LENNOX Service Literature®

UNIT INFORMATION
Corp 1210-L3

SGC SERIES
10, 20 and 24 ton
35.2, 70.4 and 84.4 kW

SGC

The SGC units are configure to order units (CTO) with a wide selection of factory installed options. SGC120 units are available in 130,000, 180,000 Btuh or 240,000 Btuh (38.1, 52.7 or 68.9 kW) heating inputs. SGC240 and 288 units are available in 260,000, 360,000 or 480,000 Btu (76.2, 105.5 or 140.6 kW). Gas heat sections are designed with Lennox aluminized steel tube heat exchangers with stainless steel as an option.

Units are designed for R410A refrigerant. Operating pressures and pressure switch settings are significantly higher than R22 charged units. Service equipment must be rated for R410A.

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

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

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

⚠WARNING

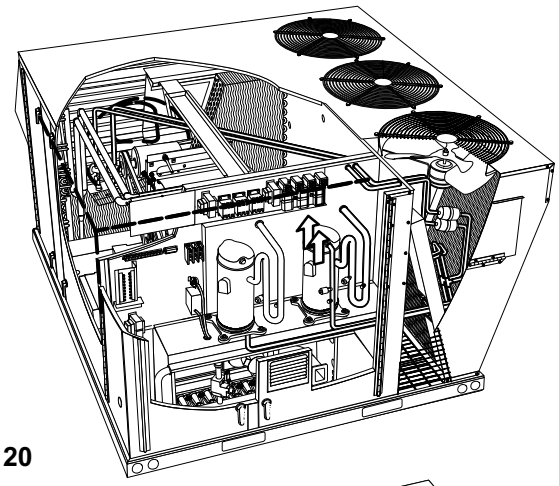
Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

⚠WARNING

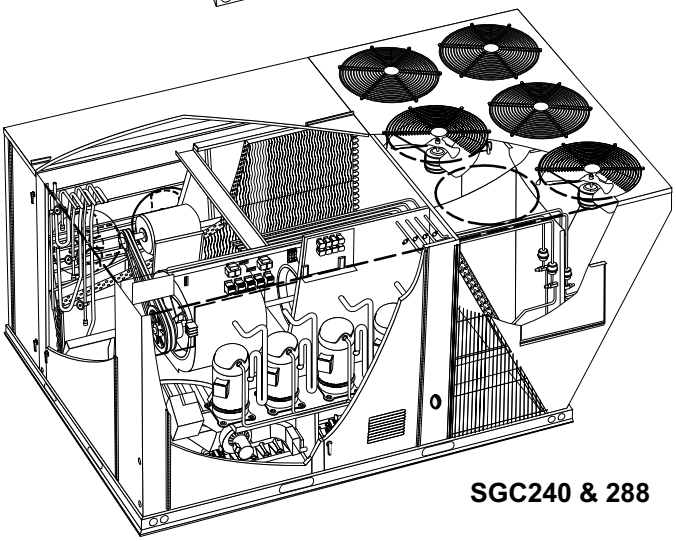
Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠CAUTION

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



SGC120



SGC240 & 288

Table of Contents

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	120	240	288
COOLING SYSTEM					
Condensate Drain Trap	EPDM - C1TRAP30121-	**43W45**	OX	OX	OX
	Copper - LTACDKC09/36	**76M19**		OX	OX
Corrosion Protection	Condenser Section	Factory	O	O	O
	Evaporator Section	Factory	O	O	O
	Both Sections	Factory	O	O	O
Drain Pan Overflow Switch	E1SNSR71AD1	**68W88**	OX	OX	OX
HEATING SYSTEM					
Combustion Air Intake Extension	C1EXTN10FF1	**89L97**		[1] X	[1] X
	C1EXTN10111	**33W62**	X		
Gas Heat Input	High One-Stage - 105 kBtuh input	Factory			
	High Two-Stage - 97.5/150 kBtuh input	Factory			
	Standard Two-Stage - 84.5/130 kBtuh input	Factory	O		
	Medium Two-Stage - 117/180 kBtuh input	Factory	O		
	High Two-Stage - 156/240 kBtuh input	Factory	O		
	Standard Two-Stage - 169/260 kBtuh input	Factory		O	O
	Medium Two-Stage - 234/360 kBtuh input	Factory		O	O
	High Two-Stage - 312/480 kBtuh input	Factory		O	O
Gas Type	Natural Gas	Factory	O	O	O
	LPG/Propane Gas	Factory	O	O	O
Low Temperature Vestibule Heater		Factory	O	O	O
Stainless Steel Heat Exchanger		Factory	O	O	
Vertical Vent Extension	C1EXTN20FF1	**31W62**			
	LTAWEK10/15	**73M72**	X		
	C1EXTN20121	**42W16**		[1] X	[1] X
ELECTRICAL					
Voltage	208/230V - 3 phase	Factory	O	O	O
60 hz	460V - 3 phase	Factory	O	O	O
	575V - 3 phase	Factory	O	O	O
GFI Service Outlets	Unit powered or field wired	Factory	O	O	O
BLOWER - SUPPLY AIR					
Constant Air Volume	1.5 hp	Factory			
	3 hp	Factory	O		
	5 hp	Factory		O	O
	7.5 hp	Factory		O	O
MSAV® (multi-stage air volume) supply fan option	3 hp	Factory	O		
	5 hp	Factory		O	O
	7.5 hp	Factory		O	O
CABINET					
Coil Guards	S1GARD22101	**50W67**			
	S1GARD22111	**50W68**	X		
	C1GARD29D-1	**84W63**		X	X
Hail Guards	S1GARD10101	**47W20**			
	S1GARD10111	**47W21**	X		
	C1GARD19D-1	**84W62**		X	X

[1] Order two each.

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
OX - Configure To Order (Factory Installed) or Field Installed
O = Configure To Order (Factory Installed)
X = Field Installed

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	120	240	288
CONTROLS					
Commercial Controls					
CPC Einstein Integration		Factory	O	O	O
Danfoss RTC Control		Factory	O	O	O
Novar® 2024		Factory	O	O	O
Novar® ETM-2051 Unit Controller		Factory	O	O	O
Novar® LSE		Factory	O	O	O
Prodigy® Control System - BACnet® Module		Factory	O	O	O
Prodigy® Control System - LonTalk® Module		Factory	O	O	O
L Connection® Network		Factory	O	O	O
Fresh Air Tempering	C1SNSR75AD1	**58W63**	X	X	X
[1] Smoke Detector	Supply	Factory	O	O	O
	Return	Factory	O	O	O
INDOOR AIR QUALITY					
Air Filters					
Healthy Climate® High Efficiency Air Filters	MERV 8	Factory		O	O
	MERV11- [4] C1FLTR50D-1-	**97L88**		OX	OX
	MERV 15- [2] C1FLTR50101	**28W03**			
	[3] C1FLTR50EA1	**28W02**	X		
	[4] C1FLTR50D-	**28W06**		X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)	C1FLTR30D-1-	**44N60**		X	X
Indoor Air Quality (CO_2) Sensors					
Sensor - Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	**77N39**	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	**87N53**	X	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	**87N52**	X	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	**87N54**	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications	C0MISC19AE1-	**85L43**	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)	C0MISC16AE1-	**90N43**	X	X	X
ECONOMIZER					
Economizer with Hood (Global Sensor, field provided)		Factory	O	O	O
Economizer Controls					
Differential Enthalpy	Order 2 - C1SNSR64FF1	**53W64**	OX	OX	OX
Single Enthalpy	C1SNSR64FF1	**53W64**	OX	OX	OX
Barometric Relief Dampers					
	Barometric Relief Dampers (No Hood)	**30W72**			
	Hood required - Order separately	**30W75**			
	Barometric Relief Dampers With Power Exhaust Fans (Hood Furnished)	**30W92**	OX		
	Barometric Relief Dampers Without Power Exhaust Fans (No Hood)	**47M14**	OX		
	Hood required - Order separately	**30W90**	OX		
	Barometric Relief Dampers Without Power Exhaust Fans (Hood Furnished)	**76W17**		OX	OX
OUTDOOR AIR					
Manual Outdoor Air Damper with Hood and Bird Screen		Factory		O	O
Motorized Outdoor Air Dampers with Hood and Bird Screen		Factory		O	O
POWER EXHAUST					
Standard Static		Factory	O	O	O
ROOF CURBS - DOWNFLOW					
14 in. height	S7CURB10101-	**30W03**			
	S1CURB10111-	**30W06**	X		
	Full Perimeter - S6CURB10121-	**30W15**		X	X
24 in. height	S7CURB11101-	**30W04**			
	S1CURB11111-	**30W07**	X		
	Full Perimeter - S6CURB11121-	**30W16**		X	X
LTL PACKAGING		Factory	O	O	O

[1] Factory installed smoke detectors must be ordered for use with either 115V or 24V external power supply only.
[2] 16 x 20 x 2 - Order 4 per unit
[3] 16 x 25 x 2 - Order 6 per unit
[4] 20 x 20 x 2 - order 12 per unit

NOTE - Catalog and model numbers shown are for ordering field installed accessories.
OX - Configure To Order (Factory Installed) or Field Installed
O = Configure To Order (Factory Installed)
X = Field Installed

SPECIFICATIONS — 10 TON

General Data	**Nominal Tonnage**	**10 Ton**	**10 Ton**
	Model No.	**SGC120H4B**	**SGC120H4M**
	Blower Type	**Constant Air Volume**	**MSAV® (Multi-Stage Air Volume) Supply Fan Option**
	Efficiency Type	**High**	**High**
Cooling Performance	Gross Cooling Capacity - Btuh	123,000	123,000
	[1] Net Cooling Capacity - Btuh	119,000	119,000
	AHRI Rated Air Flow - cfm	3700	3700
	Total Unit Power	9.7	9.8
	[1] EER (Btuh/Watt)	12.3	12.1
	[1] IEER (Btuh/Watt)	12.5	14.7
Refrigerant Charge Furnished R-410A	Circuit 1	22 lbs. 8 oz.	24 lbs. 0 oz.
	Circuit 2	21 lbs. 0 oz.	21 lbs. 8 oz.
[2] Sound Rating Number (dB)		88	88
Gas Heating Options Available - See page 7		Standard (2 Stage), Medium (2 Stage), or High (2 Stage)	
Compressor Type (No.)		Scroll (2)	Scroll (2)
Condenser Coil	Net face area - sq. ft.	47.1	47.1
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
Condenser Fan(s)	Motor horsepower	(3) 1/3	(3) 1/3
	Motor rpm	1075	1075
	Total Motor watts	940	940
	Diameter - in.	(3) 24	(3) 24
	Number of blades	3	3
	Total air volume - cfm	11,800	11,800
Evaporator Coil	Net face area - sq. ft.	15.6	15.6
	Tube diameter - in.	3/8	3/8
	Number of rows	4	4
	Fins per inch	14	14
	Drain connection - no. & size	(1) 1	(1) 1
	Expansion device type	Thermostatic Expansion Valve	
[3] Indoor Blower	Nominal motor output	3	3
	Maximum usable motor output	3.45	- - -
	RPM Range (Standard Static)	Drive #1 - 660-900 rpm	Drive #3 - 660-900 rpm
	RPM Range (High Static)	Drive #2 - 865-1080 rpm	Drive #4 - 865-1080 rpm
	Wheel nominal diameter x width - in.	(1) 15 x 15	(1) 15 x 15
Filters	Type of filter	MERV 7 or equivalent	
	Number and size - in.	(6) 16 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] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

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

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

SPECIFICATIONS — 20 TON

General Data	**Nominal Tonnage**	**20 Ton**	**20 Ton**
	Model No.	**SGC240H4B**	**SGC240H4M**
	Blower Type	**Constant Air Volume**	**MSAV® (Multi-Stage Air Volume) Supply Fan Option**
	Efficiency Type	**High**	**High**
Cooling Performance	Gross Cooling Capacity - Btuh	242,000	242,000
	Net Cooling Capacity - Btuh	[1] 236,000	[2] 236,000
	AHRI Rated Air Flow - cfm	6500	6500
	Total Unit Power - kW	18.7	18.7
	EER (Btuh/Watt)	[1] 12.6	[2] 12.6
	IEER (Btuh/Watt)	[1] 14.2	[2] 16.6
Refrigerant Charge Furnished R-410A	Circuit 1	17 lbs. 0 oz.	16 lbs. 0 oz.
	Circuit 2	17 lbs. 0 oz.	16 lbs. 0 oz.
	Circuit 3	17 lbs. 0 oz.	15 lbs. 0 oz.
	Circuit 4	17 lbs. 0 oz.	15 lbs. 0 oz.
[3] Sound Rating Number (dB)		92	92
Gas Heating Options Available - See page 7		Standard (2 Stage), Medium (2 Stage), or High (2 Stage)	
Compressor Type (No.)		Scroll (4)	Scroll (4)
Condenser Coil	Net face area - sq. ft.	70.6	70.6
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
Condenser Fan(s)	Motor horsepower	(6) 1/3	(6) 1/3
	Motor rpm	1075	1075
	Total Motor watts	1900	1900
	Diameter - in.	(6) 24	(6) 24
	Number of blades	3	3
	Total air volume - cfm	22,500	22,500
Evaporator Coil	Net face area - sq. ft.	33.3	33.3
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
	Drain connection - no. & size	(1) 1	(1) 1
	Expansion device type	Thermostatic Expansion Valve	
[4] Indoor Blower	Nominal motor HP	5	5
	Maximum usable motor HP	5.75	- - -
	RPM Range (Standard Static)	Drive #2 - 520-685 rpm	Drive #4 - 520-685 rpm
	RPM Range (High Static)	Drive #3 - 685-865 rpm	Drive #5 - 685-865 rpm
	Nominal motor HP	7.5	7.5
	Maximum usable motor HP	8.63	- - -
	RPM Range	Drive #6 - 770-965 rpm	Drive #7 - 770-965 rpm
	Wheel nominal diameter x width - in.	(2) 18 x 15	(2) 18 x 15
Filters	Type of filter	MERV 7 or equivalent	
	Number and size - in.	(12) 20 x 20 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] Rated at test conditions included in AHRI Standard 340/360, 95°F outdoor air temperature and 80°F db/67°F wb entering evaporator air; minimum external duct static pressure.

[3] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

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

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

SPECIFICATIONS — 24 TON

General Data	**Nominal Tonnage**	**24 Ton**	**24 Ton**
	Model No.	**SGC288H4B**	**SGC288H4M**
	Blower Type	**Constant Air Volume**	**MSAV® (Multi-Stage Air Volume) Supply Fan Option**
	Efficiency Type	**High**	**High**
Cooling Performance	Gross Cooling Capacity - Btuh	296,000	296,000
	Net Cooling Capacity - Btuh	288,000	288,000
	AHRI Rated Air Flow - cfm	7700	7700
	Total Unit Power - kW	24.8	24.8
	[1] EER (Btuh/Watt)	11.6	11.6
	[1] IEER (Btuh/Watt)	12.7	14.1
Refrigerant Charge Furnished R-410A	Circuit 1	16 lbs. 0 oz.	15 lbs. 8 oz.
	Circuit 2	16 lbs. 0 oz.	15 lbs. 8 oz.
	Circuit 3	16 lbs. 0 oz.	15 lbs. 8 oz.
	Circuit 4	16 lbs. 0 oz.	15 lbs. 8 oz.
[2] Sound Rating Number (dB)		94	94
Gas Heating Options Available - See page 7		Standard (2 Stage), Medium (2 Stage), or High (2 Stage)	
Compressor Type (No.)		Scroll (4)	Scroll (4)
Condenser Coil	Net face area - sq. ft.	70.6	70.6
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
Condenser Fan(s)	Motor horsepower	(6) 1/3	(6) 1/3
	Motor rpm	1075	1075
	Total Motor watts	1900	1900
	Diameter - in.	(6) 24	(6) 24
	Number of blades	3	3
	Total air volume - cfm	24,500	24,500
Evaporator Coil	Net face area - sq. ft.	33.3	33.3
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
	Drain connection - no. & size	(1) 1	(1) 1
	Expansion device type	Thermostatic Expansion Valve	
[3] Indoor Blower	Nominal motor HP	5	5
	Maximum usable motor HP	5.75	- - -
	RPM Range (Standard Static)	Drive #2 - 520-685 rpm	Drive #4 - 520-685 rpm
	RPM Range (High Static)	Drive #3 - 685-865 rpm	Drive #5 - 685-865 rpm
	Nominal motor HP	7.5	7.5
	Maximum usable motor HP	8.63	- - -
	RPM Range	Drive #6 - 770-965 rpm	Drive #7 - 770-965 rpm
	Wheel nominal diameter x width - in.	(2) 18 x 15	(2) 18 x 15
Filters	Type of filter	MERV 7 or equivalent	
	Number and size - in.	(12) 20 x 20 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] Rated at test conditions included in 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] Sound Rating Number rated in accordance with test conditions included in AHRI Standard 270.

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

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

SPECIFICATIONS - GAS HEAT — 10 TON

	Heat Input Type	Standard - 2 Stage	Medium - 2 Stage	High - 2 Stage
Gas Input - Btuh Natural Gas	First Stage	84,500	117,000	156,000
	Second Stage	130,000	180,000	240,000
	Second Stage Output	104,000	144,000	192,000
Gas Input - Btuh LPG/Propane	First Stage	94,000	130,000	173,000
	Second Stage	130,000	180,000	240,000
	Second Stage Output	104,000	144,000	192,000
Temperature Rise Range - °F		15 - 45	30 - 60	40 - 70
Recommended Gas Supply Pressure - Natural		7.0 in. w.g.	7.0 in. w.g.	7.0 in. w.g.
LPG/Propane		11.0 in. w.g.	11.0 in. w.g.	11.0 in. w.g.
Thermal Efficiency		80%	80%	80%
Gas Supply Connections		3/4 in. npt	3/4 in. npt	3/4 in. npt

SPECIFICATIONS - GAS HEAT — 20 AND 24 TON

	Heat Input Type	Standard - 2 Stage		Medium - 2 Stage		High - 2 Stage	
Gas Input - Btuh Natural Gas	First Stage	169,000		234,000		312,000	
	Second Stage	260,000		360,000		480,000	
	Second Stage Output	208,000		288,000		384,000	
Gas Input - Btuh LPG/Propane	First Stage	187,000		259,000		346,000	
	Second Stage	260,000		360,000		480,000	
	Second Stage Output	208,000		288,000		384,000	
Temperature Rise Range - °F		15 - 45 (20 ton)	10 - 40 (24 ton)	30 - 60 (20 ton)	15 - 45 (24 ton)	40 - 70 (20 ton)	20 - 50 (24 ton)
Recommended Gas Supply Pressure - Natural		7.0 in. w.g.		7.0 in. w.g.		7.0 in. w.g.	
LPG/Propane		11.0 in. w.g.		11.0 in. w.g.		11.0 in. w.g.	
Thermal Efficiency		80%		80%		80%	
Gas Supply Connections		1 in. npt		1 in. npt		1 in. npt	

HIGH ALTITUDE DERATE

NOTE - Units may be installed at altitudes up to 2000 ft. above sea level without any modifications.
At altitudes above 2000 ft. units must be derated to match information in the table shown.
At altitudes above 4500 ft. unit must be derated 2% for each 1000 ft. above sea level.
NOTE - This is the only permissible derate for these units.

Model	Heat Input Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate (Btuh)
			Natural Gas	LPG/Propane	
10 Ton	Standard (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	84,500/124,000
10 Ton	Medium (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	117,000/172,000
10 Ton	High (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	156,000/230,000
20 and 24 Ton	Standard (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	169,000/249,000
20 and 24 Ton	Medium (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	234,000/345,000
20 and 24 Ton	High (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.6	312,000/460,000

BLOWER DATA

SGC120H BLOWER PERFORMANCE
NOTE - Blower Table Includes Resistance For Base Unit With Gas Heat, Wet Indoor Coil And Air Filters In Place.
See Blower Motor / Drive Kit Table on page 11 for Motor HP and Drive Kit RPM Ranges Available.

Air Volume cfm	TOTAL STATIC PRESSURE - In. w.g.																							
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0		1.1		1.2		1.3	
	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	440	0.55	479	0.62	519	0.68	561	0.74	604	0.78	647	0.82	686	0.86	720	0.91	749	0.98	775	1.05	802	1.13	830	1.21	861	1.29
2200	458	0.61	497	0.68	538	0.75	580	0.8	624	0.85	666	0.89	704	0.94	735	1.00	762	1.08	788	1.16	815	1.24	844	1.33	875	1.41
2400	477	0.67	517	0.75	559	0.82	602	0.87	646	0.92	686	0.97	720	1.03	750	1.11	776	1.19	802	1.28	830	1.37	860	1.45	891	1.53
2600	497	0.74	538	0.82	581	0.89	626	0.95	668	1.00	706	1.06	737	1.14	765	1.22	791	1.32	818	1.41	847	1.5	876	1.59	907	1.67
2800	519	0.82	562	0.91	606	0.98	651	1.04	691	1.1	725	1.17	754	1.26	781	1.36	807	1.45	835	1.55	864	1.64	894	1.73	925	1.81
3000	544	0.92	588	1.00	633	1.07	676	1.14	713	1.21	744	1.3	772	1.4	798	1.5	825	1.61	853	1.7	882	1.8	912	1.88	943	1.97
3200	571	1.03	617	1.11	662	1.18	701	1.26	734	1.35	763	1.45	790	1.56	816	1.66	844	1.77	872	1.87	901	1.96	931	2.04	962	2.13
3400	602	1.14	648	1.22	690	1.3	725	1.4	755	1.5	783	1.62	809	1.73	836	1.84	864	1.94	892	2.04	921	2.12	951	2.21	982	2.29
3600	634	1.26	679	1.35	717	1.45	748	1.56	776	1.68	803	1.8	829	1.91	856	2.02	884	2.12	913	2.21	942	2.3	971	2.38	1002	2.46
3800	668	1.4	709	1.51	742	1.62	771	1.75	798	1.87	824	1.99	851	2.11	878	2.21	906	2.31	934	2.4	963	2.48	992	2.55	1023	2.63
4000	701	1.57	737	1.69	767	1.82	794	1.95	820	2.08	846	2.2	873	2.31	900	2.41	927	2.5	955	2.58	984	2.66	1014	2.73	1044	2.8
4200	732	1.76	763	1.9	791	2.04	817	2.17	843	2.3	869	2.41	896	2.52	922	2.61	949	2.69	977	2.77	1006	2.84	1035	2.91	1065	2.98
4400	761	1.99	789	2.14	815	2.27	841	2.4	866	2.52	892	2.63	919	2.73	945	2.81	972	2.89	999	2.96	1028	3.02	1057	3.09	**1087**	**3.16**
4600	788	2.24	814	2.38	840	2.52	865	2.64	890	2.76	916	2.86	942	2.94	968	3.01	995	3.08	1022	3.14	1050	3.21	1079	3.27	**1109**	**3.34**
4800	815	2.5	840	2.64	864	2.77	889	2.89	915	2.99	940	3.08	965	3.15	991	3.21	1017	3.27	1044	3.33	1072	3.39	**1101**	**3.45**	**1131**	**3.51**

NOTE - MSAV® (Multi-Stage Air Volume) Supply Fan Option drive is capable of 350 - 1050 rpm.
NOTE - Bold = field furnished.

BLOWER DATA

SGC240H BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Gas Heat, Wet Indoor Coil And Air Filters In Place.

See Blower Motor / Drive Kit Table on page 11 for Motor HP and Drive Kit RPM Ranges Available.

Air Volume cfm	TOTAL STATIC PRESSURE - In. w.g.																									
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0		1.1		1.2		1.3	
	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	265	0.43	321	0.54	378	0.64	429	0.74	475	0.83	515	0.91	551	1.00	584	1.11	616	1.23	647	1.36	678	1.50	709	1.66	743	1.82
2200	270	0.46	326	0.56	383	0.67	434	0.77	479	0.86	519	0.95	554	1.04	587	1.15	618	1.28	649	1.41	680	1.56	712	1.72	746	1.88
2400	276	0.48	332	0.59	389	0.70	439	0.81	483	0.90	523	0.99	558	1.09	590	1.20	621	1.33	652	1.47	682	1.62	715	1.78	749	1.95
2600	282	0.51	339	0.62	395	0.74	444	0.85	488	0.94	527	1.03	561	1.14	593	1.26	624	1.39	654	1.53	685	1.69	718	1.85	752	2.01
2800	289	0.54	346	0.65	401	0.77	450	0.89	492	0.99	531	1.08	565	1.19	596	1.31	627	1.45	657	1.60	688	1.75	721	1.92	756	2.09
3000	296	0.58	354	0.69	408	0.82	455	0.94	497	1.04	535	1.13	569	1.25	600	1.37	631	1.52	661	1.67	691	1.82	724	1.99	760	2.16
3200	304	0.61	362	0.73	415	0.86	461	0.99	503	1.09	540	1.19	573	1.31	604	1.44	634	1.59	665	1.74	695	1.90	728	2.07	764	2.24
3400	313	0.65	370	0.77	423	0.91	468	1.04	508	1.14	544	1.24	577	1.37	608	1.51	639	1.66	669	1.82	699	1.98	733	2.15	768	2.32
3600	322	0.69	379	0.82	430	0.97	474	1.10	514	1.20	550	1.31	582	1.44	613	1.58	643	1.74	673	1.90	704	2.06	738	2.23	773	2.40
3800	331	0.74	389	0.87	438	1.02	481	1.16	520	1.26	555	1.37	587	1.51	618	1.66	648	1.82	678	1.98	710	2.15	743	2.32	778	2.49
4000	342	0.79	398	0.92	446	1.08	488	1.22	526	1.32	560	1.44	592	1.59	623	1.75	653	1.91	684	2.07	715	2.24	748	2.41	783	2.58
4200	353	0.84	408	0.98	455	1.15	495	1.28	532	1.39	566	1.52	598	1.67	629	1.83	659	2.00	689	2.17	721	2.34	754	2.51	789	2.68
4400	364	0.90	418	1.04	463	1.21	503	1.35	539	1.47	572	1.60	604	1.76	634	1.93	665	2.10	695	2.27	727	2.44	761	2.61	796	2.79
4600	376	0.96	428	1.11	472	1.28	510	1.42	546	1.54	579	1.69	610	1.85	641	2.03	671	2.20	701	2.37	733	2.54	767	2.72	802	2.90
4800	388	1.02	438	1.17	480	1.34	518	1.49	553	1.63	585	1.78	616	1.95	647	2.13	677	2.30	708	2.48	740	2.65	774	2.83	809	3.01
5000	400	1.08	448	1.24	489	1.41	526	1.57	560	1.71	592	1.87	623	2.05	653	2.23	683	2.41	714	2.59	747	2.77	781	2.95	816	3.14
5200	412	1.15	458	1.32	498	1.49	534	1.65	567	1.81	599	1.98	630	2.16	660	2.35	690	2.52	721	2.70	754	2.88	789	3.07	824	3.26
5400	424	1.22	468	1.39	507	1.57	542	1.74	575	1.91	606	2.08	637	2.27	667	2.46	697	2.64	728	2.82	761	3.01	796	3.20	832	3.39
5600	436	1.30	478	1.48	516	1.66	551	1.83	583	2.01	614	2.20	644	2.39	674	2.58	705	2.76	736	2.95	769	3.13	804	3.33	839	3.52
5800	447	1.39	489	1.57	525	1.76	559	1.94	591	2.13	622	2.32	652	2.52	682	2.71	712	2.89	744	3.07	777	3.26	812	3.45	847	3.65
6000	459	1.48	499	1.67	535	1.86	568	2.05	599	2.25	630	2.45	660	2.65	690	2.84	720	3.02	752	3.20	785	3.39	819	3.58	855	3.77
6200	471	1.58	509	1.78	544	1.98	577	2.17	608	2.38	638	2.58	668	2.78	698	2.97	728	3.15	760	3.33	793	3.52	828	3.71	863	3.90
6400	482	1.69	520	1.89	554	2.10	586	2.30	616	2.51	646	2.72	676	2.92	706	3.11	736	3.29	768	3.47	801	3.65	836	3.84	871	4.03
6600	494	1.80	530	2.01	563	2.23	595	2.44	625	2.65	655	2.86	685	3.06	714	3.25	745	3.43	777	3.61	810	3.79	844	3.97	879	4.16
6800	505	1.93	541	2.14	573	2.36	604	2.58	634	2.80	664	3.01	693	3.21	723	3.40	753	3.57	785	3.75	818	3.92	853	4.11	888	4.29
7000	517	2.06	551	2.28	583	2.50	614	2.73	644	2.95	673	3.17	702	3.36	732	3.54	762	3.72	794	3.89	827	4.06	861	4.24	896	4.42
7200	528	2.20	562	2.42	593	2.66	623	2.89	653	3.11	682	3.32	711	3.52	741	3.69	771	3.86	803	4.03	836	4.20	870	4.38	905	4.56
7400	540	2.34	573	2.58	603	2.82	633	3.05	662	3.28	691	3.48	720	3.67	750	3.84	780	4.01	812	4.18	845	4.35	879	4.52	914	4.70
7600	551	2.50	583	2.74	613	2.98	643	3.22	672	3.44	701	3.65	730	3.83	759	4.00	790	4.16	821	4.32	854	4.49	888	4.66	922	4.84
7800	563	2.66	594	2.91	624	3.16	653	3.39	682	3.61	710	3.81	739	3.99	769	4.15	799	4.31	830	4.47	863	4.64	897	4.80	931	4.97
8000	574	2.83	605	3.09	634	3.34	663	3.57	691	3.79	720	3.98	749	4.15	778	4.31	808	4.47	840	4.62	872	4.78	906	4.95	940	5.12
8200	586	3.01	616	3.27	645	3.52	673	3.75	701	3.96	730	4.15	758	4.31	788	4.47	818	4.62	849	4.77	882	4.93	915	5.09	950	5.26
8400	598	3.20	627	3.46	655	3.71	683	3.94	711	4.14	740	4.32	768	4.48	798	4.63	828	4.78	859	4.93	891	5.08	925	5.24	959	5.40
8600	609	3.40	638	3.66	666	3.91	694	4.13	722	4.32	750	4.49	778	4.64	807	4.79	837	4.93	869	5.08	901	5.23	934	5.38	968	5.54
8800	621	3.60	649	3.86	677	4.10	704	4.31	732	4.50	760	4.66	788	4.81	817	4.95	847	5.09	878	5.23	910	5.38	944	5.53	977	5.69
9000	632	3.81	660	4.07	687	4.30	715	4.50	742	4.68	770	4.83	798	4.97	827	5.11	857	5.25	888	5.39	920	5.53	953	5.68	987	5.83
9200	644	4.02	671	4.28	698	4.50	725	4.69	753	4.85	780	5.00	809	5.14	837	5.27	867	5.41	898	5.54	930	5.68	963	5.83	996	5.98
9400	655	4.24	682	4.49	709	4.70	736	4.88	763	5.03	791	5.17	819	5.31	848	5.44	877	5.57	908	5.70	940	5.84	973	5.98	1006	6.13
9600	667	4.47	693	4.70	720	4.90	747	5.06	774	5.21	801	5.35	829	5.47	858	5.60	888	5.73	918	5.86	950	5.99	982	6.13	1016	6.27

BLOWER DATA

SGC288H BLOWER PERFORMANCE

NOTE - Blower Table Includes Resistance For Base Unit With Gas Heat, Wet Indoor Coil And Air Filters In Place.

See Blower Motor / Drive Kit Table on page 11 for Motor HP and Drive Kit RPM Ranges Available.

Air Volume cfm	TOTAL STATIC PRESSURE - In. w.g.																									
	0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9		1.0		1.1		1.2		1.3	
	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
2400	294	0.31	335	0.49	378	0.65	421	0.79	466	0.89	511	0.98	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2600	298	0.34	338	0.52	382	0.69	425	0.83	470	0.93	516	1.02	561	1.13	602	1.25	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2800	302	0.37	342	0.55	386	0.72	430	0.87	475	0.97	520	1.07	565	1.17	606	1.30	643	1.43	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
3000	306	0.41	347	0.59	390	0.76	434	0.91	479	1.02	525	1.11	570	1.22	610	1.35	646	1.48	678	1.62	- - -	- - -	- - -	- - -	- - -	- - -
3200	311	0.45	352	0.63	395	0.80	439	0.96	485	1.07	530	1.16	574	1.27	614	1.40	649	1.54	681	1.68	709	1.81	737	1.93	- - -	- - -
3400	316	0.49	357	0.67	400	0.85	444	1.00	490	1.11	535	1.21	579	1.32	618	1.45	653	1.59	684	1.74	712	1.87	740	2.00	768	2.11
3600	322	0.53	362	0.72	406	0.90	450	1.05	495	1.17	541	1.26	584	1.37	622	1.51	657	1.65	687	1.8	715	1.94	743	2.07	771	2.19
3800	328	0.58	369	0.77	412	0.95	456	1.11	501	1.22	546	1.32	589	1.43	627	1.57	661	1.72	691	1.87	718	2.01	746	2.14	774	2.27
4000	334	0.63	375	0.82	418	1.01	462	1.16	508	1.28	552	1.37	594	1.49	632	1.63	665	1.79	694	1.94	722	2.09	750	2.22	777	2.35
4200	341	0.68	382	0.88	425	1.07	469	1.23	514	1.34	558	1.44	600	1.55	636	1.70	669	1.86	698	2.02	725	2.17	753	2.31	781	2.44
4400	348	0.74	389	0.94	432	1.13	475	1.29	521	1.40	565	1.50	606	1.62	641	1.77	673	1.94	702	2.10	729	2.25	757	2.39	784	2.54
4600	356	0.80	397	1.00	439	1.19	483	1.36	528	1.47	571	1.57	611	1.69	647	1.85	678	2.02	706	2.19	733	2.34	760	2.49	787	2.64
4800	363	0.86	405	1.07	447	1.27	490	1.43	535	1.54	578	1.64	617	1.77	652	1.93	682	2.11	710	2.28	737	2.43	764	2.58	791	2.74
5000	372	0.93	413	1.14	455	1.34	498	1.50	542	1.61	585	1.71	623	1.84	657	2.02	687	2.20	715	2.38	741	2.53	768	2.69	795	2.85
5200	380	1.01	421	1.22	463	1.41	506	1.57	550	1.69	592	1.79	630	1.93	663	2.11	692	2.30	719	2.48	746	2.64	773	2.79	799	2.96
5400	389	1.09	430	1.3	472	1.49	515	1.65	558	1.76	599	1.87	636	2.02	668	2.21	697	2.41	724	2.58	750	2.75	777	2.91	803	3.08
5600	399	1.17	440	1.37	481	1.56	524	1.72	567	1.83	607	1.95	643	2.11	674	2.31	702	2.52	729	2.70	755	2.86	782	3.03	808	3.20
5800	409	1.25	450	1.45	491	1.64	533	1.79	576	1.91	615	2.04	649	2.21	679	2.42	707	2.63	734	2.81	760	2.98	787	3.15	812	3.33
6000	419	1.33	460	1.53	502	1.71	543	1.86	585	1.99	623	2.13	656	2.32	685	2.54	713	2.75	739	2.93	765	3.10	792	3.28	817	3.46
6200	430	1.41	471	1.60	512	1.78	553	1.94	594	2.07	630	2.23	662	2.43	691	2.66	718	2.87	745	3.05	771	3.23	797	3.41	822	3.60
6400	442	1.49	482	1.68	523	1.86	563	2.01	603	2.16	638	2.33	668	2.55	696	2.78	724	2.99	750	3.18	776	3.36	802	3.55	827	3.74
6600	454	1.58	494	1.76	533	1.93	573	2.10	612	2.26	645	2.45	675	2.67	702	2.90	730	3.12	756	3.31	782	3.50	808	3.69	832	3.89
6800	466	1.66	505	1.84	544	2.01	583	2.19	620	2.36	653	2.57	681	2.80	709	3.03	736	3.25	762	3.44	788	3.64	813	3.84	837	4.04
7000	478	1.75	517	1.92	555	2.10	593	2.28	629	2.48	660	2.70	688	2.93	715	3.16	742	3.38	768	3.58	794	3.79	819	4.00	842	4.20
7200	490	1.84	528	2.01	565	2.20	603	2.39	637	2.60	667	2.84	695	3.07	721	3.30	748	3.52	775	3.73	800	3.94	825	4.16	848	4.36
7400	502	1.94	539	2.12	576	2.30	612	2.51	645	2.74	674	2.98	701	3.22	728	3.44	755	3.66	781	3.88	807	4.11	831	4.32	853	4.53
7600	514	2.06	550	2.23	586	2.42	621	2.64	654	2.88	682	3.13	709	3.37	736	3.59	762	3.82	788	4.05	813	4.27	837	4.50	859	4.71
7800	525	2.17	561	2.35	596	2.55	631	2.78	662	3.03	690	3.28	716	3.52	743	3.75	769	3.98	795	4.22	820	4.45	843	4.68	865	4.89
8000	537	2.27	572	2.46	606	2.68	640	2.92	670	3.19	697	3.45	724	3.69	751	3.92	777	4.15	802	4.39	826	4.64	849	4.87	871	5.09
8200	549	2.38	583	2.59	617	2.82	649	3.08	678	3.36	706	3.62	732	3.86	758	4.09	784	4.33	809	4.58	833	4.83	856	5.07	877	5.30
8400	561	2.49	594	2.72	627	2.97	658	3.25	687	3.53	714	3.79	740	4.03	766	4.27	792	4.52	817	4.77	840	5.03	862	5.28	884	5.51
8600	573	2.61	605	2.87	637	3.14	667	3.43	696	3.71	722	3.98	748	4.22	774	4.46	800	4.71	824	4.98	847	5.25	869	5.50	890	5.73
8800	584	2.75	616	3.03	647	3.31	676	3.61	704	3.9	731	4.16	757	4.41	783	4.65	808	4.91	831	5.19	854	5.47	876	5.73	897	5.96
9000	596	2.91	626	3.20	656	3.50	686	3.80	713	4.09	739	4.35	765	4.60	791	4.86	816	5.12	839	5.41	862	5.70	883	5.96	904	6.20
9200	607	3.08	636	3.38	666	3.69	695	3.99	722	4.28	748	4.55	774	4.80	799	5.07	824	5.35	847	5.64	869	5.93	890	6.20	911	6.43
9400	617	3.27	647	3.58	676	3.89	704	4.19	731	4.48	757	4.75	783	5.01	808	5.28	832	5.58	855	5.88	877	6.18	898	6.44	919	6.67
9600	628	3.46	657	3.78	685	4.09	713	4.39	740	4.67	766	4.95	792	5.23	816	5.51	840	5.82	863	6.13	884	6.42	906	6.69	926	6.92
9800	638	3.67	667	3.99	695	4.29	723	4.59	749	4.88	775	5.16	801	5.45	825	5.75	849	6.07	871	6.38	893	6.68	914	6.94	934	7.17
10,000	648	3.88	677	4.19	705	4.50	732	4.79	759	5.09	785	5.39	810	5.69	834	6.01	857	6.33	880	6.64	901	6.94	922	7.20	942	7.42
10,200	659	4.10	687	4.41	715	4.71	742	5.01	769	5.32	794	5.63	819	5.95	843	6.28	866	6.60	888	6.91	909	7.21	930	7.46	951	7.68
10,400	669	4.32	697	4.62	725	4.93	752	5.24	779	5.56	804	5.88	829	6.22	853	6.55	876	6.88	897	7.19	918	7.48	939	7.73	959	7.94
10,600	680	4.54	708	4.85	736	5.16	763	5.48	789	5.81	814	6.15	839	6.50	862	6.84	885	7.17	906	7.48	927	7.76	948	8.00	968	8.21
10,800	691	4.76	719	5.08	746	5.40	773	5.74	799	6.08	824	6.44	849	6.80	872	7.14	894	7.47	916	7.77	936	8.05	957	8.28	977	8.49
11,000	702	4.99	730	5.32	757	5.66	784	6.01	810	6.37	835	6.74	859	7.11	882	7.45	904	7.78	925	8.08	946	8.34	966	8.57	986	8.77
11,200	713	5.24	741	5.58	768	5.93	795	6.29	821	6.67	846	7.05	870	7.43	892	7.77	914	8.09	935	8.38	955	8.64	975	8.86	996	9.06
11,400	725	5.49	753	5.84	780	6.21	806	6.60	832	6.99	857	7.38	880	7.76	903	8.10	924	8.41	945	8.70	965	8.94	985	9.16	1005	9.35
11,600	737	5.76	764	6.13	791	6.52	818	6.92	843	7.33	868	7.72	891	8.10	913	8.44	934	8.74	955	9.02	975	9.25	995	9.46	1014	9.64

BLOWER DATA

CONSTANT AIR VOLUME DRIVE KIT SPECIFICATIONS

Model No.	Nominal hp	Maximum hp	Drive Kit Number	RPM Range
120	3	3.45	#1 #2	660 - 900 865 - 1080
240/288	5	5.75	#2 #3	520 - 685 685 - 865
	7.5	8.63	#6	770 - 965

MSAV® (MULTI-STAGE AIR VOLUME) DRIVE KIT SPECIFICATIONS

Model No.	Nominal / Maximum hp	Drive Kit Number	RPM Range
120	3	#3 #4	660 - 900 865 - 1080
240/288	5	#4 #5	520 - 685 685 - 865
	7.5	#7	770 - 965

POWER EXHAUST FANS STANDARD STATIC PERFORMANCE

SGC120H		SGC240H		SGC288H	
Return Air System Static Pressure	Air Volume Exhausted	Return Air System Static Pressure	Air Volume Exhausted	Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm	in. w.g.	cfm	in. w.g.	cfm
0.05	4085	0	10,200	0	12,800
0.10	3685	0.05	9700	0.05	12,200
0.15	3280	0.10	9200	0.10	11,500
0.20	2880	0.15	8600	0.15	10,800
0.25	2475	0.20	8100	0.20	9900
- - -	- - -	0.25	7600	0.25	9000
- - -	- - -	0.30	6900	0.30	7900
- - -	- - -	0.35	6000	0.35	6750
- - -	- - -	0.40	5000	0.40	5450
- - -	- - -	0.45	4150	0.45	4150
- - -	- - -	- - -	- - -	0.50	2900

ELECTRICAL DATA — 10 TON

	Model No.	SGC120H4		
[1] **Voltage - 60hz**		**208/230V-3 Ph**	**460V-3 Ph**	**575V-3 Ph**
Compressor 1	Rated Load Amps	16	7.8	5.7
	Locked Rotor Amps	110	52	38.9
Compressor 2	Rated Load Amps	16	7.8	5.7
	Locked Rotor Amps	110	52	38.9
Outdoor Fan Motors (3)	Full Load Amps (total)	2.4 (7.2)	1.3 (3.9)	1 (3)
Power Exhaust (1) 0.5 HP	Full Load Amps	3	1.5	1.2
Service Outlet 115V GFI (Amps)		20	20	15
Indoor Blower Motor	Horsepower	3	3	3
	Full Load Amps	10.6	4.8	3.9
[2] **Maximum Overcurrent Protection**	Unit Only	60	30	25
	With (1) 0.5 HP Power Exhaust	70	35	25
[3] **Minimum Circuit Ampacity**	Unit Only	54	27	20
	With (1) 0.5 HP Power Exhaust	57	28	21

[1] NOTE - 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 — 20 TON

	Model No.	SGC240H4					
[1] Voltage - 60hz		208/230V-3 Ph		460V-3 Ph		575V-3 Ph	
Compressor 1	Rated Load Amps	16		7.8		5.7	
	Locked Rotor Amps	110		52		38.9	
Compressor 2	Rated Load Amps	16		7.8		5.7	
	Locked Rotor Amps	110		52		38.9	
Compressor 3	Rated Load Amps	16		7.8		5.7	
	Locked Rotor Amps	110		52		38.9	
Compressor 4	Rated Load Amps	16		7.8		5.7	
	Locked Rotor Amps	110		52		38.9	
Outdoor Fan Motors (6)	Full Load Amps	2.4		1.3		1	
	(total)	(14.4)		(7.8)		(6)	
Power Exhaust (3) 0.33 HP	Full Load Amps	2.4		1.3		1	
	(total)	(7.2)		(3.9)		(3)	
Service Outlet 115V GFI (Amps)		20		20		15	
Indoor Blower Motor	Horsepower	5	7.5	5	7.5	5	7.5
	Full Load Amps	16.7	24.2	7.6	11	6.1	9
[2] Maximum Overcurrent Protection	Unit Only	110	125	50	60	40	45
	With (3) 0.33 HP Power Exhaust	110	125	60	60	45	50
[3] Minimum Circuit Ampacity	Unit Only	100	107	49	52	37	40
	With (3) 0.33 HP Power Exhaust	107	114	53	56	40	43

ELECTRICAL DATA — 24 TON

	Model No.	SGC288H4					
[1] Voltage - 60hz		208/230V-3 Ph		460V-3 Ph		575V-3 Ph	
Compressor 1	Rated Load Amps	22.4		10.6		7.7	
	Locked Rotor Amps	149		75		54	
Compressor 2	Rated Load Amps	22.4		10.6		7.7	
	Locked Rotor Amps	149		75		54	
Compressor 3	Rated Load Amps	22.4		10.6		7.7	
	Locked Rotor Amps	149		75		54	
Compressor 4	Rated Load Amps	22.4		10.6		7.7	
	Locked Rotor Amps	149		75		54	
Outdoor Fan Motors (6)	Full Load Amps	2.4		1.3		1	
	(total)	14.4		7.8		. 6	
Power Exhaust (3) 0.33 HP	Full Load Amps	2.4		1.3		1	
	(total)	7.2		3.9		3	
Service Outlet 115V GFI (Amps)		20		20		15	
Indoor Blower Motor	Horsepower	5	7.5	5	7.5	5	7.5
	Full Load Amps	16.7	24.2	7.6	11	6.1	9
[2] Maximum Overcurrent Protection	Unit Only	150	150	70	70	50	50
	With (3) 0.33 HP Power Exhaust	150	150	70	70	50	60
[3] Minimum Circuit Ampacity	Unit Only	127	134	61	64	45	48
	With (3) 0.33 HP Power Exhaust	134	141	65	68	48	51

[1] NOTE - 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.

SGC120 PARTS ARRANGEMENT

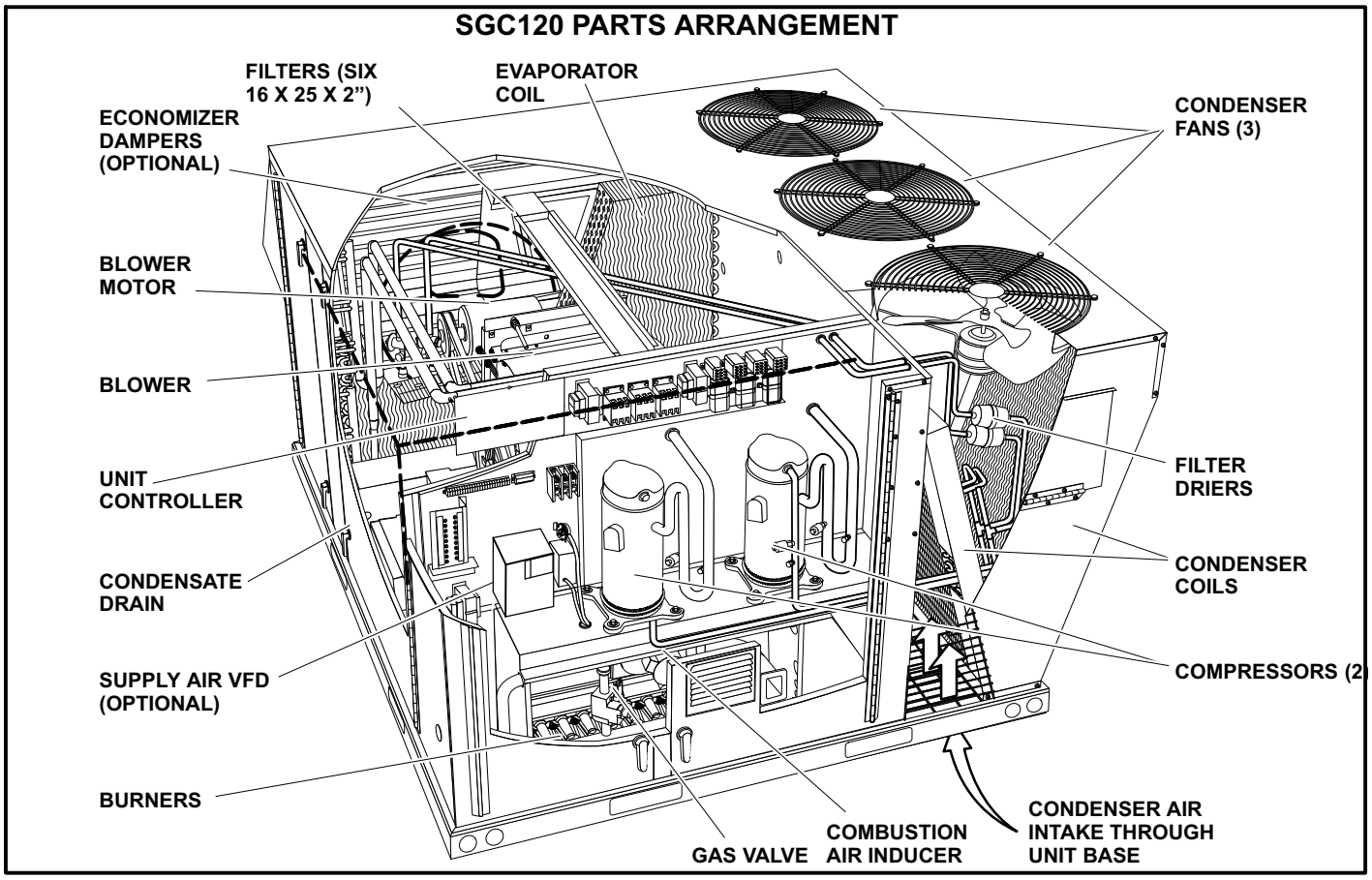


FIGURE 1

SGC240 & 288 PARTS ARRANGEMENT

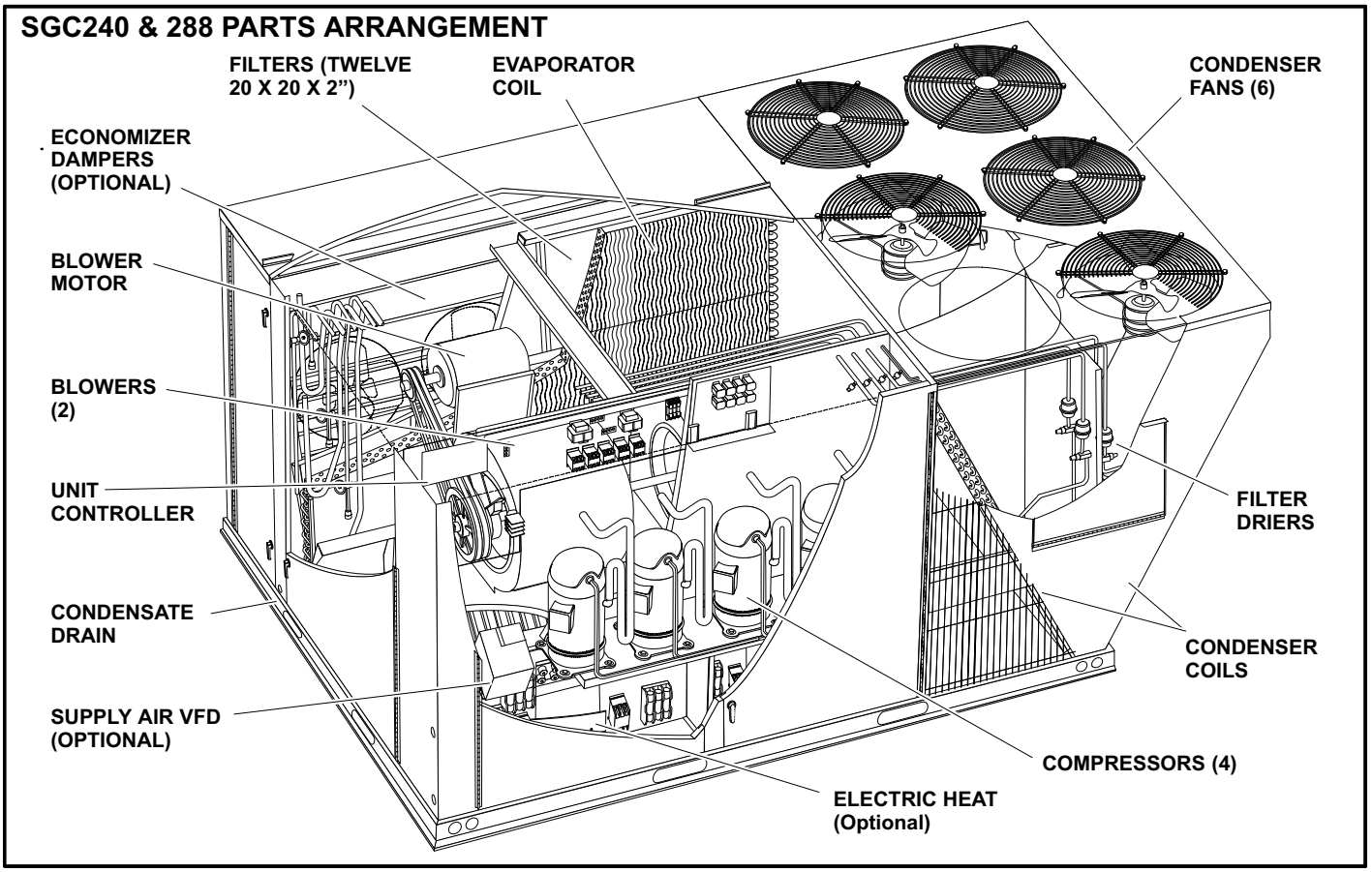


FIGURE 2

SGC120 CONTROL BOX PARTS ARRANGEMENT

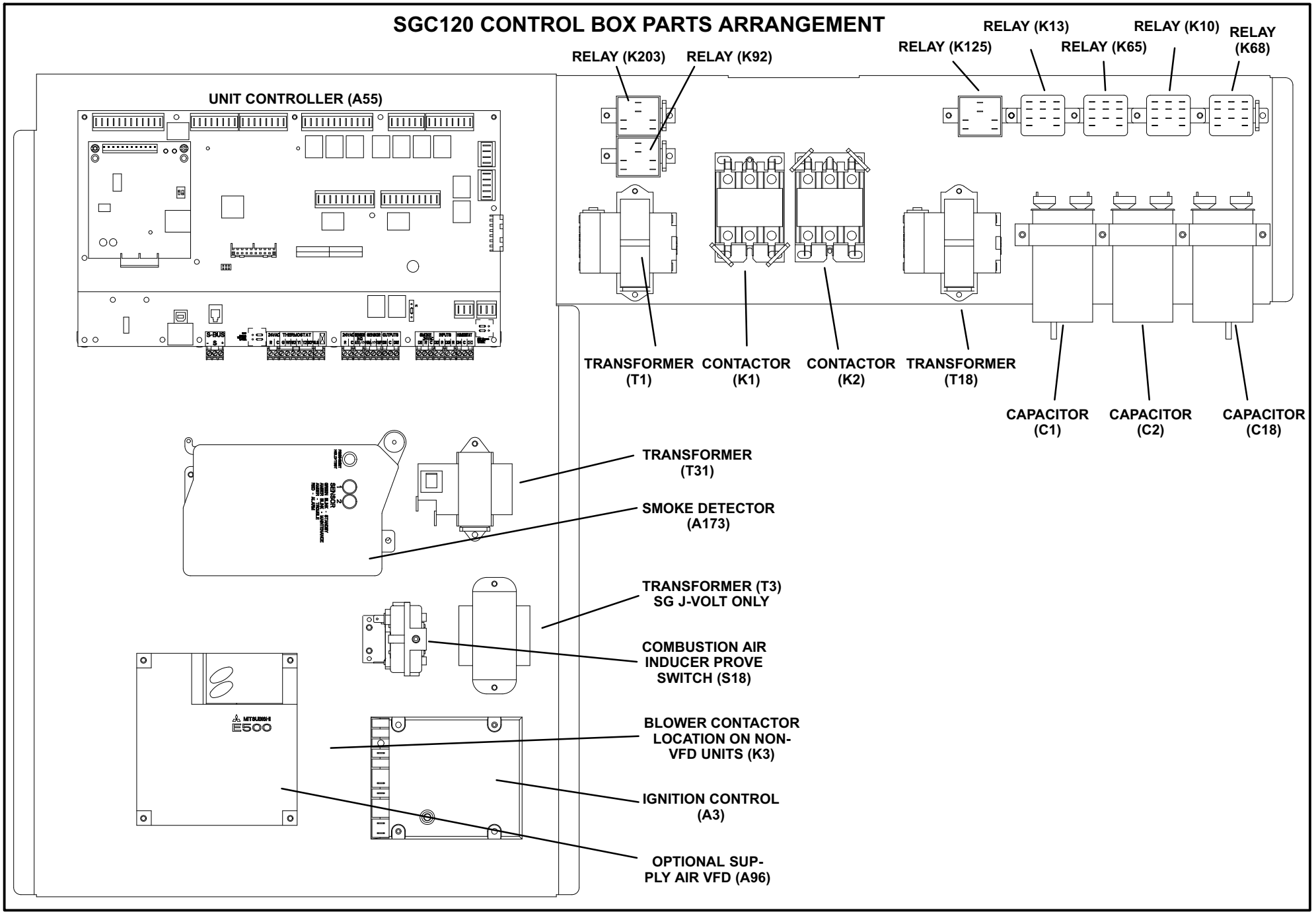


FIGURE 3

SGC240 & 288 CONTROL BOX PARTS ARRANGEMENT

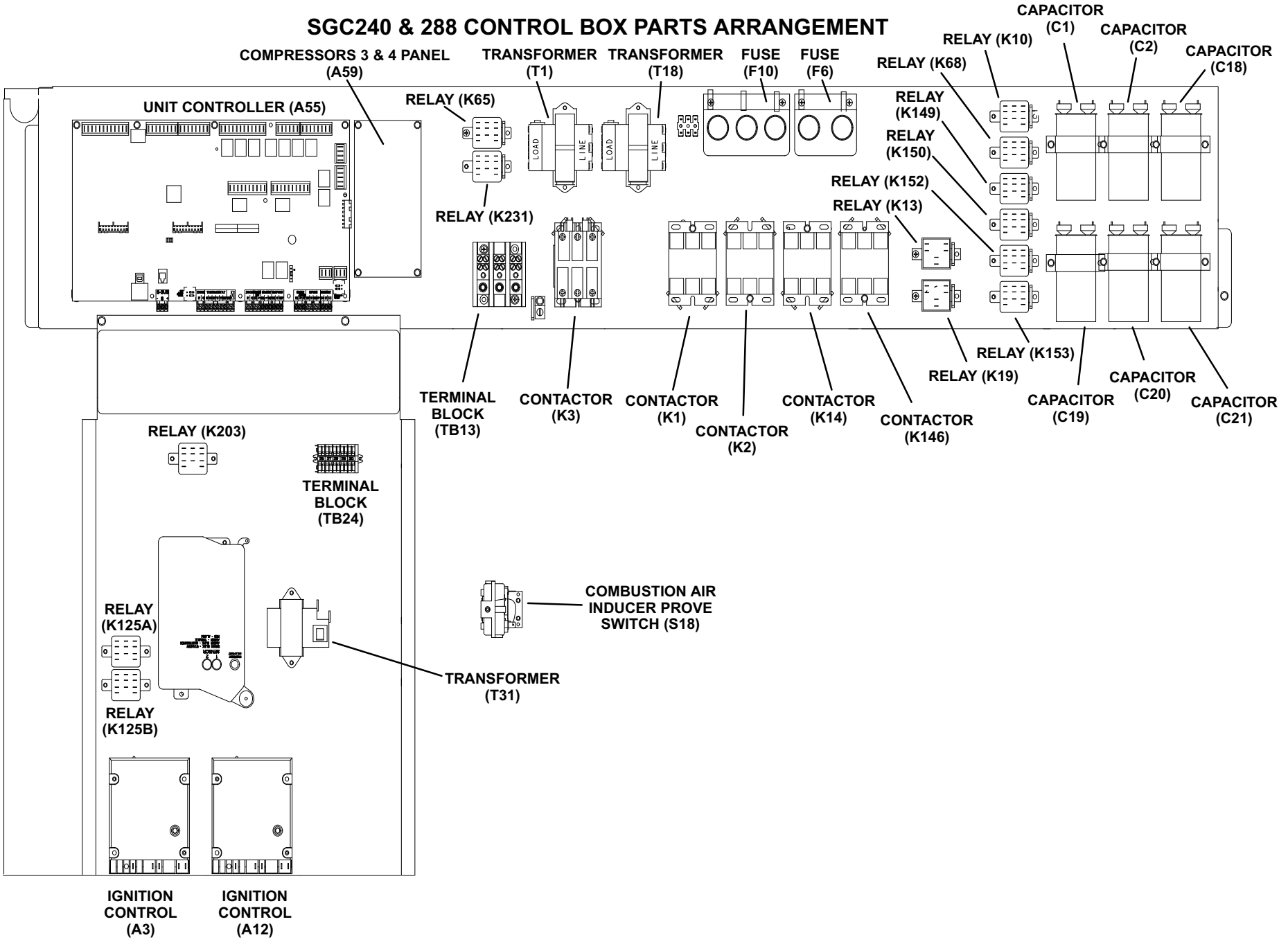


FIGURE 4

I-UNIT COMPONENTS

The SGC unit components are shown in figures 1 and 2. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue.

A-Control Box Components

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

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

SGC control box components are shown in figures 3 and 4 The control box is located in the upper left portion of the compressor compartment.

1-Circuit Breaker CB10

All units are equipped with circuit breaker CB10. Circuit breaker CB10 is a toggle switch which can be used by the service technician to disconnect power to the unit.

2-Control Transformer T1 (all units)

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 5, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

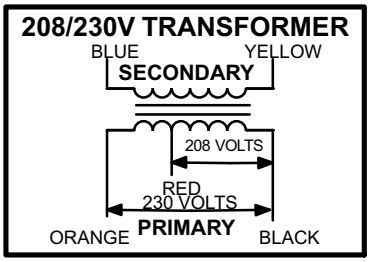


FIGURE 5

3-Contactor Transformer T18 (240 & 288 units)

T18 is a single line voltage to 24VAC transformer used in 20 and 24 ton units. Transformer T18 is protected by a 3.5 amp circuit breaker (CB18). T18 is identical to transformer T1. The transformer supplies 24VAC power to the contactors.

4-C. A. I. Transformers T3 & T13 all 575V units (240 & 288)

All SG 575 (J) voltage units use transformer T3. In addition, SG 240 & 288 units use transformer T13. The 575 to 230VAC transformers are mounted in the control box. The transformers have an output rating of 0.5A. T3 transformer supplies 230 VAC power to combustion air blower motor (B6), while T13 transformer supplies power to combustion air blower motor (B15) in SG 240 & 288 units.

5-Terminal Strips TB2 (120) and TB13 (240 & 280 units)

TB2 terminal strip distributes line voltage power to the line voltage items in the unit. TB13 terminal strip distributes line voltage power to the line voltage items in the unit.

6-Outdoor Fan Motor Fuse Block & Fuses F10 all 230V units (240 & 288 units)

Three line voltage fuses F10 provide overcurrent protection to all condenser fans in all 240 & 288 units. The fuses are rated at 30A in 208/230V units.

7-Power Exhaust Fan Fuse Block F6 all 230V units (240 & 288 units)

Two line voltage fuses F6 provide overcurrent protection to the power exhaust fans in SG 240 & 288 units. The fuses are rated at 30A.

8-Outdoor Fan Capacitors C1, C2, & C18 (all units) C19, C20 & C21 (240 & 288 units)

Fan capacitors C1, C2, C18, C19, C20 and C21 are used to assist in the start up of condenser fans B4, B5, B21, B22, B23 and B24. Ratings will be on outdoor fan motor nameplate.

9-Compressor Contactor K1 & K2 (all units), K14 & K146 (240 & 288 units)

All compressor contactors are three-pole-double-break contactors with 24VAC coils. In SG 120 units, K1 (energized by A55) and K2 (energized by A55) energize compressors B1 and B2 in response to thermostat demand. In the SG 240 & 288, K1 (energized by A55), K2 (energized by A55), K14 (energized by A59) and K146 (energized by A59) energize compressors B1, B2, B13 and B20 in response to first or second stage cool demand.

10-Combustion Air Prove Switch S18 (all units) and S45 (240 & 288 units)

Prove switches S18 & S45 are SPST N.O. switch used to monitor combustion air inducer operation. Switches S18 & S45 are wired to the main control panel A55 and close at *negative* 0.25"W.C. $\pm$ 0.05" (114 Pa $\pm$ 12.4 Pa) on 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 not adjustable. The switch will automatically open on a pressure rise (less negative pressure) at 0.10" W.C. $\pm$ 0.05" W.C. (77.2 Pa $\pm$ 12.4 Pa).

11-Outdoor Fan Relay K10, K68 (all units) K149, K150, K152, K153 (240 & 288 units)

Outdoor fan relays K10, K68, K149, K150, K152 and K153 are DPDT relays with a 24VAC coil. In all units K10 energizes condenser fan B4. In SG 120 units, K68 energizes fans B5 and B21. In SG 240 & 288 units, K68 energizes fan B5. In SG 240 & 288 units, K149, K150, K152 and K153 energize condenser fans B21, B22, B23 and B24 respectively.

12-Combustion Air Inducer Relay K13

Combustion air inducer relay K13, used in all units, is a DPDT relay with a 24VAC coil. K13 is energized by the main control module A55 after a first stage heating demand from the thermostat. K13 remains energized throughout the heating demand. When energized, K13 N.O. contacts close to energize combustion air blower and begin a heating sequence. Pressure switch S18, located in the compressor compartment, closes as combustion air static pressure falls to “prove” combustion air inducer operation. When S18 closes, the ignition controls and gas valves are energized to begin a heating sequence.

13-Combustion Air Inducer Relay K19 (240 & 288 units - second burner section)

Combustion air inducer relay K19, used in SG 240 & 288 units, is a DPDT relay with a 24 VAC coil. K19 is energized by the main control module A55 after a first stage heating demand from the thermostat. K19 remains energized throughout the first stage heating demand. When energized, K19 N.O. contacts close to energize the second heat section combustion air blower and begin second section heating sequence. Prove switch S45, located in the compressor compartment, closes as combustion air static pressure falls to “prove” combustion air blower operation. When S45 closes, the second section of the ignition control and gas valve are energized to begin the second section heating sequence.

14-Burner Control A3 (all units) and A12 (240 & 288 units)

A3 controls gas heat operation. The control makes three attempts at ignition and then locks out the system if ignition is not obtained after the third trial. Reset after lockout requires only breaking and remaking thermostat demand. The control shuts off gas flow immediately in the event of a gas or 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. For 240 & 288 unit detailed description see the Gas Heat Components section.

15-Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a N.O. DPDT relay with a 24VAC coil. K65 is used in all units equipped with the optional power exhaust fans. K65 is energized by the main control module A55, after the economizer dampers reach 50% open (adjustable in ECTO). When K65 closes on SG 120 units, exhaust fans B10 and B11 are energized. When K65 closes on SG 240 & 288 units, exhaust fans B10, B11 and B12 are energized.

16-Blower Contactor K3 (CAV units)

Blower contactor K3, used in all CAV units, is a three-pole-double-break contactor with a 24VAC coil used to energize the indoor blower motor B3 in response to blower demand. K3 is energized by main control panel (A55).

17-Relay K203 (MSAV™ units)

Blower relay K203, used in all MSAV™ units, is a 24volt SPDT relay in SG 120 units and DPDT relay in SG 240 & 288 units. K203 relay is used to energize the indoor blower motor B3 in response to blower demand. K203 is energized by main control panel (A55).

18-Main Control Module A55 (all units)

The Unit Controller provides all unit control functions, unit status information, unit diagnostics, programmable parameters, and USB verification and profile sharing. Refer to the Unit Controller guide provided with the unit. Thermostat wires are connected to J297 on the Unit Controller.

19-Compressor 3 & 4 Control Module A59 (240 & 288 units)

The compressor 3 & 4 control module A59 controls two additional compressor stage for the 240 & 288 units. A59 includes all inputs and outputs required for compressor and fan control, compressor stage diagnostics, and low ambient control.

SG 120 PLUMBING & COMPONENTS

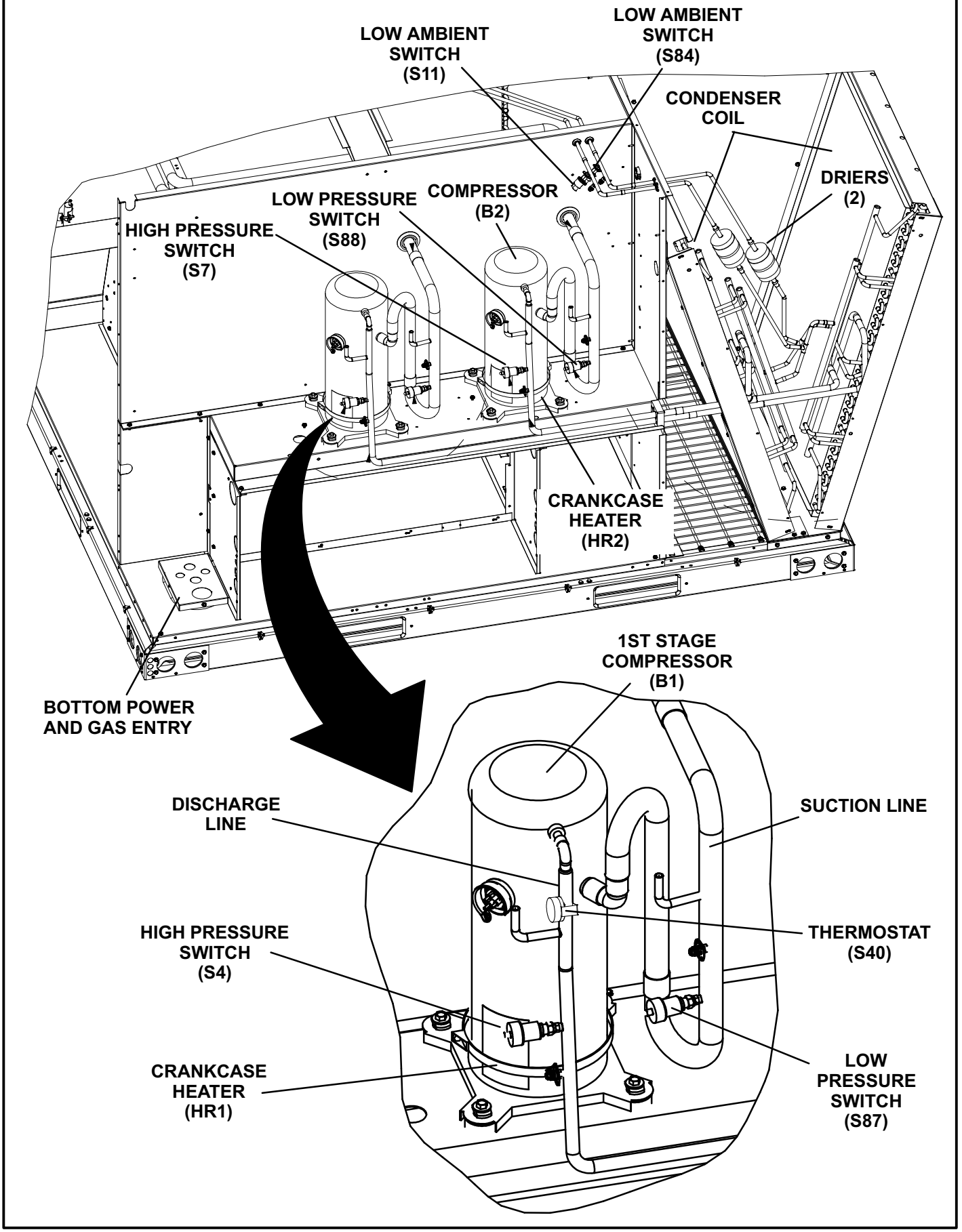
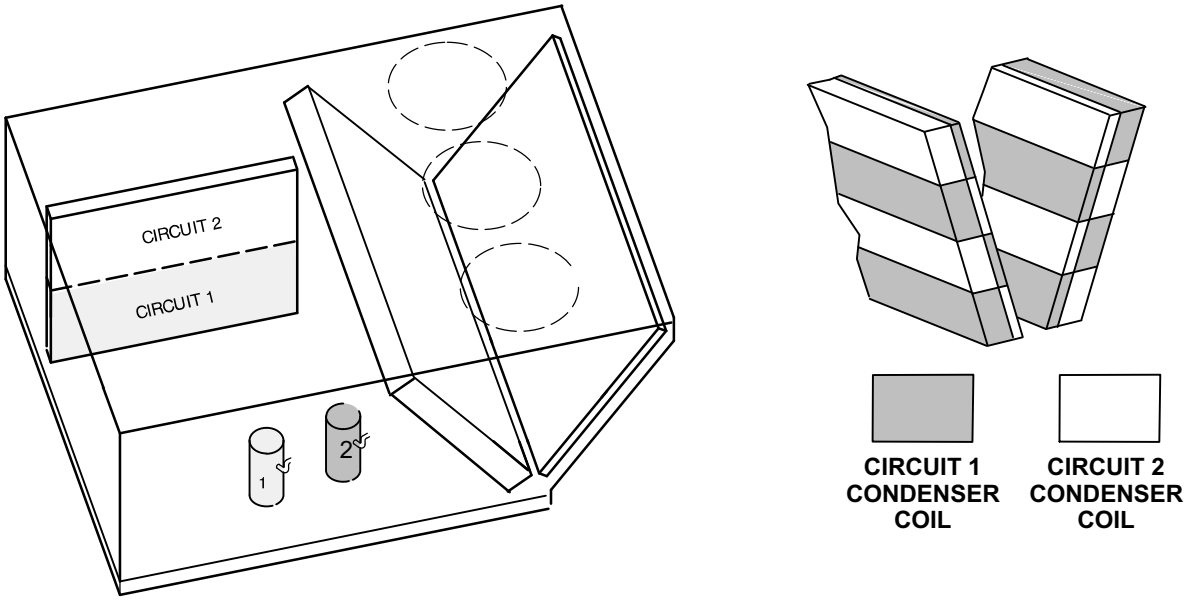


FIGURE 6

SG 120 REFRIGERATION CIRCUITS CONSTANT AIR VOLUME



SG 120 REFRIGERATION CIRCUITS MSAV™ SUPPLY AIR

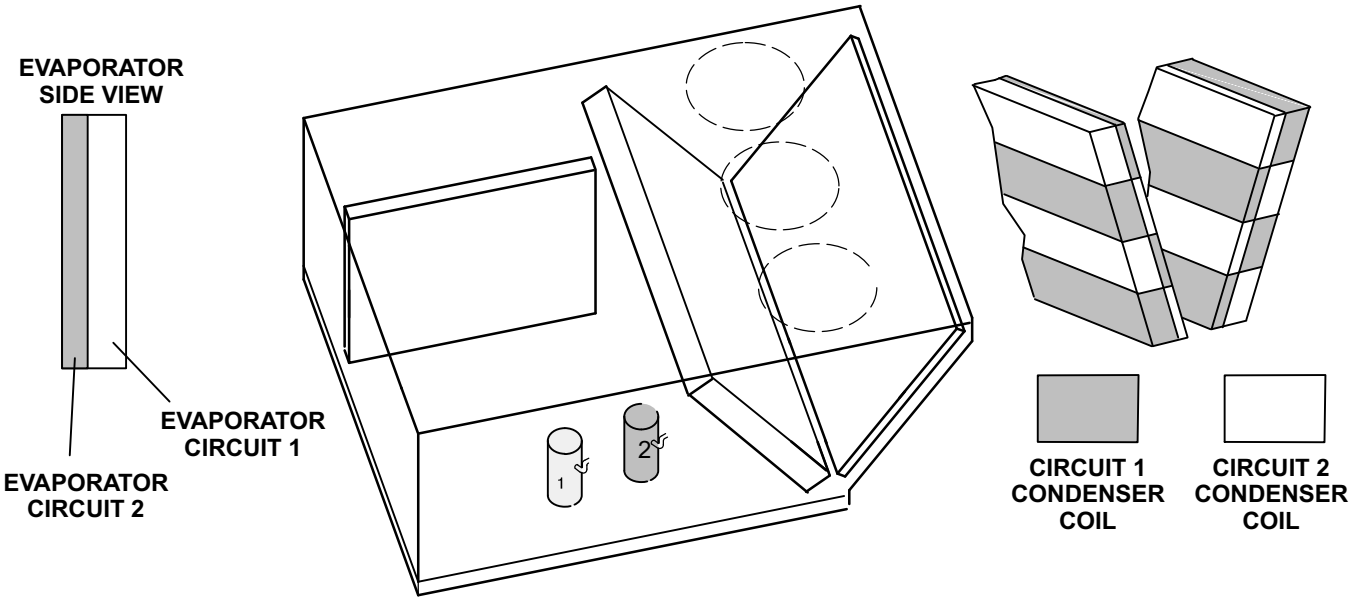


FIGURE 7

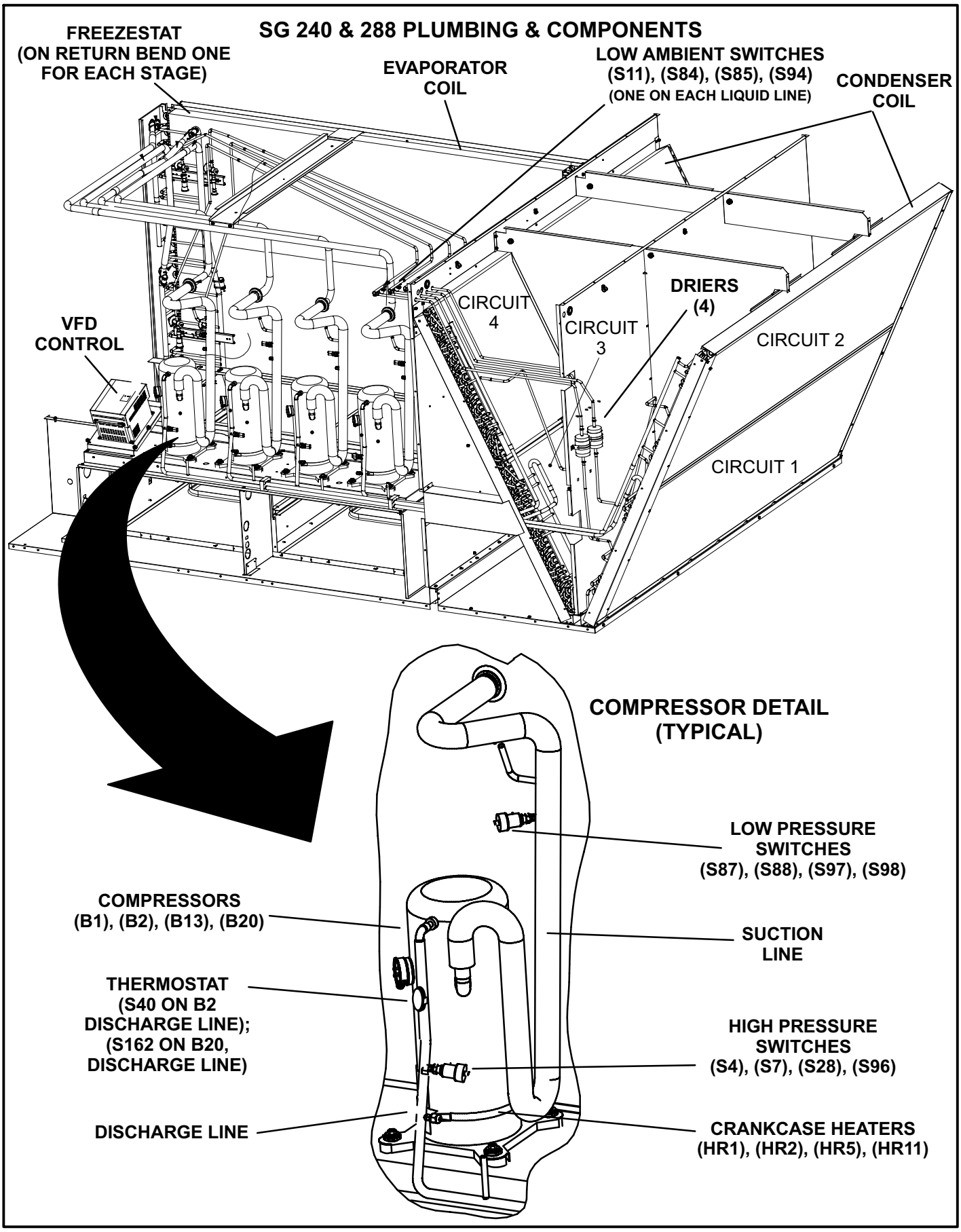
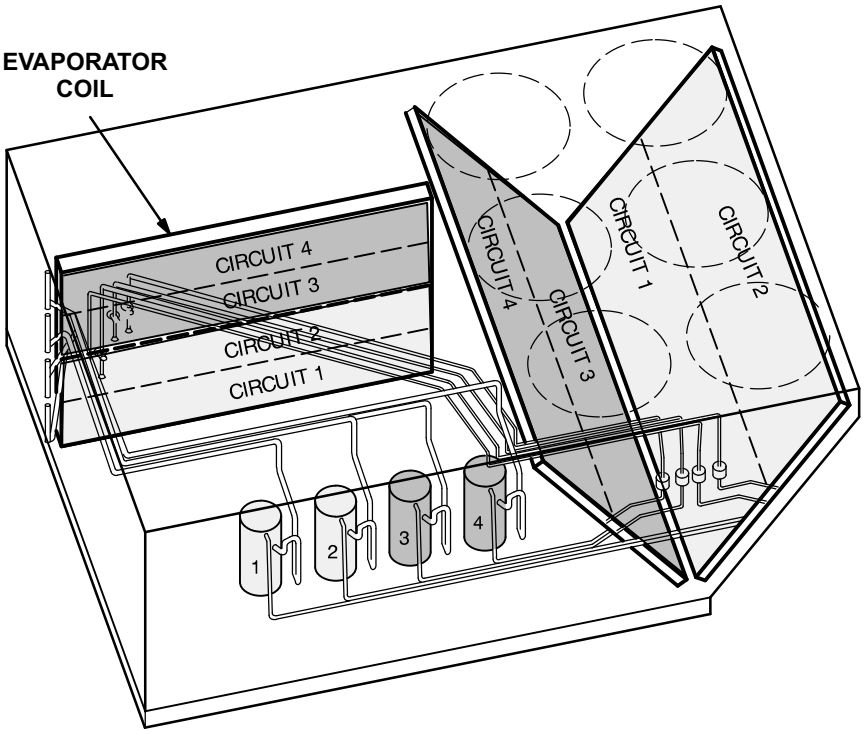

SG 240 & 288 PLUMBING & COMPONENTS
FREEZESTAT
(ON RETURN BEND ONE
FOR EACH STAGE)
EVAPORATOR
COIL
LOW AMBIENT SWITCHES
(S11), (S84), (S85), (S94)
(ONE ON EACH LIQUID LINE)
CONDENSER
COIL
VFD
CONTROL
CIRCUIT
4
CIRCUIT
3
DRIERS
(4)
CIRCUIT 2
CIRCUIT 1
COMPRESSOR DETAIL
(TYPICAL)
LOW PRESSURE
SWITCHES
(S87), (S88), (S97), (S98)
COMPRESSORS
(B1), (B2), (B13), (B20)
SUCTION
LINE
THERMOSTAT
(S40 ON B2
DISCHARGE LINE);
(S162 ON B20,
DISCHARGE LINE)
HIGH PRESSURE
SWITCHES
(S4), (S7), (S28), (S96)
DISCHARGE LINE
CRANKCASE HEATERS
(HR1), (HR2), (HR5), (HR11)

FIGURE 8

SG 240 & 288 REFRIGERATION CIRCUITS CONSTANT AIR VOLUME



SG 240 & 288 REFRIGERATION CIRCUITS MSAV™ SUPPLY AIR

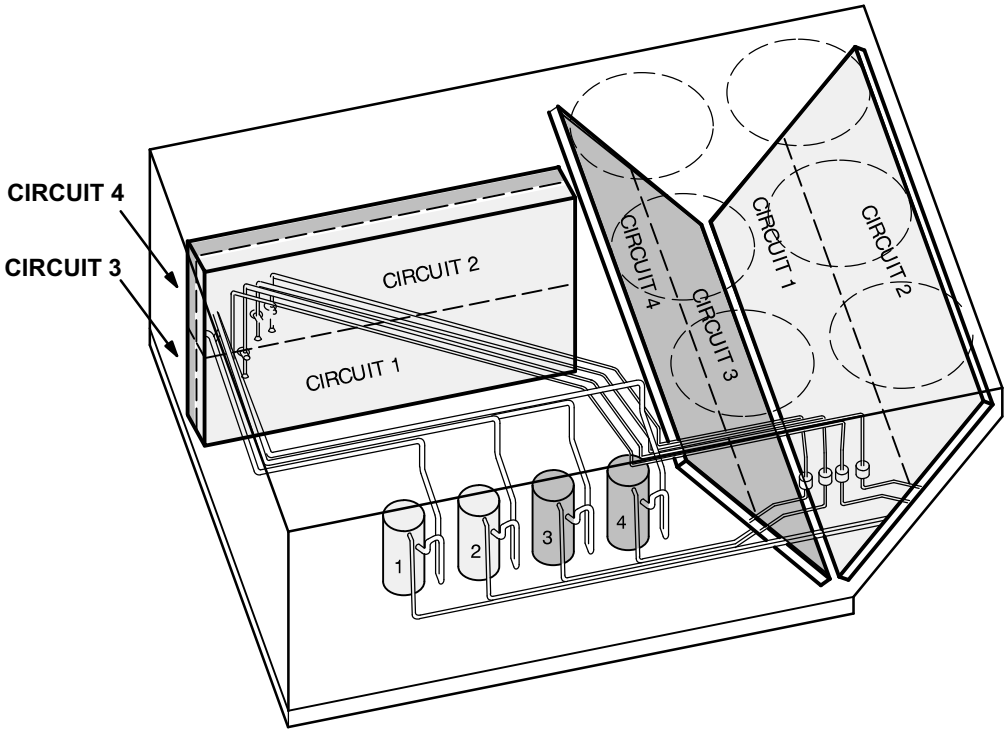


FIGURE 9

B-Cooling Components

All units use independent cooling circuits consisting of separate compressors, condenser coils and evaporator coils. See figures 6 and 8. Six draw-through type condenser fans are used in SG 240 & 288 units and three are used on 120. All units are equipped with belt-drive blowers which draw air across the evaporator during unit operation.

Cooling may be supplemented by a factory- or field-installed economizer. The evaporators are slab type; coils are also stacked on 240 & 288 units. Each evaporator uses a thermostatic expansion valve as the primary expansion device. Each evaporator is also equipped with enhanced fins and rifled tubing. In all units each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by low ambient switches and freezestats (on each evaporator).

1-Compressors B1 and B2 (all units) B13 & B20 (240 & 288 units)

SGC units use scroll compressors. SG 120 units use two compressors, SG 240 and 288 use four compressors. All compressors are equipped with independent cooling circuits. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

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

Each compressor is energized by a corresponding compressor contactor.

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

2-Crankcase Heaters HR1 & HR2 - Thermostats S40 & S162

Each compressor is protected by a crankcase heater and thermostat. The purpose of the crankcase heater is to prevent liquid from accumulating in the compressor. In SG 120, crankcase heater HR1 and HR2 protect compressors B1 and B2 respectively; both are controlled by S40 thermostat. In SG 240 & 288, HR1, HR2 and S40 protect compressors B1 and B2 while HR5, HR11and S162 protect compressors B13 and B20. See unit diagram. The crankcase heater and compressor never run at the same time.

3-High Pressure Switches S4 and S7 (all units) S28 & S96 (240 & 288 units)

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All units are equipped with this switch. The switch is located in the compressor discharge line and is wired through main control panel A55 in series with the compressor contactor coil.

S4 (first circuit), S7 (second circuit), S28 (third circuit), and S96 (fourth circuit) are wired in series with the respective compressor contactor coils.

When discharge pressure rises to 640 ± 10 psig (4413 ± 69 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 20 psig (3275 ± 138 kPa) the pressure switch will close.

Main control A55 has a three-strike counter before locking out. This means the control allows three high pressure trips per one thermostat demand. The control can be reset by breaking and remaking the thermostat demand or manually resetting the control.

4-Low Ambient Switches S11 & S84 (all units) S85 & S94 (240 & 288 units)

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

In SG 120 units, S11 and S84 are wired to the A55 control. In 240 & 288 units, S11 and S84 are wired in parallel with A55 control; S85 and S94 are wired in parallel with A55 control. The A55 cycles the outdoor fan relays.

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fan is energized. When discharge pressure in one refrigerant circuit drops to 240 ± 10 psig (1655 ± 69 kPa), the switch opens and the condenser fan in that refrigerant circuit is de-energized. This intermittent fan operation results in higher evaporating temperature allowing the system to operate without icing the evaporator coil and losing capacity.

5-Condenser Fans B4, B5, B21, B22, B23 & B24

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

6-Filter Drier (all units)

All 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.

7-Low Pressure Switches S87 & S88(all units) S98 & S97 (240 & 288 units)

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line.

S87 (compressor one) and S88 (compressor two) are wired to the A55. S98 (compressor three) and S97 (compressor four) are wired to the A59.

The A55 and A59 govern the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during first thermostat demand, before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control.

When suction pressure drops to 40 $\pm$ 5 psig (276 ± 34 kPa), (indicating low pressure), the switch opens and the compressor is de-energized. The switch automatically resets when pressure in the suction line rises to 90 $\pm$ 5 psig (620 ± 34 kPa) due to many causes such as refrigerant being added.

8-Freezestats S49 and S50 (all units) S53 & S95 (240 & 288 units)

Each unit is equipped with a low temperature switch (freezestat) located on the return bend of each evaporator coil. S49 (first circuit), S50 (second circuit), S53 (third circuit) and S95 (fourth circuit) are located on the corresponding evaporator coils.

S49 and S50 are wired to A55. S53 and S95 are wired to A59. Each freezestat is a SPST N.C. auto-reset switch which opens at 29°F $\pm$ 3°F (-1.7°C $\pm$ 1.7°C) on a temperature drop and closes at 58°F $\pm$ 4°F (14.4°C $\pm$ 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 warms sufficiently to melt any accumulated frost.

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

C-Blower Compartment

The blower compartment in all SG 120 units is located between the evaporator coil and the compressor/control compartment. The blower assembly is accessed by removing the screws in front of the blower housing. The blower pulls out as shown in figure 11 or 12.

The blower compartment in SG 240 & 288 units is located between the evaporator coil and the compressor / control section on the opposite side of the condenser coil. The blower assembly is accessed by removing the screws on either side of the sliding base. The blower pulls out as shown in figure 11 or 12.

1-Blower Wheels

SG 120 units have one 15 in. x 15 in. (381 mm x 381 mm) blower wheel.

SG 240 & 288 units have two 18 in. x 15 in. (457 mm x 381 mm) blower wheels. Both wheels are driven by one motor.

2-Indoor Blower Motor B3

All units use three-phase single-speed blower motors. CFM adjustments on CAV units are made by adjusting the motor pulley (sheave). Motors are equipped with sealed ball bearings. All motor specifications are listed in the SPECIFICATIONS (table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit rating plate for information specific to your unit.

OPERATION / ADJUSTMENT

⚠IMPORTANT

Three phase scroll compressors must be phased sequentially for correct compressor and blower rotation. Follow "COOLING START-UP" section to ensure proper compressor and blower operation.

MSAV™ Units - The blower rotation will always be correct on MSAV™ units. Checking blower rotation is not a valid method of determining voltage phasing for incoming power.

A-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. MSAV™ units refer to the Optional Supply Air VFD section.

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.

B-Blower Access

1. Disconnect wiring to heating limit switches and mixed air sensor (units with economizer).
2. Remove screws on either side of blower assembly sliding base. See figure 11 or 12.
3. Pull base toward outside of unit.

C-Determining Unit CFM (with wet coil)

IMPORTANT - MSAV™ *units are factory-set to run the blower at full speed when there is a blower (G) demand without a heating or cooling demand. Refer to the field-provided, design specified CFM for all modes of operation. Use the following procedure to adjust motor pulley to deliver the highest CFM called for in the design spec. See* MSAV™ *Start-Up section to set blower CFM for all modes once the motor pulley is set.*

1. Measure the indoor blower motor 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).
3. Referring to blower tables in the front of this manual, use static pressure and RPM readings to determine unit CFM.

Constant Air Volume (CAV) Blowers

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 11 or 12. Do not exceed minimum and maximum number of pulley turns as shown in table 1.

D-Adjust Belt Tension

Maximum life and wear can be obtained from belts only if proper pulley alignment and belt tension are maintained. Tension new belt after a 24-48 hour period of operation. This will allow belt to stretch and seat to grooves. Make sure blower and motor pulley are aligned as shown in figure 10. See figure 11 or 12 to adjust belt tension.

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.

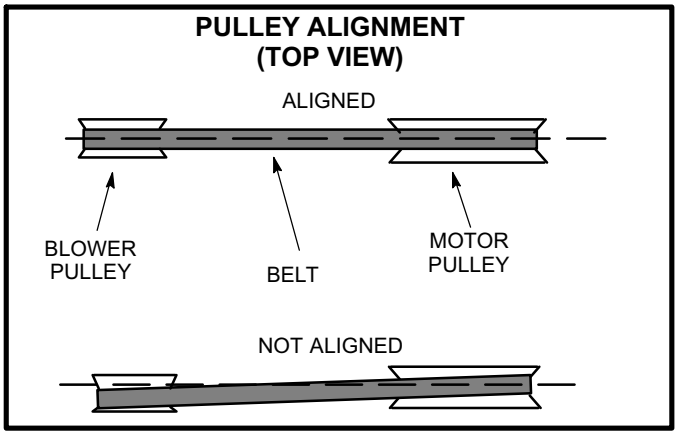


FIGURE 10

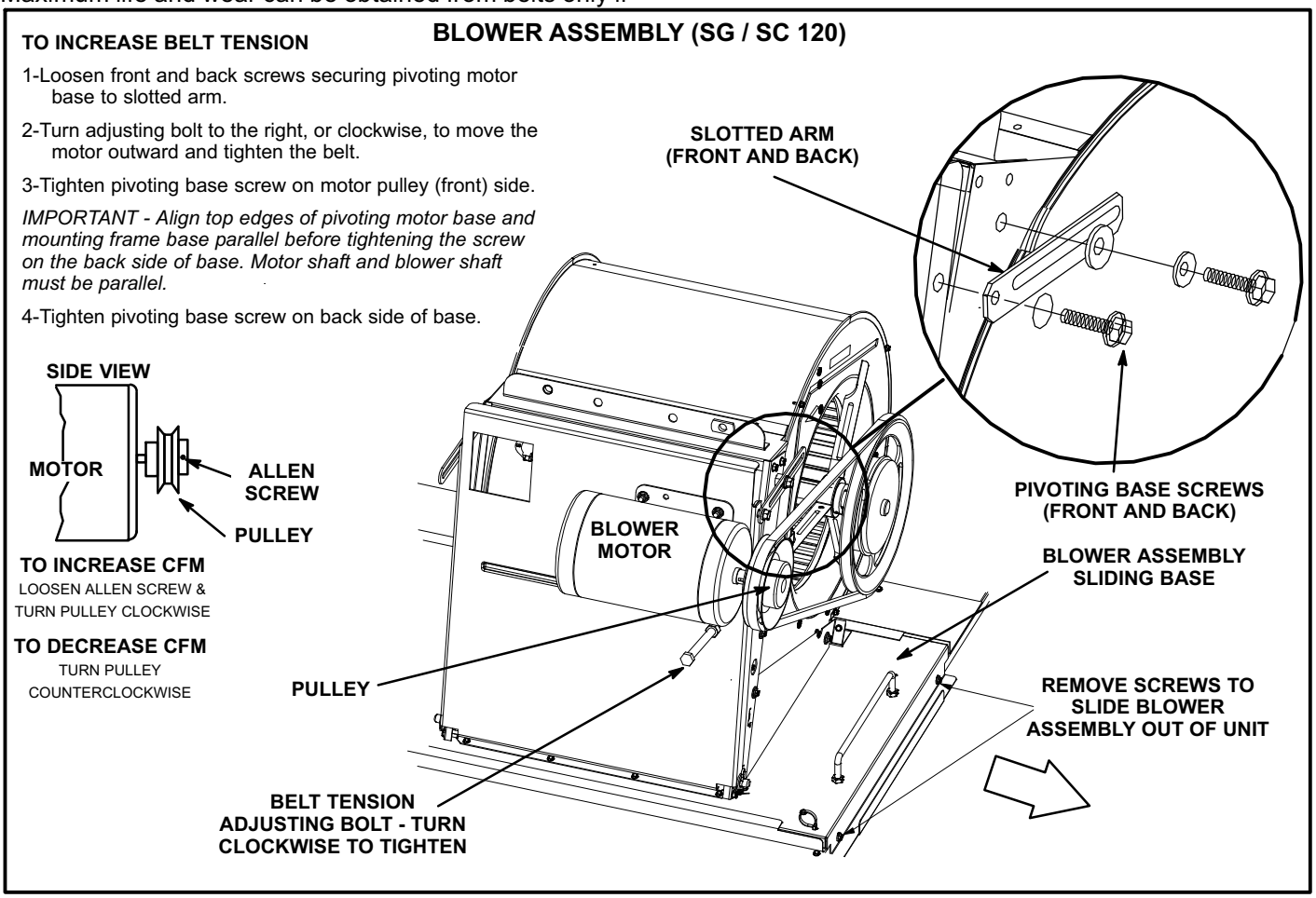


FIGURE 11

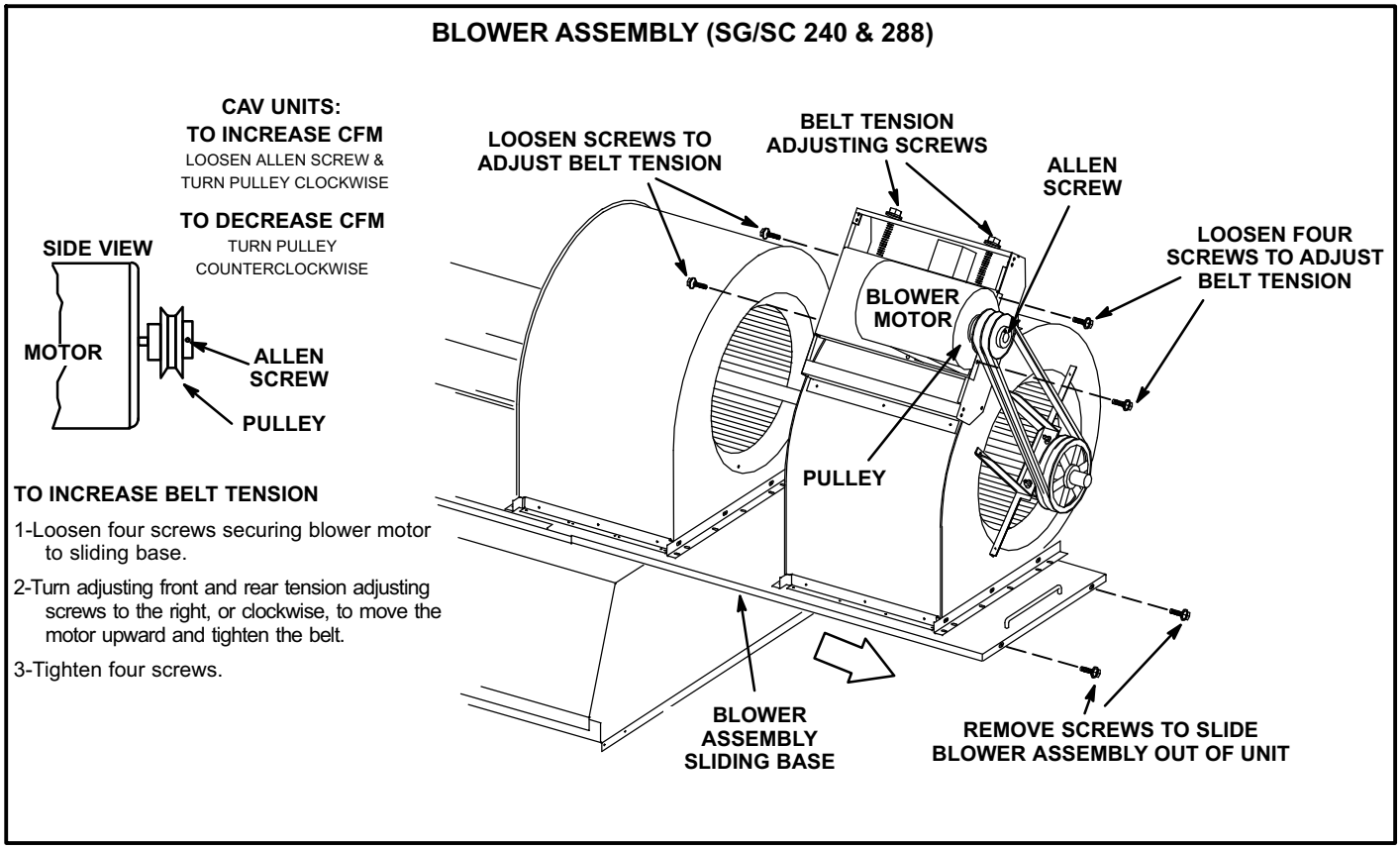


FIGURE 12

E-Check Belt Tension

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

1. Measure span length X. See figure 13.
2. Apply perpendicular force to center of span (X) with enough pressure to deflect belt 1/64" for every inch of span length or 0.4mm per 25.4mm of span length.

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

   Example: Deflection distance of a 1016mm span would be 16mm.
3. Measure belt deflection force. The deflection force should be 7.0 lbs.

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

TABLE 2
SG/SC 120 Manufacturer's Numbers

	DRIVE COMPONENTS					
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS	
Drive No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
1 (CAV) / 3 (MSAV)	1VP40 X 7/8	79J0301	BK77 X 1	49K4001	BX57	78L5301
2 (CAV) / 4 (MSAV)	1VP50 X 7/8	P-8-2187	BK80 X 1	53J9301	BX59	59A5001

TABLE 3
SG/SC 240 & 288 Manufacturer's Numbers

	DRIVE COMPONENTS							
	ADJUSTABLE SHEAVE		FIXED SHEAVE		BELTS		SPLIT BUSHING	
Drive No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.	Supplier No.	OEM Part No.
2 (CAV) / 4 (MSAV)	1VP44 X 1-1/8	100239-07	BK110H	100788-06	BX68	88K3401	H-1-7/16	49M6201
3 (CAV) / 5 (MSAV)	1VP50 X 1-1/8	P-8-1977	BK100H	100788-05	BX67	100245-09	H-1-7/16	49M6201
6 (CAV) / 7 (MSAV)	1VP60 X 1-3/8	78L5501	BK110H	100788-06	BX71	31K9701	H-1-7/16	49M6201

F-Blower Drives

Use blower tables in the front of this manual to determine BHP and RPM required. Reference Blower Data section for factory-installed drive kit specifications. See table 2 or 3 to determine the manufacturer's model number.

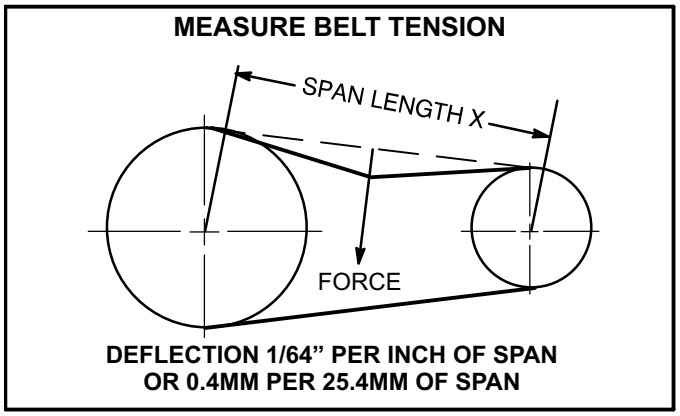


FIGURE 13

D-GAS HEAT COMPONENTS

See SPECIFICATIONS tables or unit nameplate for Btuh capacities. SG 120 units have one heat section while SG 240 & 288 units are equipped with two identical gas heat sections (gas heat section one and gas heat section two). Flexible pipe will feed supply gas to both sections. If for service the flexible connection must broken, hand tighten then turn additional 1/4" with a wrench for metal to metal seal (do not overtighten).

NOTE - Do not use thread sealing compound on flex pipe flare connections.

1-Control Box Components A3, A12, A55, T3, T13, K13 and K19

⚠WARNING

Shock hazard. Spark related components contain high voltage which can cause personal injury or death. Disconnect power before servicing. Control is not field repairable. Unsafe operation will result. If control is inoperable, simply replace the entire control.

The main control box (see figures 3 and 4) houses burner controls A3 and A12, main control module A55, combustion air blower transformers T3 and T13 and combustion air blower relays K13 and K19. For a description of the components see section I-A. A more detailed description of burner controls A3 and A12 is given.

Burner Ignition Control A3 (all units) and A12 (240 & 288)

The ignition controls are located in the control box and are manufactured by UTEC or Kidde Fenwal. See table 4 for LED codes.

TABLE 4

UTEC	
LED Flashes	Indicates
Steady Off	No power or control hardware fault.
Steady On	Power applied. Control OK.
3 Flashes	Ignition lockout from too many trials.
4 Flashes	Ignition lockout from too many flame losses within single call for heat.
5 Flashes	Control hardware fault detected.
Kidde Fenwal	
LED Flashes	Indicates
Steady On	Internal control failure.
2 Flashes	Flame with no call for heat.
3 Flashes	Ignition lockout.

The ignition control provides three main functions: gas valve control, ignition, and flame sensing. The unit will usually ignite on the first attempt; however, the ignition attempt sequence provides three trials for ignition before locking out. The lockout time for the control is 5 minutes. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires breaking and remaking power to the ignition control. See figure 14 for a normal ignition sequence and figure 15 for the ignition attempt sequence with retrials (nominal timings given for simplicity). Specific timings for the ignition controls are shown in figure 16.

Flame rectification sensing is used on all 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.

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air blower to vent exhaust gases from the burners. When the combustion air blower is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air blower 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 gas valve, the spark electrode and the flame sensing electrode. Sparking stops immediately after flame is sensed. The combustion air blower continues to operate throughout the heating demand. If the flame fails or if the burners do not ignite, the ignition control will attempt to ignite the burners up to two more times. If ignition cannot be obtained after the third attempt, the control will lock out. The ignition control is not adjustable.

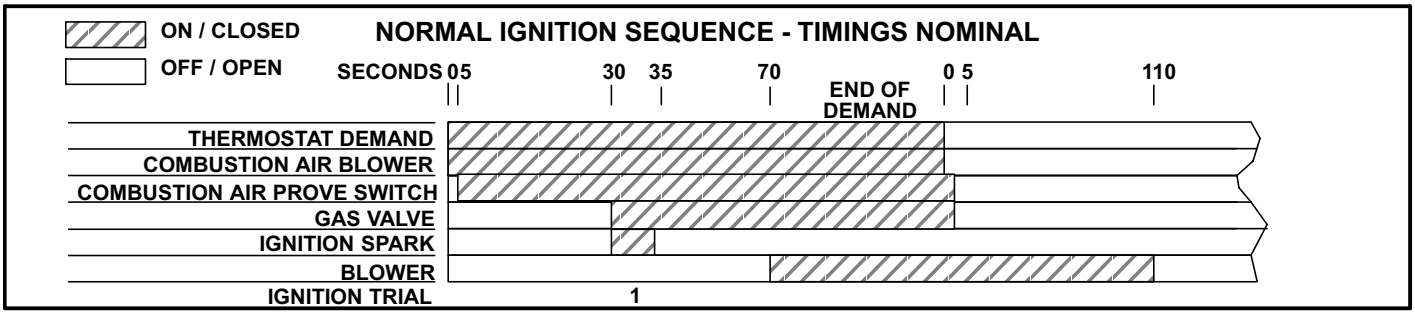


FIGURE 14

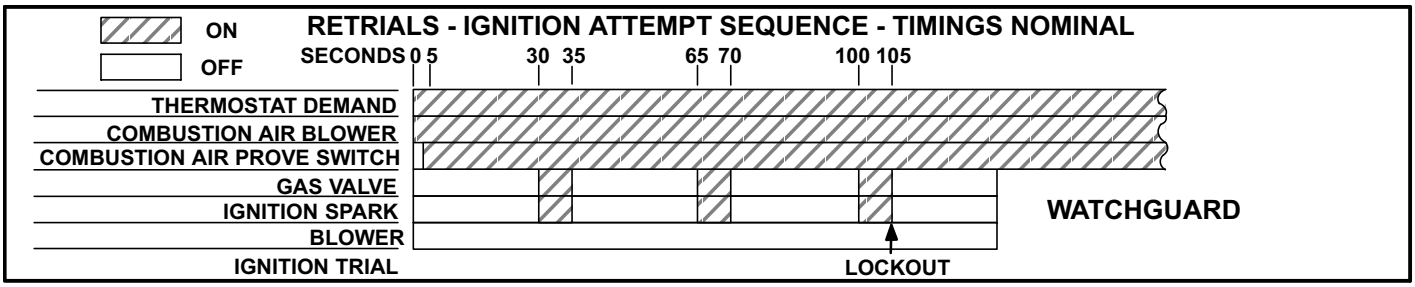


FIGURE 15

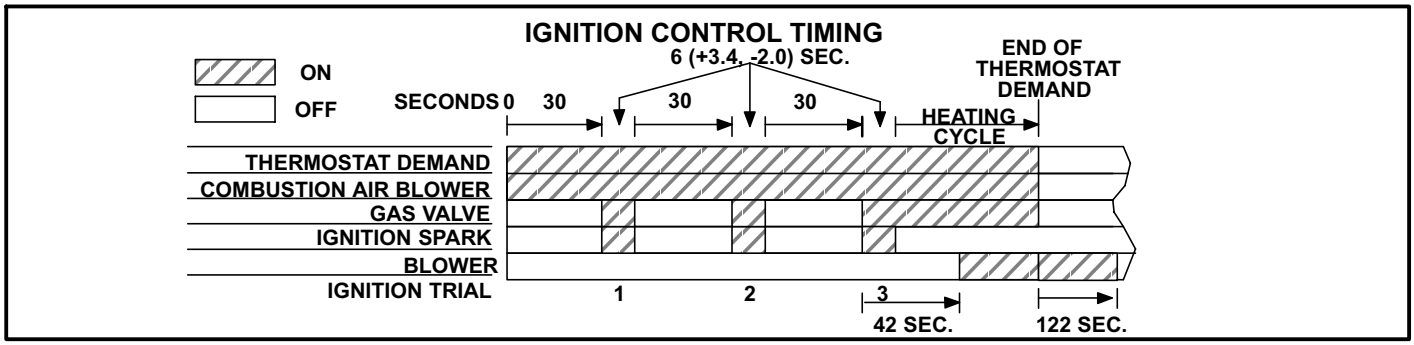


FIGURE 16

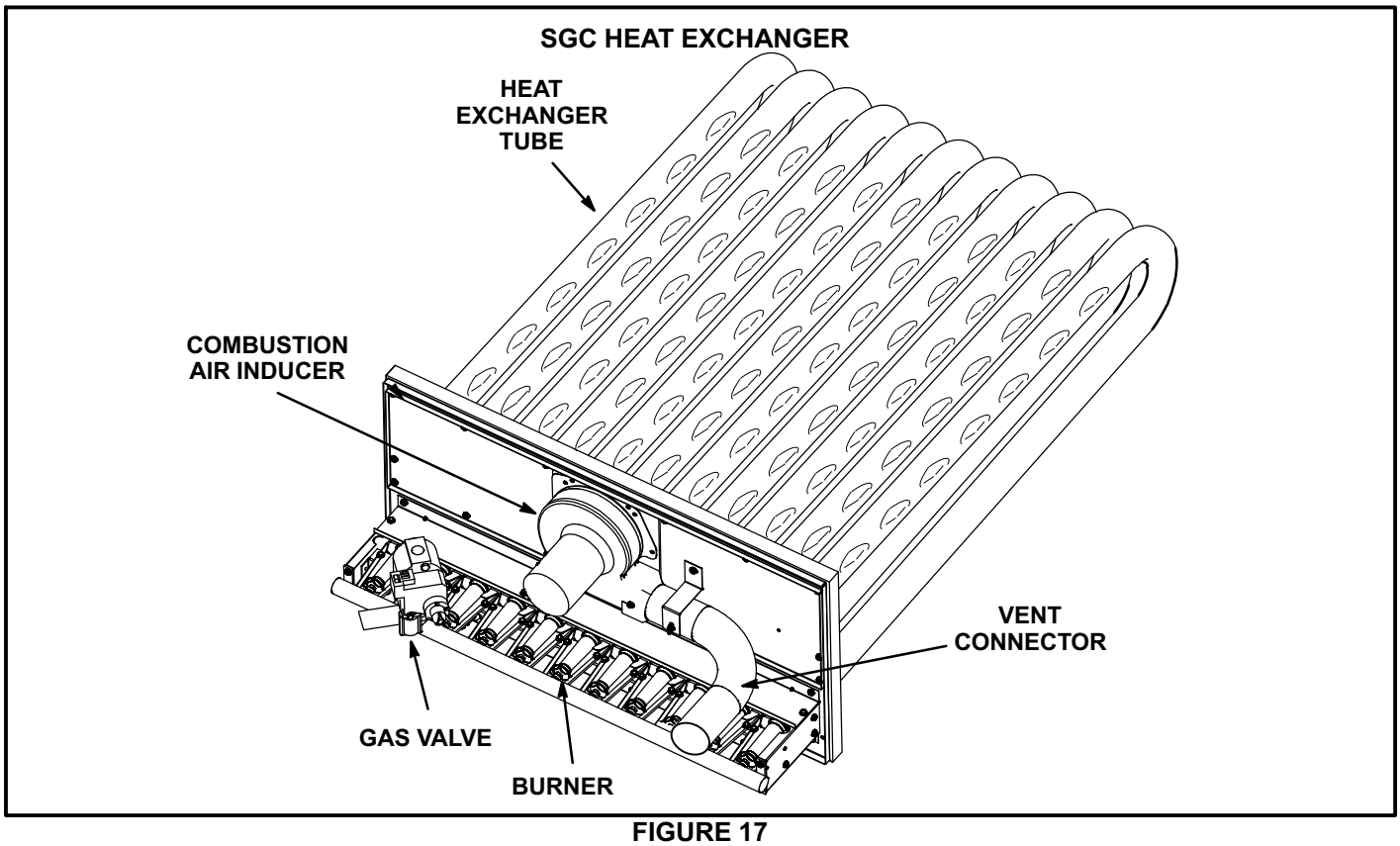


FIGURE 17

2-Heat Exchanger (Figure 17)

The SGC units use aluminized steel inshot burners with matching tubular aluminized (stainless steel is an option) steel heat exchangers and two-stage redundant gas valves. SG 120 uses one eleven-tube/burner for high heat, one nine-tube/burner for medium heat and one six-tube/burner for standard heat. SG 240 & 288 units use two six-tube/burners for low 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 blower, 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, controlled by the main control panel A55, 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.

3-Burner Assembly (Figure 18)

The burners are controlled by the spark electrode, flame sensing electrode, gas valve and combustion air blower. The spark electrode, flame sensing electrode and gas valve are directly controlled by ignition control. Ignition control and combustion air blower is controlled by main control panel A55.

Burners

All units use inshot burners (see figures 18 and 19). 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.

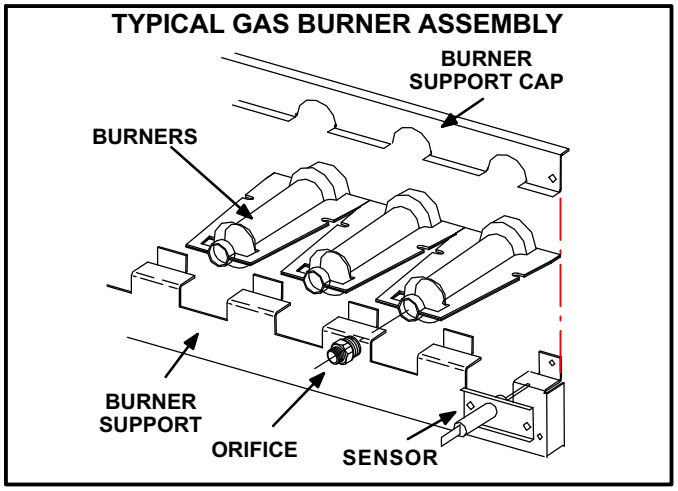


FIGURE 18

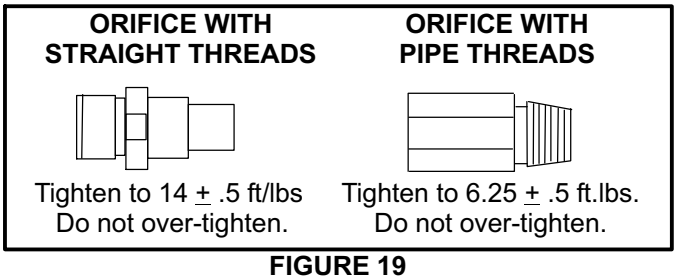


FIGURE 19

Orifice

Each burner uses an orifice which is precisely matched to the burner input. **Install only the orifices with the same threads.** 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 Lennox Repair Parts Listing for correct sizing information.

4-Flame Rollout Limits S47 (all units) & S69 (240 & 288 units)

Flame rollout limits S47 and S69, on second heat section on SG 240 & 288, are SPST N.C. high temperature limits located just above the burner air intake opening in the burner enclosures (see figure 17). S47 and S69 are wired to the main control panel A55. When S47 or S69 senses flame rollout (indicating a blockage in the combustion air passages), the corresponding flame rollout limit trips, and the ignition control immediately closes the gas valve.

Limits S47 and S69 are factory preset to open at 290°F ± 12°F (143°C ± 6.7°C) on a temperature rise.

5-Combustion Air Inducers B6 (all units) & B15 (240 & 288 units)

Combustion air inducer B6 on SG 120 and SG 240 & 288 first heat section and B15 on SG 240 & 288 second heat section, are identical blowers which provide fresh air to the corresponding burners while clearing the combustion chamber of exhaust gases. The inducers begin operating immediately upon receiving a thermostat demand and are de-energized immediately when thermostat demand is satisfied.

Both combustion air inducers use a 208/230V or 460V single-phase PSC motor and a 4.81in. x 1.25in. (122mm x 32mm) blower wheel. All motors operate at 3200 or 3450 RPM and are equipped with auto-reset 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.

All combustion air inducer motors are sealed and cannot be oiled. The inducer cannot be adjusted but can be disassembled for cleaning.

6-Secondary High Temperature Limits S21 (120 only)

S21 is the secondary high temperature limit for the SG 120. Like the primary limits, the secondary limit is located in the blower compartment. S21 is mounted on top of the blowers. See figure 20.

Secondary limit S21 is wired to the main control panel A55. The secondary limits function in the same manner as the primary limits, but are factory set to actuate at different temperatures. The N.O. contacts of S21 are connected to the blower relay coil K3 through control A55. If the limit trips the blower will be energized. S21 limits are SPDT N.C. auto-reset.

Limits settings are factory set and cannot be adjusted. If limit must be replaced, same type and set point must be used. See Lennox Repair Parts Handbook.

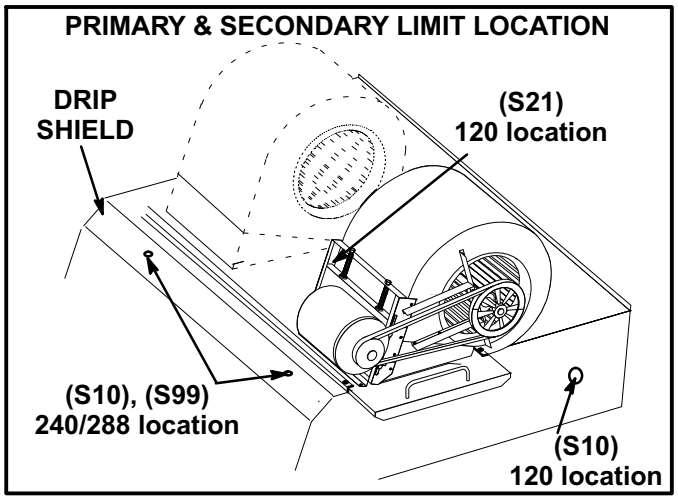


FIGURE 20

7-Primary High Temperature Limits S10 (all units) & S99 (240 & 288 units)

S10 is the primary high temperature limit for gas heat in SG 120 units and for section one in SG 240 & 288 units, while S99 is the primary high temperature limit for gas heat section two for SG 240 & 288.

On the SG 120, S10 is located on the bottom right corner of the blower section. On the SG 240 & 288, S10 and S99 are located on the drip shield behind the blower housing. See figure 20. In this location S10 and S99 also serve as secondary limits.

Primary limit S10 is wired to the main control panel A55 which energizes burner 1 control (A3), while primary limit S99 is wired to the A55 which energizes burner 2 control (A12). Its N.C. contacts open to de-energize the ignition control when excessive temperature is reached in the blower compartment. At the same time, the N.O. contacts of S10 and S99 close energizing the blower relay coil K3 through control A55. If either limit trips the blower will be energized. Limits settings are factory set and cannot be adjusted. If limit must be replaced same type and set point must be used. See Lennox Repair Parts Handbook.

8-Combustion Air Inducer Capacitors C3 (all units) & C11 (240 & 288 units)

The combustion air inducer motors in all SGC units require run capacitors. Capacitor C3 is connected to combustion air inducer B6 and C11 is connected to combustion air inducer B15. Capacitor ratings are found on inducer motor nameplate.

9-Combustion Air Prove Switches S18 (all units) & S45 (240 & 288 units)

Prove switch S18 is located in the control box on SG 120 units. On SG 240 & 288 units S18 (first heat section) and S45 (second heat section) are located in the compressor compartment . Both are SPST N.O. switches, are identical and monitor combustion air inducer operation. Switch S18 and S45 are wired to the main control panel A55.

The switches 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 switches are factory set and not adjustable. The switches will automatically open on a pressure rise (less negative pressure).

TABLE 5
S18 & S45 Prove Switch Settings

Close " wc (Pa)	Open " wc (Pa)
0.25 ± 5 (62.3±12.4)	0.10±5 (24.8±12.4)

10-Gas Valves GV1(all units) & GV3 (240 & 288 units)

Gas valves GV1 and GV3 are identical. The gas valves are two-stage redundant valves. Units are equipped with valves manufactured by Honeywell. First stage (low fire) is quick opening (on and off in less than 3 seconds) and second stage is quick opening. 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 A55 (GV1 and GV3). The Honeywell valve is adjustable for both low fire and high fire. A manual shut-off knob is provided on the valve for shut-off. Manual shut-off knob immediately closes both stages without delay. Figure 23 shows gas valve components. Table 6 shows factory gas valve regulation for SG series units.

TABLE 6
MANIFOLD INPUT PRESSURES in.wg. (kPa)

Natural Gas		Propane (LP) Gas	
1st Stage ± 0.2 (±.05)	2nd Stage ± 0.3 (±.08)	1st Stage ± 0.2 (±.05)	2nd Stage ± 0.3 (±.08)
1.6 (0.40)	3.7 (0.92)	5.5 (1.37)	10.5 (2.61)

11-Spark Electrodes (ignitor)

An electrode assembly is used for ignition spark. Two identical electrodes are used (one for each gas heat section). The electrode is mounted through holes on the left side of the burner support. 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 21) 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 a 8 mm silicone-insulated stranded high voltage wire. The wire uses 1/4" (6.35 mm)female quick connect on the electrode end and female spark plug-type terminal on the ignition control end.

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

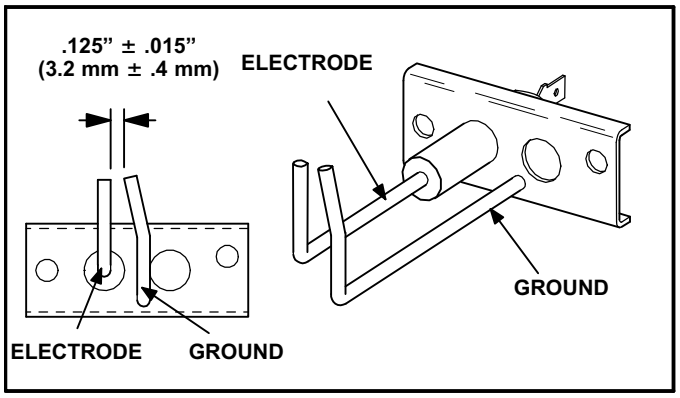


FIGURE 21

12-Flame Sensors

A flame sensor is located on the right side of each burner support. The sensor is mounted through a hole in the burner support and the tip protrudes into the flame envelope of the right 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 at the ignition control) sparking stops immediately. 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.

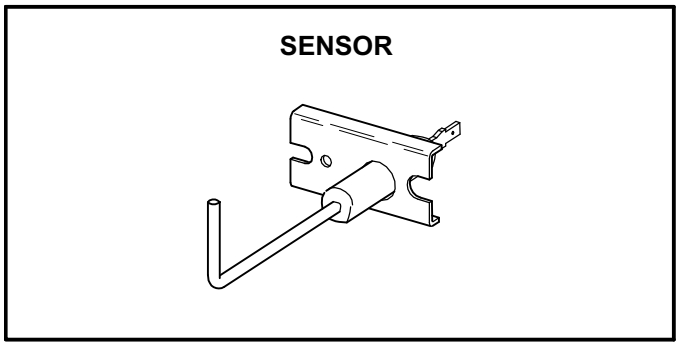


FIGURE 22

II-PLACEMENT AND INSTALLATION

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

III-CHARGING / START UP OPERATION

IMPORTANT-The crankcase heater must be energized for 24 hours before attempting to start compressor. Set thermostat so there is no demand to prevent compressors from cycling. Apply power to unit.

A-Preliminary Checks

1- Make sure that 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.

3- Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.

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

5- Make sure filters are in place before start-up.

B-Start-Up

1- Initiate first and second stage cooling demands according to instructions provided with thermostat. Refer to the Optional Supply Air VFD section on MSAV™ units.

SG 120 Units-

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

SG 240 & 288 Units-

First-stage thermostat demand will energize compressors 1 and 2. Second-stage thermostat demand will energize compressors 3 and 4. On units with an economizer, when outdoor air is acceptable, a first-stage demand will energize the economizer; a second-stage demand will energize compressors 1 and 2.

3- SG 120 units contain two refrigerant circuits and two stages of cooling. See figure 7.

4- SG 240 & 288 units contain four refrigerant circuits or systems. Evaporator and condenser coil refrigerant circuits 1 and 2 make up stage 1 cooling. Evaporator and condenser refrigerant circuits 3 and 4 make up stage 2 cooling. See figure 8 and 9.

5- Each refrigerant circuit is separately charged with R410A refrigerant. See unit rating plate for correct amount of charge.

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

C-Three Phase Scroll Compressor Voltage Phasing

⚠IMPORTANT

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.

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

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

3-Disconnect all remote electrical power supplies.

4-Reverse any two field-installed wires connected to the line side of S48 disconnect or TB13 terminal strip. Do not reverse wires at blower contactor.

5-Make sure the connections are tight.

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

*Supply air VFD motors should rotate in the correct direction; verify scroll compressor rotation separately. Contact technical support if the VFD blower is rotating incorrectly.

MSAV™ Units and Units Equipped With Voltage or Phase Detection - The Unit Controller checks the incoming power during start-up. If the voltage or phase is incorrect, the Unit Controller will display an alarm and the unit will not start.

Units charged with R410A refrigerant operate at much higher pressures than R22. The expansion valve and liquid line drier provided with the unit are approved for use with R410A. Do not replace them with components designed for use with R22.

R410A refrigerant is stored in a pink cylinder.

Manifold gauge sets used with systems charged with R410A refrigerant must be capable of handling the higher system operating pressures. The gauges should be rated for use with pressures of 0-800 on the high side and a low side of 30” vacuum to 250 psi with dampened speed to 500 psi. Gauge hoses must be rated for use at up to 800 psi of pressure with a 4000 psi burst rating.

⚠IMPORTANT

Mineral oils are not compatible with R410A. If oil must be added, it must be a polyol ester oil.

E-Refrigerant Charge and Check

⚠WARNING

Do not exceed nameplate charge under any condition.

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

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

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

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

2- Check each system separately with all stages operating.

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

4- Apply the outdoor temperature to tables 7 through 12 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 7
SG 120 CAV NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis. ±10 psig	Suct. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	250	139	248	137
75°F	288	144	285	145
85°F	326	146	321	147
95°F	370	148	366	149
105°F	417	150	414	151
115°F	469	152	463	153

TABLE 8
SG 120 MSAV™ NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2	
	Dis. ±10 psig	Suct. ±5 psig	Dis. ±10 psig	Suc. ±5 psig
65°F	251	137	251	139
75°F	288	138	288	140
85°F	326	140	326	143
95°F	369	143	270	145
105°F	416	146	417	148
115°F	467	149	467	150

TABLE 9
SG 240 CAV NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F	247	128	240	130	247	136	242	130
75°F	294	131	286	133	294	138	288	132
85°F	340	134	333	136	341	140	334	135
95°F	387	137	380	139	387	142	381	138
105°F	433	140	427	142	434	145	427	141
115°F	480	143	474	144	480	147	473	144

TABLE 10
SG 240 MSAV NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F	234	120	235	131	243	133	243	138
75°F	280	123	282	134	292	136	290	140
85°F	327	127	329	137	340	139	337	143
95°F	373	131	376	140	389	141	384	145
105°F	420	134	424	144	437	144	431	148
115°F	466	138	471	147	485	147	478	150

TABLE 11
SG 288 CAV Normal Operating Pressures

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F	246	118	231	119	253	127	246	123
75°F	297	121	284	124	304	131	295	126
85°F	348	125	336	128	354	135	344	129
95°F	399	129	388	133	405	138	394	133
105°F	450	132	440	137	456	142	443	136
115°F	501	136	493	141	506	146	492	139

TABLE 12
SG 288 MSAV™ Normal Operating Pressures

Outdoor Coil Entering Air Temp	CIRCUIT 1		CIRCUIT 2		CIRCUIT 3		CIRCUIT 4	
	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig	Dis ±10 psig	Suc ±5 psig
65°F	254	109	240	118	263	121	244	123
75°F	301	113	286	122	310	124	291	127
85°F	347	117	332	126	357	127	338	130
95°F	394	121	378	130	404	130	385	133
105°F	441	124	424	135	451	132	432	137
115°F	488	128	470	139	498	135	479	140

Charge Verification - Approach Method - AHRI Testing

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 13. 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 tables 7 through 12 as a guide for typical operating pressures.

TABLE 13
APPROACH TEMPERATURES

S Series Unit	Liquid Temp. Minus Ambient Temp.			
	1st Stage	2nd Stage	3rd Stage	4th Stage
120 CAV	8°F ± 1 (4.4°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)	NA	NA
120 MSAV™	6°F ± 1 (3.3°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)	NA	NA
240/288 CAV MSAV	6°F ± 1 (3.3°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)	6°F ± 1 (3.3°C ± 0.5)

F-Heating Startup

FOR YOUR SAFETY READ BEFORE LIGHTING

BEFORE LIGHTING smell all around the furnace area for gas. Be sure to smell near the bottom because some gas is heavier than air and will settle near the bottom.

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. Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.

⚠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

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

Do not use this furnace if any part has been under water. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. A qualified service agency should be contacted to inspect the furnace and to replace all gas controls, control system parts, electrical parts that have been wet or the furnace if deemed necessary.

⚠WARNING

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

⚠WARNING

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

Gas Valve Operation for Honeywell VR8305Q (figure 23)

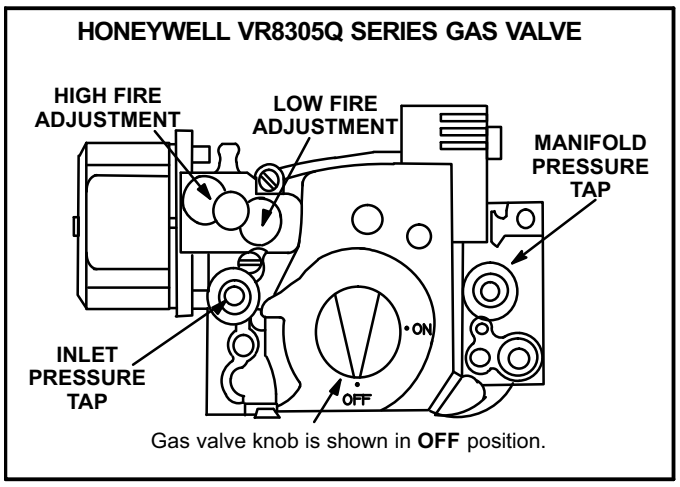


FIGURE 23

1- Set thermostat to lowest setting.

2- Turn off all electrical power to furnace.

3- This furnace 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 the knob on the gas valve clockwise to **"OFF"**.

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 the knob on the gas valve counterclockwise to **"ON"**. Do not force.

8- Close or replace the heat section access panel.

9- Turn on all electrical power to furnace.

10- Set thermostat to desired setting.

11- The combustion air inducer will start. The burners will light within 40 seconds.

12- If the furnace 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 furnace will not operate, follow the instructions "Turning Off Gas to Furnace" and call your service technician or gas supplier.

Turning Off Gas to Furnace

1- Set thermostat to the lowest setting.

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

3- Open or remove the heat section access panel.

4- Turn the knob on the gas valve clockwise to **"OFF"**. Depress knob slightly. Do not force.

5- Replace heat section access panel.

IV- SYSTEMS SERVICE CHECKS

A-Heating System Service Checks

All 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 unit Installation, Operation and Maintenance instruction for more information.

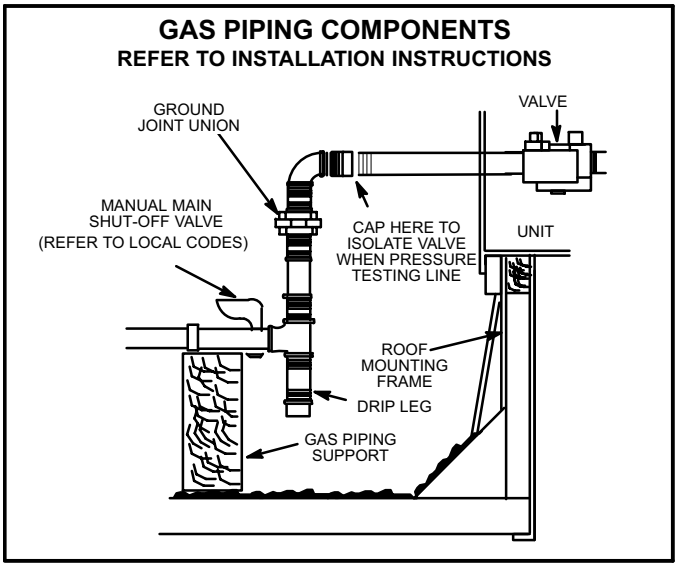


FIGURE 24

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 24.

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 through Lennox under 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.

3-Testing Gas Supply Pressure

When testing gas supply pressure, connect test gauge to the inlet pressure tap located on unit gas valve GV1 and or GV3. 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 between 4.7"W.C. and 10.5"W.C. (1168 Pa and 2610 Pa). For L.P. gas units, operating pressure at the unit gas connection must be between 10.8"W.C. and 13.5"W.C. (2685.3 Pa and 3356.7 Pa).

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 and or GV3. See figure 23 for location of pressure tap on the gas valve.

The manifold pressure is factory set and should not require adjustment. If manifold pressure is incorrect and no other source of improper manifold pressure can be found, the valve must be replaced. See figure 23 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 6.

⚠ CAUTION

Disconnect heating demand as soon as an accurate reading has been obtained.

5-Proper Gas Flow

1- Operate unit at least 15 minutes before checking gas flow. Determine the time in seconds for **two** revolutions of gas through the meter. (Two revolutions assures a more accurate time.)

2- **Divide the number of seconds by two** and compare to the time in table 14. If manifold pressure is correct and rate is incorrect, check gas orifices for proper size and restriction.

3- Remove temporary gas meter if installed.

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

TABLE 14

GAS METER CLOCKING CHART				
Unit Input Rate (Btuh)	Seconds for One Revolution			
	Natural		Natural	LP
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft Dial
75,000	48	96	120	240
125,000	29	58	72	144
130,000	28	55	69	138
180,000	20	40	50	100
240,000	15	30	38	75
260,000	14	28	35	69
360,000	10	20	25	50
480,000	8	15	19	38
Natural-1000 btu/cu ft LP-2500 btu/cu ft				

Note: Table assumes standard temperature (60°F), pressure (30in.Hg.), and fuel heating values (Btuh/Ft.^{3}). Apply pressure corrections in altitudes above 2000 ft.

6- Burner Assembly

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.

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

2- Open burner compartment access panel.

3- Remove and retain two screws securing burners to burner support. See figure 25.

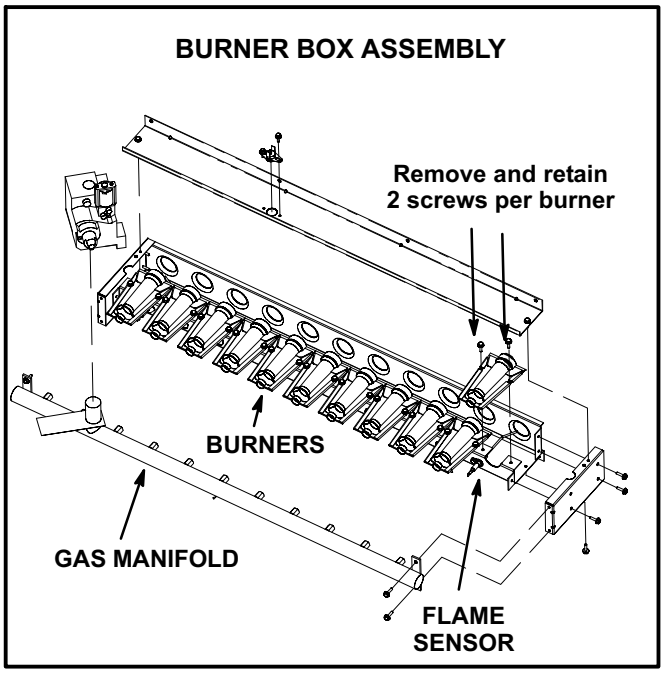


FIGURE 25

4- Clean burners as necessary.

5- Locate the ignitor under the left burner. See figure 26 and table 15 for 120 and 240 units. Use appropriately sized twist drills or feeler gauges to check the spark gap as shown in figure 27.

TABLE 15

Dimension	Unit Btuh Input	Length - in. (mm)	
		Ignitor	Sensor
A	130/260K	7-3/4 (197)	11 (279)
B	180/360K	5 (127)	5-1/2 (140)
C	240/480K	2-1/4 (57)	2-3/4 (70)

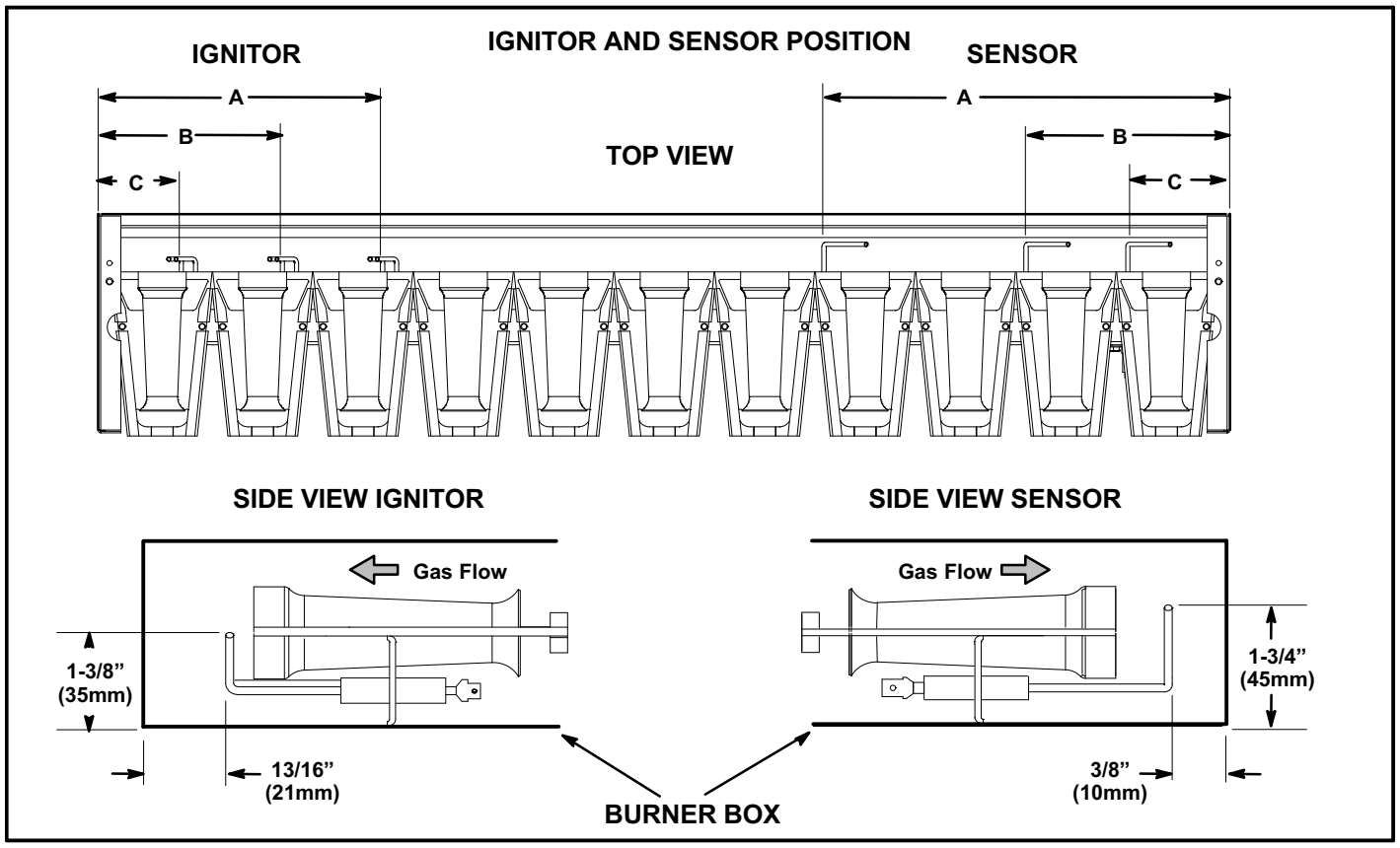


FIGURE 26

⚠WARNING

Danger of explosion. Can cause injury or death. Do not overtighten main burner mounting screws. Snug tighten only.

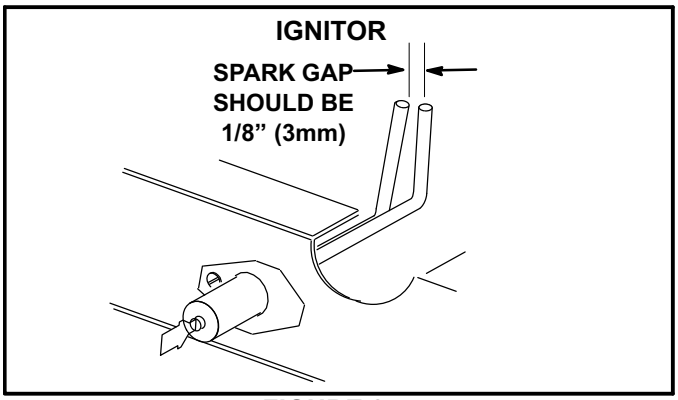


FIGURE 27

6- Secure burners with retained screws.

7- Replace access panel.

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

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. 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:

NOTE-Electrodes are not field adjustable. Any alterations to the electrode may create a hazardous condition that can cause property 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, compare reading to table 16. Do not bend electrodes.

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

TABLE 16

Manufacturer	Nominal Signal Microamps	Drop Out
JOHNSON	0.5 - 1.0	.09

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

9-Combustion Air Inducer

Under normal operating conditions, the combustion air blower 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 blower wheel can be determined by looking through the vent opening.

Cleaning Combustion Air Inducer

1- Shut off power supply and gas to unit.

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

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

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

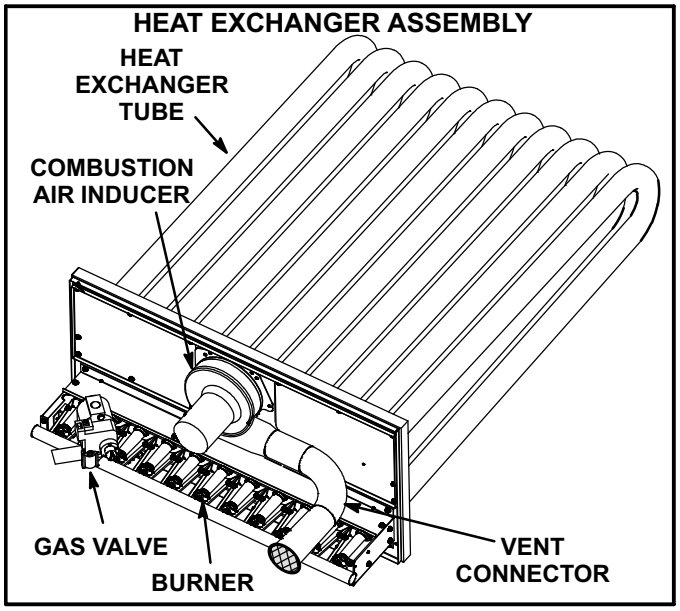


FIGURE 28

5- Return combustion air blower motor and vent connector to original location and secure with retained screws. It is recommended that the combustion air inducer gasket be replaced during reassembly.

6- Clean combustion air inlet louvers on heat access panel using a small brush.

10-Flue Passageway and Flue Box

1- Remove combustion air inducer assembly as previously described.

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.

B-Cooling System Service Checks

SGC 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 III- CHARGING.

NOTE-When unit is properly charged discharge line pressures should approximate those in tables 7 through 12.

V-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.

A-Filters

Units are equipped with filters as shown in table 17. Units will accept 4" filters. Filters should be checked monthly and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters.

TABLE 17

SGC Unit	Qty	Filter Size - inches (mm)
120	6	16 X 25 X 2 (406 X 635 X 51)
240/288	12	20 X 20 X 2 (508 X 508 X 51)

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

B-Lubrication

All motors and blower wheels used in SGC units are pre-lubricated; no further lubrication is required.

C-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.

D-Evaporator Coil

Inspect and clean coil at beginning of each season. Clean using mild detergent or commercial coil cleanser. Check condensate drain pan and line, if necessary. Flush coil and condensate drain with water taking care not to get insulation, filters and return air ducts wet. Check connecting lines and coil for evidence of oil and refrigerant leaks.

E-Condenser Coil

Clean condenser coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. Check connecting lines and coil for evidence of oil and refrigerant leaks.

NOTE-If owner complains of insufficient cooling, the refrigerant charge should be checked. See section III-CHARGING.

F-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____

VI-ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the SG units.

A-S6CURB and S1CURB

SG 120

When installing either the SG units on a combustible surface for downflow discharge applications, the Lennox S1CURB10111 14-inch or S1CURB11111 24-inch roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the SG units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled S1CURB mounting frame is shown in figure 29. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 30. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

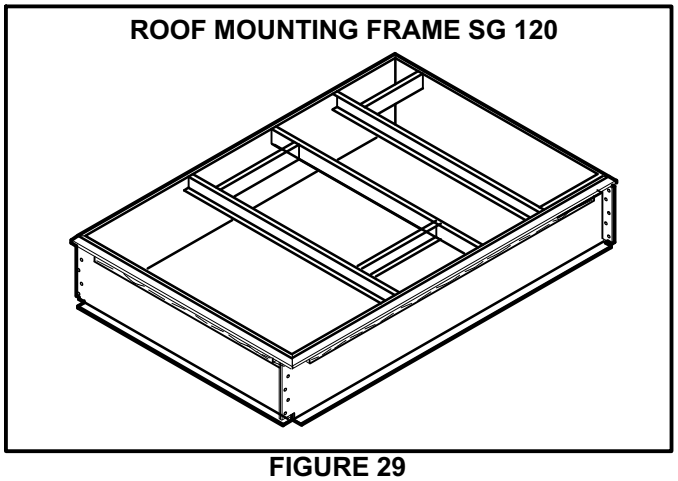


FIGURE 29

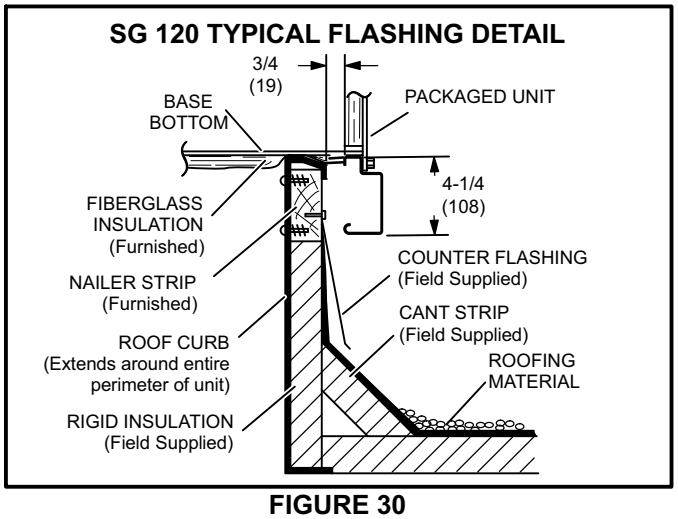


FIGURE 30

SG 240 & 288

When installing the SGC unit on a combustible surface for downflow discharge applications, the Lennox S6CURB10121 (14”) or S6CURB11121 (24”) roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the SG units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16” per linear foot or 5mm per meter in any direction.

The assembled mounting frame is shown in figure 31. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting. The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in figure 32. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

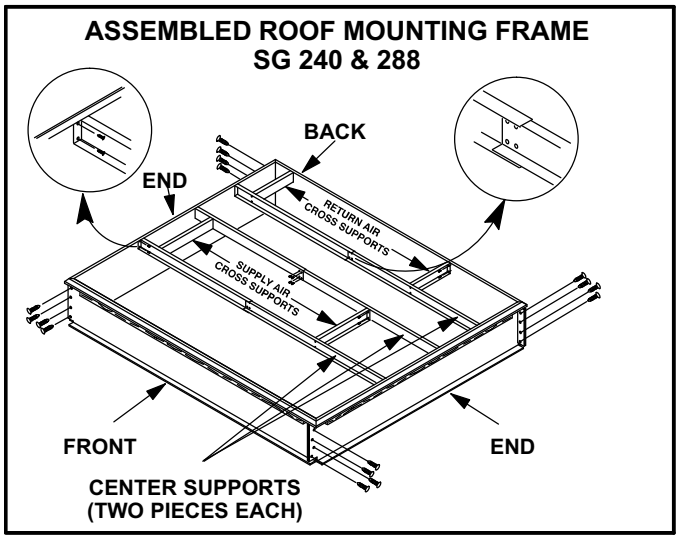


FIGURE 31

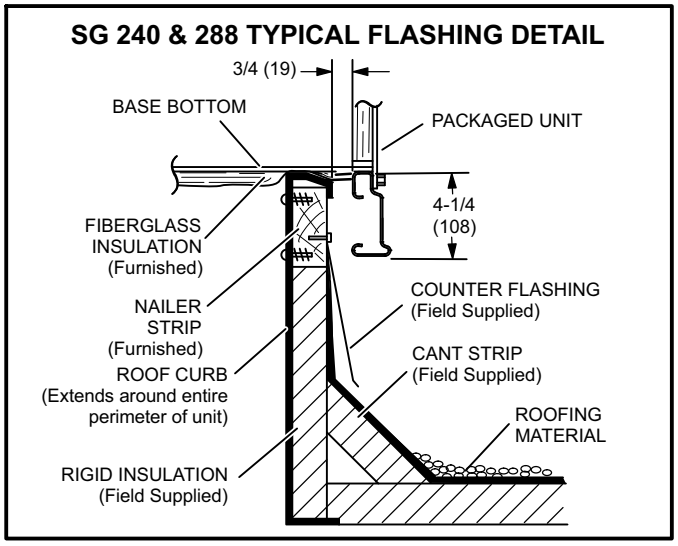


FIGURE 32

B-Outdoor Air Dampers (240 & 288 units)

Dampers are manually operated to allow up to 25 percent outside air into the system at all times.

C-Gravity Exhaust Dampers (all units)

Gravity exhaust dampers must be used any time an economizer or power exhaust fans are applied to SG 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.

D-Power Exhaust Fans (all units)

Power exhaust fans are used in downflow applications only. The fans require optional down-flow gravity exhaust dampers and economizers. Power exhaust fans provide exhaust air pressure relief and also run when return air dampers are closed and supply air blowers are operating. Figures 33 and 34 show location of the power exhaust fans. See installation instructions for more detail.

E-LP / Propane Kit

SG 120 units require one natural to LP /propane kit while SG 240 and 288 units require two (one for each gas heat section). The kit includes one gas valve, eleven burner orifices and three stickers. For more detail refer to the natural to LP gas changeover kit installation instructions.

F-Smoke Detectors A17 and A64

Photoelectric smoke detectors are a factory installed option. The smoke detectors can be installed in the supply air section (A64), return air section (A17), or in both the supply and return air section. See figure 35 for general location.

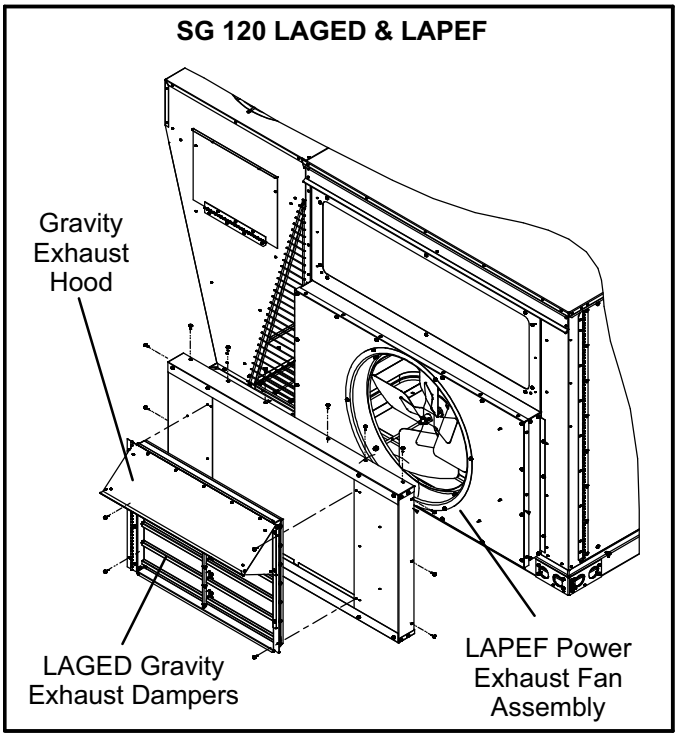


FIGURE 33

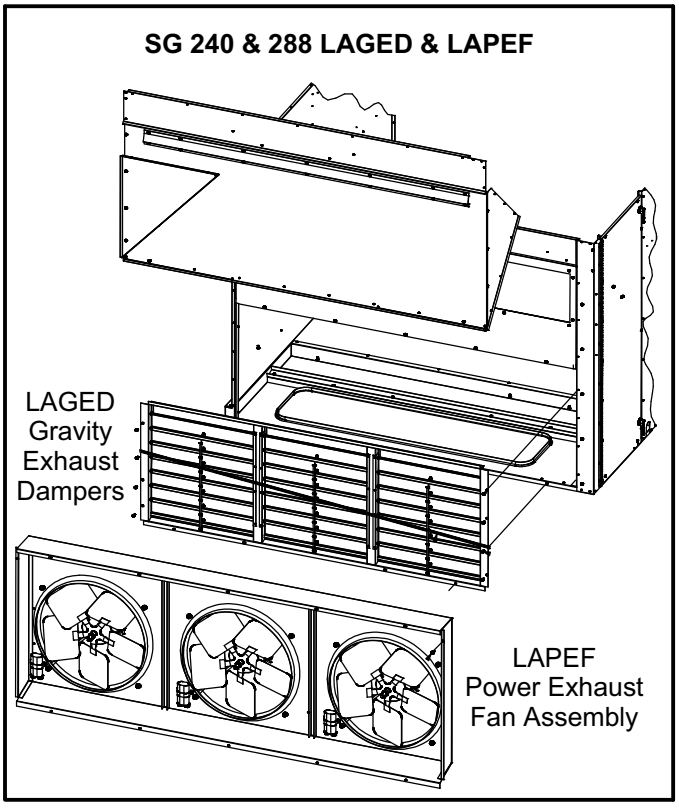


FIGURE 34

G-Economizer (Factory Installed)

The optional economizer can be used with downflow air discharge applications only. The economizer uses outdoor air for free cooling when temperature and/or humidity is suitable. An economizer hood is furnished with the economizer

NOTE - Gravity exhaust dampers are required with power exhaust.

The economizer is controlled by the main control module A55.

The economizer will operate in one of four modes. Each mode requires a different A55 Unit Controller DIP switch setting. Each mode also requires different sensors.

1-"TMP" MODE (SENSIBLE TEMPERATURE)

In the "TMP" mode, the IMC uses input from the factory installed RT6 Supply Air Sensor, RT16 Return Air Sensor, and RT17 Outdoor Air Sensor to determine suitability of outside air and economizer damper operation. When outdoor sensible temperature is less than return air sensible temperature, outdoor air is used for cooling. This may be supplemented by mechanical cooling to meet comfort demands. This application does not require additional optional sensors.

2-"ODE" MODE (OUTDOOR ENTHALPY)

The "ODE" or outdoor enthalpy mode requires a factory- or field-installed Honeywell C7400 enthalpy sensor (53W64). The sensor monitors outdoor air temperature and humidity (enthalpy). When outdoor air enthalpy is below the enthalpy control setpoint, the economizer modulates to allow outdoor air for free cooling.

3-"DIF" MODE (DIFFERENTIAL ENTHALPY)

The "DIF" or differential enthalpy mode requires two factory- or field-installed Honeywell C7400 enthalpy sensors (53W64). One sensor is installed in the outside air opening and the other sensor is installed in the return air opening. When the outdoor air enthalpy is below the return air enthalpy, the economizer opens to bring in outdoor air for free cooling.

4-"GLO" MODE (GLOBAL)

Global Mode - The "GLO" or global mode is used with an energy management system which includes a global control feature. Global control is used when multiple units (in one location) respond to a single outdoor air sensor. Each energy management system uses a specific type of outdoor sensor which is installed and wired by the controls contractor.

Motorized Outdoor Air Damper - The "GLO" mode is also used when a motorized outdoor air damper is installed in the system.

NOTE - All economizer modes of operation will modulate dampers to 55° F (13° C) supply air.

H-Blower Proving Switch S52

The blower proving switch monitors blower operation and locks out the unit in case of blower failure. The switch is N.O. and closes at .14" W.C. (34.9 Pa). See figure 35 for location of the switch.

I-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.C. overflow switch is connected to the M2 Unit Controller (A55) through DI-3. When the switch opens, the Unit Controller will shut off the unit. After a five-minute time out, the Unit Controller will verify the overflow switch position and restart the unit (if the switch has closed). The Unit Controller has a three-strike counter before the unit locks out. This means the Unit Controller will allow the overflow switch to open three times per thermostat demand. If the unit locks out, a reset of the Unit Controller is required after the switch has closed to restore unit operation.

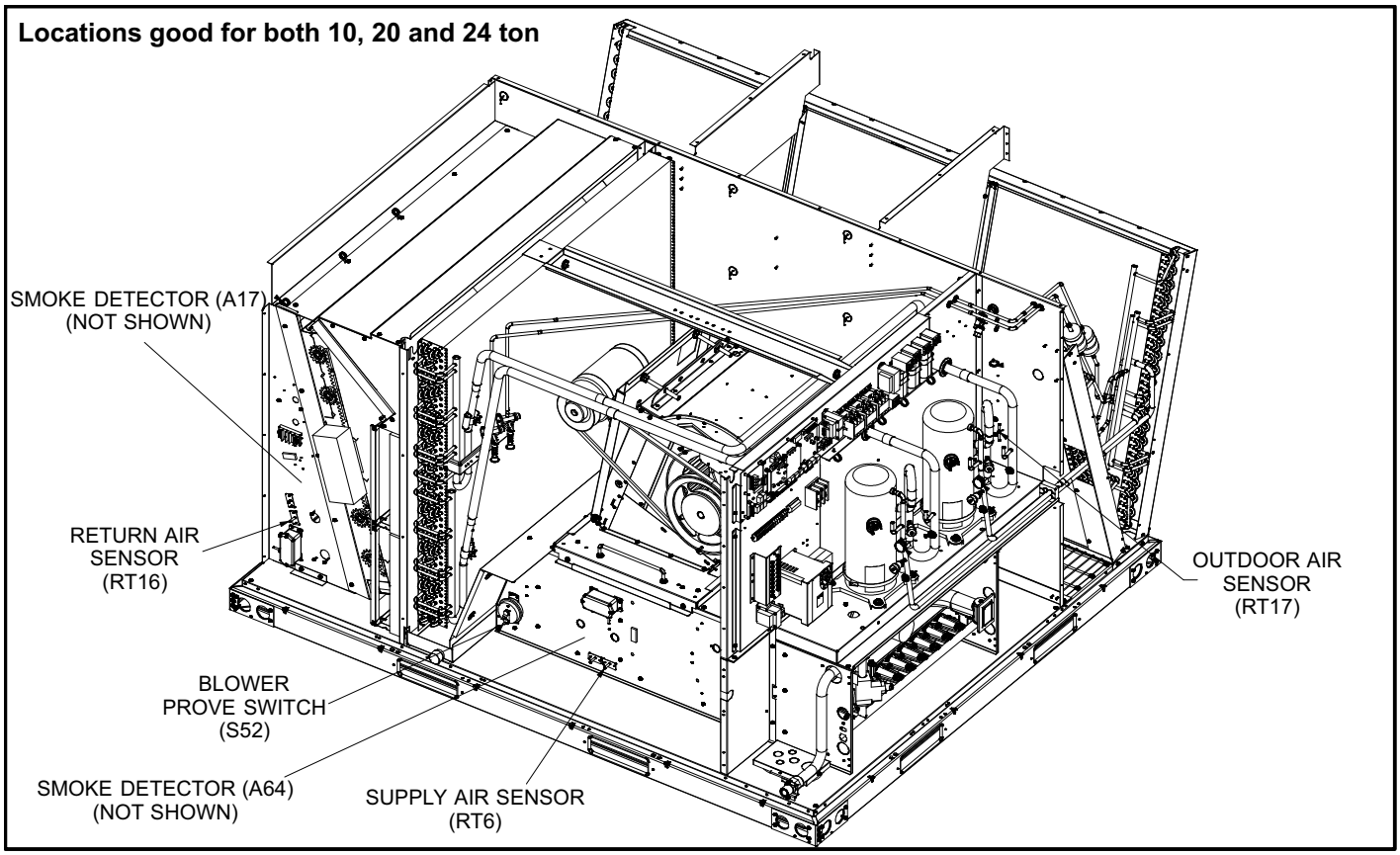


FIGURE 35

J-Multi-Staged Air Volume (MSAV™) Blowers

General

Units may contain a supply air blower equipped with a variable frequency drive A96 (VFD) which stages supply air CFM.

The supply air VFD (A96) is located near the compressors. See figure 36.

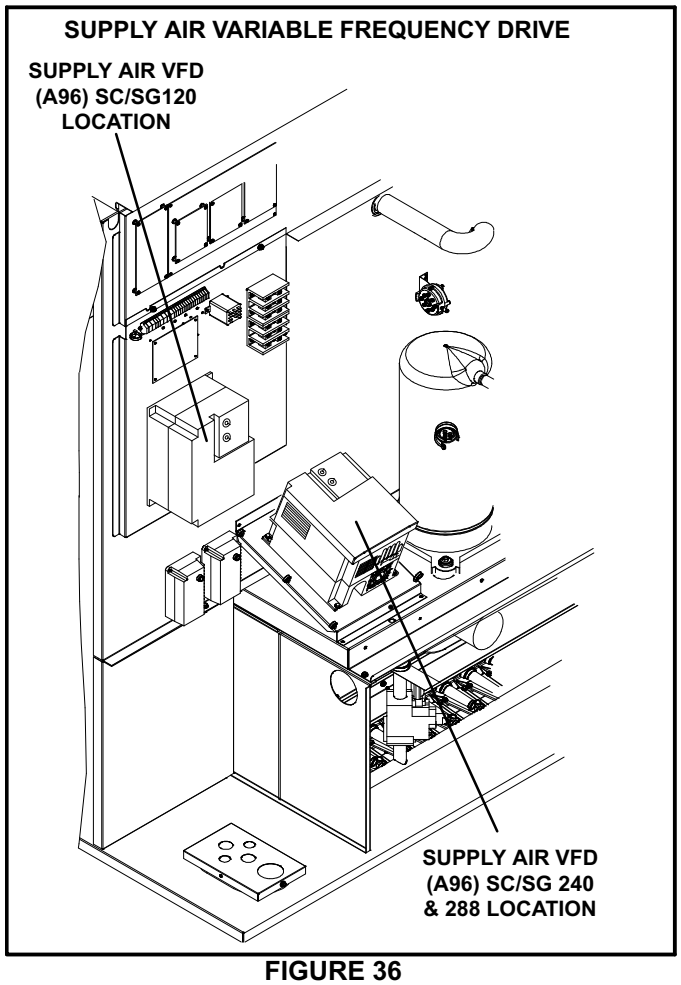


FIGURE 36

Start-Up

A-Design Specifications

Use table 18 to fill in field-provided, design specified blower CFM for appropriate unit.

If only high and low cooling design specifications are provided, set the medium cooling CFM at the high or low cooling design spec or any CFM between.

B-Set Maximum CFM

Use table 18 to determine highest blower CFM for appropriate unit. Adjust the blower pulley to deliver that amount of CFM with only the blower operating. See *Determining Unit CFM* in the Blower Operation and Adjustment section.

C-Enter Design Specifications Into Controller

Use the following menu to enter the blower design specified CFM into the Unit Controller. Make sure blower CFM is within limitations shown in table 19. Refer to the Unit Controller manual provided with unit.

Settings / Control / Guided Setup (enter information as prompted by the Unit Controller if not already done).

Advanced Guided Setup (enter information as prompted by the Unit Controller if not already done).

Setup Equipment / Change MSAV™ *Settings? / Yes*

Blower / Heat CFM
Cooling High CFM[1]
Cooling Low CFM[1]
Vent CFM

[1]The Unit Controller will prompt when more cooling stages are available depending on the number of compressors and the control mode.

D-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set. The Unit Controller will open the dampers to “Min OCP Blwr Low” when blower CFM is BELOW a “midpoint” CFM. The Unit Controller will open the damper to “Min OCP Blwr High” when blower CFM is at or ABOVE the “midpoint” CFM.

The Unit Controller will calculate the “midpoint” CFM.

Set Minimum Position 1

Use the following menu in the Unit Controller to set “Min OCP Blwr Low” for the blower CFM below the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

Settings / Control / MSAV / Damper / Low Speed

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

Note - Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.

TABLE 18
Blower CFM Design Specifications

Unit	T'Stat or Zone Control Stages	Blower Speed	Design Specified CFM
120, 240, 288	2	Htg.	
		Clg. High	
		Clg. Low	
		Ventilation	
240, 288	4	Htg.	
		Clg. High	
		Clg. Med. High	
		Clg. Med. Low	
		Clg. Low	
		Ventilation	

*Available blower speeds vary by unit and thermostat stages.

TABLE 19
MINIMUM AND MAXIMUM CFM

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM
SG 120	Std. , Med.	2225
SG 120	High	2550
SG 240	Std. , Med.	4450
SG 240	High	5075
SG 288	Std.	4825
SG 288	Med.	5925
SG 288	High	7125
Electric Heat Minimum CFM		
Unit	Heat Size (kW)	Airflow CFM
SC 120	0, 15, 20, 30, 40, 45, 60	3800
SC 240	0, 20, 30, 40, 60, 80, 90	8000
SC 288	0, 30, 60, 90	8000
Cooling Minimum CFM - 220 CFM/ton		
Unit	Blower Speed	Airflow CFM
SG/SC 120	Low, Med. Low, Med. High	2200
SG/SC 240	Low, Med. Low, Med. High	4400
SG/SC 288	Low, Med. Low, Med. High	5280
Cooling Minimum CFM - 280 CFM/ton		
Unit	Blower Speed	Airflow CFM
SG/SC 120	High	2800
SG/SC 240	High	5600
SG/SC 288	High	6720
Smoke and Ventilation Minimum CFM - 150 CFM/ton		
Unit	Not Applicable	Airflow CFM
SG/SC 120	NA	1500
SG/SC 240	NA	3000
SG/SC 288	NA	3600
Heating and Cooling Maximum CFM - 480 CFM/ton		
Unit	Blower Speed	Airflow CFM
SG/SC 120	High	4800
SG/SC 240	High	9600
SG/SC 288	High	11,520

Set Minimum Position 2

Use the same menu in the Unit Controller to set “Min OCP Blwr High” for the blower CFM above the “midpoint” CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

Settings / Control / MSAV / Damper / High Speed

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

Note - Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.

Operation

This is a summary of cooling operation. Refer to the sequence of operation provided in the Engineering Handbook or Service Manual for more detail.

A-Two-Stage T’Stat; 2- and 4-Compressor Units

1-Economizer With Outdoor Air Suitable

Y1 Demand -
- Compressors Off
- Blower Cooling Low
- Dampers modulate

Y2 Demand -
- Compressors Off
- Blower Cooling High
- Dampers Modulate

Note - If dampers are at maximum open for three minutes, compressor 1 (all units) and 2 (240 & 288 only) are energized and blower stays on cooling high.

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -
- First-stage Compressors On
  - (compressor 1 on 120 units,
  - compressor 1 & 2 on 240 & 288 units)
- Blower Cooling Low
- Dampers Minimum Position

Y2 Demand -
- All Compressors On
- Blower Cooling High
- Dampers Minimum Position

B-Zone Sensor (4 Clg. Stages), 4-Compressor Units (240, 288 Units)

1-Economizer With Outdoor Air Suitable

Y1 Demand -
Compressors Off
Blower Cooling Low
Dampers modulate

Y2 Demand -
Compressors Off
Blower Cooling High
Dampers Modulate

Note - If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.

Y3 Demand -
Compressors 1 and 2 On
Blower Cooling High
Dampers Maximum Open

Y4 Demand -
All Compressors On
Blower Cooling High
Dampers Maximum Open

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -
Compressor 1 On
Blower Cooling Low

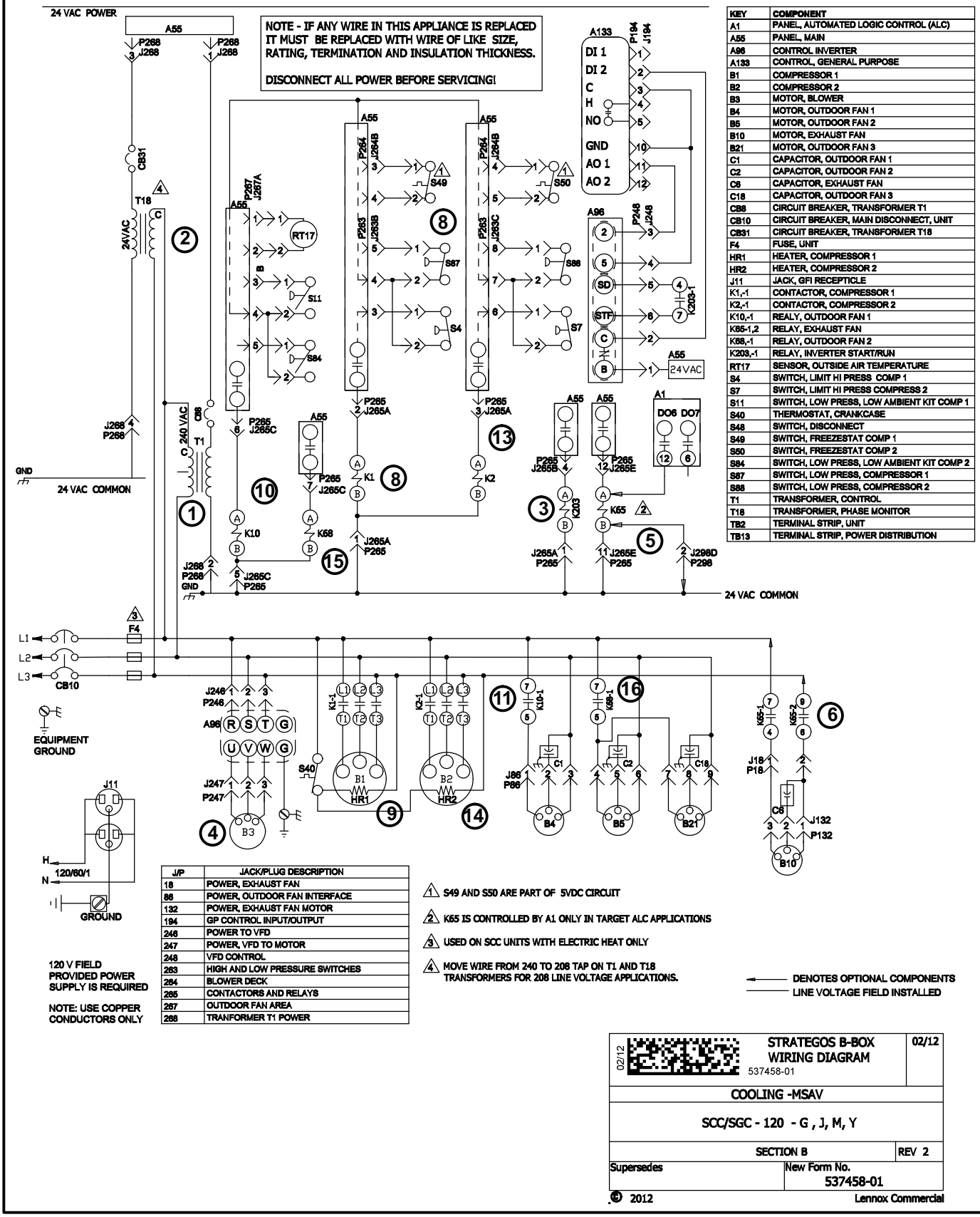
Y2 Demand -
Compressors 1 and 2 On
Blower Cooling Medium Low

Y3 Demand -
Compressors 1, 2 and 3 On
Blower Cooling Medium High

Y4 Demand -
All Compressors On
Blower Cooling High

VII-Wiring Diagrams and Sequence of Operation

SGC120 UNIT DIAGRAM



KEY	COMPONENT
A1	PANEL, AUTOMATED LOGIC CONTROL (ALC)
A55	PANEL, MAIN
A96	CONTROL INVERTER
A133	CONTROL, GENERAL PURPOSE
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN
B21	MOTOR, OUTDOOR FAN 3
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN
C18	CAPACITOR, OUTDOOR FAN 3
CB8	CIRCUIT BREAKER, TRANSFORMER T1
CB10	CIRCUIT BREAKER, MAIN DISCONNECT, UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T18
F4	FUSE, UNIT
HR1	HEATER, COMPRESSOR 1
HR2	HEATER, COMPRESSOR 2
J11	JACK, GFI RECEPTICLE
K1,-1	CONTACTOR, COMPRESSOR 1
K2,-1	CONTACTOR, COMPRESSOR 2
K10,-1	REALY, OUTDOOR FAN 1
K65-1,2	RELAY, EXHAUST FAN
K68,-1	RELAY, OUTDOOR FAN 2
K203,-1	RELAY, INVERTER START/RUN
RT17	SENSOR, OUTSIDE AIR TEMPERATURE
S4	SWITCH, LIMIT HI PRESS COMP 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 1
S40	THERMOSTAT, CRANKCASE
S48	SWITCH, DISCONNECT
S49	SWITCH, FREEZESTAT COMP 1
S50	SWITCH, FREEZESTAT COMP 2
S84	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 2
S87	SWITCH, LOW PRESS, COMPRESSOR 1
S88	SWITCH, LOW PRESS, COMPRESSOR 2
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, PHASE MONITOR
TB2	TERMINAL STRIP, UNIT
TB13	TERMINAL STRIP, POWER DISTRIBUTION

J/P	JACK/PLUG DESCRIPTION
18	POWER, EXHAUST FAN
86	POWER, OUTDOOR FAN INTERFACE
132	POWER, EXHAUST FAN MOTOR
194	GP CONTROL INPUT/OUTPUT
246	POWER TO VFD
247	POWER, VFD TO MOTOR
248	VFD CONTROL
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANFORMER T1 POWER

02/12	STRATEGOS B-BOX WIRING DIAGRAM 537458-01	02/12
	COOLING -MSAV	
	SCC/SGC - 120 - G , J, M, Y	
	SECTION B	REV 2
Supersedes	New Form No. 537458-01	

SEQUENCE OF OPERATION SG 120

Power:

1. Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to J268. J268 provides 24VAC to the unit cooling, heating and blower controls.
2. TB13 is also energized when unit disconnect switch closes. TB13 provides line voltage to compressors crankcase heaters, compressor contactors, the blower motor contactor (relay in MSAV™ units) and condenser fan relay.

Blower Operation:

3. The main control module receives a demand from thermostat terminal G. A55 energizes blower contactor K3 (K203 in MSAV units) with 24VAC.
4. Blower B3 is energized.

Economizer Operation:

5. The economizer control module A56 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).
6. N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.

1st Stage Cooling (compressor B1)

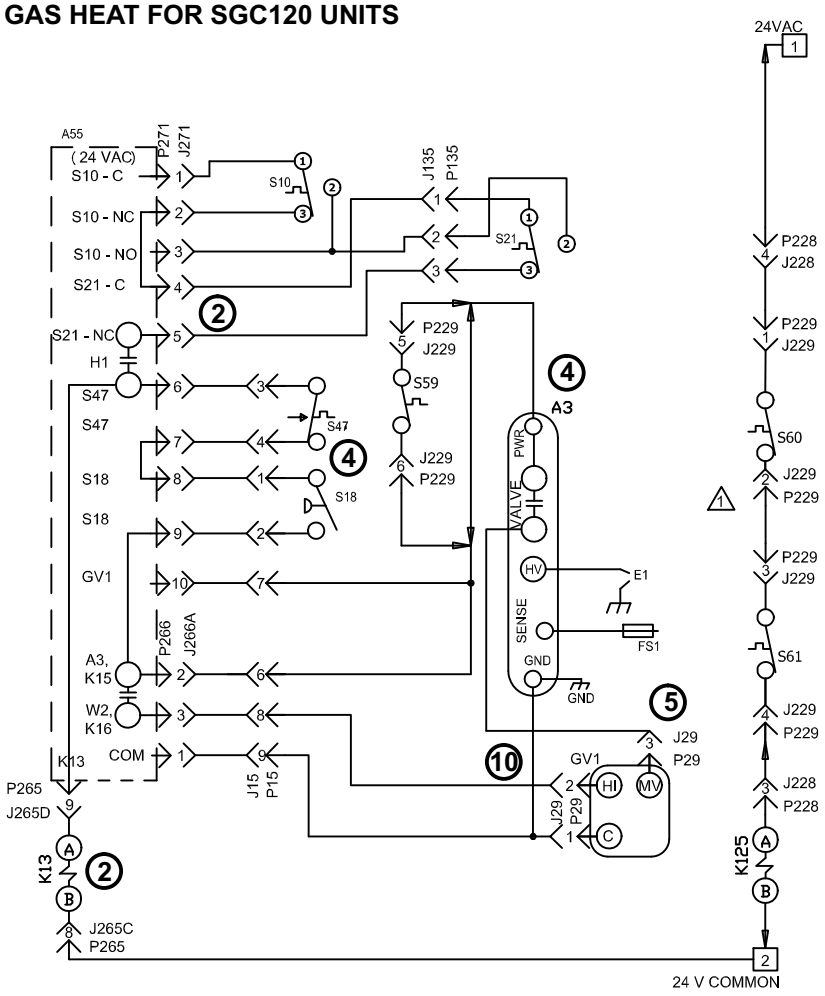
7. First stage cooling demand energizes Y1 and G in the thermostat. G energizes blower.
8. After A55 proves N.C. low pressure switch S87, N.C. freezestat S49 and N.C. high pressure switch S4, compressor contactor K1 is energized.
9. N.O. contacts K1-1 close energizing compressor B1. Thermostat S40 opens de-energizing crankcase heater HR1 and HR2.
10. N.O. low ambient switch S11 closes to energize condenser fan relay K10.
11. N.O. contacts K10-1 close energizing condenser fan B4.

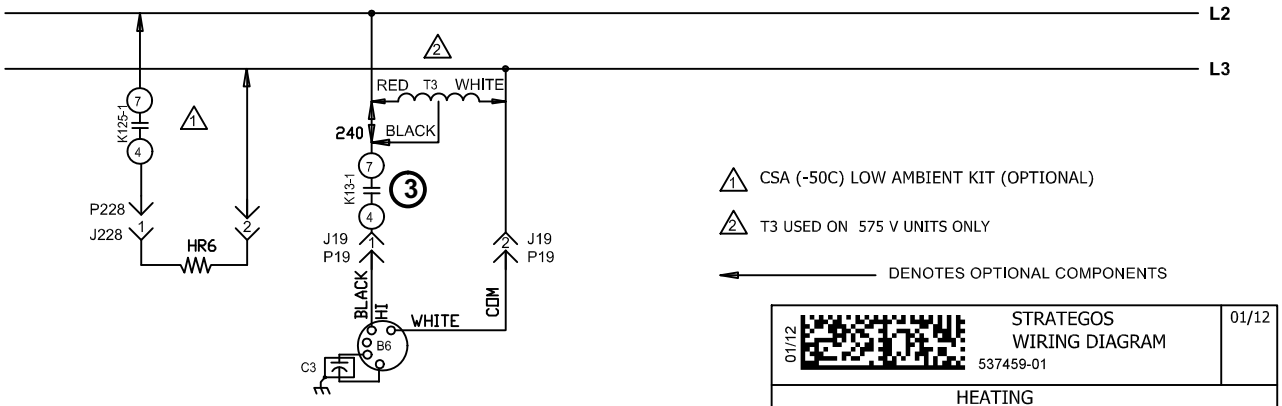
2nd Stage Cooling (compressor B2 is energized)

12. Second stage cooling demand energizes Y2.
13. After A55 proves N.C. low pressure switch S88, N.C. freezestat S50 and N.C. high pressure switch S7, compressor contactor K2 is energized.
14. N.O. contacts K2-1 close energizing compressor B2.
15. A55 energizes condenser fan relay K68.
16. N.O. contacts K68-1 and K68-2 close energizing condenser fans B5 and B21.

GAS HEAT FOR SGC120 UNITS

KEY	DESCRIPTION
A3	CONTROL, BURNER 1
A55	CONTROL, MAIN BOARD LENNOX
B6	MOTOR COMBUSTION AIR BLOWER
C3	CAPACITOR, COMB AIR BLOWER 1
E1	SPARK
FS1	SENSOR FLAME
GV1	VALVE GAS 1
HR6	HEATER, -50C LOW AMBIENT KIT
J15	JACK, BURNER 1
J19	JACK, COMBUSTION AIR BLOWER 1
J29	JACK, GAS 1 HONEYWELL VALVE
J135	JACK, PRIMARY LIMIT
J228	JACK, VESTIBULE HEATER
J229	JACK, VESTIBULE HEATER CONTROL 1
J265C	JACK, CONTACTOR RELAY
J266A	JACK, HEATING CONTROL STG 1
J271A,B	JACK, HEATING SENSORS STG 1
K13,-1	RELAY, COMBUSTION AIR BLOWER
K123, -1	RELAY, SINGLE THROW LIMIT
K125,-1	RELAY, HEAT SHUT OFF
P15	PLUG, BURNER 1
P19	PLUG, COMBUSTION AIR BLOWER 1
P29	PLUG, GAS 1 HONEYWELL VALVE
P135	PLUG, PRIMARY LIMIT
P228	PLUG, VESTIBULE HEATER
P229	PLUG, VESTIBULE HEATER CONTROL 1
P265	PLUG, CONTACTOR RELAY
P266	PLUG, HEATING CONTROL
P271	PLUG, HEATING SENSORS STG 1
S10	SWITCH, LIMIT PRIMARY GAS
S18	SWITCH, COMBUSTION AIR BLOWER PROOF
S21	SWITCH, LIMIT SECONDARY GAS
S47	SWITCH FLAME ROLLOUT BURNER
S59	TSTAT, OPEN -20F, CLOSE 10F
S60	TSTAT, OPEN 20F, CLOSE -10F
S61	TSTAT, OPEN 50F, CLOSE 20F
T3	TRANSFORMER COMB AIR BWR 1





1 CSA (-50C) LOW AMBIENT KIT (OPTIONAL)

2 T3 USED ON 575 V UNITS ONLY

DENOTES OPTIONAL COMPONENTS

01/12	STRATEGOS WIRING DIAGRAM 537459-01	01/12
HEATING		
GAS HEAT SGC - 120 - G,J,Y,M		
SECTION A		REV 1
Supersedes	New Form No. 537459-01	

SEQUENCE OF OPERATION GAS HEAT SGC120

First Stage Heat:

1. Heating demand initiates at W1 in the indoor thermostat.
2. 24VAC is routed through J268 to the main control module A55. After A55 proves N.C. primary limit S10 and secondary limit S21, the combustion air blower relay K13 is energized.
3. N.O. K13-1 contacts close allowing line voltage to energize combustion air blower B6.
4. After the combustion air blower B6 has reached full speed, the combustion air proving switch S18 contacts close. The A55 routes 24VAC through N.C. burner flame rollout switch S47 and the closed contacts of combustion air proving switch S18 to energize the ignition module A3.
5. After a 30 second delay A3 energizes the ignitor and LO terminal (low fire) of gas valve GV1.

Blower Operation:

6. The main control module receives a demand from thermostat terminal G. A55 energizes blower contactor K3 (K203 in MSAV™, see next page) with 24VAC.
7. Blower B3 is energized.

Second Stage Heat:

8. With first stage heat operating, an additional heating demand initiates W2 in the thermostat.
9. A second stage heating demand is received by A55 control module.
10. A55 energizes HI terminal (high fire) of gas valve GV1.

End of Second Stage Heat:

11. Heating demand is satisfied. Terminal W2 (high fire) is de-energized.
12. Terminal HI of GV1 is de-energized by A55 control module.

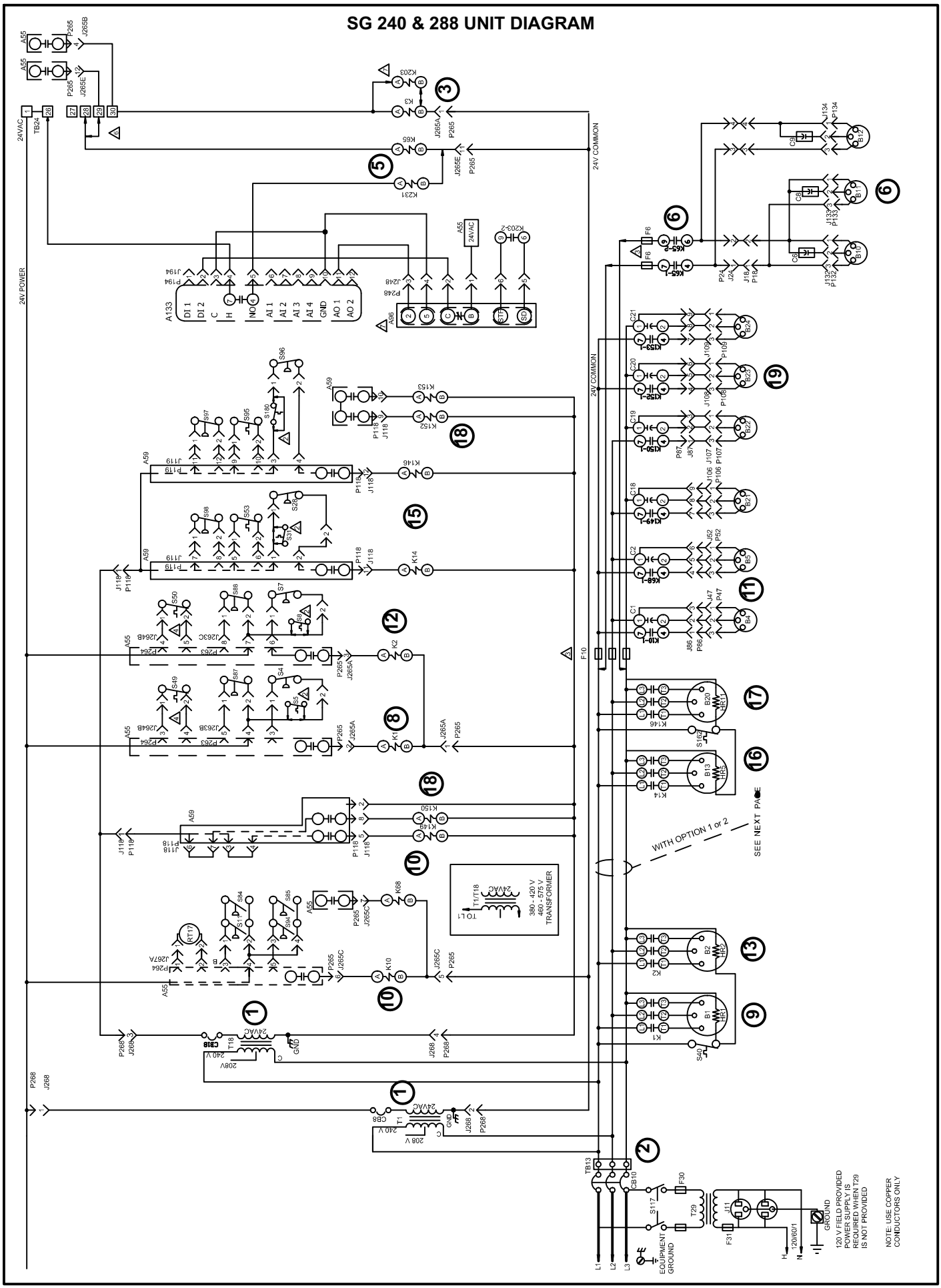
End of First Stage Heat:

13. Heating demand is satisfied. Terminal W1 (low fire) is de-energized.
14. Ignition A3 is de-energized by control module A55 in turn de-energizing terminal LO of GV1. Combustion air blower relay K13 is also de-energized.

Optional Low Ambient Kit:
(C.G.A. -50°C Low Ambient Kit)

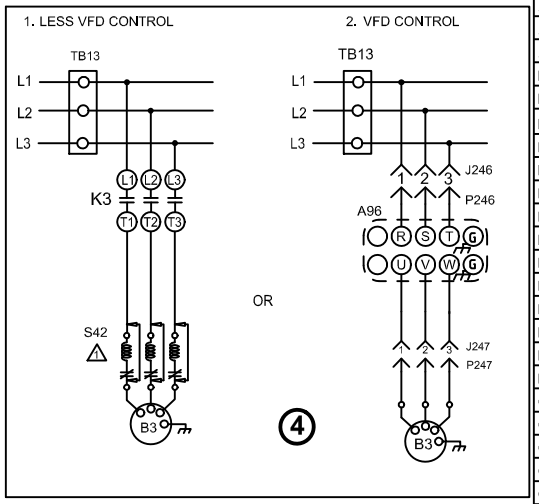
15. Line voltage (or transformer T20 in 460V and 575V only) is routed through the low ambient kit fuses F20 and N.C. low ambient kit thermostats S60 and S61,to energize low ambient kit heater HR6.

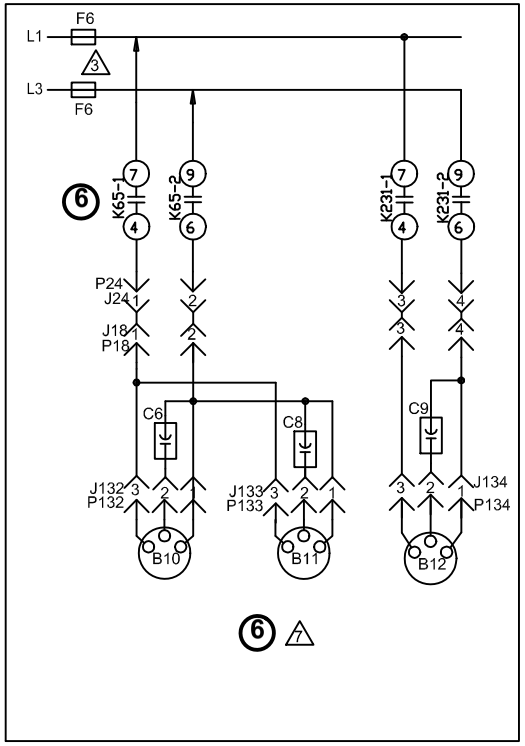
SG 240 & 288 UNIT DIAGRAM



SG 240 & 288 UNIT DIAGRAM

OPTIONS





KEY	COMPONENT
A55	PANEL, MAIN
A59	PANEL, COMPRESSORS 3 AND 4
A96	CONTROL INVERTER
A133	CONTROL, GENERAL PURPOSE
B1	COMPRESSOR 1
B2	COMPRESSOR 2
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN 1
B5	MOTOR, OUTDOOR FAN 2
B10	MOTOR, EXHAUST FAN 1
B11	MOTOR, EXHAUST FAN 2
B12	MOTOR, EXHAUST FAN 3
B13	COMPRESSOR 3
B20	COMPRESSOR 4
B21	MOTOR, OUTDOOR FAN 3
B22	MOTOR, OUTDOOR FAN 4
B23	MOTOR, OUTDOOR FAN 5
B24	MOTOR, OUTDOOR FAN 6
C1	CAPACITOR, OUTDOOR FAN 1
C2	CAPACITOR, OUTDOOR FAN 2
C6	CAPACITOR, EXHAUST FAN 1
C8	CAPACITOR, EXHAUST FAN 2
C9	CAPACITOR, EXHAUST FAN 3
C18	CAPACITOR, OUTDOOR FAN 3
C19	CAPACITOR, OUTDOOR FAN 4
C20	CAPACITOR, OUTDOOR FAN 5
C21	CAPACITOR, OUTDOOR FAN 6
CB8	CIRCUIT, BREAKER T1
CB10	CIRCUIT BREAKER, MAIN DISCONNECT UNIT
CB18	CIRCUIT, BREAKER T18
F6	FUSE, EXHAUST FAN
F10	FUSE, OUTDOOR FAN MOTOR
F30	FUSE, TRANSFORMER T29 PRIMARY
F31	FUSE, TRANSFORMER T29 SECONDARY
HR1	HEATER COMPRESSOR 1
HR2	HEATER COMPRESSOR 2
HR5	HEATER COMPRESSOR 3
HR11	HEATER COMPRESSOR 4
J11	JACK, GFI, RECEPTACLE

J/P	JACK/PLUG DESCRIPTION
P18	PLUG, EXHAUST FAN COMP
P24	PLUG, EXHAUST FAN
P47	PLUG, OUTDOOR FAN 1
P52	PLUG, OUTDOOR FAN 2
P86	PLUG, OUTDOOR FAN INTERFACE
P87	PLUG, OUTDOOR FAN INTERFACE 2
P106	PLUG, OUTDOOR FAN 3
P107	PLUG, OUTDOOR FAN 4
P108	PLUG, OUTDOOR FAN 5
P109	PLUG, OUTDOOR FAN 6
P118	PLUG, COMPRESSOR 3 AND 4, CONTROL
P119	PLUG, COMPRESSOR 3 AND 4, INPUT
P132	PLUG, EXHAUST FAN MOTOR 1
P133	PLUG, EXHAUST FAN MOTOR 2
P134	PLUG, EXHAUST FAN MOTOR 3
P194	PLUG, INPUT, OUTPUT, A133
P246	PLUG, POWER TO VFD
P247	PLUG, VFD TO MOTOR
P248	PLUG, VFD TO CONTROL
P263	PLUG, HIGH AND LOW PRESSURE SWITCHES
P264	PLUG, BLOWER DECK
P265	PLUG, CONTACTORS AND RELAYS
P267	PLUG, OUTDOOR FAN AREA
P268	PLUG, TRANSFORMERS

DENOTES OPTIONAL COMPONENTS

LINE VOLTAGE FIELD INSTALLED

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.

K1	CONTACTOR, COMPRESSOR 1
K2	CONTACTOR, COMPRESSOR 2
K3	CONTACTOR, BLOWER
K10	RELAY, OUTDOOR FAN 1
K14	CONTACTOR, COMPRESSOR 3
K65	RELAY, EXHAUST FAN
K68	RELAY, OUTDOOR FAN 2
K146	CONTACTOR, COMPRESSOR 4
K149	RELAY, OUTDOOR FAN 3
K150	RELAY, OUTDOOR FAN 4
K152	RELAY, OUTDOOR FAN 5
K153	RELAY, OUTDOOR FAN 6
K203	JACK, RELAY INVERTER CONTROL
K231	RELAY, EXHAUST FAN 3
RT17	SENSOR, OUTDOOR AIR
S4	SWITCH, LIMIT HI PRESS COMPRESS 1
S5	SWITCH, LIMIT HI TEMP COMPRESS 1
S7	SWITCH, LIMIT HI PRESS COMPRESS 2
S8	SWITCH, LIMIT HI TEMP COMPRESS 2
S11	SWITCH, LOW PRESS, LOW AMBIENT COMP 1
S28	SWITCH, LIMIT HI PRESS COMPRESS 3
S31	SWITCH, LIMIT HI TEMP COMPRESS 3
S40	THERMOSTAT, CRANKCASE 1
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S49	SWITCH, FREEZE STAT COMPRESS 1
S50	SWITCH, FREEZE STAT COMPRESS 2
S53	SWITCH, FREEZE STAT COMPRESS 3
S84	SWITCH, LOW PRESS, LOW AMBIENT COMP 2
S85	SWITCH, LOW PRESS, LOW AMBIENT COMP 3
S87	SWITCH, LOW PRESS, COMP 1
S88	SWITCH, LOW PRESS, COMP 2
S94	SWITCH, LOW PRESS, LOW AMBIENT KIT COMP 4
S95	SWITCH, FREEZE STAT COMPRESS 4
S96	SWITCH, LIMIT HI PRESS COMPRESS 4
S97	SWITCH, LOW PRESS, COMP 4
S98	SWITCH, LOW PRESS, COMP 3
S117	SWITCH, GFI
S162	THERMOSTAT, CRANKCASE 2
S180	SWITCH, LIMIT HI PRESS COMPRESS 4
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, CONTACTOR
T29	TRANSFORMER, GFI
TB13	TERMINAL STRIP, POWER DISTRIBUTION
TB24	TERMINAL STRIP, UNIT ADDER

1. S42 USED ON "M" VOLTAGE UNITS AND UNITS WITH HIGH EFFICIENCY MOTORS AND MOTORS LESS INTERNAL OVERLOAD PROTECTION

2. USED ONLY ON UNITS WITH INTERLINK COMPRESSORS

3. F6 AND F10 FUSES ARE USED ON "Y" VOLTAGE UNITS ONLY

4. S49 AND S50 ARE PART OF 5VDC CIRCUIT

6. REMOVE JUMPER BETWEEN TB24-28 AND TB24-29 WHENEVER ALC CONTROL IS USED REFER TO SECTION C DIAGRAM

7. USED ON VFD APPLICATION

	STRATEGOS WIRING DIAGRAM	11/11
COOLING		
SC, SG - 240, 288 - G,J,M,Y		
SECTION B		REV 0
Supersedes	New Form No. 537485-01	

SEQUENCE OF OPERATION SG 240 & 288

Power:

1. Line voltage from CB10 energizes transformer T1 and T18. Transformer T1 provides 24VAC power to A55 and T18 provides 24VAC power to A59. The two transformers provide 24VAC power to the unit cooling, heating and blower controls and thermostat.
2. Terminal strip TB13 is also energized when the unit disconnect closes. TB13 supplies line voltage to compressor crankcase heaters, compressors, blower motors, and fan motors.

Blower Operation (OCP input must be on):

3. The main control module A55 receives a demand from thermostat terminal G. A55 energizes blower contactor K3 (K203 on MSAV™ units) with 24VAC.
4. Blower B3 is energized.

Economizer Operation:

5. The main control module A55 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% (travel) outside air damper open (adjustable).
6. N.O. K65-1 and K65-2 both close, energizing exhaust fan motors B10, B11 and B12.

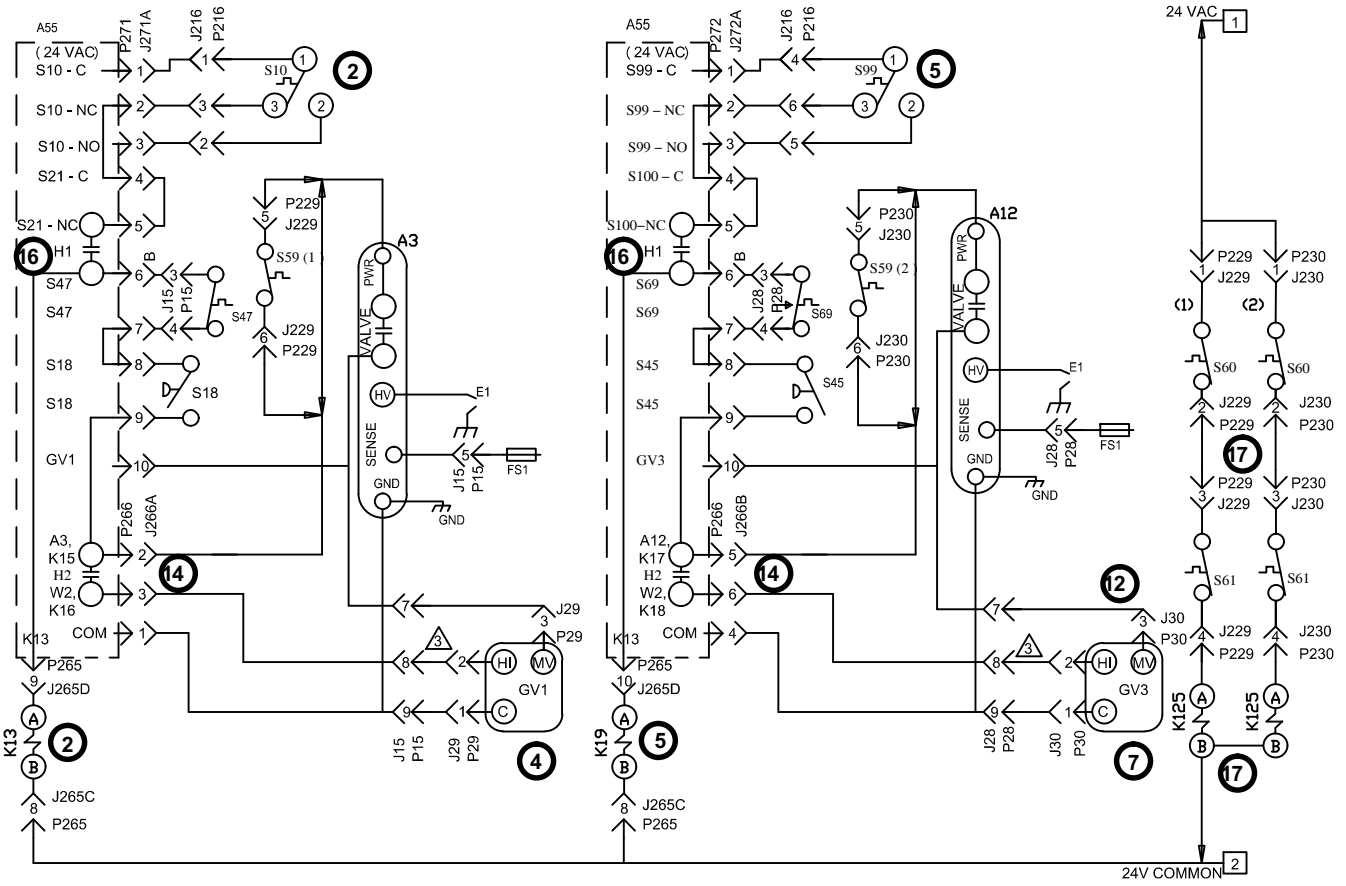
1st Stage Cooling

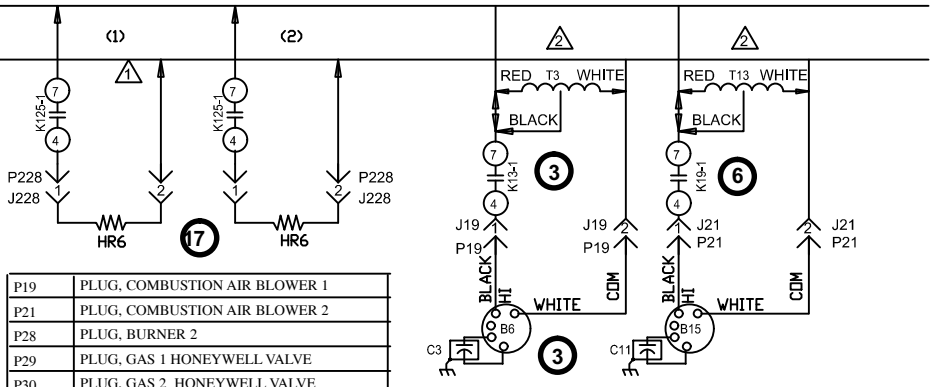
7. First stage cooling demand energizes Y1 and G in the thermostat. G energizes blower, if blower is not already running (see step 3).
8. After A55 proves N.C. low pressure switch S87, N.C. freezestat S49, and N.C. high pressure switch S4, compressor contactor K1 is energized.
9. N.O. contacts K1-1 close energizing compressor B1. Thermostat S40 opens de-energizing crankcase heaters HR1 and HR2.
10. Main control A55 energizes condenser fan contactor K10 and K68 while A59 energizes K149.
11. N.O. contacts K10-1, K68-1 and K149-1 close energizing condenser fan B4, B5 and B21.
12. Simultaneous with step 8, A55 proves N.C. low pressure switch S88, N.C. freezestat S50, and N.C. high pressure switch S7, compressor contactor K2 is energized.
13. N.O. contacts K2-1 close energizing compressor B2.

2nd Stage Cooling

14. Second stage cooling demand energizes Y2.
15. 24VAC is routed to compressor 3 and 4 module A59. After A59 proves N.C. low pressure switches S98 and S97, N.C. freezestats S53 and S95, and N.C. high pressure switches S28 and S96, compressor contactors K14 and K146 are energized.
16. N.O. contacts K14-1 close energizing compressor B13. Thermostat S162 opens de-energizing crankcase heaters HR5 and HR11.
17. N.O. contacts K146-1 close energizing compressor B20.
18. Compressor 3 and 4 module A59 energizes condenser fan contactors K150, K152 and K153.
19. N.O. contacts K150-1, K152-1 and K153-1 close energizing condenser fan B22, B23 and B24.

GAS HEAT FOR SG 240 & 288





DESCRIPTION	
KEY	DESCRIPTION
A3	CONTROL, BURNER 1
A12	CONTROL, BURNER 2
A55	PANEL, MAIN CONTROL LENNOX
B6	MOTOR COMBUSTION AIR BLOWER 1
B15	MOTOR COMBUSTION AIR BLOWER 2
C3	CAPACITOR, COMB AIR BLOWER 1
C11	CAPACITOR, COMB AIR BLOWER 2
E1	SPARK
FS1	SENSOR, FLAME
GV1	VALVE, GAS 1
GV3	VALVE, GAS 2
HR6	HEATER, –50C LOW AMBIENT KIT
J15	JACK, BURNER 1
J19	JACK, COMBUSTION AIR BLOWER 1
J21	JACK, COMBUSTION AIR BLOWER 2
J28	JACK, BURNER 2
J29	JACK, GAS 1 HONEYWELL VALVE
J30	JACK, GAS 2 HONEYWELL VALVE
J216	JACK, PRIMARY LIMIT 1
J228	JACK, VESTIBULE HEATER
J229	JACK, VESTIBULE HEATER CONTROL 1
J230	JACK, VESTIBULE HEATER CONTROL 2
J265C	JACK, CONTACTOR RELAY
J266A	JACK, HEATING CONTROL STG 1
J271A,B	JACK, HEATING SENSORS STG 1
J272A,B	JACK, HEATING SENSORS STG 2
K13,–1	RELAY, COMBUSTION AIR BLOWER 1
K19,–1	RELAY, COMBUSTION AIR BLOWER 2
K125,–1	RELAY, HEAT SHUT OFF
P15	PLUG, BURNER 1
P19	PLUG, COMBUSTION AIR BLOWER 1
P21	PLUG, COMBUSTION AIR BLOWER 2
P28	PLUG, BURNER 2
P29	PLUG, GAS 1 HONEYWELL VALVE
P30	PLUG, GAS 2 HONEYWELL VALVE
P228	PLUG, VESTIBULE HEATER
P229	PLUG, VESTIBULE HEATER CONTROL 1
P230	PLUG, VESTIBULE HEATER CONTROL 2
P216	PLUG, PRIMARY LIMIT 1
P265	PLUG, CONTACTOR RELAY
P266	PLUG, HEATING CONTROL
P271	PLUG, HEATING SENSORS STG 1
P272	PLUG, HEATING SENSORS STG 2
S10	SWITCH, LIMIT PRIMARY GAS
S18	SWITCH, COMB AIR BLOWER 1 PROOF
S45	SWITCH, COMB AIR BLOWER 2 PROOF
S47	SWITCH, FLAME ROLLOUT BURNER
S59	TSTAT, OPEN –20F, CLOSE 10F
S60	TSTAT, OPEN 20F, CLOSE –10F
S61	TSTAT, OPEN 50F, CLOSE 20F
S69	SWITCH, FLAME ROLLOUT 2
S99	SWITCH, LIMIT PRIMARY BURNER 2
T3	TRANSFORMER, COMB AIR BLOWER 1

1 CSA (-50C) LOW AMBIENT KIT (OPTIONAL)

2 T3 AND T13 USED ON 575 V UNITS ONLY

3 P15-8 TO J29-2, P28-8 TO J30-2, ARE OMITTED FOR LOW FIRE UNITS

DENOTES OPTIONAL COMPONENTS

WIRING DIAGRAM	02/10
HEATING	
GAS HEAT FOR ENERGENCE™ LGH 260, 360 AND 480	
SECTION A	REV. 2.0
Supersedes	New Form No. 537185-01

GAS HEAT FOR SG 240 & 288 UNITS

FIRST STAGE HEAT:

1. Heating demand initiates at W1 in thermostat.
2. 24VAC is routed to the main control module A55. After A55 proves N.C. primary limit S10, the combustion air blower relay K13 is energized.
3. N.O. K13-1 contacts close allowing line voltage (or transformer T3 in 575V only) to energize combustion air blower B6.
4. After the combustion air blower B6 has reached full speed, the combustion air proving switch (S18) contacts close. The A55 routes 24VAC through N.C. burner 1 flame rollout switch S47 and the closed contacts of the combustion air proving switch (S18) to energize the ignition module A3. After a 30 second delay A3 energizes the gas valve GV1 on low fire.
5. As steps 2, 3 and 4 occur, A55 proves N.C. primary gas heat limit S99 and the combustion air blower relay K19 is energized.
6. N.O. K19-1 contacts close allowing line voltage (or transformer T13 in 575V only) to energize combustion air blower B15.
7. After the combustion air blower B15 has reached full speed, the combustion air proving switch (S45) contacts close. The A55 routes 24VAC through N.C. burner 2 flame rollout switch S69 and the closed contacts of the combustion air proving switch (S45) to energize the ignition module A12. After a 30 second delay A12 energizes gas valve GV3 on low fire.

BLOWER OPERATION:

8. The main control module receives a demand from thermostat terminal G. A55 energizes blower contactor K3 (K203 in MSAV™ units) with 24VAC.
9. Blower B3 is energized.

SECOND STAGE HEAT:

10. With first stage heat operating, an additional heating demand initiates W2 in the thermostat.
11. A second stage heating demand is received by the A55 module.
12. The module will energize the corresponding gas valves GV1 and GV3 on high fire.

END OF SECOND STAGE HEAT:

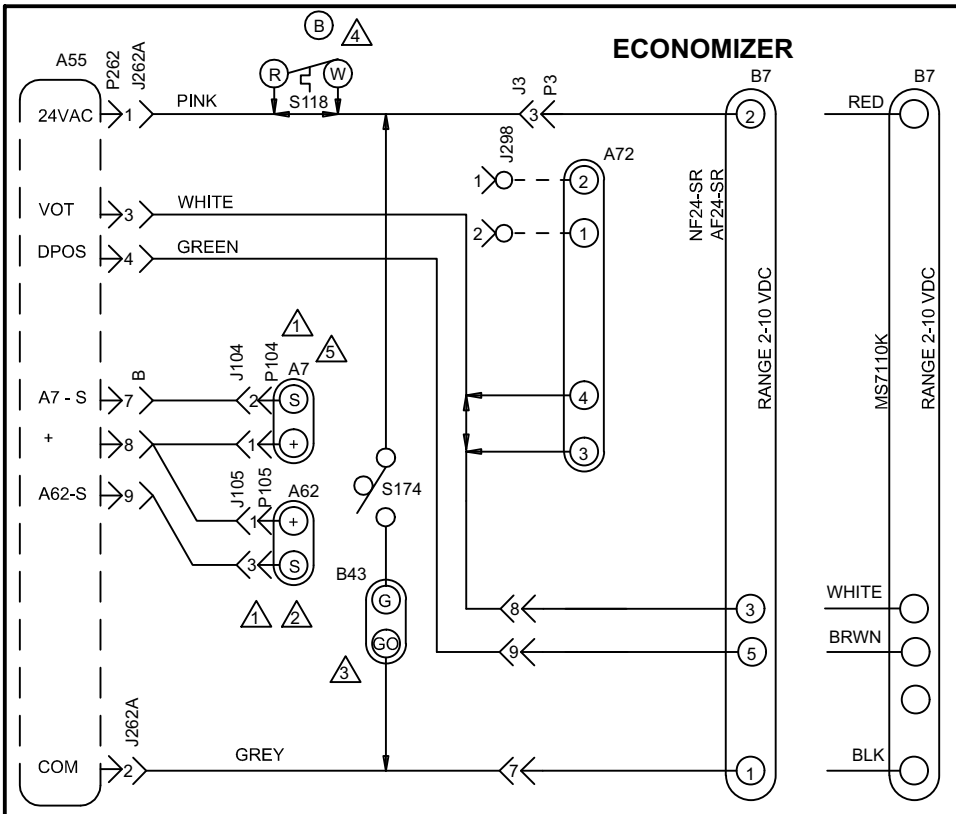
13. Heating demand is satisfied. Terminal W2 is de-energized.
14. High fire on GV1 and GV3 are de-energized by the A55 module.

END OF FIRST STAGE HEAT:

15. Heating demand is satisfied. Terminal W1 is de-energized.
16. Ignition module A3 is de-energized by A55 in turn de-energizing GV1. Combustion blower relay K13 is also de-energized. At the same instant, ignition module A12 is de-energized by A55 module in turn de-energizing GV3. K19 combustion air blower relay is also de-energized.

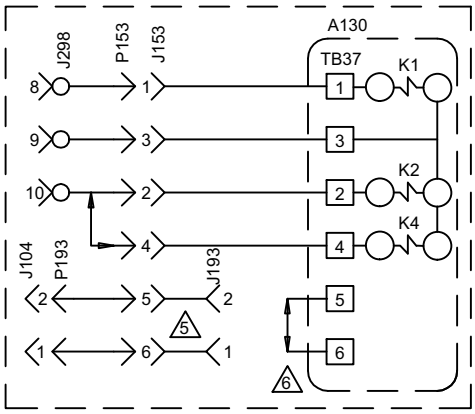
LOW AMBIENT KIT
(C.G.A. -50°C LOW AMBIENT KIT):

17. 24V is routed through low ambient kit thermostats S60 and S61 when ambient temperature is below -10°F and 20°F respectively. K125 relay energizes low ambient kit heaters HR6.



1. DELETE A7 AND A62 (IF USED) FOR EITHER GLOBAL ENTHALPY OR SENSIBLE TEMPERATURE CONTROL
2. FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR
3. OPTIONAL EXHAUST DAMPER ACTUATOR TO HOLD EXHAUST DAMPER CLOSED WHEN OUTSIDE AIR DAMPER IS CLOSED
4. S118 USED ON 35 TO 50 TON ENERGENCE UNITS WITH ENERGY RECOVERY WHEEL (ERW)
5. REPOSITION A7 ENTHALPY SENSOR FROM ROOFTOP UNIT ECONOMIZER INTO INTAKE HOOD OF THE ERW ROOFTOP UNIT
6. REMOVE JUMPER WHEN INSTALLING OPTIONAL LOW AMBIENT SWITCH

DESCRIPTION	
KEY	COMPONENT
A7	SENSOR, SOLID STATE ENTHALPY
A130	CONTROL, ERS
A55	CONTROL, MAIN PANEL LENNOX
A62	SENSOR, ENTHALPY INDOOR
A72	CONTROL, REMOTE MIN POS (OPT)
B7	MOTOR, DAMPER ECONOMIZER
B43	MOTOR, EXHAUST DAMPER
J3	JACK, UNIT ECONOMIZER
J104	JACK, SENSOR OUTDOOR ENTHALPY
J105	JACK, SENSOR RETURN AIR ENTHALPY
J153	JACK, ENTHALPY / DAMPER MOTOR
J193	JACK, ENTHALPY SENSOR
J298A	JACK, IAQ INTERFACE
J262A	JACK, DAMPER MOTOR
J262B	JACK, ENTHALPY SENSORS
P3	PLUG, ECONOMIZER BYPASS
P153	PLUG, ENTHALPY / DAMPER MOTOR
P193	PLUG, ENTHALPY SENSOR
P262	PLUG, ECONOMIZER OUTPUT
S118	THERMOSTAT, DESICANT DEFROST
S174	SWITCH, EXHAUST DAMPER



ENERGY RECOVERY WHEEL HOOK UP

NOTE- THIS DIAGRAM USED ONLY WHEN ECONOMIZER OR MOTORIZED OUTDOOR AIR DAMPERS ARE INSTALLED.

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

WIRING DIAGRAM	09/09
ACCESSORIES	
ENERGENCE™ SERIES ECONOMIZER AND MOTORIZED OAD PIVOTING WHEEL ENERGY RECOVERY SYSTEM OPTION	
SECTION D	
Supersedes	New Form No. 537189-01

POWER:

1. A55 energizes the economizer components with 24VAC.

OPERATION:

2. The outdoor enthalpy sensor A7 and indoor enthalpy sensor A62 (if differential enthalpy is used) communicates to the main control module A55 when to power the damper motor B7.
3. The main control module A55 supplies B7 with 0 - 10 VDC to control the positioning of economizer.
4. The damper actuator provides 2 to 10 VDC position feedback.