Horizontal)	208/230V-3ph - Z1PWRE15A-1P	24E01	X	X	X	X
	460V-3ph - Z1PWRE15A-1G	28E01	X	X	X	X
575V Transformer Kit	575V-3ph - Z1TRFM20A-1J	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	Z1CURB40B-1	10Z25	X	X	X	X
14 in. height	Z1CURB41B-1	10Z26	X	X	X	X
18 in. height	Z1CURB42B-1	10Z27	X	X	X	X
24 in. height	Z1CURB43B-1	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 and model 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 — 7.5 - 8.5 TON

General Data	Nominal Tonnage	7.5 Ton	7.5 Ton	8.5 Ton	8.5 Ton
	Model Number	ZCB092S4B	ZCA092S4M	ZCB102S4B	ZCA102S4M
	Efficiency Type	Standard	Standard	Standard	Standard
	Blower Type	Constant Air Volume (CAV)	MSAV® (Multi-Stage Air Volume)	Constant Air Volume (CAV)	MSAV® (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity - Btuh	91,100	88,200	99,900	99,900
	[1] Net Cooling Capacity - Btuh	88,000	86,000	97,000	97,000
	AHRI Rated Air Flow - cfm	2,750	2,800	3,250	3,250
	Total Unit Power - kW	8.0	7.7	8.8	8.7
	[1] EER (Btuh/Watt)	11.2	11.2	11.2	11.2
	[1] IEER (Btuh/Watt)	12.9	13.2	12.9	13.2
	Refrigerant Type	R-410A	R-410A	R-410A	R-410A
Refrigerant Charge Furnished	Circuit 1	4 lbs. 7 oz.	4 lbs. 7 oz.	4 lbs. 13 oz.	4 lbs. 13 oz.
	Circuit 2	3 lbs. 1 oz.	3 lbs. 1 oz.	4 lbs. 10 oz.	4 lbs. 10 oz.
Electric Heat Available		7.5,15,22.5,30 & 45 kW			
Compressor Type (number)		Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils	Net face area (total) - sq. ft.	20.9	20.9	20.9	20.9
	Number of rows	1	1	1	1
	Fins per inch	23	23	23	23
Outdoor Coil Fans	Motor - (No.) hp	(2) 1/3	(2) 1/3	(2) 1/3	(2) 1/3
	Motor rpm	1075	1075	1075	1075
	Total Motor watts	740	740	740	740
	Diameter - (No.) in.	(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades	3	3	3	3
	Total Air volume - cfm	8800	8800	8800	8800
Indoor Coils	Net face area (total) - sq. ft.	12.78	12.78	12.78	12.78
	Tube diameter - in.	3/8	3/8	3/8	3/8
	Number of rows	2	2	3	3
	Fins per inch	14	14	14	14
	Drain connection - Number and size	(1) 1 in. NPT coupling			
	Expansion device type	Refrigerant Metering Orifice (RFC)			
[2] Indoor Blower and Drive Selection	Nominal motor output	2 hp, 3 hp, 5 hp			
	Maximum usable motor output (US Only)	2.3 hp, 3.45 hp, 5.75 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	(1) 15 X 15	(1) 15 X 15	(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. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 1.0.

SPECIFICATIONS					10 - 12.5 TON
General Data	Nominal Tonnage	10 Ton	10 Ton	12.5 Ton	12.5 Ton
	Model Number	ZCB120S4B	ZCA120S4M	ZCB150S4B	ZCA150S4M
	Efficiency Type	Standard	Standard	Standard	Standard
	Blower Type	Constant Air Volume (CAV)	MSAV® (Multi-Stage Air Volume)	Constant Air Volume (CAV)	MSAV® (Multi-Stage Air Volume)
Cooling Performance	Gross Cooling Capacity - Btuh	119,000	118,400	143,000	142,000
	[1] Net Cooling Capacity - Btuh	115,000	115,000	136,000	136,000
	AHRI Rated Air Flow - cfm	3100	3,800	3,700	4,400
	Total Unit Power - kW	10.3	10.3	12.7	12.4
	[1] EER (Btuh/Watt)	11.2	11.2	11.0	11.0
	[1] IEER (Btuh/Watt)	12.9	13.2	12.4	12.2
	Refrigerant Type	R-410A	R-410A	R-410A	R-410A
Refrigerant Charge Furnished	Circuit 1	6 lbs. 4 oz.	5 lbs 0 oz.	12 lbs. 6 oz.	7 lbs 0 oz.
	Circuit 2	5 lbs. 7 oz.	5 lbs 4 oz.	13 lbs. 6 oz.	6 lbs 12 oz.
Electric Heat Available		15, 22.5, 30, 45 and 60 KW			
Compressor Type (number)		Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils	Net face area (total) - sq. ft.	28.0	28.0	27.8	28.0
	Number of rows	1	1	3	1
	Fins per inch	23	23	20	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	700	700	910	950
	Diameter - (No.) in.	(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades	3	3	3	3
	Total Air volume - cfm	9000	9000	9000	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	4	3	4	4
	Fins per inch	14	14	14	14
	Drain connection - Number and size	(1) 1 in. NPT coupling			
	Expansion device type	Refrigerant Metering Orifice (RFC)			
[2] Indoor Blower and Drive Selection	Nominal motor output	2 hp, 3 hp, 5 hp			
	Maximum usable motor output (US Only)	2.3 hp, 3.45 hp, 5.75 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	(1) 15 X 15	(1) 15 X 15	(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. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Units equipped with MSAV® (Multi-Stage Air Volume)option are limited to a motor service factor of 1.0.

102S STANDARD EFFICIENCY BELT DRIVE BLOWER − 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.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.):

7.5 kW, 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		2.0		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
1750	494	0.11	562	0.34	632	0.56	702	0.74	771	0.85	838	0.96	902	1.07	961	1.19	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2000	514	0.26	581	0.49	650	0.70	719	0.87	786	0.98	852	1.09	915	1.20	972	1.32	1026	1.47	1076	1.65	- - -	- - -	- - -	- - -	- - -	- - -
2250	533	0.41	599	0.62	667	0.82	735	0.99	802	1.10	866	1.21	928	1.33	984	1.46	1037	1.63	1085	1.81	1132	2.01	1178	2.21	1226	2.43
2500	553	0.55	619	0.76	685	0.95	753	1.10	818	1.22	881	1.34	942	1.47	997	1.62	1048	1.80	1096	1.99	1142	2.20	1188	2.41	1237	2.64
2750	573	0.70	638	0.90	705	1.08	771	1.22	835	1.35	897	1.49	957	1.63	1011	1.80	1061	1.99	1108	2.19	1154	2.41	1200	2.63	1249	2.87
3000	594	0.85	659	1.05	725	1.22	791	1.36	853	1.50	915	1.65	973	1.81	1026	1.99	1075	2.20	1121	2.42	1167	2.64	1213	2.87	1262	3.12
3250	617	1.01	682	1.20	747	1.37	812	1.52	873	1.67	934	1.83	990	2.01	1042	2.21	1089	2.43	1135	2.66	1181	2.90	1228	3.13	1277	3.38
3500	640	1.17	706	1.36	771	1.53	834	1.70	895	1.86	954	2.03	1008	2.23	1058	2.46	1105	2.69	1150	2.93	1196	3.17	1243	3.41	1293	3.65
3750	665	1.34	731	1.54	796	1.72	857	1.89	917	2.07	975	2.26	1027	2.48	1076	2.72	1121	2.97	1166	3.22	1212	3.46	1261	3.71	1311	3.96
4000	692	1.54	758	1.75	822	1.93	882	2.11	940	2.30	996	2.51	1047	2.76	1094	3.02	1139	3.27	1184	3.52	1230	3.77	1280	4.03	1330	4.29
4250	722	1.76	787	1.97	849	2.15	908	2.35	965	2.56	1018	2.79	1067	3.06	1113	3.33	1157	3.59	1202	3.85	1250	4.11	1300	4.38	1352	4.65

BLOWER DATA

120S4M STANDARD EFFICIENCY BELT DRIVE BLOWER − 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.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)

15 kW, 22.5 kW- 2065 cfm

30 kW - 2250 cfm

45 kW - 2625 cfm

60 kW - 3500 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

120S4B AND 150S STANDARD EFFICIENCY BELT DRIVE BLOWER − 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.

MINIMUM AIR VOLUME REQUIRED FOR USE WITH OPTIONAL ELECTRIC HEAT (Maximum Static Pressure - 2.0 in. w.g.)

15 kW, 22.5 kW- 2065 cfm

30 kW - 2250 cfm

45 kW - 2625 cfm

60 kW - 3500 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		2.0		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	Maximum hp	Drive Kit Number	RPM Range
2	2.3	1	590 - 890
2	2.3	2	800 - 1105
2	2.3	3	795 - 1195
3	3.45	4	730 - 970
3	3.45	5	940 - 1200
3	3.45	6	1015 - 1300
5	5.75	10	900 - 1135
5	5.75	11	1040 - 1315
5	5.75	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. In Canada, nominal motor output is also maximum usable motor output. If motors of comparable output are used, be sure to keep within the service factor limitations outlined on the motor nameplate.

NOTE – Units equipped with MSAV® (Multi-Stage Air Volume) option are limited to a motor service factor of 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, 120S4M	120/S4B, 150			MERV 8	MERV 13
1750	0.02	0.03	0.04	0.03	0.03	0.01	0.03
2000	0.02	0.04	0.05	0.03	0.05	0.01	0.03
2250	0.03	0.05	0.06	0.04	0.06	0.01	0.04
2500	0.03	0.05	0.07	0.04	0.08	0.01	0.05
2750	0.04	0.06	0.08	0.05	0.09	0.02	0.05
3000	0.05	0.07	0.09	0.06	0.11	0.02	0.06
3250	0.05	0.08	0.10	0.06	0.13	0.02	0.06
3500	0.06	0.09	0.11	0.09	0.15	0.03	0.07
3750	0.07	0.10	0.13	0.09	0.17	0.03	0.08
4000	0.07	0.11	0.14	0.09	0.19	0.04	0.08
4250	0.08	0.13	0.15	0.13	0.21	0.04	0.09
4500	0.09	0.14	0.17	0.14	0.24	0.04	0.09
4750	0.10	0.15	0.18	0.17	0.26	0.05	0.10
5000	0.10	0.16	0.20	0.20	0.29	0.06	0.10
5250	0.11	0.17	0.22	0.22	0.32	0.06	0.11
5500	0.12	0.19	0.23	0.25	0.34	0.07	0.12
5750	0.13	0.20	0.25	0.31	0.37	0.07	0.12
6000	0.14	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 & 120S4M 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
120S4B & 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

7.5 TON STANDARD EFFICIENCY - CONSTANT AIR VOLUME — ZCB092S4B

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	8.7			4			3.6		
	Locked Rotor Amps	70			31			27		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	25	25	30	15	20	20
	With (2) 0.5 HP Power Exhaust	50	50	60	25	30	30	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	38	41	48	20	22	25	15	16	19
	With (2) 0.5 HP Power Exhaust	41	44	51	22	23	26	16	17	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	50	50	60	60	25	25	30	15	20	20
		15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	38	38	41	41	48	48	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	25	30	30	20	20	25
		15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	41	41	44	44	51	51	22	23	26	16	17	20
		15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 7.5 TON

7.5 TON STANDARD EFFICIENCY - Msav® (Multi-Stage Air Volume) Supply Air — ZCa092S4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	8.7			4			3.6		
	Locked Rotor Amps	70			31			27		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	25	25	30	15	20	20
	With (2) 0.5 HP Power Exhaust	50	50	60	25	30	30	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	38	41	48	20	22	25	15	16	19
	With (2) 0.5 HP Power Exhaust	41	44	51	22	23	26	16	17	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	50	50	60	60	25	25	30	15	20	20
		15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	38	38	41	41	48	48	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	25	30	30	20	20	25
		15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	41	41	44	44	51	51	22	23	26	16	17	20
		15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 8.5 TON

8.5 TON STANDARD EFFICIENCY - CONSTANT AIR VOLUME — ZCB102S4B

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	11			5.5			4.7		
	Locked Rotor Amps	86			37			34		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	25	30	30	20	20	25
	With (2) 0.5 HP Power Exhaust	50	50	60	30	30	30	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	41	44	51	22	23	26	16	17	20
	With (2) 0.5 HP Power Exhaust	44	47	54	23	25	27	17	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	50	50	60	60	25	30	30	20	20	25
		15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	41	41	44	44	51	51	22	23	26	16	17	20
		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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	30	30	30	20	20	25
		15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	44	44	47	47	54	54	23	25	27	17	19	21
		15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 8.5 TON

8.5 TON STANDARD EFFICIENCY - Msav® (Multi-Stage Air Volume) Supply Air — ZCa102S4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	11			5.5			4.7		
	Locked Rotor Amps	86			37			34		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	25	30	30	20	20	25
	With (2) 0.5 HP Power Exhaust	50	50	60	30	30	30	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	41	44	51	22	23	26	16	17	20
	With (2) 0.5 HP Power Exhaust	44	47	54	23	25	27	17	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	7.5 kW	50	50	50	50	60	60	25	30	30	20	20	25
		15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	7.5 kW	41	41	44	44	51	51	22	23	26	16	17	20
		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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	50	50	50	50	60	60	30	30	30	20	20	25
		15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	7.5 kW	44	44	47	47	54	54	23	25	27	17	19	21
		15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 10 TON

10 TON STANDARD EFFICIENCY - CONSTANT AIR VOLUME — ZCB120S4B

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	30	30	35	20	20	25
	With (2) 0.5 HP Power Exhaust	50	60	70	30	30	35	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	43	46	53	24	26	29	16	18	20
	With (2) 0.5 HP Power Exhaust	46	49	56	26	27	30	18	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64
		60 kW	139	158	143	162	150	169	78	80	84	63	65	67

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 10 TON

10 TON STANDARD EFFICIENCY - Msav® (Multi-Stage Air Volume) Supply Air — ZCa120S4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Compressor 2	Rated Load Amps	13.5			8			5		
	Locked Rotor Amps	109			59			40		
Outdoor Fan Motors (2)	Full Load Amps	2.4			1.3			1.0		
	(total)	(4.8)			(2.6)			(2.0)		
Power Exhaust (2) 0.5 HP	Full Load Amps	1.5			0.6			0.6		
	(total)	(3.0)			(1.2)			(1.2)		
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	Unit Only	50	50	60	30	30	35	20	20	25
	With (2) 0.5 HP Power Exhaust	50	60	70	30	30	35	20	20	25
[3] Minimum Circuit Ampacity	Unit Only	43	46	53	24	26	29	16	18	20
	With (2) 0.5 HP Power Exhaust	46	49	56	26	27	30	18	19	21

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	[4] 50	60	60	60	[4] 60	70	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	60	60	[4] 60	70	70	70	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	53	59	57	63	64	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64
		60 kW	139	158	143	162	150	169	78	80	84	63	65	67

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 12.5 TON

12.5 TON STANDARD EFFICIENCY - CONSTANT AIR VOLUME — ZCB150S4B

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Compressor 2	Rated Load Amps	22.4			10.6			7.7		
	Locked Rotor Amps	149			75			54		
Outdoor Fan Motors (2)	Full Load Amps (total)	3.0 (6.0)			1.5 (3.0)			1.2 (2.4)		
Power Exhaust (2) 0.5 HP	Full Load Amps (total)	1.5 (3)			0.6 (1.2)			0.6 (1.2)		
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	Unit Only	80	80	90	35	35	40	25	30	30
	With (2) 0.5 HP Power Exhaust	80	80	90	35	40	40	30	30	30
[3] Minimum Circuit Ampacity	Unit Only	62	65	71	28	30	33	22	23	25
	With (2) 0.5 HP Power Exhaust	65	68	74	30	31	34	23	24	26

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	80	80	80	80	90	90	35	35	40	25	30	30
		22.5 kW	80	80	4 80	90	90	90	40	40	45	35	35	35
		30 kW	4 90	100	4 100	110	4 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	4 150	175	80	80	80	60	60	70
		60 kW	4 150	175	4 150	175	4 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	62	62	65	65	71	71	28	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	80	80	80	80	90	90	35	40	40	30	30	30
		22.5 kW	4 80	90	4 80	90	4 90	100	40	45	45	35	35	40
		30 kW	4 100	110	4 100	110	4 110	125	60	60	60	45	45	50
		45 kW	150	150	4 150	175	4 150	175	80	80	80	60	70	70
		60 kW	4 150	175	4 150	175	4 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	65	65	68	68	74	74	30	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64
		60 kW	139	158	143	162	150	169	78	80	84	63	65	67

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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/ELECTRIC HEAT DATA — 12.5 TON

12.5 TON STANDARD EFFICIENCY - Msav® (Multi-Stage Air Volume) Supply Air — ZCa150S4M

[1] Voltage - 60hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Compressor 2	Rated Load Amps	19.6			8.2			6.6		
	Locked Rotor Amps	136			66.1			55.3		
Outdoor Fan Motors (2)	Full Load Amps (total)	3.0 (6.0)			1.5 (3.0)			1.2 (2.4)		
Power Exhaust (2) 0.5 HP	Full Load Amps (total)	1.5 (3.0)			0.6 (1.2)			0.6 (1.2)		
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	Unit Only	70	80	80	30	30	35	25	25	25
	With (2) 0.5 HP Power Exhaust	80	80	80	30	35	35	25	25	30
[3] Minimum Circuit Ampacity	Unit Only	58	61	67	25	27	30	20	22	24
	With (2) 0.5 HP Power Exhaust	61	64	70	27	28	31	22	23	25

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	208V	240V	208V	240V	480V	480V	480V	600V	600V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	15 kW	70	70	80	80	80	80	30	30	35	25	25	30
		22.5 kW	[4] 70	80	[4] 80	90	[4] 80	90	40	40	45	35	35	35
		30 kW	[4] 90	100	[4] 100	110	[4] 100	125	50	60	60	40	45	45
		45 kW	150	150	150	150	[4] 150	175	80	80	80	60	60	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	15 kW	58	58	61	61	67	67	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	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	80	80	80	80	80	80	30	35	35	25	25	30
		22.5 kW	[4] 80	90	[4] 80	90	[4] 90	100	40	45	45	35	35	40
		30 kW	[4] 100	110	[4] 100	110	[4] 110	125	60	60	60	45	45	50
		45 kW	150	150	[4] 150	175	[4] 150	175	80	80	80	60	70	70
		60 kW	[4] 150	175	[4] 150	175	[4] 150	175	80	80	90	70	70	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (2) 0.5 HP Power Exhaust	15 kW	61	61	64	64	70	70	29	31	34	23	25	28
		22.5 kW	72	81	76	85	84	93	40	42	45	32	34	37
		30 kW	92	104	96	108	103	115	51	53	57	41	43	46
		45 kW	131	149	135	153	142	160	74	76	79	60	61	64
		60 kW	139	158	143	162	150	169	78	80	84	63	65	67

ELECTRIC HEAT ACCESSORIES

Unit Fuse Block	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

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.

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

ZCA/ZCB PARTS ARRANGEMENT

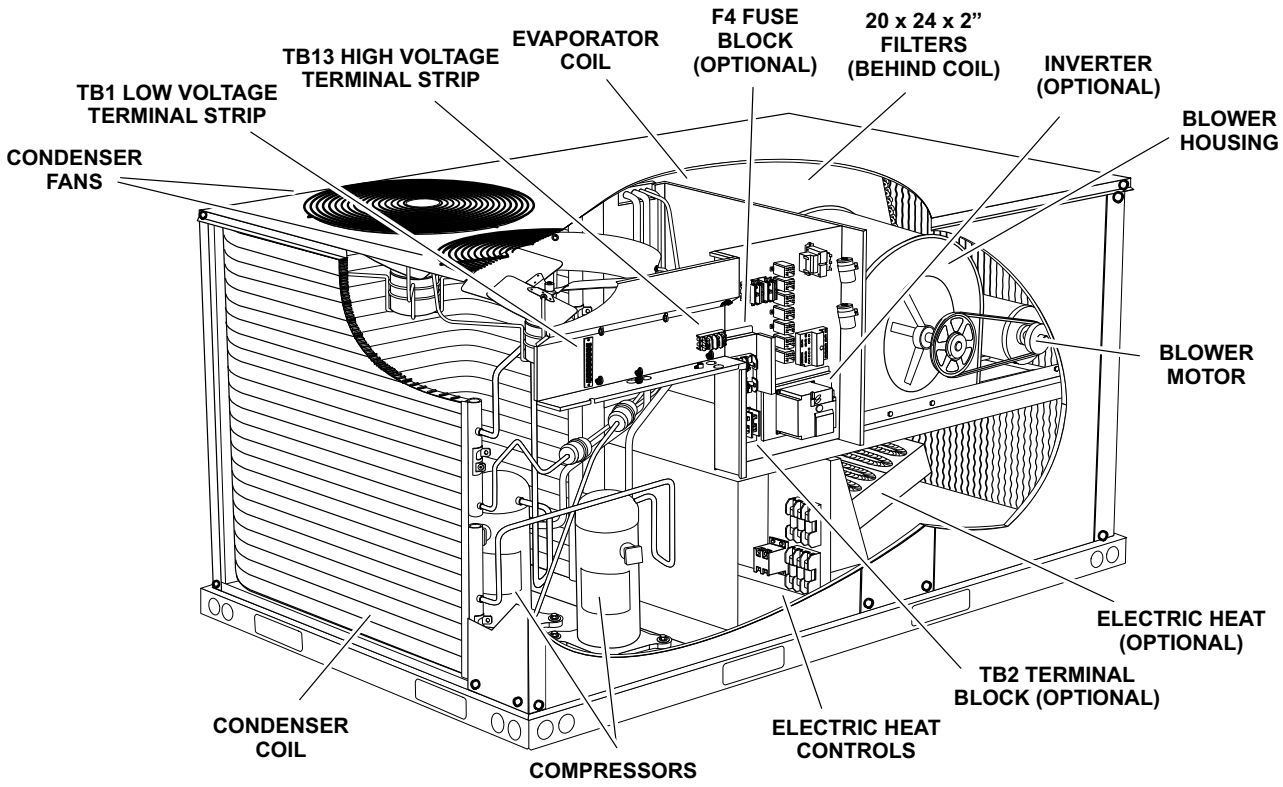


FIGURE 1

ZCA/ZCB CONTROL BOX

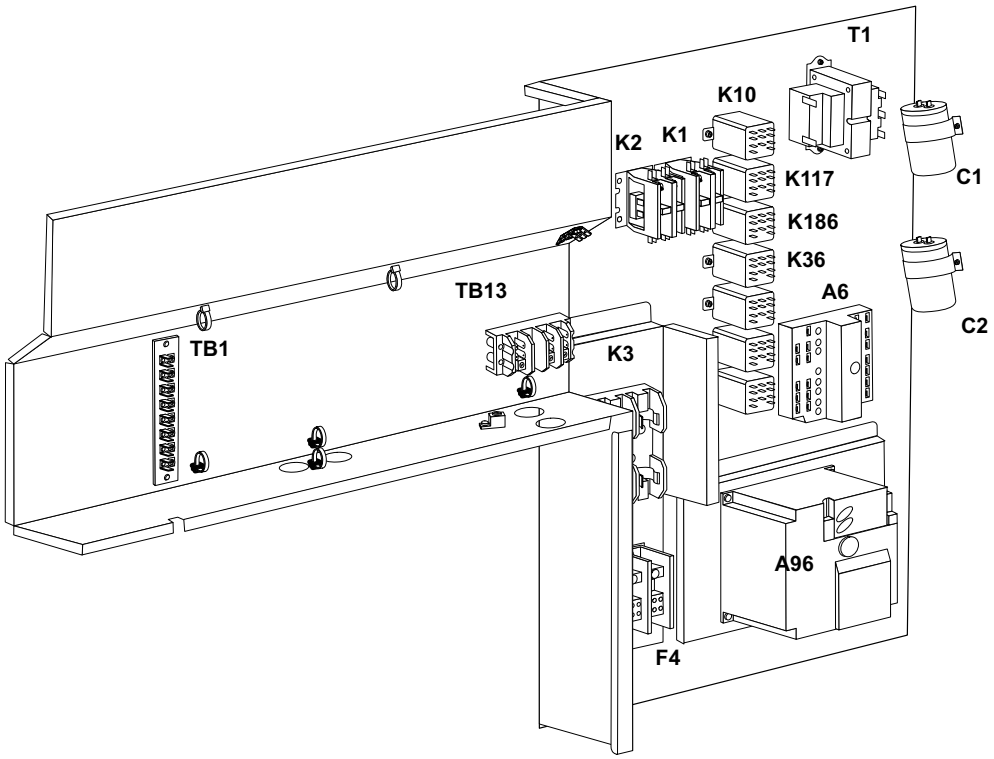


FIGURE 2

I-UNIT COMPONENTS

All 7.5 through 12.5 ton (26.3 through 44 kW) units are configure to order units (CTO). The ZCA/ZCB 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

ZCA/ZCB 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.

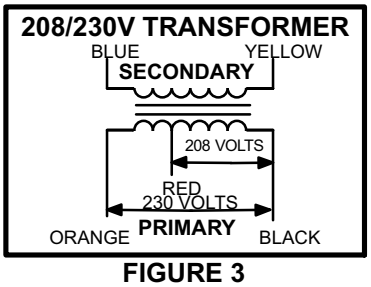


FIGURE 3

2-C. A. I. Transformers T3 575V units

All ZCA/ZCB 575 (J) voltage units use transformer T3 mounted in the control box. The transformers have an output rating of 0.5A. T3 transformer supplies 230 VAC power to the combustion air inducer motor (B6).

3-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.

4-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.

5-Compressor Contactor K1 & K2

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

6-Blower Contactor K3

Blower contactor K3, used in all units, is a two-pole-double-break contactor with a 24VAC coil used to energize the indoor blower motor B3 in response to blower demand. K3 is energized by a thermostat cooling demand.

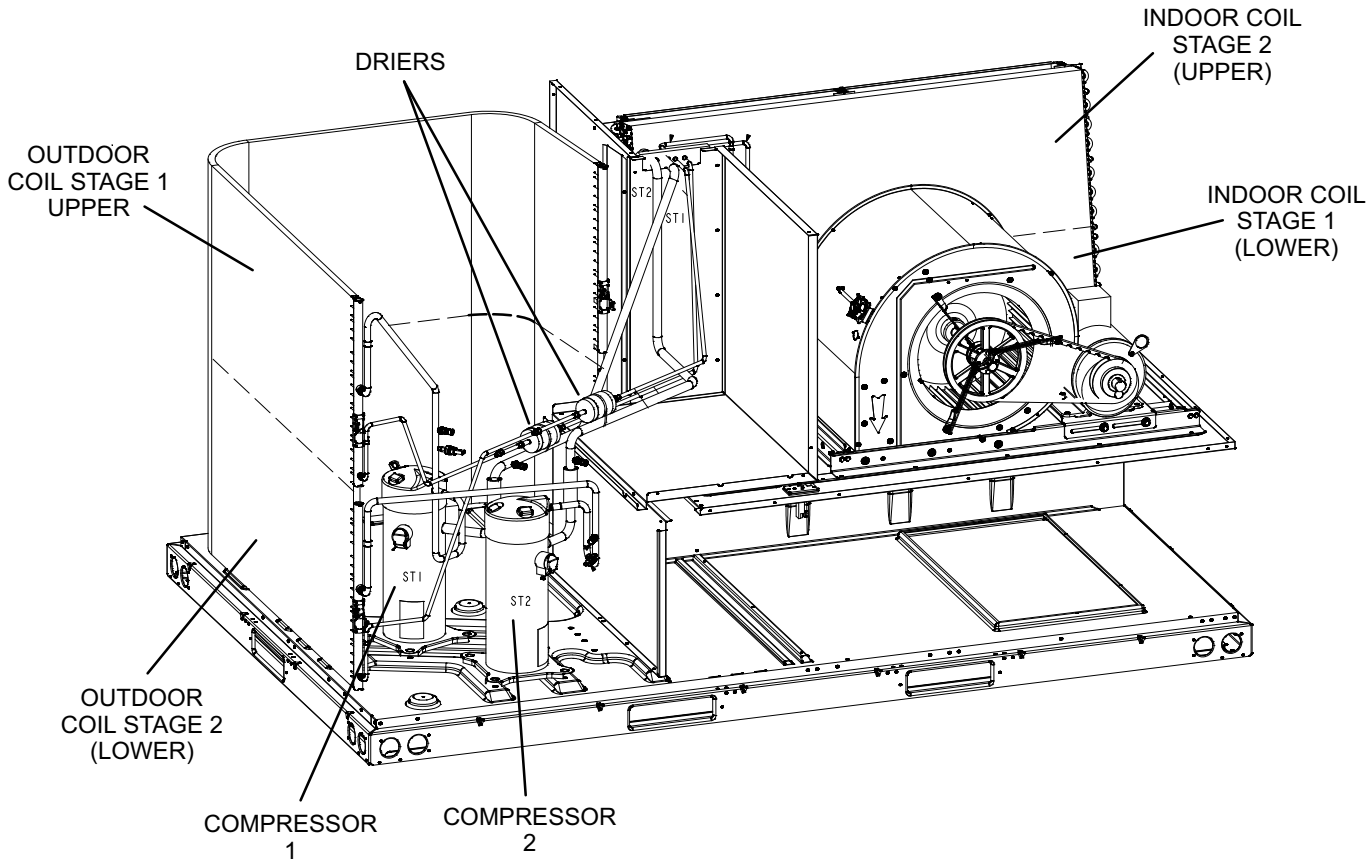
7-Condenser Fan Relay K10

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

8-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a DPDT relay with a 24VAC coil. K65 is used in all ZCA/ZCB 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.

ZCA/ZCB092,102, 120, 150 PLUMBING AND COMPRESSOR CIRCUITS DETAIL



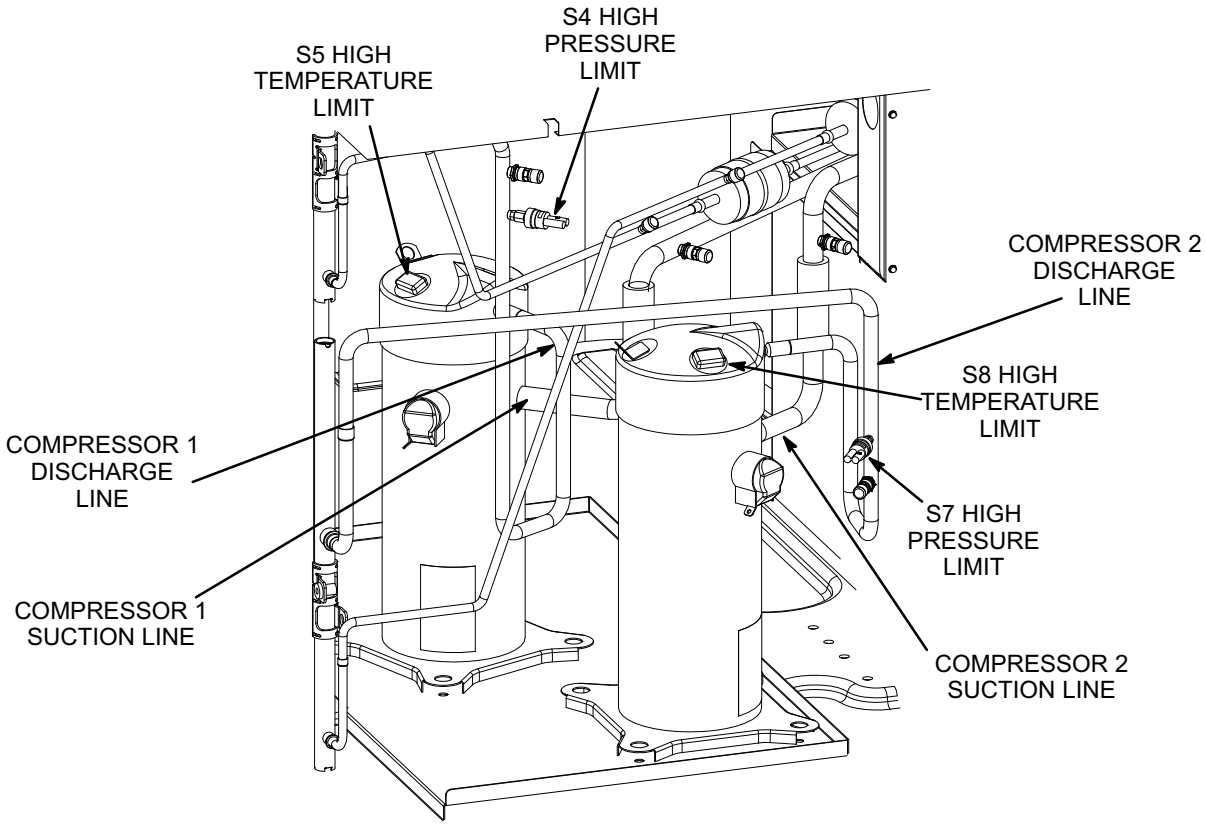


FIGURE 4

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 ZCA/ZCB092/150 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 slab type and are stacked. Each evaporator uses a refrigerant metering orifice as the primary refrigerant metering device. Each evaporator is also equipped with enhanced fins and rifled tubing.

In all units each compressor is protected by S49 and S50 freezestats and S4 and S7 high pressure switches (on each evaporator). Low ambient switches (S11, S84) are available as an option for additional compressor protection. On 150 units, each compressor is protected by a crankcase heater.

1-Compressors B1 and B2

All ZCA/ZCB092/150 units use two scroll compressors. 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-Thermal Protectors S5, S8

Some compressors have thermal protectors located on top of the compressor. The protectors open at 248°F ± 9°F (120°C ± 5°C) and close at 169°F ± 18°F (76°C ± 10°C).

3-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).

4-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 ZCA/ZCB092/150, 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.

5-Crankcase Heaters HR1, HR2 (optional)

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.

C-Electric Heat

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. 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. K15 is energized by a W1 thermostat demand and K16 is energized by a W2 thermostat demand. Contactor K15 energizes the first stage heating elements, while K16 energizes the second stage heating elements.

2-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

3-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.

4-High Temperature Limits S20, S157, S158, S159, S160 & S161(Secondary)

Limits are SPST normally closed manual-reset thermostat . Like the primary temperature limit, S20 and S157 are wire in series with the first stage contactor coil K15. When S20 or S157 opens, contactor K15 is de-energized. When the contactors are de-energized, first stage and all subsequent stages of heat are de-energized. S158, S159, S160 and S161 are wired in series with contactor coil K16. When these limits open K16 is de-energized, de-energizing second stage heat.

5-Terminal Strip TB2

Terminal strip 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.

6-Terminal Strip TB3

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

7-Fuses F3, F42, F43 &F44

These fuses are connected in line with heating elements HE1, HE2, HE3, HE4, HE5 and HE6 through contactors K15 and K16. The fuses provide short circuit and ground fault protection.

8-Fuse Block F4

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

9-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.

D-Blower Compartment

All units are equipped with belt drive blowers.

1-Blower Wheels

All ZCA/ZCB092/150 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.

OPERATION / ADJUSTMENT

A-Three Scroll Compressor Voltage Phasing

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

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.

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 **Not** Equipped With An Inverter -*
Run blower without a cooling demand.

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 **and** Y2 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	No minimum	5
B Section	1*	6

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

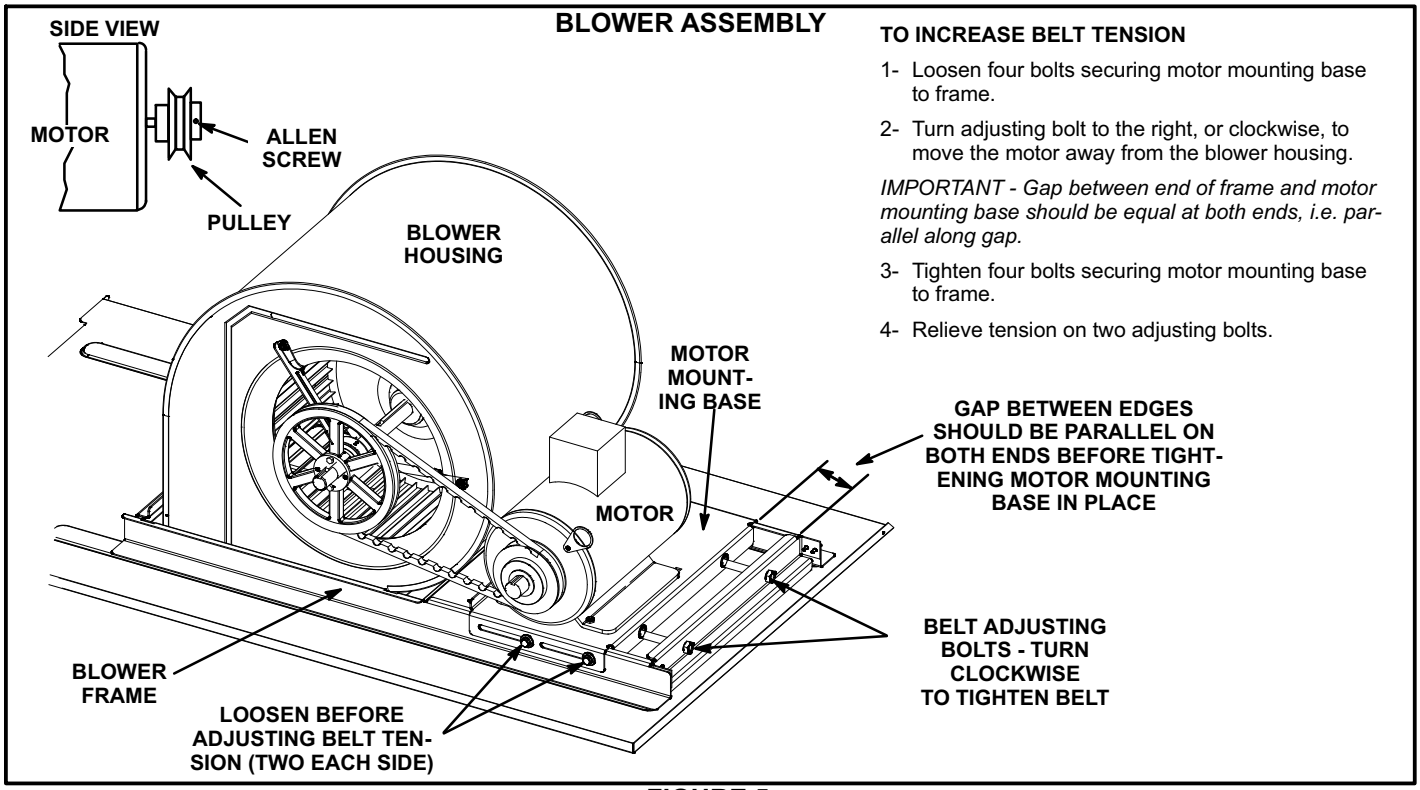


FIGURE 5

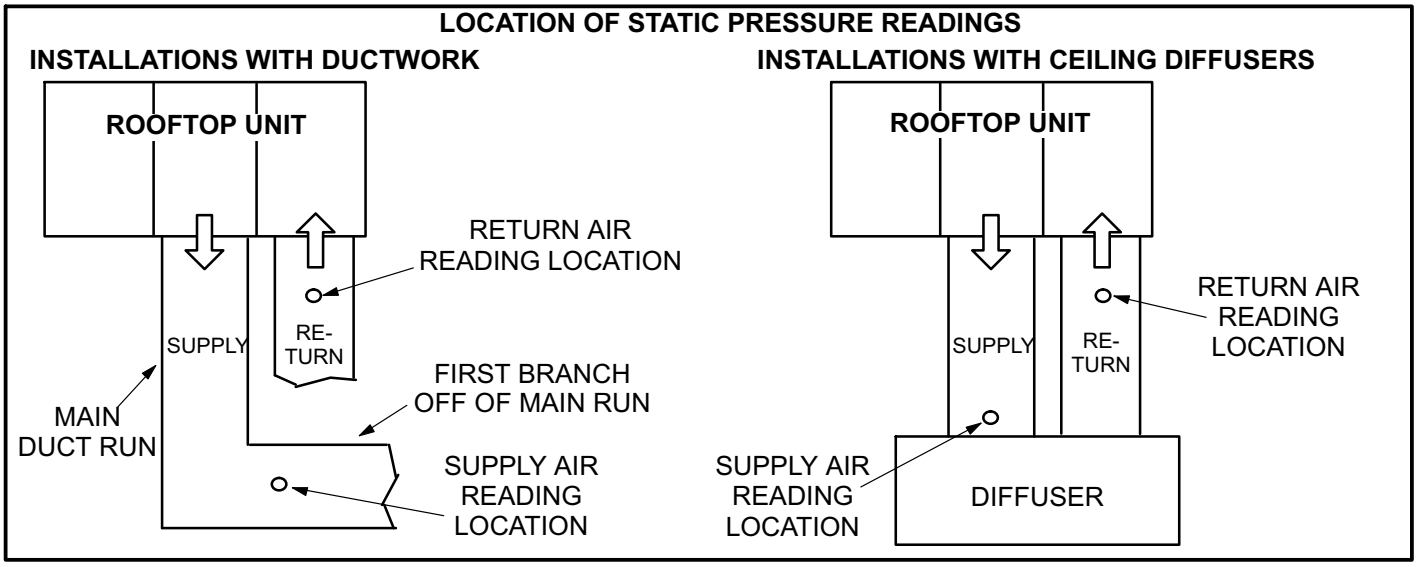


FIGURE 6

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 grooves. Make sure blower and motor pulley are aligned as shown in figure 7.

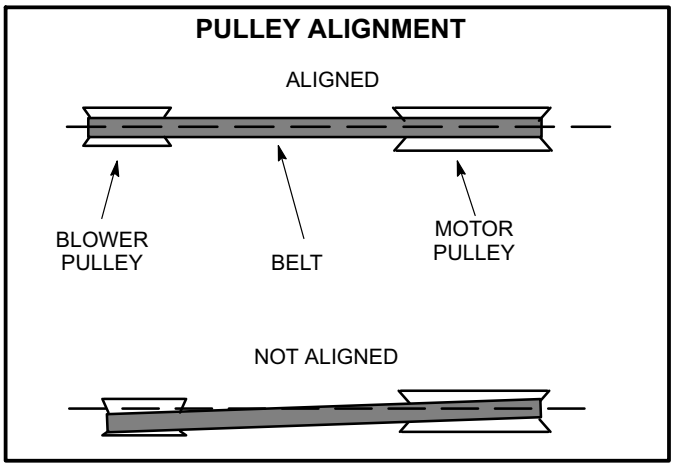


FIGURE 7

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

2- *To increase belt tension -*
Turn adjusting bolt 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 bolt 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 bolts on side of base.

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 used belt, the deflection force should be 5 lbs. (35kPa). A new belt deflection force should be 7 lbs. (48kPa).

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

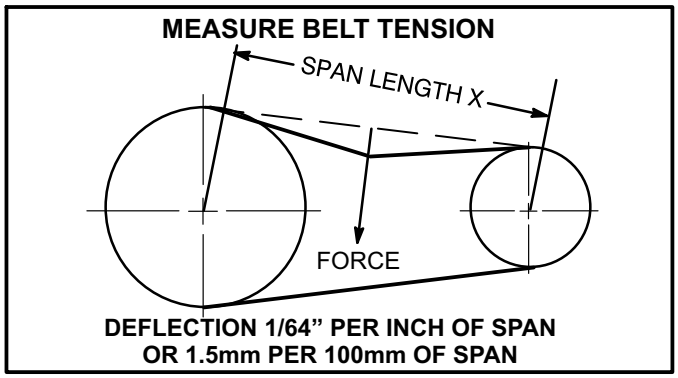


FIGURE 8

Field-Furnished Blower Drives

For field-furnished blower drives, use the blower tables in this manual 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

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

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 9 or 10.

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

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

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.

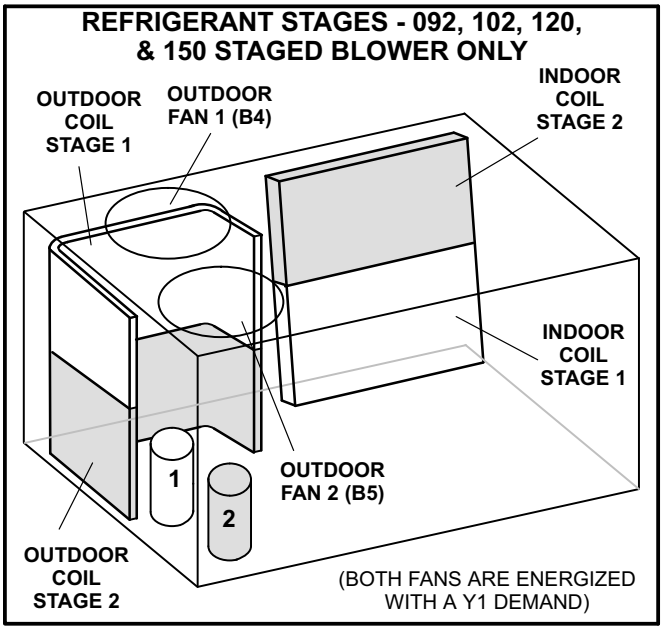


FIGURE 9

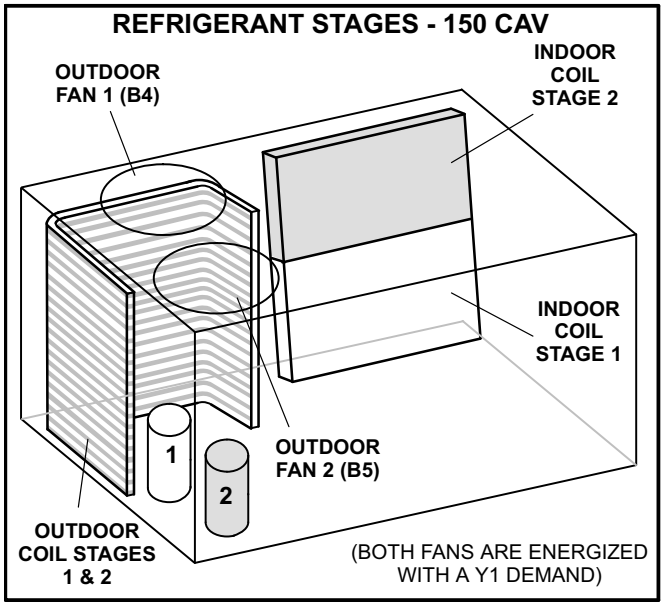


FIGURE 10

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 3 - 8) 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 3

ZCA092 & ZCB092 Normal Operating Pressures												
	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	250	106	287	107	329	112	373	111	423	115	477
	108	253	111	291	114	333	118	380	122	431	123	486
	120	265	125	300	129	344	134	393	138	443	137	500
	134	280	138	318	144	362	148	410	153	462	155	517
Circuit 2	94	248	97	283	98	323	103	370	108	412	110	453
	98	249	101	287	104	329	109	373	115	423	119	474
	112	260	117	297	120	341	124	386	129	435	135	487
	125	275	129	312	134	354	139	403	144	452	148	501

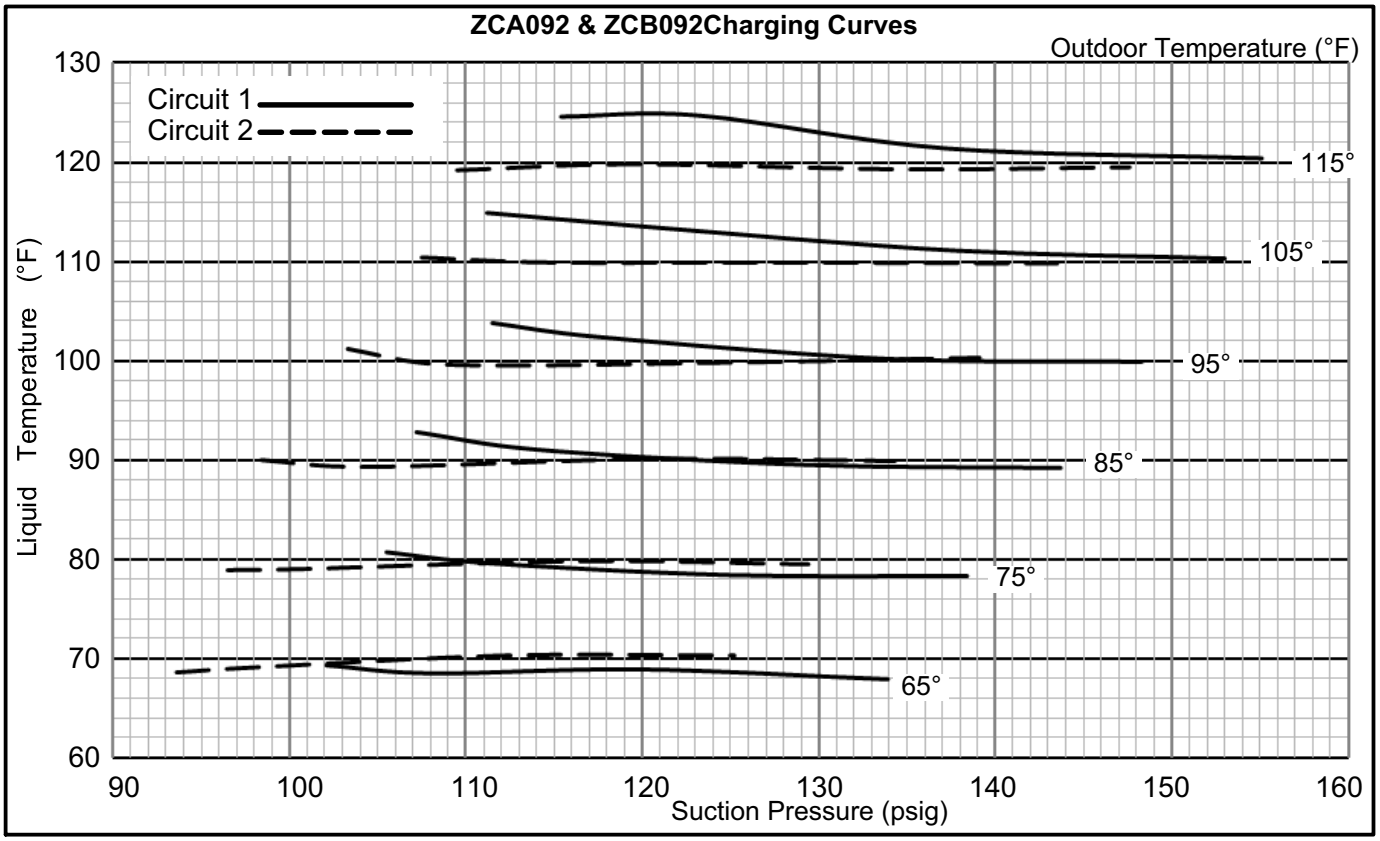


TABLE 4

ZCA102 & ZCB102 Normal Operating Pressures

	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	108	250	110	284	113	328	116	371	119	423	123	478
	114	252	118	290	121	334	124	382	127	432	131	484
	128	267	132	305	137	347	140	392	145	445	148	500
	143	285	146	322	151	363	156	411	160	461	166	517
Circuit 2	107	273	109	310	112	353	114	398	118	448	121	498
	114	277	117	315	120	357	123	403	125	447	129	496
	128	289	133	331	137	375	140	417	144	471	148	525
	144	303	148	344	153	391	157	438	162	489	166	545

ZCA102 & ZCB102Charging Curves

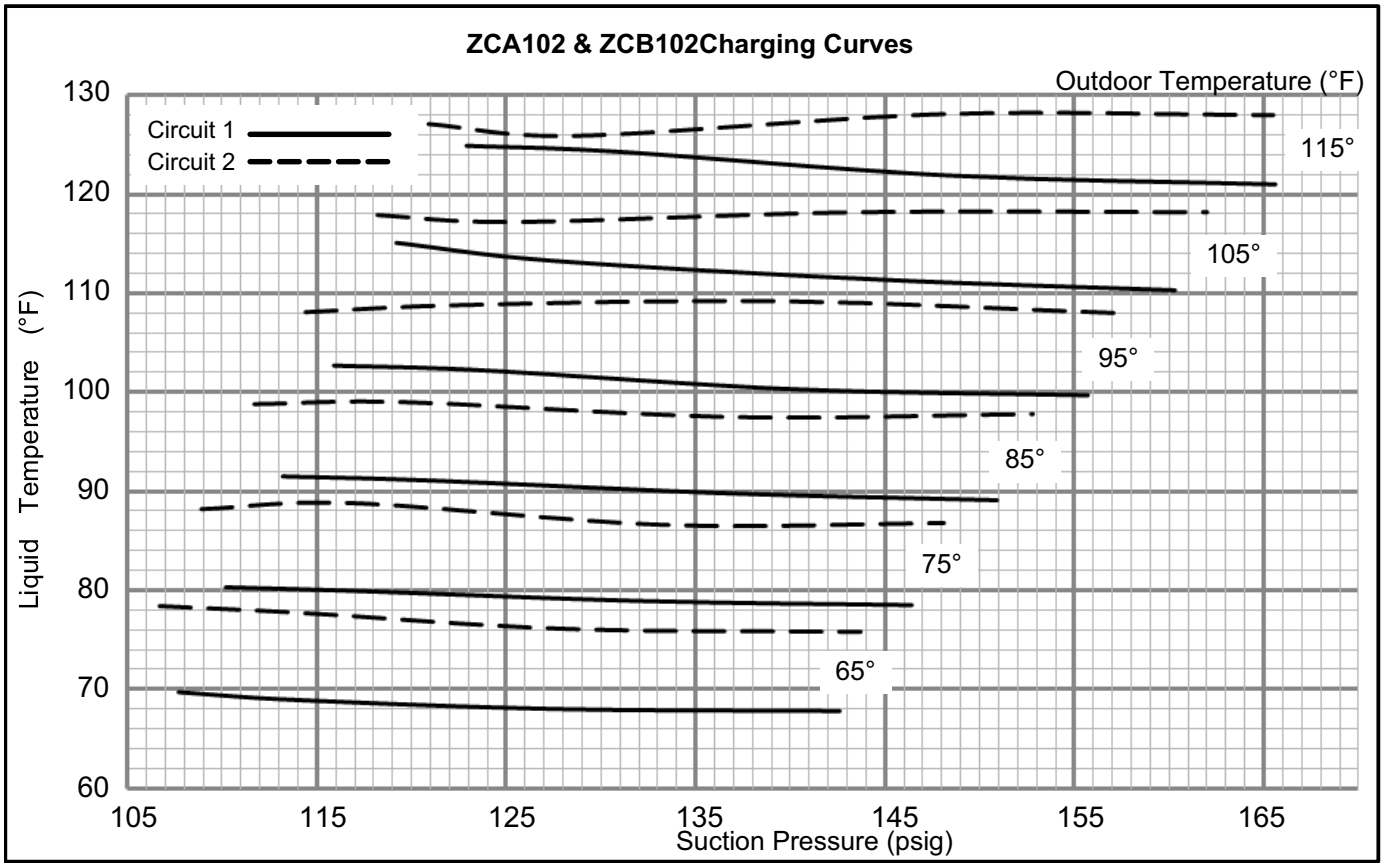


TABLE 5

ZCA120Normal Operating Pressures												
	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	107	245	111	286	114	330	117	380	119	433	121	492
	113	249	117	252	121	333	125	382	128	440	129	501
	128	269	133	307	138	350	141	398	146	455	145	521
	140	284	145	321	151	363	157	413	162	470	163	539
Circuit 2	110	254	114	296	117	342	120	391	121	444	126	507
	117	259	121	300	125	345	128	396	130	454	133	515
	133	281	138	321	142	365	145	414	149	472	151	537
	144	289	149	328	155	371	160	423	165	481	170	546

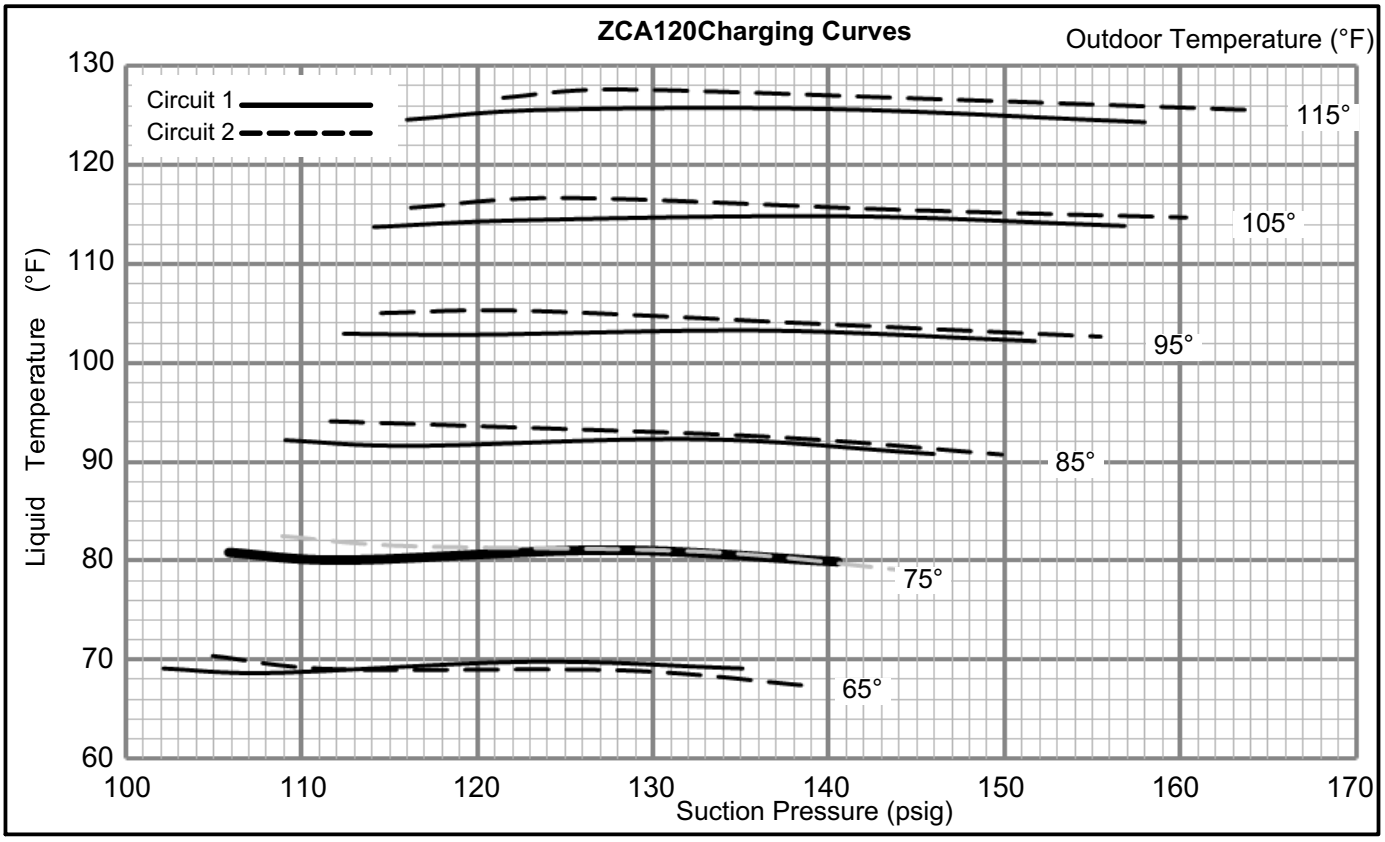


TABLE 6

ZCB120 Normal Operating Pressures

	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	107	253	109	290	111	333	114	379	118	428	121	482
	115	260	117	297	120	340	124	386	127	436	130	490
	130	278	134	316	137	357	141	404	145	454	146	509
	146	302	152	341	155	383	159	430	164	482	167	537
Circuit 2	107	262	109	301	112	344	115	390	119	440	121	494
	115	268	118	307	121	350	124	398	127	449	129	504
	128	275	133	320	137	363	141	412	144	462	146	521
	145	303	150	342	155	383	160	429	164	480	166	539

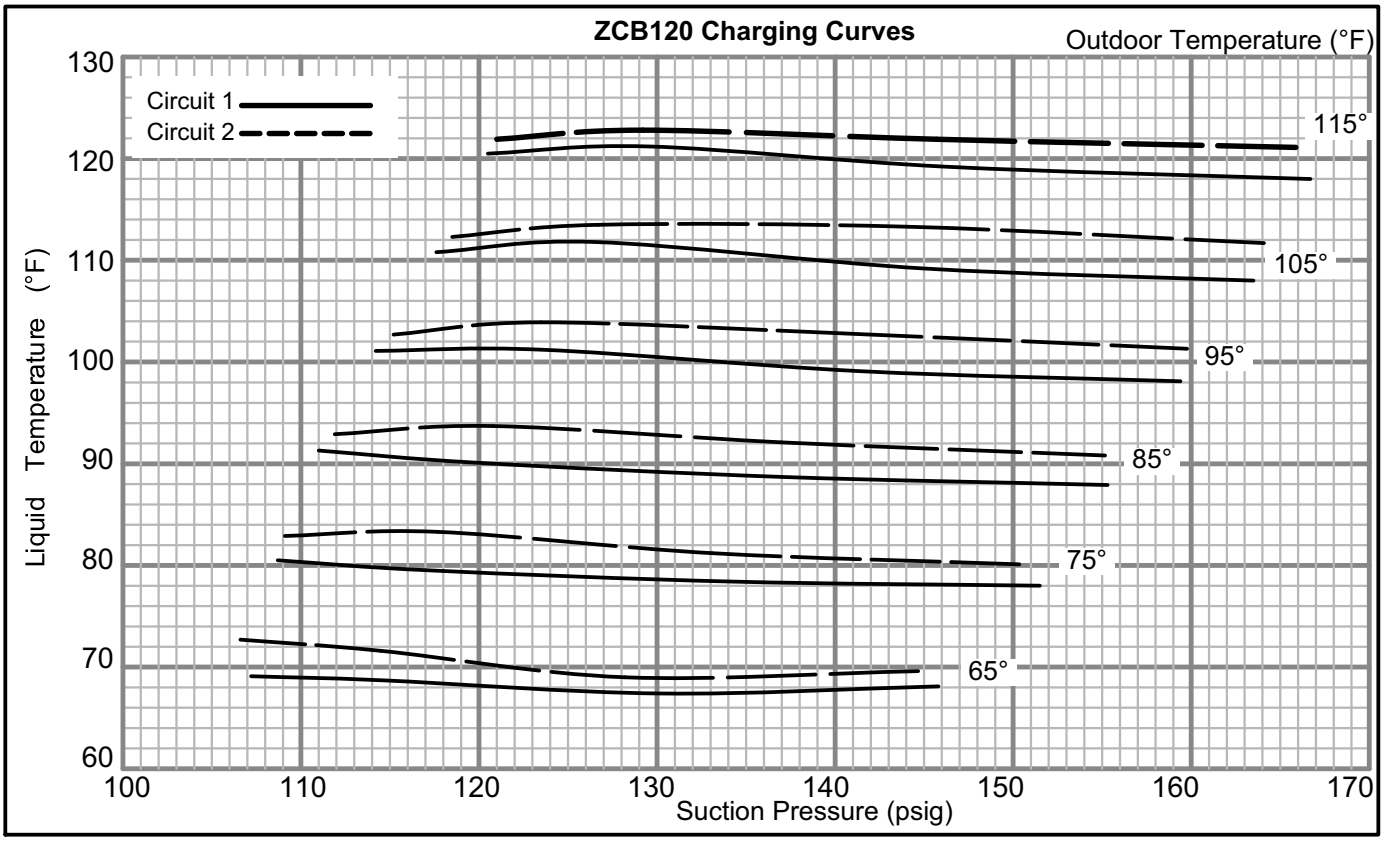


TABLE 7

ZCA150 Normal Operating Pressures												
	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	108	251	112	291	114	337	117	385	118	440	122	501
	114	254	118	293	122	338	124	385	127	440	129	496
	129	268	133	308	137	351	141	401	145	459	146	521
	144	290	148	326	154	373	159	423	163	479	167	538
Circuit 2	110	258	113	298	116	344	118	390	122	448	125	507
	116	261	120	302	123	347	126	395	127	449	131	507
	130	275	134	315	138	360	142	410	147	467	149	526
	145	294	150	332	155	379	160	429	164	484	167	542

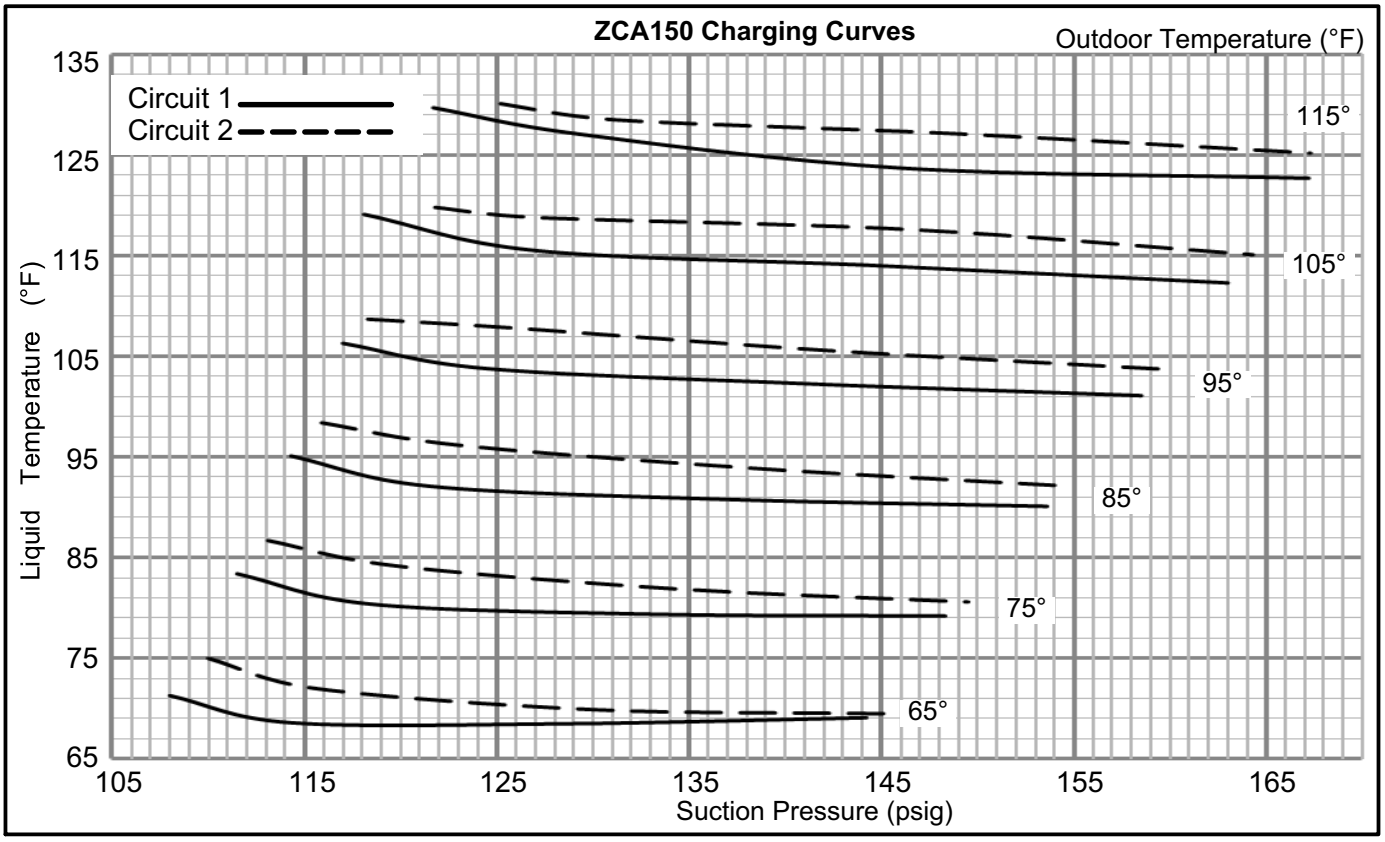
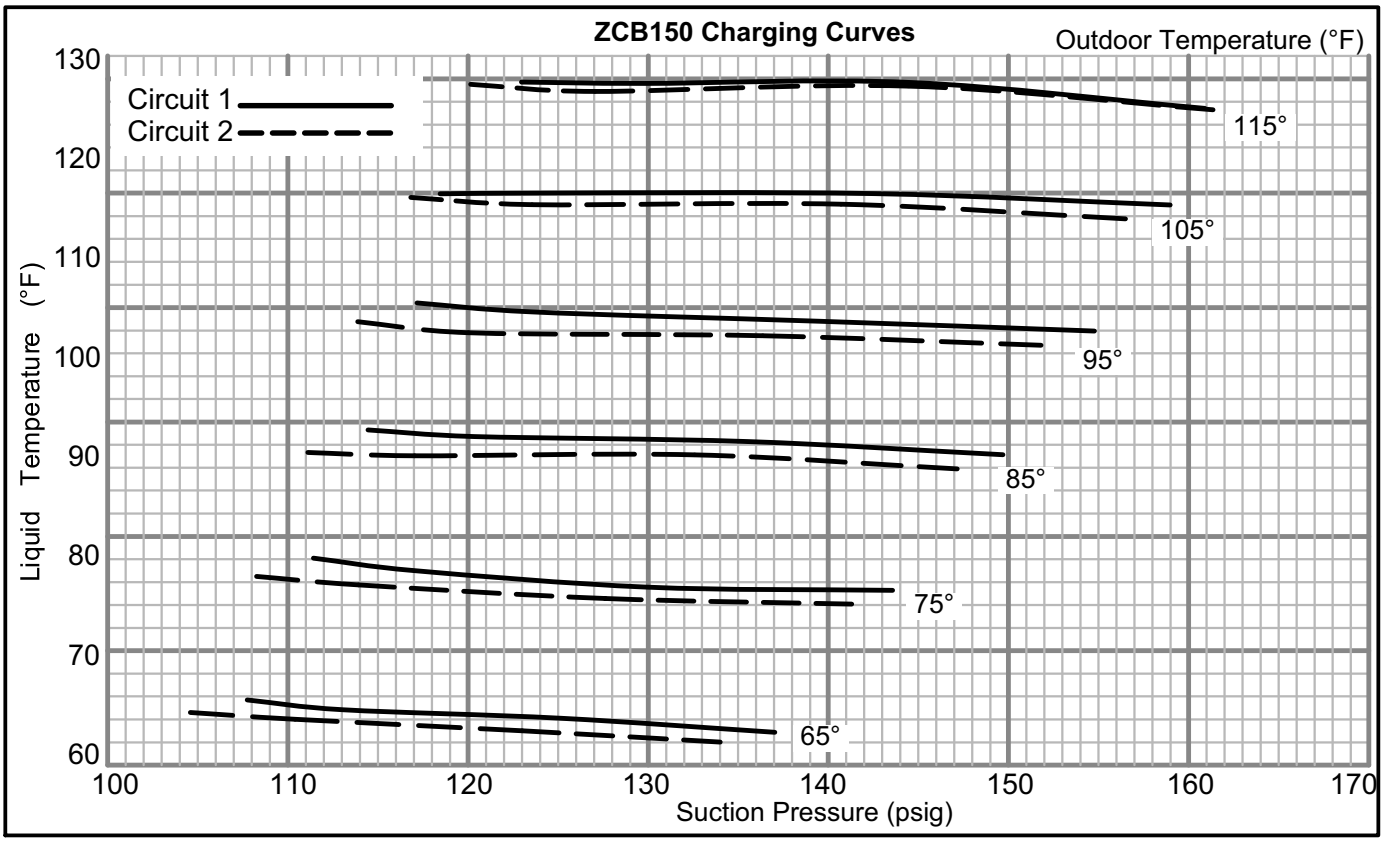


TABLE 8

ZCB150 Normal Operating Pressures												
	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	108	261	111	303	114	343	117	391	118	441	123	495
	113	264	117	305	120	349	124	394	124	443	130	498
	125	271	130	312	136	361	139	407	143	464	145	519
	137	277	144	322	150	370	155	418	159	471	161	524
Circuit 2	105	261	108	304	111	344	114	392	117	442	120	495
	110	263	114	306	117	351	120	396	124	445	127	500
	123	270	128	312	133	361	136	409	141	465	144	520
	134	277	141	323	147	372	152	420	157	473	161	524



V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

ZCA/ZCB 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 3 through 8.

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 11. Lift filter stop to remove filters. See figure 12.

⚠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 12.

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

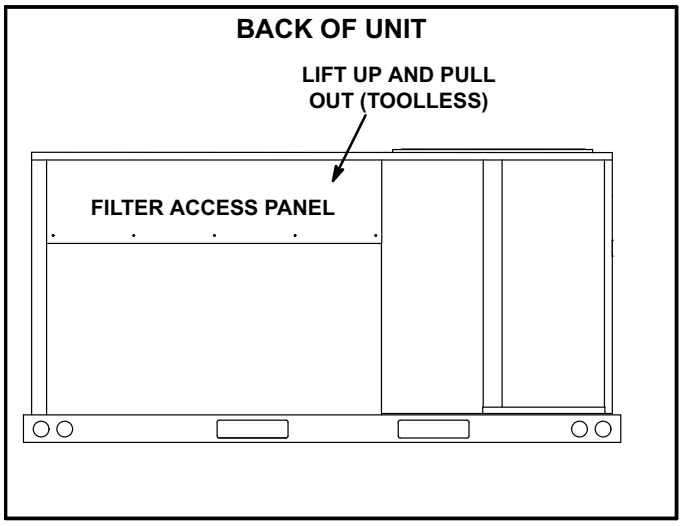


FIGURE 11

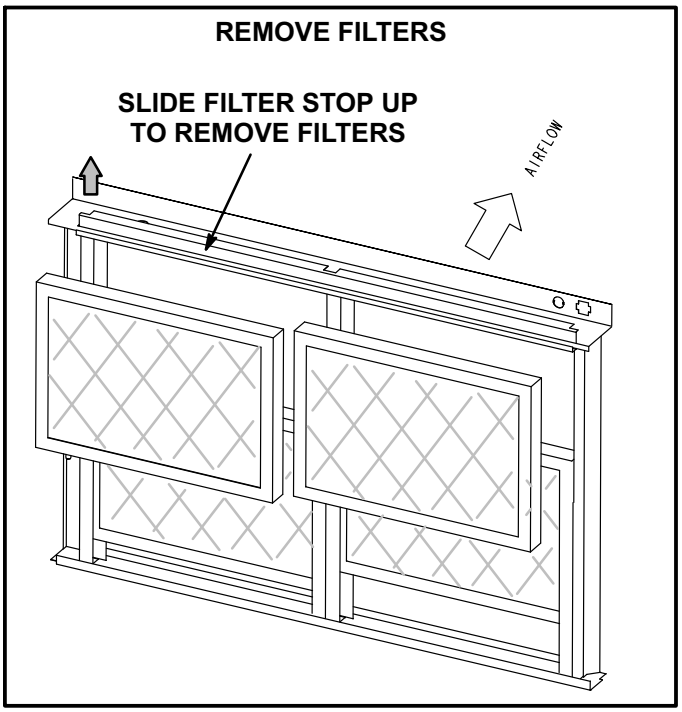


FIGURE 12

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 ZCA/ZCB 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 ZCA/ZCB 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 13. 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 14. 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 ZCA/ZCB units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

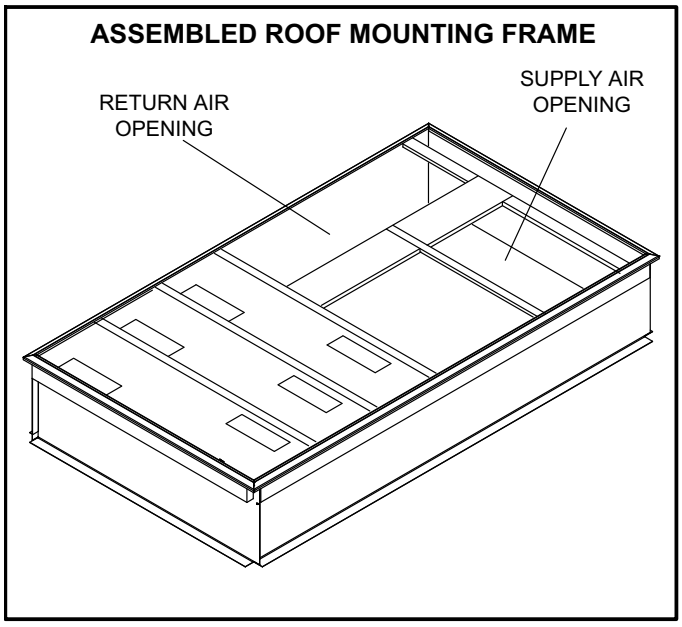


FIGURE 13

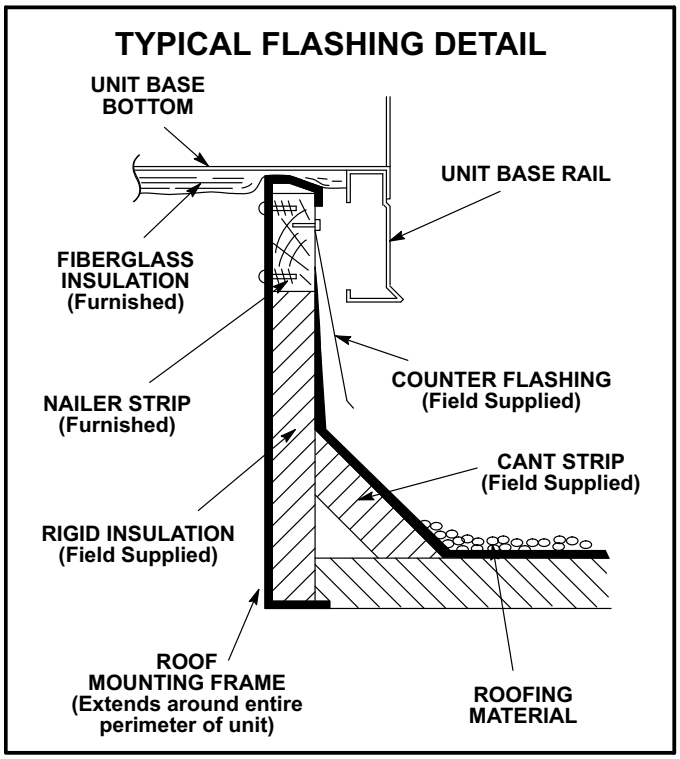


FIGURE 14

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 15.

The mixed air temperature sensor (R1) measures the supply air sensible temperature. See figure 16. The outdoor air sensible control is the default economizer control. An outdoor air single sensible sensor, S175, is also provided. See table 9 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 9

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.

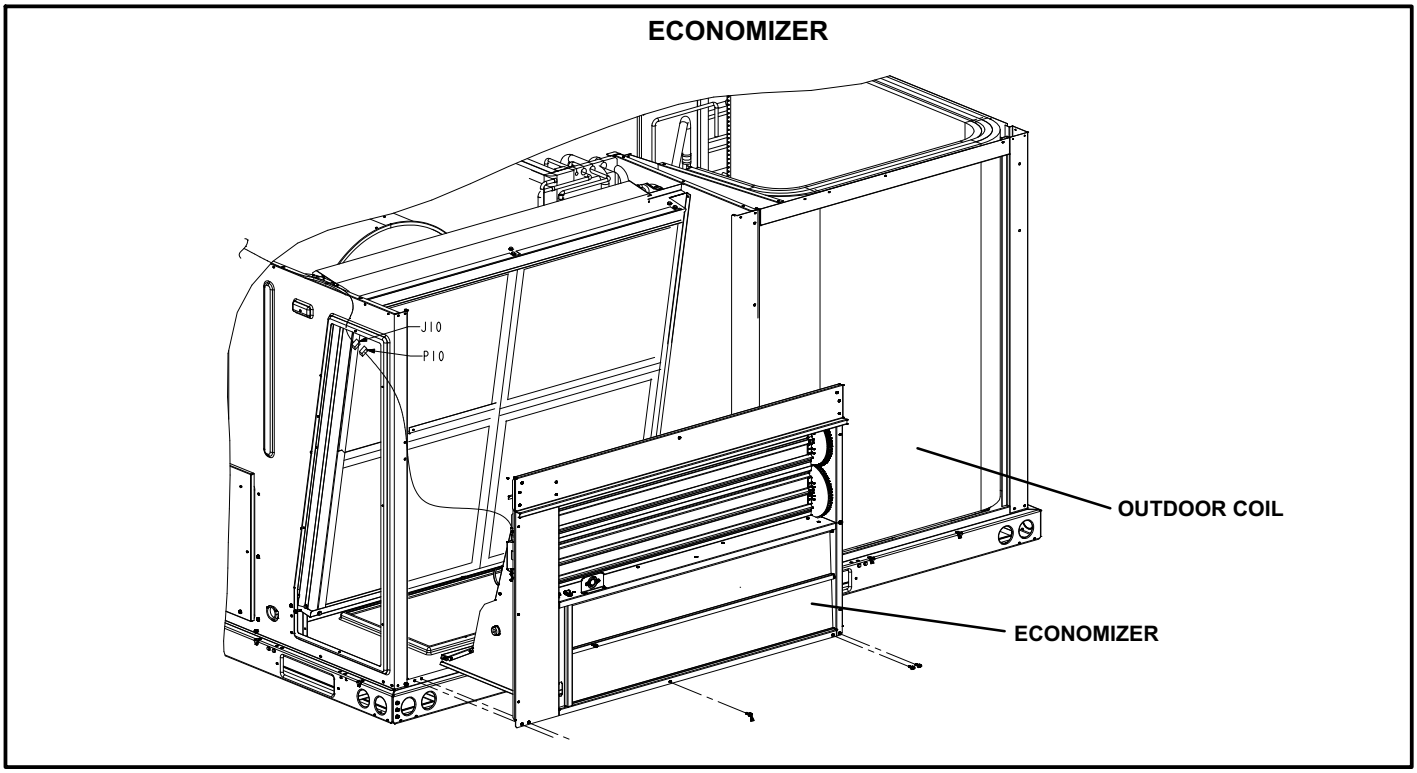


FIGURE 15

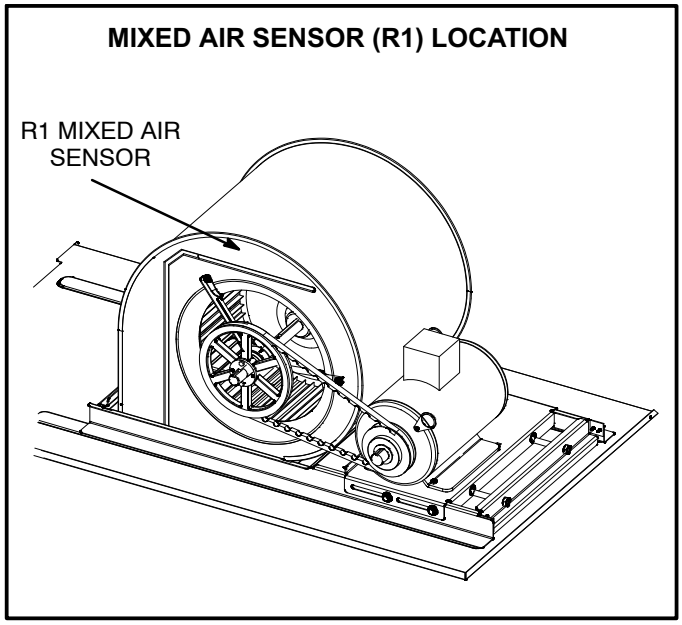


FIGURE 16

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 set-point requiring more fresh air. See figure 17.

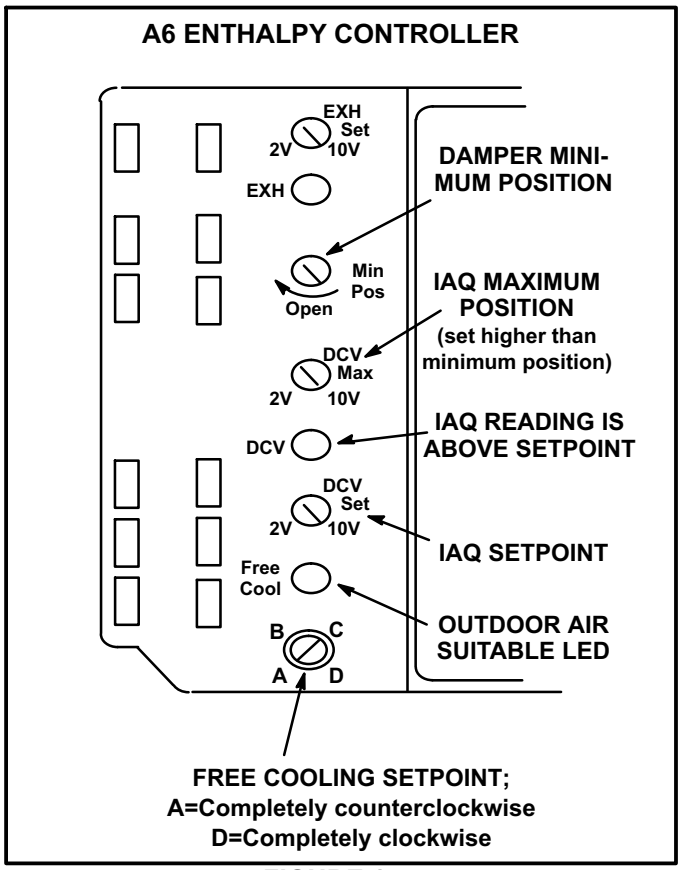


FIGURE 17

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in table 10. Setting A is recommended. See figure 17. 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 10
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).

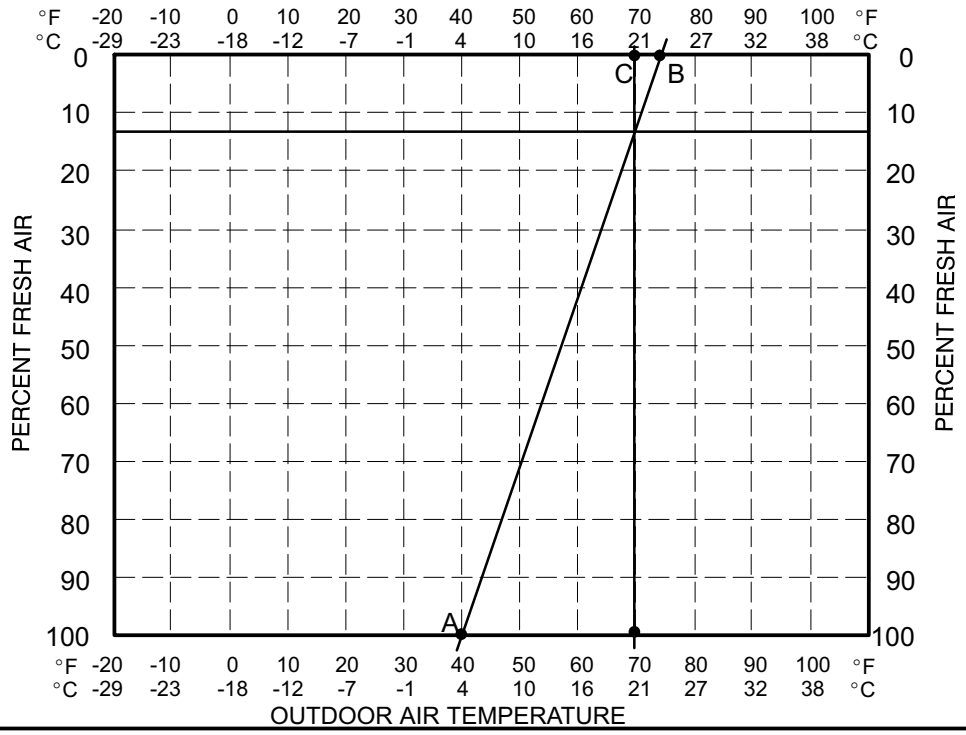
6- Draw a straight line between points A and B.

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 17.

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 17.

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 11 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 11

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.*

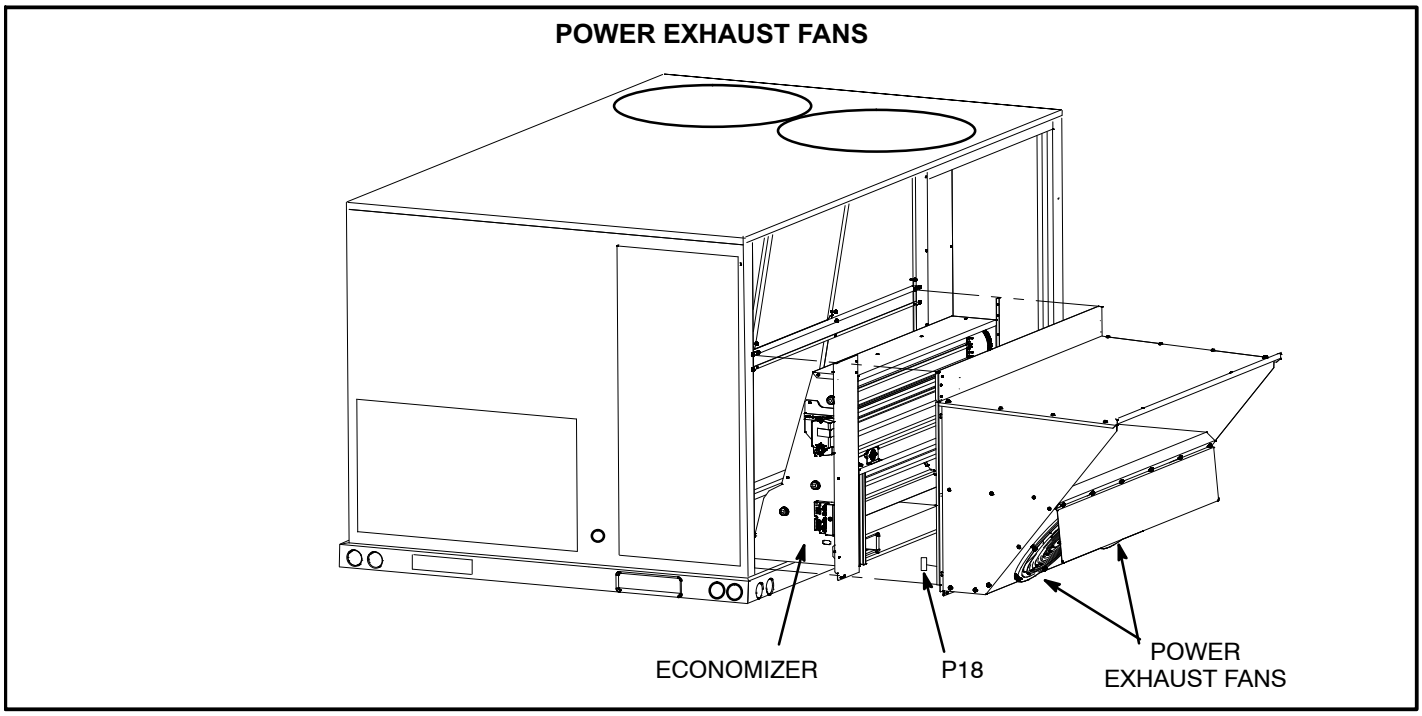


FIGURE 18

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 18. 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 19. 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.)

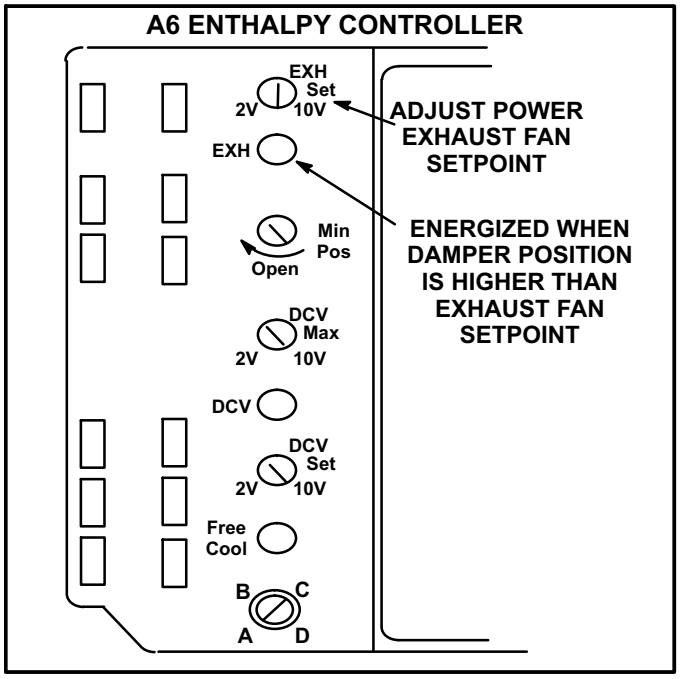
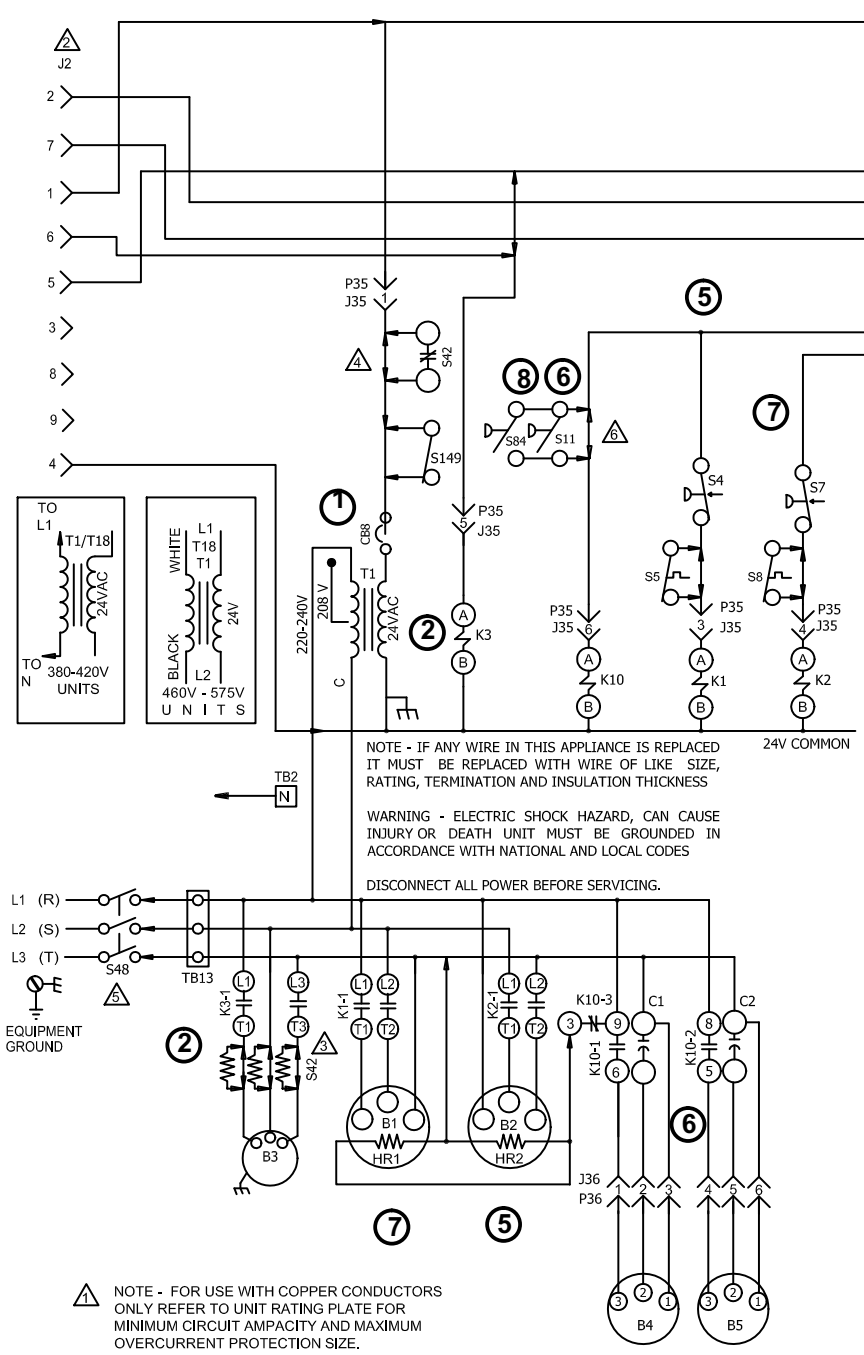


FIGURE 19

F-Drain Pan Overflow Switch S149 (optional)

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.

ZCA/ZCB092/150 UNIT DIAGRAM



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.

KEY	COMPONENT
A42	MONITOR, PHASE PROTECTION
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
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI PRESS COMP 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
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

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 ZGA UNITS OR FIELD INSTALLED ZCA WITH ELECTRICAL HEAT
3. IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS
4. S42 USED ON "M" VOLTAGE UNITS
5. S48 OR CB8 MAY BE USED
6. JUMPER WHEN S11 AND S84 ARE NOT USED

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

04/14	WIRING DIAGRAM 537671-01	04/14
COOLING - CAV		
ZCA, ZGA - 092, 102, 120, 150 - G, J, M, Y		
SECTION B		REV. 0
Supersedes	New Form No. 537671-01	

ZCA/ZCB092/150 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 contactor K3 with 24VAC. N.O. K3 closes, energizing blower B3.

1st Stage Cooling (compressor B1)

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 compressor B1.

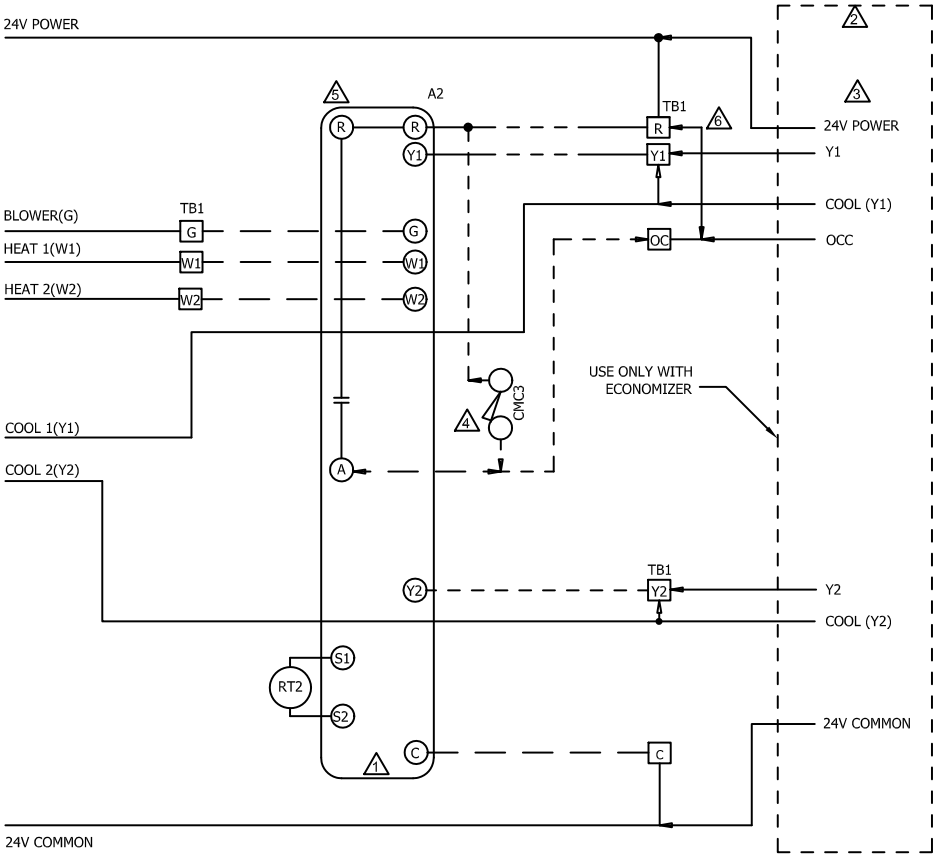
4- Optional N.O. low ambient switch S11 closes to energize condenser fan relay K10. N.O. contacts K10-1 and K10-2 close energizing condenser fans B4 and B5. N.C. contacts K10-3 open de-energizing crankcase heaters HR1 and HR2.

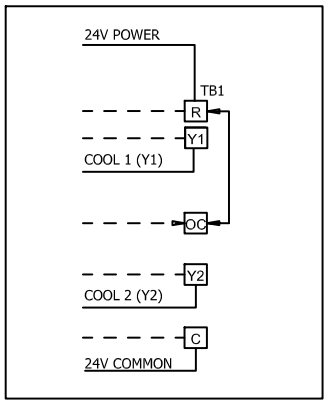
2nd Stage Cooling (compressor B2 is energized)

5- 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.

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.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT





CONNECTION SCHEME FOR ZCA, ZGA AND ZHA 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
CMC3	CLOCK, TIME
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

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

04/14	WIRING DIAGRAM 537673-01	04/14
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT (RAIDER B)		
SECTION C		REV 0
Supersedes	New Form No. 537673-01	

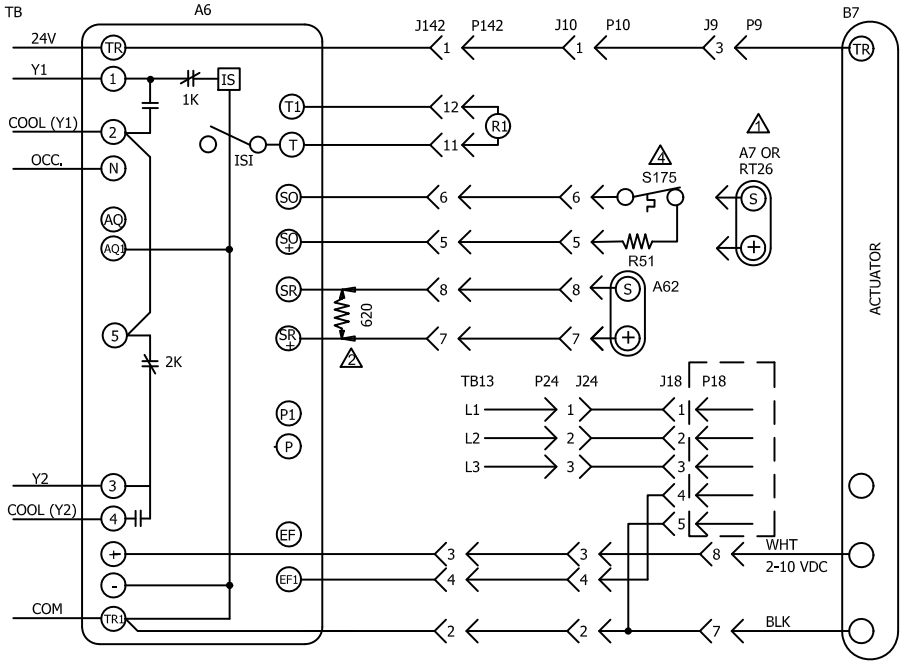
POWER:

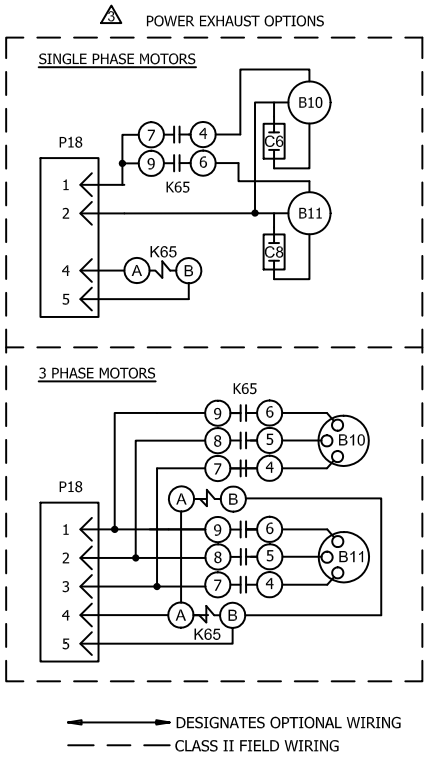
1- Terminal strip TB1 energizes thermostat components with 24VAC.

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





DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

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:

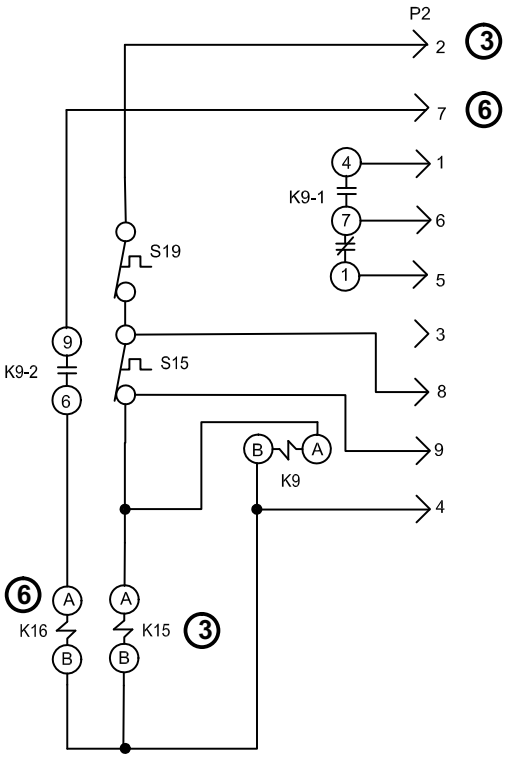
2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

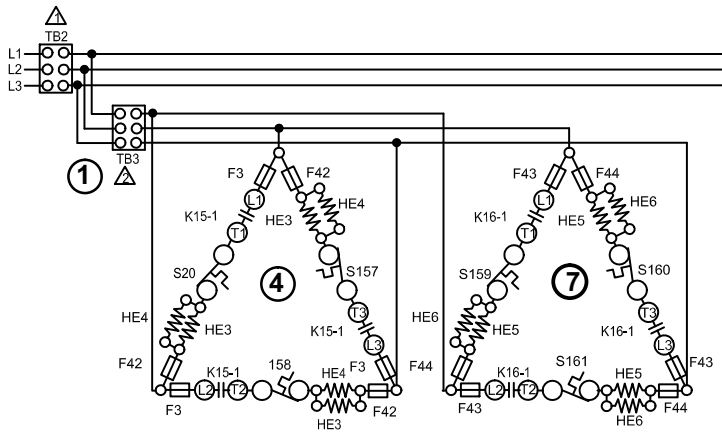
3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

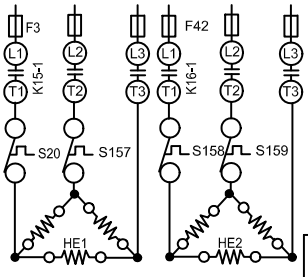
4- The damper actuator provides 2 to 10 VDC position feedback.

EHA-7.5, 15, 22.5, 30, 45 & 60kW Y VOLTAGE
ZCA/ZCB 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







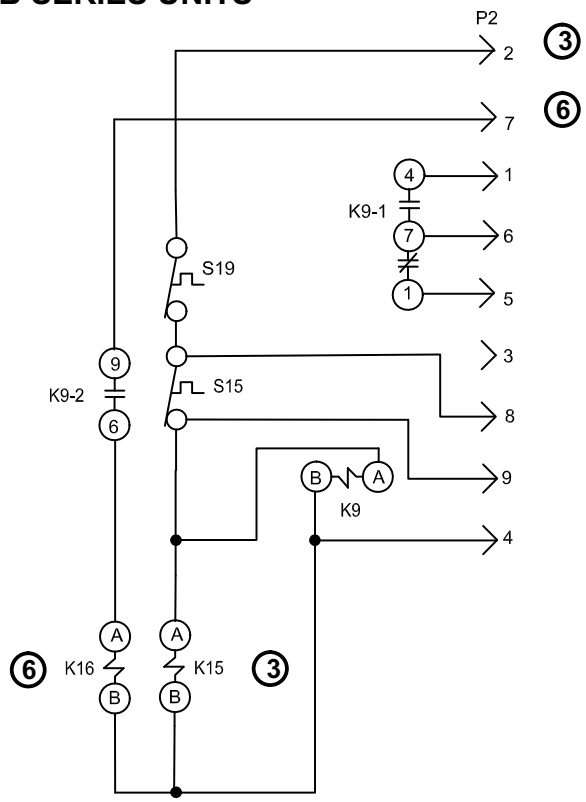
1. TB2,S48 OR CB10 MAY BE USED
2. TB3 IS USED ON SOME UNITS

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

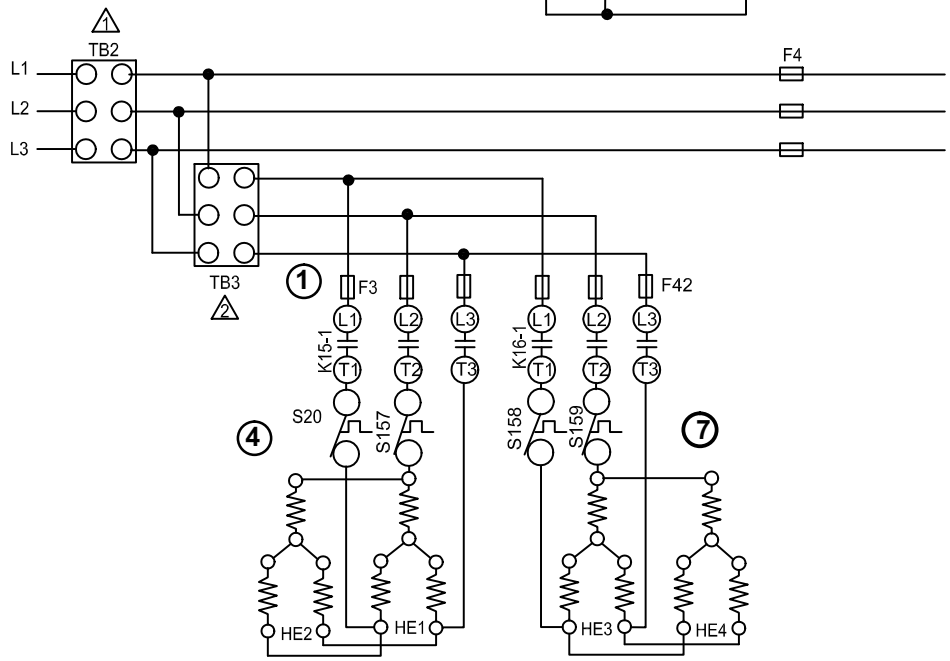
04/14	WIRING DIAGRAM 537690-01	04/14
	HEATING - ELECTRIC	
	7.5, 15, 22.5, 30, 45, 60 - Y	
	SECTION A	REV 0
Supersedes	New Form No. 537690-01	

EHA-7.5, 15, 22.5, 30, 45 & 60kW G, J VOLTAGE
ZCA/ZCB 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.

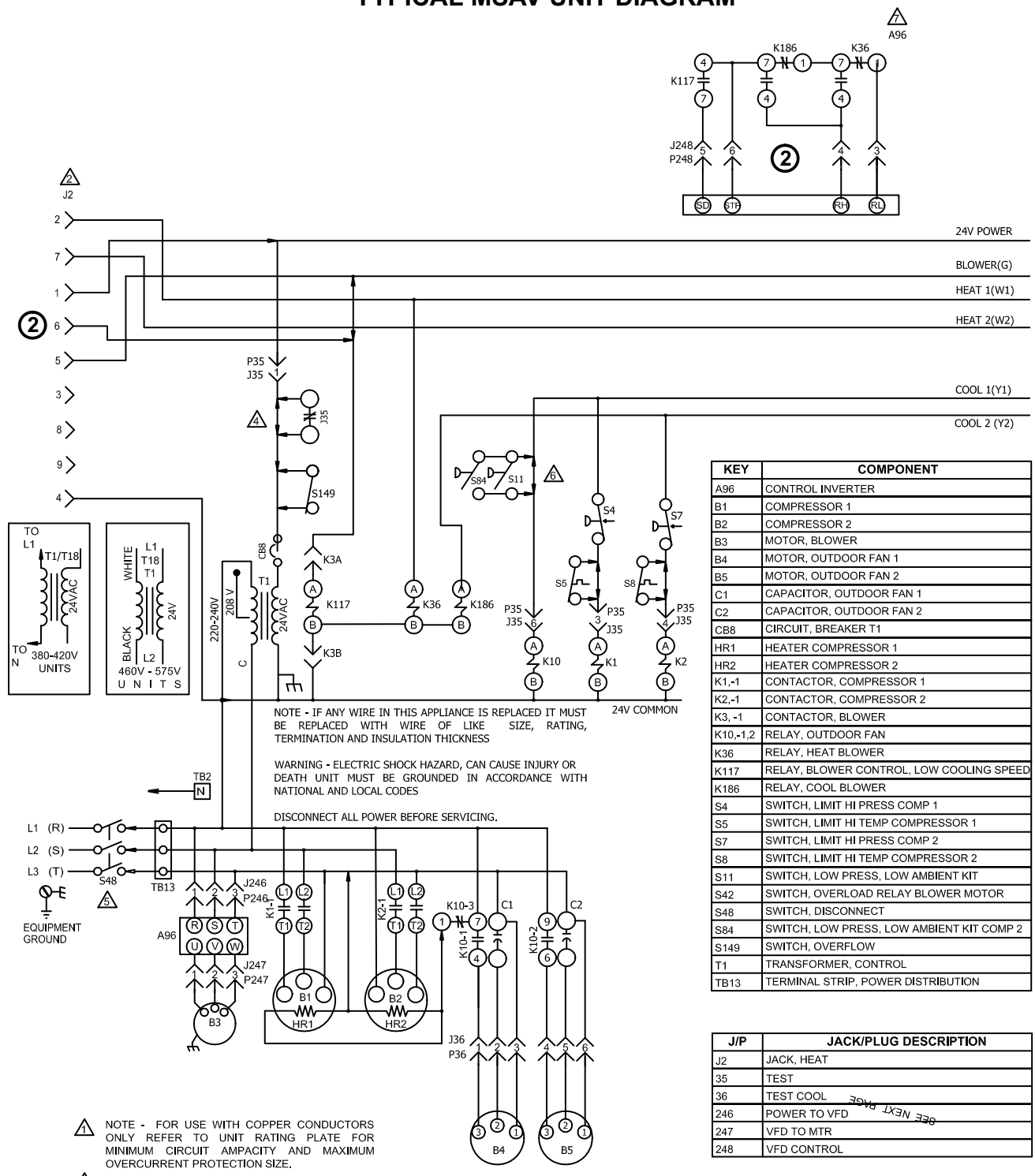
SECOND STAGE HEAT:

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.

TYPICAL MSAV 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
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN
K36	RELAY, HEAT BLOWER
K117	RELAY, BLOWER CONTROL, LOW COOLING SPEED
K186	RELAY, COOL BLOWER
S4	SWITCH, LIMIT HI PRESS COMP 1
S5	SWITCH, LIMIT HI TEMP COMPRESSOR 1
S7	SWITCH, LIMIT HI PRESS COMP 2
S8	SWITCH, LIMIT HI TEMP COMPRESSOR 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
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
246	POWER TO VFD
247	VFD TO MTR
248	VFD CONTROL

SEE NEXT PAGE

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 ZGA UNITS ONLY OR FIELD INSTALLED
3. IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS
4. S42 USED ON "M" VOLTAGE UNITS
5. S48 OR CB8 MAY BE USED
6. JUMPER WHEN S11 AND S84 ARE NOT USED
7. MITSUBISHI VFD

04/14	WIRING DIAGRAM 537722-01	04/14
COOLING - MSAV		
ZCA, ZGA - 092, 102, 120, 150 - G, J, M, Y		
SECTION B		REV. 0
Supersedes	New Form No. 537722-01	

MSAV BLOWER OPERATION

G Blower Demand:

1- 24VAC is routed through J/P2-5 to the A3 ignition control.

2- When heating proves, 24VAC is routed from A3 ignition control, through J/P2-6 and K117 relay is energized. K117 N.O. contacts close and 24VAC is routed through K186 and K36 N.C. contacts to A96 inverter terminal RL. Blower operates in low speed.

Y1 Cooling Demand:

1- Blower demand initiates low speed in the same manner as G Blower Demand.

Y2 Cooling Demand:

1- K186 relay is energized and K186 N.O. contacts close.

2- The blower demand closes K117 N.O. contacts. 24VAC is routed through K117 and K186 closed contacts to A96 inverter terminal RH. Blower operates in high speed.

W1 Heating Demand:

1- K36 relay is energized and K36 N.O. contacts close. The blower demand closes K117 N.O. contacts. 24VAC is routed through K117 and K36 closed contacts to A96 inverter terminal RH. Blower operates in high speed.