UNIT INFORMATION KGC SERIES

7.5 to 12.5 ton

100097

Service Literature

KGC092 through 150

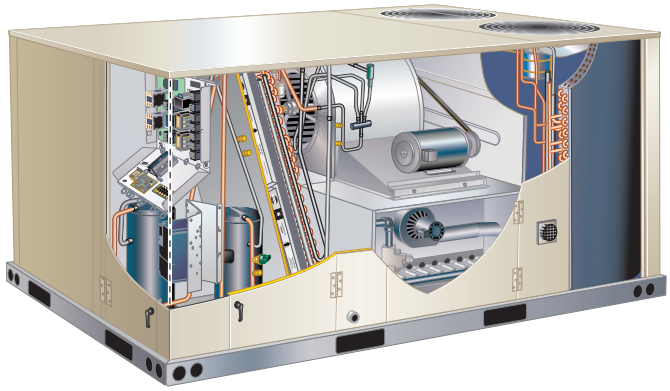
The KGC 7.5, 8.5, 10 and 12.5 ton (092, 102, 120, 150) packaged gas units are available in standard cooling efficiency. Units are available in 130,000, 180,000 or 240,000Btuh (38.1, 52.7 or 70.3 kW) heating inputs. Gas heat sections are designed with aluminized steel tube heat exchangers.

All KGC 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.

Units come standard with a lightweight, all-aluminum condenser coil; optional, fin/tube condenser coils are available.

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

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



⚠ WARNING

To prevent serious injury or death:

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

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

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

⚠ WARNING

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

⚠ CAUTION

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

⚠ WARNING

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

Table of Contents

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
COOLING SYSTEM						
Condensate Drain Trap	PVC	**22H54**	X	X	X	X
	Copper	**76W27**	X	X	X	X
Conventional Fin/Tube Condenser Coil (replaces Environ™ Coil System) (Required for Humiditrol® Dehumidification option)		Factory	O	O	O	O
Drain Pan Overflow Switch		**74W42**	X	X	X	X
Low Ambient Kit (0°F)		**18B87**	X	X	X	X
HEATING SYSTEM						
Bottom Gas Piping Kit		**54W95**	X	X	X	X
Combustion Air Intake Extensions		**19W51**	X	X	X	X
Gas Heat Input	130,000 Btuh	Factory	O	O	O	O
	180,000 Btuh	Factory	O	O	O	O
	240,000 Btuh	Factory	O	O	O	O
Low Temperature Vestibule Heater	208/230V-3ph	**22A51**	X	X	X	X
	460V	**22A55**	X	X	X	X
	575V	**13X65**	X	X	X	X
LPG/Propane Conversion Kits	Standard Heat	**14N22**	X	X	X	X
	Medium Heat	**14N23**	X	X	X	X
	High Heat	**14N25**	X	X	X	X
Stainless Steel Heat Exchanger		Factory	O	O	O	O
Vertical Vent Extension Kit		**42W16**	X	X	X	X
BLOWER - SUPPLY AIR						
Blower Motors	Belt Drive - 2 hp	Factory	O	O	O	O
	Belt Drive - 3 hp	Factory	O	O	O	O
	Belt Drive - 5 hp	Factory	O	O	O	O
VFD Manual Bypass Kit		**90W53**	X	X	X	X
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						
Combination Coil/Hail Guards		**24M51**	OX	OX		
		24C85			OX	OX
Hinged Access Panels		Factory	O	O	O	O
Horizontal Discharge Kit		**51W25**	X	X	X	X
Return Air Adaptor Plate (for same size L Series® and T-Class™ replacement)		**54W96**	X	X	X	X

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

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

O = Configure To Order (Factory Installed)

X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
CONTROLS						
NOTE - Also see Conventional Thermostat Control Systems on page 13 for additional options.						
Smoke Detector - Supply or Return (Power board and one sensor)		**11K76**	X	X	X	X
Smoke Detector - Supply and Return (Power board and two sensors)		**11K80**	X	X	X	X
INDOOR AIR QUALITY						
Air Filters						
Healthy Climate® High Efficiency Air Filters 20 x 25 x 2 (Order 4 per unit)	MERV 8	**50W61**	X	X	X	X
	MERV 13	**52W41**	X	X	X	X
	MERV 16	**21U41**	X	X	X	X
Replaceable Media Filter With Metal Mesh Frame (includes non-pleated filter media) (Order 4 per unit)	20 x 25 x 2	**Y3063**	X	X	X	X
Indoor Air Quality (CO_2) Sensors						
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**23V86**	X	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting		**87N52**	X	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**85L43**	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**77N39**)		**90N43**	X	X	X	X
Needlepoint Bipolar Ionization (NPBI)						
Needlepoint Bipolar Ionization (NPBI) Kit		**22U15**	X	X	X	X
UVC Germicidal Lamps						
[1] Healthy Climate® UVC Light Kit (110/230V-1ph)		**21A93**	X	X	X	X
Step-Down Transformers	460V primary, 230V secondary	**10H20**	X	X	X	X
	575V primary, 230V secondary	**10H21**	X	X	X	X
HUMIDITROL® DEHUMIDIFICATION REHEAT OPTION						
Humiditrol® Dehumidification Option		Factory	O	O	O	O
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	80 amp	**54W56**	OX	OX	OX	OX
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX
	[2] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X	X
	[2] 20 amp non-powered, field-wired (575V)	Factory	O	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	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)

[2] Canada requires a minimum 20 amp circuit. Select 20 amp, non-powered, field wired GFI.

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

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

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X = Field Installed

OPTIONS / ACCESSORIES

Item Description		Catalog Number	Unit Model No 092	102	120	150
ECONOMIZER						
Standard Economizer (Not for Title 24)						
Standard Economizer with Single Temperature Control Downflow or Horizontal Applications - Includes Barometric Relief Dampers and Air Hoods		**13U45**	X	X	X	X
Standard Economizer Controls (Not for Title 24)						
Single Enthalpy Control		**21Z09**	X	X	X	X
Differential Enthalpy Control (order 2)		**21Z09**	X	X	X	X
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)						
High Performance Economizer Downflow or Horizontal Applications - Includes Barometric Relief Dampers and Air Hoods Factory Installed Economizer - Enthalpy control is furnished as standard. Field programmable for Sensible Control without additional hardware Field Installed Economizer - Sensible Sensible Sensor is furnished as standard		**23G23**	OX	OX	OX	OX
High Performance Economizer Controls						
Single Enthalpy Control		**23G26**	X	X	X	X
Differential Enthalpy Control (order 1 for factory; order 2 for field) (Not for Title 24)		**23G26**	X	X	X	X
Economizer Accessories						
WLAN Stick (For High Performance Economizer only)		**23K58**	X	X	X	X
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood						
Horizontal Low Profile Barometric Relief Dampers With Exhaust Hood		**53K04**	X	X	X	X
OUTDOOR AIR						
Outdoor Air Dampers With Outdoor Air Hood						
Motorized		**14G28**	X	X	X	X
Manual		**14G29**	X	X	X	X
POWER EXHAUST						
Standard Static	208/230V-3ph	**53W44**	X	X	X	X
	460V-3ph	**53W45**	X	X	X	X
	575V-3ph	**53W46**	X	X	X	X
ROOF CURBS						
Hybrid Roof Curbs, Downflow						
8 in. height		**11F54**	X	X	X	X
14 in. height		**11F55**	X	X	X	X
18 in. height		**11F56**	X	X	X	X
24 in. height		**11F57**	X	X	X	X
Adjustable Pitch Curb						
14 in. height		**54W50**	X	X	X	X
CEILING DIFFUSERS						
Step-Down - Order one	RTD11-95S	**13K61**	X			
	RTD11-135S	**13K62**		X	X	
	RTD11-185S	**13K63**				X
Flush - Order one	FD11-95S	**13K56**	X			
	FD11-135S	**13K57**		X	X	
	FD11-185S	**13K58**				X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X			
	C1DIFF31B-1	**12X66**		X	X	
	C1DIFF32B-1	**12X67**				X

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

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

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SPECIFICATIONS — UNIT

General Data			7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
	Nominal Tonnage		7.5 Ton	8.5 Ton	10 Ton	12.5 Ton
	Model Number		KGC092S4M	KGC102S4M	KGC120S4M	KGC150S4M
	Efficiency Type		Standard	Standard	Standard	Standard
	Blower Type		MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume	MSAV® Multi-Stage Air Volume
Cooling Performance	Gross Cooling Capacity - Btuh		87,800	99,600	118,000	143,000
	[1] Net Cooling Capacity - Btuh		86,000	97,000	115,000	138,000
	[1] AHRI Rated Air Flow - cfm		2400	2800	3200	3800
	Total Unit Power - kW		7.8	8.8	10.5	12.8
	[1] EER (Btuh/Watt)		11.0	11.0	11.0	10.8
	[1] IEER (Btuh/Watt)		14.6	14.6	14.6	14.0
Refrigerant Charge	Refrigerant Type		R-410A	R-410A	R-410A	R-410A
	Environ™ Coil System	Circuit 1	5 lbs. 5 oz.	5 lbs. 5 oz.	5 lbs. 5 oz.	7 lbs. 0 oz.
		Circuit 2	3 lbs. 12 oz.	3 lbs. 10 oz.	4 lbs. 9 oz.	6 lbs. 15 oz.
	Fin/Tube Coil System	Circuit 1	9 lbs. 4 oz.	10 lbs. 3 oz.	10 lbs. 0 oz.	12 lbs. 10 oz.
		Circuit 2	6 lbs. 0 oz.	5 lbs. 14 oz.	10 lbs. 8 oz.	12 lbs. 8 oz.
	Conventional Fin/Tube with Reheat Option	Circuit 1	9 lbs. 13 oz.	10 lbs. 12 oz.	10 lbs. 9 oz.	13 lbs. 0 oz.
		Circuit 2	6 lbs. 0 oz.	5 lbs. 14 oz.	10 lbs. 8 oz.	12 lbs. 8 oz.
Gas Heating Options Available - See page 6			Standard (2 stage), Medium (2 Stage), High (2 Stage)			
Compressor Type (number)			(1) Two-Stage Scroll (1) Single-Stage Scroll			
Outdoor Coils Environ (Fin/Tube)	Net face area (total) - sq. ft.		20.5	20.5	28.0	28.0
	Number of rows		1 (2)	1 (2)	1(2)	1 (3)
	Fins per inch		23 (20)	23 (20)	23 (20)	20
Outdoor Coil Fans	Motor - (No.) hp		(2) 1/3	(2) 1/3	(2) 1/2	(2) 1/2
	Motor rpm		1075	1075	1075	1075
	Total Motor watts		740	740	1050	1050
	Diameter - (No.) in.		(2) 24	(2) 24	(2) 24	(2) 24
	Number of blades		3	3	3	3
	Total Air volume - cfm		8800	8800	9700	9700
Indoor Coils	Net face area (total) - sq. ft.		13.54	13.54	13.54	13.54
	Tube diameter - in.		3/8	3/8	3/8	3/8
	Number of rows		3	3	4	4
	Fins per inch		14	14	14	14
	Drain connection - Number and size		(2) 1 in. NPT coupling			
	Expansion device type		Balanced Port Thermostatic Expansion Valve (removable power element)			
[2] **Indoor Blower and Drive Selection**	Nominal motor output		2 hp, 3 hp, 5 hp			
	Maximum usable motor output (US)		2.3 hp, 3.45 hp, 5.75 hp			
	Motor - Drive kit number		**2 hp** **Kit 1** 590-890 rpm **Kit 2** 800-1105 rpm **Kit 3** 795-1195 rpm **3 hp** **Kit 4** 730-970 rpm **Kit 5** 940-1200 rpm **Kit 6** 1015-1300 rpm **5 hp** **Kit 10** 900-1135 rpm **Kit 11** 1040-1315 rpm **Kit 12** 1125-1425 rpm			
	Blower wheel nominal diameter x width - in.		(1) 15 X 15			
Filters	Type of filter		MERV 4, 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] AHRI Certified to AHRI Standard 340/360; 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

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

NOTE – Motor service factor limit - 1.0.

SPECIFICATIONS — GAS HEAT

			Heat Input Type	Standard	Medium	High
			Number of Gas Heat Stages	**2**	**2**	**2**
Gas Heating Performance	Input - Btuh		1st Stage	84,500	117,000	156,000
			2nd Stage	130,000	180,000	240,000
	Output - Btuh		2nd Stage	104,000	144,000	194,000
			Temperature Rise Range - °F	15-45	30-60	40-70
			Minimum air volume - cfm	2150	2250	2600
			[1] Thermal Efficiency	80%	80%	81%
			Gas Supply Connections	3/4 in NPT	3/4 in NPT	3/4 in NPT
			Recommended Gas Supply Pressure - Nat. / LPG	7 / 11 in. w.g.		
Gas Supply Pressure Range			Min. / Max. (Natural)	4.5 / 10.5 in. w.g.		
			Min. / Max. (LPG)	10.8 / 13.5 in. w.g.		

[1] Thermal Efficiency at full input.

HIGH ALTITUDE DERATE

NOTE - Units may be installed at altitudes up to 2000 feet above sea level without any modifications.

At altitudes above 2000 feet units must be derated to match gas manifold pressures shown in table below.

At altitudes above 4500 feet unit must be derated 2% (130K through 180K) and 4% (240K) for each 1000 feet above sea level.

NOTE - This is the only permissible derate for these units.

Refer to the Installation Instructions for more detailed information.

Heat Input Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate (Btuh)
		Natural Gas	LPG/ Propane	
Standard (2 stage)	2001 - 4500	1.6 / 3.4	4.4 / 9.7	84,500 / 125,000
Medium (2 stage)	2001 - 4500	1.6 / 3.4	4.4 / 9.7	117,000 / 173,000
High (2 stage)	2001 - 4500	1.6 / 3.4	4.4 / 9.7	156,000 / 221,000

KGC092S4M AND KGC102S4M - 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.

Maximum Static Pressure With Gas Heat - 2.0 in. w.g.
Minimum Air Volume Required For Different Gas Heat Sizes:
Standard - 2150 cfm; Medium - 2250 cfm; High - 2600 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	593	0.11	636	0.07	682	0.10	731	0.22	784	0.60	840	0.96	898	1.26	948	1.38	996	1.47	1045	1.57	1092	1.71	1140	1.92	1188	2.32
2250	604	0.15	645	0.11	690	0.15	739	0.39	790	0.74	846	1.08	901	1.34	953	1.48	1002	1.57	1052	1.70	1100	1.86	1149	2.09	1197	2.42
2500	615	0.19	655	0.15	699	0.20	747	0.55	797	0.89	851	1.20	906	1.44	959	1.58	1009	1.68	1059	1.83	1108	2.01	1158	2.26	1206	2.52
2750	626	0.23	666	0.19	709	0.37	755	0.71	805	1.03	858	1.32	912	1.55	966	1.70	1017	1.81	1067	1.97	1117	2.17	1166	2.44	1215	2.71
3000	637	0.27	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	0.31	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	1.50	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

KGC120S4M AND KGC150S4M - 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.

Maximum Static Pressure With Gas Heat - 2.0 in. w.g.
Minimum Air Volume Required For Different Gas Heat Sizes:
Standard - 2150 cfm; Medium - 2250 cfm; High - 2600 cfm

Total Air Volume cfm	Total Static Pressure − in. w.g.																									
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2000	497	0.25	558	0.44	624	0.6	694	0.74	764	0.85	830	0.99	889	1.16	943	1.34	994	1.52	1045	1.71	1096	1.89	1146	2.08	1197	2.27
2250	511	0.34	573	0.52	638	0.68	708	0.82	776	0.94	839	1.09	896	1.26	948	1.45	998	1.64	1048	1.83	1098	2.01	1149	2.2	1200	2.4
2500	527	0.44	589	0.62	654	0.78	723	0.91	789	1.05	850	1.21	904	1.39	955	1.58	1003	1.77	1052	1.96	1101	2.14	1152	2.33	1203	2.53
2750	545	0.55	606	0.72	672	0.88	740	1.03	804	1.17	861	1.34	914	1.53	962	1.72	1010	1.92	1057	2.10	1105	2.29	1154	2.47	1206	2.68
3000	564	0.66	626	0.84	692	1.01	759	1.16	819	1.32	874	1.49	924	1.68	971	1.88	1017	2.08	1063	2.26	1110	2.44	1158	2.63	1208	2.83
3250	585	0.79	648	0.98	714	1.14	778	1.31	836	1.48	887	1.66	935	1.86	981	2.06	1026	2.26	1071	2.45	1117	2.63	1163	2.80	1213	3.00
3500	607	0.93	672	1.13	737	1.31	798	1.48	852	1.66	901	1.85	948	2.05	993	2.26	1037	2.46	1081	2.65	1125	2.83	1171	3.01	1221	3.21
3750	632	1.10	698	1.31	762	1.50	819	1.67	869	1.86	915	2.05	961	2.25	1005	2.47	1049	2.68	1092	2.88	1136	3.05	1181	3.24	1231	3.45
4000	660	1.30	726	1.52	787	1.70	838	1.87	885	2.06	930	2.26	974	2.48	1018	2.71	1062	2.93	1105	3.12	1149	3.30	1194	3.49	1245	3.72
4250	691	1.53	755	1.75	810	1.91	857	2.07	901	2.27	945	2.50	990	2.74	1034	2.98	1077	3.20	1120	3.39	1163	3.58	1210	3.79	1262	4.03
4500	724	1.78	783	1.98	831	2.12	874	2.28	917	2.50	962	2.75	1006	3.02	1051	3.27	1094	3.49	1137	3.70	1181	3.89	1228	4.11	1281	4.38
4750	757	2.05	809	2.20	851	2.33	891	2.51	935	2.76	980	3.05	1025	3.33	1070	3.59	1113	3.82	1156	4.03	1201	4.24	1249	4.47	1303	4.75
5000	787	2.31	831	2.43	870	2.57	910	2.78	954	3.06	1000	3.38	1046	3.68	1091	3.95	1135	4.19	1178	4.40	1224	4.62	1272	4.86	1325	5.13
5250	814	2.55	852	2.66	889	2.83	930	3.09	975	3.41	1023	3.76	1070	4.08	1115	4.35	1159	4.59	1203	4.81	1248	5.03	1297	5.27	1350	5.53
5500	835	2.78	871	2.91	909	3.13	952	3.44	999	3.81	1049	4.18	1096	4.51	1142	4.79	1186	5.03	1229	5.24	1275	5.46	1324	5.69	- - -	- - -
5750	854	3.01	890	3.19	930	3.48	977	3.86	1027	4.27	1078	4.66	1126	4.99	1171	5.26	1214	5.49	1258	5.70	- - -	- - -	- - -	- - -	- - -	- - -
6000	871	3.26	910	3.53	955	3.90	1006	4.34	1060	4.80	1111	5.19	1158	5.51	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
6250	890	3.57	934	3.94	985	4.41	1041	4.91	1096	5.38	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

FACTORY INSTALLED BELT DRIVE KIT SPECIFICATIONS

Nominal hp	Maximum hp	Drive Kit Number	RPM Range
2	2.3	1	590 - 890
2	2.3	2	800 - 1105
2	2.3	3	795 - 1195
3	3.45	4	730 - 970
3	3.45	5	940 - 1200
3	3.45	6	1015 - 1300
5	5.75	10	900 - 1135
5	5.75	11	1040 - 1315
5	5.75	12	1125 - 1425

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

NOTE – Motor service factor limit - 1.0.

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		Gas Heat Exchanger			Economizer	Humiditrol® Reheat Coil	Filters			Return Air Adaptor Plate
	092, 102	120, 150	Standard Heat	Medium Heat	High Heat			MERV 8	MERV 13	MERV 16	
1750	0.04	0.04	0.06	0.02	0.02	0.05	0.02	0.01	0.03	0.06	0.00
2000	0.05	0.05	0.07	0.05	0.06	0.06	0.02	0.01	0.03	0.08	0.00
2250	0.06	0.06	0.07	0.07	0.08	0.08	0.02	0.01	0.04	0.09	0.00
2500	0.07	0.07	0.09	0.10	0.11	0.11	0.03	0.01	0.05	0.10	0.00
2750	0.08	0.08	0.09	0.11	0.12	0.12	0.03	0.02	0.05	0.11	0.00
3000	0.10	0.09	0.11	0.12	0.13	0.13	0.03	0.02	0.06	0.12	0.02
3250	0.11	0.10	0.12	0.15	0.16	0.15	0.04	0.02	0.06	0.13	0.02
3500	0.12	0.11	0.12	0.16	0.17	0.15	0.04	0.03	0.07	0.15	0.04
3750	0.14	0.13	0.14	0.19	0.20	0.15	0.05	0.03	0.08	0.16	0.07
4000	0.15	0.14	0.14	0.21	0.22	0.19	0.05	0.04	0.08	0.17	0.09
4250	0.17	0.15	0.14	0.24	0.28	0.19	0.06	0.04	0.09	0.19	0.11
4500	0.19	0.17	0.15	0.26	0.32	0.22	0.07	0.04	0.09	0.20	0.12
4750	0.20	0.18	0.16	0.29	0.37	0.25	0.07	0.05	0.10	0.21	0.16
5000	0.22	0.20	0.16	0.34	0.43	0.29	0.08	0.06	0.10	0.23	0.18
5250	0.24	0.22	0.16	0.37	0.47	0.32	0.08	0.06	0.11	0.24	0.19
5500	0.25	0.23	0.18	0.44	0.54	0.34	0.09	0.07	0.12	0.25	0.22
5750	0.27	0.25	0.19	0.49	0.59	0.45	0.10	0.07	0.12	0.27	0.25
6000	0.29	0.27	0.20	0.54	0.64	0.52	0.10	0.08	0.13	0.28	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 DATA — 7.5 TON

		Model No.	KGC092S4								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)		Rated Load Amps	14			6.5			4.9		
		Locked Rotor Amps	93			60			41		
Compressor 2 (Non-Inverter)		Rated Load Amps	9			5.6			3.8		
		Locked Rotor Amps	71			38			36.5		
Outdoor Fan Motors (2)		Full Load Amps (2 Non-ECM)	2.4			1.3			1		
		Total	4.8			2.6			2		
Power Exhaust (1) 0.33 HP		Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor		Horsepower	2	3	5	2	3	5	2	3	5
		Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	50	50	60	25	25	30	15	20	20
		With (1) 0.33 HP Power Exhaust	50	60	60	25	25	30	20	20	25
[3] Minimum Circuit Ampacity (MCA)		Unit Only	39	42	49	20	22	25	15	16	19
		With (1) 0.33 HP Power Exhaust	42	45	52	22	23	26	16	17	20
ELECTRICAL ACCESSORIES											
Disconnect		80 amp	**54W56** (all models)								

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

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

[2] HACR type breaker or fuse.

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

ELECTRICAL DATA — 8.5 TON

		Model No.	KGC102S4								
[1] Voltage - 60Hz			208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)		Rated Load Amps	14			6.5			4.9		
		Locked Rotor Amps	93			60			41		
Compressor 2 (Non-Inverter)		Rated Load Amps	13.1			6.1			4.4		
		Locked Rotor Amps	83.1			41			33		
Outdoor Fan Motors (2)		Full Load Amps (2 Non-ECM)	2.4			1.3			1		
		Total	4.8			2.6			2		
Power Exhaust (1) 0.33 HP		Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)			15			15			20		
Indoor Blower Motor		Horsepower	2	3	5	2	3	5	2	3	5
		Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)		Unit Only	50	60	60	25	25	30	20	20	25
		With (1) 0.33 HP Power Exhaust	50	60	70	25	25	30	20	20	25
[3] Minimum Circuit Ampacity (MCA)		Unit Only	43	46	53	21	22	25	16	17	19
		With (1) 0.33 HP Power Exhaust	46	49	56	22	23	27	17	18	20
ELECTRICAL ACCESSORIES											
Disconnect		80 amp	**54W56** (all models)								

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

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

[2] HACR type breaker or fuse.

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

ELECTRICAL DATA — 10 TON

	Model No.	KGC120S4								
[1] Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps	14			6.5			4.9		
	Locked Rotor Amps	93			60			41		
Compressor 2 (Non-Inverter)	Rated Load Amps	16			7.8			5.7		
	Locked Rotor Amps	110			52			38.9		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)	3			1.5			1.2		
	Total	6			3			2.4		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	60	60	70	30	30	30	20	20	25
	With (1) 0.33 HP Power Exhaust	60	60	70	30	30	35	20	25	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only	48	51	57	23	25	27	18	19	21
	With (1) 0.33 HP Power Exhaust	50	53	60	24	26	29	19	20	22

ELECTRICAL ACCESSORIES

Disconnect	80 amp	**54W56** (all models)

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

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

[2] HACR type breaker or fuse.

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

ELECTRICAL DATA — 12.5 TON

	Model No.	KGC150S4								
[1] Voltage - 60Hz		208/230V - 3 Ph			460V - 3 Ph			575V - 3 Ph		
Compressor 1 (Non-Inverter)	Rated Load Amps	17.6			8.5			6.3		
	Locked Rotor Amps	136			66.1			55.3		
Compressor 2 (Non-Inverter)	Rated Load Amps	22.4			10.6			7.7		
	Locked Rotor Amps	149			75			54		
Outdoor Fan Motors (2)	Full Load Amps (2 Non-ECM)	3			1.5			1.2		
	Total	6			3			2.4		
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4			1.3			1		
Service Outlet 115V GFI (amps)		15			15			20		
Indoor Blower Motor	Horsepower	2	3	5	2	3	5	2	3	5
	Full Load Amps	7.5	10.6	16.7	3.4	4.8	7.6	2.7	3.9	6.1
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	80	80	90	35	40	40	25	25	30
	With (1) 0.33 HP Power Exhaust	80	80	90	40	40	40	25	30	30
[3] Minimum Circuit Ampacity (MCA)	Unit Only	60	63	69	29	30	33	22	23	25
	With (1) 0.33 HP Power Exhaust	62	65	71	30	31	34	23	24	26

ELECTRICAL ACCESSORIES

Disconnect	80 amp	**54W56** (all models)

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

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

[2] HACR type breaker or fuse.

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

FIELD WIRING NOTES

- For use with copper wiring only
- Field wiring not furnished
- All wiring must conform to NEC or CEC and local electrical codes
- For specific wiring information, please refer to the installation instructions

Parts Arrangement

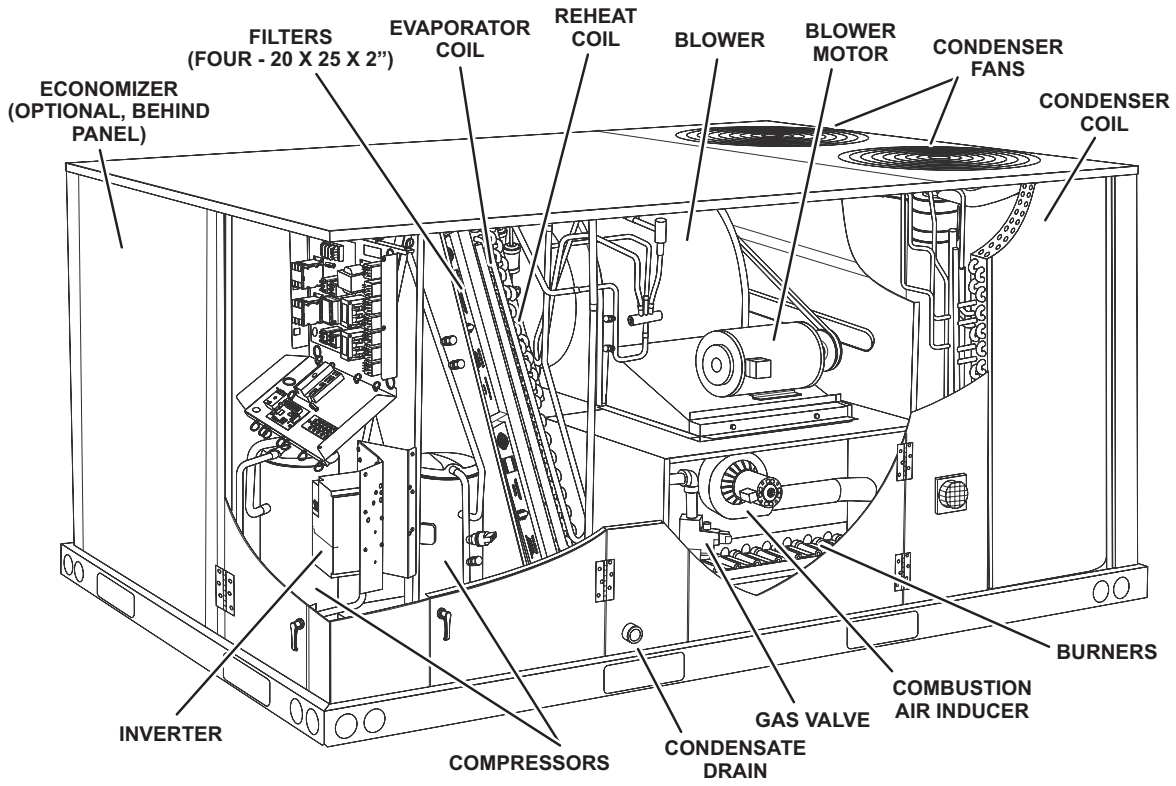


FIGURE 1

KGC Control Box Y, G, J Volt Units

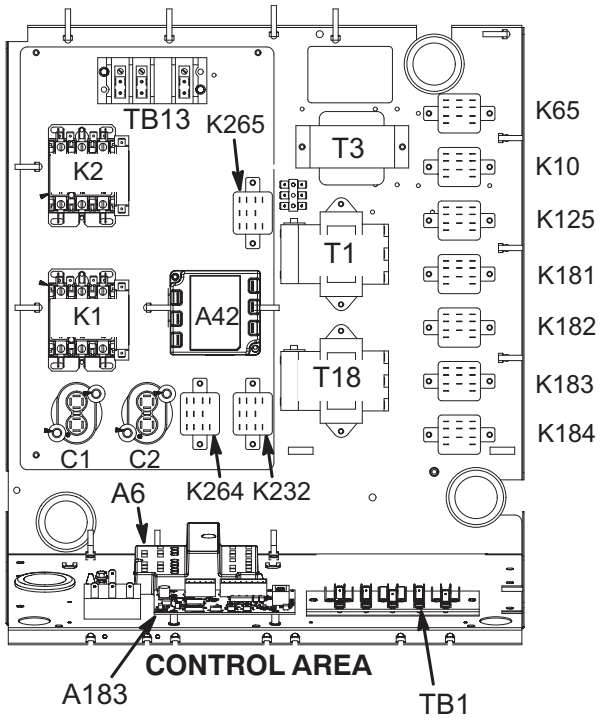


FIGURE 2

I-UNIT COMPONENTS

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

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

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

A-Control Box Components

KGC control box components are shown in FIGURE 2. The control box is located in the upper portion of the compressor compartment.

1-Disconnect Switch S48

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 use a single line voltage to 24VAC transformer installed in the control box. The 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.

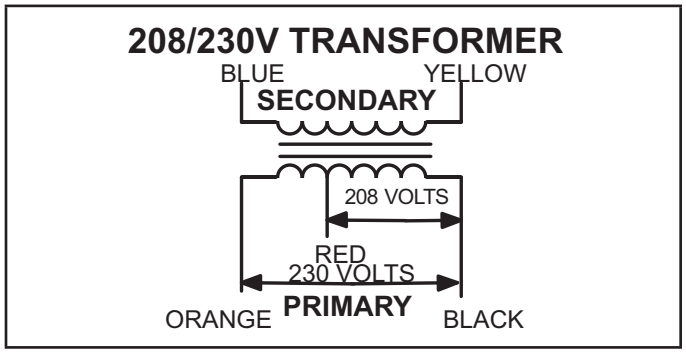


FIGURE 3

3-C. A. I. Transformers T3 575V Only

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

4-Terminal Strip TB1

All indoor thermostat connections are made at terminal block 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.

5-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.

6-Compressor Contactor K1 & K2

All compressor contactors are three-pole-double-break contactors with 24VAC coils. In all KGC units, K1 and K2 energize compressors B1 and B2 in response to thermostat demand. See FIGURE 4.

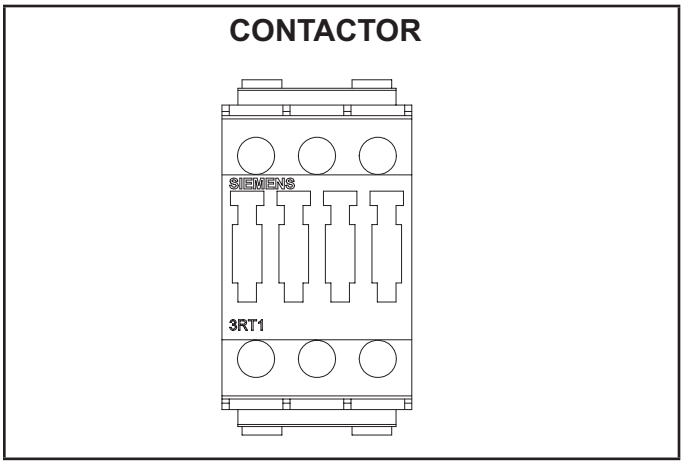


FIGURE 4

7-Blower Contactor K3

Blower contactor K3, used in all units, is a three-poledouble- 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. See FIGURE 4.

8-Condenser Fan Relay K10

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

9-Power Exhaust Relay K65 (PED units)

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

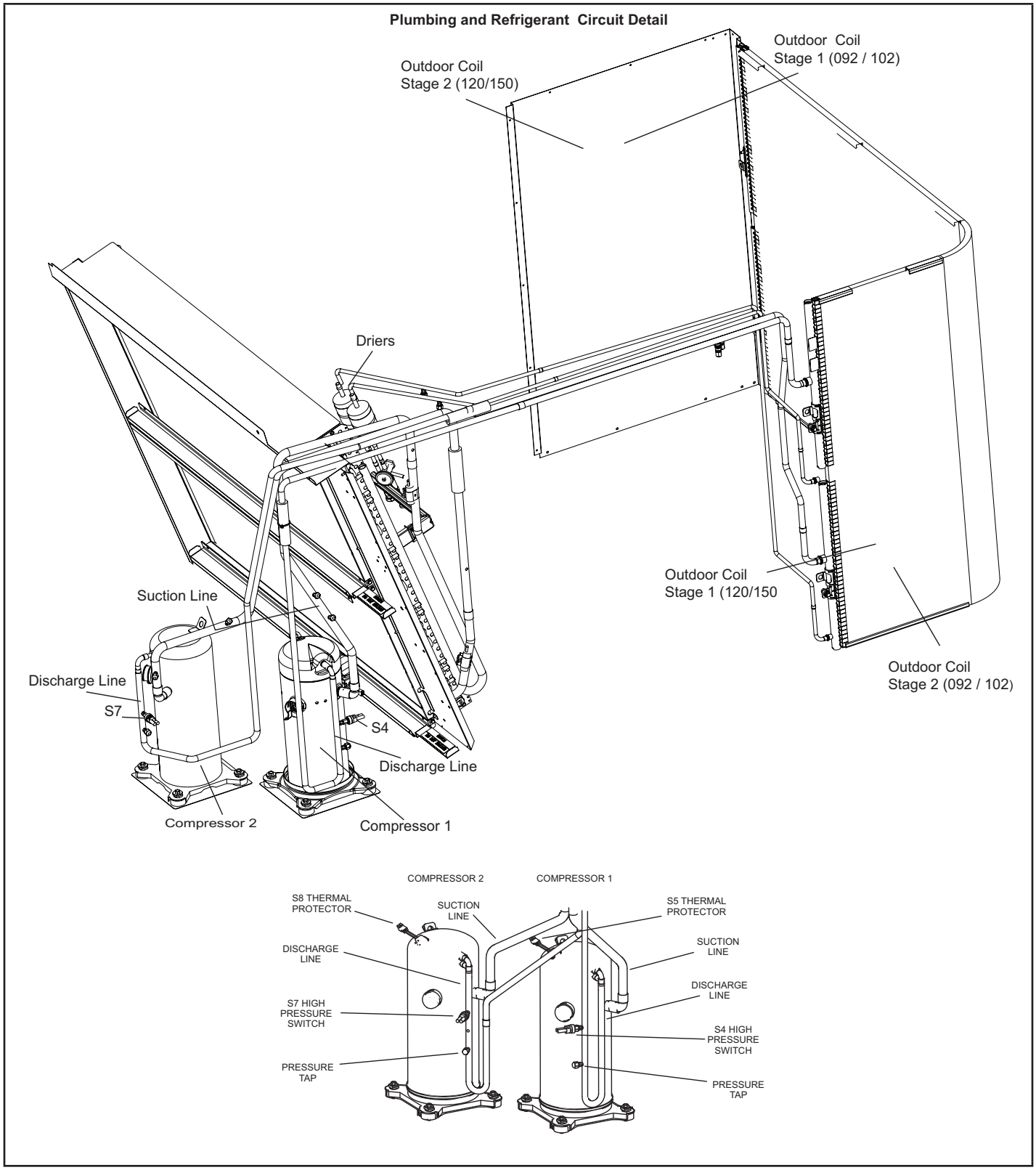

Plumbing and Refrigerant Circuit Detail
Outdoor Coil
Stage 2 (120/150)
Outdoor Coil
Stage 1 (092 / 102)
Driers
Outdoor Coil
Stage 1 (120/150
Outdoor Coil
Stage 2 (092 / 102)
Suction Line
Discharge Line
S7
S4
Discharge Line
Compressor 2
Compressor 1
COMPRESSOR 2
COMPRESSOR 1
S8 THERMAL PROTECTOR
SUCTION LINE
S5 THERMAL PROTECTOR
DISCHARGE LINE
SUCTION LINE
DISCHARGE LINE
S7 HIGH PRESSURE SWITCH
S4 HIGH PRESSURE SWITCH
PRESSURE TAP
PRESSURE TAP

FIGURE 5

KGC WITH OPTIONAL REHEAT
KGC092 - 150 Shown

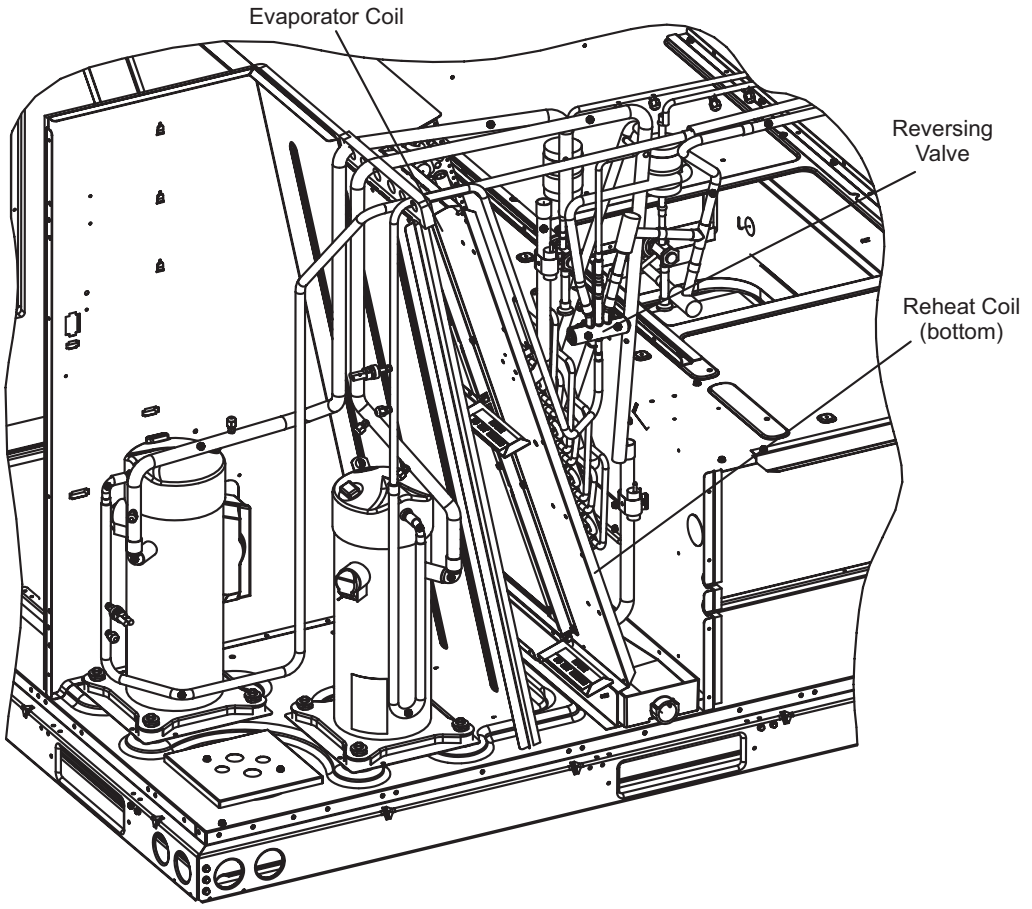


FIGURE 6

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See FIGURE 5 and FIGURE 6. Two draw-through-type condenser fans are used in KGC 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. Each evaporator uses a thermostatic expansion valve as the primary refrigerant device.

KGC150 Evaporators use a thermostatic expansion valve as primary refrigerant metering device. KGC092/102/120 use thermostatic expansion valve on stage one and orifices on stage 2. The evaporators are slab-type and are stacked. 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). On 150 units, each compressor is protected by a crankcase heater.

1-Compressors B1 and B2

All 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 coverover terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Each compressor is energized by a corresponding compressor contactor.

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

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

⚠ IMPORTANT

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

2-Thermal Protectors S5, S8

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

3-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 are wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 12 psig (4413 ± 138 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 Kit (field installed)

The Low ambient kit is field installed. This kit has a temperature switch and a head pressure controller. This kit allows mechanical cooling operation by maintaining liquid pressures at low outdoor temperatures, by stopping or slowing the outdoor fans.

Liquid line pressure switches (A188 & A189) will de-energize condenser fans below 355 psig, preventing low ambient operation. Liquid line pressure transducers are installed to convert the pressure to an analog signal which is sent to the head pressure controller (A190). The head pressure controller provides a variable output which slows condenser fan operation at lower ambient temperatures (A190 terminal M to K10 normally open contacts). Lower fan speeds increase the liquid line pressure, allowing operation above 355 psig.

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.

7- Filter Drier

Units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each condenser coil. The drier removes contaminants and moisture from the system.

8- Condenser Fans B4, B5

See SPECIFICATIONS tables at the front of this manual for specifications of condenser fans used in all units. All condenser fans used have single-phase motors. The fan assembly may be removed for servicing and cleaning.

C-Blower Compartment

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

The blower compartment in all 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.

1-Blower Wheels

All 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 and Adjustments

A-Three Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

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

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

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

3 - Disconnect all remote electrical power supplies.

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

5 - Make sure the connections are tight.

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

Supply Air Inverter Units - Units are equipped with a phase monitor located in the control compartment. The phase monitor will detect the phasing of incoming power.

If the incoming power is out of phase or if any of the three phases are lost, the indicating LED on the phase monitor will turn red and the unit will not start. In normal operation with correct incoming power phasing, the LED will be green.

B-Blower Operation

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

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

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

C-Blower Access

The blower assembly is secured to a sliding frame which allows the blower motor to be pulled out of the unit. See figure 10.

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

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

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

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

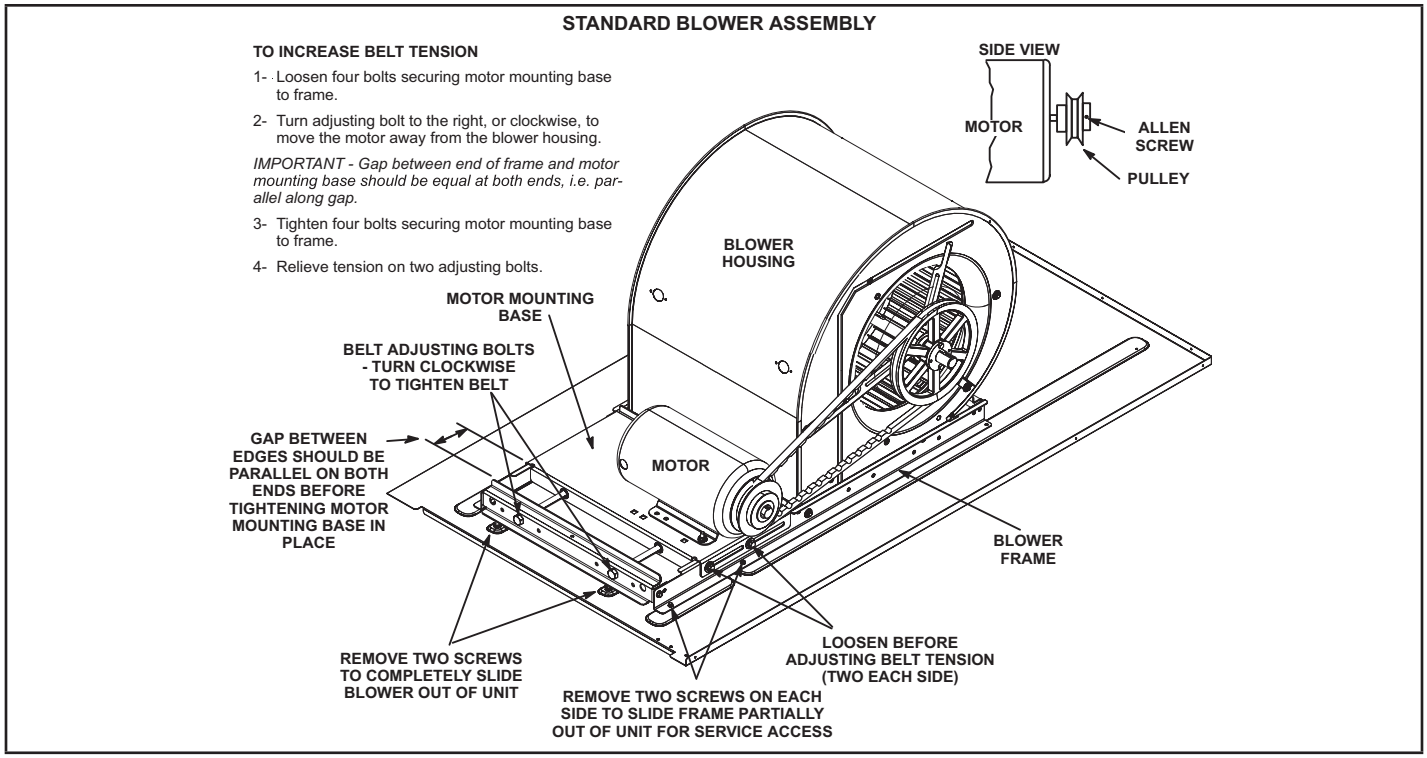


FIGURE 7

D-Determining Unit CFM

IMPORTANT - *Units equipped with an inverter are factoryset to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Use the following procedure to adjust motor pulley to deliver the full load cooling or heating CFM. See Inverter Start-Up section to set blower CFM for all modes once the motor pulley is set.*

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). Blower performance data is based on static pressure readings taken in locations shown in FIGURE 8.

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

3 - Refer to BLOWER DATA (table of contents) and use static pressure and RPM readings to determine unit CFM.

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 7. 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	0	5
B Section	1*	6

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

E-Blower Belt Adjustment

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belts after a 24-48 hour period of operation. This will allow belt to stretch and seat in the pulley grooves. Make sure blower and motor pulleys are aligned as shown in FIGURE 9.

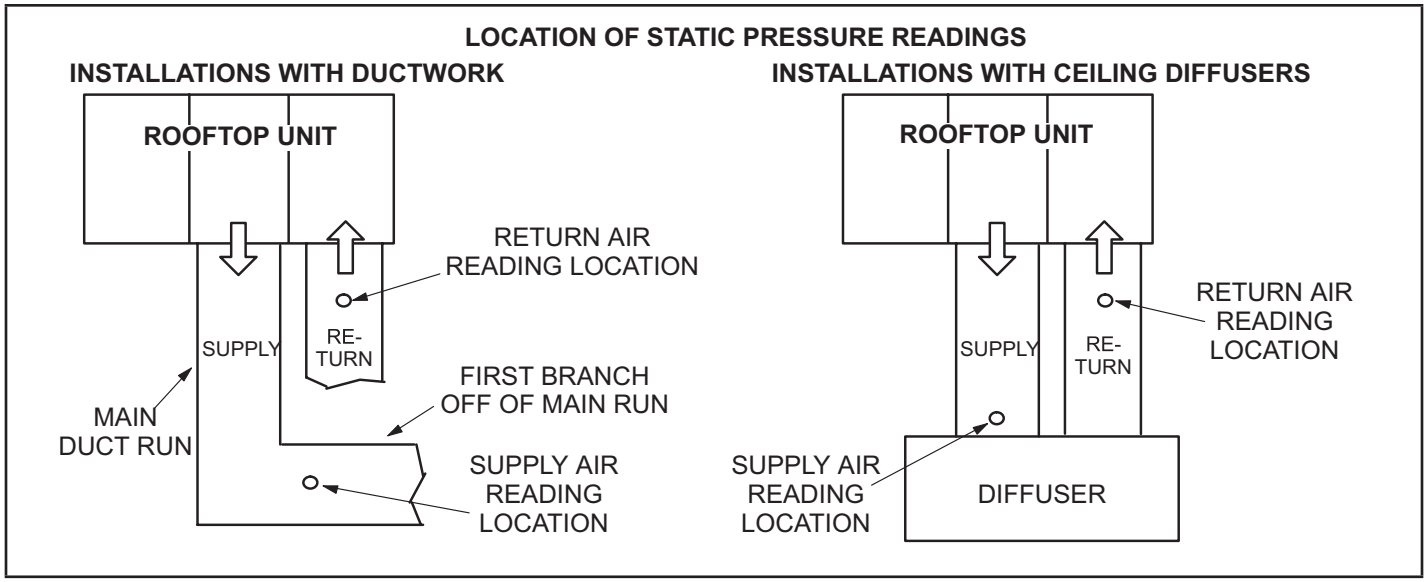


FIGURE 8

1 - Loosen four bolts securing motor base to mounting frame. See FIGURE 7.

2 - *To increase belt tension -*

Turn both adjusting bolts to the right, or clockwise, to move the motor outward and tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -

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

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

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

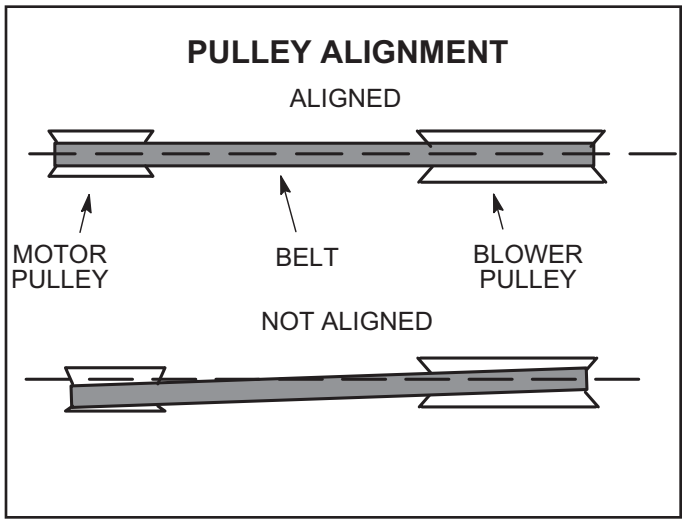


FIGURE 9

F-Check Belt Tension

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

1 - Measure span length X. See FIGURE 10.

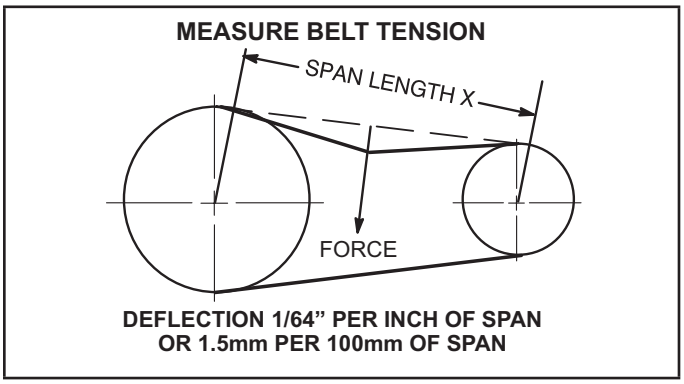


FIGURE 10

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

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

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

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

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

G-Field-Furnished Blower Drives

See BLOWER DATA for field-furnished blower drives to determine BHP and RPM required. Reference TABLE 2 MANUFACTURER'S NUMBERSfor drive component manufacturer's numbers

TABLE 2
MANUFACTURER'S NUMBERS

DRIVE NO.	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELT	
	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.	BROWNING NO.	OEM PART NO.
1	1VP34x7/8	31K6901	AK61x1	100244-20	AX54	100245-25
2	1VP40x7/8	79J0301	AK59x1	31K6801	AX55	100245-26
3	1VP34x7/8	31K6901	AK46x1	100244-17	AX52	100245-33
4	1VP44x7/8	53J9601	AK74x1	100244-21	AX58	100245-34
5	1VP50x7/8	98J0001	AK69x1	37L4701	AX58	100245-34
6	1VP50x7/8	98J0001	AK64x1	12L2501	AX57	100245-28
10	1VP50x1-1/8	P-8-1977	BK77x1	49K4001	BX59	59A5001
11	1VP50x1-1/8	P-8-1977	BK67x1	100244-24	BX57	78L5301
12	1VP50x1-1/8	P-8-1977	BK62x1	100244-23	BX56	100245-11

D-GAS HEAT COMPONENTS

KGC units are available in 130,000 BTUH (38.1 kW), 180,000 BTUH (52.7 Kw) or 240,000 BTUH (70.3 kW) heat sizes.

1-Heat Exchanger (FIGURE 11)

The KGC units use aluminized steel inshot burners with matching tubular aluminized steel heat exchangers and two-stage redundant gas valves. Units use two six tube/burners for standard heat, two nine tube/burners for medium heat and two eleven tube/burners for high heat. Burners in all units use a burner venturi to mix gas and air for proper combustion. Combustion takes place at each tube entrance. As hot combustion gases are drawn upward through each tube by the combustion air inducer, exhaust gases are drawn out the top and fresh air/gas mixture is drawn in at the bottom. Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blowers force air across all surfaces of the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange.

The gas valves accomplish staging by allowing more or less gas to the burners as called for by heating demand.

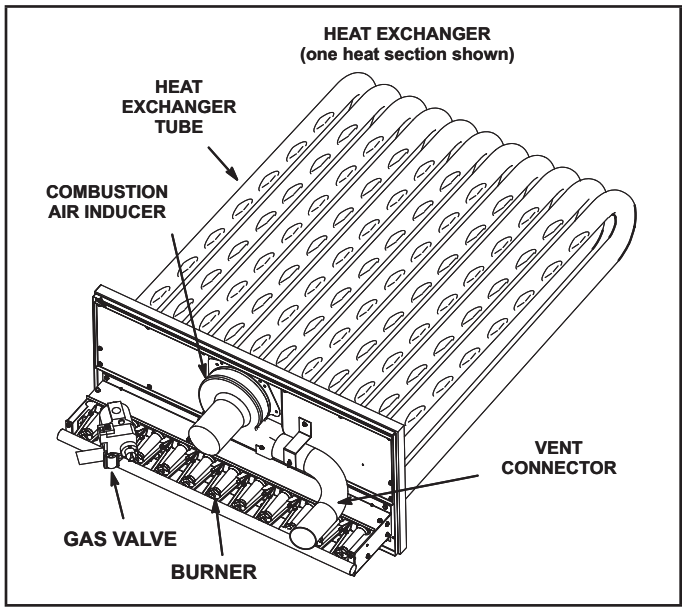


FIGURE 11

2-Burner Box Assembly (FIGURE 12)

The burner assembly consists of a spark electrode, flame sensing electrode and gas valve. Ignition board A3 controls all functions of the assembly.

Burners

All units use inshot burners. Burners are factory set and do not require adjustment. A peep hole with cover is furnished in the heating access panel for flame viewing. Always operate the unit with the access panel in place.

Burners can be removed individually for service. Burner maintenance and service is detailed in the SERVICE CHECKS section of this manual.

Orifice

Each burner uses an orifice which is precisely matched to the burner input. The orifice is threaded into the burner manifold. The burner is supported by the orifice and will easily slide off for service.

NOTE - *Do not use thread sealing compound on the orifices. Using thread sealing compound may plug the orifices.*

Each orifice and burner are sized specifically to the unit. Refer to Product Zone @ www.davenet.com for correct sizing information.

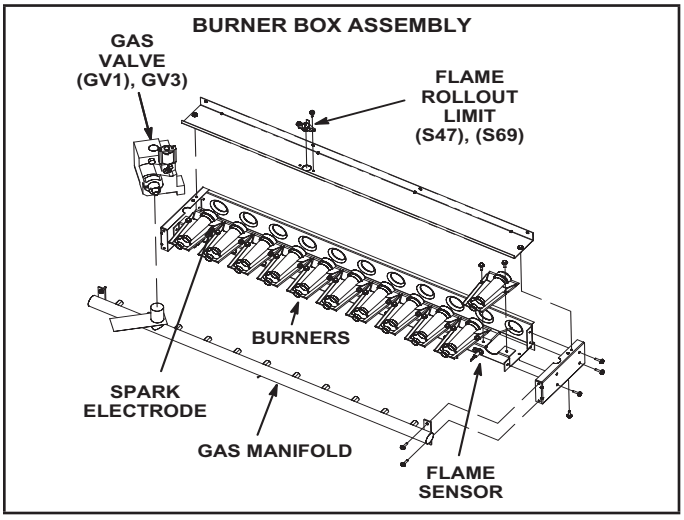


FIGURE 12

3-Flame Rollout Limits S47

Flame rollout limit S47 is a SPST N.C. high temperature limits located just above the burner air intake opening in the burner enclosures (FIGURE 12). S47 is wired to the ignition control A3. When S47 senses flame rollout (indicating a blockage in the combustion air passages), the ignition control immediately closes the gas valve.

Limit S47 is factory preset to open at 290°F ± 12°F (143C ± 6.7C) on a temperature rise in all units. All flame rollout limits are manual reset.

4-Primary High Temperature Limit S10

S10 is a SPST N.C. high-temperature primary limit for gas heat in all units. S10 is located next to the blower. See FIGURE 13.

Primary limit S10 is wired to the ignition control A3. Its N.C. contacts open to de-energize the ignition control when excessive temperature is reached in the blower compartment. If the limit trips, the blower relay coil K3 will be energized by ignition control A3. Three limits with different actuating temperatures are used for limits S10. Use appropriate limit when replacement is required.

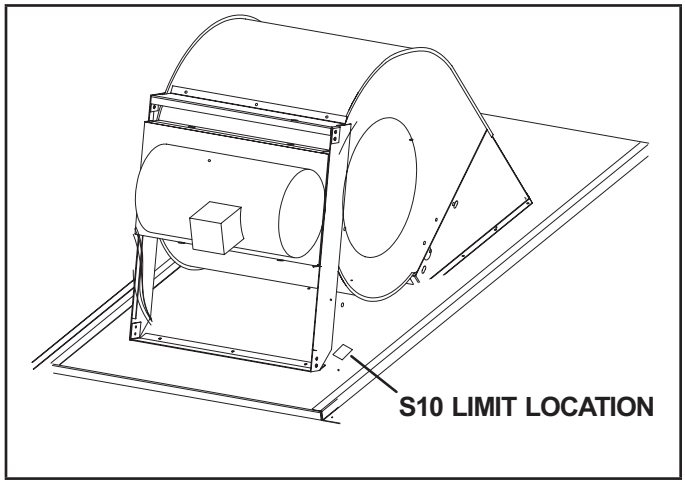


FIGURE 13

5-Combustion Air Prove Switches S18

Prove switch S18 is a SPST N.O. switch located to the right of the induced draft assembly. S18 monitors combustion air inducer operation. Switch S18 is wired to the ignition control A3. The switch closes on a negative pressure fall. This negative pressure fall and switch actuation allows the ignition sequence to continue (proves, by closing, that the combustion air inducer is operating before allowing the gas valve to open.) The combustion air prove switch is factory-set and is not adjustable. The switch will automatically open on a pressure rise (less negative pressure). TABLE 3 shows prove switch settings.

TABLE 3

S18 Prove Switch Settings

Close“ wc (Pa)	Close“ wc (Pa)
0.25 ± 5 (62.3+12.4)	0.10+5 (24.8±12.4)

6-Combustion Air Inducers B6

Combustion air inducers on KGC units provide air to the corresponding burners while clearing the combustion chamber of exhaust gases. The inducer begins operating immediately upon receiving a thermostat demand and is de-energized when thermostat demand is satisfied.

The inducer uses a 208/230V single-phase PSC motor and a 4.81in. x 1.25in. (122mm x 32mm) blower wheel. All motors operate at 3200RPM and are equipped with autoreset overload protection. Inducers are supplied by various manufacturers. Ratings may vary by manufacturer.

Specific inducer electrical ratings can be found on the unit rating plate. On a heating demand (W1), the ignition control A3 initiates the heating cycle. A3 then allows 30 seconds for the combustion air inducer to vent exhaust gases from the burners.

When the combustion air inducer is purging the exhaust gases, the combustion air prove switch closes, proving that the combustion air inducer is operating before allowing the ignition sequence to continue. When the combustion air prove switch is closed and the delay is over, the ignition control activates the first-stage operator of the gas valve (low fire), the spark and the flame sensing electrode.

Sparking stops immediately after flame is sensed or at the end of the eight-second trial for ignition. All combustion air inducer motors are sealed and cannot be oiled. The inducer is not adjustable; but, it can be disassembled for cleaning.

7-Combustion Air Motor Capacitors C3

The combustion air inducer motors in all KGC units require run capacitors. Capacitor C3 is connected to combustion air inducer B6. Ratings will be on the side of capacitor or combustion air motor nameplate.

8-Gas Valves GV1

Gas valve GV1 is a two-stage redundant valve. Units are-equipped with valves manufactured by White-Rodgers orHoneywell. On a call for first-stage heat (low fire), the valve is energized by the ignition control simultaneously with the spark electrode. On a call for second-stage heat (high fire), the second- stage operator is energized directly from A3. A manual shut-off knob is provided on the valve for shutoff. The manual shut-off knob immediately closes both stages without delay. On both valves, the first stage (low fire) is quick-opening (on and off in less than 3 seconds).

On the White-Rodgers valve, the second stage is slow-opening (on to high fire pressure in 40 seconds and off to low fire pressure in 30 seconds). The White-Rodgers valve is adjustable for high fire only. Low fire is not adjustable. On the Honeywell valve, the second stage is quick-opening. .

TABLE 4

GAS VALVE REGULATION FOR KGC UNITS				
Max Inlet Pressure	Operating Pressure (outlet) Factory Setting (“WC)			
	Natural		L.P	
	Low	High	Low	High
13.0”W.C.	1.6±0.2	3.7±0.3	5.5±0.3	10.5±0.5

9-Spark Electrodes

An electrode assembly is used for ignition spark. The electrode is inserted through holes under the left-most burner.

The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

During ignition, spark travels through the spark electrode (FIGURE 14) and ignites the left burner. Flame travels from burner to burner until all are lit.

The spark electrode is connected to the ignition control by an 8 mm silicone-insulated, stranded, high-voltage wire. The wire uses a 1/4” (6.35 mm) female quick connect on both ends of the wire.

NOTE - *If the electrode wire is replaced, wire and suppression must be same type of cable. See repair parts listing for correct replacement*.

The spark electrode assembly can be removed for inspection by removing the screw securing the electrode assembly and sliding it out of unit.

For proper unit operation, electrodes must be positioned

and gapped correctly. Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125” + 0.015” (3.2 mm + .4 mm). See FIGURE 14.

NOTE - *IN ORDER TO MAXIMIZE SPARK ENERGY TO ELECTRODE, HIGH-VOLTAGE WIRE SHOULD TOUCH UNIT CABINET AS LITTLE AS POSSIBLE.*

⚠ IMPORTANT

In order to maximize spark energy to electrode, high voltage wire should touch unit cabinet as little as possible

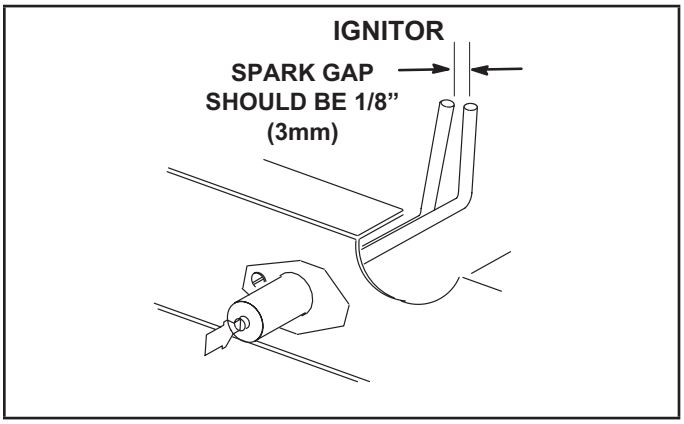


FIGURE 14

10-Flame Sensor FIGURE 15

A flame sensor is located under the left most side burner. The sensor is mounted through a hole in the burner support and the tip protrudes into the flame envelope of the left most burner. The sensor assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

When flame is sensed by the flame sensor (indicated by microamp signal through the flame) sparking stops immediately or after the eight second trial for ignition. During operation, flame is sensed by current passed along the ground electrode (located on the spark electrode), through the flame and into the sensing electrode. The ignition control allows the gas valve to stay open as long as a flame signal (current passed through the flame) is sensed.

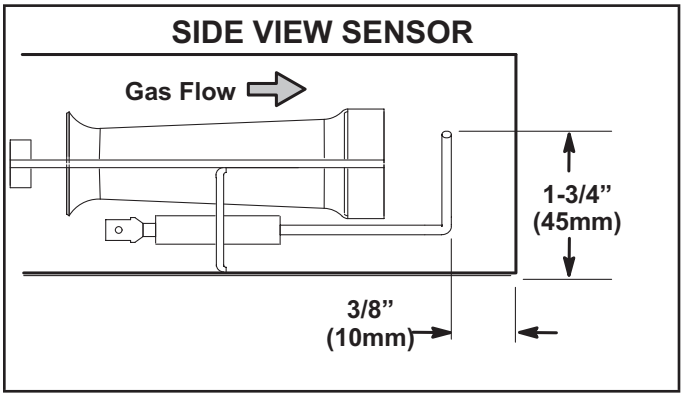


FIGURE 15

INTEGRATED CONTROL BOARD A3

11-Burner Control A3

⚠ 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.

The burner control A3 is located in the gas heat section. See FIGURE 17.

The ignition control provides four main functions: gas valve control, blower control, ignition and flame sensing.

The control has a green LED to show control status (TABLE 5). The unit will usually ignite on the first trial and A3 allows three trials for ignition before locking out. The lockout time is 1 hour. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires removing power from the control for more than 1 second or removing the thermostat call for heat for more than 1 second but no more than 20 seconds. 24 volt thermostat connections (P2) and heating component connections (J1) are made through separate jackplugs. See TABLE 6 for thermostat terminations and TABLE 7 for heating component terminations

TABLE 5

LED	STATUS
Slow Flash	Normal operation. No call for heat
Fast Flash	Normal operation. Call for heat
Steady Off	Internal Control Fault, No Power To Board or Gas Valve Relay Fault
Steady On	Control Internal Failure
2 Flashes	Lockout. Failed to detect or sustain flame
3 Flashes	Rollout switch open / Prove switch open or closed
4 Flashes	Primary High Limit switch open
5 Flashes	Flame sensed but gas valve not open.
6 Flashes	On Board Microprocessors Disagree

TABLE 6

P2 TERMINAL DESIGNATIONS	
PIN #	**Function**
1	**R** 24 Volts to thermostat
2	**W1** Heat Demand
3	**Y** Cool Demand
4	**C** Common
5	**G** Indoor Blower
6	**BL OUT** Indoor Blower Relay
7	**W2** Second Stage Heat

TABLE 7

J1 TERMINAL DESIGNATIONS	
PIN #	**Function**
1	Limit Switch Out
2	Rollout Switch / Prove Switch Out
3	Gas Valve Common
4	Gas Valve Out
5	Rollout Switch / Prove Switch In
6	Limit Switch In

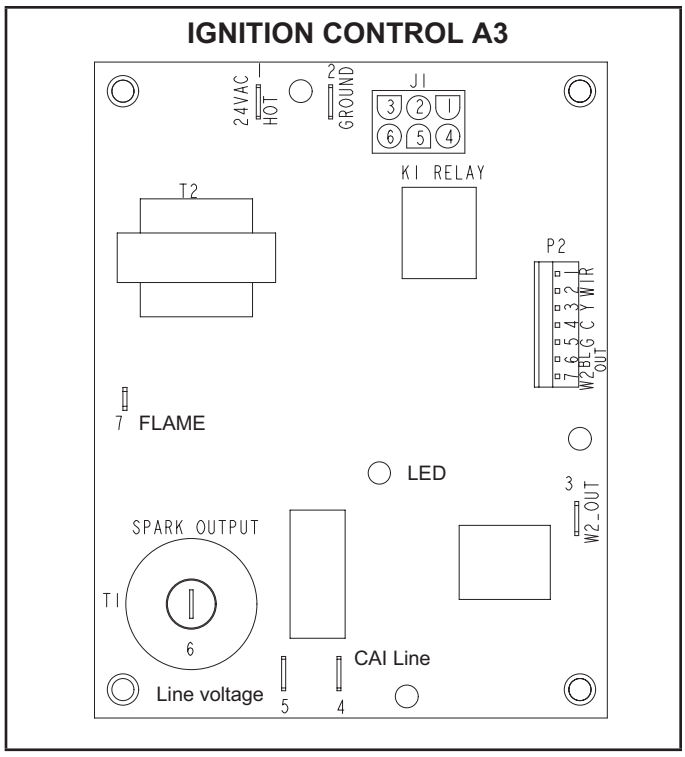


FIGURE 16

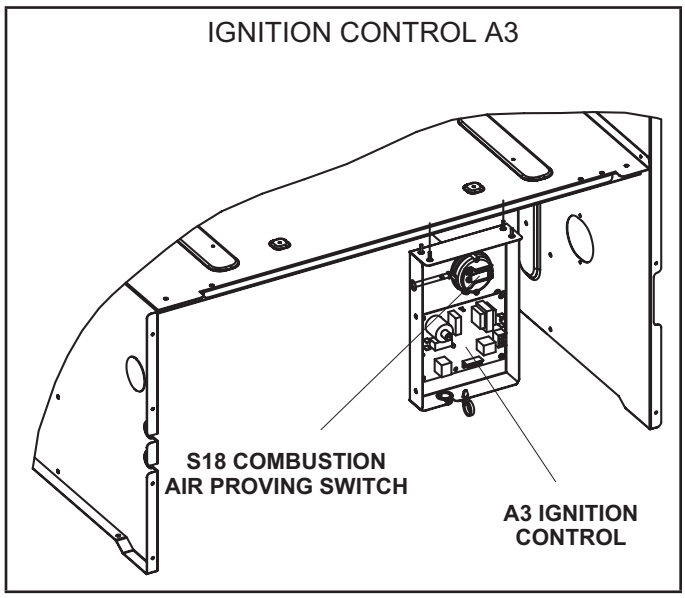


FIGURE 17

Flame rectification sensing is used on all KGC units. Loss of flame during a heating cycle is indicated by an absence of flame signal (0 microamps). If this happens, the control will immediately restart the ignition sequence and then lock out if ignition is not gained after the third trial. See System Service Checks section for flame current measurement.

The control shuts off gas flow immediately in the event of a power failure. Upon restoration of gas and power, the control will restart the ignition sequence and continue until flame is established or system locks out.

Operation

On a heating demand, the ignition control checks for a closed limit switch and open combustion air prove switch. Once this check is complete and conditions are correct, the ignition control then allows 30 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch closes proving that the combustion air inducer is operating before allowing the ignition control to energize.

When the combustion air prove switch is closed and the delay is over, the ignition control activates the gas valve, the spark electrode and the flame sensing electrode.

Once the gas valve is energized, the non-adjustable 40-second indoor blower delay period begins. Sparking stops immediately after flame is sensed or at the end of the 8-second trial for ignition.

The control then proceeds to “steady state” mode where all inputs are monitored to ensure the limit switch, rollout switch and prove switch are closed as well as flame is present. When the heat call is satisfied and the gas valve is de-energized, a combustion air inducer post purge period of 5 seconds begins along with a 120-second blower off delay.

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.

III-STARTUP - OPERATION

Refer to startup directions and to the unit wiring diagram when servicing. See unit nameplate for minimum circuit ampacity and maximum fuse size.

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 control box cover.

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 (if applicable) or TB2. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

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

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

B-Heating Startup

FOR YOUR SAFETY READ BEFORE LIGHTING

⚠ WARNING

Electric shock hazard. Can cause injury or death. Do not use this unit if any part has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.

BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, do not try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

This unit is equipped with an automatic spark ignition system. There is no pilot. In case of a safety shutdown, move thermostat switch to **OFF** and return the thermostat switch to **HEAT** to reset ignition control.

⚠ WARNING

Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

⚠ 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.

⚠ WARNING

SMOKE POTENTIAL

The heat exchanger in this unit could be a source of smoke on initial firing. Take precautions with respect to building occupants and property. Vent initial supply air outside when possible.

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

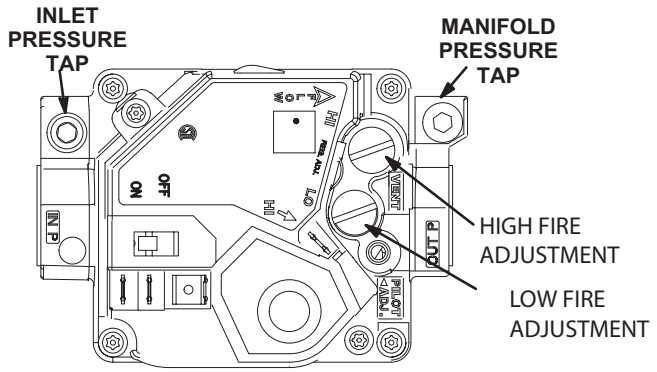
C-Placing Unit In Operation

⚠ WARNING

Danger of explosion and fire. Can cause injury or product or property damage. You must follow these instructions exactly.

Gas Valve Operation FIGURE 18 and FIGURE 19

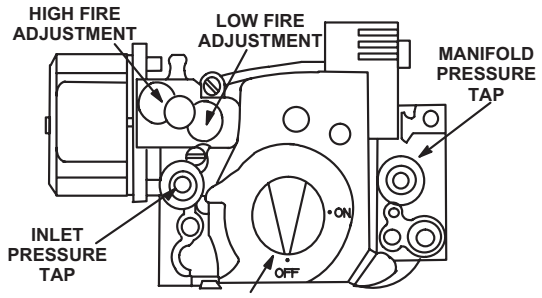
WHITE RODGERS 36H54 GAS VALVE



GAS VALVE SWITCH SHOWN IN **ON** POSITION.

FIGURE 18

HONEYWELL VR8205Q/VR8305Q GAS VALVE



Gas valve knob is shown in **OFF** position.

FIGURE 19

1 - Set thermostat to lowest setting.

2 - Turn off all electrical power to appliance.

3 - This appliance is equipped with an ignition device which automatically lights the burner. **Do not** try to light the burner by hand.

4 - Open or remove the heat section access panel.

5 - Turn gas valve switch to OFF. See FIGURE 18. On Honeywell VR8305Q gas valves, turn the knob on the gas valve clockwise to “OFF”. Do not force. See FIGURE 19.

6 - Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP!** Immediately call your gas supplier from a neighbor’s phone. Follow the gas supplier’s instructions. If you do not smell gas, go to the next step.

7 - Turn gas valve switch to ON. See FIGURE 18. On Honeywell VR8305Q gas valves, turn the knob on the gas valve counter clockwise to “ON”. Do not force. See FIGURE 19.

8 - Close or replace the heat section access panel.

9 - Turn on all electrical power to appliance.

10 - Set thermostat to desired setting.

11 - The ignition sequence will start.

12 - If the appliance does not light the first time (gas line not fully purged), it will attempt up to two more ignitions before locking out.

13 - If lockout occurs, repeat steps 1 through 10.

14 - If the appliance will not operate, follow the instructions

15 - “Turning Off Gas to Appliance” and call your service technician or gas supplier.

Turning Off Gas to Unit

1 - If using an electromechanical thermostat, set to the lowest setting.

2 - Before performing any service, turn off all electrical power to the appliance.

3 - Open or remove the heat section access panel.

4 - Turn gas valve switch to OFF. See FIGURE 18. On Honeywell VR8305Q gas valves, turn the knob on the gas valve clockwise to “OFF”. Do not force. See FIGURE 19.

5 - Close or replace the heat section access panel.

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has a direct spark ignition system.

D-Safety or Emergency Shutdown

Turn off power and main manual shut off valve to unit.

E - Cooling Start Up

⚠ IMPORTANT

If unit is equipped with a crankcase heater. Make sure heater is energized 24 hours before unit start- up to prevent compressor damage as a result of slugging.

Supply Air Inverter Units - Refer to the Inverter Start-Up section for further instruction on blower control.

Compressor 1 is a two-stage compressor. Compressor 2 is a single-stage compressor.

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

2 - No Economizer Installed in Unit -

See table 8 for cooling operation.

Units Equipped With Economizer -

When outdoor air is suitable, any combination of thermostat demands will energize the economizer. See TABLE 9 COOLING OPERATION - WITH ECONOMIZER for cooling operation.

TABLE 8
COOLING OPERATION - NO ECONOMIZER

T'Stat	Compressors	OD Fans
Y1	Compr. 1 Low	Both On
Y1 + Y2	Compr. 1 Low; Compr. 2 On	Both On
Y1 + Y2 + Y3	Compr. 1 High; Compr. 2 On	Both On

TABLE 9
COOLING OPERATION - WITH ECONOMIZER

T'Stat	Compressors	OD Fans
Y1	Off	Off
Y1 + Y2	Compr. 1 Low	Both On
Y1 + Y2 + Y3	Compr. 1 High	Both On

3 - Units contain two refrigerant circuits or stages. See FIGURE 20 and FIGURE 21.

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

5 - Refer to Cooling Operation and Adjustment section for proper method to check refrigerant charge

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

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

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

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

3 - Disconnect all remote electrical power supplies.

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

5 - Make sure the connections are tight.

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

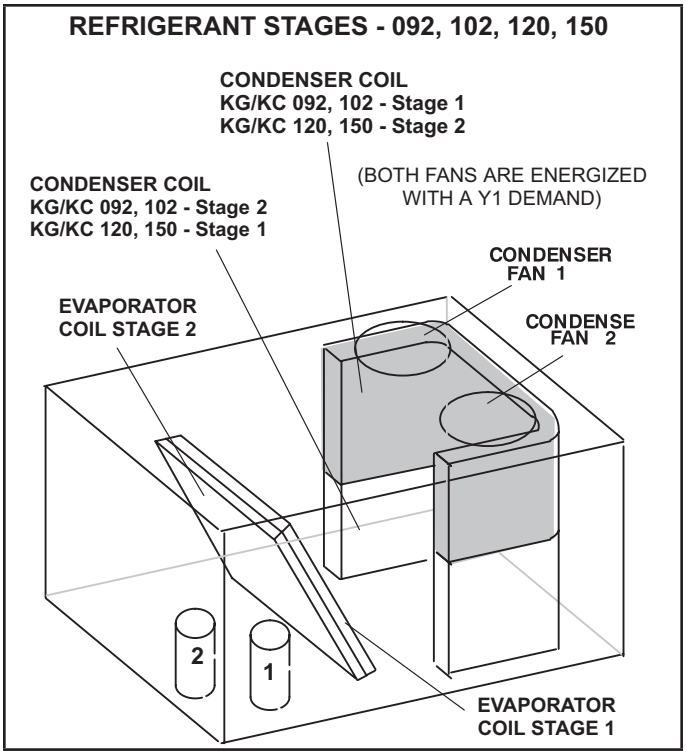


FIGURE 20

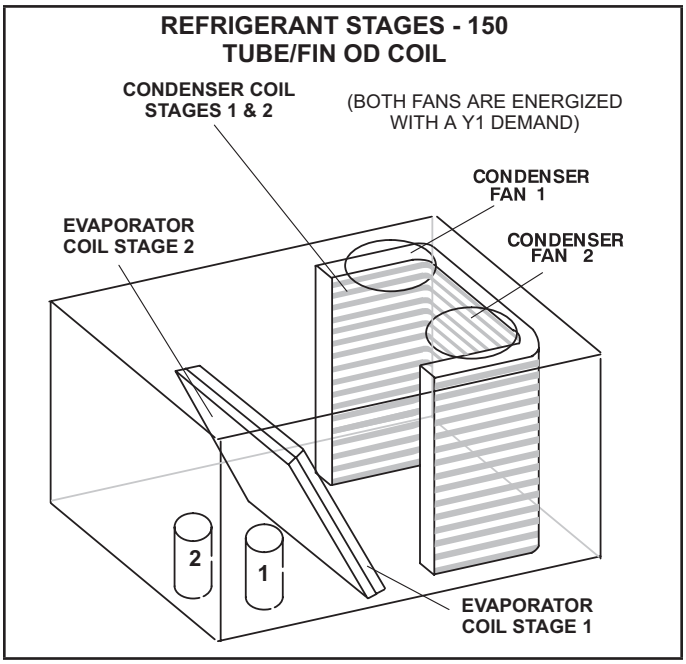


FIGURE 21

IV-CHARGING

A-All Aluminum Outdoor Coil

⚠ WARNING

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

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

WARNING - Do not exceed nameplate charge under any condition.

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

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

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

IMPORTANT - Charge unit in standard cooling mode.

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

2 - Check each system separately with all stages operating. Compare the normal operating pressures (TABLE 10 581125-01to TABLE 13) to the pressures obtained from the gauges. Check unit components if there are significant differences.

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

NOTE - *Pressures are listed for sea level applications.*

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

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

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

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

7 - Example KG/KC 092S Circuit 1: At 95°F outdoor ambient and a measured suction pressure of 130psig, the target liquid temperature is 94.4°F. For a measured liquid temperature of 112°F, add charge in increments until measured liquid temperature agrees with the target liquid temperature.

TABLE 10 581125-01

KG/KC 092S Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	99	247	102	293	105	341	108	393	111	448	113	506
	106	249	109	293	112	341	116	392	119	446	122	503
	120	256	124	298	128	344	132	392	136	444	140	499
	135	267	141	308	146	351	151	397	156	447	161	500
Circuit 2	115	246	118	282	121	322	124	366	127	413	130	464
	121	250	125	287	129	327	133	371	136	419	140	470
	132	257	137	295	143	336	148	382	153	430	158	483
	141	265	148	304	155	346	161	393	167	443	173	496

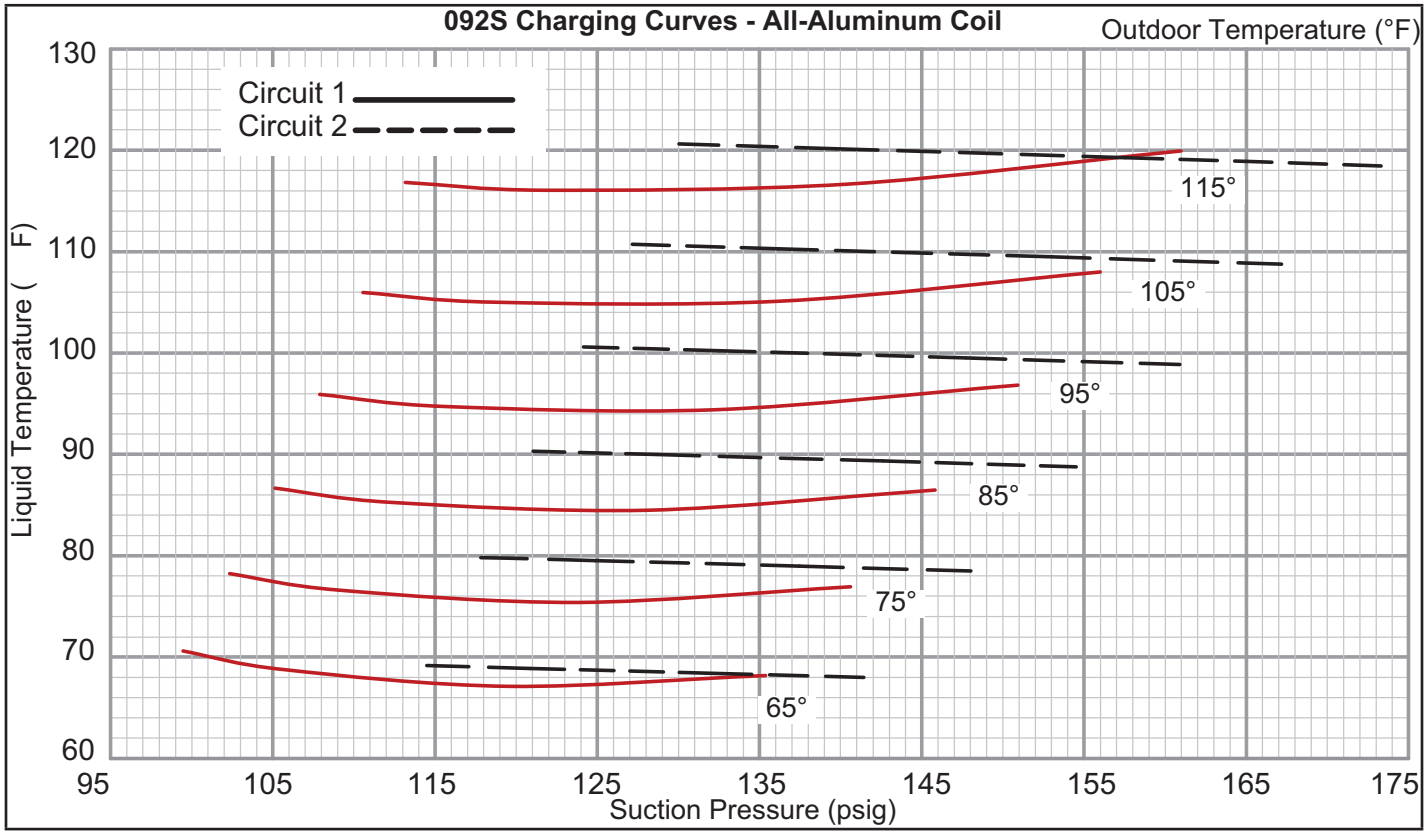


TABLE 11 581126-01

KG/KC 102S Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	100	245	103	288	106	337	109	390	112	449	115	513
	107	251	110	293	113	340	117	392	120	450	123	513
	122	262	126	301	130	345	134	395	138	450	141	510
	140	271	144	307	149	349	153	396	158	448	162	506
Circuit 2	110	262	113	300	115	342	118	388	121	439	124	493
	117	267	120	306	123	348	127	394	130	445	133	499
	130	278	134	317	138	359	143	406	147	457	151	511
	142	288	148	327	153	371	158	418	163	468	168	523

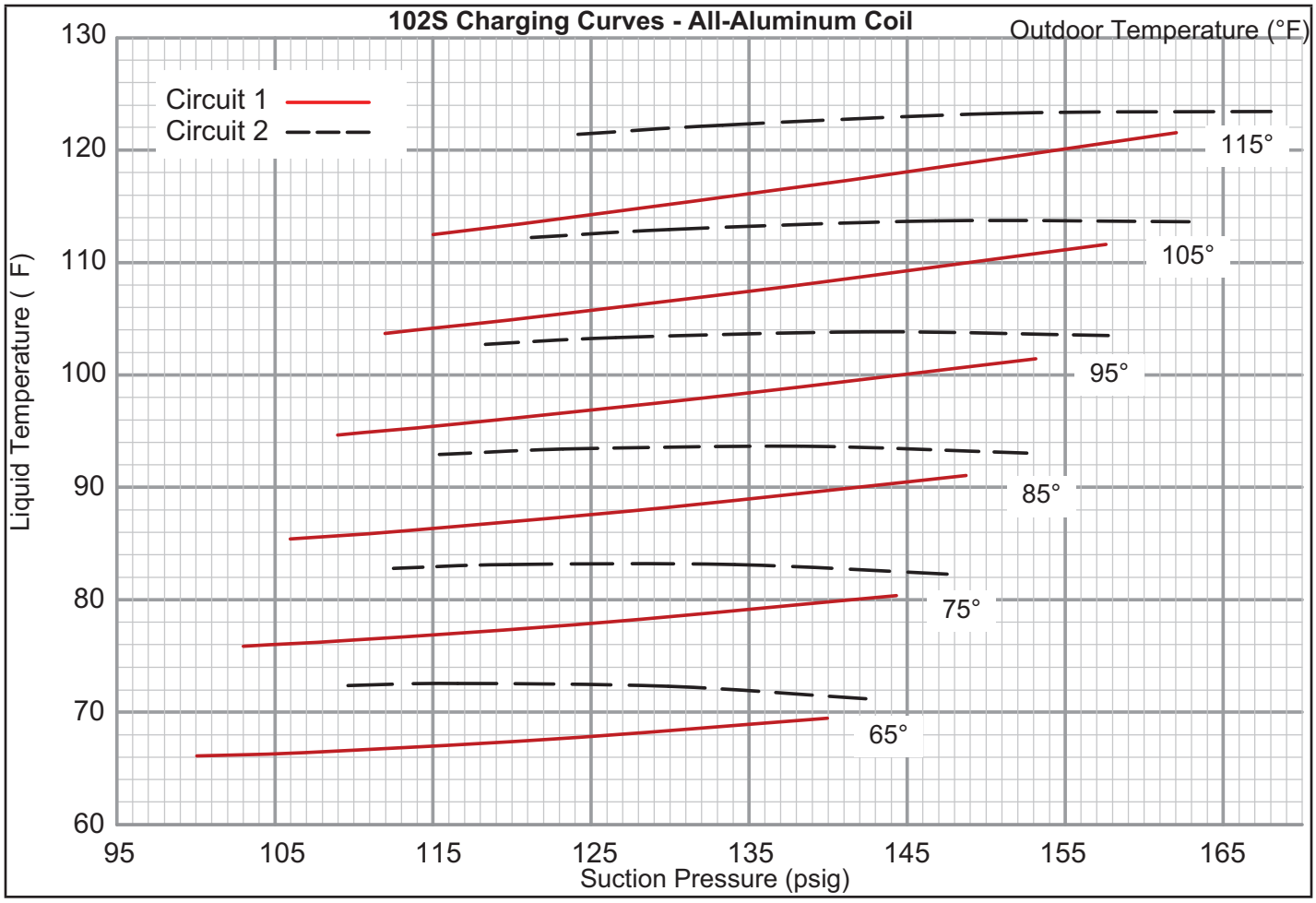


TABLE 12 581127-01

KG/KC 120S Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	103	255	106	306	109	366	111	434	113	511	114	598
	109	253	112	299	115	354	118	417	120	490	122	571
	123	265	127	301	131	346	134	400	137	463	140	534
	141	298	146	324	150	360	154	404	158	457	161	519
Circuit 2	110	248	115	284	119	324	123	370	126	422	129	479
	116	267	121	303	126	344	130	390	134	442	138	499
	128	292	134	328	139	370	144	417	149	469	153	527
	138	300	144	337	151	379	157	426	162	479	167	537

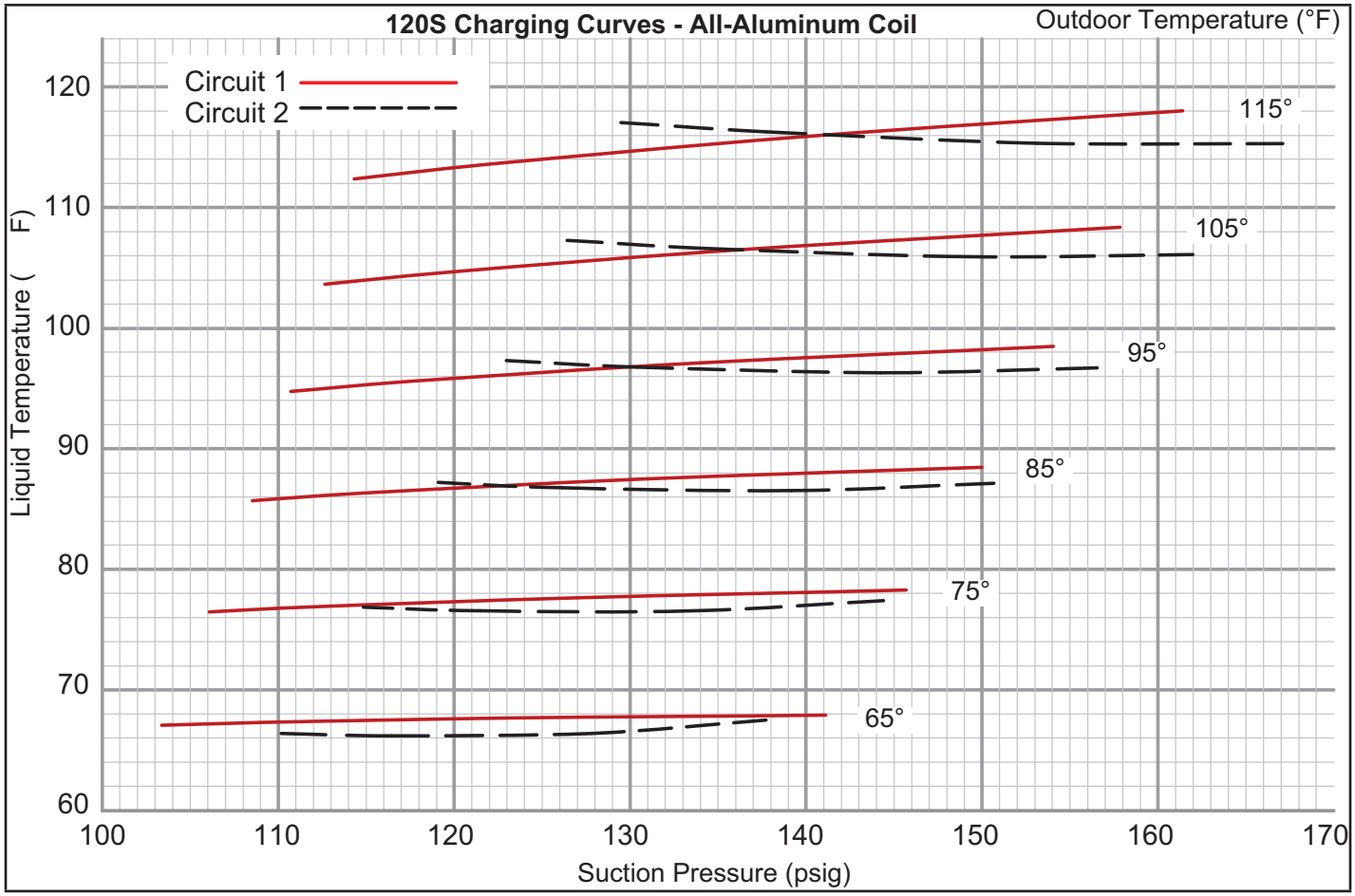
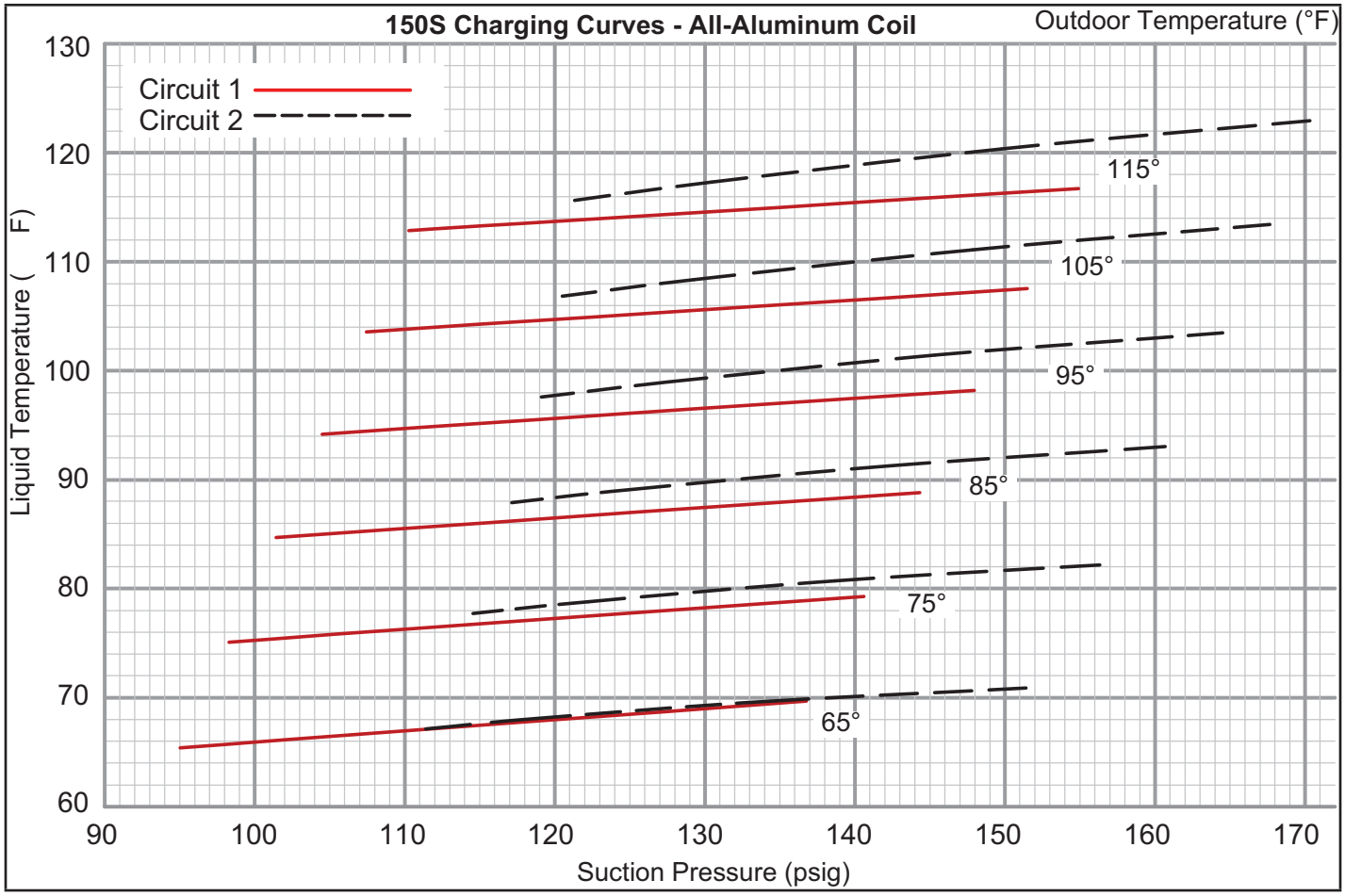


TABLE 13 581128-01

KG/KC 150S Normal Operating Pressures - All-Aluminum Coil												
	Outdoor Coil Entering Air Temperature											
	65°F		75°F		85°F		95°F		105°F		115°F	
	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)	Suct (psig)	Disc (psig)
Circuit 1	95	250	98	293	101	342	104	397	107	459	110	527
	102	253	105	295	109	343	112	397	115	458	118	525
	118	263	122	303	125	349	128	401	132	459	135	524
	137	279	141	316	144	360	148	410	151	466	155	529
Circuit 2	111	259	115	303	117	355	119	413	121	479	121	553
	119	260	122	302	125	351	128	407	129	471	130	542
	134	272	139	309	142	353	145	405	148	464	150	530
	151	296	156	329	161	368	165	415	168	469	170	531



B-Refrigerant Charge and Check - Fin/Tube Coil

WARNING - Do not exceed nameplate charge under any condition.

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

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

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

IMPORTANT - Charge unit in standard cooling mode.

1 - 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 TABLE 14 to TABLE 17 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 14 581129-01
KGC/KCC092S Fin/Tube - W & W/O Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ± 10 psig	Suction ± 5 psig	Discharge ± 10 psig	Suction ± 5 psig
65°F	270	128	255	140
75°F	310	131	295	146
85°F	352	133	338	151
95°F	401	136	388	155
105°F	453	140	433	160
115°F	511	145	488	162

TABLE 15 581130-01
KGC/KCC102S Fin/Tube - W & W/O Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ± 10 psig	Suction ± 5 psig	Discharge ± 10 psig	Suction ± 5 psig
65°F	269	128	276	138
75°F	308	132	314	142
85°F	350	135	359	146
95°F	396	139	407	149
105°F	447	141	458	152
115°F	502	146	513	156

TABLE 16 581131-01
KGC/KCC120S Fin/Tube - W & W/O Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ± 10 psig	Suction ± 5 psig	Discharge ± 10 psig	Suction ± 5 psig
65°F	263	125	262	132
75°F	301	125	304	140
85°F	341	123	348	146
95°F	386	125	394	152
105°F	440	130	447	156
115°F	492	139	499	158

TABLE 17 581132-01
KGC/KCC150S Fin/Tube - W & W/O Reheat

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Discharge ± 10 psig	Suction ± 5 psig	Discharge ± 10 psig	Suction ± 5 psig
65°F	281	121	283	137
75°F	320	125	325	141
85°F	364	129	370	143
95°F	407	132	415	145
105°F	456	135	464	148
115 °F	508	139	517	151

Charge Verification - Approach Method - AHRI Testing (Fin/Tube Coil Continued)

1 - Using the same thermometer, compare liquid temperature to outdoor ambient temperature.

Approach Temperature = Liquid temperature (at condenser outlet) minus ambient temperature.

2 - Approach temperature should match values in TABLE 18. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.

3 - The approach method is not valid for grossly over or undercharged systems. Use TABLE 14 to TABLE 17 as a guide for typical operating pressures.

TABLE 18
APPROACH TEMPERATURE - Fin/Tube - TXV

Unit	Liquid Temp. Minus Ambient Temp.	
	1st Stage	2nd Stage
092S	7°F ± 1 (3.9°C + 0.5)	9°F ± 1 (5.0°C + 0.5)
102S	5°F ± 1 (2.8°C + 0.5)	15°F ± 1 (8.3°C + 0.5)
120S	3°F ± 1 (1.6°C + 0.5)	2.0°F ± 1 (1.1°C + 0.5)
150S	1°F ± 1 (0.6°C + 0.5)	3°F ± 1 (1.6°C + 0.5)

V- SYSTEMS SERVICE CHECKS

A-Heating System Service Checks

All KGC units are ETL / CSA design certified without modification.

Before checking piping, check with gas company or authorities having jurisdiction for local code requirements. Refer to the KGC Installation instruction for more information.

1-Gas Piping

Gas supply piping must not allow more than 0.5"W.C. (124.3 Pa) drop in pressure between the gas meter and the unit. Supply gas pipe must not be smaller than the unit gas connection. Refer to installation instructions for details.

2-Testing Gas Piping

NOTE - *In case emergency shutdown is required, turn off the main manual shut-off valve and disconnect the main power to the unit. These controls should be properly labeled by the installer.*

When pressure testing gas lines, the gas valve must be disconnected and isolated. **Gas valves can be damaged if subjected to more than 0.5 psig [14"W.C. (3481 Pa)]. See FIGURE 22.**

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping.

The use of specialty Gas Leak Detector is strongly recommended. It is available as part number 31B2001. See CORP 8411-L10, for further details.

Do not use matches, candles, flame or any other source of ignition to check for gas leaks.

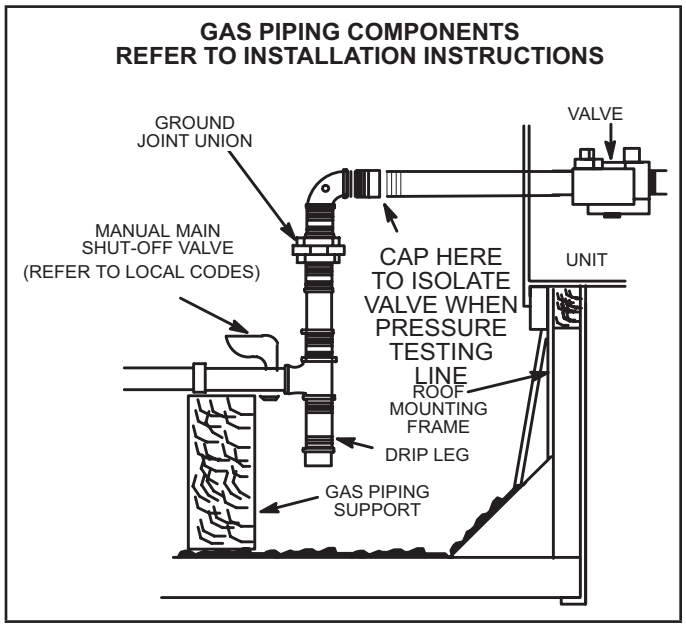


FIGURE 22

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap located on unit gas valve GV1. Test supply gas pressure with unit firing at maximum rate (both stages energized). Make sure the reading falls within the range of the following values. Low pressure may result in erratic operation or "underfire." High pressure can result in permanent damage to the gas valve or "overfire."

For natural gas units, operating pressure at the unit gas connection must be a minimum of 4.7" w.c. (1.19kPa) and a maximum of 10.5" (2.60kPa) w.c. For LP/propane gas units, operating pressure at the unit gas connection must be a minimum of 11" w.c. (2.74kPa) and a maximum of 13.0" w.c. (3.23kPa).

On multiple unit installations, each unit should be checked separately while operating at maximum rate, beginning with the one closest to the supply gas main and progressing to the one furthest from the main. Multiple units should also be tested with and without the other units operating. Supply pressure must fall within the range listed in the previous paragraph.

4-Check and Adjust Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move test gauge to the outlet pressure tap located on unit gas valve GV1. See FIGURE 18 or FIGURE 19 for location of pressure tap on the gas valve. The manifold pressure is factory set and should not require adjustment. See TABLE 4. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. See FIGURE 18 or FIGURE 19 for location of gas valve (manifold pressure) adjustment screw.

All gas valves are factory-regulated. The gas valve should completely and immediately cycle off in the event of gas or power failure. The manual shut-off knob can be used to immediately shut off gas supply.

⚠ CAUTION

For safety, connect a shut-off valve between the manometer and the gas tap to permit shut off of gas pressure to the manometer.

Manifold Adjustment Procedure

1 - Connect test gauge to the outlet pressure tap on the gas valve. Start the unit (call for second stage heat) and allow five minutes for the unit to reach steady state.

2 - While waiting for the unit to stabilize, notice the flame. The flame should be stable without flashback and should not lift from the burner heads. Natural gas should burn basically blue with some clear streaks. L.P. gas should burn mostly blue with some clear yellow streaks.

3 - After allowing the unit to stabilize for five minutes, record the manifold pressure and compare to the values given in TABLE 4.

5-High Altitude

See table of contents for “High Altitude Derate” section for altitudes above 2000 feet (610 m).

6-Proper Gas Flow

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for two revolutions of gas through the meter. (Two revolutions assures a more accurate time.) Divide by two and compare to time in table 19. Seconds in TABLE 19 are based on a 1 cu.ft. dial and gas value of 1000 btu’s for natural and 2500 btu’s for LP. Adjust manifold pressure on gas valve to match time needed.

NOTE - *To obtain accurate reading, shut off all other gas appliances connected to meter.*

TABLE 19

Unit (BTU)	Seconds for Natural	Seconds for Propane
84,500	43	106
117,000	31	77
130,000	28	69
156,00	23	58
180,000	20	50
240,000	15	37

7-Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1 - Turn off gas and electric power.

2 - .Remove access panel(s) and unit center mullion.

3 - Remove gas valve, manifold assembly and burners.

4 - Remove combustion air inducer and flue box cover. Pay careful attention to the order in which gaskets and orifice are removed.

5 - Support heat exchanger (to prevent it from falling when final screws are removed.)

6 - Remove screws supporting heat exchanger.

7 - To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. to ensure proper operation.

8-Flame Sensing

Flame current is an electrical current which passes from the ignition control through the sensor electrode during unit operation. The current passes from the sensor through the flame to the ground electrode (located on the flame electrode) to complete a safety circuit. The electrodes should be located so the tips are at least 1/2” (12.7 mm) inside the flame envelope. Do not bend electrodes. To measure flame current, follow the procedure on the following page:

⚠ CAUTION

Electrodes are not field adjustable. Any alterations to the electrode may create a hazardous condition that can cause property damage or personal injury.

1 - Disconnect power to unit.

2 - Remove lead from sensing electrode and install a 0-50DC microamp meter in series between the sensing electrode and the sensing lead.

3 - Reconnect power and adjust thermostat for heating demand.

4 - When flame is established, microamp reading should be 0.5 to 1.0. Do not bend electrodes. *Dropout signal is .09 or less*.

5 - Disconnect power to unit before disconnecting meter. Make sure sensor wire is securely reconnected before reconnecting power to unit.

NOTE-*If the meter scale reads 0, the leads are reversed. Disconnect power and reconnect leads for proper polarity.*

B-Cooling System Service Checks

KGC 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 TABLE 10 through TABLE 17.*

VI-MAINTENANCE

⚠ 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

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

A-Filters

Units are equipped with six 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 23.

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

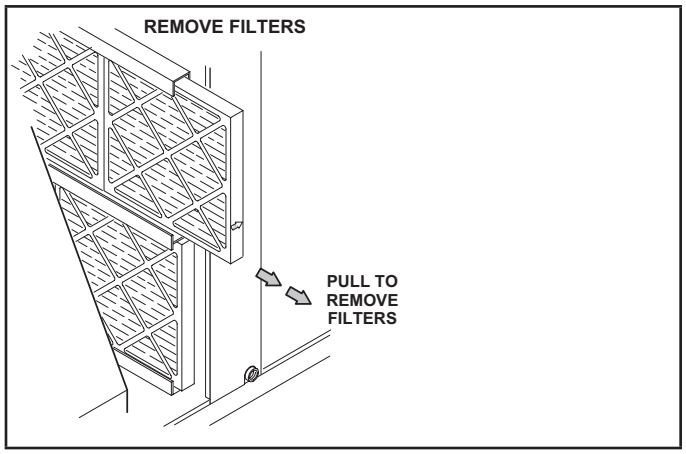


FIGURE 23

B-Lubrication

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

C-Burners (Gas Units)

Periodically examine burner flames for proper appearance during the heating season. Before each heating season examine the burners for any deposits or blockage which may have occurred.

Clean burners as follows:

1 - Turn off both electrical power and gas supply to unit.

2 - Remove burner compartment access panel.

3 - Remove screws securing burners to burner support and lift the individual burners or the entire burner assembly from the orifices. See FIGURE 24. Clean as necessary.

4 - Locate the ignitor under the left burners. Check ignitor spark gap with appropriately sized twist drills or feeler gauges. See FIGURE 25 and TABLE 20..

5 - Check the alignment of the ignitor and the sensor as shown in FIGURE 26.

6 - Replace burners and screws securing burner. Replace access panel.

7 - Restore electrical power and gas supply. Follow lighting instructions attached to unit and use inspection port in access panel to check flame.

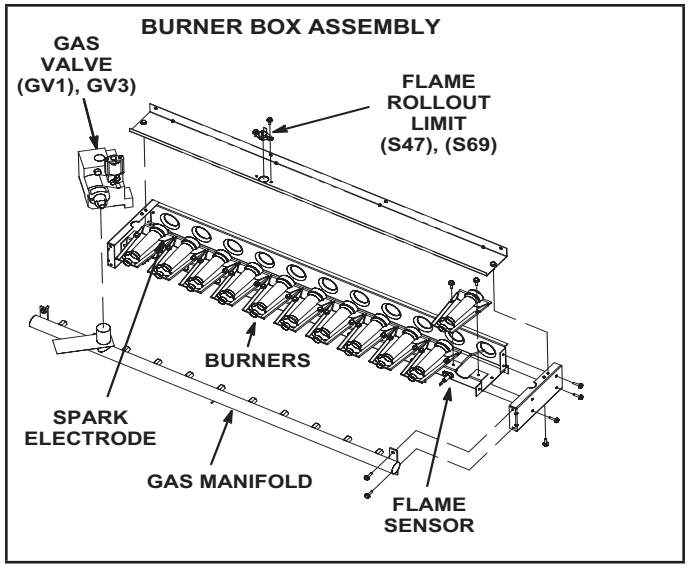


FIGURE 24

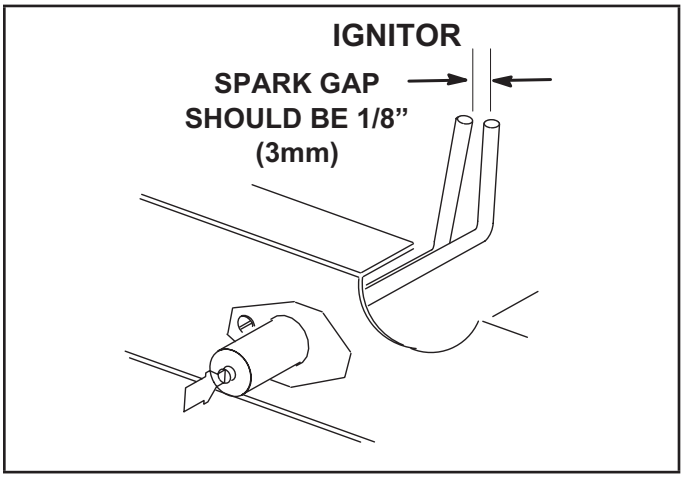


FIGURE 25

TABLE 20

Dimension	Unit Btuh Input	Length - in. (mm)	
		Ignitor	Sensor
A	130K	7-3/4 (197)	11 (279)
B	180K	5 (127)	5-1/2 (140)
C	240K	2-1/4 (57)	2-3/4 (70)

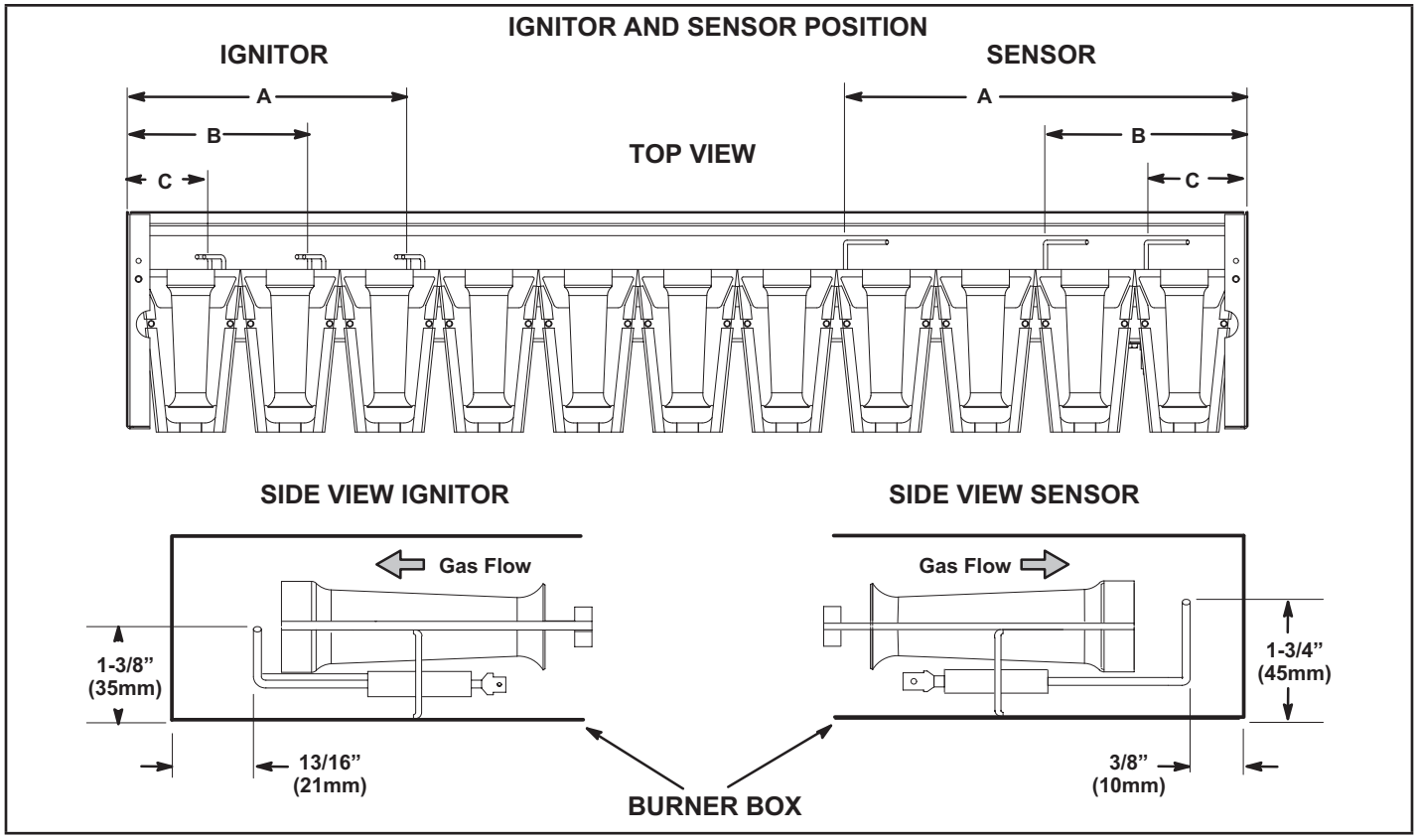


FIGURE 26

D-Combustion Air Inducer

A combustion air proving switch checks combustion air inducer operation before allowing power to the gas controller.

Gas controller will not operate if inducer is obstructed. Under normal operating conditions, the combustion air inducer wheel should be checked and cleaned prior to the heating season. However, it should be examined periodically during the heating season to establish an ideal cleaning schedule. With power supply disconnected, the condition of the inducer wheel can be determined by looking through the vent opening.

Clean combustion air inducer as follows:

1 - Shut off power supply and gas to unit.

2 - Disconnect pressure switch air tubing from combustion air inducer port.

3 - Remove and retain screws securing combustion air inducer to flue box. Remove and retain two screws from bracket supporting vent connector. See FIGURE 27.

4 - Clean inducer wheel blades with a small brush and wipe off any dust from housing. Clean accumulated dust from front of flue box cover

5 - Return combustion air inducer motor and vent connector to original location and secure with retained screws.

6 - It is recommended that the combustion air inducer gasket be replaced during reassembly.

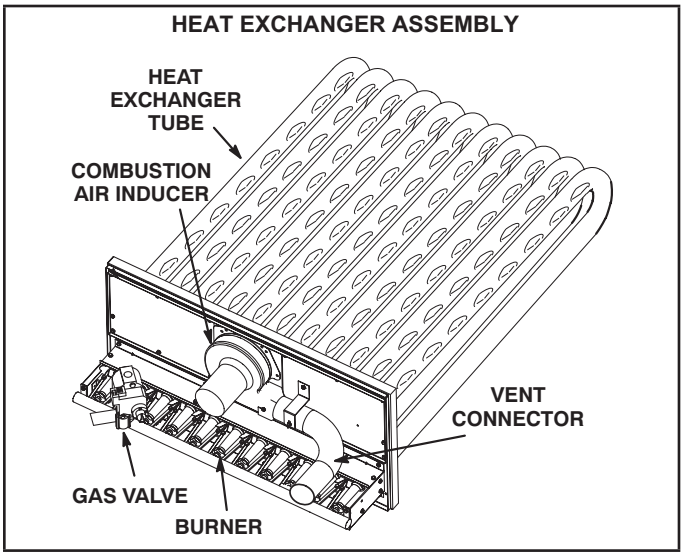


FIGURE 27

E-Flue Passageway and Flue Box (Gas Units)

1 - Remove combustion air inducer assembly as described in section D.

2 - Remove flue box cover. Clean with a wire brush as required.

3 - Clean tubes with a wire brush.

4 - Reassemble the unit. The flue box cover gasket and combustion air inducer gasket should also be replaced during reassembly.

F-Evaporator Coil

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

G-Condenser Coil

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

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

H-Supply Air 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.

I-Electrical

1 - Check all wiring for loose connections.

2 - Check for correct voltage at unit (unit operating).

3 - Check amp-draw on both condenser fan motor and blower motor.

Fan Motor Rating Plate ____ Actual _____

Indoor Blower Motor Rating Plate____ Actual____

VII-OPTIONAL ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be installed to the KGC units.

A-LP / Propane Kit

KGC092/150 units require a natural to LP /propane kit. The kit includes one LP spring conversion kit, up to eleven burner orifices and three stickers. For more detail refer to the natural to LP gas changeover kit installation instructions.

B-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 fivesecond 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.

C-C1CURB Mounting Frames

When installing units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the KGA/KGB units are not installed 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 installed level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled C1CURB mounting frame is shown in FIGURE 28. Refer to the roof mounting frame installation instructions for details of proper assembly and installation. The roof mounting frame MUST be squared to the roof and level before installation. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in FIGURE 29. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

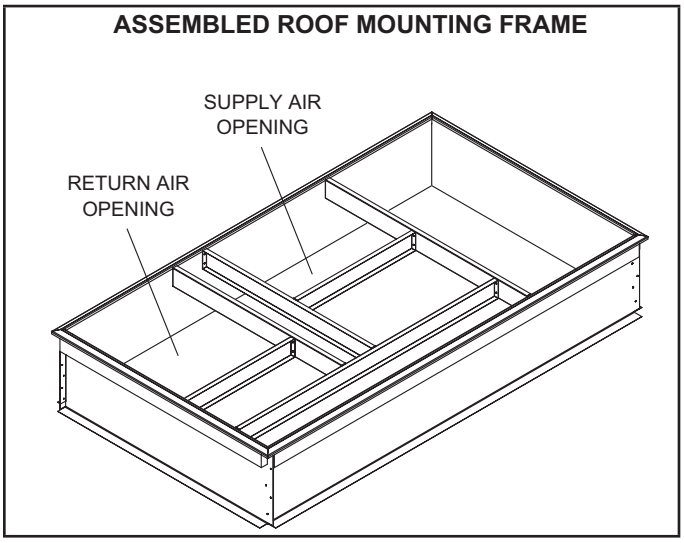


FIGURE 28

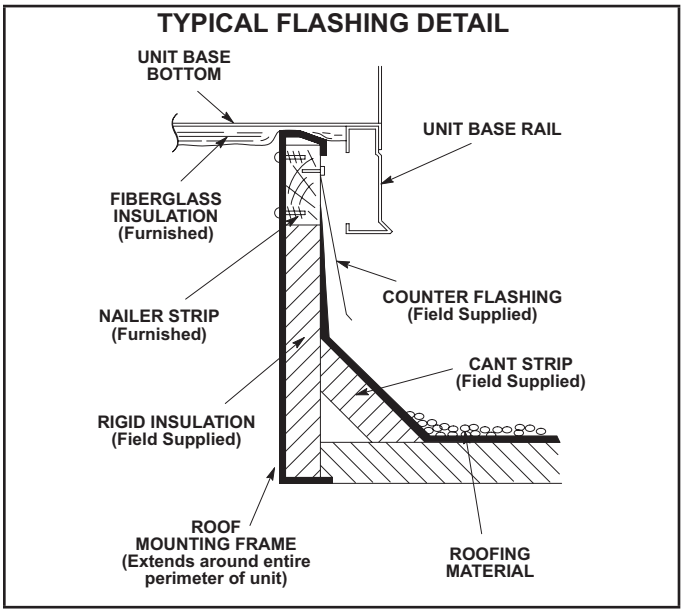


FIGURE 29

D-Transitions

Optional supply/return transition C1DIFF30B-1, C1DIFF31B-1 and C1DIFF32B-1 are available for use with the KGC 7.5 through 12.5 ton units, utilizing optional C1CURB roof mounting frames. Transition must be installed in the C1CURB mounting frame before setting the unit on the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures

E-Supply and Return Diffusers

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

F-Outdoor Air Dampers C1DAMP20B-1 and C1DAMP10B-2

Optional manual and motorized outdoor air dampers (FIGURE 32) 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

G-K1ECON20B / K1ECON22B-1 Economizer,

(Field- or Factory-Installed)

See specific economizer installation instructions for more detail for both K1ECON20B and high performance economizer K1ECON22B1 (Title 24 California). Economizers use outdoor air for free cooling when temperature and/or humidity is suitable. See FIGURE 31.

Below is a brief description of the K1ECON20B economizer. The mixed air temperature sensor (R1) measures the supply air sensible temperature. See FIGURE 30. The outdoor air sensible control is the default economizer control. An outdoor air single sensible sensor, S175, is also provided. See TABLE 21 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 (CO2) increases.

TABLE 21

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	CO2 sensed (A63) is higher than CO2 setpoint.

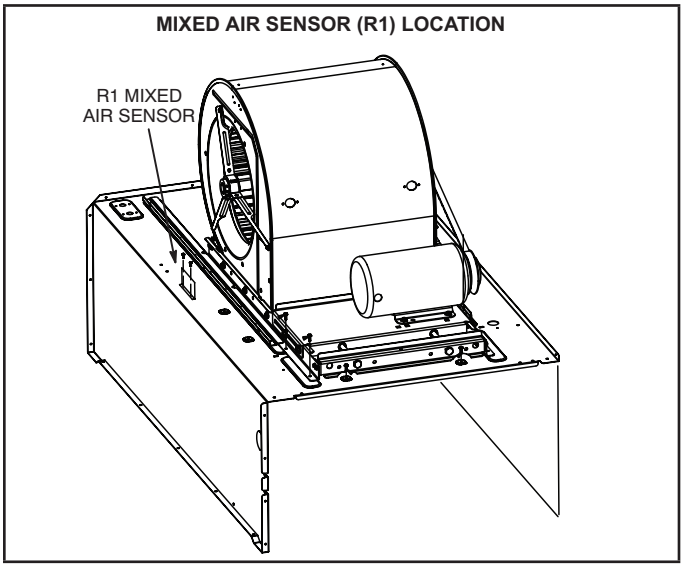


FIGURE 30

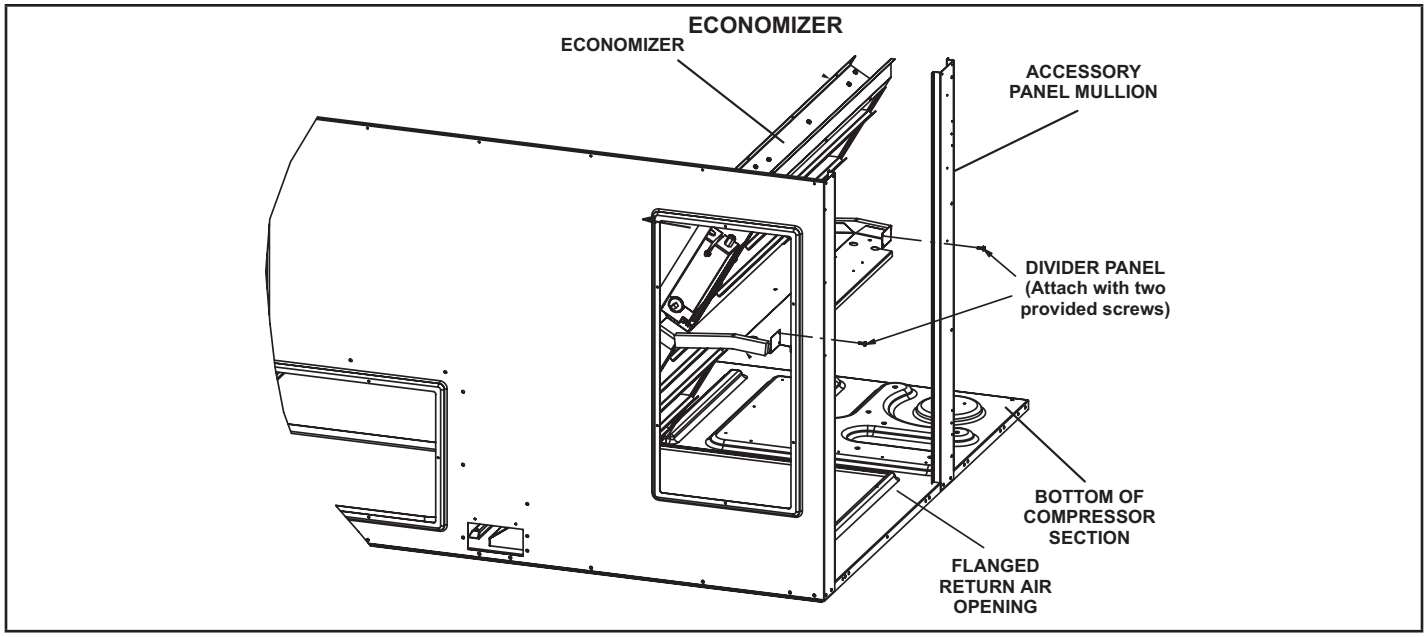
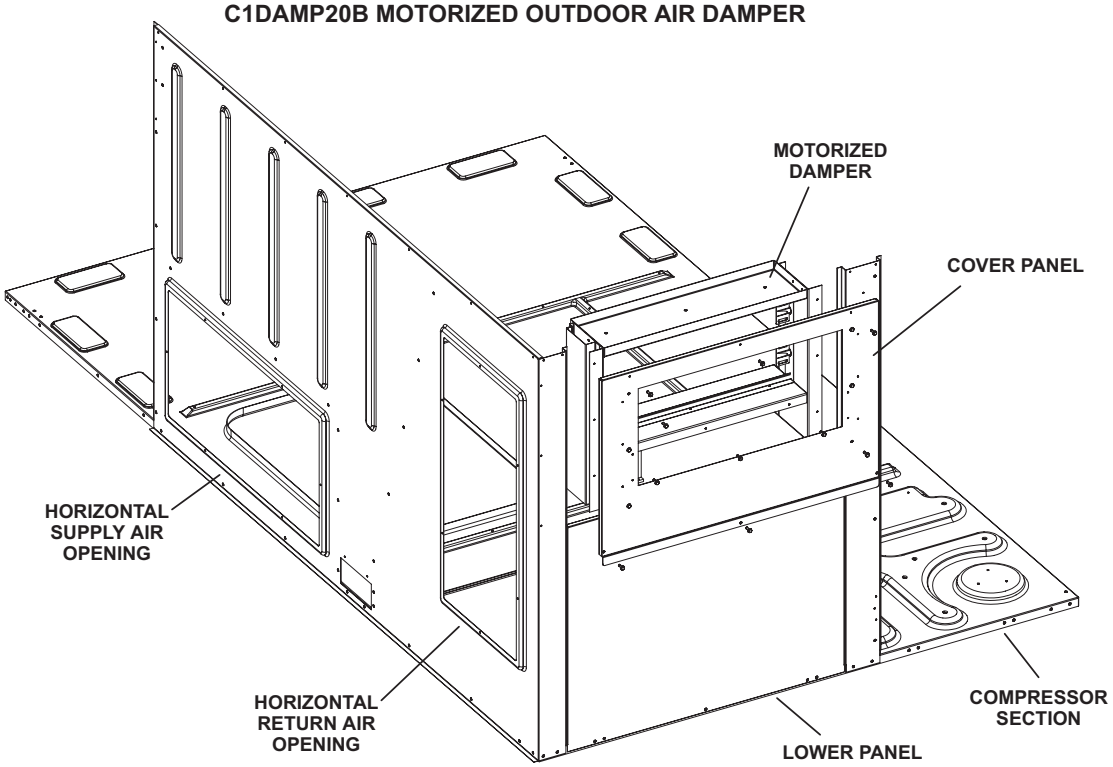


FIGURE 31

C1DAMP20B MOTORIZED OUTDOOR AIR DAMPER



C1 DAMP10B MANUAL OUTDOOR AIR DAMPER

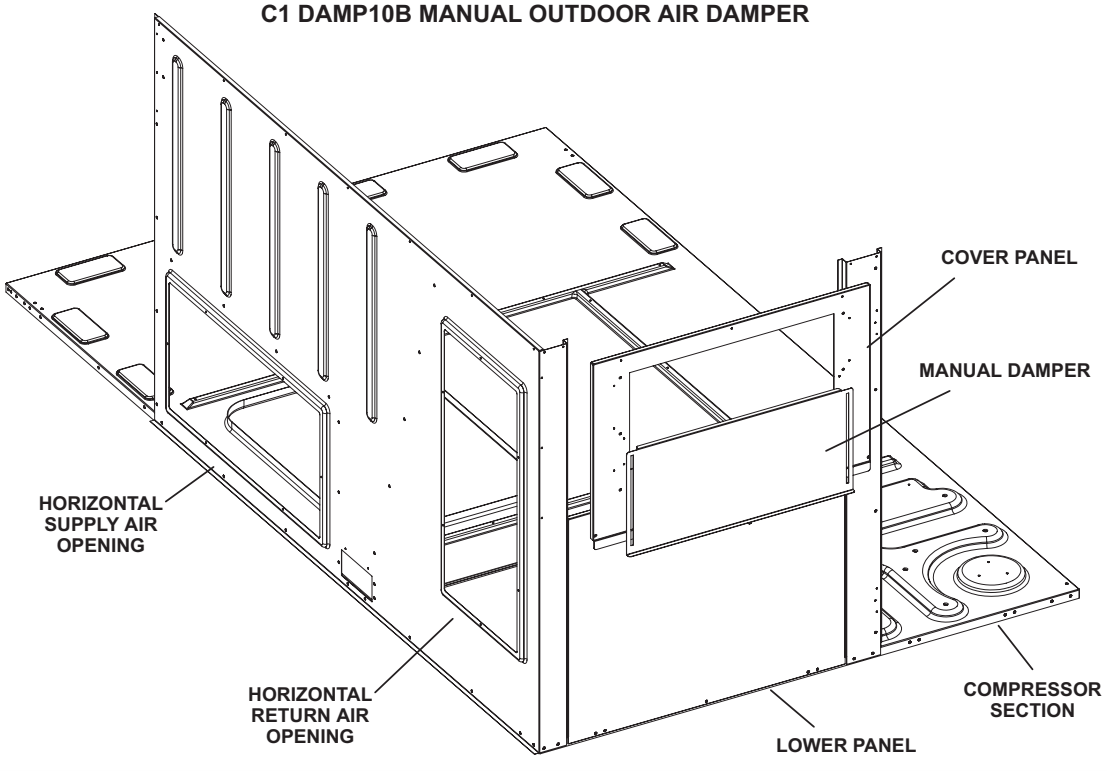


FIGURE 32

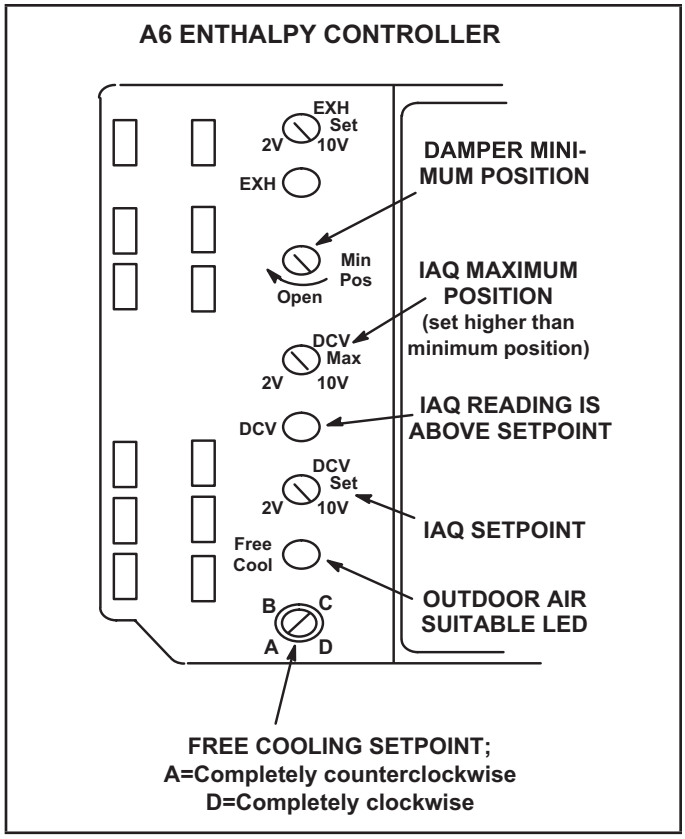


FIGURE 33

A6 Enthalpy Control LEDs

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 33.

Outdoor air is considered suitable when temperature and humidity are less than the free cooling setpoints shown in TABLE 22. Setting A is recommended. See FIGURE 33. 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 22

ENTHALPY FREE COOLING SETPOINTS

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

*Setting A is recommended

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” (40F, 4C shown).

4 - Measure return air temperature. Mark that point on the top line of chart 1 (FIGURE 34) and label the point “B” (74F, 23C shown).

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

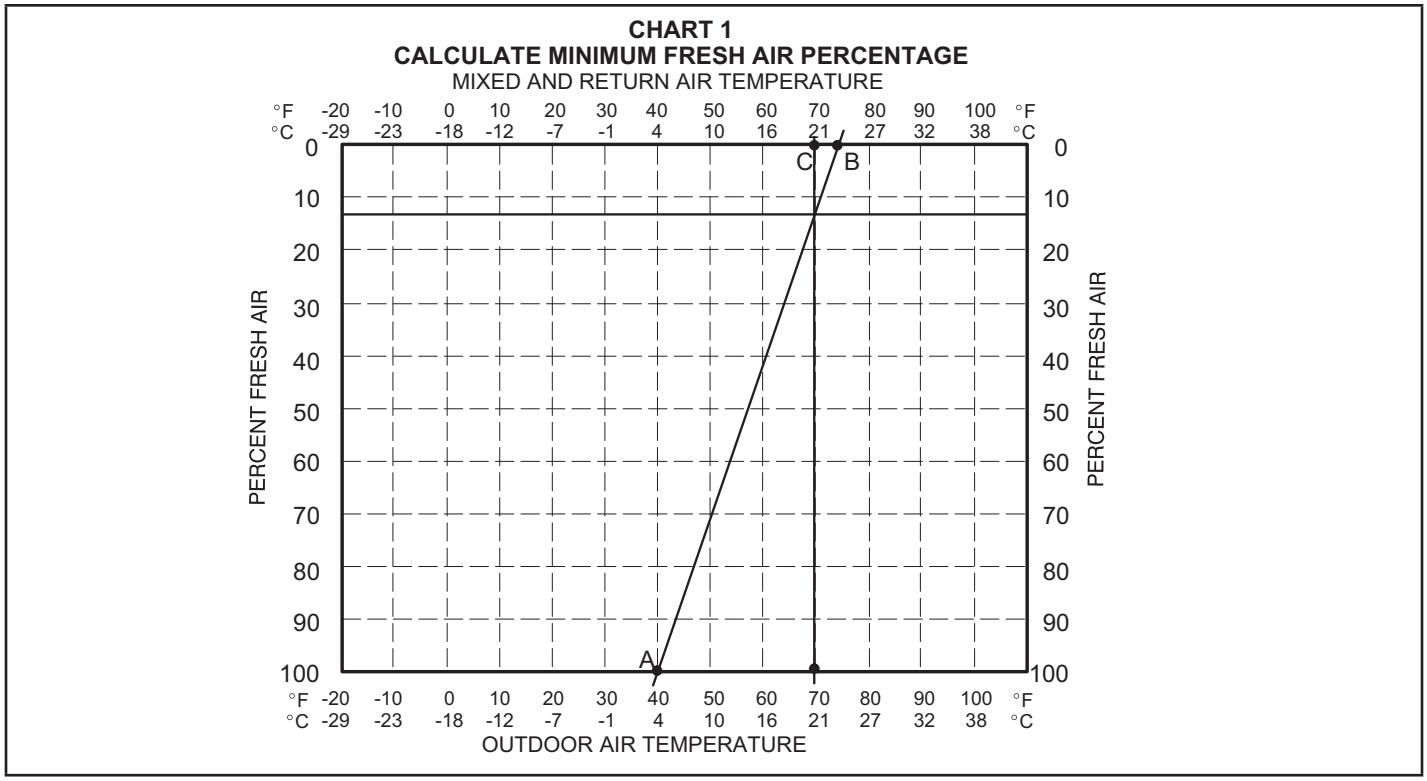


FIGURE 34

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 CO2 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 33. The DCV MAX potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC.

Dampers will open approximately halfway when CO2 rises above setpoint. Adjust the DCV MAX potentiometer to the approximate setting specified by the controls contractor. Refer to FIGURE 33.

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. See TABLE 24.

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 23 for economizer operation with a standard twostage 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 fully 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 45F (7C), dampers will move to minimum position until discharge air temperature rises to 48F (9C).

⚠ IMPORTANT

Remove jumper R and OC when unit is controlled with a thermostat that has a night setback mode. If reheat operation is desired during tjhis time, wire A20 to R.

TABLE 23

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	Modulating	Modulating	No
Y2	Modulating	Modulating	Stage 1
Y3	Modulating	Modulating	Stage 2

TABLE 24

ECONOMIZER OPERATION-OUTDOOR AIR IS **NOT SUITABLE** FOR FREE COOLING -- FREE COOL LED "OFF"

Thermostat Demand	Damper Position		Mechanical Cooling
	Unoccupied	**Occupied**	
Off	Closed	Closed	No
G	Closed	Minimum*	No
Y1	Closed	Minimum*	Stage 1
Y2	Closed	Minimum*	Stage 2

*IAQ sensor can open damper to DCV max.

H-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 a seconomizer minimum position. Adjust motorized damper position using the thumbwheel on the damper motor. See FIGURE 35. Manual damper fresh air intake percentage can be determined in the same manner.

I-Gravity Exhaust Dampers

Dampers are used in downflow (FIGURE 36) and horizontal (FIGURE 37) 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 KGC 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.

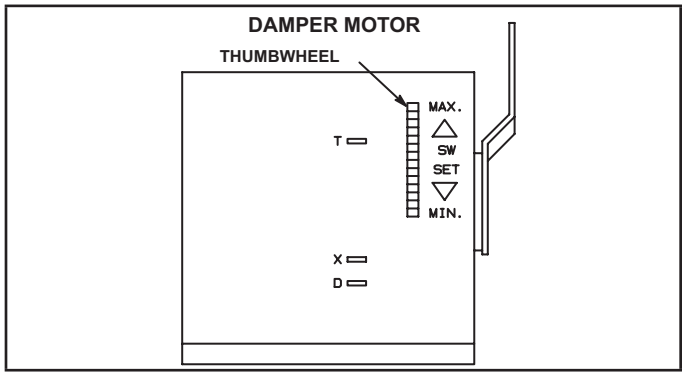


FIGURE 35

NOTE - *GED is optional except when used with power exhaust dampers, where it is required.*

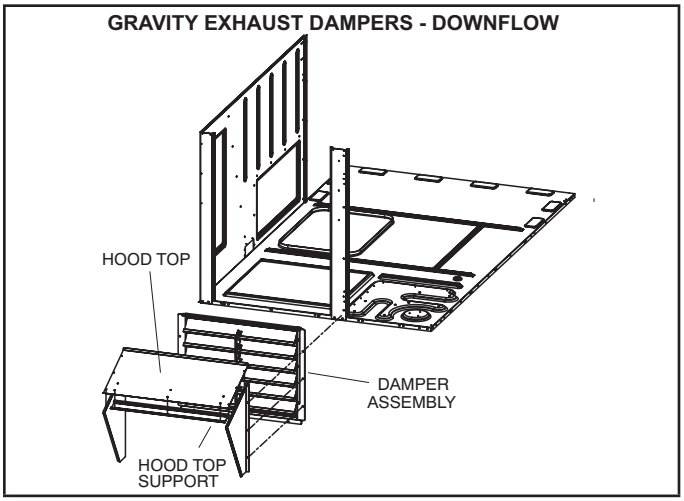


FIGURE 36

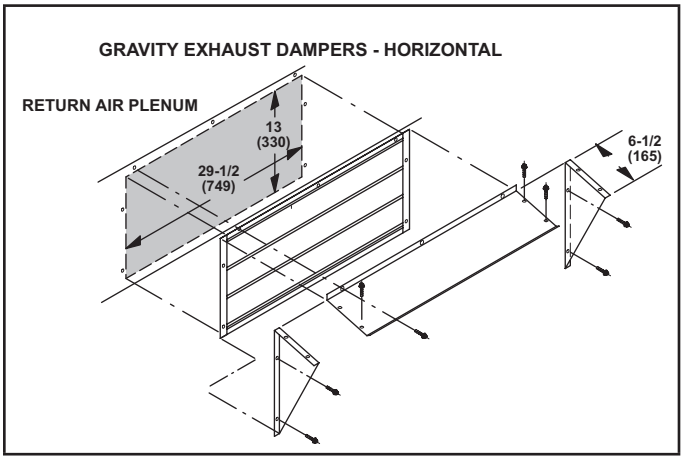


FIGURE 37

J-Power Exhaust Fan

The power exhaust fan (PEF) requires the use of a gravity exhaust damper and economizer and is used in downflow applications only. See FIGURE 38. 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.

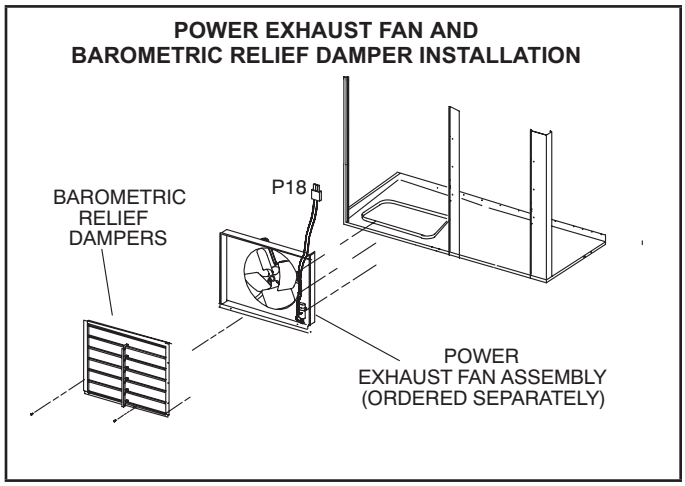


FIGURE 38

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 39. 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.)

K-Optional Cold Weather Kit (Canada only)

Electric heater is available to automatically control the minimum temperature in the gas burner compartment. Heater is ETL/CSA certified to allow cold weather operation of unit down to -60° F (-50° C).

The kit includes the following parts:

1 - Transformer (T20) is a 600V to 120/240V step-down transformer mounted in the blower compartment.

2 - T20 has two in line fuses (F20), one on each leg of the transformer. Both are rated at 15 amps.

3 - The strip heater (HR6) is located as close as possible to the gas valve. It is wired in series with T20. The strip heater is rated at 500 Watts

4 - A thermostat mounting box is installed on the vestibule of the heating compartment. Included in the box are the following thermostat switches:

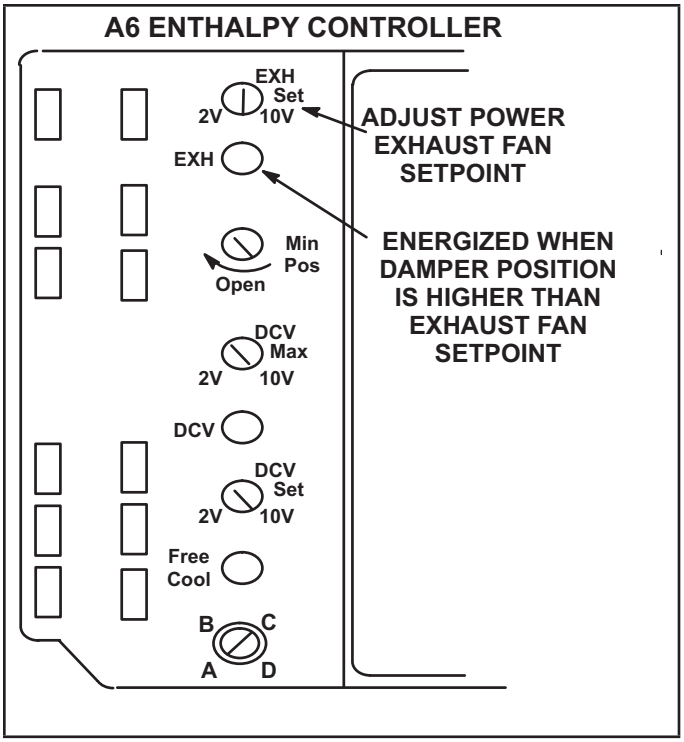


FIGURE 39

a - Thermostat switch (S59) is an auto-reset SPST N.C. switch which opens on a temperature drop. The switch is wired in series with 24V power and the combustion air blower switch. When the temperature drops below -30° F (-35° C) the switch opens and the gas heat section is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (-12° C).

b - Thermostat switch (S60) is an auto-reset SPST N.C. switch which opens on a temperature rise. The switch is wired in series with HR6 and T20. When the temperature rises above 20° F (-7° C) the switch opens and the electric heater is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (23.3° C).

c -Thermostat switch (S61) is an auto-reset SPST N.O. switch which closes on a temperature drop. The switch is wired in series with HR6 and T20. When temperature drops below 20° F (-7° C) the switch closes and electric heater is energized. The switch automatically opens when heating compartment temperature reaches 76° F (24° C).

L-Control Systems

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.

M-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 sections.

N-Hot Gas Reheat Start-Up and Operation

General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See FIGURE 40 for reheat refrigerant routing.

L14 Reheat Coil Solenoid Valve

When room conditions close the dehumidistat switch, L14 reheat valve is energized and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above setpoint. Reheat will terminate when the indoor relative humidity falls below or the digital output deenergizes. Turn the knob on the dehumidistat to adjust the setpoint.

Check-Out

Test hot gas reheat operation using the following procedure.

1 - Make sure reheat is wired as shown in wiring section.

2 - Initiate a dehumidification demand by adjusting dehumidistat setpoint knob BELOW indoor relative humidity. The blower , compressor 1 and compressor 2 should be operating.

3 - End a dehumidification demand by adjusting setpoint knob ABOVE indoor relative humidity. The blower, compressor 1, and compressor 2 should deenergize.

Default Reheat Operation

TABLE 25

Reheat Operation - Two Cooling Stages - Default

T'stat and Humidity Demands	Operation
Reheat Only	Compressor 1 Reheat
Reheat & Y1	Compressor 1 Reheat & Compressor 2 Cooling*
Reheat & Y1 & Y2	Compressor 1 Cooling & Compressor 2 Cooling**

*If there is no reheat demand and outdoor air is suitable, free cooling will operate.

**If there is no reheat demand and outdoor air is suitable, free cooling and compressor 1 will operate.

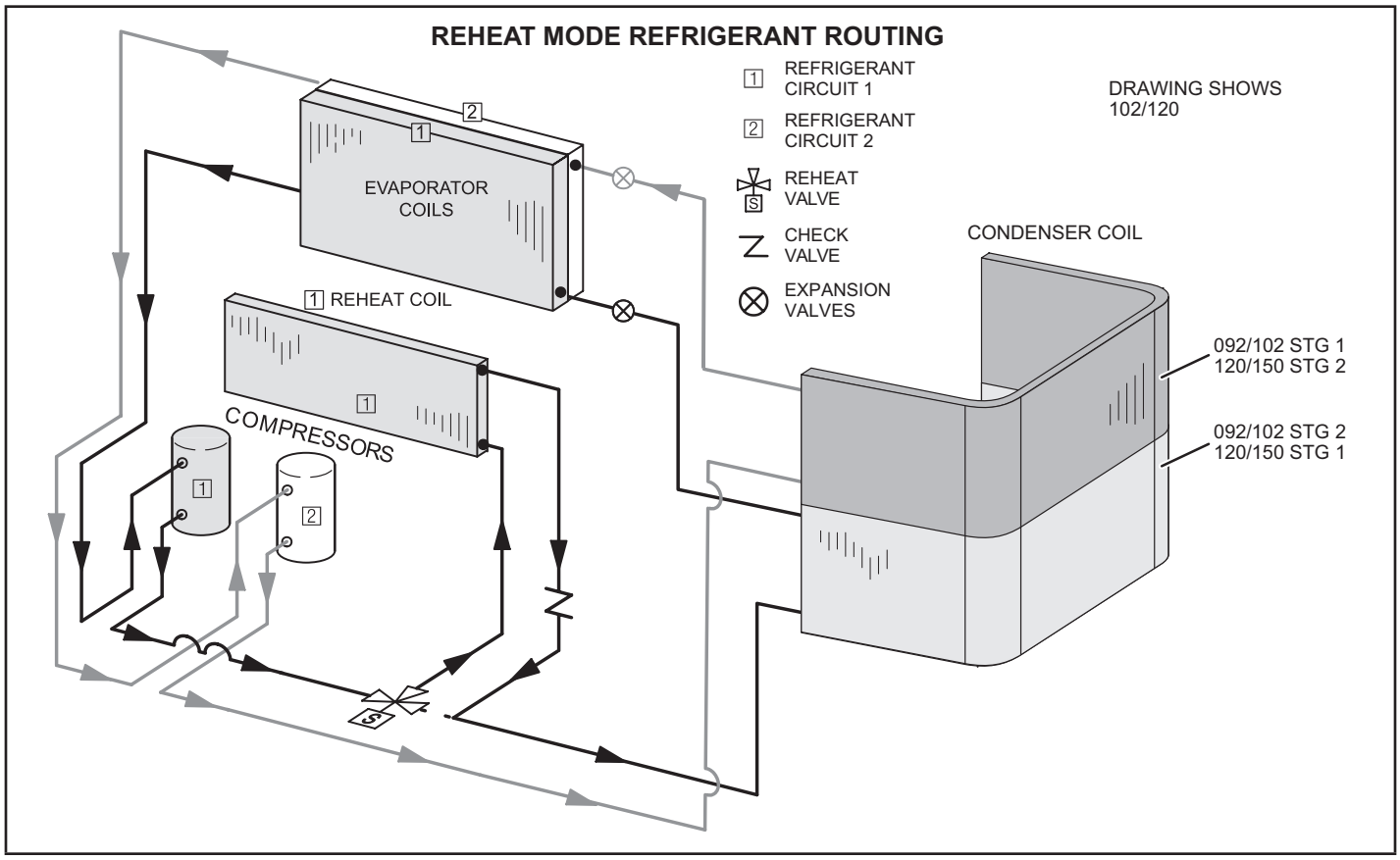
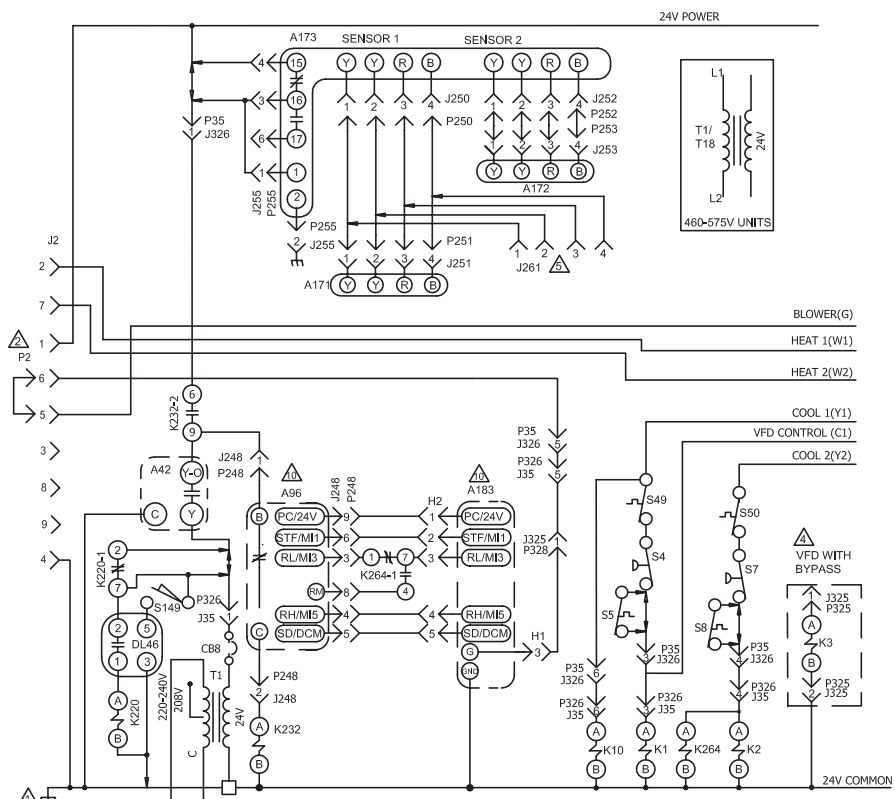
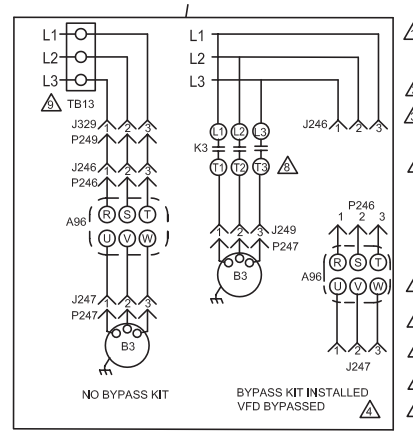


FIGURE 40

VIII-Wiring Diagrams and Sequence of Operation





KEY	COMPONENT
A42	MONITOR, PHASE PROTECTION
A96	CONTROL, INVERTER
A171	SENSOR ONE, SMOKE, RETURN AIR
A172	SENSOR TWO, SMOKE, SUPPLY AIR
A173	MODULE, CONTROL SMOKE DETECTION
A183	CONTROL, VFD BOARD
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
J11	JACK, GFI, RECEPTACLE
K1,-1,-2	CONTACTOR, COMPRESSOR 1
K2,-1,-2	CONTACTOR, COMPRESSOR 2
K3, -1	CONTACTOR, BLOWER
K10,-1,2	RELAY, OUTDOOR FAN
K65-1,2	RELAY, EXHAUST FAN
K220, -1	RELAY, OVERFLOW DELAY
K232-2	RELAY, INVERTER PROTECTION
K264-1	RELAY, RL-RM TRANSFER
L34	SOLENOID, 2-SPEED COMPRESSOR
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
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S149	SWITCH, OVERFLOW
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, REHEAT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	JACK/PLUG DESCRIPTION
2	HEAT
18	EXHAUST FAN COMPT
24	EXHAUST FAN
35	TEST
36	TEST COOL
86	OUTDOOR FANS 1
132	EXHAUST FAN MOTOR 1
246	POWER TO VFD
247	POWER VFD TO MOTOR
248	VFD CONTROL
249	CONTACTOR BYPASS
250	SMOKE DETECTOR ONE
251	SMOKE DETECTOR ONE
252	SMOKE DETECTOR TWO
253	SMOKE DETECTOR TWO
255	MODULE, CONTROL SMOKE DETECTION
261	SMOKE DETECTOR JUMPER
326	VFD CONTROL ADD-ON
328	VFD CONTROL ADD-ON
H1	HEADER 1, A183 VFD BOARD
H2	HEADER 2, A183 VFD BOARD

1. NOTE - FOR USE WITH COPPER CONDUCTORS ONLY REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.
2. P2 IS USED ON KCA UNITS ONLY
3. IMPORTANT: TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION. TAPE UNUSED MOTOR LEADS
4. TO BYPASS A96 VFD:
   DISCONNECT POWER SUPPLY
   UNPLUG P249 FROM J329; PLUG P249 INTO J249
   UNPLUG P246 FROM J246;
   UNPLUG P247 FROM J247; PLUG P247 INTO J246
   UNPLUG P328 FROM J325; PLUG P325 INTO J325
   UNPLUG P326 FROM J35;
   UNPLUG P35 FROM J326; PLUG P35 INTO J35
5. CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
6. S48 OR CB10 MAY BE USED
7. 120V FIELD PROVIDED POWER SUPPLY IS REQUIRED
8. K3 REPLACES TB13 WHEN A96 VFD BYPASS OPTION IS INSTALLED
9. REFERENCE LOW AMBIENT KIT INSTRUCTIONS FOR WIRING DIAGRAM WHEN KIT IS INSTALLED
10. VFD TERMINALS FOR MITSUBISHI / DELTA DRIVES

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.

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

2023/07	WIRING DIAGRAM 538301-02	23/07
COOLING		
KC/KG - 092, 102, 120, 150 - G, J, Y VFD UNITS		
SECTION B		REV. 0
Supersedes 538301-01	New Form No. 538301-02	

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 - VFD units are controlled by A96 inverter.

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)

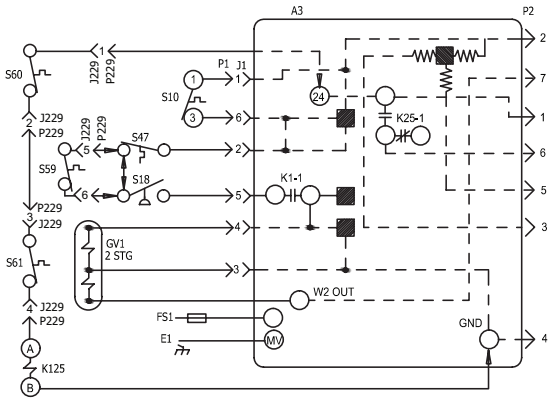
5 - First stage cooling demand Y1 and G are energized by the thermostat. G energizes blower. 24VAC is routed through TB1 passing N.C. freezestat S49 and optional N.C. high pressure switch S4. Compressor contactor K1 is energized. N.O. contacts K1-1 close energizing compressor B1. N.C. Contacts K1-2 open de-energizng crankcase heater HR1

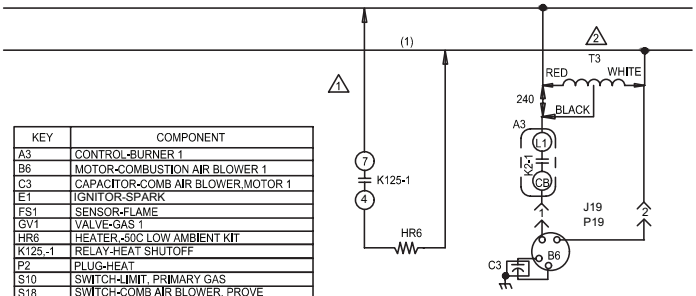
6 - Contacts K10-1 close energizing condenser fan B4.

2nd Stage Cooling (compressor B2)

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. N.C.K2-2 opens de-energizing crankcase heater HR2.

8 - N.O. contacts K10-1 close energizing condenser fan B5.





KEY	COMPONENT
A3	CONTROL-BURNER 1
B6	MOTOR-COMBUSTION AIR BLOWER 1
C3	CAPACITOR-COMB AIR BLOWER,MOTOR 1
E1	IGNITOR-SPARK
FS1	SENSOR-FLAME
GV1	VALVE-GAS 1
HR6	HEATER,-50C LOW AMBIENT KIT
K125,-1	RELAY-HEAT SHUTOFF
P2	PLUG-HEAT
S10	SWITCH-LIMIT, PRIMARY GAS
S18	SWITCH-COMB AIR BLOWER, PROVE
S47	SWITCH-FLAME ROLLOUT, BURNER 1
S59	THERMOSTAT-OPEN -20F, CLOSE 10F
S60	THERMOSTAT-OPEN 20F, CLOSE -10F
S61	THERMOSTAT-OPEN 50F, CLOSE 20F
T3	TRANSFORMER-COMB AIR BLOWER 1

J/P	JACK/PLUG DESCRIPTION
1	GAS LIMIT
19	COMBUSTION AIR BLOWER
229	VESTIBULE HEATER,CONTROL 1

07/17	WIRING DIAGRAM 537063-03	07/17
HEATING - GAS		
KDB/ZG*/KG* UNITS - 130 THRU 240		
SECTION A		REV 2
Supersedes	New Form No. 537063-03	

GAS HEAT SEQUENCE OF OPERATION

First Stage Heat:

1 - The thermostat initiates W1 heating demand.

2 - 24VAC is routed from TB1 to ignition control A3 through P2. A3 proves N.C. primary limit S10 and N.C. rollout switch S47.

3 - Combustion air inducer blower B6 is energized.

4 - After the combustion air inducer B6 has reached full speed, the combustion air proving switch S18 contacts close.

5 - After a 30 second delay, A3 energizes the ignitor and LO terminal (low fire) of gas valve GV1.

Second Stage Heat:

6 - With first stage heat operating, an additional heating demand from the thermostat initiates W2.

7 - A second stage heating demand is received by TB1. The second stage heat signal passes from TB1 to A3.

8 - A3 energizes HI terminal (high fire) of gas valve GV1.

End of Second Stage Heat:

9 - Heating demand is satisfied. Terminal W2 (high fire) is de-energized.

10 - Terminal HI of GV1 is de-energized by A3 control module.

End of First Stage Heat:

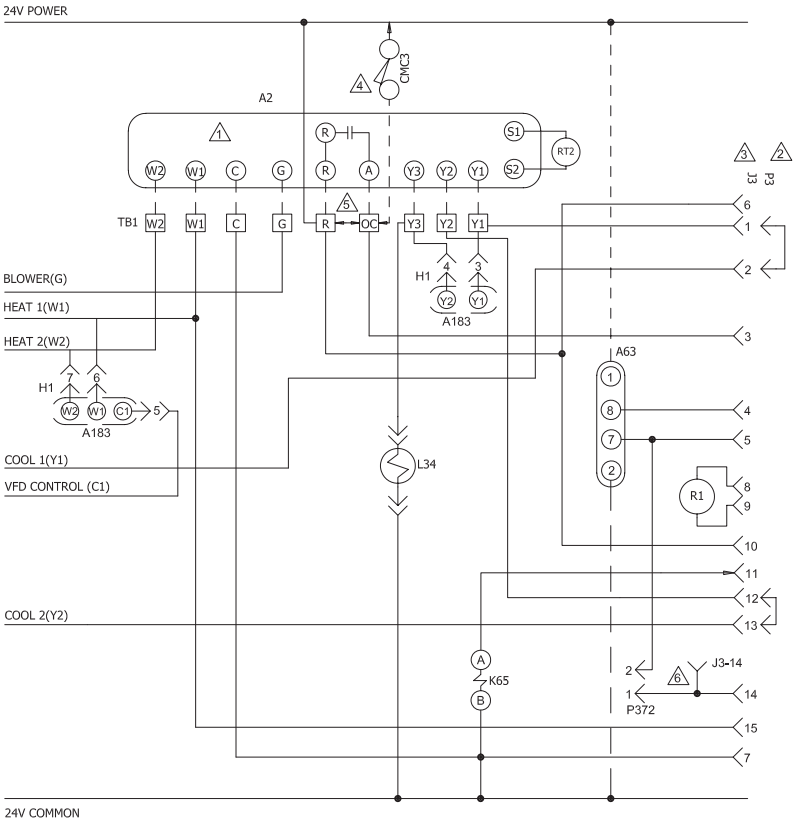
11 - Heating demand is satisfied. Terminal W1 (low fire) is de-energized.

12 - Ignition A3 is de-energized in turn de-energizing terminal LO of GV1.

Optional Low Ambient Kit:(ETL/CSA -50° C Low Ambient Kit)

13 - Line voltage is routed through the N.C. low ambient kit thermostats S60 and S61. K125 relay is energized closing N.O. K125-1 contacts and energizing the low ambient kit heater HR6.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



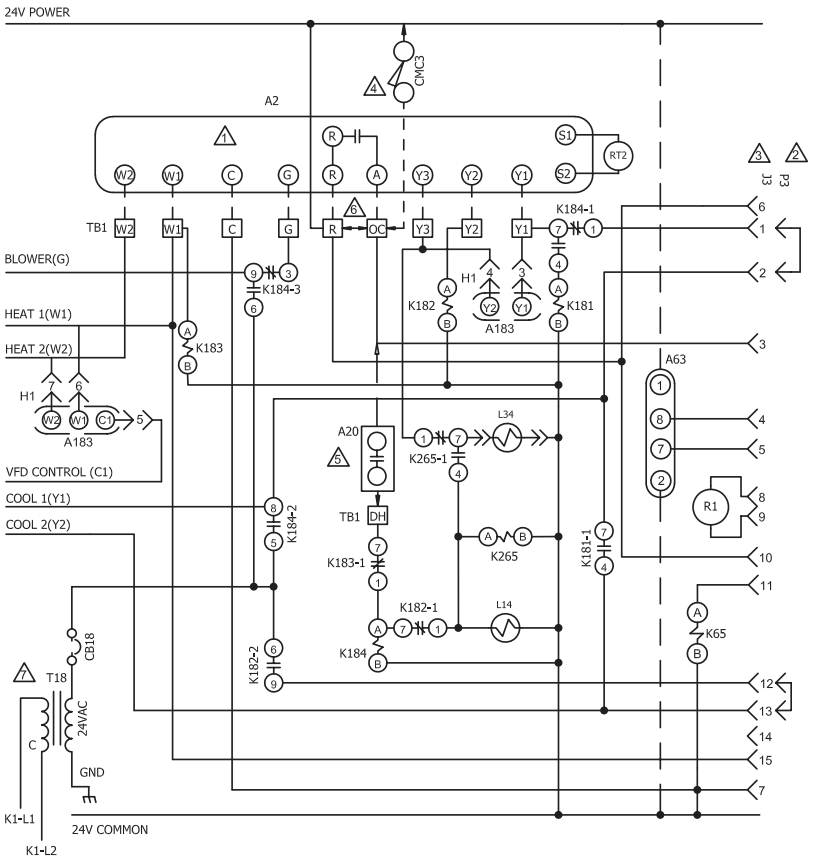
KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A63	SENSOR, CO2
A183	CONTROL, VFD BOARD
CMC3	CLOCK, TIME
H1	HEADER 1 ON VFD BOARD
J3	JACK, UNIT ECONOMIZER
K65	RELAY, EXHAUST FAN
P3	PLUG, LESS ECONOMIZER
P372	PLUG, BACNET/JADE ALARM
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
TB1	TERMINAL STRIP, CLASS II VOLTAGE
L34	SOLENOID, 2-SPEED COMPRESSOR

1. THERMOSTAT SUPPLIED BY USER
2. REMOVE P3 WHEN ECONOMIZER IS USED
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPTIONAL) CLOSED OCCUPIED
5. REMOVE JUMPER BETWEEN TB1-R AND TB1-OC WHEN USING A NITE SETBACK THERMOSTAT
6. P372 USED FOR ALARM FEEDBACK SIGNAL FOR UNITS EQUIPPED WITH JADE ECONOMIZER CONTROL AND BACNET, TITLE 24 APPLICATION

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

2022/05	WIRING DIAGRAM 538300-01	05/22
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT		
SECTION C		REV 0
Supersedes	New Form No. 538300-01	

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



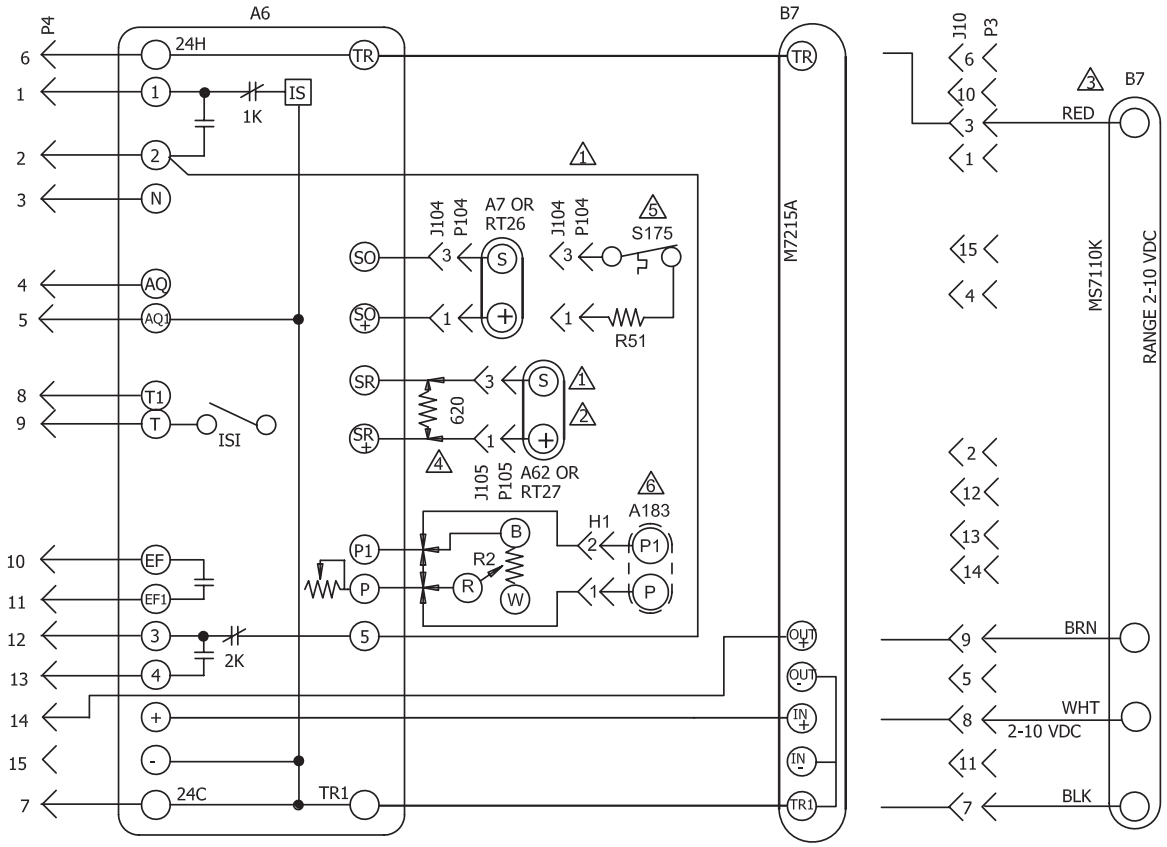
KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A20	REMOTE DEHUMIDISTAT
A63	SENSOR, CO2
A183	CONTROL, VFD BOARD
CB18	CIRCUIT BREAKER, T18
CMC3	CLOCK, TIME
J3	JACK, UNIT ECONOMIZER
K65	RELAY, EXHAUST FAN
K181,-2	RELAY, Y1
K182,-2	RELAY, Y2
K183,-2	RELAY, W1
K184,-3	RELAY, DEHUMIDIFICATION
K265	RELAY, 2 SPEED COMPRESSOR
L14	VALVE, REHEAT COMP 1
L34	SOLENOID, 2 SPEED COMPRESSOR
P3	PLUG, LESS ECONOMIZER
R1	SENSOR, MIXED AIR OR SUPPLY AIR
RT2	SENSOR, REMOTE THERMOSTAT
T18	TRANSFORMER, REHEAT
TB1	TERMINAL STRIP, THERMOSTAT
TB37	TERMINAL STRIP, REHEAT

1. THERMOSTAT SUPPLIED BY USER
2. REMOVE P3 WHEN ECONOMIZER IS USED
3. J3 MAXIMUM LOAD 20VA 24VAC CLASS II
4. TIME CLOCK CONTACTS (OPTIONAL) CLOSED OCCUPIED
5. REMOTE DEHUMIDISTAT CONTACTS CLOSED WHEN HUMIDITY IS ABOVE SET POINT
6. REMOVE JUMPER BETWEEN TB1-R AND TB1-OC WHEN USING A NITE SETBACK THERMOSTAT
7. SEE B SECTION DIAGRAM FOR VOLTAGE SPECIFIC WIRING

DENOTES OPTIONAL COMPONENTS
CLASS II FIELD WIRING

2022/06	WIRING DIAGRAM 538303-01	06/22
CONTROL		
ELECTRONIC/ELECTROMECHANICAL THERMOSTAT WITH REHEAT		
SECTION C		REV 0
Supersedes	New Form No. 538303-01	

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
A183	CONTROL, VFD BOARD
B7	MOTOR-DAMPER, ECONOMIZER
H1	HEADER 1 ON LANDMARK VFD BOARD
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

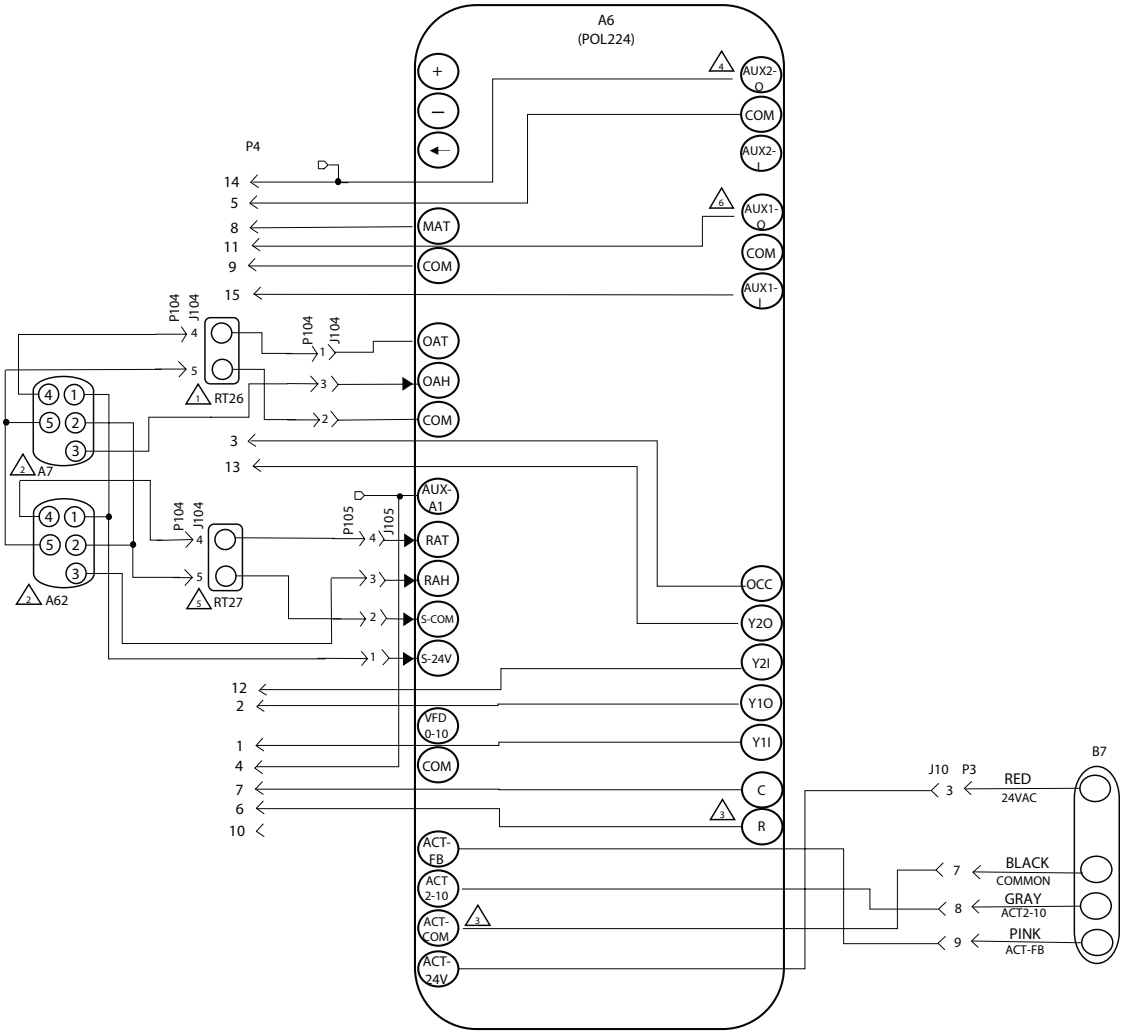
1. RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS
2. A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING
3. USED ON C BOX UNITS
4. REPLACE A7 OR RT26 WITH 620 OHM RESISTOR FOR CONTROLS WITH GLOBAL ECON
5. OPTIONAL OUTDOOR THERMOSTAT TO REPLACE RT26 SENSIBLE SENSOR
6. A183 USED ON UNITS WITH VFD ONLY

DESIGNATES OPTIONAL WIRING

CLASS II FIELD WIRING

2018/09	LANDMARK WIRING DIAGRAM 537080-02	18/09
ACCESSORIES		
ECONOMIZER		
SECTION D		REV 1
Supersedes	New Form No. 537080-02	

ECONOMIZER



KEY	COMPONENT
A6	CONTROL - ECONOMIZER
A7	SENSOR - OUTDOOR ENTHALPY
A62	SENSOR - INDOOR ENTHALPY
B7	MOTOR - DAMPER ECONOMIZER
J10	JACK - ECONOMIZER MOTOR
J104	JACK - SENSOR OUTDOOR
J105	JACK - SENSOR RETURN AIR
P3	PLUG - ECONOMIZER MOTOR
P4	PLUG - ECONOMIZER
P104	PLUG - SENSOR OUTDOOR
P105	PLUG - SENSOR RETURN AIR
RT26	SENSOR - OUTDOOR AIR TEMP
RT27	SENSOR - RETURN AIR TEMP

◄——► DESIGNATES OPTIONAL WIRING
— — — CLASS II FIELD WIRING

1. OUTDOOR AIR TEMP SENSOR RT26 OR OUTDOOR AIR ENTHALPY SENSOR A7 MAY BE USED.
2. FOR DIFFERENTIAL ENTHALPY SENSING USE OUTDOOR ENTHALPY SENSOR A7 AND RETURN AIR ENTHALPY SENSOR A62.
3. REFER ALSO TO MAIN UNIT WIRING DIAGRAM SECTION C.
4. PROGRAMMABLE, USE FOR SYSTEM ALARM OUTPUT.
5. FOR DIFFERENTIAL TEMPERATURE SENSING USE RT26 & RT27 SENSORS.
6. PROGRAMMABLE, USE FOR POWER EXHAUST FAN 2 OUTPUT.

WIRING DIAGRAM	3/31
538242-01	
ACCESSORIES	
SIEMENS CONTROL ECONOMIZER (B &C-BOX)	
D1	REV 0
Supersedes	New Form No. 538242-01