SGC 3 & 5 TON

The SGC 3 and 5 ton (10.5 and 21 kW) units are configure to order units (CTO) with a wide selection of factory installed options. Units are available in the following heating inputs:

036 - 105,000 Btuh / 30.7 kW

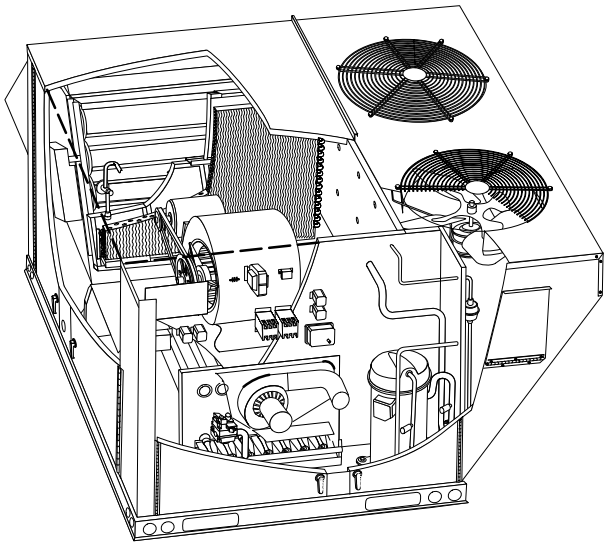
060 - 150,000 Btuh / 44 kW

Gas heat sections are designed with Lennox aluminized or optional stainless steel tube heat exchangers.

The SGC is designed for R-410A refrigerant. Operating pressures and pressure switch settings are significantly higher than R-22 charged units. Service equipment must be rated for R-410A.

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

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

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

⚠ IMPORTANT

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, service agency or the gas supplier.

⚠ CAUTION

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

⚠ WARNING

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

Table of Contents

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	036	060
COOLING SYSTEM				
Condensate Drain Trap	EPDM - C1TRAP30121-	**43W45**	OX	OX
Corrosion Protection	Condenser Section	Factory	O	O
	Evaporator Section	Factory	O	O
	Both Sections	Factory	O	O
Drain Pan Overflow Switch	E1SNSR71AD1	**68W88**	OX	OX
HEATING SYSTEM				
Combustion Air Intake Extension	C1EXTN10FF1	**89L97**	X	X
Gas Heat Input	High One-Stage - 105 kBtuh input	Factory	O	
	High Two-Stage - 97.5/150 kBtuh input	Factory		O
Gas Type	Natural Gas	Factory	O	O
	LPG/Propane Gas	Factory	O	O
Low Temperature Vestibule Heater		Factory	O	O
Stainless Steel Heat Exchanger		Factory	O	O
Vertical Vent Extension	C1EXTN20FF1	**31W62**	X	X
ELECTRICAL				
Voltage	208/230V - 3 phase	Factory	O	O
60 hz	460V - 3 phase	Factory	O	O
	575V - 3 phase	Factory	O	O
GFI Service Outlets	Unit powered or field wired	Factory	O	O
BLOWER - SUPPLY AIR				
Constant Air Volume	1.5 hp	Factory	O	O
CABINET				
Coil Guards	S1GARD22101	**50W67**	X	X
Hail Guards	S1GARD10101	**47W20**	X	X

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

OPTIONS / ACCESSORIES

Item Description	Model Number	Catalog Number	036	060
CONTROLS				
Commercial Controls				
CPC Einstein Integration		Factory	O	O
Danfoss RTC Control		Factory	O	O
Novar® 2024		Factory	O	O
Novar® ETM-2051 Unit Controller		Factory	O	O
Novar® LSE		Factory	O	O
Prodigy® Control System - BACnet® Module		Factory	O	O
Prodigy® Control System - LonTalk® Module		Factory	O	O
L Connection® Network		Factory	O	O
Fresh Air Tempering	C1SNSR75AD1	**58W63**	X	X
[1] Smoke Detector	Supply	Factory	O	O
	Return	Factory	O	O
INDOOR AIR QUALITY				
Air Filters				
	MERV 15- [2] C1FLTR50101	**28W03**	X	X
Indoor Air Quality (CO_2) Sensors				
Sensor - Wall-mount, off-white plastic cover with LCD display	C0SNSR50AE1L	**77N39**	X	X
Sensor - Wall-mount, off-white plastic cover, no display	C0SNSR52AE1L	**87N53**	X	X
Sensor - Black plastic case with LCD display, rated for plenum mounting	C0SNSR51AE1L	**87N52**	X	X
Sensor - Wall-mount, black plastic case, no display, rated for plenum mounting	C0MISC19AE1	**87N54**	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications	C0MISC19AE1-	**85L43**	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**87N53** or **77N39**)	C0MISC16AE1-	**90N43**	X	X
ECONOMIZER				
Economizer with Hood (Global Sensor, field provided)		Factory	O	O
Economizer Controls				
Differential Enthalpy	Order 2 - C1SNSR64FF1	**53W64**	OX	OX
Single Enthalpy	C1SNSR64FF1	**53W64**	OX	OX
Barometric Relief Dampers				
	Barometric Relief Dampers (No Hood)	**30W72**	OX	OX
	Hood required - Order separately	**30W75**	OX	OX
ROOF CURBS - DOWNFLOW				
14 in. height	S7CURB10101-	**30W03**	X	X
24 in. height	S7CURB11101-	**30W04**	X	X
LTL PACKAGING		Factory	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

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 — 3 and 5 TON

General Data	**Nominal Tonnage**	**3 Ton**	**5 Ton**
	Model No.	**SGC036H4**	**SGC060H4**
	Efficiency Type	**High**	**High**
Cooling Performance	Gross Cooling Capacity - Btuh	37,200	61,500
	[1] Net Cooling Capacity - Btuh	36,000	59,500
	AHRI Rated Air Flow - cfm	1200	1650
	Total Unit Power	2.5	4.65
	[1] SEER (Btuh/Watt)	16.1	15.5
	[1] EER (Btuh/Watt)	14.3	12.8
Refrigerant Charge Furnished (R-410A)		16 lbs. 8 oz.	18 lbs. 8 oz.
[2] Sound Rating Number (dB)		76	78
Gas Heating Options Available - See page 5		High (1 Stage)	High (2 Stage)
Compressor Type (No.)		Scroll (1)	Scroll (1)
Condenser Coil	Net face area - sq. ft.	19	19
	Tube diameter - in.	3/8	3/8
	Number of rows	3	3
	Fins per inch	14	14
Condenser Fan(s)	Motor horsepower	(1) 1/6	(2) 1/6
	Motor rpm	825	825
	Total Motor watts	160	320
	Diameter - in.	(1) 24	(2) 24
	Number of blades	3	3
	Total air volume - cfm	2800	4900
Evaporator Coil	Net face area - sq. ft.	8.0	8.0
	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	1.5	1.5
	Maximum usable motor output	1.7	1.7
	RPM Range (Standard Static)	Drive #6 - 595-890 rpm	Drive #1 - 765-1075 rpm
	RPM Range (High Static)	Drive #3 - 960-1320 rpm	Drive #4 - 1070-1430 rpm
	Wheel nominal diameter x width - in.	(1) 10 x 10	(1) 10 x 10
Filters	Type of filter	MERV 7 or equivalent	
	Number and size - in.	(4) 16 x 20 x 2	(4) 16 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 210/240; 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.

SPECIFICATIONS - GAS HEAT — 3 AND 5 TON

	Model No.	**SGC036H4**	**SGC060H4**
	Heat Input Type	High - 1 Stage	High - 2 Stage
Gas Input - Btuh Natural Gas	First Stage	- - -	97,500
	Second Stage	105,000	150,000
	Second Stage Output	84,000	120,000
Gas Input - Btuh LPG/Propane	First Stage	- - -	97,500
	Second Stage	105,000	150,000
	Second Stage Output	84,000	120,000
Temperature Rise Range - °F		35 - 65	40 - 70
Recommended Gas Supply Pressure - Natural		7.0 in. w.g.	7.0 in. w.g.
LPG/Propane		11.0 in. w.g.	11.0 in. w.g.
Thermal Efficiency		80%	80%
Gas Supply Connections		3/4 in. npt	3/4 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**	
3 Ton	High (1 Stage)	2001 - 4500	3.4	9.0	97,000
5 Ton	High (2 Stage)	2001 - 4500	1.6/3.4	5.5/9.0	97,500/138,000

SPECIFICATIONS - Prodigy® Control System	
Operating Environment	Temperature: -40°F to 155°F
	Humidity: 10% - 95% RH, Non- Condensing
Power Requirements	24VAC (+/-25%), 50/60Hz
	4.8 VA for M2 maximum
	14.4 VA for M2 w/all expansion boards Maximum
Memory Type	Re-programmable Flash
Device Commissioning	Auto-poll (real plug and play)
Unit type	Electric/Electric, Gas/Electric & Heat Pumps (Rooftops)
Cooling stages	4
Heating stages	2
Modulating Gas Valves	2
Electronic Configure To Order Parameters	239
Alarm Codes	107
Alarm Codes Stored	84
Display Type	Scrolling, 7 plus Character Red LED
Indicator LEDs	1- Heartbeat on each board
	1- Bus transmit
	1 - Bus receive
	1- each for Y1,Y2,W1,W2,G,OCP
Dimensions - Main Board	Main Board: Height: 8 in., Width: 14-1/2 in., Depth: 6 in.
Weight	2 lbs. for M2 w/all modules installed
Cable Type	SysBus - Lennox yellow COMM cable: C0MISC00AE1- (27M19) (500 ft. box), C0MISC04AE1- (94L63) (1000 ft. box), C0MISC01AE1- (68M25) (2500 ft. roll) ZoneBus - Lennox purple COMM cable: C0MISC05AE1- (23W99) (500 ft. box) C0MISC06AE1- (24W00) (1000 ft

BLOWER DATA

SGC036H 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 9 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
900	567	0.34	639	0.37	717	0.39	793	0.42	866	0.46	938	0.51	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1000	590	0.37	662	0.39	738	0.42	813	0.45	883	0.49	951	0.53	1015	0.56	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1100	616	0.39	687	0.42	761	0.44	834	0.47	901	0.51	966	0.55	1028	0.59	1084	0.62	1134	0.65	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1200	645	0.42	715	0.45	787	0.47	857	0.5	922	0.54	984	0.58	1043	0.62	1098	0.66	1148	0.69	1196	0.73	1245	0.79	- - -	- - -	- - -	- - -
1300	676	0.46	745	0.48	815	0.51	882	0.54	944	0.58	1003	0.62	1060	0.66	1113	0.7	1162	0.74	1210	0.78	1260	0.84	1311	0.91	1363	0.97
1400	710	0.49	777	0.52	844	0.54	909	0.58	968	0.62	1025	0.66	1080	0.7	1131	0.74	1179	0.79	1226	0.84	1276	0.9	1327	0.97	1379	1.03
1500	747	0.54	812	0.56	876	0.59	937	0.62	994	0.67	1049	0.71	1101	0.75	1151	0.8	1198	0.85	1244	0.9	1293	0.97	1344	1.03	1396	1.1
1600	787	0.58	848	0.61	909	0.64	967	0.68	1021	0.72	1074	0.77	1124	0.81	1172	0.86	1217	0.92	1263	0.97	1310	1.04	1361	1.1	1413	1.17
1700	831	0.63	888	0.65	943	0.69	997	0.74	1049	0.79	1100	0.83	1148	0.88	1194	0.93	1238	0.99	1283	1.05	1329	1.11	1378	1.17	1430	1.24
1800	875	0.68	926	0.71	978	0.76	1029	0.81	1078	0.86	1127	0.9	1174	0.95	1218	1.01	1260	1.07	1303	1.13	1348	1.19	1395	1.25	1447	1.32
1900	916	0.74	964	0.78	1012	0.83	1060	0.88	1108	0.93	1155	0.98	1200	1.03	1242	1.09	1283	1.15	1325	1.21	1368	1.27	1415	1.33	1466	1.4
2000	954	0.82	999	0.86	1045	0.91	1092	0.96	1139	1.01	1184	1.06	1226	1.12	1266	1.18	1306	1.24	1347	1.3	1389	1.36	1436	1.42	1486	1.49
2100	990	0.9	1034	0.95	1080	0.99	1125	1.05	1170	1.1	1212	1.15	1253	1.21	1291	1.27	1330	1.33	1370	1.39	1412	1.46	1458	1.52	1508	1.59
2200	1026	0.99	1070	1.03	1114	1.08	1158	1.14	1201	1.19	1241	1.25	1279	1.31	1317	1.37	1354	1.43	1394	1.49	1436	1.56	1482	1.62	1531	1.69
2300	1063	1.08	1106	1.13	1149	1.18	1192	1.24	1232	1.3	1270	1.36	1306	1.42	1342	1.48	1380	1.54	1419	1.6	1461	1.66	1507	1.73	1555	1.79
2400	1101	1.18	1143	1.23	1184	1.28	1224	1.35	1262	1.41	1298	1.48	1333	1.54	1369	1.6	1406	1.65	1445	1.71	1488	1.77	1533	1.83	1580	1.9
2500	1139	1.28	1179	1.34	1219	1.4	1256	1.47	1292	1.53	1327	1.6	1361	1.66	1396	1.71	1433	1.77	1473	1.83	1515	1.88	1559	1.94	1606	2.01

BLOWER DATA

SGC060H 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 9 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
900	567	0.34	639	0.37	717	0.39	793	0.42	866	0.46	938	0.51	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1000	590	0.37	662	0.39	738	0.42	813	0.45	883	0.49	951	0.53	1015	0.56	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1100	616	0.39	687	0.42	761	0.44	834	0.47	901	0.51	966	0.55	1028	0.59	1084	0.62	1134	0.65	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1200	645	0.42	715	0.45	787	0.47	857	0.5	922	0.54	984	0.58	1043	0.62	1098	0.66	1148	0.69	1196	0.73	1245	0.79	- - -	- - -	- - -	- - -
1300	676	0.46	745	0.48	815	0.51	882	0.54	944	0.58	1003	0.62	1060	0.66	1113	0.7	1162	0.74	1210	0.78	1260	0.84	1311	0.91	1363	0.97
1400	710	0.49	777	0.52	844	0.54	909	0.58	968	0.62	1025	0.66	1080	0.7	1131	0.74	1179	0.79	1226	0.84	1276	0.9	1327	0.97	1379	1.03
1500	747	0.54	812	0.56	876	0.59	937	0.62	994	0.67	1049	0.71	1101	0.75	1151	0.8	1198	0.85	1244	0.9	1293	0.97	1344	1.03	1396	1.1
1600	787	0.58	848	0.61	909	0.64	967	0.68	1021	0.72	1074	0.77	1124	0.81	1172	0.86	1217	0.92	1263	0.97	1310	1.04	1361	1.1	1413	1.17
1700	831	0.63	888	0.65	943	0.69	997	0.74	1049	0.79	1100	0.83	1148	0.88	1194	0.93	1238	0.99	1283	1.05	1329	1.11	1378	1.17	**1430**	**1.24**
1800	875	0.68	926	0.71	978	0.76	1029	0.81	1078	0.86	1127	0.9	1174	0.95	1218	1.01	1260	1.07	1303	1.13	1348	1.19	1395	1.25	**1447**	**1.32**
1900	916	0.74	964	0.78	1012	0.83	1060	0.88	1108	0.93	1155	0.98	1200	1.03	1242	1.09	1283	1.15	1325	1.21	1368	1.27	1415	1.33	**1466**	**1.4**
2000	954	0.82	999	0.86	1045	0.91	1092	0.96	1139	1.01	1184	1.06	1226	1.12	1266	1.18	1306	1.24	1347	1.3	1389	1.36	**1436**	**1.42**	**1486**	**1.49**
2100	990	0.9	1034	0.95	1080	0.99	1125	1.05	1170	1.1	1212	1.15	1253	1.21	1291	1.27	1330	1.33	1370	1.39	1412	1.46	**1458**	**1.52**	**1508**	**1.59**
2200	1026	0.99	1070	1.03	1114	1.08	1158	1.14	1201	1.19	1241	1.25	1279	1.31	1317	1.37	1354	1.43	1394	1.49	**1436**	**1.56**	**1482**	**1.62**	**1531**	**1.69**
2300	1063	1.08	1106	1.13	1149	1.18	1192	1.24	1232	1.3	1270	1.36	1306	1.42	1342	1.48	1380	1.54	1419	1.6	**1461**	**1.66**	**1507**	**1.73**	**1555**	**1.79**
2400	1101	1.18	1143	1.23	1184	1.28	1224	1.35	1262	1.41	1298	1.48	1333	1.54	1369	1.6	1406	1.65	**1445**	**1.71**	**1488**	**1.77**	**1533**	**1.83**	**1580**	**1.9**
2500	1139	1.28	1179	1.34	1219	1.4	1256	1.47	1292	1.53	1327	1.6	1361	1.66	1396	1.71	**1433**	**1.77**	**1473**	**1.83**	**1515**	**1.88**	**1559**	**1.94**	**1606**	**2.01**

NOTE - Bold = field furnished.

BLOWER DATA

CONSTANT AIR VOLUME DRIVE KIT SPECIFICATIONS

Model No.	Nominal hp	Maximum hp	Drive Kit Number	RPM Range
036	1.5	1.7	#6 #3	595 - 890 960 - 1320
060	1.5	1.7	#1 #4	765 - 1075 1070 - 1430

ELECTRICAL DATA

3 - 5 TON

	Model No.	SGC036H4			SGC060H4		
[1] Voltage - 60hz		208/230V-3 Ph	460V-3 Ph	575V-3 Ph	208/230V-3 Ph	460V-3 Ph	575V-3 Ph
Compressor	Rated Load Amps	9	5.6	3.8	16	7.8	5.7
	Locked Rotor Amps	71	38	36.5	110	52	38.9
Outdoor Fan Motor(s)	Full Load Amps (total)	(1) 0.9	(1) 0.6	(1) 0.5	(2) 0.9 (1.8)	(2) 0.6 (1.2)	(2) 0.5 (1)
Service Outlet 115V GFI (Amps)		20	20	15	20	20	15
Indoor Blower Motor	Horsepower	1.5	1.5	1.5	1.5	1.5	1.5
	Full Load Amps	5.7	2.8	2.4	5.7	2.8	2.4
[2] **Maximum Overcurrent Protection**	Unit Only	25	15	15	40	20	15
[3] **Minimum Circuit Ampacity**	Unit Only	18	11	8	28	14	11

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

[2] HACR tpe breaker of fuse.

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

SGC036/060 PARTS ARRANGEMENT

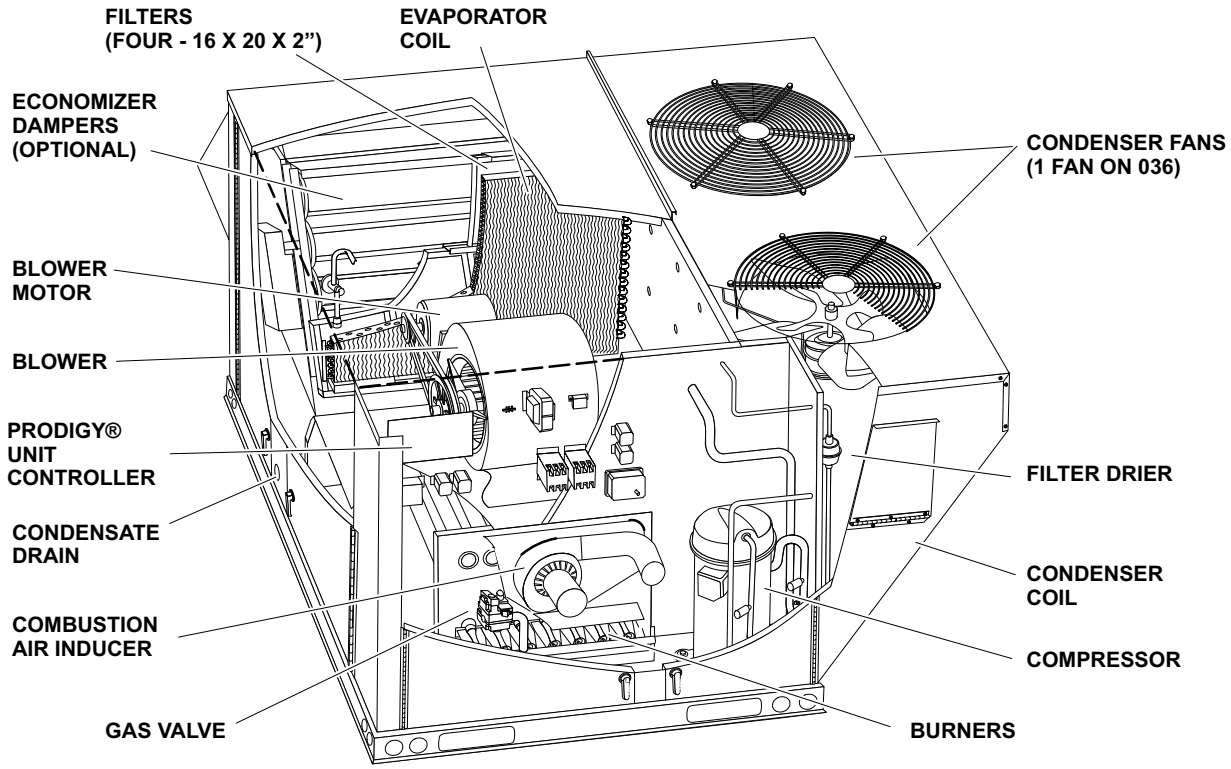


FIGURE 1

SGC036/060 CONTROL PANEL

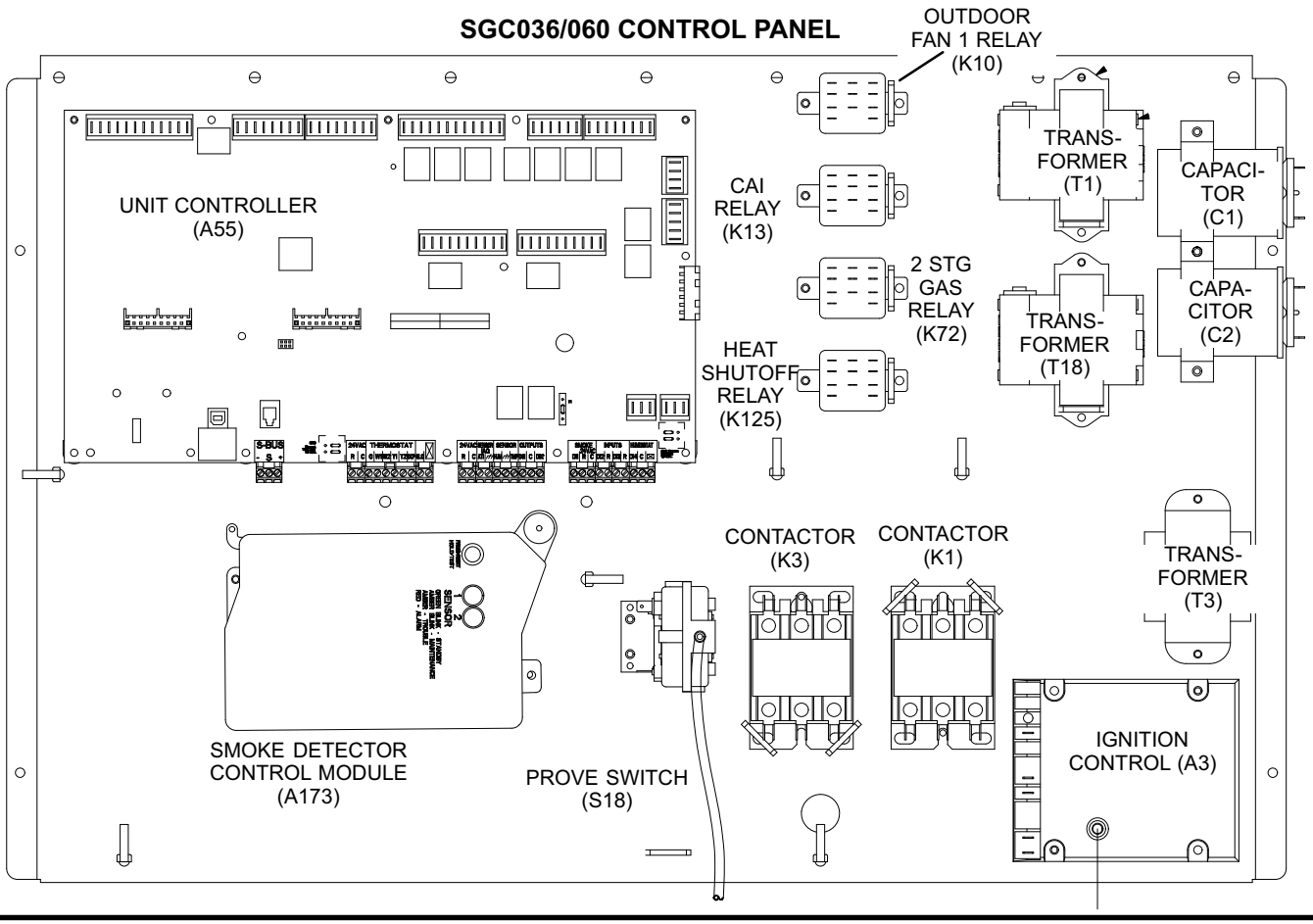


FIGURE 2

I-UNIT COMPONENTS

SGC units are configure to order units (CTO). The SGC unit components are shown in figure 1. L1, L2 and L3 wiring is color coded; L1 is red, L2 is yellow and L3 is blue.

A-Control Panel Components

SGC control panel components are shown in figure 2. The control panel is located in the upper 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 SGC series units use a single line voltage to 24VAC leadless transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 70VA and is protected by a 3.5 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use two primary voltage taps as shown in figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

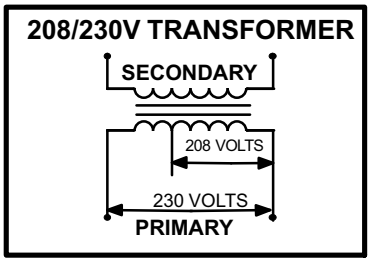


FIGURE 3

3-CAI Transformers T3 (SGC 460V & 575V units)

All SGC 460 (G) and 575 (J) voltage units use one auto voltage to 230VAC transformer mounted in the compressor compartment. The transformer has an output rating of 0.75A. T3 transformer supplies 230 VAC power to combustion air inducer motor (B6).

4-Outdoor Fan Capacitor C1

Fan capacitor C1 is used to assist in the start up of condenser fan B4. See motor nameplate for ratings.

5-Compressor Contactor K1 (all units)

K1 is a 24V to line voltage contactor used to energize the compressor in response to thermostat demand. SGC units use three-pole-double-break contactors.

NOTE-Contactor K1 is energized by the A55 Unit Controller. Refer to the operation sequence for the control system installed. There may be a 5 minute delay depending on the system installed.

6-Blower Contactor K3 (all units)

Blower contactor K3 is used in all units. K3 has a 24VAC coil used to energize the indoor blower motor B3, in response to blower demand. K3 is energized by main control panel (A55).

7-Outdoor Fan Relay K10 (all units)

Outdoor fan relay K10, used in all units, is a DPDT relay with a 24VAC coil. In all units K10 (energized by A55), energizes condenser fan B4 in response to thermostat demand. Once discharge pressure of 450 $\pm$ 10 psig achieved, operation is controlled by Low ambient switch (S11).

8-Combustion Air Inducer Relay K13

Combustion air inducer relay K13, used in all SGC units, is a DPDT relay with a 24VAC coil. K13 is energized by the Unit Controller A55 after a heating demand from the thermostat. K13 remains energized throughout the heating demand. When energized, K13 N.O. contacts close to energize the combustion air blower and begin a heating sequence. Prove switch S18, located in the gas heat 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.

9-Gas Relay K72 (two-stage units)

Relay K72 is normally closed and controls combustion air inducer B6. K72 switches the inducer B6 to high speed in response to two-stage heat demand.

10-Combustion Air Prove Switch S18

The combustion air prove switch S18 is a SPST N.O. pressure switch located in the vestibule area. S18 monitors combustion air inducer operation. Switch S18 is wired to the ignition control A3. The switch closes on a *negative* pressure fall. This negative pressure fall and switch actuation allows the ignition sequence to continue (proves, by closing, that the combustion air inducer is operating before allowing the gas valve to open.) The combustion air prove switch is factory set and not adjustable. The switch will automatically open on a pressure rise (less negative pressure). The combustion air prove switch is factory set and not adjustable. Table 1 shows prove switch settings for unit production dates before and after February 2009.

TABLE 1
S18 Prove Switch Settings

Close“ w.c. (Pa)	Open “ w.c. (Pa)
0.25 $\pm$ 0.05 (62.3 $\pm$ 12.4)	0.10 $\pm$ 0.05 (24.8 $\pm$ 12.4)

ELECTROSTATIC DISCHARGE (ESD)
Precautions and Procedures

⚠ CAUTION

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

11-Unit Controller A55 (all units)

The Unit Controller integrates most control functions required to operate the SGC unit. It is located in the upper left corner of the control box. The control includes complete unit diagnostics with permanent code storage, field programmable control parameters and control options, on-site testing and serial communications. For further information refer to *Installation and Setup Guide For the Unit Controller* provided with each unit.

The A55 controls one compressor, one single- or two-stage gas valve, one bank of electric heat, one outdoor fan and one blower. A55 includes the thermostat inputs, serial communications ports, diagnostic code display, control pushbutton and expansion ports. The Unit Controller also includes the economizer control. The economizer control features four different modes to determine outdoor air suitability for free cooling: sensible temperature, outdoor enthalpy, differential enthalpy and global control. See figure 4.

A55 UNIT CONTROLLER INPUTS AND OUTPUTS

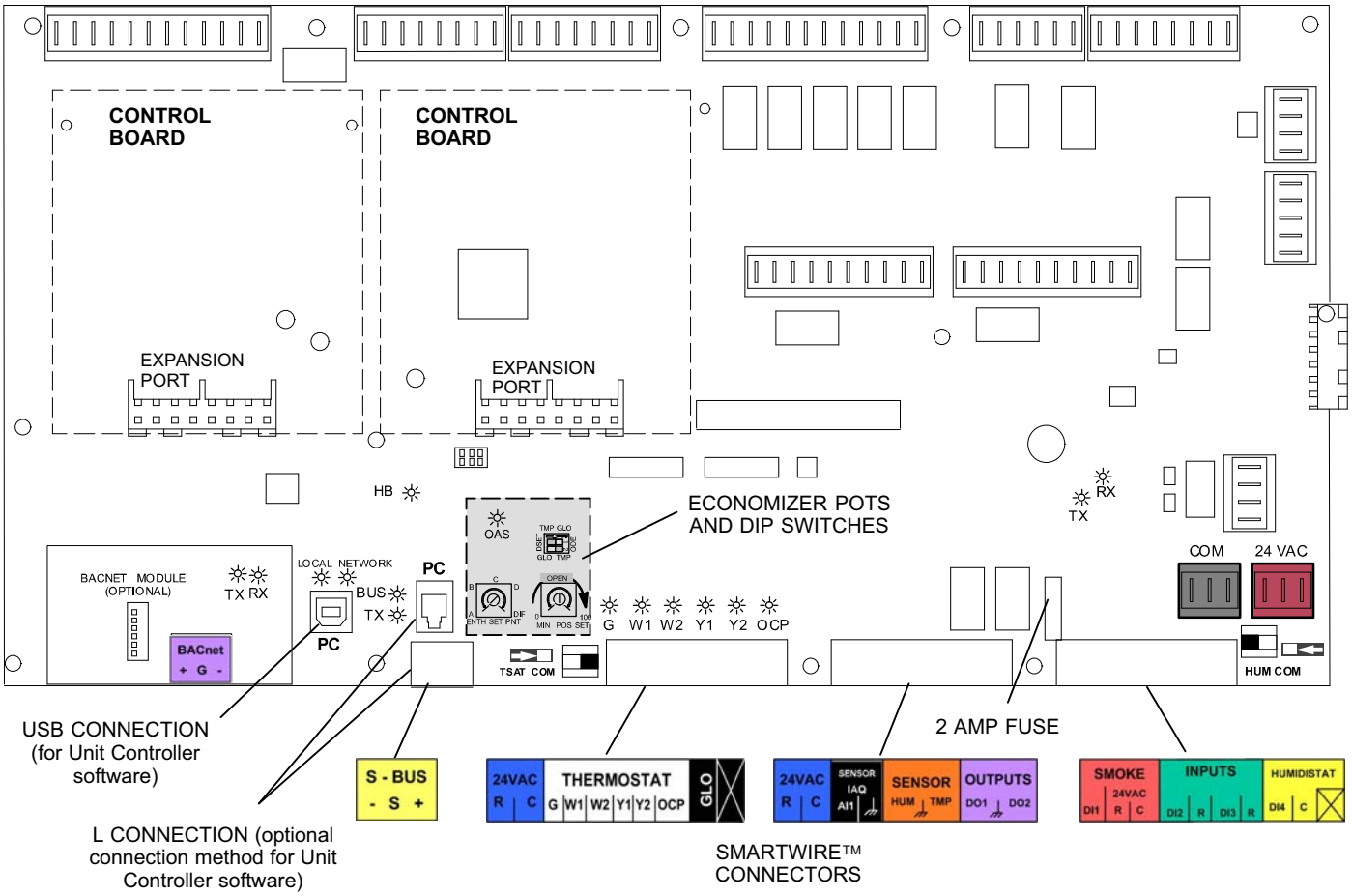


FIGURE 4

COMPRESSOR AND COOLING COMPONENTS DETAIL

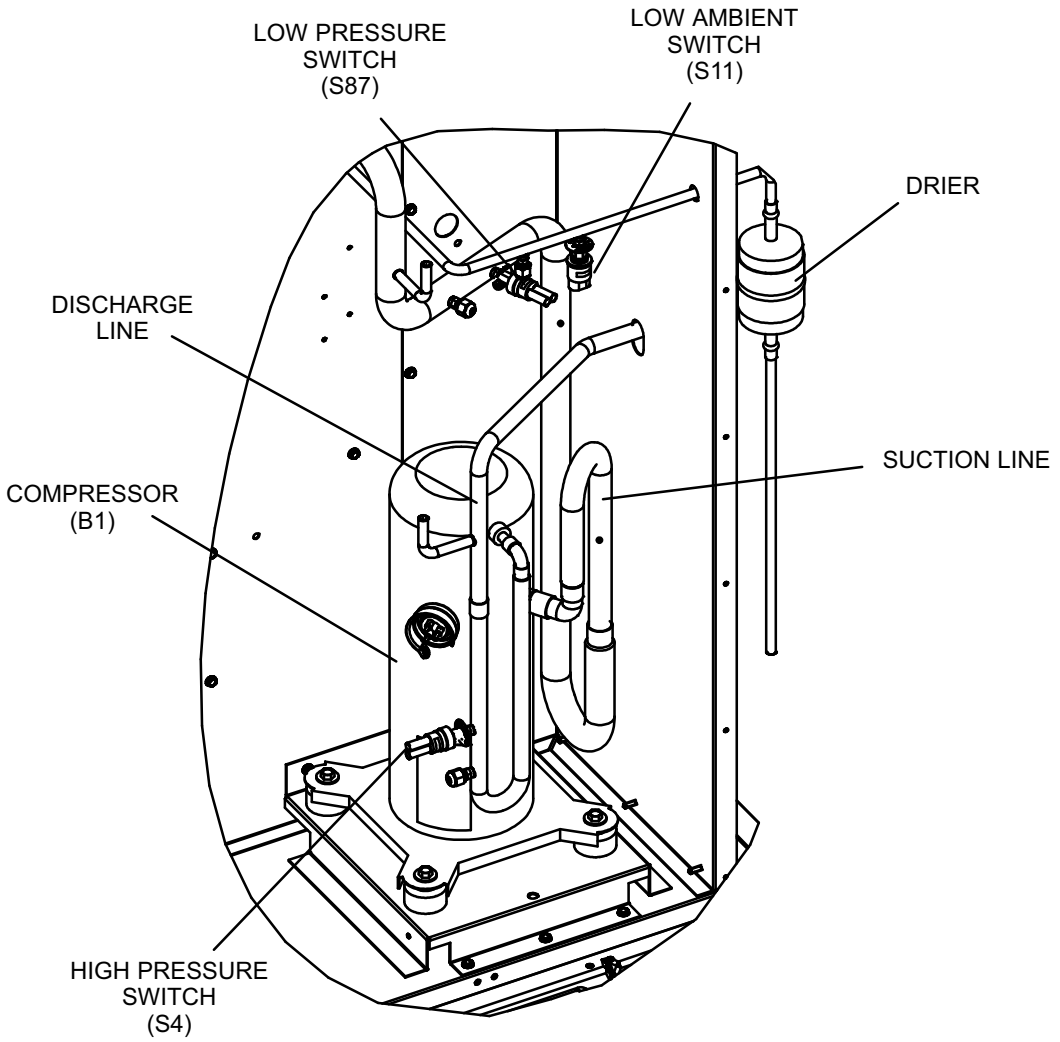


FIGURE 5

B-Cooling Components

See figure 5 for compressor and cooling components. Units are equipped with a draw-through type condenser fan. 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 evaporator is slab type and 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 the low ambient switch and freezestat.

1-Compressors B1 (all units)

SGC units are equipped with scroll compressors. Compressors are supplied by various manufacturers. Compressor electrical specifications vary by manufacturer and type. See SPECIFICATIONS and ELECTRICAL DATA in this manual.

⚠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.

Compressor B1 is energized by a corresponding compressor contactor K1.

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

2-Filter Drier

SGC units have a filter drier located in the liquid line of each refrigerant circuit upstream of the TXV in the blower compartment. The drier removes contaminants and moisture from the system.

3-High Pressure Switch S4

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All SGC units are equipped with this switch. The switch is located in the compressor discharge line. S4 is wired in series with the compressor contactor coil.

When discharge pressure rises to 640 ± 10 psig (4413± 69 kPa) (indicating a problem in the system) the switch opens and the 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 will allow 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 Switch S11

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

When liquid pressure rises to 450 ± 10 psig (3102 ± 69 kPa), the switch closes and the condenser fan is energized through the A55 control. When discharge pressure in the refrigerant circuit drops to 240 ± 10 psig (1655 ± 69 kPa), the switch opens and the condenser fan 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-Low Pressure Switch S87

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 is wired directly to the Unit Controller A55.

The Unit Controller A55 governs 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 ± 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 ± 5 psig (620 ± 34 kPa).

6-Condenser Fan B4 & B5

Refer to Specifications section of this manual for specifications of condenser fan B4 used in SGC units. The condenser fan used is a single-phase motor. The fan may be removed for servicing and cleaning by removing the fan grill.

7-Crankcase Heater HR1 & Thermostat S40

The compressor is protected by a crankcase heater HR1 and thermostat S40. The purpose of the crankcase heater is to prevent liquid from accumulating in the compressor. The crankcase heater and compressor never run at the same time.

Thermostat S40 is located on the compressor discharge line and will open when discharge line temperature reaches 94°, de-energizing HR1. Once temperature drops down to 74° the thermostat closes energizing HR1.

8-Freezestats S49

Each unit is equipped with a low temperature switch (freezestat) S49 located on a return bend of the evaporator coil.

Each freezestat is wired to the Unit Controller A55. Each freezestat is a SPST N.C. auto-reset switch which opens at 29°F ± 3°F (-1.7°C ± 1.7°C) on a temperature drop and closes at 58°F ± 4°F (14.4°C ± 2.2°C) on a temperature rise. To prevent coil icing, freezestats open during compressor operation to temporarily disable the compressor until the coil warms sufficiently to melt any accumulated frost.

If the freezestat is tripping frequently due to coil icing, check the airflow, filters, ductwork for any restrictions and unit charge, before allowing unit back in operation. Make sure to eliminate conditions which might promote evaporator ice buildup.

C-Blower Compartment

1-Blower Wheel (all units)

All SGC units have one 10 in. x 10 in. (254 x 254 mm) blower wheel.

2-Indoor Blower Motor B3 (all units)

All units use belt drive three-phase indoor blower motors. All motors are single-speed ball-bearing type which use an adjustable pulley for adjusting blower speed.

⚠IMPORTANT

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

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.

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 6.

3- Pull base toward outside of unit.

C-Determining Unit CFM

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 DATA tables (table of contents), 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 6. Do not exceed minimum and maximum number of pulley turns as shown in table 2.

TABLE 2
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.

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 7.

1- Loosen four screws securing blower motor to sliding base. See figure 6.

2- *To increase belt tension -*
Turn front belt tension adjusting bolt to the left, or counterclockwise, to tighten the belt. This increases the distance between the blower motor and the blower housing.

To loosen belt tension -
Turn the front belt tension adjusting bolt to the right, or clockwise to loosen belt tension.

3- Turn rear belt tension adjusting bolt until pulleys are aligned. Tighten screws securing slotted arm and rear belt tension adjusting bolt once adjustments have been made.

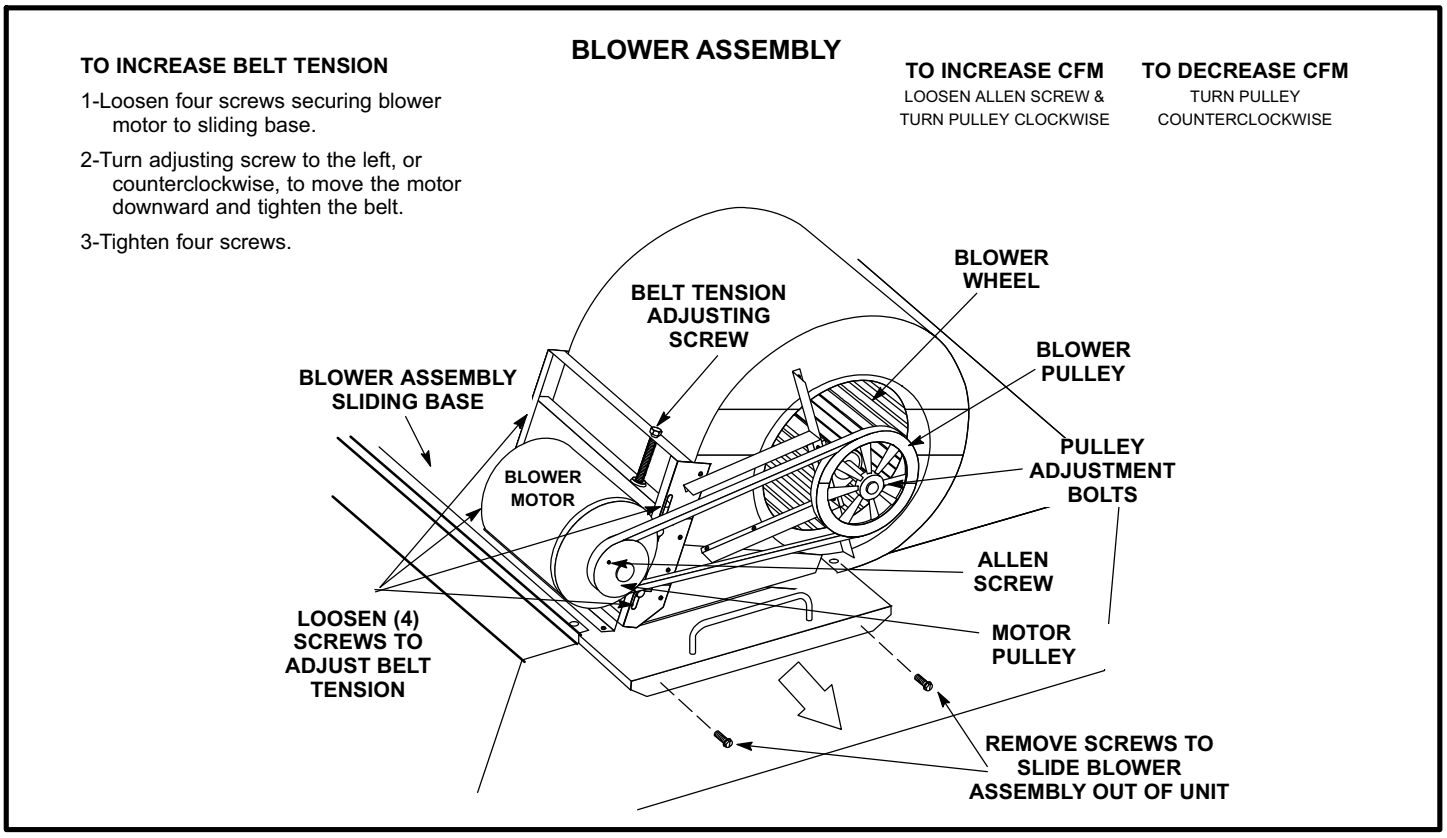


FIGURE 6

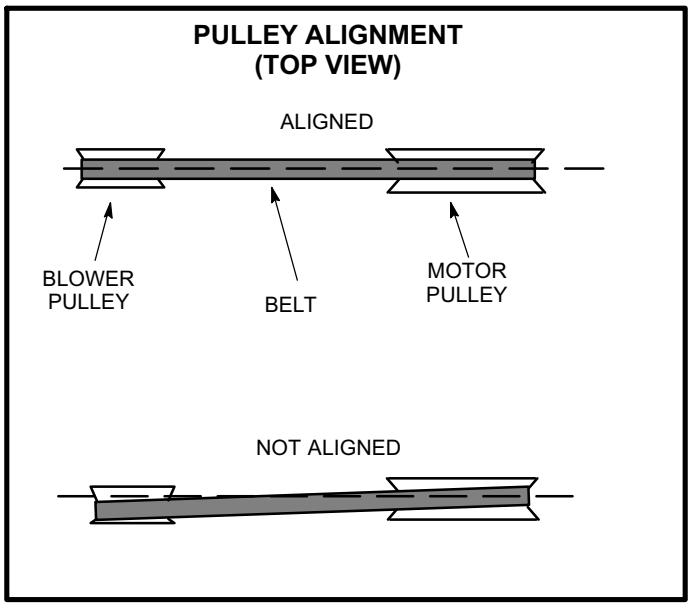


FIGURE 7

Check Belt Tension

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

1- Measure span length X. See figure 8.

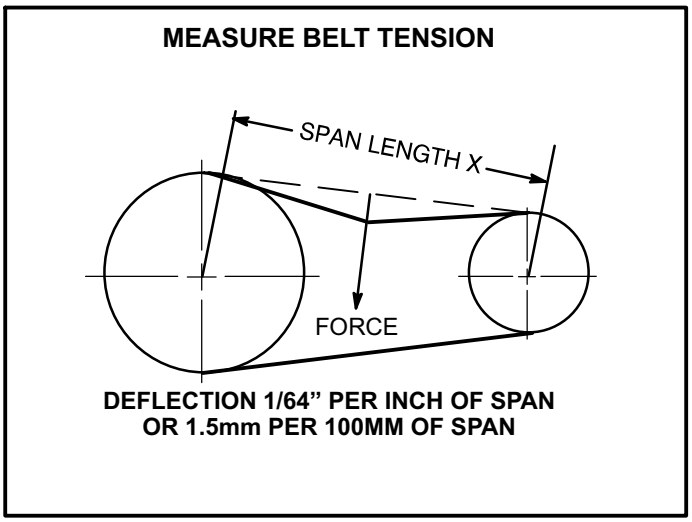


FIGURE 8

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

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

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

3- Measure belt deflection force. 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.

D-External Static Pressure

1- Measure tap locations as shown in figure 9.

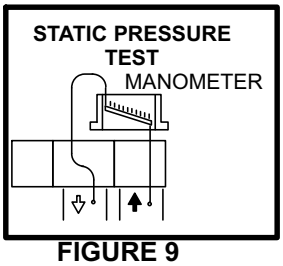


FIGURE 9

2- Punch a 1/4" diameter hole in supply and return air plenums. Insert manometer hose flush with inside edge of hole or insulation. Seal around the hose with permagum. Connect the zero end of the manometer to the discharge (supply) side of the system. On ducted systems, connect the other end of manometer to the return duct as above.

3- With only the blower running and the evaporator coil dry, observe the manometer reading. Adjust blower motor speed to deliver the air desired according to the job requirements.

4- Seal around the hole when the check is complete.

E-Blower Drives

For field-furnished blower drives, use BLOWER DATA tables to determine BHP and RPM required. Reference the Drive Kit Specifications table and 3 to determine the manufacturer's model number.

TABLE 3
SG/SC 036 & 060 Manufacturer's Drive 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	1VP40 X 7/8	79J0301	AK61 X 1	100244-20	AX44	12L2601
3	1VP40 X 7/8	79J0301	AK49 X 1	100244-18	AX43	73K8201
4	1VP44 X 7/8	53J9601	AK51 X 1	18L2201	AX44	12L2601
6	1VP34 X 7/8	31K6901	AK61 X 1	100244-20	AX44	12L2601

D-GAS HEAT COMPONENTS (SGC units)

See unit nameplate or SPECIFICATIONS for unit Btuh ranges.

1-Burner Ignition Control A3

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 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 10 for a normal ignition sequence and figure 11 for the ignition attempt sequence with retrials (nominal timings given for simplicity). Specific timings for the ignition controls are shown in figure 12.

Flame rectification sensing is used on all SGC units. Loss of flame during a heating cycle is indicated by an absence or low flame signal (0.09 or less 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 IV- System Service Check 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 Unit Controller A55. The ignition control then allows 30 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.

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.

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 houses the burner control A3. See figure 13.

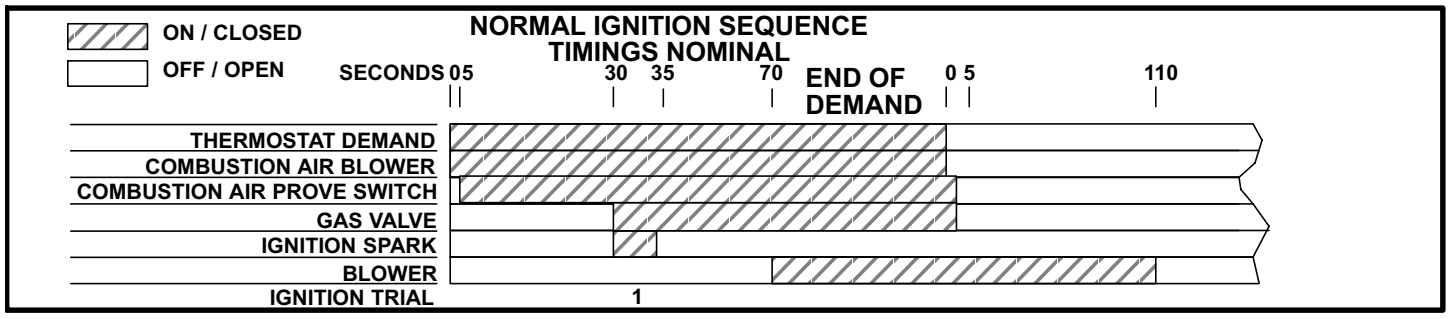


FIGURE 10

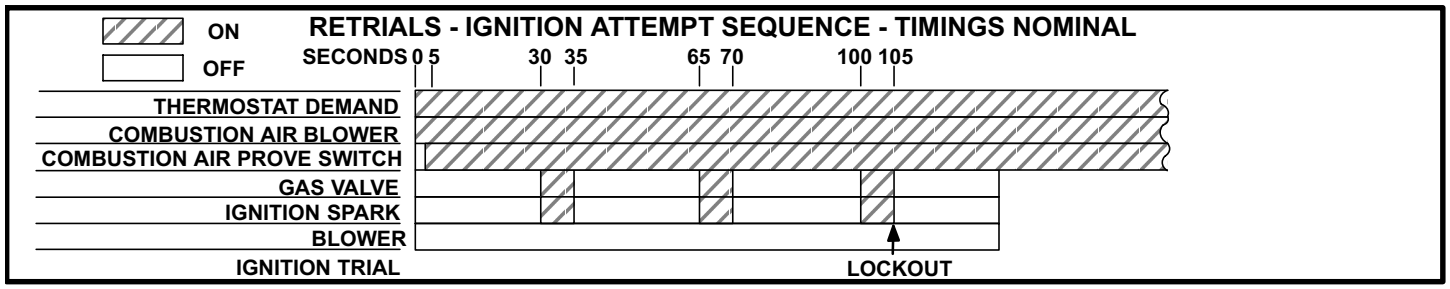


FIGURE 11

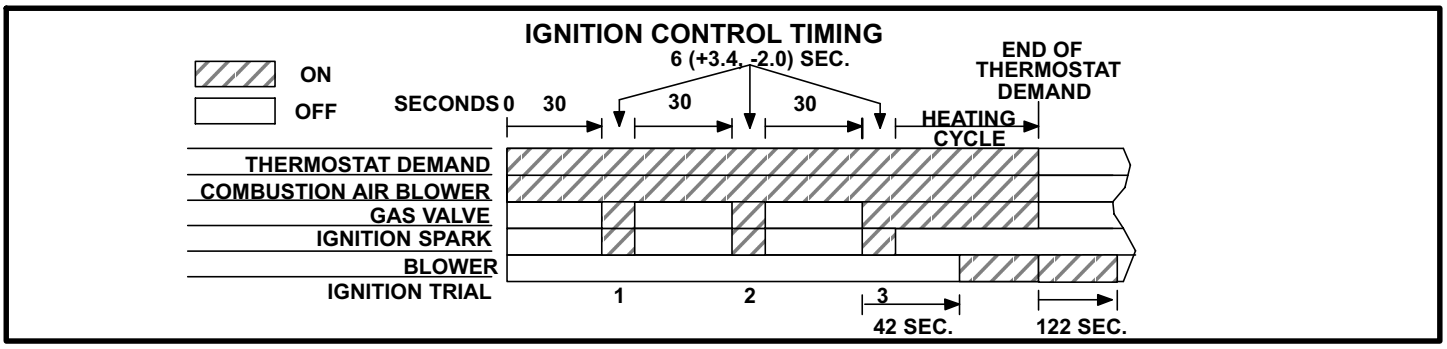


FIGURE 12

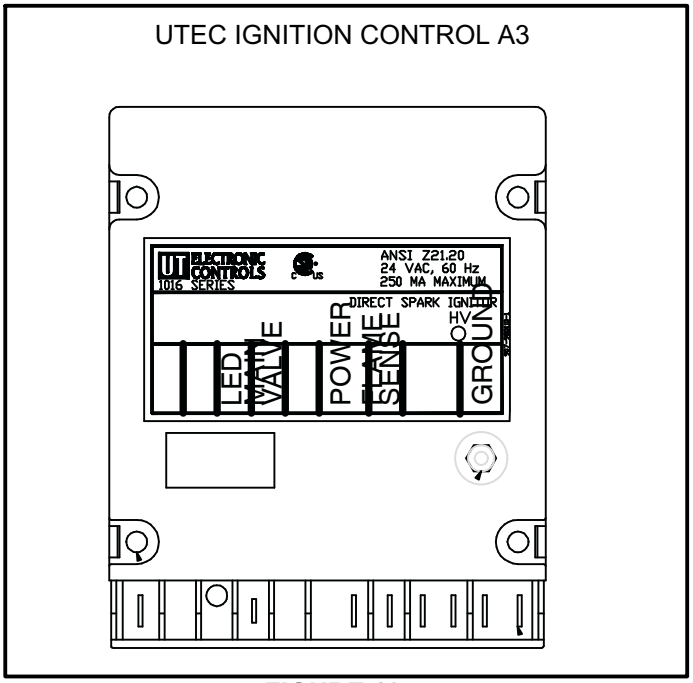


FIGURE 13

The ignition control provides three main functions: gas valve control, ignition, and flame sensing. The control has a green LED to show control status (table 4).

TABLE 4

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.

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

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

Operation

On a heating demand, the ignition control checks for a closed limit switch. Once this check is complete and conditions are correct, the ignition control then allows 30 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch closes proving that the combustion air inducer is operating before allowing the ignition control to energize. When the combustion air prove switch is closed and the delay is over, the ignition control activates the gas valve, the spark electrode and the flame sensing electrode. At the start of the ignition sequence, the adjustable 40 second (default) indoor blower delay period begins. Sparking stops immediately after flame is sensed or at the end of the 8 second trial for ignition. If flame is not sensed, the ignition control will wait 5 minutes before attempting ignition again. The unit will usually ignite on the first trial and A3 allows three trials for ignition before locking out. The lockout time is 1 hour. After lockout, the ignition control automatically resets and provides three more attempts at ignition. Manual reset after lockout requires holding the A55 Unit Controller left arrow key until the Unit Controller resets. See the Unit Controller manual provided with the unit.

Once the flame is sensed, the ignition control then proceeds to “steady state” mode where all inputs are monitored to ensure the limit switch, rollout switch and prove switch are closed as well as flame is present. When the heat call is satisfied the gas valve and combustion air inducer are de-energized. An adjustable 120-second (default) blower off delay begins.

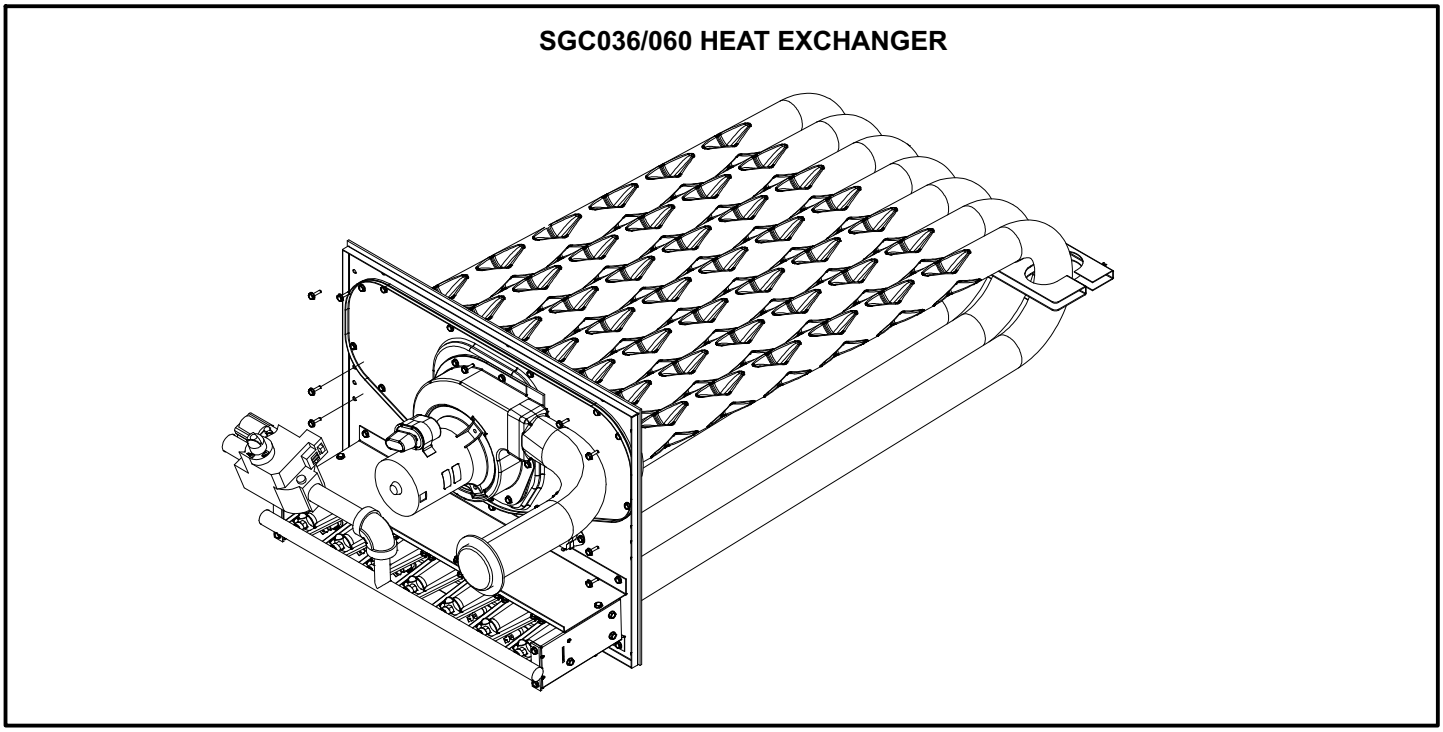


FIGURE 14

2-Heat Exchanger (Figure 14)

SGC units use aluminized steel inshot burners with matching tubular aluminized or optional stainless steel heat exchangers and either a one or two-stage redundant gas valve. SGC036 uses a five tube/burner assembly. SGC060 uses a seven tube / burner assembly. Each burner uses 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 valve accomplishes staging by allowing more or less gas to the burners as called for by heating demand.

3-Primary High Temperature Limit S10

S10 is the primary high temperature limits for gas heat. Primary limits S10 is wired in series to the main control panel A55 which energizes burner control (A3). 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 primary limit close keeping the blower relay coil K3 under the control of A55. If the limit trips the blower will be energized. See figure 15 limit location and LENNOX REPAIR PARTS for set point.

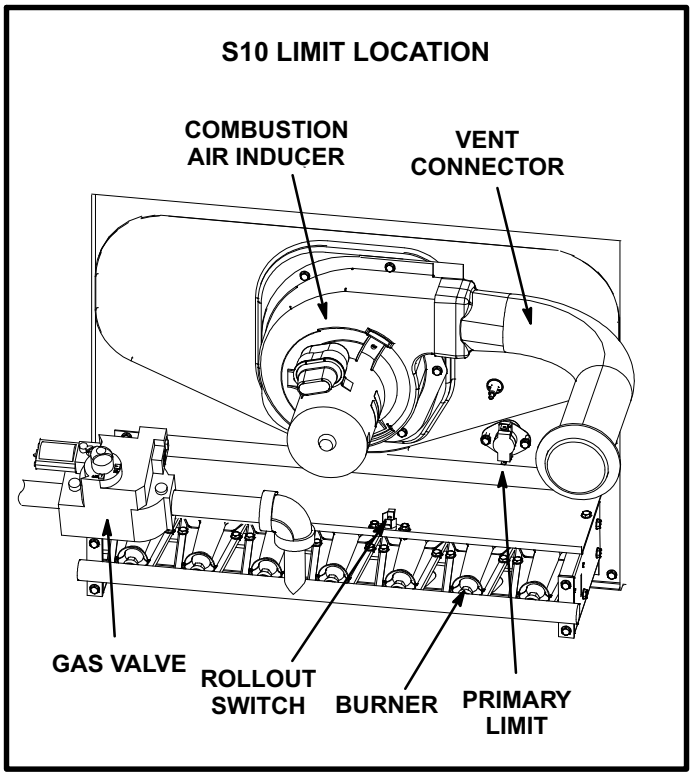


FIGURE 15

4-Flame Rollout Limit S47

Flame rollout limit S47 is a SPST N.C. high temperature limit located just above the burner air intake opening in the burner enclosure (see figure 15). S47 is wired to the main control panel A55. When S47 senses flame rollout (indicating a blockage in the combustion air passages), the flame rollout limit trips, and the ignition control immediately closes the gas valve.

Limit S47 is factory preset to open at 350°F ± 12°F (177°C ± 6.7°C) on a temperature rise. All flame rollout limits are manual reset.

5-Burner Assembly (Figure 16)

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.

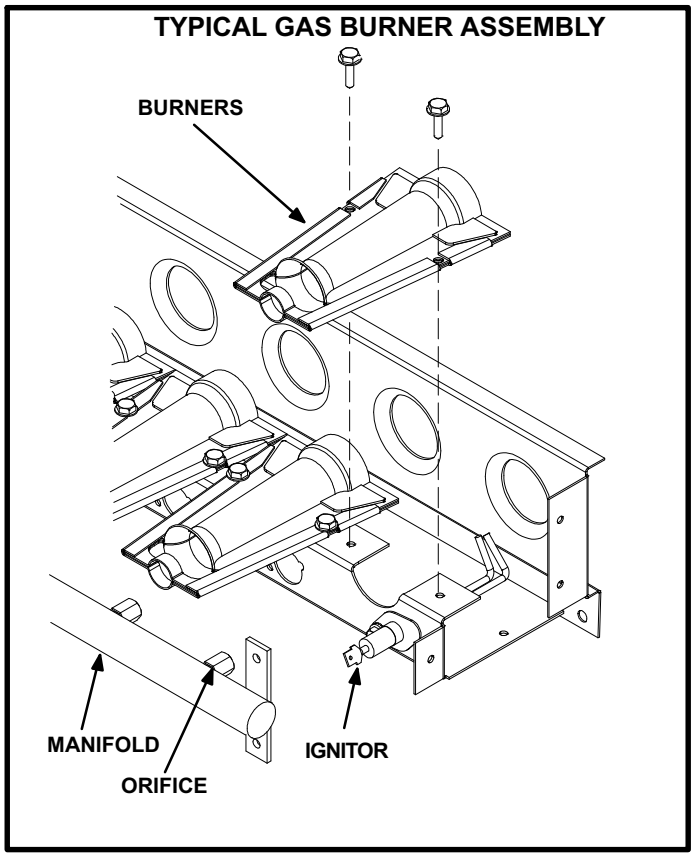


FIGURE 16

Burners

All units use inshot burners (see figure 16). 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 sections of this manual.

Orifice

Each burner uses an orifice which is precisely matched to the burner input. The orifice is threaded into the manifold and supports the burner. Remove the two screws securing the burner and slide off of the orifice 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.

6-Combustion Air Inducer B6

Combustion air inducer B6 provides fresh air to the burners while clearing the combustion chamber of exhaust gases. The inducer begins operating immediately upon receiving a thermostat demand and is de-energized immediately when thermostat demand is satisfied.

The inducer uses a 208/230V single-phase PSC motor and a 5.24in. x 0.96in. (120mm x 33.3mm) blower wheel. The motor operates at 3300RPM and is equipped with auto-reset overload protection. Two-speed units have reduced RPM for low speed.

Blowers are supplied by various manufacturers. Ratings may vary by manufacturer. Specific blower electrical ratings can be found on the unit rating plate.

All inducers motors are sealed and cannot be oiled. The blower cannot be adjusted but can be disassembled for cleaning.

The inducer motor in all SGC units requires a run capacitor. Capacitor C3 is connected to combustion air inducer B6. Inducer motor nameplate will have capacitor ratings.

7-Gas Valve GV1

Gas valve GV1 is a two stage redundant gas valve used in all SGC units manufactured by Honeywell. First stage (low fire) is quick opening (on and off in less than 3 seconds). 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. The valve is adjustable for both high fire and low 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 17 shows gas valve components. Table 5 shows factory set gas valve manifold pressures for SGC series units.

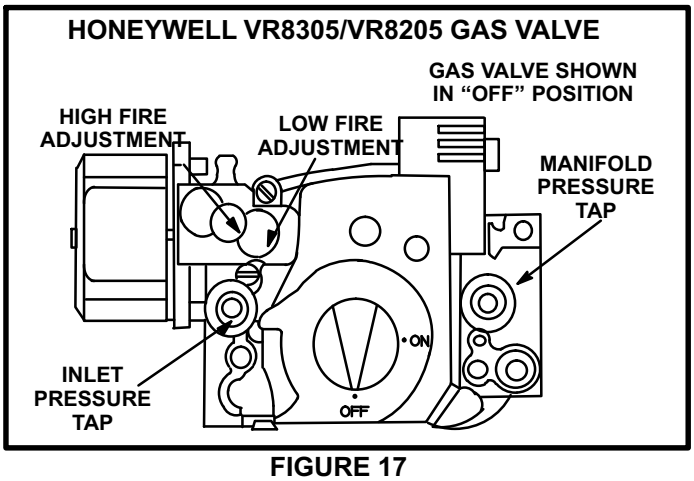


FIGURE 17

TABLE 5

TWO STAGE GAS VALVE FACTORY SETTING			
Natural (inlet-5.5" to 10.0")		L.P. (11.0" to 13.0")	
High Fire	Low Fire	High Fire	Low Fire
3.7" ± 0.3"	1.6" ± 0.3	10.5" ± 0.3	5.5" ± 0.3

8-Spark Electrodes

An electrode assembly is used for ignition spark. The electrode is mounted through holes on the right end 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 the spark electrode ignites the right burner. See figure 18. Flame travels from burner to burner until all are lit.

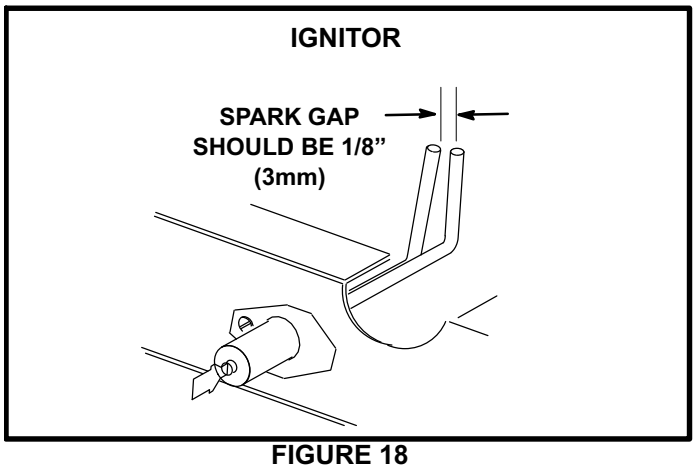


FIGURE 18

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.

9-Flame Sensors

A flame sensor is located on the left side of the burner box. See figure 19. 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.

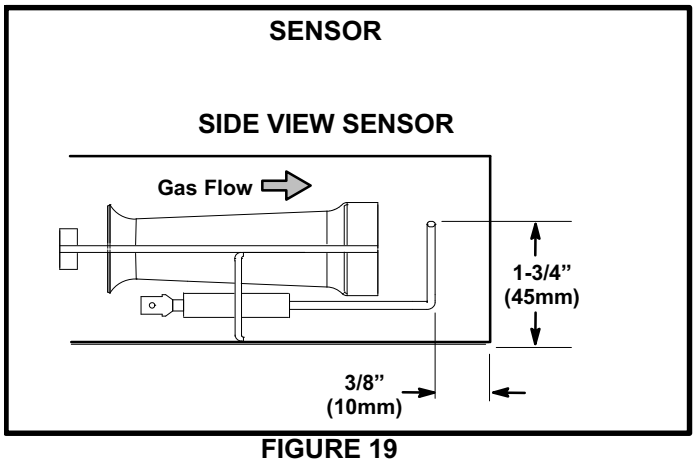


FIGURE 19

When flame is sensed by the flame sensor (indicated by microamp signal through the flame) 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.

II-PLACEMENT AND INSTALLATION

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

III-START UP - OPERATION - CHARGING

A-Preliminary and Seasonal 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- Refer to unit diagram located on inside of compressor access door for unit wiring.

6- Adjust blower belt according to “Blower Operation and Adjustments” See section I-Components subsection C-.

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

B-Cooling Start Up

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

1- Set fan switch to AUTO or ON and move system selection switch to cool. Adjust thermostat to a setting below room temperature to bring on the compressor. Compressor will start and cycle on demand from thermostat.

2- The refrigerant circuit is charged with R410A refrigerant. See unit rating plate for correct amount of charge.

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

Three Phase Scroll Compressor Voltage Phasing

Three phase scroll compressors must be phased sequentially to ensure correct compressor and blower rotation and operation. Compressor and blower are wired in phase at the factory

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 circuit breaker CB10 or TB2 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.

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.

R410A Refrigerant

Units charged with R-410A refrigerant operate at much higher pressures than R-22. The expansion valve and liquid line drier provided with the unit are approved for use with R-410A. Do not replace them with components designed for use with R-22.

R-410A 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 R-410A. If oil must be added, it must be a polyol ester oil.

C-Charging

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 charge, *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 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 6 and 7 to determine normal operating pressures.

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 6
SGC036 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	Discharge ± 10 psig	Suction ± 5 psig
65°F	241	146
75°F	286	149
85°F	332	151
95°F	378	153
105°F	423	156
115°F	469	158

TABLE 7
SGC060 NORMAL OPERATING PRESSURES

Outdoor Coil Entering Air Temp	DIscharge ± 10 psig	Suction ± 5 psig
65°F	244	131
75°F	290	135
85°F	337	139
95°F	384	142
105°F	431	146
115°F	477	150

Charge Verification - Approach Method

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

Approach Temperature = Liquid temperature minus ambient temperature.

2- Approach temperature should match values in table 8. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.

3- Do not use the approach method if system pressures do not match pressures in tables 6 and 7. The approach method is not valid for grossly over or undercharged systems.

TABLE 8
APPROACH TEMPERATURES

Unit	Liquid Temp. Minus Ambient Temp.
036	6°F ± 1 (3.3°C ± 0.5)
060	3°F ± 1 (1.7°C ± 0.5)

D-Heating Start-Up

FOR YOUR SAFETY READ BEFORE LIGHTING

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

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

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

⚠WARNING

Danger of explosion. Can cause injury or product or property damage. 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.

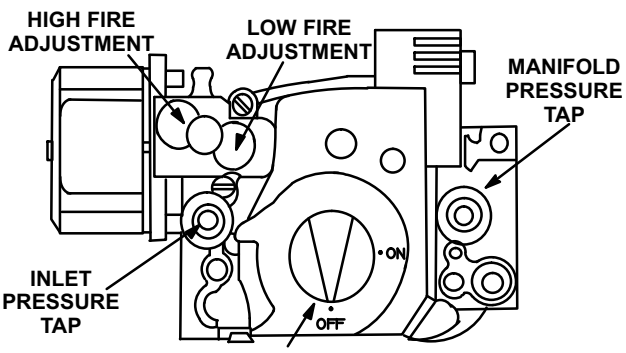
A-Placing Unit In Operation

⚠WARNING

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

Gas Valve Operation for Honeywell VR8305Q (figure 20)

HONEYWELL VR8305Q SERIES GAS VALVE



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

FIGURE 20

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"**. Depress 36C knob slightly. Do not force.

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- If using an electromechanical thermostat, set 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"**.

5- Replace heat section access panel.

IV- SYSTEMS SERVICE CHECKS

A-SGC Heating System Service Checks

All SGC units are ETL and CSA design certified without modification.

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

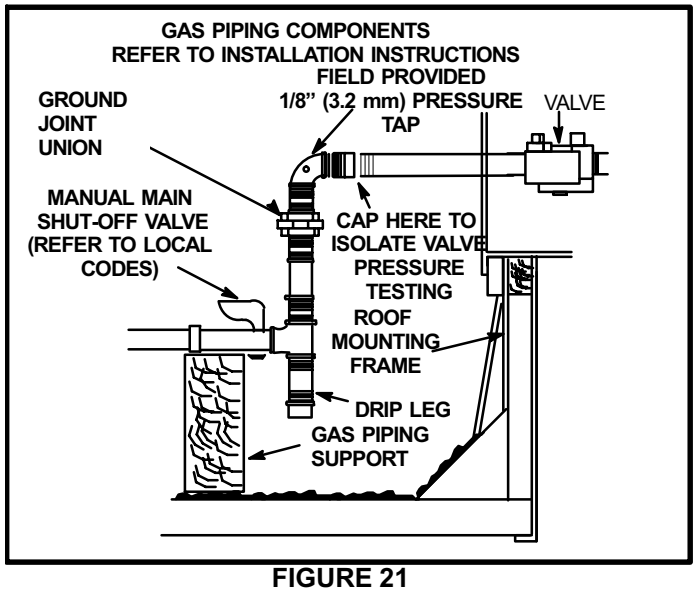


FIGURE 21

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 21.

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**.

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 (field provided - figure 21). 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." Operating pressure at the unit gas connection must be within ranges shown in table 9.

TABLE 9

Operating Pressures @ Unit Gas Connection - "w.c. (Pa)	
Natural Gas	**LP/Propane Gas**
4.7-10.5 (1170-2610)	11.0-13.0 (2740-3230)

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 manifold outlet pressure tap located on unit gas valve GV1. See figure 17 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 attempts to adjust fail, the valve must be replaced. Refer to figure 17 for location of gas valve (manifold pressure) adjustment screw. See table below for normal operating manifold pressure. The valve is adjustable for both high fire and low fire.

All gas valves are factory adjusted. 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.

TABLE 10

TWO STAGE GAS VALVE FACTORY SETTING			
Natural (inlet-5.5" to 10.0")		**L.P. (11.0" to 13.0")**	
High Fire	**Low Fire**	**High Fire**	**Low Fire**
3.7" ± 0.3"	**1.6" ± 0.3"**	**10.5" ± 0.3"**	**5.5" ± 0.3"**

⚠ 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 for gas supply pressure (above).

⚠ 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 11. 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.

6-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 12.

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.

7-Inshot Burner

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 screws securing burner box top cap.

TABLE 11

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
105,000	34	69	86	171
125,000	29	58	72	144
130,000	28	55	69	138
150,000	24	48	60	120
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.

TABLE 12

Model	Altitude-ft. (m)	Gas Manifold Pressure in. w.g.	
		Natural	LP (Propane)
036	2001-4500	3.4	9.0
060	2001-4500	1.6 / 3.4	5.5 / 9.0

8-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 mullions.

3- Disconnect combustion air blower. Draw wires through divider panel to allow for clearance of vest panel. Remove access panel(s) and unit center mullions.

4- Remove screws supporting heat exchanger.

5- 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. (4N.m) to ensure proper operation. Re-caulk corners of vest panel

9-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 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 below:

⚠WARNING

Electric shock hazard. Electrodes are not field-adjustable. Any alterations to the electrode can cause injury, death, or property damage.

1- Disconnect power to unit.

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

3- Reconnect power and adjust thermostat for heating demand.

4- After flame is established signal should be 0.5 to 1.0 . Drop out signal is 0.09.

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

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

10-Combustion Air Inducer

A combustion air proving switch checks combustion air inducer operation before allowing power to the gas controller. Gas controller will not operate if inducer is obstructed.

Under normal operating conditions, the combustion air blower wheel should be checked and cleaned prior t 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 screws securing combustion air inducer to flue box. Remove and retain two screws from bracket supporting vent connector. See figure 22.

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.

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.

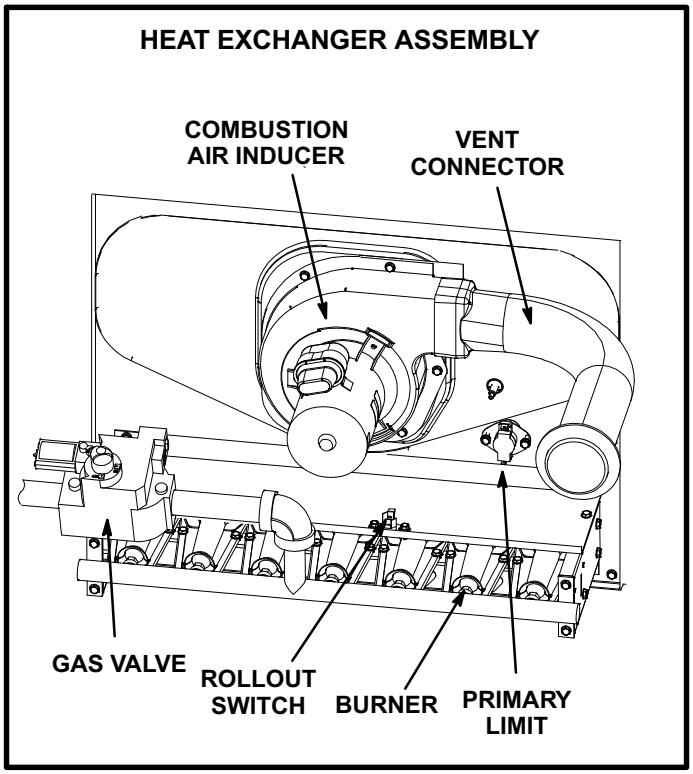


FIGURE 22

E-Flue Passageway and Flue Box

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

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. See section III- subsection C- Charging.

1-Gauge Manifold Attachment

Service gauge ports are identified in figure 5. Attach high pressure line to discharge line Schrader port and the low pressure line to the suction line Schrader port.

NOTE-When unit is properly charged discharge and suction line pressures should approximate those in tables 6 and 7.

V-MAINTENANCE

⚠ CAUTION

Electrical shock hazard. Turn off power to unit before performing any maintenance, cleaning or service operation on the unit.

A-Filters

Units are equipped with filters as shown in table 13. 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.

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

TABLE 13
NUMBER AND SIZE OF FILTER BY UNIT

SGC Unit	Qty	Filter Size - inches (mm)
036, 060	4	16 X 20 X 2 (406 X 508 X 51)

B-Lubrication

All motors used in SGC units are prelubricated; 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.

⚠ CAUTION

Be careful when servicing unit to avoid accidental contact with sharp metallic edges which may cause personal injury.

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-subsection C- 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

A-S7CURB Mounting Frame

When installing either the SGC units on a combustible surface for downflow discharge applications, the Lennox S7CURB10101 14-inch or S7CURB11101 24-inch height roof mounting frame is used. The roof mounting frames are recommended in all other applications but not required. If the SGC 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 23. 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 24. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

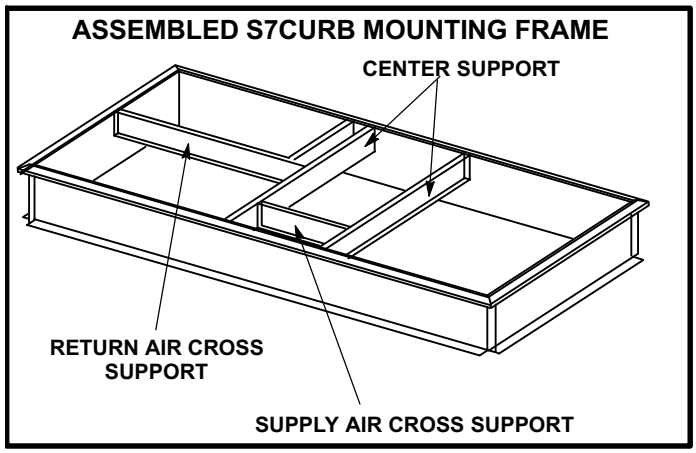


FIGURE 23

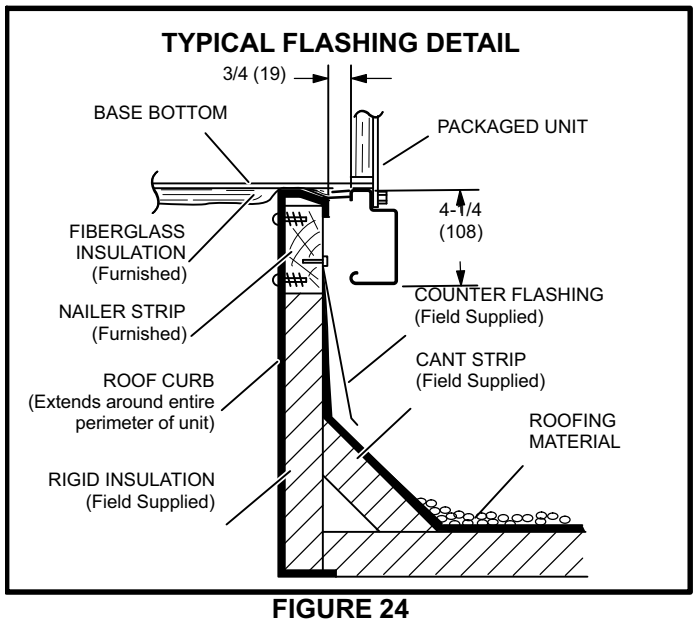


FIGURE 24

B-Outdoor Air Dampers

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

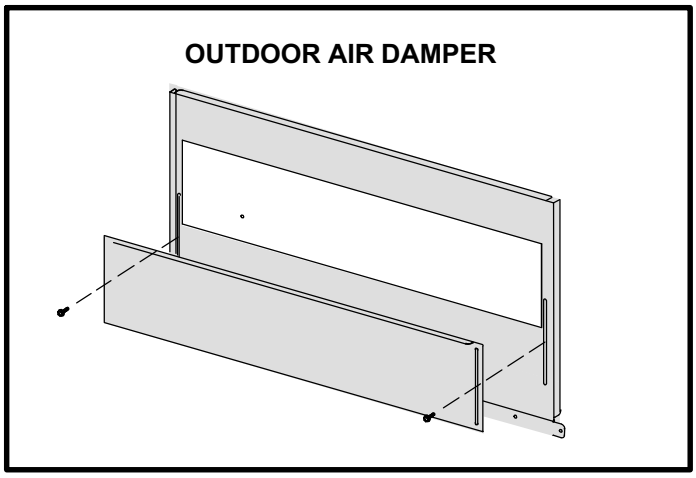


FIGURE 25

C-Economizer (Factory Installed)

The economizer is used with SGC units in downflow air discharge applications. The economizer uses outdoor air for free cooling when temperature and/or humidity is suitable. An economizer hood is required and must be ordered separately.

NOTE - Gravity exhaust dampers are optional with economizers.

The economizer is controlled by the Unit Controller which is located at the left corner of the unit control panel. The economizer DIP switch and mode setting devices are at the bottom center of the Unit Controller. See figure 26.

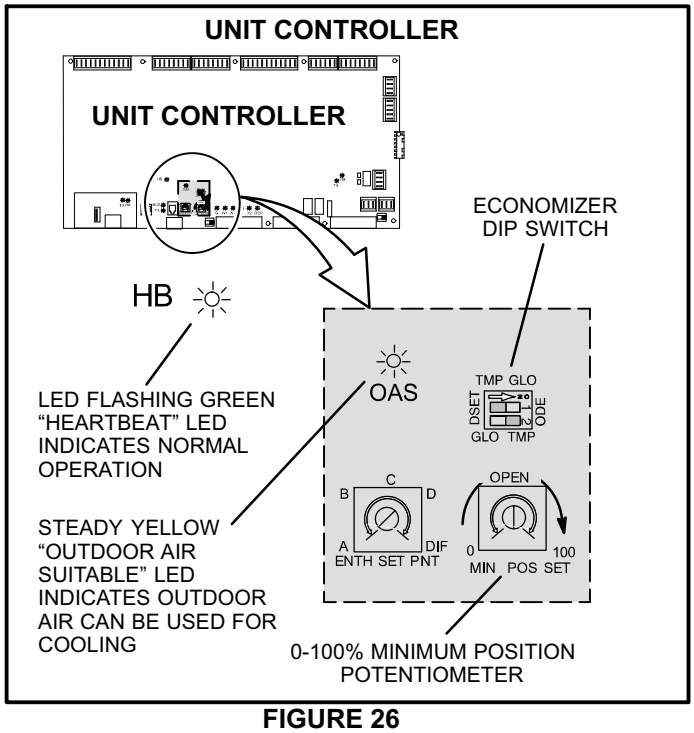


FIGURE 26

Optional field-provided sensors may be used instead of unit sensors to determine whether outdoor air is suitable for free cooling. Refer table 14.

TABLE 14

Mode	Field-Provided Sensors	Dampers will modulate to 55°F discharge air (RT6) when:
TMP	None Needed	OA temp. (RT17) is less than RA temp. (RT16) or when the Energy Management System sends an economizer enable message.**
ODE	C7400	OA enthalpy* (A7) is less than enthalpy setpoint.
DIF	(Two) C7400	OA enthalpy (A7) is less than RA enthalpy (A62).
GLO	Energy Management System With Global Output	Global input is energized.

*Temperature + humidity= enthalpy.

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

D- Gravity Exhaust Dampers

Gravity exhaust dampers may be used in downflow and horizontal air discharge applications. Gravity exhaust dampers are installed in the return air duct.

The 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.

E-Control Systems

All thermostat wiring is connected to J297 located on the A55 Unit Controller. Each thermostat has additional control options available. See thermostat installation instructions for more detail.

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. Figure 27 shows the general location.

G-LP / Propane Kit

A natural to LP / propane gas changeover kit is required for gas conversion on SGC036/060 series units. The kit includes a gas valve and burner orifices.

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 0.14" W.C. (34.9 Pa) The switch is mounted on the blower deck in the blower compartment. See figure 27.

I-Indoor Air Quality (CO_2) Sensor A63

The indoor air quality sensor monitors CO_2 levels and reports the levels to the Unit Controller A55. The board adjusts the economizer dampers according to the CO_2 levels. The sensor is mounted next to the indoor thermostat or in the return air duct. Refer to the indoor air quality sensor installation instructions for proper adjustment.

J-Drain Pan Overflow Switch S149 (optional)

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

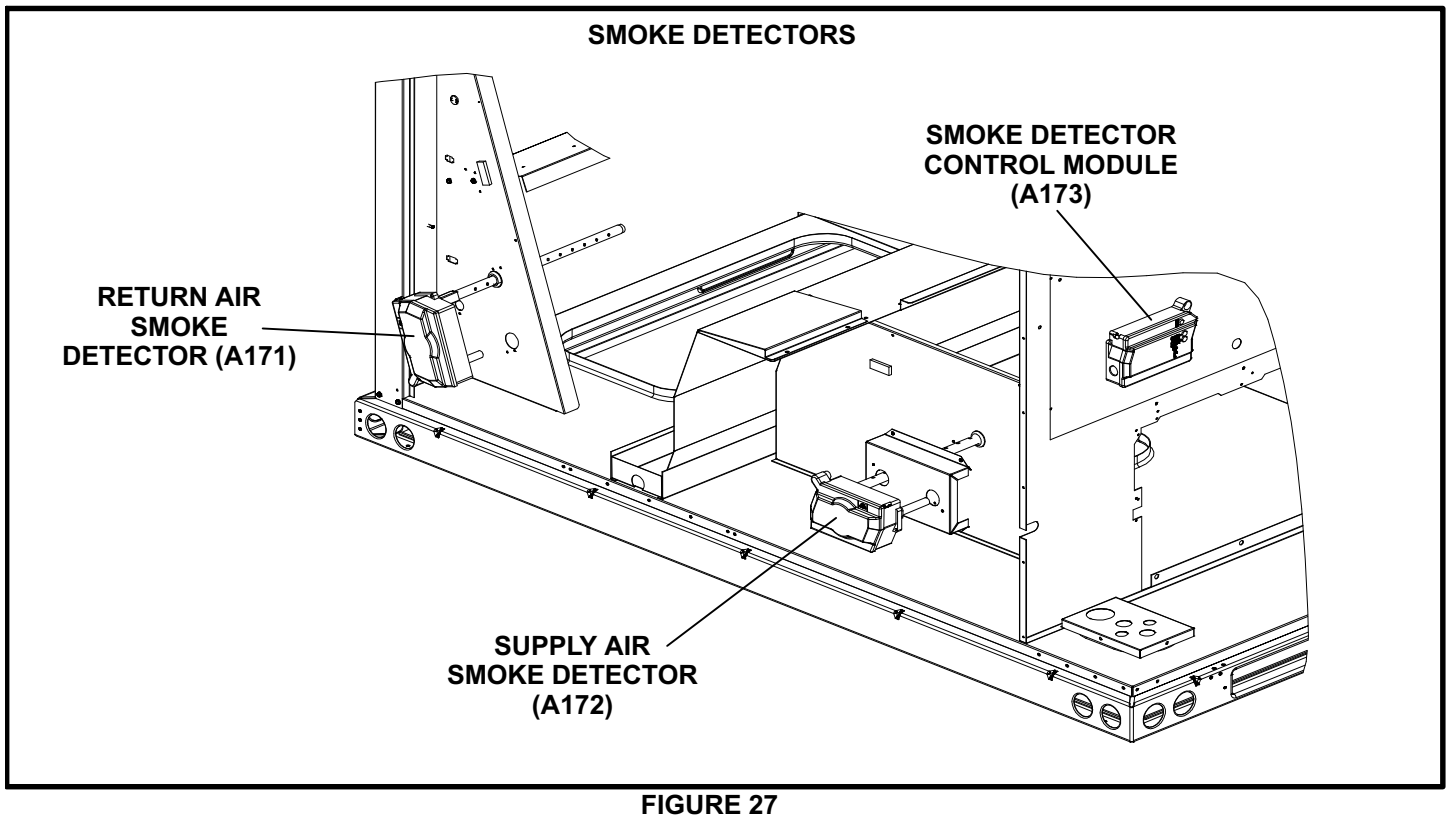
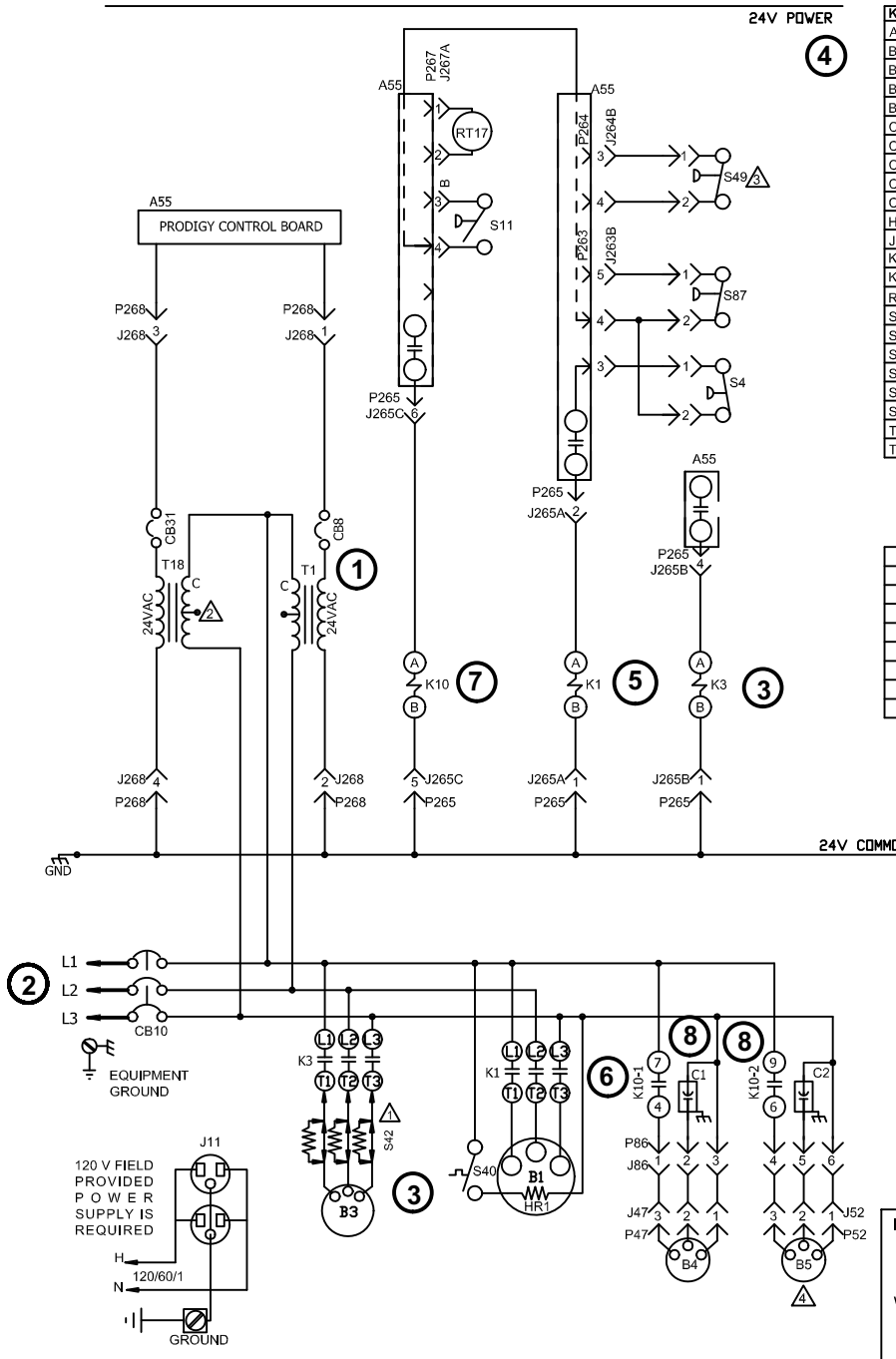


FIGURE 27

VII- WIRING DIAGRAMS / SEQUENCE OF OPERATION

SGC036 & 060



KEY	COMPONENT
A55	CONTROL, MAIN PANEL LENNOX
B1	COMPRESSOR 1
B3	MOTOR, BLOWER
B4	MOTOR, OUTDOOR FAN
B5	MOTOR, OUTDOOR FAN 2
C1	CAPACITOR, OUTDOOR FAN 1
C6	CAPACITOR, EXHAUST FAN
CB8	CIRCUIT, BREAKER
CB10	CIRCUIT BREAKER, MAIN DISCONNECT UNIT
CB31	CIRCUIT BREAKER, TRANSFORMER T18
HR1	HEATER, COMPRESSOR
J11	JACK, GFI RECEPTICLE
K3, -1	CONTACTOR, BLOWER LOW
K10,-1	RELAY, OUTDOOR FAN 1
RT17	SENSOR, OUTDOOR AIR
S4	SWITCH, LIMIT HI PRESS
S11	SWITCH, LOW PRESS, LOW AMBIENT KIT
S40	THERMOSTAT, CRANKCASE
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
S49	SWITCH, FREEZESTAT
S87	SWITCH, LOW PRESS, COMPRESSOR 1
T1	TRANSFORMER, CONTROL
T18	TRANSFORMER, PHASE MONITOR

J/P	JACK/PLUG DESCRIPTION
47	OUTDOOR FAN MOTOR 1
52	OUTDOOR FAN MOTOR 2
86	OUTDOOR FANS
263	HIGH AND LOW PRESSURE SWITCHES
264	BLOWER DECK
265	CONTACTORS AND RELAYS
267	OUTDOOR FAN AREA
268	TRANSFORMER 1 POWER

DENOTES OPTIONAL COMPONENTS
LINE VOLTAGE FIELD INSTALLED

1. USED ON UNITS WITH HIGH EFFICIENCY MOTORS
2. MOVE WIRE FROM 240 TO 208 TAP ON T1 OR T18 TRANSFORMER FOR 208 LINE VOLTAGE APPLICATIONS
3. S49 IS PART OF A 5VDC CIRCUIT
4. USED ON 060 UNIT ONLY

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.
USE COPPER CONDUCTORS ONLY.

02/12	STRATEGOS WIRING DIAGRAM 537455-01	02/12
COOLING		
SCC/ SGC - 036H, 060H - G,J,Y		
SECTION B		REV 1
Supersedes	New Form No. 537455-01	

SEQUENCE OF OPERATION SGC036, SGC060

Power:

1- Line voltage from unit disconnect energizes transformer T1. T1 provides 24VAC power to terminal strip TB34. TB34 provides 24VAC to the unit thermostat cooling, heating and blower controls.

2- Line voltage from unit disconnect provides voltage to compressor crankcase heaters HR1, compressor contactor K1, the blower motor contactor K3 and condenser fan relay K10.

Blower Operation:

3- The Unit Controller A55 receives a demand from thermostat terminal G. A55 energizes blower contactor K3 with 24VAC. N.O. contacts K3-1 close, energizing blower B3.

1st Stage Cooling

4- Cooling demand energizes Y1 and G in the thermostat. G energizes blower.

5- 24VAC is routed through TB34 to the Unit Controller A55. 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.

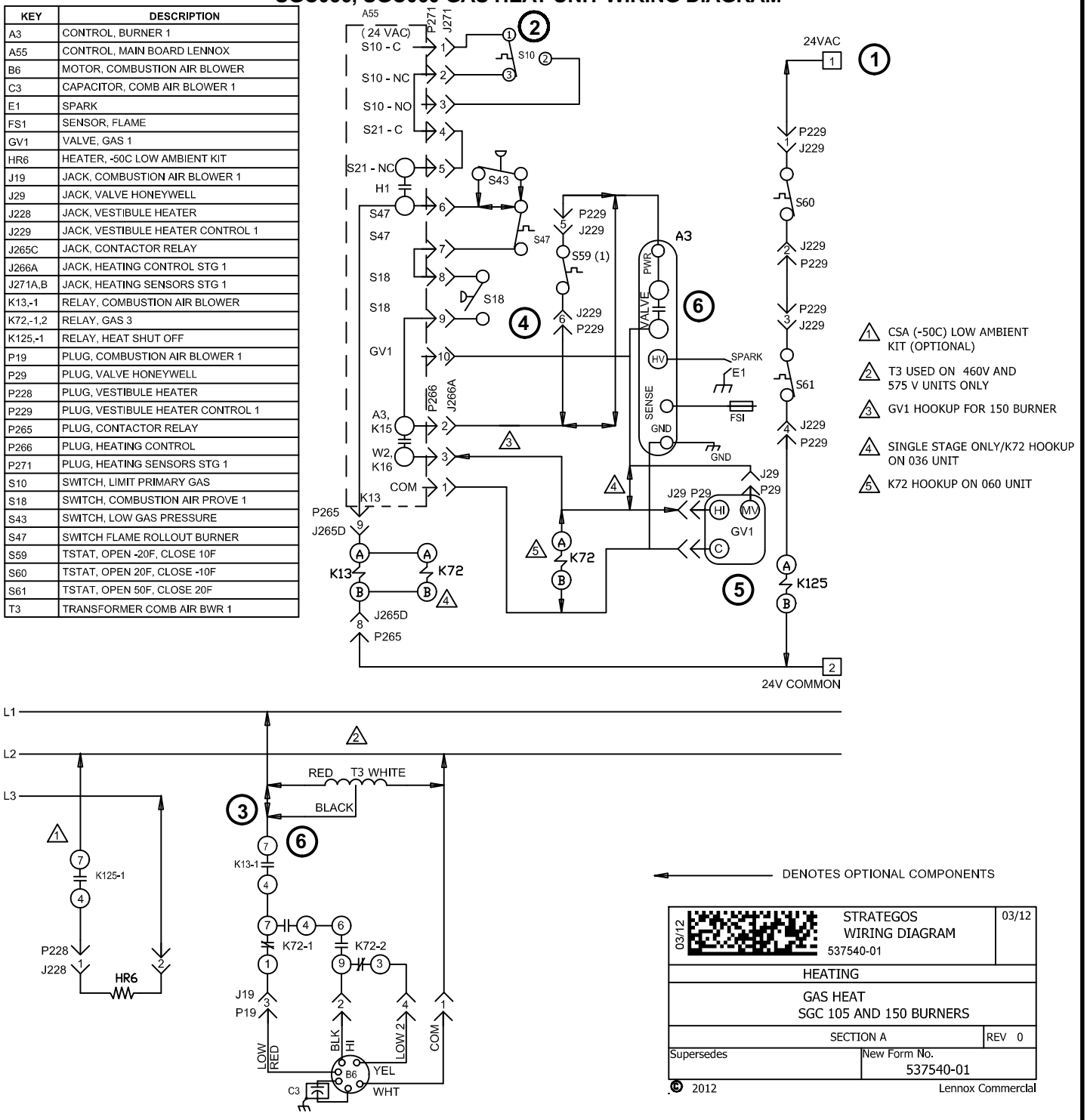
6- N.O. contacts K1-1 close energizing compressor B1.

7- N.O. low ambient switch S11 closes to energize condenser fan relay K10.

8- N.O. contacts K10-1 close energizing condenser fan B4. ***060 ONLY*** - N.O. contacts K10-2 close, energizing condenser fan B5.

SGC036, SGC060 GAS HEAT UNIT WIRING DIAGRAM

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
J19	JACK, COMBUSTION AIR BLOWER 1
J29	JACK, VALVE HONEYWELL
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
K72,-1,2	RELAY, GAS 3
K125,-1	RELAY, HEAT SHUT OFF
P19	PLUG, COMBUSTION AIR BLOWER 1
P29	PLUG, VALVE HONEYWELL
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 PROVE 1
S43	SWITCH, LOW GAS PRESSURE
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



Heat Call

1- Heating demand initiates at W1 in the thermostat.

2- 24VAC is routed through TB34 to the Unit Controller 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 to energize combustion air blower B6.

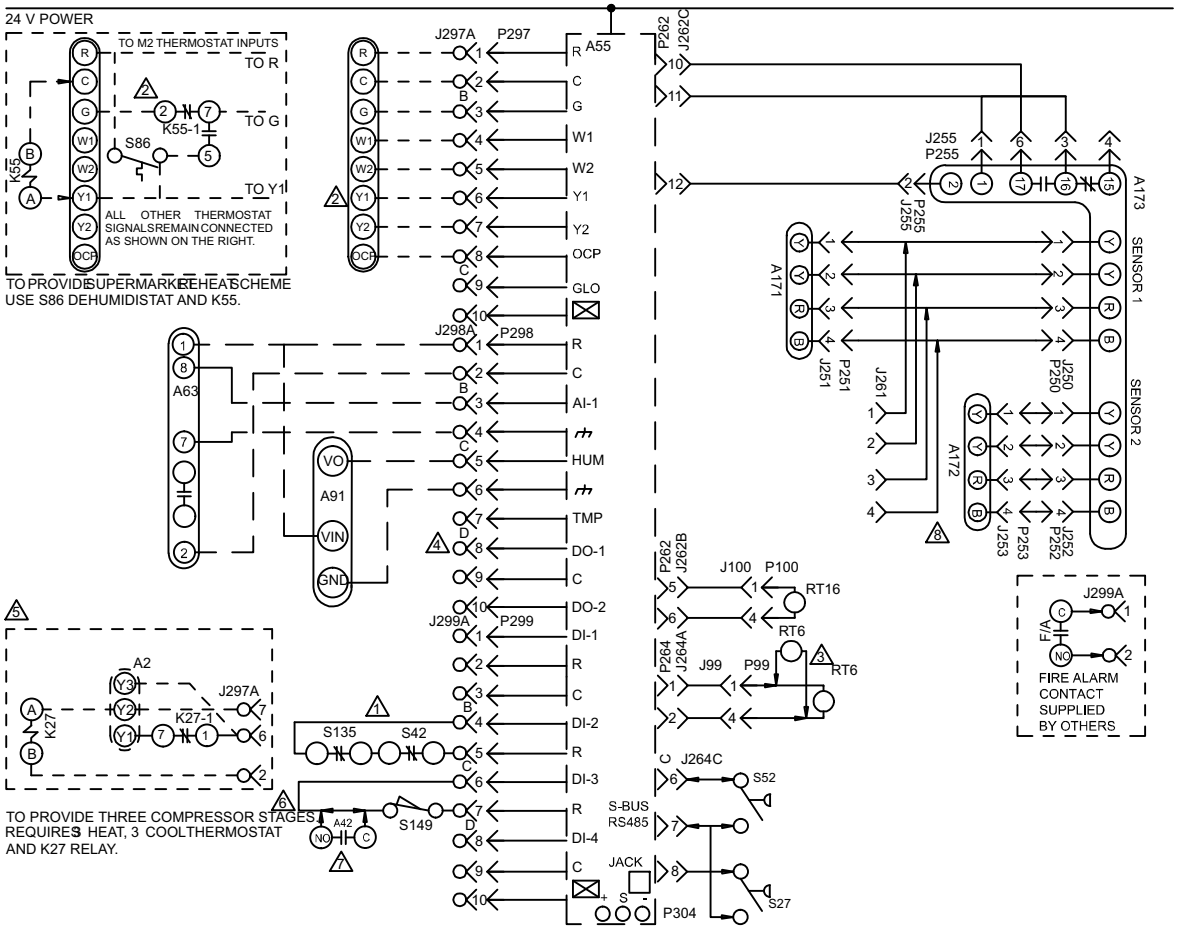
4- After the combustion air blower B6 has reached full speed, the combustion air proving switch S18 contacts close. The A55 routes 24VAC through N.C. burner flame rollout switch S47 and the closed contacts of combustion air proving switch S18 to energize the ignition module A3.

5- After a 30 second delay A3 energizes the ignitor and gas valve GV1.

End of Heat Call

6- Ignition A3 is de-energized by control module A55 in turn de-energizing GV1. Combustion air blower relay K13 is also de-energized.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



DESCRIPTION	
KEY	COMPONENT
A2	SENSOR, ELECTRONIC THERMOSTAT
A42	MONITOR, PHASE PROTECTOR
A55	PANEL, MAIN
A63	SENSOR, CO2 (IAQ) OPTIONAL
A91	SENSOR, HUMIDITY
A171	SENSOR ONE, SMOKE, RETURN AIR
A172	SENSOR TWO, SMOKE, SUPPLY AIR
A173	MODULE, CONTROL SMOKE DETECTION
J99	JACK, RT16 RETURN AIR SENSOR
J100	JACK, RT6 SUPPLY AIR SENSOR
J250	JACK, SMOKE DETECTOR ONE
J251	JACK, SMOKE DETECTOR ONE
J252	JACK, SMOKE DETECTOR TWO
J253	JACK, SMOKE DETECTOR TWO
J255	JACK, MODULE, CONTROL SMOKE DETECTION
J261	JACK, SUPPLY SMOKE DETECTOR JUMPER
J262	JACK, ECONOMIZER
J264	JACK, BLOWER DECK
J297	JACK, THERMOSTAT - DDC INTERFACE
J298	JACK, IAQ INTERFACE
J299	JACK, SAFETY INTERFACE
K27, -1	RELAY, TRANSFER
K55,-1	RELAY, BLOWER
P99	PLUG, RT16 RETURN AIR SENSOR
P100	PLUG, RT6 SUPPLY AIR SENSOR
P250	PLUG, SMOKE DETECTOR ONE
P251	PLUG, SMOKE DETECTOR ONE
P252	PLUG, SMOKE DETECTOR TWO
P253	PLUG, SMOKE DETECTOR TWO
P255	PLUG, MODULE, CONTROL SMOKE DETECTION
P262	PLUG, ECONOMIZER
P264	PLUG, BLOWER DECK
P297	PLUG, THERMOSTAT - DDC INTERFACE
P298	PLUG, IAQ INTERFACE
P299	PLUG, SAFETY INTERFACE
P304	PLUG, SYS BUS
RT6	SENSOR, SUPPLY AIR TEMP
RT16	SENSOR, RETURN AIR TEMP
S27	SWITCH, FILTER
S52	SWITCH, AIRFLOW
S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR LO
S86	SWITCH, DEHUMIDISTAT
S135	SWITCH, OVERLOAD RELAY BLOWER MOTOR HI
S149	SWITCH, OVERFLOW

1. FOR MOTORS WITH S42 AND S135 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2. USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, M2 PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UCS SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING.
3. REMOTE LOCATION OF RT6
4. P298-8 (DO-1) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
5. THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE M2 BOARD (A55).
6. M2 SETTINGS MUST BE MODIFIED WHEN A42, S42, S52, S135 OR S149 ARE INSTALLED
7. A42 USED ON 036 THROUGH 72 UNITS ONLY
8. CONNECT A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY

DESIGNATES OPTIONAL WIRING
CLASS II FIELD WIRING

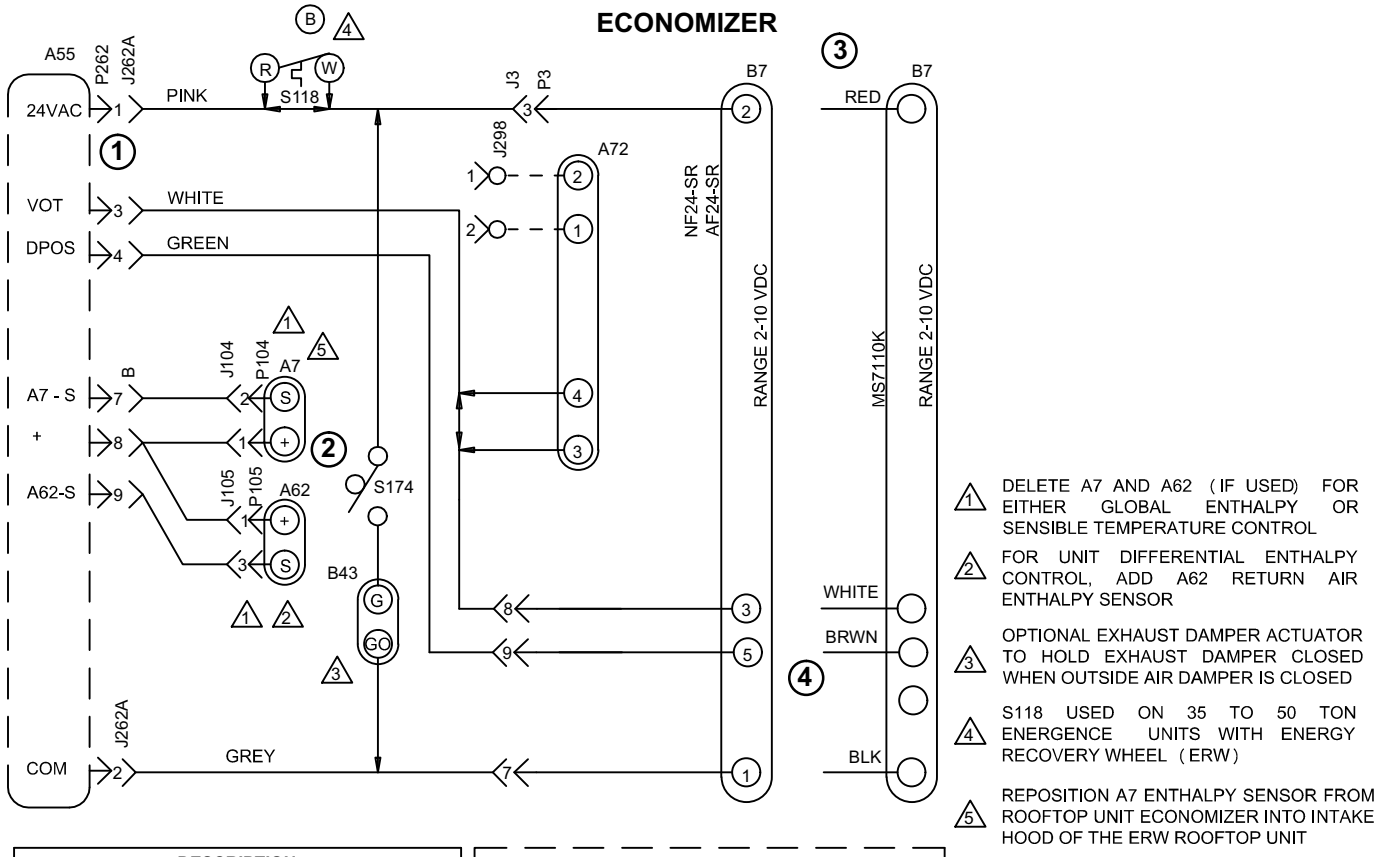
WIRING DIAGRAM	11/09
ACCESSORIES	
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT FOR ENERGENCE™	
SECTION C	REV. 3.0
Supersedes	New Form No. 537108-01

POWER:

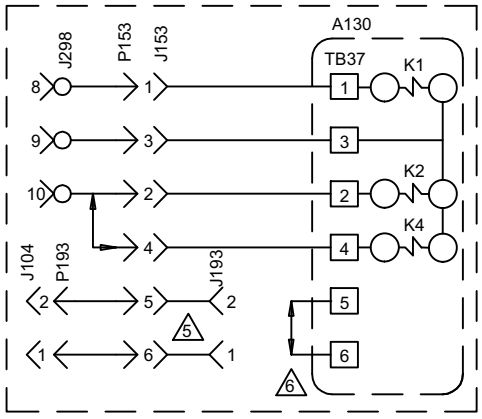
1- A55 Unit Controller, located in the main control box, supplies thermostat components with 24VAC.

OPERATION:

2- A55 receives data from the electronic thermostat A2 (Y1, Y2, W1, W2, G) and energizes the appropriate components for heat or cool demand.



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- 24VAC is routed through A55 and energizes the economizer components.

OPERATION:

2- The Unit Controller A55 along with input from outdoor enthalpy sensor A7 and indoor enthalpy sensor A62 (if differential enthalpy is used) communicate when to power the damper motor B7.

3- The Unit Controller A55 supplies B7 with 0 - 10 VDC to control the positioning of economizer.

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