KCA092 through 150

The KCA 7.5, 8.5, 10 and 12.5 ton (092, 102, 120, 150) packaged cooling units are available in standard cooling efficiency. Optional auxiliary electric heat is factory or field installed in KCA units. Electric heat operates in single or multiple stages depending on the kW input size. 7.5kW through 60kW heat sections are available for the KCA heat pump.

All KCA 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.

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 qualified installer or service agency.

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during unit installation and service to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the furnace, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface, such as the gas valve or blower deck, before performing any service procedure.

⚠ CAUTION

Danger of sharp metallic edges. Can cause injury. Take care when servicing unit to avoid accidental contact with sharp edges.

⚠ 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						
Compressor Crankcase Heater	208/230V- 3ph - K1CCHT02B-1Y	**54W17**	X	X	X	
	460V-3ph - K1CCHT02B-1G	**54W18**	X	X	X	
	575V-3ph - K1CCHT02B-1J	**54W19**	X	X	X	
Condensate Drain Trap	PVC - LTACDKP09/36	**76M18**	X	X	X	X
	Copper - LTACDKC09/36	**76M19**	X	X	X	X
Corrosion Protection		Factory	O	O	O	O
Drain Pan Overflow Switch	K1SNSR71AB1-	**74W42**	X	X	X	X
Efficiency		Standard	O	O	O	O
Low Ambient Kit	K1SNSR33B-1	**54W16**	X	X	X	X
Refrigerant Type		R-410A	O	O	O	O
BLOWER - SUPPLY AIR						
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	Kit #1 590-890 rpm	Factory	O	O	O	O
See Blower Data Tables for selection	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						
Coil Guards	K1GARD20B-1	**55W08**	X	X	X	X
Hail Guards	K1GARD10B1	**55W11**	X	X	X	X
Hinged Access Panels		Factory	O	O	O	O
Horizontal Discharge Kit	K1HECK00B-1	**51W25**	X	X	X	X
Return Air Adaptor Plate (for L Series® and T-Class™ replacement)	C1CONV10B-1	**54W96**	X	X	X	X
CONTROLS						
Commercial Controls	L Connection® Building Automation System	- - -	X	X	X	X
Smoke Detector - Supply or Return (Power board and one sensor)	C1SNSR44B-1	**53W80**	X	X	X	X
Smoke Detector - Supply and Return (Power board and two sensors)	C1SNSR43B-1	**53W81**	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 - C1FLTR15B-1	**50W61**	X	X	X	X
20 x 25 x 2 (Order 4 per unit)	MERV 13 - C1FLTR40B-1	**52W41**	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
UVC Germicidal Lamps						
[1] Healthy Climate® UVC Light Kit (208/230v-1ph)	C1UVCL10B-1	**54W62**	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
Disconnect Switch - See Electrical/Electric Heat tables for selection	80 amp - C1DISC080B-1	**54W56**	OX	OX	OX	OX
	150 amp - C1DISC150B-1	**54W57**	OX	OX	OX	OX
GFI Service Outlets	LTAGFIK10/15	**74M70**	OX	OX	OX	OX
ELECTRIC HEAT						
7.5 kW	208/230V-3ph - C1EHO075B-1Y	**56W38**	X	X		
	460V-3ph - C1EHO075B-1G	**56W39**	X	X		
	575V-3ph - C1EHO075B-1J	**56W40**	X	X		
15 kW	208/230V-3ph - C1EHO015B-1Y	**56W41**	X	X	X	X
	460V-3ph - C1EHO150B-1G	**56W42**	X	X	X	X
	575V-3ph - C1EHO150B-1J	**56W43**	X	X	X	X
22.5 kW	208/230V-3ph - C1EHO225B-1Y	**56W44**	X	X	X	X
	460V-3ph - C1EHO225B-1G	**56W45**	X	X	X	X
	575V-3ph - C1EHO225B-1J	**56W46**	X	X	X	X
30 kW	208/230V-3ph - C1EHO300B-1Y	**56W47**	X	X	X	X
	460V-3ph - C1EHO300B-1G	**56W48**	X	X	X	X
	575V-3ph - C1EHO300B-1J	**56W49**	X	X	X	X
45 kW	208/230V-3ph - C1EHO450B-1Y	**56W50**	X	X	X	X
	460V-3ph - C1EHO450B-1G	**56W51**	X	X	X	X
	575V-3ph - C1EHO450B-1J	**56W52**	X	X	X	X
60 kW	208/230V-3ph - C1EHO600B-1Y	**55W02**			X	X
	460V-3ph - C1EHO600B-1G	**55W03**			X	X
	575V-3ph - C1EHO600B-1J	**55W04**			X	X

[1] Lamps operate on 110-230V single-phase power supply. Step-down transformer may be ordered separately for 460V and 575V units. Alternately, 110V power supply may be used to directly power the UVC ballast(s)

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						
Economizer						
Economizer with Single Temperature Control - Downflow or Horizontal With Barometric Relief Dampers (downflow) and Air Hoods	K1ECON20B-1	**54W55**	OX	OX	OX	OX
Economizer Controls						
Single Enthalpy Control	C1SNSR64FF1	**53W64**	OX	OX	OX	OX
Differential Enthalpy Control (order 2)	C1SNSR64FF1	**53W64**	X	X	X	X
Horizontal Barometric Relief Dampers With Exhaust Hood						
Horizontal Barometric Relief Dampers - Exhaust Hood Furnished	LAGEDH03/15	**53K04**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers						
Motorized Dampers with outdoor air hood	C1DAMP20B-1	**53W49**	OX	OX	OX	OX
Manual Dampers with outdoor air hood	C1DAMP10B-1	**53W48**	OX	OX	OX	OX
POWER EXHAUST						
Standard Static	208/230V-3ph - K1PWRE10B-1Y	**53W44**	X	X	X	X
	460V-3ph - K1PWRE10B-1G	**53W45**	X	X	X	X
	575V-3ph - K1PWRE10B-1J	**53W46**	X	X	X	X
ROOF CURBS - DOWNFLOW						
Clip Curb						
8 in. height	C1CURB23B-1	**54W46**	X	X	X	X
14 in. height	C1CURB20B-1	**54W47**	X	X	X	X
18 in. height	C1CURB21B-1	**54W48**	X	X	X	X
24 in. height	C1CURB22B-1	**54W49**	X	X	X	X
Standard						
8 in. height	C1CURB12B-1	**54W44**	X	X	X	X
14 in. height	C1CURB10B-1	**54W43**	X	X	X	X
24 in. height	C1CURB11B-1	**54W45**	X	X	X	X
Adjustable Pitched Curb						
14 in. height	C1CURB55B-1	**54W50**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95	**29G04**	X			
	RTD11-135	**29G05**		X	X	
	RTD11-185	**29G06**				X
Flush - Order one	FD11-95	**29G08**	X			
	FD11-135	**29G09**		X	X	
	FD11-185	**29G10**				X
Transitions (Supply and Return) - Order one	LASRT08/10	**24L14**	X			
	LASRT10/12	**49K55**		X	X	
	LASRT15	**49K56**				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

SPECIFICATIONS

General Data		Nominal Tonnage	7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
		Model Number	**KCA092S4B**	**KCA102S4B**	**KCA120S4B**	**KCA150S4B**
		Efficiency Type	**Standard**	**Standard**	**Standard**	**Standard**
		Blower Type	Constant Air Volume CAV	Constant Air Volume CAV	Constant Air Volume CAV	Constant Air Volume CAV
Cooling Performance	Gross Cooling Capacity - Btuh		88,900	100,483	119,640	144,800
	[1] Net Cooling Capacity - Btuh		86,000	97,000	115,000	138,000
	AHRI Rated Air Flow - cfm		3,000	3,400	3,800	4,300
	Total Unit Power - kW		7.7	8.7	10.3	12.5
	[1] EER (Btuh/Watt)		11.2	11.2	11.2	11
	[2] IEER (Btuh/Watt)		11.4	11.4	11.4	11.2
	Refrigerant Type		R-410A	R-410A	R-410A	R-410A
	Refrigerant Charge Furnished	Circuit 1	7 lbs. 8 oz.	8 lbs. 8 oz.	10 lbs. 0 oz.	14 lbs. 0 oz.
		Circuit 2	7 lbs. 0 oz.	8 lbs. 8 oz.	10 lbs. 0 oz.	12 lbs. 0 oz.
Electric Heat Available - See page 3			7.5,15,22.5,30 & 45 KW		15,22.5,30,45 & 60 KW	
Compressor Type (number)			Scroll (2)	Scroll (2)	Scroll (2)	Scroll (2)
Outdoor Coils	Net face area (total) - sq. ft.		20.42	24.5	28.0	28.0
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		2	2	2	3
	Fins per inch		20	20	20	20
Outdoor Coil Fans	Motor - (No.) hp		(2) 1/3	(2) 1/3	(2) 1/3	(2) 1/2
	Motor rpm		1075	1075	1075	1075
	Total Motor watts		670	670	670	830
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3	3
	Total Air volume - cfm		7200	7400	7800	8,800
Indoor Coils	Net face area (total) - sq. ft.		12.78	12.78	12.78	13.54
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		2	2	3	4
	Fins per inch		14	14	14	14
	Drain connection - Number and size		(1) 1 in. NPT coupling			
	Expansion device type		Balance port TXV, removable head			
[3] Indoor Blower and Drive Selection	Nominal motor output		2 hp, 3 hp, 5 hp	2 hp, 3 hp, 5 hp	2 hp, 3 hp, 5 hp	2 hp, 3 hp, 5 hp
	Maximum usable motor output (US Only)		2.3 hp, 3.45 hp, 5.75 hp	2.3 hp, 3.45 hp, 5.75 hp	2.3 hp, 3.45 hp, 5.75 hp	2.3 hp, 3.45 hp, 5.75 hp
	Motor - Drive kit number		2 hp [4] **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	2 hp [4] **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	2 hp **Kit 1** 590-890 rpm **Kit 2** 800-1105 rpm **Kit 3** 795-1195 rpm 3 hp [4] **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	2 hp **Kit 1** 590-890 rpm **Kit 2** 800-105 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 [4] **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 25 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] Certified in accordance with the ULE certification program, which is based on 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] Integrated Energy Efficiency Ratio certified and tested according to AHRI Standard 340/360..

[3] 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.

[4] Standard motor and drive kit furnished with unit.

BLOWER DATA

092 AND 102 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.

See page 9 for blower motors and drives.

See page 9 for wet coil and option/accessory air resistance data.

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, 30 kW and 45 kW - 2800 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
2250	- - -	- - -	- - -	- - -	707	0.14	753	0.50	800	0.84	847	1.15	892	1.38	934	1.53	979	1.65	1051	1.86	1126	2.12	1183	2.36	1238	2.62
2500	- - -	- - -	- - -	- - -	714	0.29	758	0.64	803	0.97	849	1.26	893	1.48	936	1.63	983	1.75	1052	1.96	1124	2.22	1184	2.49	1241	2.77
2750	- - -	- - -	680	0.11	721	0.45	763	0.78	807	1.09	852	1.37	896	1.58	940	1.74	989	1.88	1053	2.08	1121	2.34	1185	2.63	1244	2.93
3000	- - -	- - -	689	0.29	728	0.61	770	0.93	812	1.23	856	1.49	901	1.70	947	1.87	996	2.02	1055	2.21	1120	2.47	1186	2.78	1248	3.10
3250	661	0.17	698	0.46	737	0.78	777	1.09	819	1.38	862	1.63	908	1.84	955	2.01	1004	2.17	1059	2.36	1122	2.62	1189	2.94	1252	3.28
3500	672	0.36	708	0.65	746	0.95	786	1.25	827	1.53	870	1.78	916	1.99	965	2.17	1013	2.33	1065	2.52	1126	2.79	1193	3.12	1257	3.47
3750	684	0.56	719	0.85	756	1.14	795	1.43	836	1.70	880	1.95	927	2.16	976	2.34	1023	2.51	1073	2.71	1133	2.98	1198	3.32	1263	3.67
4000	697	0.78	731	1.05	768	1.34	807	1.62	848	1.89	892	2.13	940	2.34	988	2.53	1034	2.71	1083	2.91	1141	3.19	1205	3.53	1270	3.89
4250	710	1.00	745	1.27	781	1.55	819	1.83	861	2.09	906	2.33	954	2.55	1001	2.74	1046	2.93	1094	3.14	1151	3.42	1214	3.76	1278	4.12

BLOWER DATA

120 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.

See page 9 for blower motors and drives.

See page 9 for wet coil and option/accessory air resistance data.

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

15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

60 kW - 4000 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
3000	- - -	- - -	677	0.24	719	0.55	764	0.87	813	1.18	866	1.45	920	1.67	975	1.82	1026	1.96	1076	2.13	1126	2.35	1176	2.63	1225	2.92
3250	650	0.14	688	0.43	730	0.73	775	1.04	823	1.34	875	1.60	930	1.81	985	1.97	1036	2.12	1086	2.31	1136	2.54	1186	2.83	1235	3.13
3500	663	0.35	700	0.63	741	0.92	786	1.22	834	1.5	886	1.76	942	1.96	997	2.14	1048	2.31	1097	2.51	1147	2.75	1196	3.04	1245	3.35
3750	676	0.57	714	0.84	754	1.12	798	1.41	846	1.68	899	1.93	956	2.14	1010	2.32	1060	2.51	1109	2.72	1158	2.98	1207	3.27	1255	3.58
4000	691	0.79	728	1.05	768	1.33	812	1.61	860	1.88	914	2.12	971	2.34	1023	2.53	1072	2.73	1121	2.95	1169	3.22	1218	3.51	1266	3.83
4250	706	1.03	743	1.28	783	1.55	827	1.82	876	2.09	931	2.33	987	2.55	1037	2.76	1085	2.97	1133	3.20	1181	3.47	1229	3.76	1277	4.08
4500	722	1.27	759	1.52	799	1.78	844	2.05	894	2.31	949	2.56	1003	2.79	1052	3.00	1098	3.22	1145	3.46	1193	3.73	1241	4.03	1289	4.34
4750	739	1.53	776	1.77	817	2.03	862	2.30	913	2.56	968	2.81	1020	3.04	1066	3.27	1112	3.49	1158	3.74	1205	4.01	1253	4.30	1301	4.61
5000	757	1.79	794	2.04	835	2.30	882	2.56	934	2.83	988	3.08	1036	3.32	1081	3.55	1125	3.78	1171	4.02	1218	4.29	1265	4.59	1312	4.89

BLOWER DATA

150 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.

See page 9 for blower motors and drives.

See page 9 for wet coil and option/accessory air resistance data.

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

15 kW, 22.5 kW, 30 kW and 45 kW - 2800 cfm

60 kW - 4000 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
3750	689	0.68	731	0.97	775	1.27	820	1.56	865	1.81	911	2.02	957	2.19	1004	2.35	1051	2.53	1100	2.74	1151	2.99	1204	3.29	1258	3.61
4000	706	0.92	748	1.22	792	1.51	836	1.78	881	2.02	926	2.22	972	2.39	1018	2.57	1065	2.76	1113	2.98	1163	3.25	1217	3.55	1271	3.87
4250	725	1.18	766	1.47	810	1.75	854	2.02	899	2.25	943	2.44	988	2.61	1033	2.81	1079	3.01	1127	3.25	1178	3.52	1230	3.82	1284	4.14
4500	744	1.45	786	1.73	829	2.01	873	2.27	917	2.49	961	2.67	1005	2.87	1050	3.07	1096	3.29	1143	3.53	1193	3.81	1245	4.11	1298	4.43
4750	764	1.73	806	2.01	849	2.28	893	2.53	936	2.74	980	2.94	1023	3.15	1068	3.37	1113	3.60	1160	3.84	1210	4.12	1261	4.42	1314	4.74
5000	785	2.02	827	2.30	870	2.57	914	2.81	957	3.02	1000	3.23	1043	3.46	1087	3.69	1131	3.92	1178	4.17	1227	4.44	1278	4.74	1330	5.05
5250	807	2.33	850	2.61	893	2.87	937	3.11	979	3.33	1021	3.55	1064	3.80	1107	4.03	1151	4.27	1197	4.51	1245	4.78	1295	5.08	1347	5.38
5500	831	2.66	874	2.94	917	3.2	960	3.43	1002	3.67	1043	3.91	1085	4.16	1127	4.39	1171	4.63	1216	4.87	1264	5.14	1313	5.42	1364	5.72
5750	856	3.00	899	3.29	943	3.55	985	3.79	1026	4.04	1066	4.30	1107	4.55	1149	4.78	1192	5.00	1237	5.24	1284	5.50	- - -	- - -	- - -	- - -
6000	883	3.38	927	3.66	970	3.93	1010	4.19	1050	4.46	1089	4.72	1129	4.95	1171	5.17	1213	5.40	1257	5.63	- - -	- - -	- - -	- - -	- - -	
6250	912	3.78	956	4.07	997	4.35	1036	4.63	1074	4.90	1113	5.15	1152	5.37	1193	5.58	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

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

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3175
0.05	2955
0.10	2685
0.15	2410
0.20	2165
0.25	1920
0.30	1420
0.35	1200

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

Air Volume cfm	Wet Indoor Coil			Electric Heat	Economizer	Filters		Return Air Adaptor Plate
	092, 102	120	150			MERV 8	MERV 13	
2250	0.07	0.10	0.13	0.04	0.08	0.01	0.04	0.00
2500	0.09	0.12	0.15	0.04	0.11	0.01	0.05	0.00
2750	0.09	0.12	0.17	0.05	0.12	0.02	0.05	0.00
3000	0.11	0.15	0.19	0.06	0.13	0.02	0.06	0.02
3250	0.13	0.18	0.23	0.06	0.15	0.02	0.06	0.02
3500	0.14	0.21	0.26	0.09	0.15	0.03	0.07	0.04
3750	0.16	0.23	0.29	0.09	0.15	0.03	0.08	0.07
4000	0.17	0.25	0.31	0.09	0.19	0.04	0.08	0.09
4250	0.20	0.27	0.34	0.13	0.19	0.04	0.09	0.11
4500	0.21	0.30	0.37	0.14	0.22	0.04	0.09	0.12
4750	0.23	0.32	0.40	0.17	0.25	0.05	0.10	0.16
5000	0.26	0.35	0.43	0.20	0.29	0.06	0.10	0.18
5250	0.27	0.36	0.46	0.22	0.32	0.06	0.11	0.19
5500	0.29	0.40	0.50	0.25	0.34	0.07	0.12	0.22
5750	0.32	0.43	0.56	0.31	0.45	0.07	0.12	0.25
6000	0.33	0.46	0.59	0.33	0.52	0.08	0.13	0.27

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

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

CEILING DIFFUSER AIR THROW DATA

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

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

ELECTRICAL/ELECTRIC HEAT DATA — 7.5 TON

7.5 TON STANDARD EFFICIENCY (R-410A) — KCA092S4

[1] Voltage - 60hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps	13.1	6.1	4.4
	Locked Rotor Amps	83.1	41	33
Compressor 2	Rated Load Amps	13.1	6.1	4.4
	Locked Rotor Amps	83.1	41	33
Outdoor Fan Motors (2)	Full Load Amps (total)	2.4 (4.8)	1.3 (2.6)	1 (2)
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	15
Indoor Blower Motor	Horsepower	2	2	2
	Full Load Amps	7.5	3.4	2.7
[2] Maximum Overcurrent Protection	Unit Only	50	25	15
	With (1) 0.33 HP Power Exhaust	50	25	20
[3] Minimum Circuit Ampacity	Unit Only	42	20	15
	With (1) 0.33 HP Power Exhaust	45	22	16

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	**7.5 kW**	50	50	25	15
		15 kW	50	60	30	25
		22.5 kW	70	80	40	35
		30 kW	90	100	50	40
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	**7.5 kW**	42	42	20	15
		15 kW	49	55	27	22
		22.5 kW	69	78	39	31
		30 kW	88	100	50	40
		45 kW	127	145	72	58
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	50	50	25	20
		15 kW	60	60	30	25
		22.5 kW	80	90	40	35
		30 kW	100	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	45	45	22	16
		15 kW	52	58	29	23
		22.5 kW	72	81	40	32
		30 kW	91	103	51	41
		45 kW	130	148	74	59

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	15 kW	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**54W57**	**54W56**	**54W56**

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 8.5 TON

8.5 TON STANDARD EFFICIENCY (R-410A) — KCA102S4

[1] Voltage - 60hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps	14.5	6.3	6
	Locked Rotor Amps	98	55	41
Compressor 2	Rated Load Amps	14.5	6.3	6
	Locked Rotor Amps	98	55	41
Outdoor Fan Motors (2)	Full Load Amps (total)	2.4 (4.8)	1.3 (2.6)	1 (2)
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	15
Indoor Blower Motor	Horsepower	2	2	2
	Full Load Amps	7.5	3.4	2.7
[2] Maximum Overcurrent Protection	Unit Only	50	25	20
	With (1) 0.33 HP Power Exhaust	60	25	25
[3] Minimum Circuit Ampacity	Unit Only	45	21	19
	With (1) 0.33 HP Power Exhaust	48	22	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	**7.5 kW**	50	50	25	20
		15 kW	50	60	30	25
		22.5 kW	70	80	40	35
		30 kW	90	100	50	40
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	**7.5 kW**	45	45	21	19
		15 kW	49	55	27	22
		22.5 kW	69	78	39	31
		30 kW	88	100	50	40
		45 kW	127	145	72	58
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	60	60	25	25
		15 kW	60	60	30	25
		22.5 kW	80	90	40	35
		30 kW	100	110	60	45
		45 kW	150	150	80	60
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**7.5 kW**	48	48	22	20
		15 kW	52	58	29	23
		22.5 kW	72	81	40	32
		30 kW	91	103	51	41
		45 kW	130	148	74	59

ELECTRICAL ACCESSORIES

Disconnect	**7.5 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	15 kW	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W56**	**54W56**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**54W57**	**57W57**	**54W56**	**54W56**

[1] Extremes of operating range are plus and minus 10% of line voltage.
[2] HACR type breaker or fuse.
[3] Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL/ELECTRIC HEAT DATA — 10 TON

10 TON STANDARD EFFICIENCY (R-410A) — KCA120S4

[1] Voltage - 60hz			208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps		16	7.8	5.7
	Locked Rotor Amps		110	52	38.9
Compressor 2	Rated Load Amps		16	7.8	5.7
	Locked Rotor Amps		110	52	38.9
Outdoor Fan Motors (2)	Full Load Amps (total)		2.4 (4.8)	1.3 (2.6)	1 (2)
Power Exhaust (1) 0.33 HP	Full Load Amps		2.4	1.3	1
Service Outlet 115V GFI (amps)			15	15	15
Indoor Blower Motor	Horsepower		3	3	3
	Full Load Amps		10.6	4.8	3.9
[2] Maximum Overcurrent Protection	Unit Only		60	30	20
	With (1) 0.33 HP Power Exhaust		60	30	25
[3] Minimum Circuit Ampacity	Unit Only		52	25	19
	With (1) 0.33 HP Power Exhaust		54	27	20

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	**15 kW**	60	60	30	25
		22.5 kW	80	90	40	35
		30 kW	100	110	60	45
		45 kW	150	150	80	60
		60 kW	150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	**15 kW**	53	59	29	23
		22.5 kW	72	81	40	32
		30 kW	92	104	52	41
		45 kW	131	149	74	60
		60 kW	139	158	79	63
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	60	70	35	25
		22.5 kW	80	90	45	35
		30 kW	100	110	60	45
		45 kW	150	175	80	70
		60 kW	150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	56	62	31	25
		22.5 kW	75	84	42	34
		30 kW	95	107	53	43
		45 kW	134	152	76	61
		60 kW	142	161	80	64

ELECTRICAL ACCESSORIES

Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**54W57**	**54W56**	**54W56**
	45 kW	**57W57**	**54W57**	**54W56**	**54W56**
	60 kW	**[4] Not available**	**[4] Not available**	**54W56**	**54W56**

[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] Disconnect must be field furnished.

ELECTRICAL/ELECTRIC HEAT DATA — 12.5 TON

12.5 TON STANDARD EFFICIENCY (R-410A) — KCA150S4

[1] Voltage - 60hz		208/230V - 3 Ph	460V - 3 Ph	575V - 3 Ph
Compressor 1	Rated Load Amps	19	9.7	7.4
	Locked Rotor Amps	123	62	50
Compressor 2	Rated Load Amps	19	9.7	7.4
	Locked Rotor Amps	123	62	50
Outdoor Fan Motors (2)	Full Load Amps (total)	3 . (6)	1.5 . (3)	1.2 . (2.4)
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	15
Indoor Blower Motor	Horsepower	5	5	5
	Full Load Amps	16.7	7.6	6.1
[2] Maximum Overcurrent Protection	Unit Only	70	35	25
	With (1) 0.33 HP Power Exhaust	70	35	25
[3] Minimum Circuit Ampacity	Unit Only	53	27	22
	With (1) 0.33 HP Power Exhaust	56	29	23

ELECTRIC HEAT DATA

Electric Heat Voltage			208V	240V	480V	600V
[2] Maximum Overcurrent Protection	Unit+ Electric Heat	**15 kW**	70	70	35	25
		22.5 kW	[4] 70	80	40	30
		30 kW	[4] 90	100	50	40
		45 kW	[4] 125	150	80	60
		60 kW	150	150	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat	**15 kW**	53	53	27	22
		22.5 kW	64	73	37	30
		30 kW	84	96	48	39
		45 kW	123	141	71	57
		60 kW	130	150	75	61
[2] Maximum Overcurrent Protection	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	70	70	35	25
		22.5 kW	[4] 70	80	40	35
		30 kW	[4] 90	100	50	40
		45 kW	150	150	80	60
		60 kW	[4] 150	175	80	70
[3] Minimum Circuit Ampacity	Unit+ Electric Heat and (1) 0.33 HP Power Exhaust	**15 kW**	56	56	29	23
		22.5 kW	67	76	38	31
		30 kW	87	99	50	40
		45 kW	126	144	72	58
		60 kW	133	153	77	62

ELECTRICAL ACCESSORIES

Disconnect	**15 kW**	**54W56**	**54W56**	**54W56**	**54W56**
	22.5 kW	**54W57**	**54W57**	**54W56**	**54W56**
	30 kW	**54W57**	**57W57**	**54W56**	**54W56**
	45 kW	**[4] Not available**	**[4] Not available**	**54W56**	**54W56**
	60 kW	**[4] Not available**	**[4] Not available**	**54W57**	**54W56**

[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] Disconnect must be field furnished.

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

KCA PARTS ARRANGEMENT

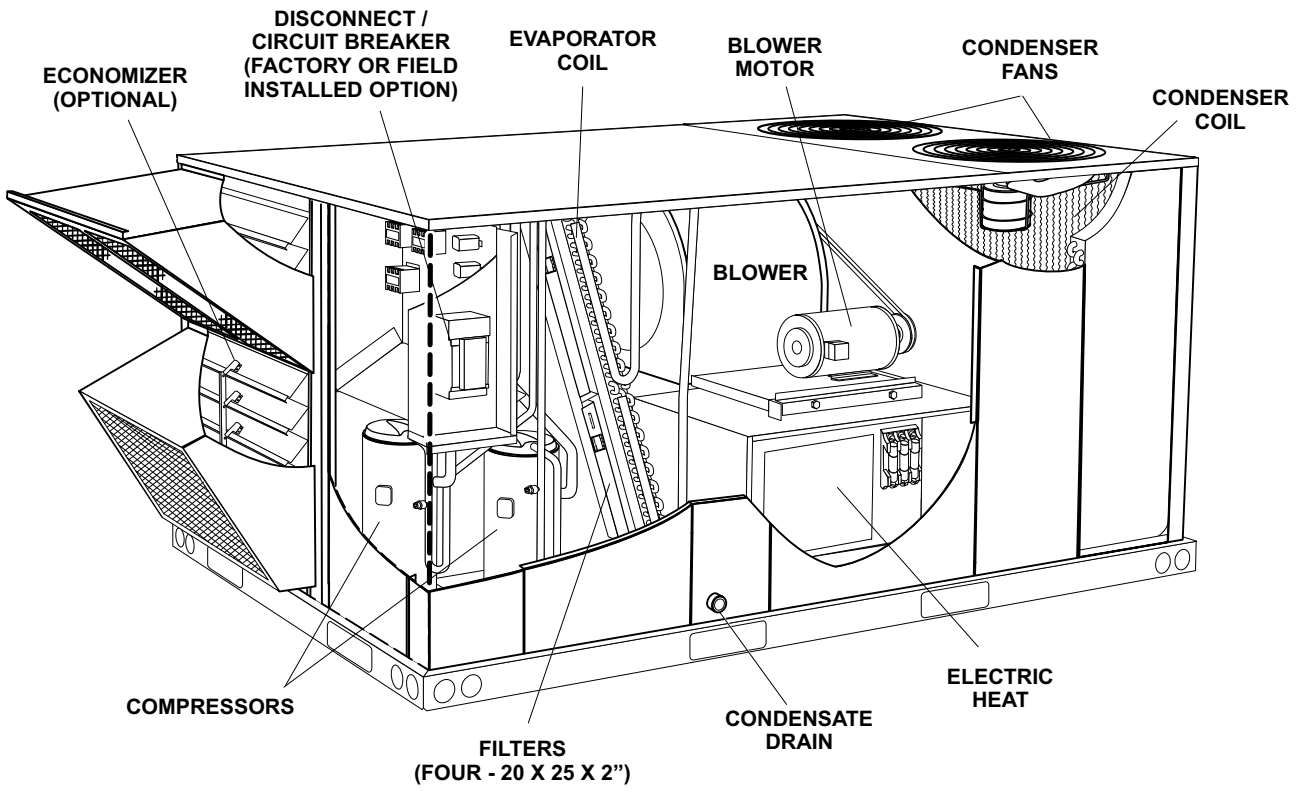


FIGURE 1

KCA CONTROL BOX - Y, G, J-VOLT UNITS

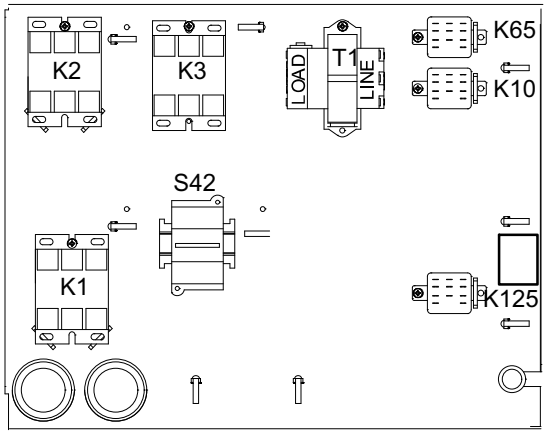


FIGURE 2

KCA CONTROL BOX - M VOLT CE UNITS

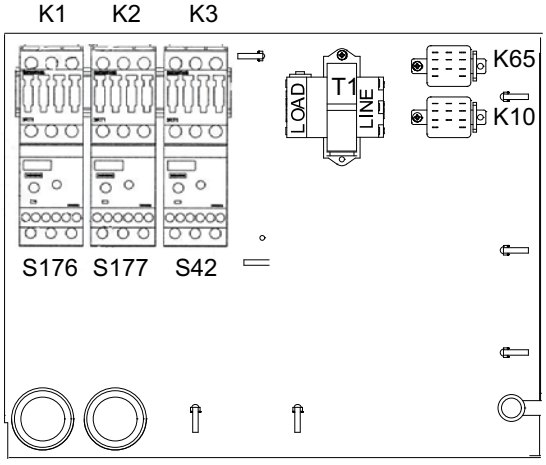


FIGURE 3

I-UNIT COMPONENTS

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

KCA control box components are shown in figure 2 and 3. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48 or CB10 (CB10 field-installed only)

All units may be equipped with an optional disconnect switch S48 or circuit breaker CB10. S48 and CB10 are toggle switches, which can be used by the service technician to disconnect power to the unit.

2-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 4, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

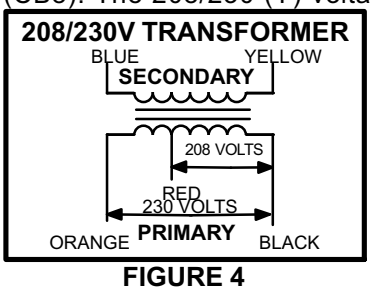


FIGURE 4

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 three-pole-double-break contactors with 24VAC coils. In all KCA units, K1 and K2 energize compressors B1 and B2 in response to thermostat demand. On CE M-volt units, contactor is CE approved by manufacturer (Siemens). See figure 5.

6-Condenser Fan Relay K10

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

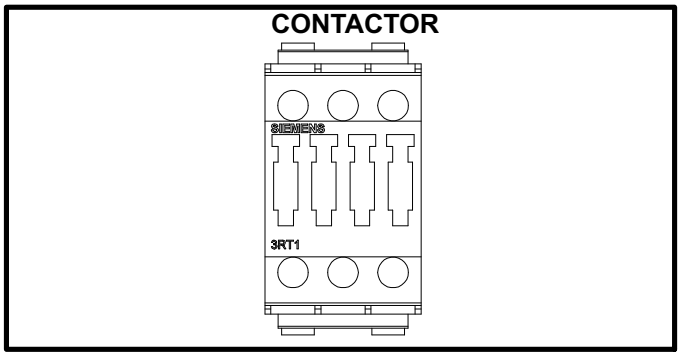


FIGURE 5

7-Blower Contactor K3

Blower contactor K3, used in all units, is a three-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. On M-volt CE units, the contactor is CE approved by manufacturer (Siemens). See figure 5.

8-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a DPDT relay with a 24VAC coil. K65 is used in all KCA 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.

9-Blower Motor Overload Relay Switch (S42)

The blower motor overload relay is used in all units equipped with high efficiency motors. The relay (S42) is connected in line with the blower motor to monitor the current flow to the motor. When the relay senses an overload condition, a set of normally closed contacts open to de-energize 24VAC power to T1 transformer. Non-CE units will be equipped with a relay manufactured by Telemecanique figure 7 or Siemens figure 8. M-volt CE units will be equipped with a relay manufactured by Siemens. See figure 6.

10-Compressor Overload Relays S176, S177 (M-volt CE units)

Relays are wired in series with the appropriate compressor contactor and monitor the current flow to the compressor motor. When the relay senses an overload condition, N.C. contacts open to de-energize the compressor. Relays are manufactured by Siemens; see figure 6.

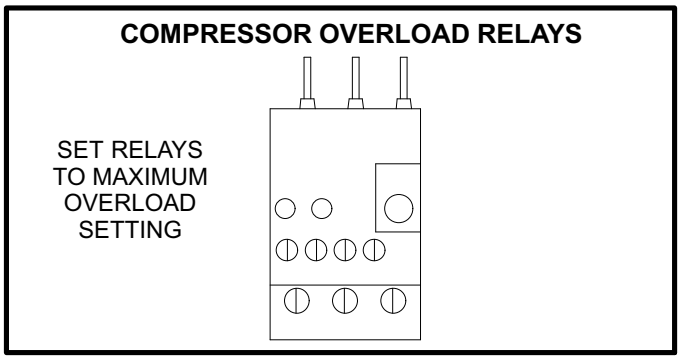
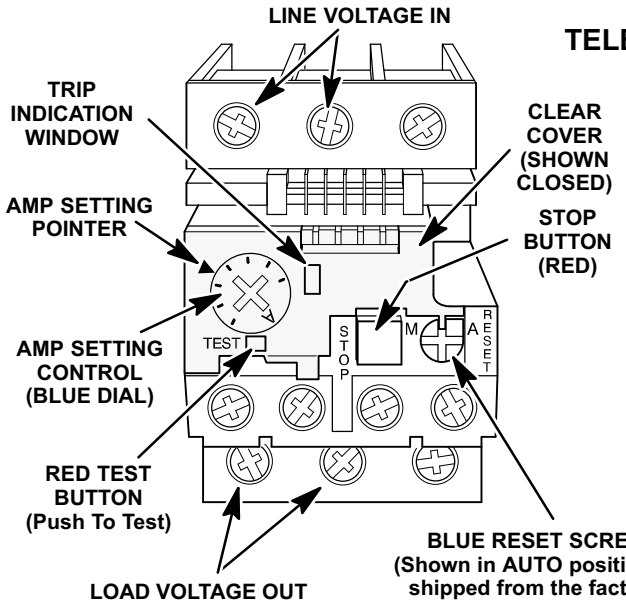


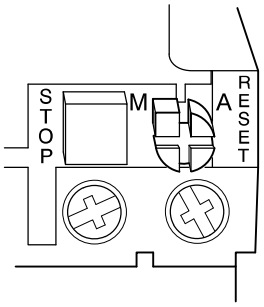
FIGURE 6

TELEMECANIQUE OVERLOAD RELAY



DETAIL SHOWING RESET BUTTON ADJUSTED TO MANUAL POSITION

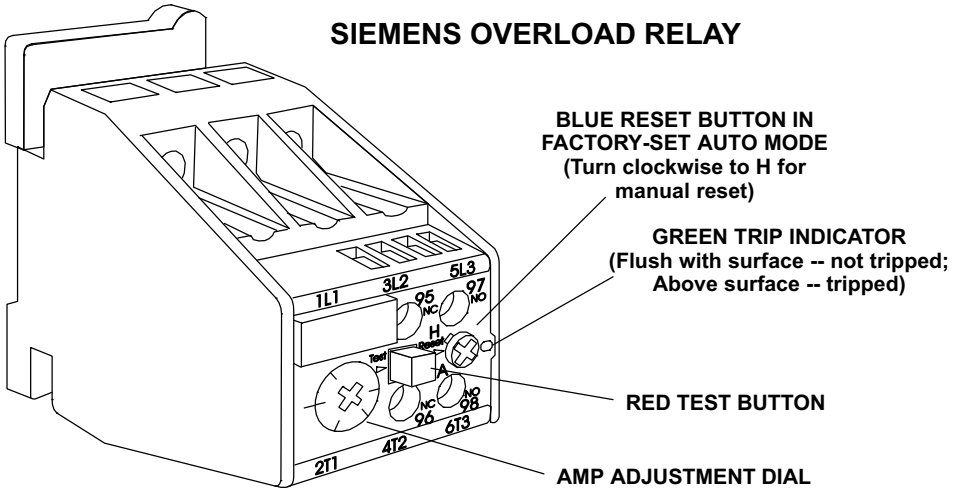
Lift clear cover and turn adjustment screw counterclockwise. Reset screw will pop out when pointer is in M (manual position). Close cover to lock reset screw into position.



Lift clear cover to adjust relay amp setting according to value given on the blower motor nameplate. Proper relay amp setting equals motor nameplate FLA X service factor of 1.15 X .95.
Cover must also be lifted to adjust control mode from automatic reset to manual reset (see detail above) and to test the control.
Control must be in the manual reset mode to perform a test. Use a pointed object to press the small red test button. A yellow marker should appear in the trip indication window to the right of the amp setting control. Press the blue reset screw to reset the relay.
The red STOP button opens the normally closed contacts which power the blower motor. This button stops blower motor operation as long as it is pressed in.

FIGURE 7

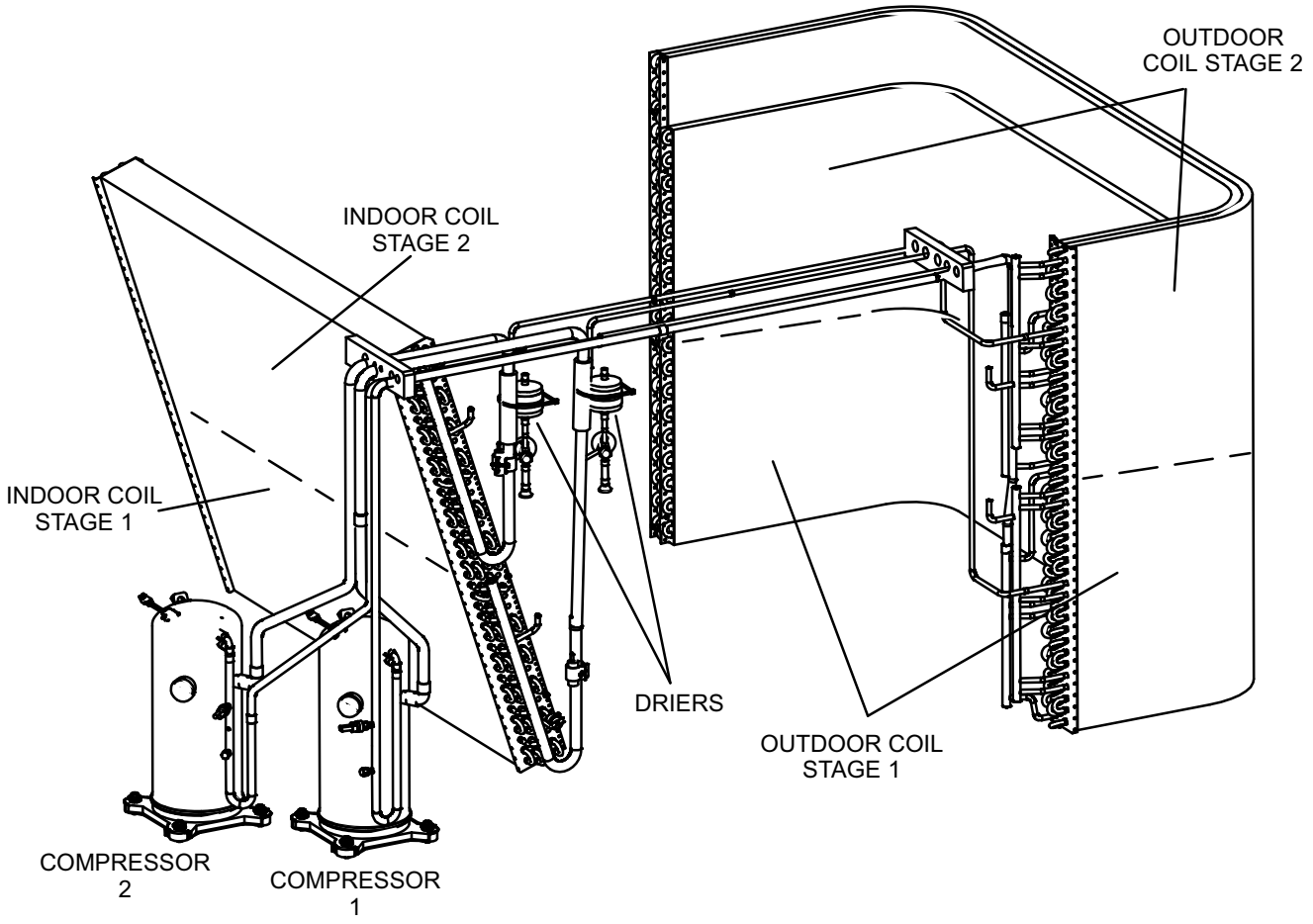
SIEMENS OVERLOAD RELAY



Adjust relay amp setting according to value given on the blower motor nameplate. Proper relay amp setting equals motor nameplate FLA X service factor of 1.15 X .95.
Use small slotted screwdriver to adjust control mode from automatic reset (A) to manual reset (H).
Control must be in the manual reset mode (H) to perform a test. Press the red test button. Green trip indicator should pop out. Press the blue reset screw to reset the relay.

FIGURE 8

KCA092,102, 120, 150 PLUMBING AND COMPRESSOR CIRCUITS DETAIL



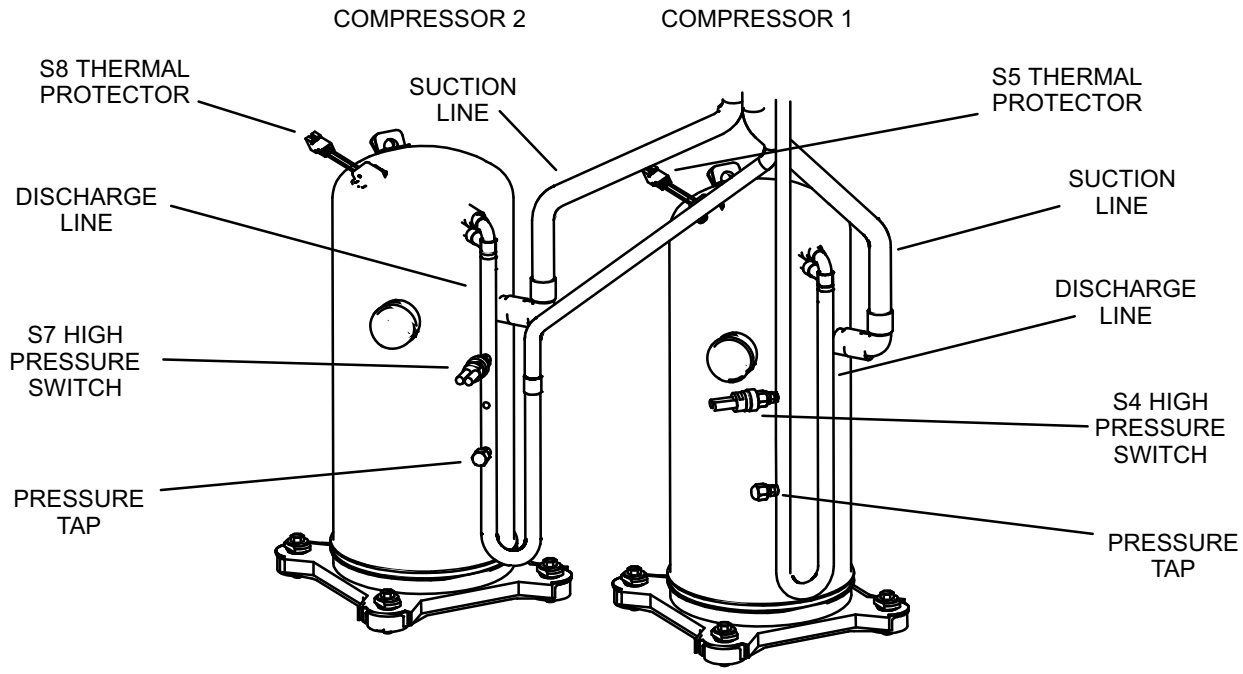


FIGURE 9

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figure 9. Two draw-through type condenser fans are used in KCA092/150 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 thermostatic expansion valve 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 KCA092/150 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 1-800-4-LENNOX (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-Freezestats S49 and S50

Each unit is equipped with a low temperature switch (freezestat) located on a return bend of each evaporator coil. S49 (first circuit) and S50 (second circuit) are located on the corresponding evaporator coils.

Freezestats are wired in series with compressor contactors. Each freezestat is a SPST N.C. auto-reset switch which opens at 29°F ± 3°F (-1.7°C ± 1.7°C) on a temperature drop and closes at 58°F ± 4°F (14.4°C ± 2.2°C) on a temperature rise. To prevent coil icing, freezestats open during compressor operation to temporarily disable the respective compressor until the coil temperature rises.

If the freezestats are tripping frequently due to coil icing, check the airflow/filters, economizer position and unit charge before allowing unit back in operation. Make sure to eliminate conditions which might promote evaporator ice buildup.

4-High Pressure Switches S4 and S7

The high pressure switch is a manual 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).

5-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 KCA092/150, 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 discharge 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.

6-Crankcase Heaters HR1, HR2

150S units use insertion type heaters. Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor manufacturer.

C-Blower Compartment

The blower compartment in all KCA092/150S units is located between the evaporator coil and the condenser coil section. The blower assembly is accessed by disconnecting the blower motor .See *Blower Access* in the Operation/ Adjustment section. The blower pulls out as shown in figure 10.

1-Blower Wheels

All KCA092/150 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

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.

Determining Unit CFM

1- The following measurements must be made with a dry indoor coil. Run blower without a cooling demand. Measure the indoor blower shaft RPM. Air filters must be in place when measurements are taken.

2- With all access panels in place, measure static pressure external to unit (from supply to return). *Measure static below roof curb if roof curb is used.*

3- Refer to blower tables in BLOWER DATA (table of contents) in the front of this manual. Use static pressure and RPM readings to determine unit air volume.

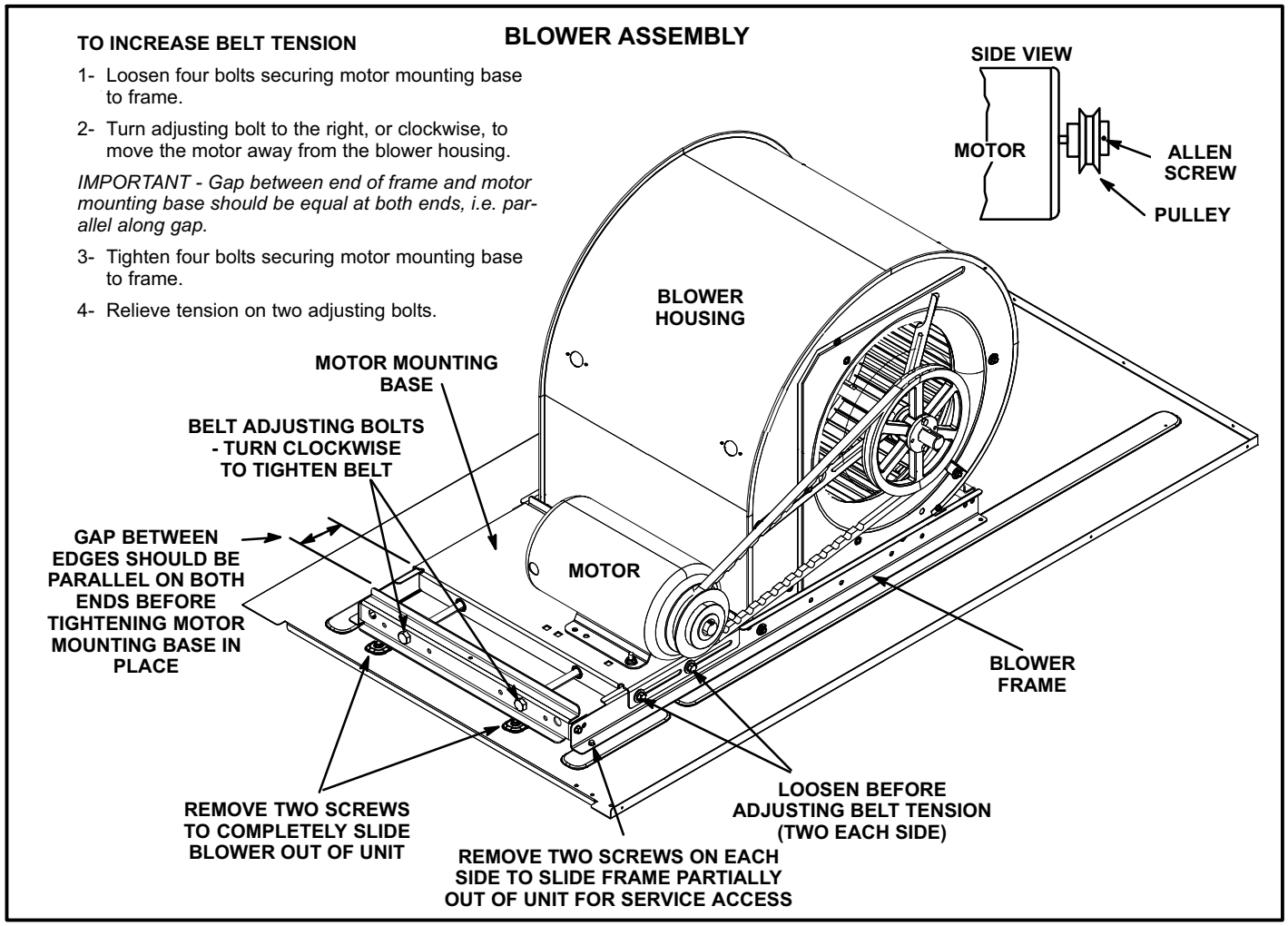


FIGURE 10

4- 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 10. Do not exceed minimum and maximum number of pulley turns as shown in table 1.

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.

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 11.

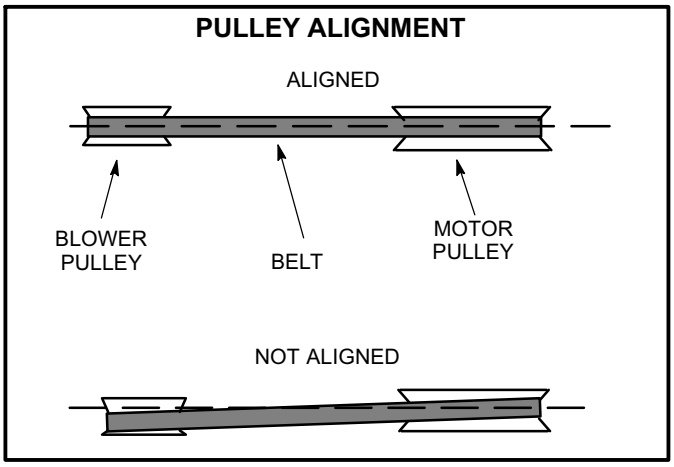


FIGURE 11

1- Loosen four bolts securing motor base to mounting frame. See figure 10.

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 12.

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.

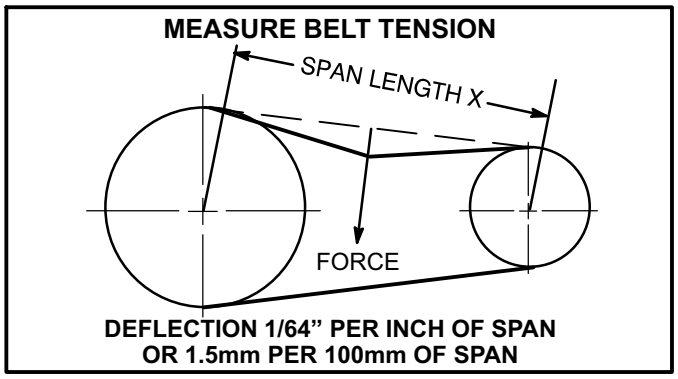


FIGURE 12

D-Optional Electric Heat Components

Table 2 shows electric heat fuse ratings. See Options/Accessories section (see table of contents) for KCA to EHA matchups. See Electrical/Electric Heat Data section (see table of contents) of this manual for electrical ratings and capacities.

All electric heat sections consist of electric heating elements exposed directly to the air stream. See figure 14. EHA parts arrangement is shown in figures 14 and 15. Multiple-stage elements are sequenced on and off in response to thermostat demand.

1-Contactors K15, K16

Contactors K15 and K16 are three-pole double-break contactors located on the electric heat vestibule. All contactors are equipped with a 24VAC coil. The coils in the K15 and K16 contactors are energized by a W2 thermostat demand, K9, and DL2. Contactor K15 energizes the first stage heating elements, while K16 energizes the second stage heating elements. On M-volt units, contactors are CE approved by manufacturer (Siemens). See figure 5.

2-High Temperature Limits S15 (Primary)

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

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

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

4-Terminal 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.

5-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.

6-Heating Elements HE1 through HE6

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

7-Fuse F3

Fuse F3 are housed in a fuse block which holds three fuses. Each F3 fuse is connected in series with each leg of electric heat. Figure 15 and table 2 show the fuses used with each electric heat section. For simplicity, the service manual labels the fuses F3 - 1, 2 and F4 - 1, 2.

8-Unit Fuse Block F4

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

ELECTRIC HEAT CONTROL ASSEMBLY

1-Electric Heat Relay K9

All KCA series units with electric heat use an electric heat relay K9. K9 is a N.O. DPDT pilot relay intended to electrically isolate the unit’s 24V circuit from the electric heat 24V circuit. K9 is energized by CMC1. K9-1 closes, energizing timer DL2. K9 is located in the electric heat control assembly. See figure 13.

2-Time Delay DL2

DL2 is a factory-installed solid state timer used in 22.5 to 60 kW electric heat units. DL2 allows staging by providing a timed-interval between the first and second heating elements. When the timer is energized, the contacts are delayed for 30 seconds before closing. When the timer is de-energized, the contacts are delayed 1 second before opening. DL2 is located in the electric heat control assembly. See figure 13.

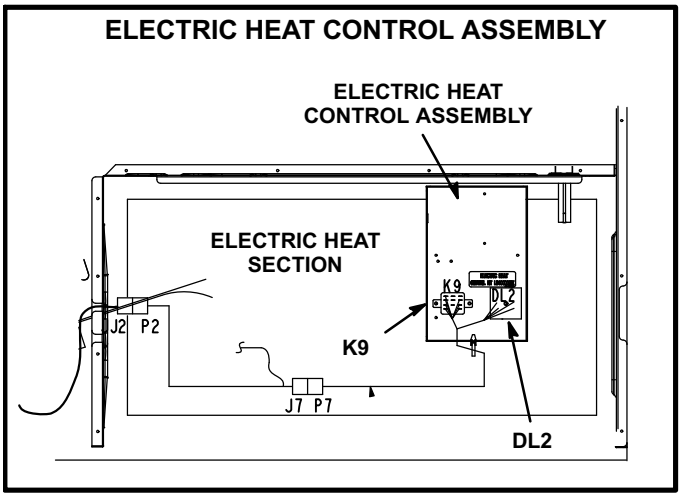


FIGURE 13

TABLE 2

KCA ELECTRIC HEAT SECTION FUSE RATING					
EHA QUANTITY & SIZE	**VOLTAGES**	**FUSE (3 each)**			
		F3 - 1	**F3 - 2**	**F3 - 3**	**F3 - 4**
EHA100-7.5	208/230V	25 Amp 250V	——	——	——
	460V	15 Amp 600V	——	——	——
	575V	10 Amp 600V	——	——	——
EHA100-15	208/230V	50 Amp 250V	——	——	——
	460V	25 Amp 600V	——	——	——
	575V	20 Amp 600V	——	——	——
EHA100-22.5	208/230V	50 Amp250V	——	——	25 Amp 250V
	460V	25 Amp 600V	——	——	15 Amp 600V
	575V	20 Amp 600V	——	——	10 Amp 600V
EHA100-30	208/230V	50 Amp 250V	——	——	50 Amp 250V
	460V	25 Amp 600V	——	——	25 Amp 600V
	575V	20 Amp 600V	——	——	20 Amp 600V
EHA100-45	208/230V	50 Amp 250V	——	60 Amp 250V	60 Amp 250V
	460V	25 Amp 600V	——	——	50 Amp 600V
	575V	20 Amp 600V	——	——	40 Amp 600V
EHA102-7.5	208/230V	25 Amp 250V	——	——	——
	460V	15 Amp 600V	——	——	——
	575V	10 Amp 600V	——	——	——
EHA150-15	208/230V	50 Amp 250V	——	——	——
	460V	25 Amp 600V	——	——	——
	575V	20 Amp 600V	——	——	——
EHA360-22.5	208/230V	50 Amp 250V	——	——	25 Amp 250V
	460V	25 Amp 600V	——	——	15 Amp 600V
	575V	20 Amp 600V	——	——	10 Amp 600V
EHA150-30	208/230V	50 Amp 250V	——	——	50 Amp 250V
	460V	25 Amp 600V	——	——	25 Amp 600V
	575V	20 Amp 600V	——	——	20 Amp 600V
EHA150-45	208/230V	50 Amp 250V	——	60 Amp 250V	60 Amp 250V
	460V	25 Amp 600V	——	——	50 Amp 600V
	575V	20 Amp 600V	——	——	40 Amp 600V
EHA150-60	208/230V	60 Amp 250V	60 Amp 250V	60 Amp 250V	60 Amp 250V
	460V	50 Amp 600V	——	——	50 Amp 600V
	575V	40 Amp 600V	——	——	40 Amp 600V

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

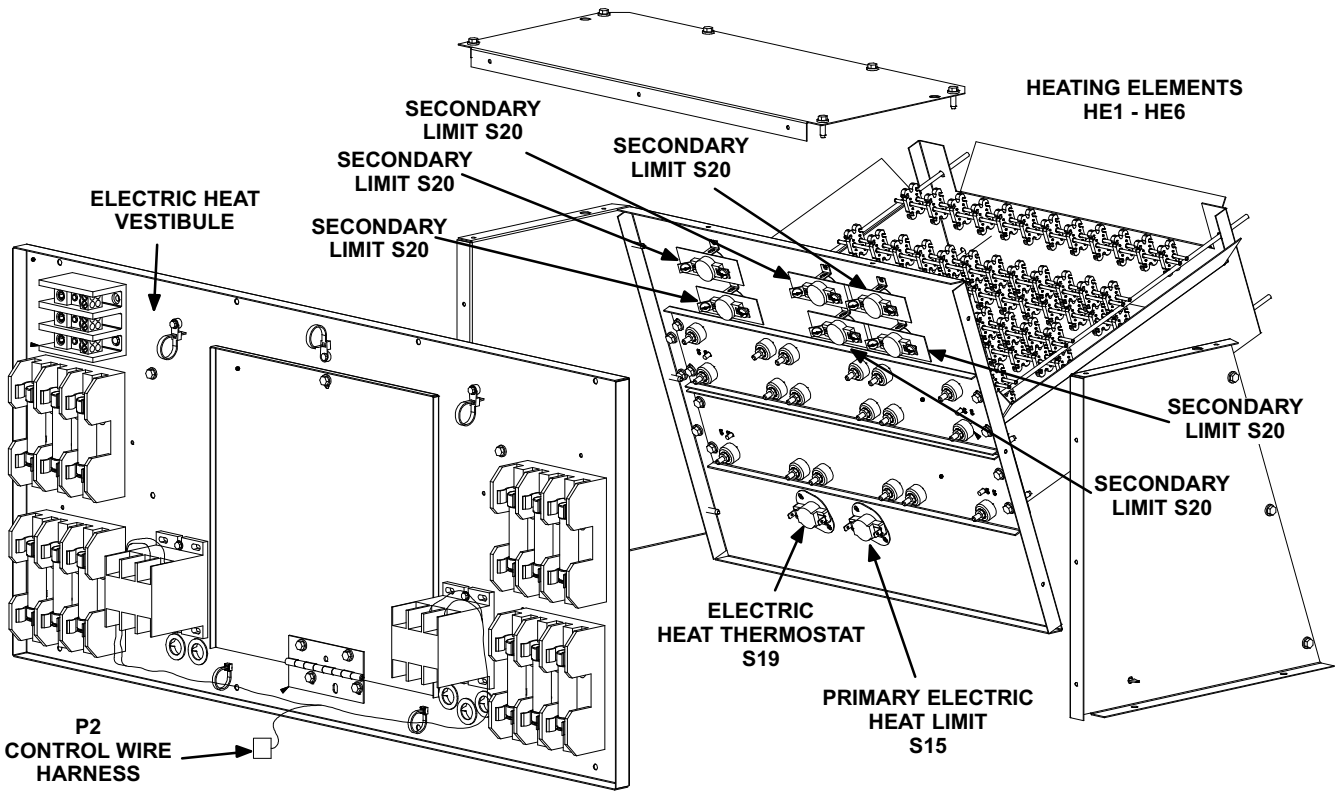


FIGURE 14

ELECTRIC HEAT VESTIBULE PARTS ARRANGEMENT

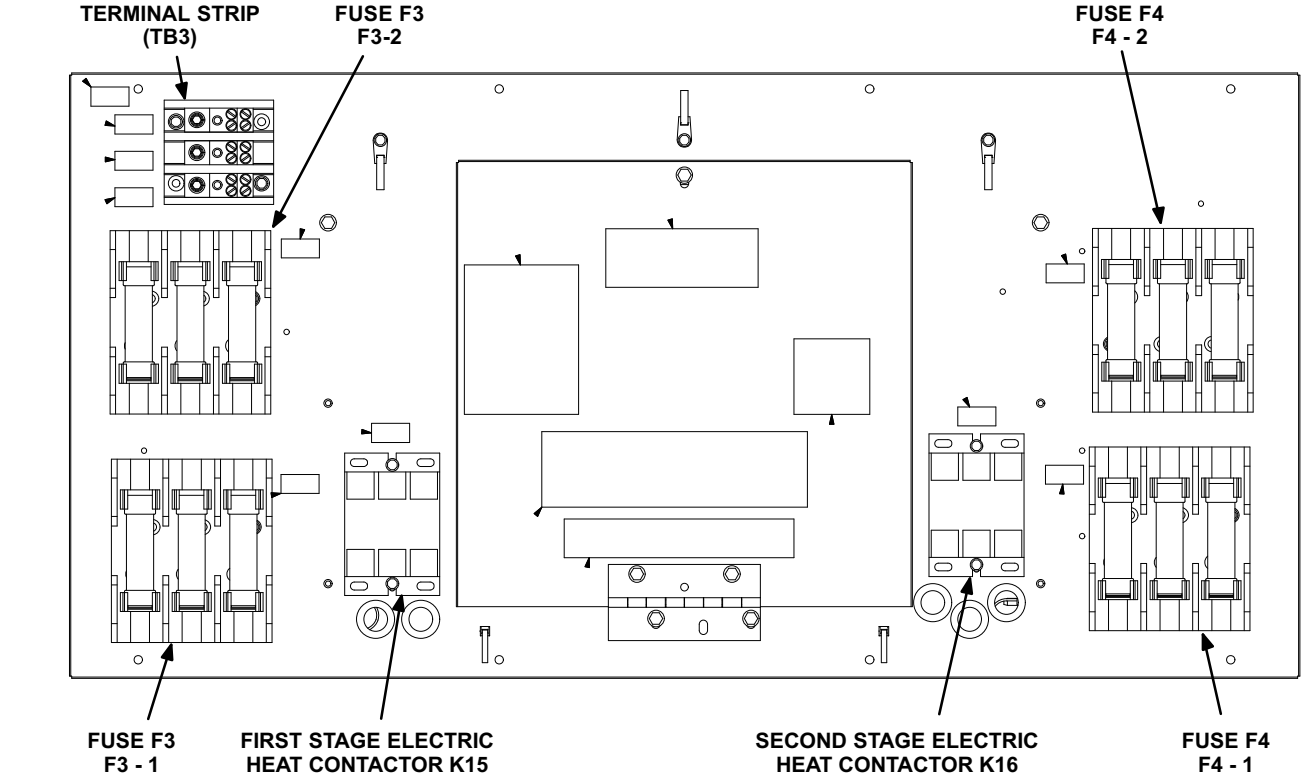


FIGURE 15

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 (LARMF18/36 or LARMFH18/24).

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.

B-Cooling Startup

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

2- First-stage thermostat demand will energize compressor 1. Second-stage thermostat demand will energize compressor 2. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressor 1.

3- Units contain two refrigerant circuits or stages. See figure 16.

4- Each refrigerant circuit is separately charged with 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.

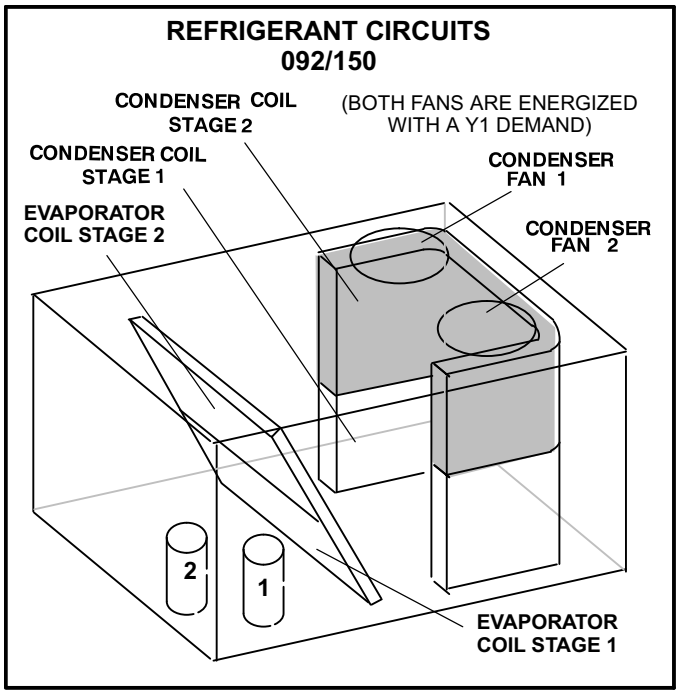


FIGURE 16

C-Safety or Emergency Shutdown

Turn off power to unit.

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:

1- Attach gauge manifolds and operate unit in cooling mode with economizer disabled until system stabilizes (approximately five minutes). Make sure outdoor air dampers are closed.

2- Check each system separately with all stages operating.

3- Use a thermometer to accurately measure the outdoor ambient temperature.

4- Apply the outdoor temperature to tables 3 through 6 to determine normal operating pressures. Pressures are listed for sea level applications at 80°F dry bulb and 67°F wet bulb return air.

5- Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. **Correct any system problems before proceeding.**

6- If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.

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

7- Use the following approach method along with the normal operating pressures to confirm readings.

TABLE 3
KCA092 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	260	130	269	132
75° F	301	133	311	133
85° F	343	135	354	136
95° F	388	138	401	139
105° F	435	140	449	141
115° F	481	142	497	144

TABLE 4
KCA102 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	262	128	270	129
75° F	299	131	310	131
85° F	342	134	353	134
95° F	386	137	399	136
105° F	434	140	448	139
115° F	487	143	501	142

TABLE 5
KCA120 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	275	135	282	136
75° F	313	137	323	138
85° F	355	140	366	141
95° F	400	142	414	143
105° F	447	145	464	145
115° F	499	148	517	148

TABLE 6
KCA150 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ±10 psig	Suction ±5 psig	Discharge ±10 psig	Suction ±5 psig
65° F	279	132	283	136
75° F	318	134	323	138
85° F	360	136	364	139
95° F	406	138	411	140
105° F	456	141	462	142
115° F	508	145	515	145

Charge Verification - Approach Method - AHRI Testing

1- Using the same thermometer, compare liquid temperature (at condenser outlet) to outdoor ambient temperature.

Approach Temperature = Liquid temperature minus ambient temperature.

2- Approach temperature should match values shown in table 7. An approach temperature greater than this value indicates an undercharge. An approach temperature less than this value indicates an overcharge.

3- The approach method is not valid for grossly over or undercharged systems. Use tables 3 through 6 as a guide for typical operating pressures.

TABLE 7
APPROACH TEMPERATURE

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
092	9°F ± 1 (5.0°C ± 0.5)	8°F ± 1 (4.4°C ± 0.5)
102	7°F ± 1 (3.9°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)
120	8°F ± 1 (4.4°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)
150	6°F ± 1 (3.3°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)

V- SYSTEMS SERVICE CHECKS

A-Cooling System Service Checks

KGA 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 6.

⚠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.

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.

⚠WARNING

Product contains fiberglass wool.
Disturbing the insulation in this product during installation, maintenance, or repair will expose you to fiberglass wool. Breathing this may cause lung cancer. (Fiberglass wool is known to the State of California to cause cancer.)
Fiberglass wool may also cause respiratory, skin and eye irritation.
To reduce exposure to this substance or for further information, consult material safety data sheets available from address shown on unit nameplate or contact your supervisor.

A-Filters

Units are equipped with four 20 X 25 X 2" filters. Filters should be checked and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. See figure 17. *Filters must be U.L.C. certified or equivalent for use in Canada.*

B-Lubrication

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

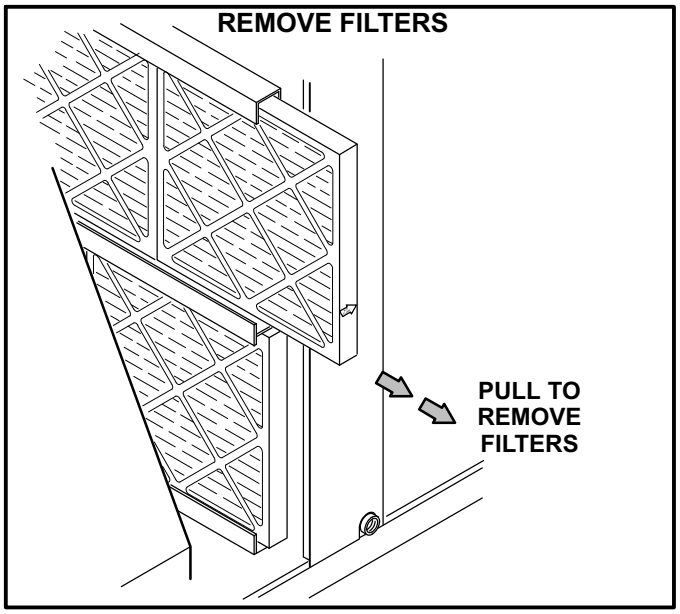


FIGURE 17

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 detergent or commercial coil cleaner and inspect monthly during the cooling season.

Condenser coils are made of one, two and three formed slabs. Dirt and debris may become trapped between the slabs. To clean between slabs, carefully separate coil slabs and wash them thoroughly. See figure 18. Flush coils with water following cleaning.

Note - Remove all screws and gaskets prior to cleaning procedure and replace upon completion.

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.

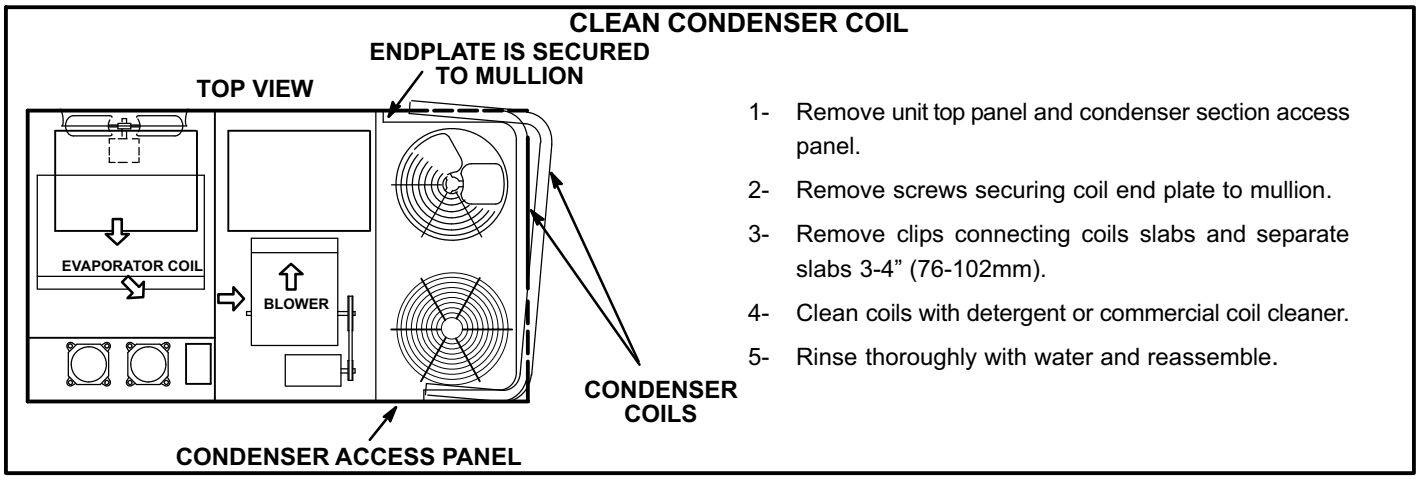


FIGURE 18

VII-ACCESSORIES

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

A-LARMF Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the Lennox C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the KCA 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 C1CURB mounting frame is shown in figure 19. 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 20. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

B-Transitions

Optional supply/return transitions LASRT08/10 is available for use with the KCA 7.5 ton units and LASRT10/12 is available for the 8.5 and 10 ton units, utilizing optional C1CURB roof mounting frames. KCA 12.5 ton units will use LASRT15 with C1CURB roof mounting frame. Transition must be installed in the C1CURB mounting frame before mounting the unit to the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

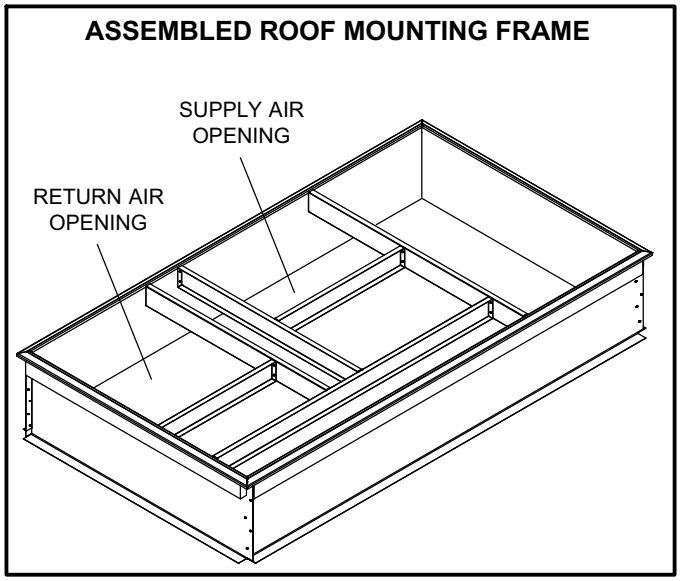


FIGURE 19

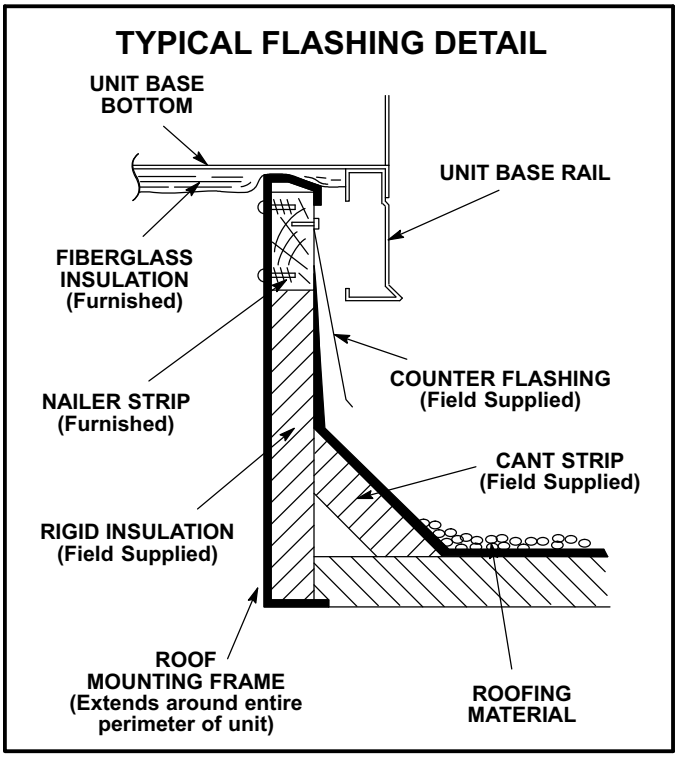
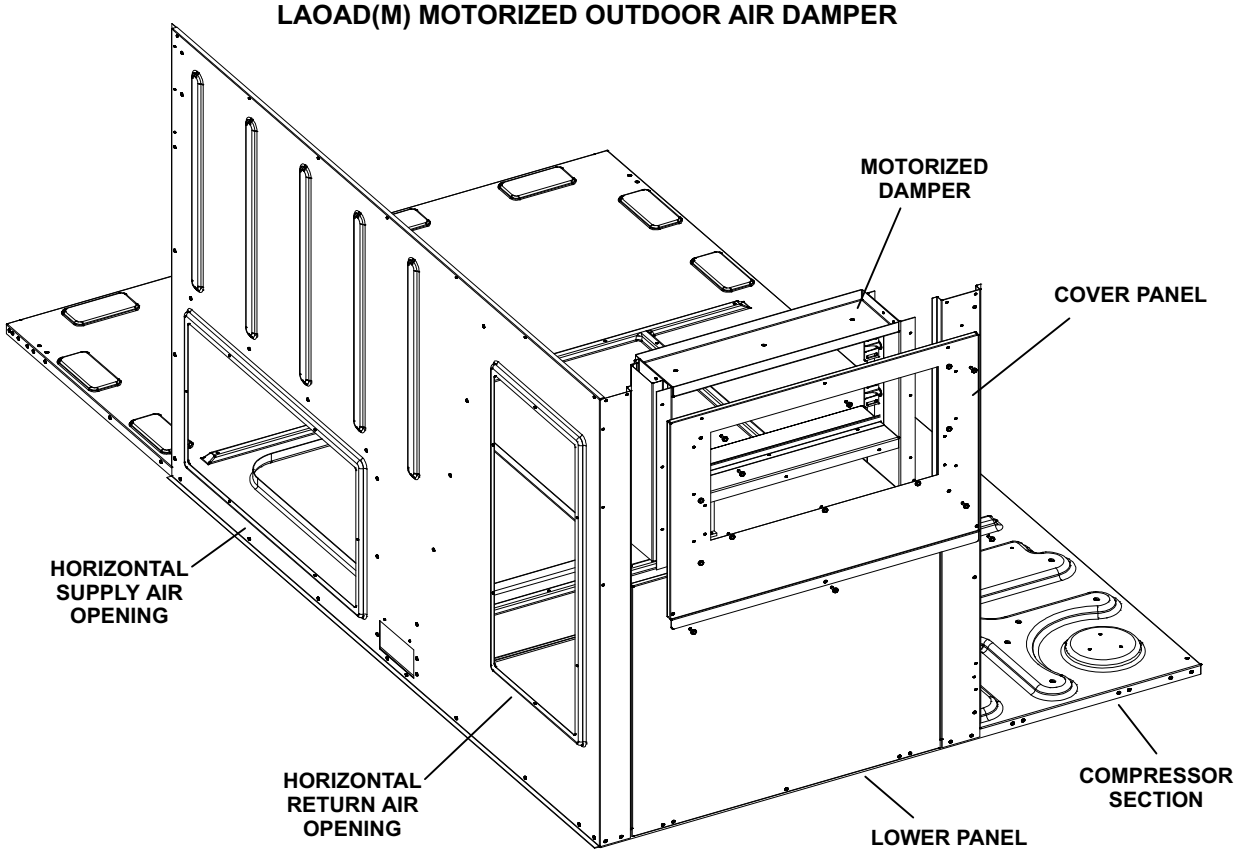


FIGURE 20

LAOAD(M) MOTORIZED OUTDOOR AIR DAMPER



MANUAL OUTDOOR AIR DAMPER

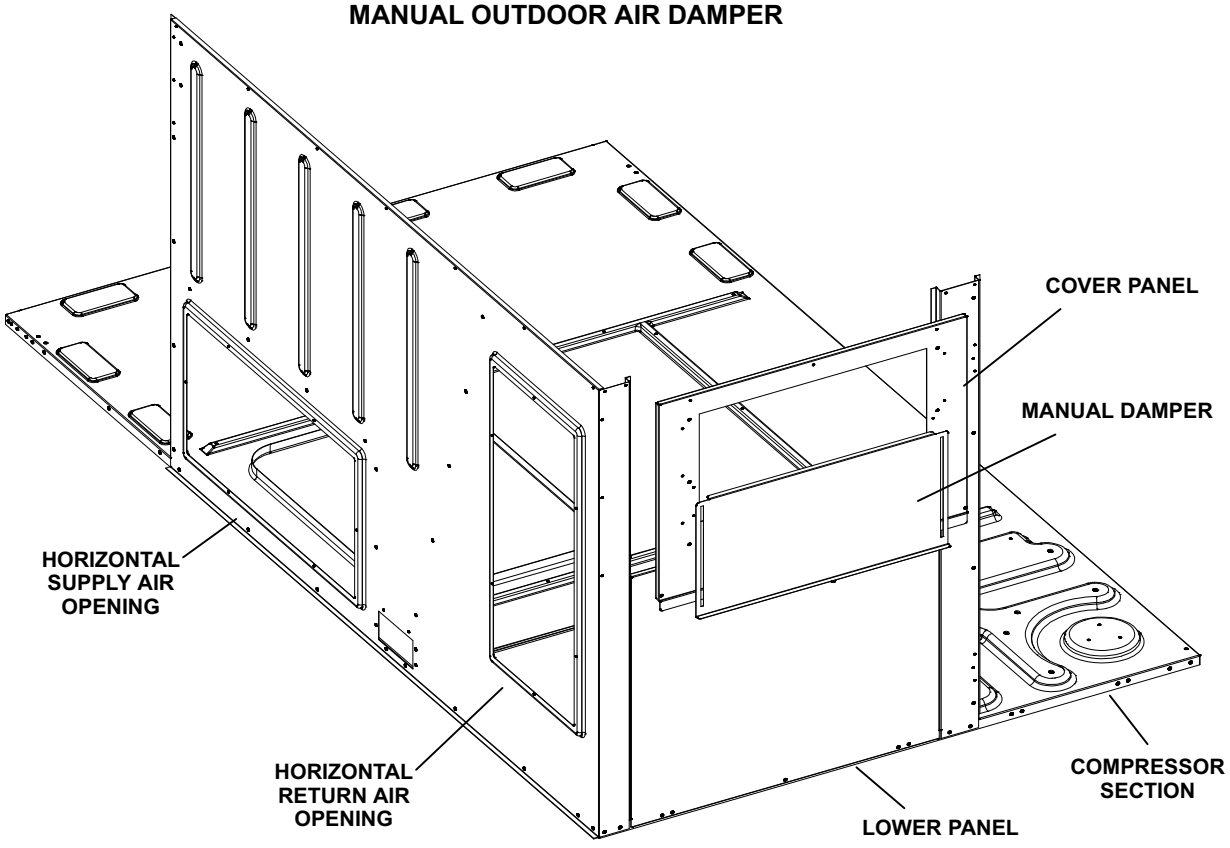


FIGURE 21

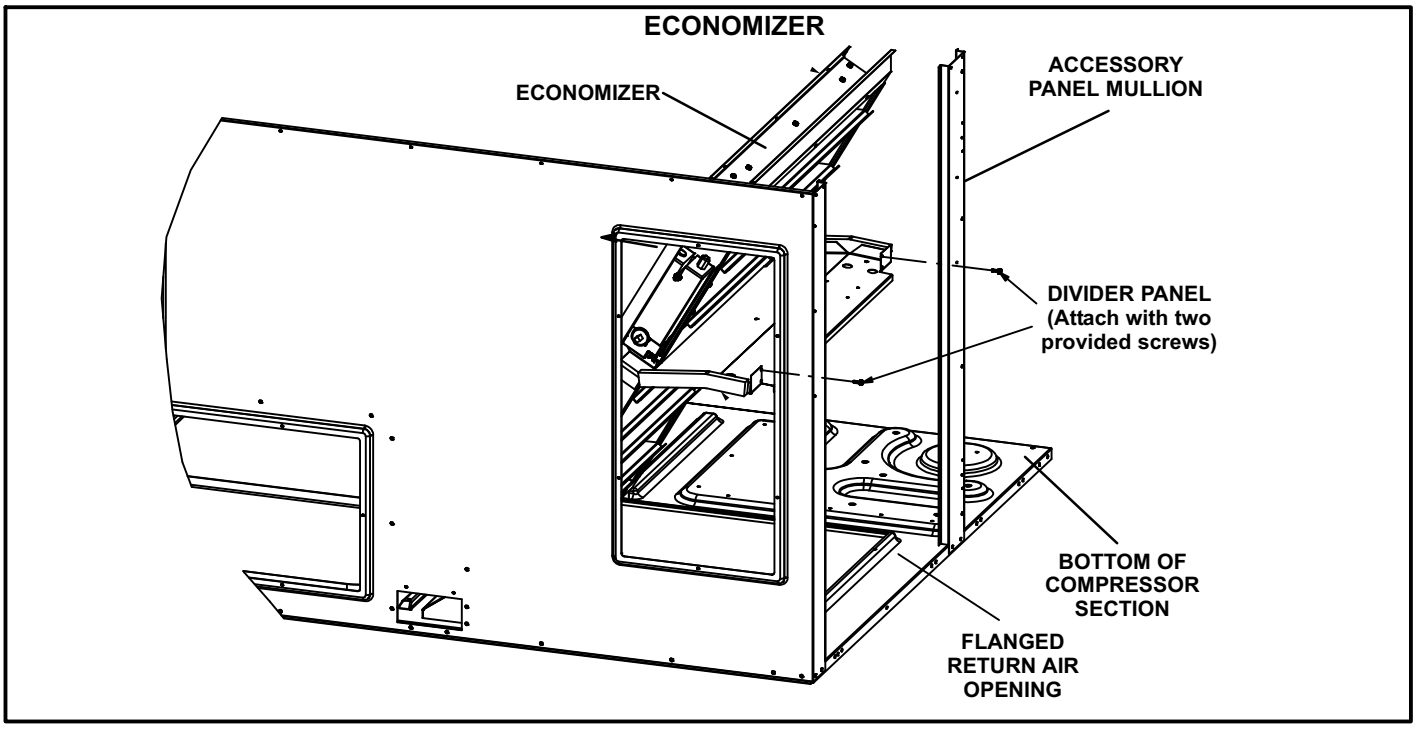


FIGURE 22

C-LAOAD(M) Outdoor Air Dampers Field or Factory Installed

Optional manual and motorized outdoor air dampers provide up to 25 percent fresh air for return. Motorized damper opens to minimum position simultaneously with the blower during the occupied period and remains closed during the unoccupied period. Manual damper assembly is manually operated; damper position is manually set at installation and remains in that position. See figure 21.

D-Supply and Return Diffusers

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

E-K1ECON20B Economizer

(Field or Factory Installed)

Economizers use outdoor air for free cooling when temperature and/or humidity is suitable. See figure 22.

The mixed air temperature sensor (R1) measures the supply air sensible temperature. See figure 23. The outdoor air sensible control is the default economizer control. An outdoor air single sensible sensor, S175, is also provided. See table 8 for outdoor and return air (OA and RA) sensor options. Refer to instructions provided with sensors for installation.

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

TABLE 8

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

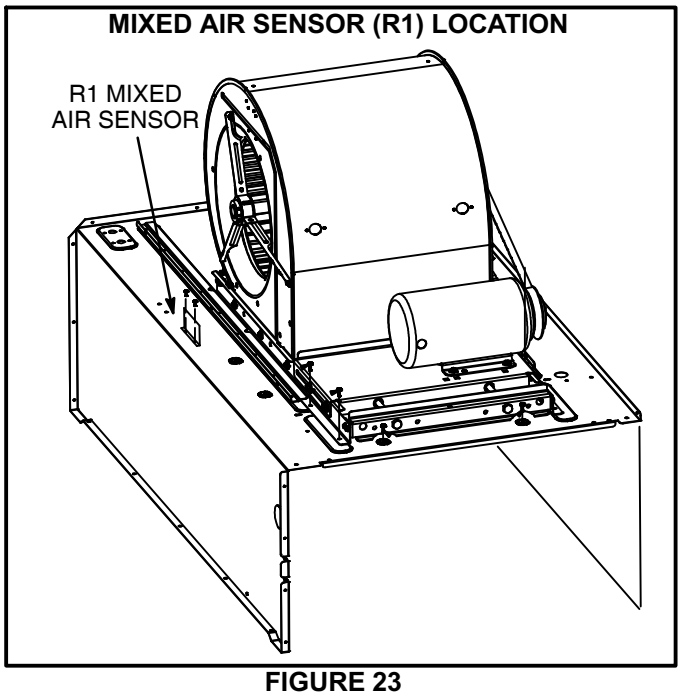


FIGURE 23

A6 Enthalpy Control LED'S

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

When an optional IAQ sensor is installed, a steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See figure 24.

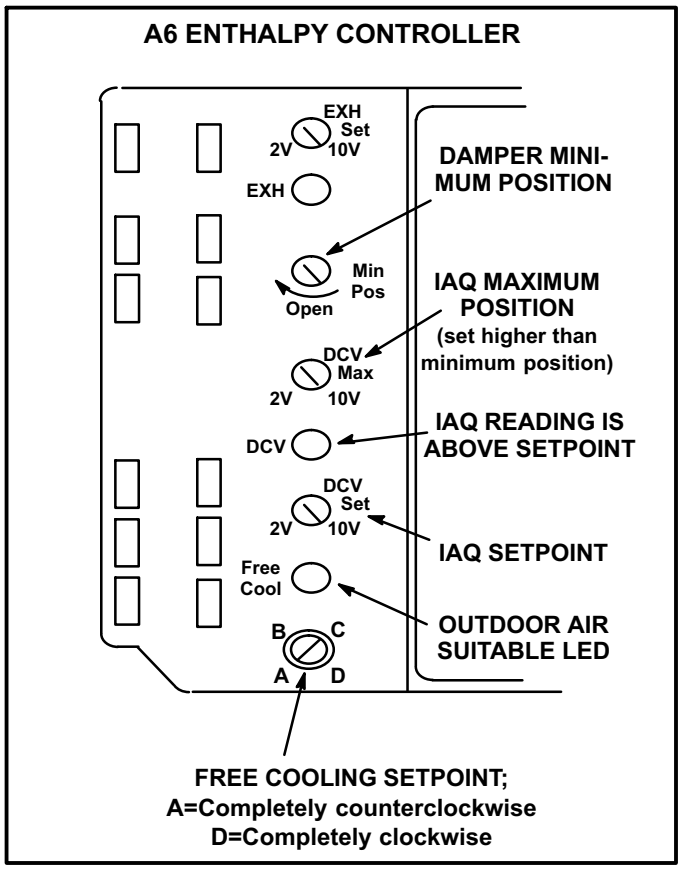


FIGURE 24

Free Cooling Setpoint

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in table 9. Setting A is recommended. See figure 24. At setting A, free cooling will be energized when outdoor air is approximately 73°F (23°C) and 50% relative humidity. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be energized at 70°F (21°C) and 50% relative humidity.

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

TABLE 9
ENTHALPY CONTROL SETPOINTS

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

Damper Minimum Position

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

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

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

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

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

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

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

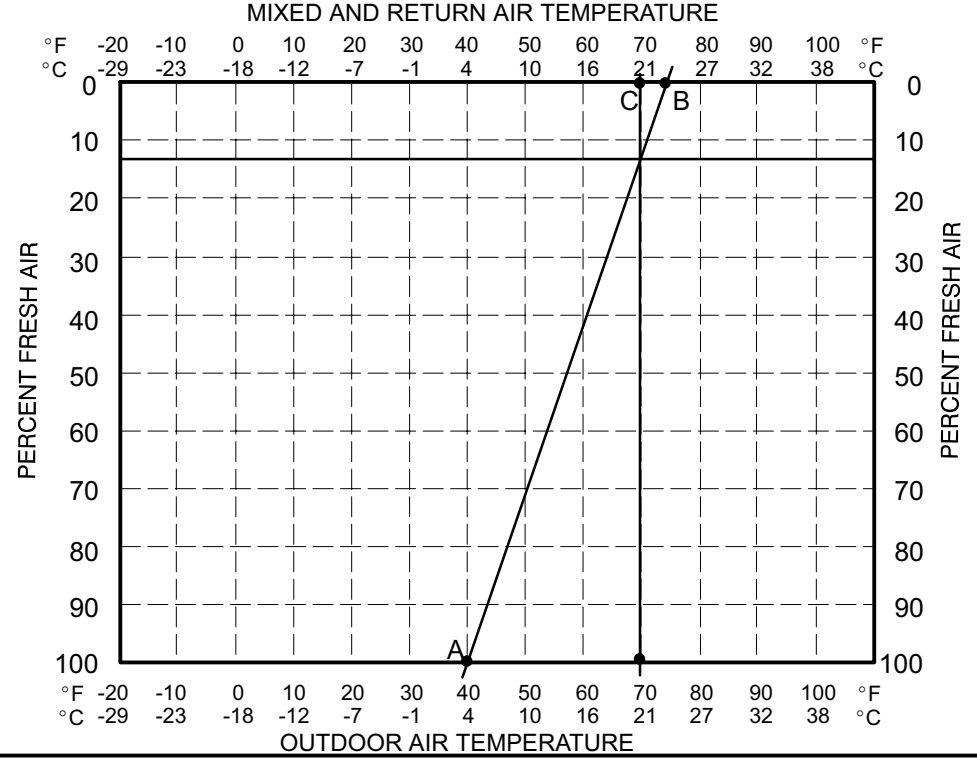
6- Draw a straight line between points A and B.

7- Draw a vertical line through point C.

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

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

CHART 1
CALCULATE MINIMUM FRESH AIR PERCENTAGE



DCV Set and Max Settings

Adjust settings when an optional IAQ sensor is installed.

The DCV SET potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO_2 sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the DCV SET potentiometer to the approximate setting specified by the controls contractor. Refer to figure 24.

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 24.

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

Economizer Operation

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

Outdoor Air Not Suitable:

During the unoccupied time period dampers are closed.

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

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

Outdoor Air Suitable:

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

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

TABLE 10

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

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

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

B-Outdoor Air Dampers

Optional manual and motorized outdoor air dampers provide fresh outdoor air. The motorized damper assembly opens to minimum position during the occupied time period and remains closed during the unoccupied period. Manual damper assembly is set at installation and remains in that position.

Set damper minimum position in the same manner as economizer minimum position. Adjust motorized damper position using the thumbwheel on the damper motor. See figure 25. Manual damper fresh air intake percentage can be determined in the same manner.

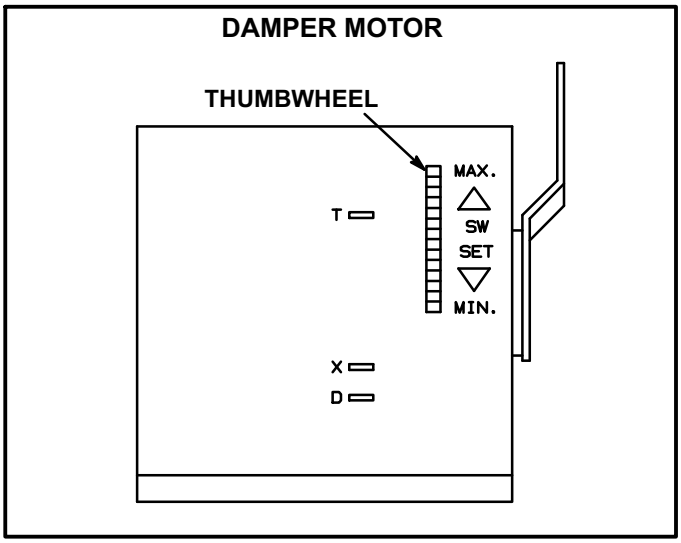


FIGURE 25

F-Gravity Exhaust Dampers

Dampers are used in downflow (see figure 26) and horizontal (see figure 27) air discharge applications. Horizontal gravity exhaust dampers are installed in the return air duct. The dampers must be used any time an economizer and a power exhaust fan is applied to KCA series units.

Gravity exhaust dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Gravity exhaust dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

NOTE- GED is optional except required with power exhaust dampers.

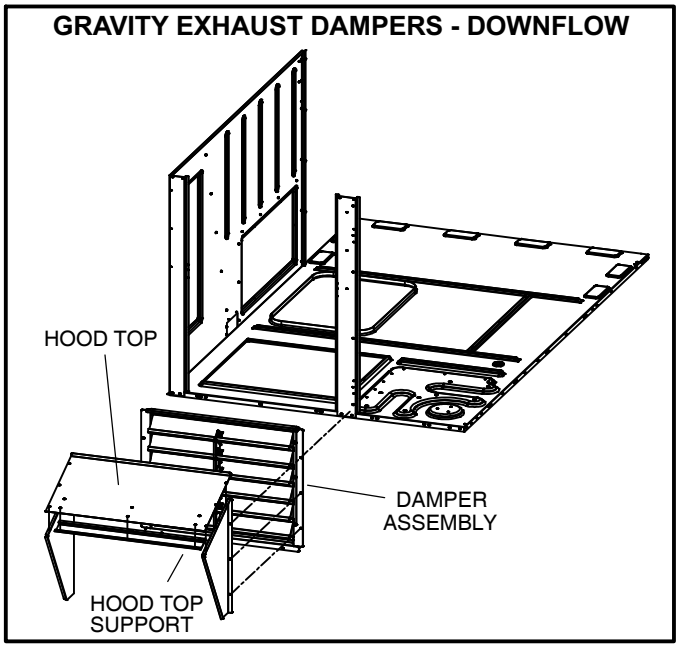


FIGURE 26

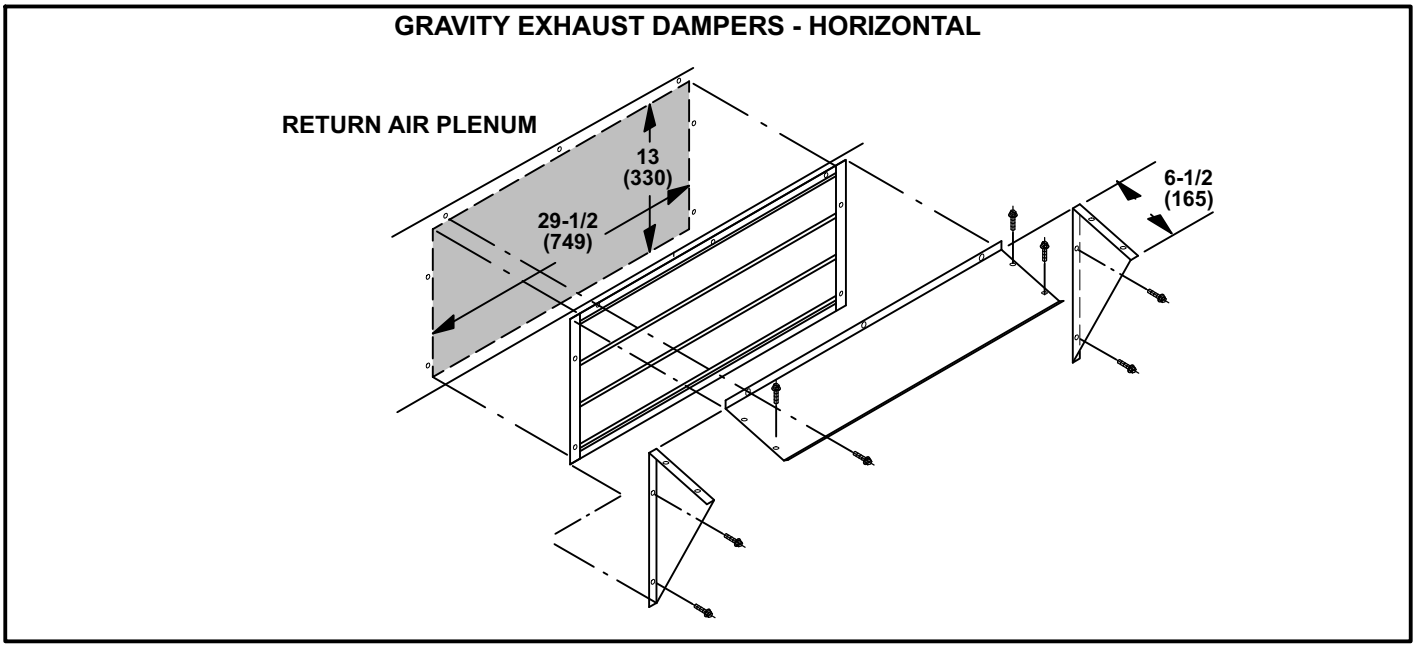


FIGURE 27

G-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 28. 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.

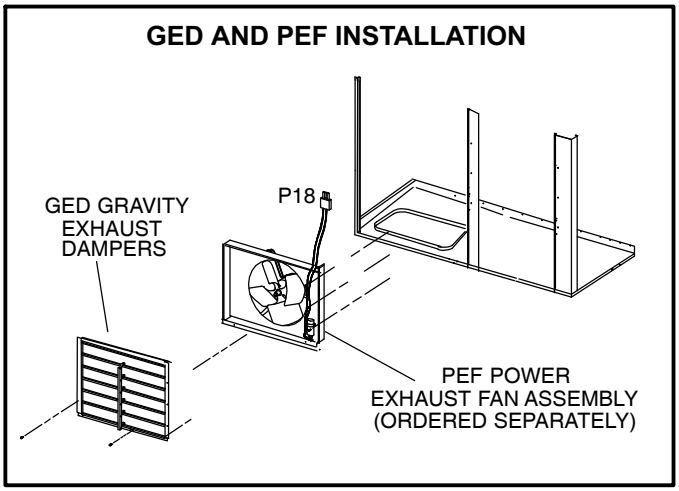


FIGURE 28

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 29. 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.)

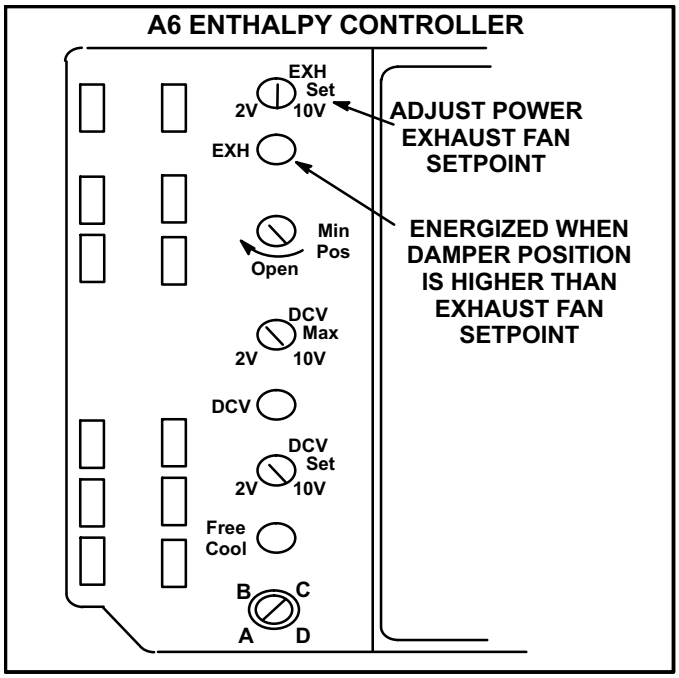


FIGURE 29

H-Control Systems

Three different types of control systems may be used with the KCA series units. All thermostat wiring is connected to TB1 located in the control area. Each thermostat has additional control options available. See thermostat installation instructions for more detail.

1- Electro-mechanical thermostat (13F06)
   The electro-mechanical thermostat is a two stage heat / two stage cool thermostat with dual temperature levers. A non-switching or manual system switch subbase may be used.

2- Electronic thermostat (see price book)
   Any two stage heat / two stage cool electronic thermostat may be used.

3- Honeywell T7300 thermostat (60L59)
   The Honeywell T7300 thermostat is a programmable, internal or optional remote temperature sensing thermostat. The T7300 provides occupied and unoccupied changeover control.

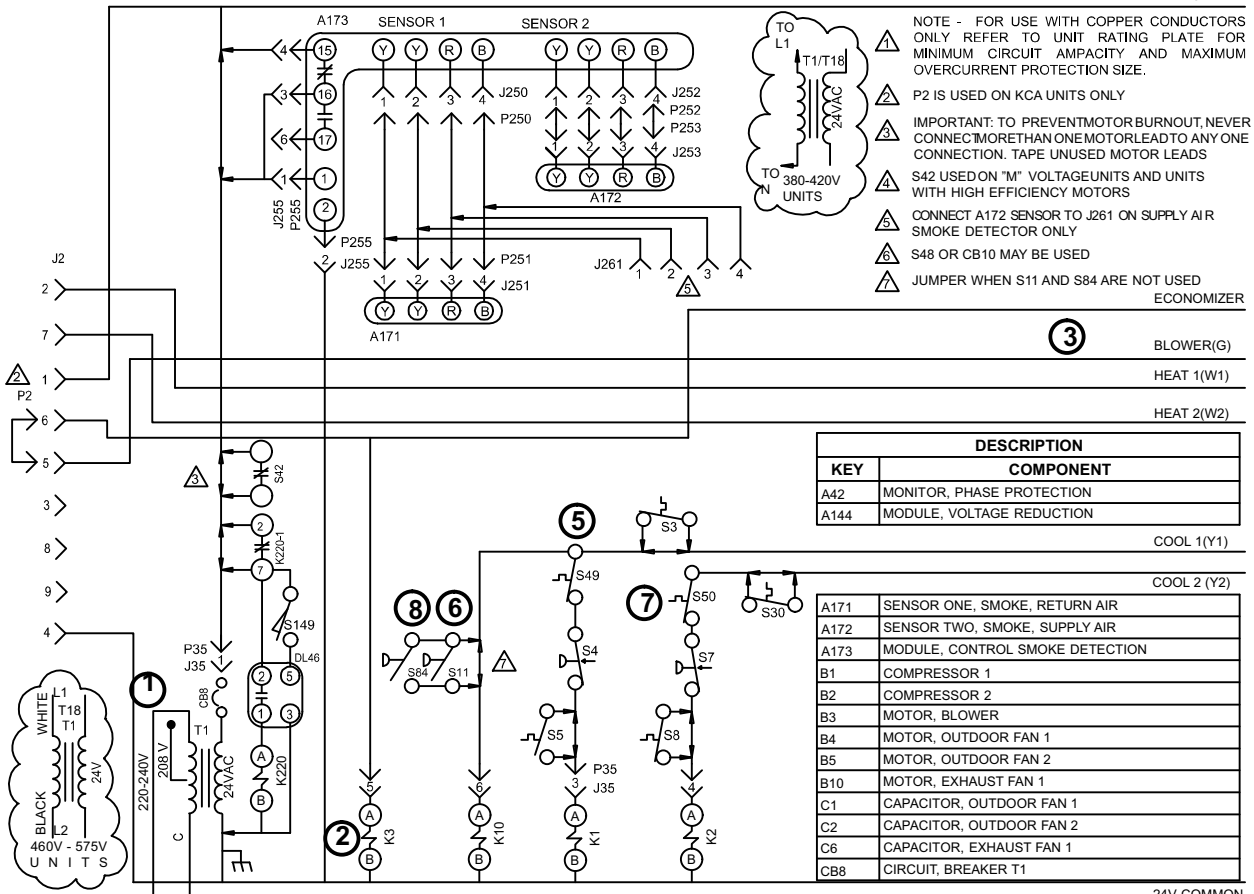
I-Smoke Detectors A171 and A172

Photoelectric smoke detectors are a field installed option. The smoke detectors can be installed in the supply air section (A172), return air section (A171), or in both the supply and return air section.

J-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.

KCA092/150 UNIT DIAGRAM



NOTE - FOR USE WITH COPPER CONDUCTORS ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

P2 IS USED ON KCA UNITS ONLY

IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS

S42 USED ON "M" VOLTAGE UNITS AND UNITS WITH HIGH EFFICIENCY MOTORS

CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY

S48 OR CB10 MAY BE USED

JUMPER WHEN S11 AND S84 ARE NOT USED

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.

DESCRIPTION	
KEY	COMPONENT
A42	MONITOR, PHASE PROTECTION
A144	MODULE, VOLTAGE REDUCTION

A171	SENSOR ONE, SMOKE, RETURN AIR
A172	SENSOR TWO, SMOKE, SUPPLY AIR
A173	MODULE, CONTROL SMOKE DETECTION
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN 1
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN 1
CB8	CIRCUIT, BREAKER T1

DL46	DELAY, OVERFLOW SWITCH
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
J2	JACK, HEAT
J11	JACK, GFI, RECEPTICLE
J18	JACK, EXHAUST FAN COMPT
J24	JACK, EXHAUST FAN
J35	JACK, TEST
J36	JACK, TEST COOL
J86	JACK, OUTDOOR FANS 1
J132	JACK, BLOWER , EXHAUST FAN MOTOR 1
J250	JACK, SMOKE DETECTOR ONE
J251	JACK, SMOKE DETECTOR ONE
J252	JACK, SMOKE DETECTOR TWO
J253	JACK, SMOKE DETECTOR TWO
J255	JACK, MODULE, CONTROL SMOKE DETECTION
J261	JACK, SMOKE DETECTOR JUMPER
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN
K65-1,2	RELAY, EXHAUST FAN
K220, -1	RELAY, OVERFLOW DELAY
P2	JACK, HEAT
P18	PLUG, EXHAUST FAN COMPT
P24	PLUG, EXHAUST FAN
P35	JACK, TEST
P36	PLUG, TEST COOL

P86	PLUG, OUTDOOR FANS 1
P132	PLUG, EXHAUST FAN MOTOR 1
P250	JACK, SMOKE DETECTOR ONE
P251	JACK, SMOKE DETECTOR ONE
P252	JACK, SMOKE DETECTOR TWO
P253	JACK, SMOKE DETECTOR TWO
P255	PLUG, MODULE, CONTROL SMOKE DETECTION
S3	SWITCH, LIMIT LOW COMPRESSOR 1
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
S30	SWITCH, LIMIT LOW COMPRESSOR 2
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S149	SWITCH, OVERFLOW
T1	TRANSFORMER, CONTROL

WIRING DIAGRAM		03/10
COOLING		
KCA, KGA - 092, 102, 120,150 - G, J, M, Y		
SECTION B		REV. 0.0
Supersedes	New Form No. 537075-02	

KCA092/150 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.

Economizer Operation:

3- The economizer control module receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).

4- N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.

1st Stage Cooling (compressor B1)

5- First stage cooling demand Y1 and G are energized by the thermostat. G energizes blower. 24VAC is routed through TB1 passing N.C. freezestat S49 and optional N.C. high pressure switch S4. Compressor contactor K1 is energized. N.O. contacts K1 close energizing compressor B1.

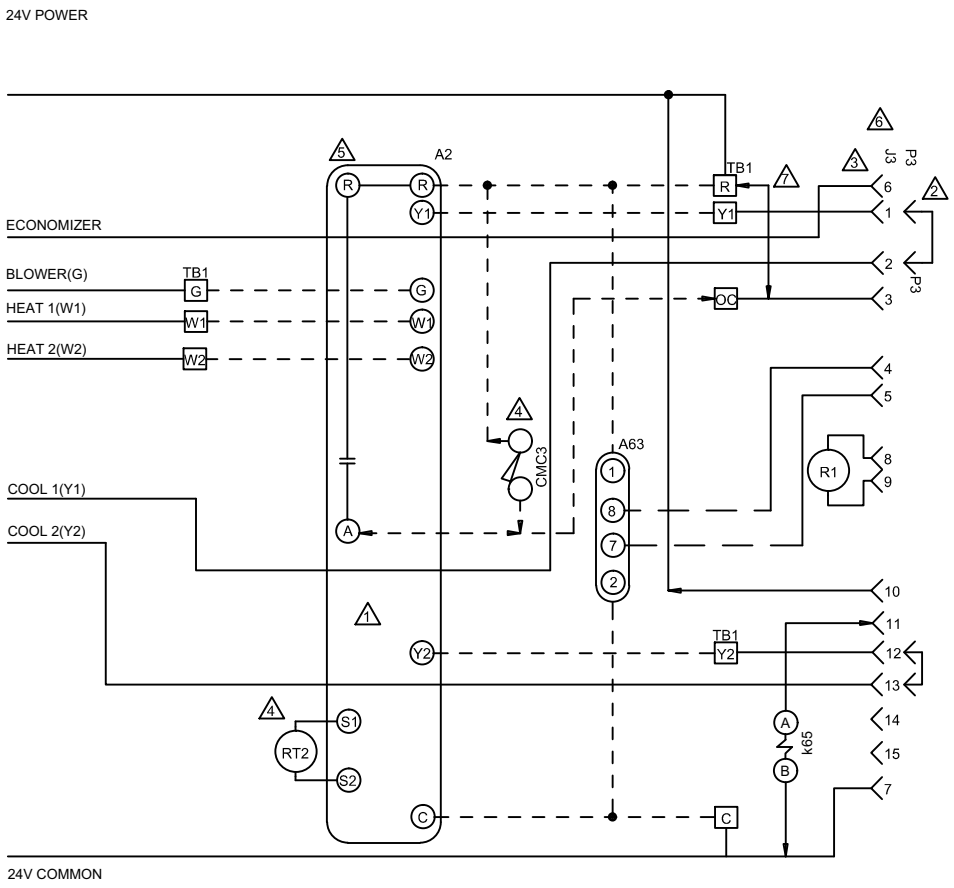
6- Optional N.O. low ambient switch S11 closes to energize condenser fan relay K10. N.O. contacts K10-1 and K10-2 close energizing condenser fans B4 and B5. N.C. contacts K10-1 open de-energizing crankcase heaters HR1 and HR2.

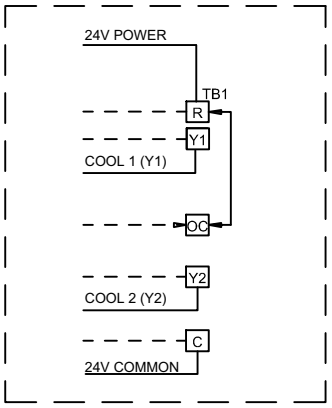
2nd Stage Cooling (compressor B2 is energized)

7- 24VAC is routed through TB1 and proves N.C. freezestat S50 and optional N.C. high pressure switch S7. Compressor contactor K2 is energized. N.O. K2 contacts close energizing compressor B2.

8- 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 K10-1 open de-energizing crankcase heaters HR1 and HR2.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT





CONNECTION SCHEME FOR KCA, KGA AND KHA 092 THROUGH 150 UNITS WITHOUT ECONOMIZER ONLY

DESCRIPTION	
KEY	**COMPONENT**
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
CMC3	CLOCK, TIME
J3	JACK, UNIT ECONOMIZER
K65	RELAY, EXHAUST FAN
P3	PLUG, ECONOMIZER BYPASS
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
TB1	TERMINAL STRIP, CLASS II VOLTAGE

1. THERMOSTAT SUPPLIED BY USER
2. REMOVEP3 WHEN ECONOMIZERS USED, ONLY ON KCA, KGA AND KHA 180 THROUGH 300 UNITS.
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED
5. TOUCHSCREEN THERMOSTAT
6. J3 AND P3 ARE NOT USED ON KCA, KGA AND KHA 092 THROUGH 150 UNITS WITHOUT ECONOMIZER
7. REMOVE JUMPER BETWEEN TB1-R AND TB1-OCP WHEN USING A NITE SETBACK THERMOSTAT

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

	WIRING DIAGRAM	12/09
ACCESSORIES		
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT		
SECTION C		REV. 2.0
Supersedes	New Form No. 537077-01	

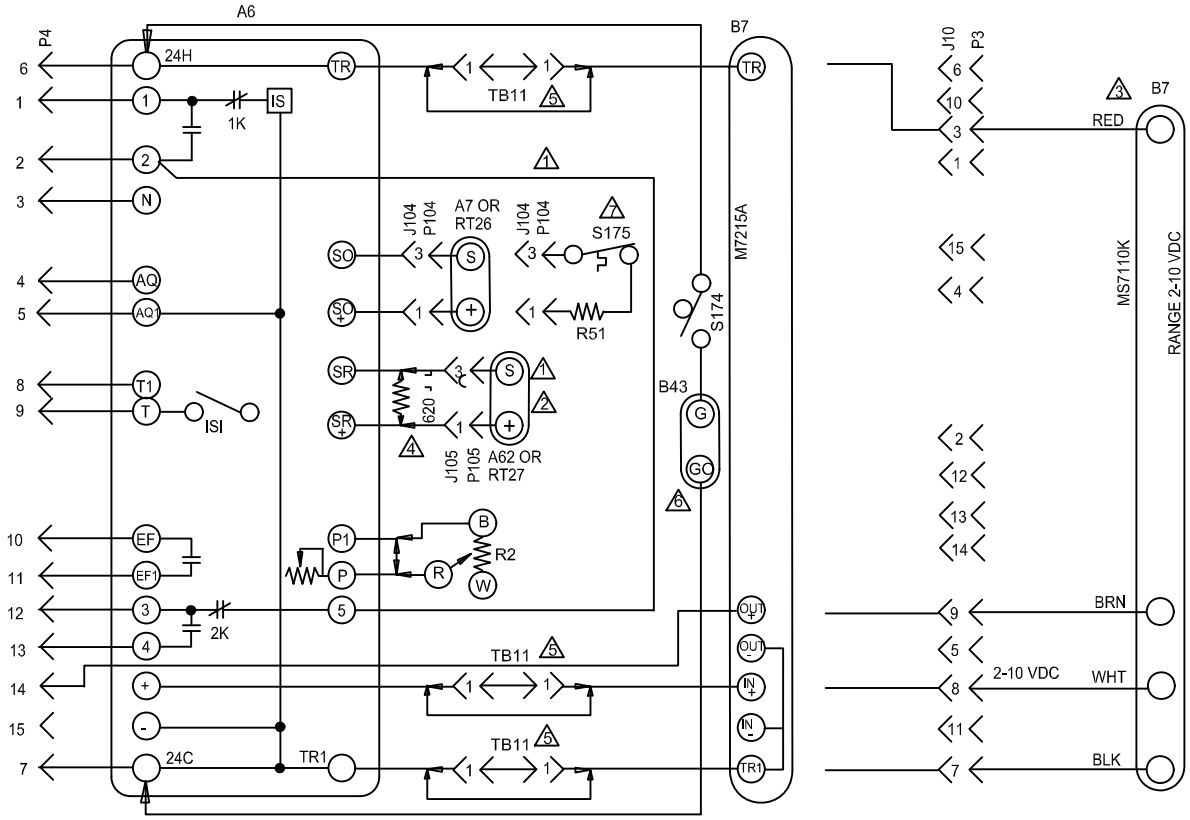
POWER:

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



DESCRIPTION	
KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
B7	MOTOR-DAMPER, ECONOMIZER
B43	MOTOR-EXHAUST DAMPER
J10	JACK-ECONOMIZER
J104	JACK-SENSOR,OUTDOOR ENTHALPY
J105	JACK-SENSOR,RETURN AIR ENTHALPY
P3	PLUG-LESS ECONOMIZER
P4	PLUG-ECONOMIZER
P104	PLUG-SENSOR,OUTDOOR ENTHALPY
P105	PLUG-SENSOR,RETURN AIR ENTHALPY
R2	POT-MINIMUM POSITION
R51	RESISTOR-SENSIBLE 820 OHM
RT26	SENSOR-OUTDOOR AIR TEMP
RT27	SENSOR-INDOOR AIR TEMP
S175	THERMOSTAT-SENSIBLE TEMP 55-70F
S174	SWITCH-EXHAUST DAMPER
TB11	TERMINAL STRIP-CLASS II VOLT

1. OPTIONAL OUTDOOR THERMOSTAT TO REPLACE RT26 SENSIBLE SENSOR
6. OPTIONAL EXHAUST DAMPER TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
5. TB11 USED ON "C" BOX ONLY WITH MOTOR M7215A
4. REPLACE A7 OR RT26 WITH 620 OHM RESISTOR FOR CONTROLS WITH GLOBAL ECON

3. USED ON C BOX UNITS
2. A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING
1. RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

WIRING DIAGRAM	5/09
ACCESSORIES	
ECONOMIZER	
ECONOMIZER SECTION D1	
Supersedes Form No.	New Form No. 537080-01

SEQUENCE OF OPERATION

POWER:

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

OPERATION:

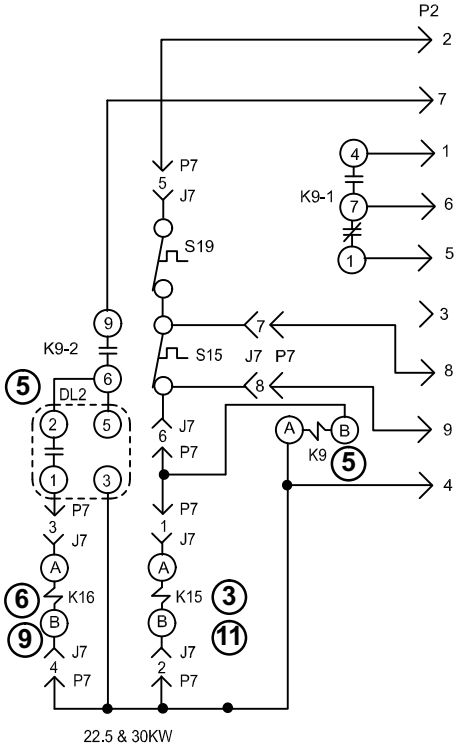
2- Enthalpy sensor A7 and A62 (if differential enthalpy is used) communicates to the economizer control module A6 when to power the damper motor B7.

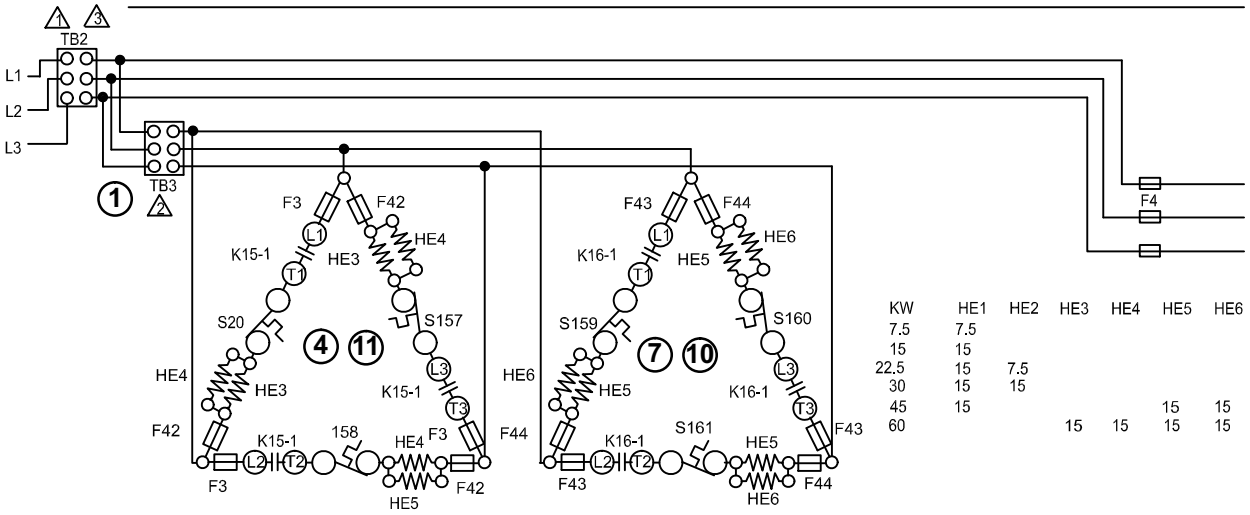
3- Economizer control module A6 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

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

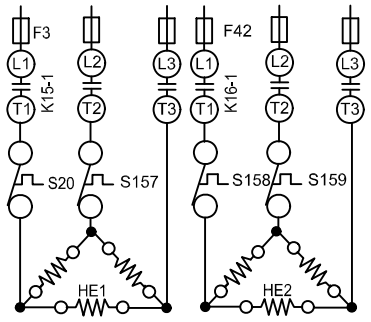
EHA-7.5, 15, 22.5, 30, 45 & 60kW Y VOLTAGE
KCA SERIES UNITS

DESCRIPTION	
KEY	COMPONENT
DL2	DELAY-ELECTRIC HEAT
F3	FUSE-ELECTRIC HEAT
F4	FUSE-UNIT
F42	FUSE-ELECTRIC HEAT 2
F43	FUSE-ELECTRIC HEAT 3
F44	FUSE-ELECTRIC HEAT 4
HE1	ELEMENT-ELECT HEAT 1
HE2	ELEMENT-ELECT HEAT 2
HE3	ELEMENT-ELECT HEAT 3
HE4	ELEMENT-ELECT HEAT 4
HE5	ELEMENT-ELECT HEAT 5
HE6	ELEMENT-ELECT HEAT 6
J7	JACK-ELECT HT SUB-BASE KIT
K9,-1	RELAY-HEAT
K15,-1	CONTACTOR-ELECTRIC HT 1
K16,-1	CONTACTOR-ELECTRIC HT 2
P2	PLUG-UNIT, HEAT
P7	PLUG-ELECT HT SUB-BASE KIT
S15	SWITCH-LIMIT,PRIMARY,ELECT HT
S19	THERMOSTAT-ELECTRIC HEAT LIMIT
S20	SWITCH-LIMIT,SECONDARY ELECT HT
S157	SWITCH-LIMIT,SECONDARY ELECT HT 2
S158	SWITCH-LIMIT,SECONDARY ELECT HT 3
S159	SWITCH-LIMIT,SECONDARY ELECT HT 4
S160	SWITCH-LIMIT,SECONDARY ELECT HT 5
S161	SWITCH-LIMIT,SECONDARY ELECT HT 6
TB2	TERMINAL STRIP-UNIT
TB3	TERMINAL STRIP-ELECTRIC HEAT





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

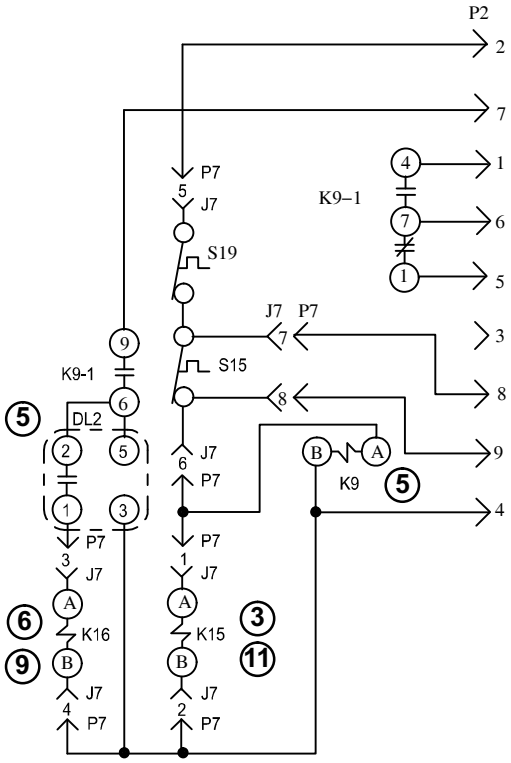


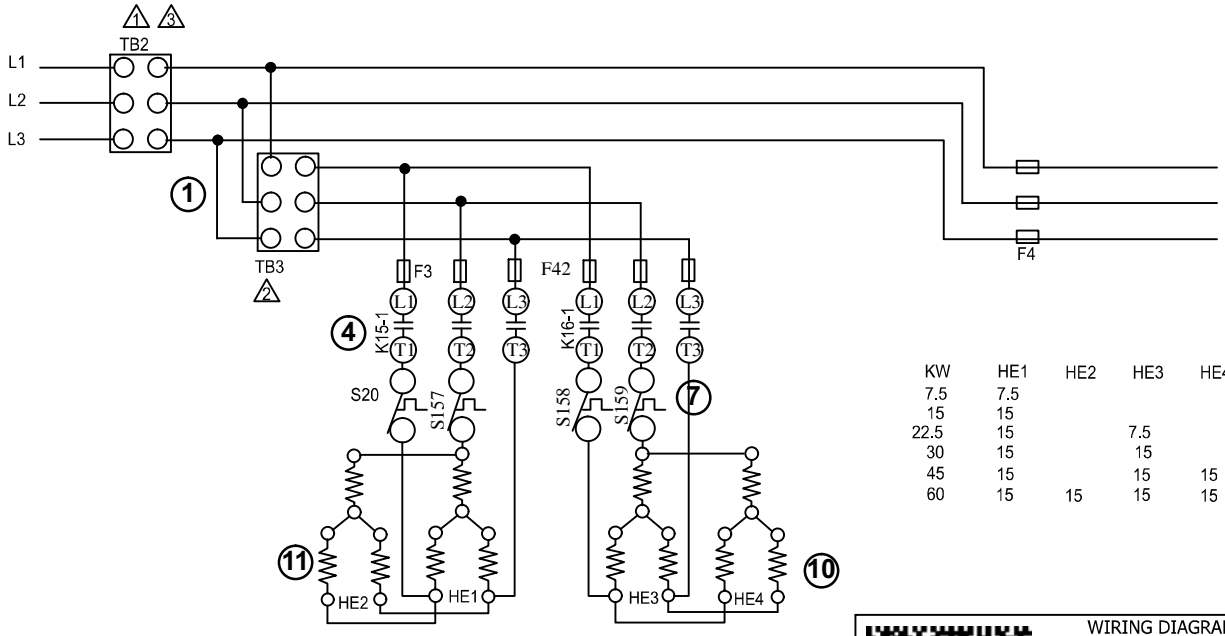
3 NOT USED ON 7.5,15, AND 30KW UNITS
2 TB3 IS USED ON SOME UNITS
1 TB2,S48 OR CB10 MAY BE USED

WIRING DIAGRAM	8/09
HEATING-ELECTRIC	
EHO-7.5,15,22.5,30,45,60-Y FOR USE WITH KCA AND KHA UNITS B BOX	
HEATING SECTION-A5	
Supersedes Form No. 534870W	New Form No. 537058-01

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

DESCRIPTION	
KEY	**COMPONENT**
DL2	DELAY–ELECTRIC HEAT
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
J7	JACK–ELECT HT SUB–BUS KIT
K9,–1	RELAY–HEAT
K15,–1	CONTACTOR–ELECTRIC HT 1
K16,–1	CONTACTOR–ELECTRIC HT 2
P2	PLUG–HEAT
P7	PLUG–ELECT HT SUB–BASE KIT
S15	SWITCH LIMIT, PRIMARY, ELECT HT
S19	THERMOSTAT–ELECTRIC HEAT LIMIT
S20	SWITCH–LIMIT, SECONDARY ELECT HT
S157	SWITCH LIMIT, SECONDARY ELECT HT 2
S158	SWITCH LIMIT, SECONDARY ELECT HT 3
S159	SWITCH LIMIT, SECONDARY ELECT HT 4
TB2	TERMINAL STRIP–UNIT
TB3	TERMINAL STRIP–ELECTRIC HEAT





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

3 NOT USED ON 7.5, 15 AND 30 KW UNITS

2 TB3 IS USED ON SOME UNITS

1 TB2,S48 OR CB10 MAY BE USED

WIRING DIAGRAM	05/10
HEATING–ELETRIC	
EHA-7.5, 15, 22.5, 30, 45, 60 - G, J FOR USE WITH KCA AND KHA UNITS - B BOX	
HEATING SECTION-A4	REV. 0.0
Supersedes: 534871W	New Form No.: 537057-02

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 HE7. Each element is protected by fuse F3.

SECOND STAGE HEAT:

2- Heating demand initiates at W1 in thermostat.

3- 24VAC W2 signal is routed through from the thermostat to TB1. After S15 N.C. primary limit and S20 secondary limit is proved, the electric heat contactor K15 is energized.