

**G60UH(X) SERIES UNITS**

G60UH(X) series units are mid-efficiency gas furnaces used for upflow or horizontal applications only, manufactured with Lennox Duralok Plus heat exchangers formed of aluminized steel. G60UH(X) units are available in heating capacities of 44,000 to 132,000 Btuh and cooling applications up to 5 tons. Refer to Engineering Handbook for proper sizing.

Units are factory equipped for use with natural gas. Kits are available for conversion to LPG operation. G60UH(X) model units are equipped with the Two-Stage / Variable Speed Integrated SureLight control. G60UH(X) unit meets the California Nitrogen Oxides (NO<sub>x</sub>) Standards and California Seasonal Efficiency requirements. All units use a redundant gas valve to assure safety shut-off as required by C.S.A.

All specifications in this manual 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. In the absence of local or state codes, the guidelines and procedures outlined in this manual (except where noted) are recommendations only and do not constitute code.

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G60UH-1 MODEL SHOWN

**⚠ 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.**

**⚠ 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**

**Sharp edges. Be careful when servicing unit to avoid sharp edges which may result in personal injury.**

## SPECIFICATIONS

Gas Heating Performance	Model No.	G60UH-24A-045	G60UH-24A-070	G60UH-36A-070
	<b>Low NOx Model No.</b>	<b>G60UH-24A-045X</b>	- - -	<b>G60UH-36A-070X</b>
	Input - Btuh (kW) low fire	30,000 (8.8)	45,000 (13.2)	45,000 (13.2)
	Output - Btuh (kW) low fire	24,000 (7.0)	36,000 (10.6)	36,000 (10.6)
	Input - Btuh (kW) high fire	44,000 (12.9)	66,000 (19.3)	66,000 (19.3)
	Output - Btuh (kW) high fire	36,000 (10.5)	54,000 (15.8)	54,000 (15.8)
	☆AFUE	80.0%	80.0%	80.0%
	California Seasonal Efficiency	73.1	74.2	73.9
	High static (AGA/CGA) - in. w.g. (Pa)	.50 (124)	.50 (124)	.50 (124)
	Temperature rise range - °F (°C) low fire	15 - 45 (8 - 25)	20 - 50 (11 - 28)	20 - 50 (11 - 28)
	Temperature rise range - °F (°C) high fire	35 - 65 (19 - 36)	40 - 70 (22 - 39)	40 - 70 (22 - 39)
<b>Connections</b>	Flue connection - in. (mm) round	4 (102)	4 (102)	4 (102)
	Gas pipe size IPS - in. (mm)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
<b>Indoor Blower</b>	Wheel nominal diameter x width - in. (mm)	10 x 7 (254 x 178)	10 x 7 (254 x 178)	10 x 8 (254 x 203)
	Motor output - hp (W)	1/5 (149)	1/5 (149)	1/3 (249)
	Tons (kW) of add-on cooling	2 (7.0)	2 (7.0)	2 - 3 (7.0 - 10.6)
<b>Shipping weight - 1 package</b>		121 lbs. (55 kg)	127 lbs. (58 kg)	132 lbs. (60 kg)
<b>Matching Coils</b>	☐Up-flow cased	C33-18A-2F, C33-24A-2F, C33-30A-2F, C33-36A-2F, C33-38A-2F		
	Horizontal	CH33-18A-2F, CH33-24/30A-2F, CH33-36A-2F		
<b>Electrical characteristics</b>		120 volts - 60 hertz - 1 phase (less than 12 amps)		
<b>OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA</b>				
<b>☑ Air Filter and Rack Kit Number and size of filters</b>	Horizontal (end)	<b>87L95</b> - (1) 14 x 25 x 1 in. (356 x 635 x 25 mm)		
	Side Return	Single ( <b>44J22</b> ) or Ten Pack ( <b>66K63</b> ) - (1) 16 x 25 x 1 in. (406 x 635 x 25 mm)		
<b>EZ Filter Base</b>	Catalog Number - Shipping Weight	<b>73P55</b> - 6 lbs. (3 kg)		
	Dimensions - H x W x D	4 x 14-1/4 x 28-5/8 in. (102 x 362 x 727 mm)		
	Number and size of filter (field provided)	14 x 25 x 1 in. (356 x 635 x 25 mm)		
<b>Horizontal Support Frame Kit - Shipping Weight</b>		<b>56J18</b> — 18 lbs. (8 kg)		
<b>Vent Adaptor - 6 in. 152 (mm) connection size</b>		<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)
<b>High Altitude</b>		See Page 10		
<b>Propane/Natural Gas Kit</b> 0 to 7500 ft (0 - 2286m)		<b>59M87</b>		

☆Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.

NOTE - Filters and provisions for mounting are not furnished and must be field provided.

☐ The same C33 uncased models match the furnaces shown but require an optional adaptor base or field fabricated transition. See C33 coil bulletin for additional information.

☑ Cleanable polyurethane frame type filter.

**SPECIFICATIONS Cont.**

<b>Gas Heating Performance</b>	<b>Model No.</b>	<b>G60UH-36B-090</b>	<b>G60UH-48B-070</b>	<b>G60UH-48B-090</b>	<b>G60UH-36C-110</b>
	<b>Low NOx Model No.</b>	---	---	<b>G60UH-48B-090X</b>	---
	Input - Btuh (kW) low fire	60,000 (17.6)	45,000 (13.2)	60,000 (17.6)	75,000 (22.0)
	Output - Btuh (kW) low fire	48,000 (14.1)	36,000 (10.6)	49,000 (14.4)	61,000 (17.9)
	Input - Btuh (kW) high fire	88,000 (25.8)	66,000 (19.3)	88,000 (25.8)	110,000 (32.2)
	Output - Btuh (kW) high fire	72,000 (21.1)	54,000 (15.8)	72,000 (21.1)	90,000 (26.4)
	☆AFUE	80.0%	80.0%	80.0%	80.0%
	California Seasonal Efficiency	73.8%	73.1%	74.6%	74.2%
	High static (AGA/CGA) - in. w.g. (Pa)	.50 (124)	.50 (124)	.50 (124)	.50 (124)
	Temperature rise range - °F (°C) low fire	20 - 50 (11 - 28)	15 - 45 (8 - 25)	-1, -2 units 20 - 50 (11 - 28) -4 units 15 - 45 (8.3 - 25)	25 - 55 (14 - 31)
	Temperature rise range - °F (°C) high fire	40 - 70 (22 - 39)	25 - 55 (15 - 33)	-1, -2 units 40 - 70 (22 - 39) -4 units 35 - 65 (19 - 36)	50 - 80 (28 - 44)
<b>Connections</b>	Flue connection - in. (mm) round	4 (102)	4 (102)	4 (102)	4 (102)
	Gas pipe size IPS - in. (mm)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
<b>Indoor Blower</b>	Wheel nominal diameter x width - in.	10 x 8	10 x 10	10 x 10	10 x 8
	mm	254 x 203	254 x 254	254 x 254	254 x 203
	Motor output - hp (W)	1/3 (249)	1/2 (373)	1/2 (373)	1/3 (249)
	Tons (kW) of add-on cooling	2 - 3 (7.0 - 10.6)	2 - 4 (7.0 - 14.1)	2 - 4 (7.0 - 14.1)	2 - 3 (7.0 - 10.6)
<b>Shipping weight - 1 package</b>		146 lbs. (66 kg)	147 lbs (67 kg)	153 lbs (69 kg)	166 lbs. (75 kg)
<b>Matching Coils</b>	☐ Up-flow cased	C33-24B-2F, C33-30B-2F, C33-36B-2F, C33-38B-2F, C33-42B-2F, C33-48B-2F			C33-36C-2F, C33-48C-2F, C33-50/60C-2F,
	Horizontal	CH33-36B-2F, CH33-42B-2F, CH33-44/48B-2F			CH33-36C-2F, CH33-48C-2F, CH33-50/60C-2F
<b>Electrical characteristics</b>		120 volts - 60 hertz - 1 phase (less than 12 amps)			
<b>OPTIONAL ACCESSORIES – MUST BE ORDERED EXTRA</b>					
<b>☑ Air Filter and Rack Kit</b>	Horizontal (end)	<b>87L96</b> - (1) 18 x 25 x 1 in. (457 x 635 x 25 mm)			<b>87L97</b> - (1) 20 x 25 x 1 in. (508 x 635 x 25 mm)
	Side Return	Single <b>44J22</b> or Ten Pack ( <b>66K63</b> ) - (1) 16 x 25 x 1 in. (406 x 635 x 25 mm)			
<b>EZ Filter Base</b>	Catalog Number - Shipping Weight	<b>73P56</b> - 7 lbs. (3 kg)			<b>73P57</b> - 8 lbs. (4 kg)
	Dimensions - H x W x D	4 x 17-5/8 x 28-5/8 in. (102 x 448 x 727 mm)			4 x 21-5/8 x 28-5/8 in. (102 x 549 x 727 mm)
	Number & size of field provided filter	16 x 25 x 1 in. (406 x 635 x 25 mm)			20 x 25 x 1 in. (508 x 635 x 25 mm)
<b>Horizontal Support Frame Kit - Shipping Weight</b>		<b>56J18</b> - 18 lbs. (8 kg)	<b>56J18</b> - 18 lbs. (8 kg)	<b>56J18</b> - 18 lbs. (8 kg)	<b>56J18</b> - 18 lbs. (8 kg)
<b>LPG/Propane Kit</b>	4501-7500 ft. (1372-2286 m)	<b>59M13</b>	<b>59M13</b>	<b>59M13</b>	<b>59M13</b>
	7501-10,000 ft. (2286-3048 m)	<b>59M14</b>	<b>59M14</b>	<b>59M14</b>	<b>59M14</b>
<b>Vent Adaptor - 6 in. 152 (mm) connection size</b>		<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)
<b>High Altitude</b>		See Page 10			
<b>Propane/Natural Gas Kit</b>	0 to 7500 ft (0 - 2286m)	<b>59M87</b>			

☆Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.

NOTE - Filters and provisions for mounting are not furnished and must be field provided.

☐ The same C33 uncased models match the furnaces shown but require an optional adaptor base or field fabricated transition. See C33 coil bulletin for additional information.

☑ Cleanable polyurethane frame type filter.

**SPECIFICATIONS Cont.**

<b>Gas Heating Performance</b>	<b>Model No.</b>	<b>G60UH-48C-110</b>	<b>G60UH-60C-110</b>	<b>G60UH-60D-135</b>
	<b>Low NOx Model No.</b>	- - -	<b>G60UH-60C-110X</b>	- - -
	Input - Btuh (kW) low fire	75,000 (22.0)	75,000 (22.0)	90,000 (26.4)
	Output - Btuh (kW) low fire	60,000 (17.6)	61,000 (17.9)	73,000 (21.4)
	Input - Btuh (kW) high fire	110,000 (32.2)	110,000 (32.2)	132,000 (38.7)
	Output - Btuh (kW) high fire	90,000 (26.4)	90,000 (26.4)	108,000 (31.6)
	☆AFUE	80.0%	80.0%	80.0%
	California Seasonal Efficiency	74.9	75.1	74.9
	High static (AGA/CGA) - in. w.g. (Pa)	.50 (124)	.50 (124)	.50 (124)
	Temperature rise range - °F (°C) low fire	20 - 50 (11 - 28)	-1, -2, -3 units 25 - 55 (14 - 31) -4 units 20 - 50 (11 - 28)	25 - 55 (14 - 31)
	Temperature rise range - °F (°C) high fire	40 - 70 (22 - 39)	35 - 65 (19 - 36)	45 - 75 (25 - 42)
<b>Connections</b>	Flue connection - in. (mm) round	4 (102)	4 (102)	4 (102)
	Gas pipe size IPS - in. (mm)	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
<b>Indoor Blower</b>	Wheel nominal diameter x width - in. (mm)	10 x 10 (254 x 254)	11-1/2 x 10 (292 x 254)	11-1/2 x 10 (292 x 254)
	Motor output - hp (W)	1/2 (373)	1 (746) -1, -2 models 3/4 (560)	1 (746) -1, -2 models 3/4 (560)
	Tons (kW) of add-on cooling	2 - 4 (7.0 - 14.1)	5 (17.6)	5 (17.6)
<b>Shipping weight - 1 package</b>		169 lbs. (77 kg)	172 lbs. (78 kg)	192 lbs. (87 kg)
<b>Matching Coils</b>	☐ Up-flow cased	C33-36C-2F, C33-48C-2F, C33-50/60C-2F,	C33-36C-2F, C33-48C-2F, C33-50/60C-2F,	C33-60D-2F, C33-62D-2F
	Horizontal	CH33-36C-2F, CH33-48C-2F, CH33-50/60C-2F	CH33-36C-2F, CH33-48C-2F, CH33-50/60C-2F	CH33-60D-2F, CH33-62D-2F
<b>Electrical characteristics</b>		120 volts - 60 hertz - 1 phase (less than 12 amps)		
<b>OPTIONAL ACCESSORIES – MUST BE ORDERED EXTRA</b>				
<b>☐ Air Filter and Rack Kit</b>	Horizontal (end)	<b>87L97</b> - (1) 20 x 25 x 1 in. (508 x 635 x 25 mm)	<b>87L97</b>	<b>87L98</b>
<b>Number and size of filters</b>	Side Return	(1) 20 x 25 x 1 in. (508 x 635 x 25 mm)	(1) 20 x 25 x 1 in. (508 x 635 x 25 mm)	(1) 25 x 25 x 1 in. (635 x 635 x 25 mm)
		☐ Single <b>44J22</b> or Ten Pack ( <b>66K63</b> ) - (1) 16 x 25 x 1 (406 x 635 x 25)		
<b>EZ Filter Base</b>	Catalog Number - Shipping Weight	<b>73P57</b> - 8 lbs. (4 kg)	<b>73P57</b>	<b>73P58</b> - 10 lbs. (5 kg)
	Dimensions - H x W x D	4 x 21-5/8 x 28-5/8 in. (102 x 549 x 727 mm)	4 x 21-5/8 x 28-5/8 in. (102 x 549 x 727 mm)	4 x 24-5/8 x 28-5/8 in. (102 x 625 x 727 mm)
	Number and size of field provided filter	20 x 25 x 1 in. (508 x 635 x 25 mm)	20 x 25 x 1 in. (508 x 635 x 25 mm)	24 x 24 x 1 in. (610 x 610 x 25 mm)
<b>Horizontal Support Frame Kit - Shipping Weight</b>		<b>56J18</b> - 18 lbs. (8 kg)	<b>56J18</b> - 18 lbs. (8 kg)	<b>56J18</b> - 18 lbs. (8 kg)
<b>RAB Return Air Base</b>		Not Required	RAB60C ( <b>12M71</b> )	RAB60D ( <b>12M72</b> )
<b>Vent Adaptor - 6 in. 152 (mm) connection size</b>		<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)	<b>18M79</b> - 2 lbs. (1 kg)
<b>High Altitude</b>		See Page 10		
<b>Propane / Natural Kit</b>		<b>59M87</b>		

☆Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.

NOTE - Filters and provisions for mounting are not furnished and must be field provided.

☐ The same C33 uncased models match the furnaces shown but require an optional adaptor base or field fabricated transition. See C33 coil bulletin for additional information.

☐ Cleanable polyurethane frame type filter.

☐ Flue connection on the unit is 4 in. (102 mm) diameter. Most applications will require 5 in. (127 mm) venting and field supplied 4 x 5 in. (102 x 127 mm) adaptor. See Venting Tables in the Installation Instructions for detailed information.

☐ Not for use with RAB Return Air Base or with 60C and 60D size units with air flow requirements of 1800 cfm (850 L/s) or greater. See Blower Performance Tables for additional information.

## BLOWER DATA

<b>G60UH-24A-045 PERFORMANCE</b>										
External Static Pressure		Air Volume / Watts at Various Blower Speeds								
		High			Medium			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1090	515	460	905	425	390	725	340	300
0.05	12	1080	510	450	900	425	390	720	340	300
0.10	25	1065	505	445	895	420	385	710	335	295
0.15	37	1050	495	435	895	420	380	700	330	290
0.20	50	1030	485	425	890	420	375	690	325	290
0.25	62	1015	480	415	875	415	370	680	320	285
0.30	75	995	470	410	860	405	365	665	315	280
0.40	100	960	455	395	840	395	350	650	305	270
0.50	125	910	430	380	795	375	335	610	290	260
0.60	150	840	395	355	750	355	315	540	255	245
0.70	175	770	365	340	665	315	295	490	230	235
0.80	200	660	310	315	555	260	275	420	200	225
0.90	225	560	265	295	480	225	260	355	170	210

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-24A-070 PERFORMANCE</b>										
External Static Pressure		Air Volume / Watts at Various Blower Speeds								
		High			Medium			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1075	505	445	905	425	375	730	345	290
0.05	12	1070	505	445	900	425	375	725	340	290
0.10	25	1065	505	440	895	420	370	720	340	285
0.15	37	1060	500	435	890	420	365	715	335	285
0.20	50	1055	500	430	885	420	360	710	335	280
0.25	62	1045	495	425	880	415	360	700	330	280
0.30	75	1030	485	415	875	415	355	690	325	270
0.40	100	1010	475	400	860	405	350	675	320	270
0.50	125	975	460	390	840	395	340	660	310	265
0.60	150	940	445	375	805	380	325	640	300	255
0.70	175	890	420	360	755	355	305	605	285	240
0.80	200	830	390	340	700	330	285	565	265	225
0.90	225	765	360	305	640	300	265	515	245	205

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-36A-070 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1500	710	705	1290	610	565	985	465	455	830	390	375
0.05	12	1475	695	695	1275	600	555	980	465	445	820	385	365
0.10	25	1450	685	680	1255	590	545	970	460	440	810	380	360
0.15	37	1425	675	670	1240	585	535	965	455	430	805	380	355
0.20	50	1400	660	655	1225	580	525	955	450	425	795	375	350
0.25	62	1370	645	645	1205	570	510	945	445	415	790	375	345
0.30	75	1340	630	630	1180	555	500	930	440	405	780	370	335
0.40	100	1285	605	610	1140	540	475	900	425	390	745	350	325
0.50	125	1215	575	580	1080	510	450	865	410	375	705	335	310
0.60	150	1150	545	560	1015	480	430	810	380	355	655	310	290
0.70	175	1060	500	535	940	445	405	730	345	330	585	275	270
0.80	200	955	450	515	800	375	370	655	310	305	480	225	260
0.90	225	785	370	475	605	285	325	585	275	270	410	195	255

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

### BLOWER DATA Cont.

<b>G60UH-36B-090 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1500	710	720	1255	590	595	1040	490	460	900	425	370
0.05	12	1485	700	705	1250	590	580	1040	490	450	895	420	365
0.10	25	1465	690	685	1240	585	570	1035	490	445	890	420	360
0.15	37	1450	685	675	1235	585	555	1035	490	440	885	420	355
0.20	50	1435	675	660	1225	580	545	1030	485	435	880	415	350
0.25	62	1420	670	645	1215	575	530	1025	485	425	875	415	345
0.30	75	1400	660	630	1200	565	520	1020	480	415	870	410	340
0.40	100	1345	635	595	1170	550	495	1000	470	400	855	405	330
0.50	125	1300	615	575	1135	535	475	965	455	380	830	390	300
0.60	150	1235	585	545	1080	510	445	930	440	360	780	370	290
0.70	175	1165	550	510	1020	480	415	870	410	340	740	350	280
0.80	200	1080	510	480	940	445	385	800	380	315	670	315	260
0.90	225	985	465	445	840	395	355	710	335	290	600	285	245

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-36C-110 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1555	735	715	1335	630	575	1085	510	460	925	435	365
0.05	12	1540	725	705	1330	630	555	1080	510	450	920	435	360
0.10	25	1525	720	690	1320	625	545	1075	505	440	915	430	355
0.15	37	1510	715	680	1310	620	535	1070	505	430	910	430	350
0.20	50	1490	705	670	1295	610	525	1065	505	420	900	425	340
0.25	62	1465	690	655	1280	605	510	1060	500	415	890	420	335
0.30	75	1440	680	645	1260	595	495	1050	495	405	880	415	330
0.40	100	1385	655	615	1230	580	485	1030	485	390	865	410	320
0.50	125	1320	625	590	1190	560	460	995	470	375	835	395	300
0.60	150	1260	595	570	1135	535	430	960	455	355	815	385	295
0.70	175	1190	560	545	1075	505	410	915	430	345	775	365	285
0.80	200	1090	515	515	970	460	385	860	405	325	760	360	280
0.90	225	975	460	485	880	415	360	790	375	305	705	335	275

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-48B-070 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
.00	0	2080	980	846	1810	855	764	1535	725	634	1295	610	519
.10	25	2030	955	810	1790	845	714	1520	715	600	1285	605	492
.20	50	1955	920	767	1760	830	675	1515	715	566	1275	600	477
.30	75	1885	890	732	1710	805	640	1505	710	555	1265	595	459
.40	100	1820	860	699	1670	790	611	1470	695	525	1255	590	443
.50	125	1740	820	664	1600	755	575	1420	670	496	1215	575	414
.60	150	1635	770	624	1530	720	544	1350	635	464	1175	555	400
.70	175	1545	730	597	1420	670	501	1270	600	432	1080	510	368
.80	200	1400	660	554	1295	610	462	1135	535	392	990	465	343
.90	225	1250	590	512	1125	530	419	1050	495	372	875	410	310

NOTES - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.  
 Air volume based on bottom air return air. Actual air volume may vary on side return air applications.

## BLOWER DATA Cont.

<b>G60UH-48B-090 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1970	930	790	1810	855	735	1585	750	670	1340	630	565
0.05	12	1940	915	780	1785	840	715	1580	745	650	1335	630	555
0.10	25	1915	905	765	1760	830	695	1570	740	630	1325	625	540
0.15	37	1880	885	745	1730	815	660	1560	735	615	1325	625	530
0.20	50	1840	870	730	1700	800	620	1545	730	600	1320	625	520
0.25	62	1805	850	715	1670	790	625	1520	715	585	1310	620	510
0.30	75	1765	835	695	1640	775	625	1490	705	565	1295	610	500
0.40	100	1695	800	670	1570	740	595	1440	680	540	1260	595	480
0.50	125	1600	755	635	1490	705	560	1360	640	505	1195	565	450
0.60	150	1505	710	600	1400	660	530	1285	605	480	1140	540	425
0.70	175	1395	660	565	1265	595	485	1170	550	440	990	465	380
0.80	200	1250	590	520	1100	520	445	975	460	390	905	425	355
0.90	225	1005	475	460	870	410	385	900	425	365	810	380	325

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-48C-110 PERFORMANCE</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2015	950	895	1620	765	780	1340	630	640	1150	545	525
0.05	12	1990	940	870	1615	760	760	1340	630	640	1150	545	525
0.10	25	1965	925	850	1610	760	745	1340	630	640	1150	545	525
0.15	37	1930	910	825	1605	755	725	1335	630	630	1150	545	525
0.20	50	1895	895	805	1600	755	710	1335	630	615	1150	545	525
0.25	62	1860	880	785	1590	750	695	1330	630	605	1150	545	520
0.30	75	1820	860	765	1580	745	675	1330	630	590	1145	540	515
0.40	100	1740	820	725	1530	720	635	1320	625	560	1140	540	490
0.50	125	1665	785	695	1475	695	600	1285	605	525	1120	530	470
0.60	150	1575	745	650	1405	665	555	1230	580	490	1075	505	445
0.70	175	1475	695	610	1310	620	515	1165	550	470	1015	480	415
0.80	200	1350	635	560	1210	570	485	1080	510	430	930	440	380
0.90	225	1210	570	520	1070	505	430	870	410	365	740	350	325

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

NOTE - Air volumes based on bottom return air. Actual air volume may vary on side return air applications.

<b>G60UH-60C-110 with 3/4 hp PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.</b>													
External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2450	1155	1220	2300	1085	1060	2056	970	905	1725	815	735
0.05	12	2410	1135	1205	2265	1070	1045	2040	965	895	1715	810	725
0.10	25	2370	1120	1195	2230	1050	1030	2020	955	890	1710	810	720
0.15	37	2325	1095	1175	2200	1040	1015	1995	940	875	1700	800	715
0.20	50	2280	1075	1165	2170	1025	1005	1975	935	870	1695	800	710
0.25	62	2245	1060	1150	2130	1005	990	1950	920	855	1680	795	705
0.30	75	2205	1040	1135	2095	990	975	1925	910	845	1665	785	700
0.40	100	2115	995	1105	2010	950	940	1860	875	820	1625	770	685
0.50	125	2025	955	1060	1945	920	920	1810	855	805	1605	755	675
0.60	150	1910	900	1015	1850	875	885	1715	810	780	1540	730	670
0.70	175	1835	865	1005	1775	840	865	1655	780	765	1495	705	655
0.80	200	1745	825	975	1655	780	835	1540	725	730	1400	660	635
0.90	225	1610	760	945	1540	725	805	1475	695	715	1310	620	615

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

### BLOWER DATA Cont.

**G60UH-60C-110 with 3/4 hp PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter in order to maintain proper air velocity across the filter.**

External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	<b>2395</b>	<b>1130</b>	<b>1230</b>	<b>2260</b>	<b>1065</b>	<b>1085</b>	<b>2015</b>	<b>950</b>	<b>920</b>	1730	815	750
0.05	12	<b>2365</b>	<b>1115</b>	<b>1220</b>	<b>2230</b>	<b>1050</b>	<b>1070</b>	<b>1985</b>	<b>935</b>	<b>905</b>	1720	810	745
0.10	25	<b>2330</b>	<b>1100</b>	<b>1205</b>	<b>2200</b>	<b>1040</b>	<b>1060</b>	<b>1960</b>	<b>925</b>	<b>890</b>	1705	805	750
0.15	37	<b>2285</b>	<b>1080</b>	<b>1190</b>	<b>2170</b>	<b>1025</b>	<b>1045</b>	<b>1030</b>	<b>485</b>	<b>880</b>	1695	800	740
0.20	50	<b>2245</b>	<b>1060</b>	<b>1170</b>	<b>2135</b>	<b>1010</b>	<b>1030</b>	<b>1905</b>	<b>900</b>	<b>870</b>	1675	790	735
0.25	62	<b>2200</b>	<b>1040</b>	<b>1160</b>	<b>2100</b>	<b>990</b>	<b>1020</b>	<b>1890</b>	<b>890</b>	<b>860</b>	1665	785	730
0.30	75	<b>2170</b>	<b>1025</b>	<b>1145</b>	<b>2070</b>	<b>980</b>	<b>1005</b>	<b>1870</b>	<b>880</b>	<b>850</b>	1655	780	720
0.40	100	<b>2085</b>	<b>985</b>	<b>1110</b>	<b>1990</b>	<b>940</b>	<b>975</b>	<b>1825</b>	<b>860</b>	<b>835</b>	1610	760	705
0.50	125	<b>1980</b>	<b>935</b>	<b>1075</b>	<b>1910</b>	<b>900</b>	<b>945</b>	1755	830	810	1555	735	690
0.60	150	<b>1890</b>	<b>890</b>	<b>1045</b>	<b>1835</b>	<b>865</b>	<b>915</b>	1670	790	780	1515	715	680
0.70	175	1800	850	1020	1725	815	885	1615	760	770	1445	685	655
0.80	200	1700	805	995	1645	775	855	1525	720	745	1380	650	645
0.90	225	1590	750	980	1520	720	820	1410	665	710	1300	615	625

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

**G60UH-60D-135 with 3/4 hp PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.**

External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2465	1165	1205	2325	1100	1060	2155	1015	930	1895	895	780
0.05	12	2430	1145	1195	2295	1085	1050	2125	1000	920	1875	885	770
0.10	25	2395	1130	1180	2265	1070	1040	2095	990	910	1855	875	765
0.15	37	2350	1110	1165	2230	1050	1025	2070	975	900	1830	865	755
0.20	50	2310	1090	1150	2195	1035	1010	2045	965	890	1805	850	745
0.25	62	2265	1070	1135	2155	1015	995	2010	950	875	1785	840	735
0.30	75	2220	1050	1120	2115	1000	980	1975	930	865	1765	830	730
0.40	100	2120	1000	1080	2035	960	950	1915	905	845	1715	810	720
0.50	125	2050	970	1055	1955	925	925	1830	865	815	1645	775	700
0.60	150	1930	910	1015	1860	880	895	1745	825	795	1585	745	680
0.70	175	1835	865	985	1775	840	870	1655	780	770	1530	720	670
0.80	200	1720	810	955	1645	775	830	1560	735	745	1445	685	650
0.90	225	1595	755	925	1535	725	800	1455	685	720	1310	620	620

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

**G60UH-60D-135 with 3/4 hp PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter in order to maintain proper air velocity across the filter.**

External Static Pressure		Air Volume / Watts at Various Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	<b>2350</b>	<b>1110</b>	<b>1180</b>	<b>2225</b>	<b>1050</b>	<b>1035</b>	<b>2055</b>	<b>970</b>	<b>905</b>	<b>1855</b>	<b>875</b>	<b>775</b>
0.05	12	<b>2310</b>	<b>1090</b>	<b>1170</b>	<b>2195</b>	<b>1035</b>	<b>1025</b>	<b>2035</b>	<b>960</b>	<b>895</b>	<b>1835</b>	<b>865</b>	<b>765</b>
0.10	25	<b>2275</b>	<b>1075</b>	<b>1155</b>	<b>2165</b>	<b>1020</b>	<b>1010</b>	<b>2010</b>	<b>950</b>	<b>885</b>	<b>1815</b>	<b>855</b>	<b>760</b>
0.15	37	<b>2235</b>	<b>1055</b>	<b>1140</b>	<b>2130</b>	<b>1005</b>	<b>1000</b>	<b>1980</b>	<b>935</b>	<b>875</b>	1795	845	755
0.20	50	<b>2195</b>	<b>1035</b>	<b>1130</b>	<b>2100</b>	<b>990</b>	<b>985</b>	<b>1945</b>	<b>920</b>	<b>865</b>	1775	835	750
0.25	62	<b>2155</b>	<b>1020</b>	<b>1115</b>	<b>2055</b>	<b>970</b>	<b>970</b>	<b>1915</b>	<b>905</b>	<b>855</b>	1750	825	740
0.30	75	<b>2115</b>	<b>1000</b>	<b>1100</b>	<b>2010</b>	<b>950</b>	<b>950</b>	<b>1885</b>	<b>890</b>	<b>845</b>	1725	815	735
0.40	100	<b>2010</b>	<b>950</b>	<b>1055</b>	<b>1940</b>	<b>915</b>	<b>930</b>	<b>1830</b>	<b>865</b>	<b>830</b>	1665	785	720
0.50	125	<b>1930</b>	<b>910</b>	<b>1035</b>	<b>1860</b>	<b>880</b>	<b>905</b>	1745	825	805	1600	755	705
0.60	150	<b>1830</b>	<b>865</b>	<b>1005</b>	1770	835	880	1655	780	775	1530	720	685
0.70	175	1735	820	985	1655	780	845	1595	755	765	1480	700	675
0.80	200	1645	775	955	1545	730	815	1480	700	735	1375	650	650
0.90	225	1515	715	925	1435	675	785	1385	655	710	1290	610	630

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

**BLOWER DATA Cont.**

**G60UH-60C-110 with 1 hp PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.**

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
.00	0	2555	1205	1378	2300	1085	1027	1985	935	863	1655	780	678
.10	25	2490	1175	1354	2265	1070	1002	1980	935	839	1640	775	667
.20	50	2420	1140	1330	2225	1050	980	1975	930	832	1635	770	660
.30	75	2355	1110	1300	2175	1025	957	1945	915	810	1625	765	653
.40	100	2275	1075	1265	2115	1000	934	1915	905	785	1620	765	639
.50	125	2175	1025	1229	2040	960	903	1860	875	762	1595	750	623
.60	150	2085	985	1199	1965	925	873	1800	850	733	1565	740	608
.70	175	1990	940	1140	1870	880	843	1730	815	714	1525	720	590
.80	200	1890	890	1105	1770	835	807	1630	770	676	1455	685	567
.90	225	1760	830	1067	1655	780	777	1535	725	649	1370	645	541

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

**G60UH-60C-110 with 1 hp PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x25 mm) cleanable air filter in order to maintain proper air velocity.**

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
.00	0	<b>2385</b>	<b>1125</b>	<b>1296</b>	<b>2185</b>	<b>1030</b>	<b>981</b>	<b>1915</b>	<b>905</b>	<b>836</b>	1650	780	686
.10	25	<b>2330</b>	<b>1100</b>	<b>1274</b>	<b>2150</b>	<b>1015</b>	<b>961</b>	<b>1900</b>	<b>895</b>	<b>815</b>	1635	770	677
.20	50	<b>2255</b>	<b>1065</b>	<b>1234</b>	<b>2095</b>	<b>990</b>	<b>930</b>	<b>1885</b>	<b>890</b>	<b>794</b>	1625	765	664
.30	75	<b>2190</b>	<b>1035</b>	<b>1207</b>	<b>2035</b>	<b>960</b>	<b>902</b>	<b>1855</b>	<b>875</b>	<b>769</b>	1620	765	651
.40	100	<b>2115</b>	<b>1000</b>	<b>1179</b>	<b>1970</b>	<b>930</b>	<b>876</b>	<b>1820</b>	<b>860</b>	<b>751</b>	1605	755	639
.50	125	<b>2055</b>	<b>970</b>	<b>1156</b>	<b>1905</b>	<b>900</b>	<b>853</b>	1760	830	725	1575	745	622
.60	150	<b>1985</b>	<b>935</b>	<b>1141</b>	<b>1830</b>	<b>865</b>	<b>827</b>	1705	805	704	1525	720	602
.70	175	<b>1910</b>	<b>900</b>	<b>1119</b>	1745	825	797	1635	770	680	1475	695	582
.80	200	<b>1810</b>	<b>855</b>	<b>1088</b>	1650	780	772	1560	735	659	1430	675	571
.90	225	1715	810	1058	1570	740	751	1485	700	638	1355	640	549

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

**G60UH-60D-135 with 1 hp PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.**

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
.00	0	2715	1280	1407	2255	1065	1070	1910	900	850	1660	785	674
.10	25	2640	1245	1403	2250	1060	1030	1900	895	834	1645	775	668
.20	50	2540	1200	1355	2245	1060	1006	1890	890	821	1630	770	665
.30	75	2480	1170	1319	2200	1040	975	1890	890	781	1625	765	656
.40	100	2390	1125	1282	2155	1015	940	1885	890	775	1615	760	642
.50	125	2320	1095	1251	2085	985	904	1860	875	758	1605	755	631
.60	150	2205	1040	1210	2020	955	876	1815	855	731	1595	750	611
.70	175	2080	980	1161	1935	915	839	1760	830	707	1545	730	588
.80	200	2010	950	1122	1855	875	810	1690	795	679	1495	705	568
.90	225	1880	885	1071	1755	830	781	1585	745	646	1430	675	545

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

### BLOWER DATA Cont.

**G60UH-60D-135 with 1 hp PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x25 mm) cleanable air filter in order to maintain proper air velocity.**

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
.00	0	<b>2455</b>	<b>1160</b>	<b>1336</b>	<b>2170</b>	<b>1025</b>	<b>1019</b>	<b>1850</b>	<b>875</b>	<b>829</b>	1555	735	673
.10	25	<b>2380</b>	<b>1125</b>	<b>1299</b>	<b>2140</b>	<b>1010</b>	<b>974</b>	<b>1840</b>	<b>870</b>	<b>812</b>	1550	730	664
.20	50	<b>2305</b>	<b>1085</b>	<b>1266</b>	<b>2105</b>	<b>995</b>	<b>947</b>	<b>1830</b>	<b>865</b>	<b>791</b>	1545	730	656
.30	75	<b>2235</b>	<b>1055</b>	<b>1234</b>	<b>2045</b>	<b>965</b>	<b>914</b>	<b>1820</b>	<b>860</b>	<b>774</b>	1540	725	642
.40	100	<b>2160</b>	<b>1020</b>	<b>1240</b>	<b>1985</b>	<b>935</b>	<b>886</b>	<b>1800</b>	<b>850</b>	<b>755</b>	1540	725	628
.50	125	<b>2065</b>	<b>975</b>	<b>1170</b>	<b>1925</b>	<b>910</b>	<b>863</b>	1745	825	726	1535	725	614
.60	150	<b>1990</b>	<b>940</b>	<b>1146</b>	<b>1870</b>	<b>880</b>	<b>844</b>	1700	800	706	1505	710	599
.70	175	<b>1895</b>	<b>895</b>	<b>1111</b>	1775	835	808	1655	780	689	1465	690	573
.80	200	<b>1805</b>	<b>850</b>	<b>1074</b>	1680	790	779	1565	740	656	1425	670	562
.90	225	1695	800	1042	1590	750	752	1480	700	630	1335	630	533

NOTE - All air data is measured external to unit with 1 in. (25 mm) cleanable filter (not furnished - field provided) in place. Also see Filter Air Resistance table.

### HIGH ALTITUDE

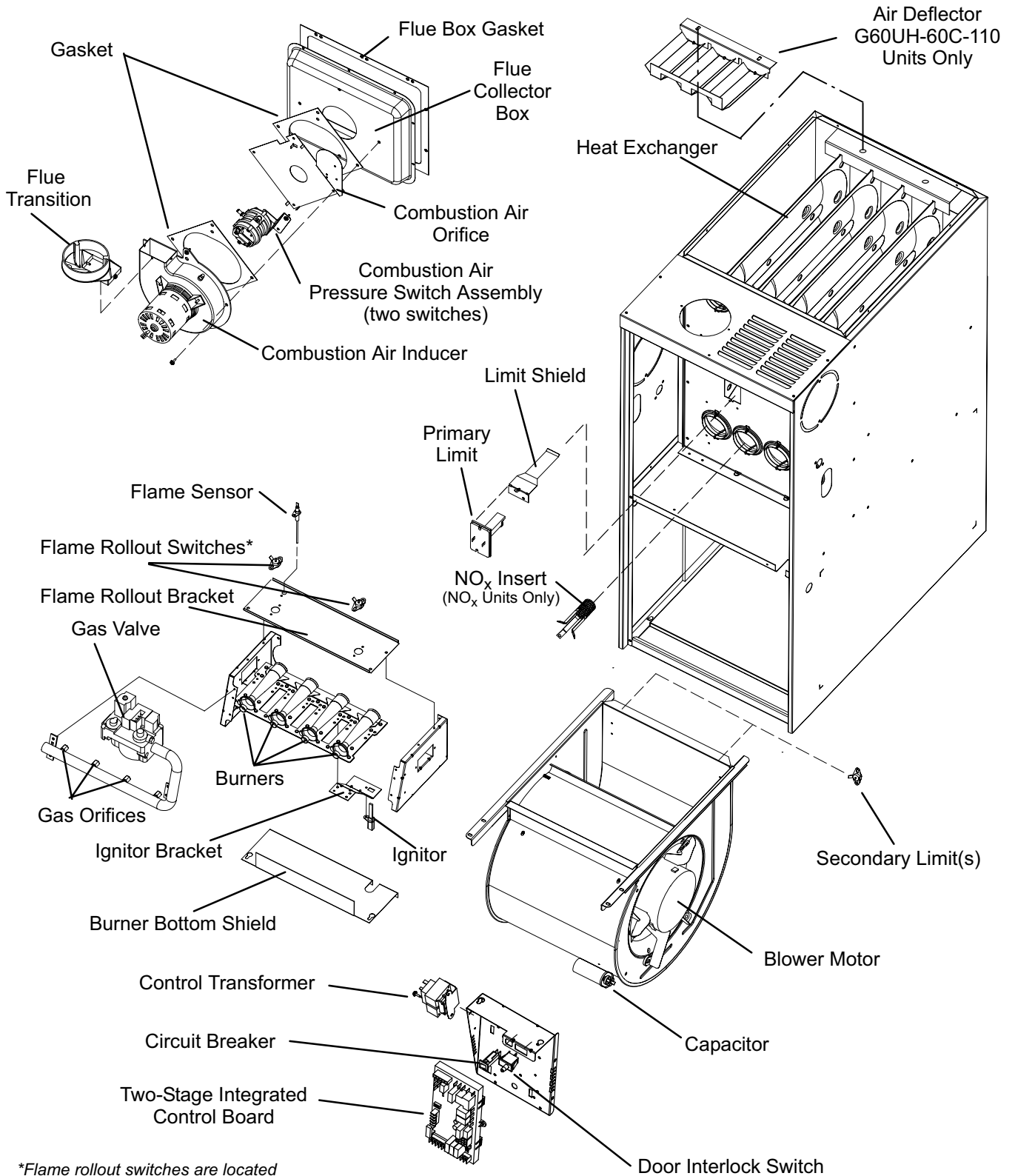
#### HIGH ALTITUDE / MANIFOLD PRESSURE INFORMATION

Model Input Size	Gas	Altitude						Manifold Pressure at all altitudes			
		0 - 4500 ft. (0 - 1372 m)		4,501 - 7500 ft. (1373 - 2286 m)		7501-10,000 ft. (2286 - 3048 m)		Low Fire		High Fire	
		Required Conversion Kit	Pressure Switch	Required Conversion Kit	<sup>1</sup> Pressure Switch	Required Conversion Kit	<sup>1</sup> Pressure Switch	in. w.g.	kPa	in. w.g.	kPa
045/070-1 to -6	Nat.	N/A	N/A	N/A	N/A	<b>59M16</b>	<b>18M64</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	N/A	<b>59M14</b>	<b>18M64</b>	4.9	1.22	10.0	2.5
045/070-7 and later	Nat.	N/A	N/A	N/A	N/A	<b>59M17</b>	<b>18M64</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	N/A	<b>59M14</b>	<b>18M64</b>	4.9	1.22	10.0	2.5
090-1 to -6	Nat.	N/A	N/A	N/A	<b>18M61</b>	<b>59M16</b>	<b>18M64</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	<b>18M61</b>	<b>59M14</b>	<b>18M64</b>	4.9	1.22	10.0	2.5
090-7 and later	Nat.	N/A	N/A	N/A	<b>18M61</b>	<b>59M17</b>	<b>18M64</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	<b>18M61</b>	<b>59M14</b>	<b>18M64</b>	4.9	1.22	10.0	2.5
110/135-1 to -6	Nat.	N/A	N/A	N/A	<b>18M63</b>	<b>59M16</b>	<b>18M61</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	<b>18M63</b>	<b>59M14</b>	<b>18M61</b>	4.9	1.22	10.0	2.5
110/135-7 and later	Nat.	N/A	N/A	N/A	<b>18M63</b>	<b>59M17</b>	<b>18M61</b>	1.7	0.42	3.5	0.87
	LPG	<b>59M13</b>	N/A	<b>59M13</b>	<b>18M63</b>	<b>59M14</b>	<b>18M61</b>	4.9	1.22	10.0	2.5

Pressure switch is factory set. No adjustment necessary. All models use the factory installed pressure switch from 0-4500 feet (0-1372 m).

1 - Conversion requires 2 pressure switches

# PARTS ARRANGEMENT



\*Flame rollout switches are located on brackets on the inner sides.

NOTE - G60UH-1, -2 and -3 unit models are equipped with a fully enclosed burner box. See figure 20.

FIGURE 1

## I-UNIT COMPONENTS

G60UH(X) unit components are shown in figure 1. The gas valve, combustion air inducer and burners can be accessed by removing the burner access panel. Electrical components are in the control box (figure 2) found in the blower section.

G60UH(X) units are factory equipped with a bottom return air panel in place. The panel is designed to be field removed as required for bottom air return. Markings are provided for side return air and may be cut out in the field.

### 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.

### 1. Control Transformer (T1)

A transformer located in the control box provides power to the low voltage section of the unit. Transformers on all models are rated 40VA with a 120V primary and a 24V secondary.

### 2. Door Interlock Switch (S51)

A door interlock switch rated 14A at 125VAC is wired in series with line voltage. When the blower door is removed the unit will shut down.

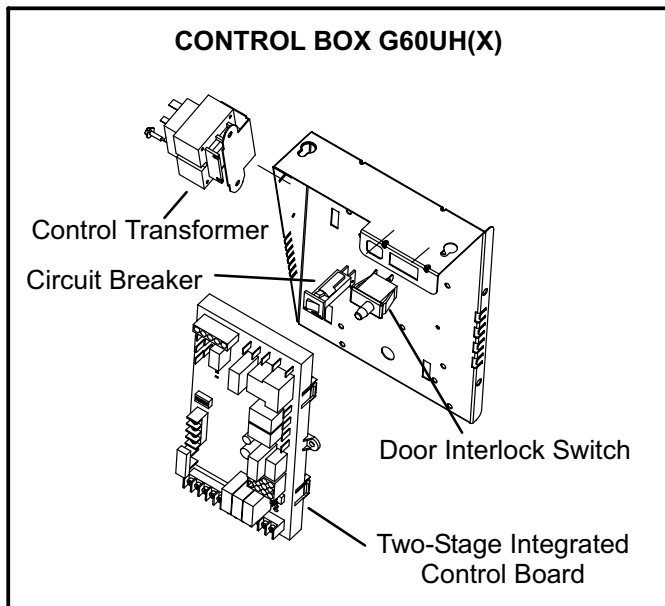


FIGURE 2

### 3. Circuit Breaker (CB8)

A 24V circuit breaker is also located in the control box. The switch provides overcurrent protection to the transformer (T1). The breaker is rated 3A at 32V. If the current exceeds this limit the breaker will trip and all unit operation will shutdown. The breaker can be manually reset by pressing the button on the face. See figure 3.

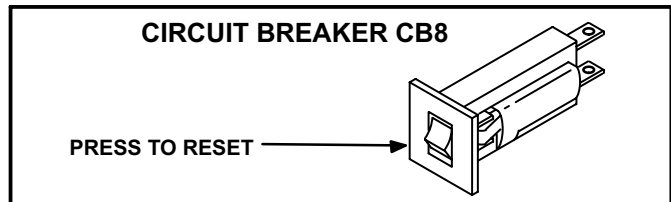


FIGURE 3

#### ⚠ WARNING

Shock hazard.

Disconnect power before servicing. Integrated Control Board is not field repairable. If control is inoperable, simply replace entire control.

Can cause injury or death. Unsafe operation will result if repair is attempted.

### 4. Integrated Control Board(A92) SureLihgt® Board 18M34

All G60UH units are equipped with the Lennox Two-Stage Integrated control board. The system consists of a ignition control board (figure 4 with control terminal designations in tables 3, 4 and 5). and ignitor (figure 8). The board and ignitor work in combination to ensure furnace ignition and ignitor durability. The board controls all major furnace operations. The board features two LED lights, DS1 and DS2 for troubleshooting. The board also has two accessory terminals rated at (1) one amp. See table 6 for troubleshooting diagnostic codes.

#### Electronic Ignition

At the beginning of the heat cycle, SureLight control monitors the first stage and second stage combustion air inducer prove switch. The control will not begin the heating cycle if the first stage prove switch is closed (by-passed). Likewise the control will not begin the second stage heating cycle if the second stage prove switch is closed, and will allow first stage heat only. However if the second stage prove switch closes during the first stage pre-purge, the control will respond to second stage heat. Once the first stage prove switch is determined to be open, the combustion air inducer is energized on low (first stage) heat speed. When the differential in the prove switch is great enough, the prove switch closes and a 15-second pre-purge begins. If the switch is not proven within 2-1/2 minutes, the control goes into Watchguard-Pressure Switch mode for a 5-minute re-set period.

After the 15-second pre-purge period, the SureLight ignitor warms up for 20 seconds after which the gas valve opens for a 4-second trial for ignition. The ignitor energizes during the trial until flame is sensed. If ignition is not proved during the 4-second period, the control will try four more times with an inter purge and warm-up time between trials of 35

seconds. After a total of five trials for ignition (including the initial trial), the control goes into Watchguard-Flame Failure mode. After a 60-minute reset period, the control will begin the ignition sequence again.

The SureLight control board has an added feature that prolongs the life of the ignitor. After a successful ignition, the SureLight control utilizes less power to energize the ignitor on successive calls for heat. The control continues to ramp down the voltage to the ignitor until it finds the lowest amount of power that will provide a successful ignition. This amount of power is used for 255 cycles. On the 256th call for heat, the control will again ramp down until the lowest power is determined and the cycle begins again.

### Two Stage Operation / Thermostat Selection Jumper

The control can be utilized in two modes: SINGLE-STAGE thermostat or TWO-STAGE thermostat. The thermostat selection jumper E20, located just below dip switches 1 through 4 (figure 4), must be positioned for the particular application. The jumper is factory set on "TWO" for use with a two-stage thermostat with two stage heat. Re-position jumper to "SINGLE" for use with a single stage thermostat with two stage heat.

While in the single-stage thermostat mode (*single* jumper setting), the burners will always fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. After a 10 minute recognition period, the unit will switch to second stage heat. While in the two-stage thermostat mode (*two* jumper setting) the burners will fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. The unit will switch to second-stage heat on call from the indoor thermostat. If there is a simultaneous call for first and second stage heat, the unit will fire on first stage heat and switch to second stage heat after 30 seconds of operation. See Sequence of Operation flow charts in the back of this manual for more detail.

### Dip Switch Settings

**Dip Switches 1 and 2 - Heating Fan off Delay** - The fan on time of 45 seconds is not adjustable. Fan off time (time that the blower operates after the heat demand has been satisfied) can be adjusted by flipping the dip switches 1 and 2 located on the SureLight integrated control. The unit is shipped with a factory fan off setting of 90 seconds. Fan off time will affect comfort and is adjustable to satisfy individual applications. For customized comfort, monitor the supply air temperature once the heat demand is satisfied. Note the supply air temperature at the instant the blower is de-energized. Adjust the fan-off delay to achieve a supply air temperature between 90° - 110° at the instant the blower is de-energized. (Longer delay times allow for lower air temperature, shorter delay times allow for higher air temperature). See table 1 for dip switch settings.

**TABLE 1**  
**Heating Fan Off Delay**

Delay (Seconds)	Switch 1	Switch 2
60	Off	Off
90	Off	On
120	On	Off
180	On	On

**Switch 3 - Second Stage Delay (Used with Single-Stage Thermostat Only)** -- This switch is used to determine the second stage on delay when a single-stage thermostat is being used. The switch is factory-set in the ON position, which provides a 10-minute delay before second-stage heat is initiated. If the switch is toggled to the OFF position, it will provide a 15-minute delay before second-stage heat is initiated. This switch is only activated when the thermostat selector jumper is positioned for SINGLE-stage thermostat use.

**Switch 4 - Cooling Fan off Delay** - The fan on delay time of 2 seconds is not adjustable. Fan off time (time that the blower operates after the cool demand has been satisfied) can be adjusted by flipping dip switch 4. The unit is shipped with a factory fan off setting of 45 seconds. Fan off time will affect comfort and is adjustable to satisfy individual applications. See table 2 for cool fan off time settings.

**TABLE 2**  
**Cooling Fan Off Delay**

Delay (Seconds)	Switch 4
2	Off
45	On

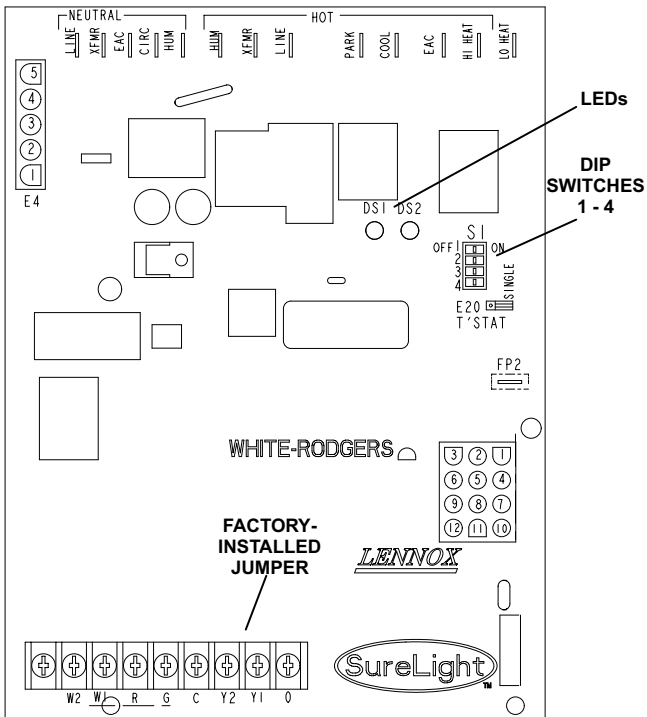
### Diagnostic LED's (DS1 and DS2)

Two diagnostic LED'S are located on the two-stage integrated control board. See figure 4. These light flashes correspond with the codes detailed in table 6.

### Factory Installed Jumper Y1 to Y2

A factory-installed jumper from Y1 to Y2 terminals on the integrated control board terminal strip must be clipped for two-stage cooling.

### CONTROL BOARD 18M34



#### THERMOSTAT CONNECTIONS (TB1)

- W2= HEAT DEMAND FROM 2ND STAGE T' STAT
- W1= HEAT DEMAND FROM 1ST STAGE T' STAT (WHITE)
- R= CLASS 2 VOLTAGE TO THERMOSTAT
- G= MANUAL FAN FROM T' STAT (GREEN)
- C= THERMOSTAT SIGNAL GROUND CONNECTED TO TRANSFORMER GROUND (TR) & CHASIS GROUND (GRD)
- Y1= THERMOSTAT 1st STAGE COOL SIGNAL
- Y2= THERMOSTAT 2nd STAGE COOL SIGNAL
- O= THERMOSTAT SIGNAL TO HEAT PUMP REVERSING VALVE

DIP SWITCH(ES)	FUNCTION
1 and 2	Blower Off Delay (Heating Mode)
3	Second Stage ON Delay (Single-stage t'stat)
4	Blower Off Delay (Cooling Mode)

FIGURE 4

TABLE 3

Integrated Control Board Terminals	
120VAC Neutral	
LINE	Line
XFMR	Transformer
EAC	Electronic Air Cleaner
CIRC	Indoor Blower
HUM	Humidifier
120VAC Line	
HUM	Humidifier
XMFR	Transformer
LINE	Line
PARK	For Unused Leads
COOL	Cooling Speed
EAC	Electronic Air Cleaner
HI HEAT	Hlgh Heat Speed
LO HEAT	Low Heat, Low Cool and Continuous Fan Speed

TABLE 4

Integrated Control Board 5 Pin Terminal	
PIN #	Function
1	Ignitor
2	Combustion Air Inducer High Speed
3	Combustion Air Inducer Low Speed
4	Combustion Air Inducer Neutral
5	Ignitor Neutral

TABLE 5

Integrated Control Board 12Pin Terminal	
PIN #	Function
1	Gas Valve 2nd Stage (High Fire)
2	Second Stage Prove Switch
3	Not Used
4	Ground
5	24V Hot
6	Primary Limit In
7	Gas Valve 1st stage (Low Fire)
8	Gas Valve Common
9	24V Neutral
10	Ground
11	Primary Limit Out
12	1st Stage Prove Switch

**TABLE 6**

**DIAGNOSTIC CODES**

Diagnostic LEDs are labeled DS1 and DS2. See figure 4 for location of diagnostic LEDs.

<b>DS1</b>	<b>DS2</b>	<b>DESCRIPTION</b>
SIMULTANEOUS SLOW FLASH	SIMULTANEOUS SLOW FLASH	Power on - Normal operation. Also signaled during cooling and continuous fan.
SIMULTANEOUS FAST FLASH	SIMULTANEOUS FAST FLASH	Normal operation - signaled when heating demand initiated at thermostat.
SLOW FLASH	ON	Primary, secondary or rollout limit switch open. Limits must close within 3 minutes or unit goes into 1 hour Watchguard.
OFF	SLOW FLASH	Low pressure switch open; OR: Blocked inlet/exhaust vent; OR: Low pressure switch closed prior to activation of combustion air inducer.
OFF	FAST FLASH	High pressure switch open; OR: Blocked inlet/exhaust vent; OR: High pressure switch closed prior to activation of combustion air inducer.
ALTERNATING SLOW FLASH	ALTERNATING SLOW FLASH	Watchguard -- burners failed to ignite; OR limit open more than 3 minutes; OR lost flame sense 5 times in one heating cycle; OR pressure switch opened 5 times in one heating cycle.
SLOW FLASH	OFF	Flame sensed without gas valve energized.
ON ON OFF	ON OFF ON	Circuit board failure or control wired incorrectly. Check 24 and 115 volts to board.
FAST FLASH	SLOW FLASH	Main power polarity reversed. Switch line and neutral.
SLOW FLASH	FAST FLASH	Low flame signal. Measures below 0.23 microAmps. Replace flame sense rod.
ALTERNATING FAST FLASH	ALTERNATING FAST FLASH	The following conditions are sensed during the ignitor warm-up period only: 1) Improper main ground; 2) Broken ignitor; OR: Open ignitor circuit; 3) Line voltage below 75 volts. (If voltage lower than 75 volts prior to ignitor warm-up, control will signal waiting on call from thermostat, and will not respond.

*NOTE - Slow flash rate equals 1 Hz (one flash per second). Fast flash rate equals 3 Hz (three flashes per second). Low flame sense current = 0.17-0.22 microAmps.*

## **⚠ WARNING**

**Shock hazard.**

**Disconnect power before servicing. Integrated Control Board is not field repairable. If control is inoperable, simply replace entire control.**

**Can cause injury or death. Unsafe operation will result if repair is attempted.**

### **5. Integrated Control Board(A92) SureLight Board 100869**

G6OUH units are equipped with the Lennox two-stage integrated SureLight control board. The system consists of a ignition / blower control board (figures 5 and 6) with control pin designations in tables 8 and 9 and an ignitor (figure 9). The board and ignitor work in combination to ensure furnace ignition and ignitor durability. The SureLight integrated board controls all major furnace operations. The board features a red LED light, for furnace status and troubleshooting. The LED flashes in “X” + “Y” codes. For example using table 10 under “PRESSURE SWITCH CODES”, if the red LED flashes 2 times, then off for 2 seconds then flashes 3 times, the low pressure switch is failed open. The board also has two 120 volt accessory terminals rated at (1) one amp each and one 24 volt accessory terminal rated at 0.5.

#### **Electronic Ignition**

At the beginning of the heat cycle the SureLight control monitors the first stage and second stage combustion air inducer prove switch. The control will not begin the heating cycle if the first stage prove switch is closed (by-passed). Likewise the control will not begin the second stage heating cycle if the second stage prove switch is closed, and will remain in first stage heat. However, if the second stage prove switch closes during the first stage heat pre-purge, the control will allow second stage heat. Once the first stage prove switch is determined to be open, the combustion air inducer is energized on low (first stage) heat speed. When the differential in the prove switch is great enough, the prove switch closes and a 15-second pre-purge begins. If the switch is not proven within 2-1/2 minutes, the control goes into Watchguard-Pressure Switch mode for a 5-minute reset period.

After the 15-second pre-purge period, the SureLight ignitor warms up for 20 seconds after which the gas valve opens for a 4-second trial for ignition. The ignitor energizes during the trial until flame is sensed. If ignition is not proved during the 4-second period, the control will try four more times with an inter purge and warm-up time between trials of 35 seconds. After a total of five trials for ignition (including the initial trial), the control goes into Watchguard-Flame Failure mode. After a 60-minute reset period, the control will begin the ignition sequence again.

*NOTE - Board 100869 DOES NOT ramp down voltage to the ignitor. A regulated 95 volts is provided to the igniter at ignition.*

#### **Two Stage Operation / Thermostat Selection Jumper**

The control can be utilized in two modes: SINGLE-STAGE thermostat or TWO-STAGE thermostat. The thermostat selection is made using a dip switch (figure 4) and must be positioned for the particular application. The dip switch is factory set on “TWO” for use with a two-stage thermostat with two stage heat. Re-position dip switch to “SINGLE” for use with a single stage thermostat with two stage heat. While in the single-stage thermostat mode (*single* dip switch setting), the burners will always fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. After a 10 minute recognition period, the unit will switch to second stage heat. While in the two-stage thermostat mode (*two* dip switch setting) the burners will fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. The unit will switch to second-stage heat on call from the indoor thermostat. If there is a simultaneous call for first and second stage heat, the unit will fire an first stage heat and switch to second stage heat after 30 seconds of operation. See Sequence of Operation flow charts in the back of this manual for more detail.

## DIP Switch Settings

**Switch 1 -- Thermostat Selection** -- This unit may be used with either a single-stage or two-stage thermostat. The thermostat selection is made using a DIP switch which must be properly positioned for the particular application. The DIP switch is factory-positioned for use with a two-stage thermostat. If a single-stage thermostat is to be used, the DIP switch must be repositioned.

- a - Select "OFF" for two-stage heating operation controlled by a two-stage heating thermostat (factory setting);
- b - Select "ON" for two-stage heating operation controlled by a single-stage heating thermostat. This setting provides a timed delay before second-stage heat is initiated.

**Switch 2 -- Second Stage Delay (Used with Single-Stage Thermostat Only)** -- This switch is used to determine the second stage on delay when a single-stage thermostat is being used. The switch is factory-set in the OFF position, which provides a 10-minute delay before second-stage heat is initiated. If the switch is toggled to the ON position, it will provide a 15-minute delay before second-stage heat is initiated. This switch is only activated when the thermostat selector jumper is positioned for SINGLE-stage thermostat use.

**Switches 3 and 4 -- Heating Blower-Off Delay** -- The heating blower-on delay of 45 seconds is not adjustable. The heating blower-off delay (time that the blower operates after the heating demand has been satisfied) can be adjusted by moving switches 3 and 4 on the integrated control board. The unit is shipped from the factory with a heating blower-off delay of 90 seconds. The heating blower off delay affects comfort and is adjustable to satisfy individual applications. Adjust the blower off delay to achieve a sup-

ply air temperature between 90° and 110°F at the exact moment that the blower is de-energized. Longer off delay settings provide lower supply air temperatures; shorter settings provide higher supply air temperatures. Table 7 provides the blower off timings that will result from different switch settings.

**TABLE 7  
Heating Blower-Off Delay Switch Settings**

Blower Off Delay (Seconds)	Switch 3	Switch 4
60	Off	On
90	Off	Off
120	On	Off
180	On	On

**Switch 5 -- Cooling Blower-Off Delay** -- The cooling blower-off delay (time that the blower operates after the cooling demand has been satisfied) can be adjusted by moving switch 5 on the integrated control board. The switch is factory-set in the OFF position, which provides a cooling blower-off delay of 45 seconds. If the switch is toggled to the ON position, it will provide a 2-second cooling blower-off delay

### On-Board Jumper W951

On-board jumper W951, which connects terminals R and O on the integrated control board, must be cut when the furnace is installed in applications which include a heat pump unit and a thermostat which features dual fuel use. If the jumper is left intact, terminal "O" will remain energized eliminating the HEAT MODE in the heat pump.

### On-Board Jumper W915

On-board jumper W915, which connects terminals Y1 and Y2 on the integrated control board, must be cut if two-stage cooling will be used. If the jumper is not cut the outdoor unit will operate in first-stage cooling only.

### CONTROL BOARD 100869

#### 1/4" QUICK CONNECT TERMINALS

HUM = 120 VAC OUTPUT TO HUMIDIFIER  
 EAC = 120 VAC OUTPUT TO ELECTRONIC AIR CLEANER  
 XMFR = 120 VAC OUTPUT TO TRANSFORMER  
 LI = 120 VAC INPUT TO CONTROL  
 SENSE = 120 VAC OUTPUT TO FLAME SENSER

NEUTRALS= 120 VAC NEUTRAL

PARK = DEAD TERMINAL FOR UNUSED BLOWER LEAD  
 HEAT LOW = 120 VAC OUTPUT TO CIRC BLWR -- LOW HT SPEED  
 HEAT HIGH/ COOL LOW = 120 VAC OUTPUT TO CIRC BLWR -- HIGH HEAT AND LOW COOL SPEED  
 COOL HIGH = 120 VAC OUTPUT TO CIRC BLWR -- HIGH COOL SPEED

#### THERMOSTAT CONNECTIONS (TB1)

W1= HEAT DEMAND FROM 1ST STAGE T'STAT  
 W2= HEAT DEMAND FROM 2ND STAGE T'STAT  
 G= MANUAL FAN FROM T'STAT  
 Y2= THERMOSTAT 2nd STAGE COOL SIGNAL  
 Y1= THERMOSTAT 1st STAGE COOL SIGNAL  
 C= THERMOSTAT SIGNAL GROUND CONNECTED TO TRANSFORMER GROUND (TR) & CHASSIS GROUND (GRD)  
 R= CLASS 2 VOLTAGE TO THERMOSTAT  
 1= ERROR CODE RECALL  
 H= 24V HUMIDIFIER OUTPUT  
 L= LENNOX SYSTEM OPERATION MONITOR  
 O= THERMOSTAT SIGNAL TO HEAT PUMP REVERSING VALVE

#### DIP SWITCH FUNCTIONS

DIP SWITCH(ES)	FUNCTION
1 -- 2 Stage T'stat	Selects t/stat type (single or two-stage)
2 -- 2nd Stage Delay	Second stage ON delay (single-stage t'stat)
3 & 4 -- Heat Off Delay	Heating fan OFF delay
5 -- Cool Off Delay	Cooling fan OFF delay

FIGURE 5

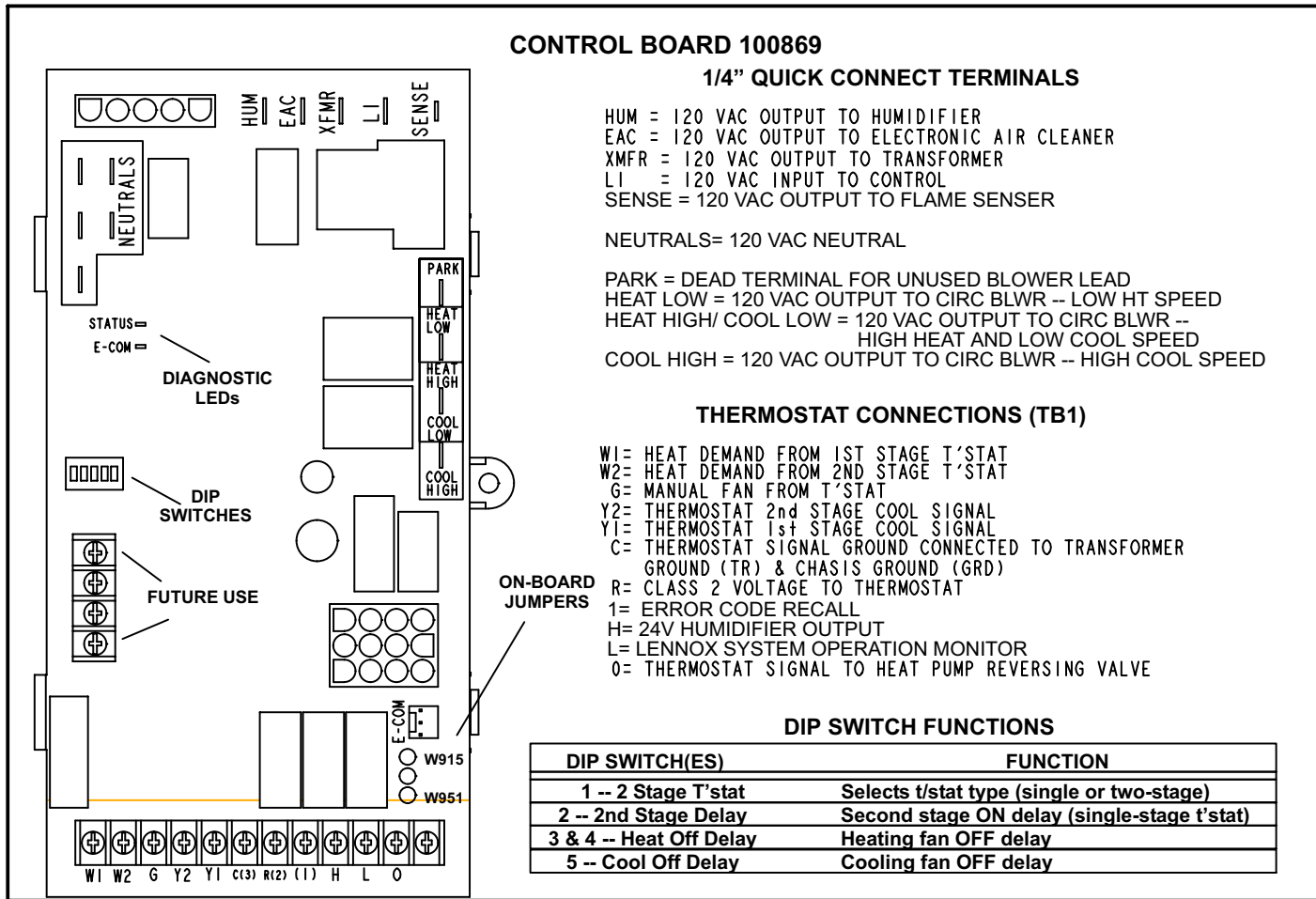


TABLE 8

PIN #	Function
1	Ignitor
2	Combustion Air Inducer High Speed
3	Combustion Air Inducer Low Speed
4	Combustion Air Inducer Neutral
5	Ignitor Neutral

TABLE 9

PIN #	Function
1	Gas Valve High Fire
2	Second Stage Prove Switch
3	Rollout In
4	Ground
5	24V Hot
6	Primary Limit In
7	Gas Valve Low Stage
8	Gas Valve Common
9	24V Neutral
10	Ground
11	Rollout Switch Out
12	1st Stage Prove Switch

# CONTROL BOARD 100869

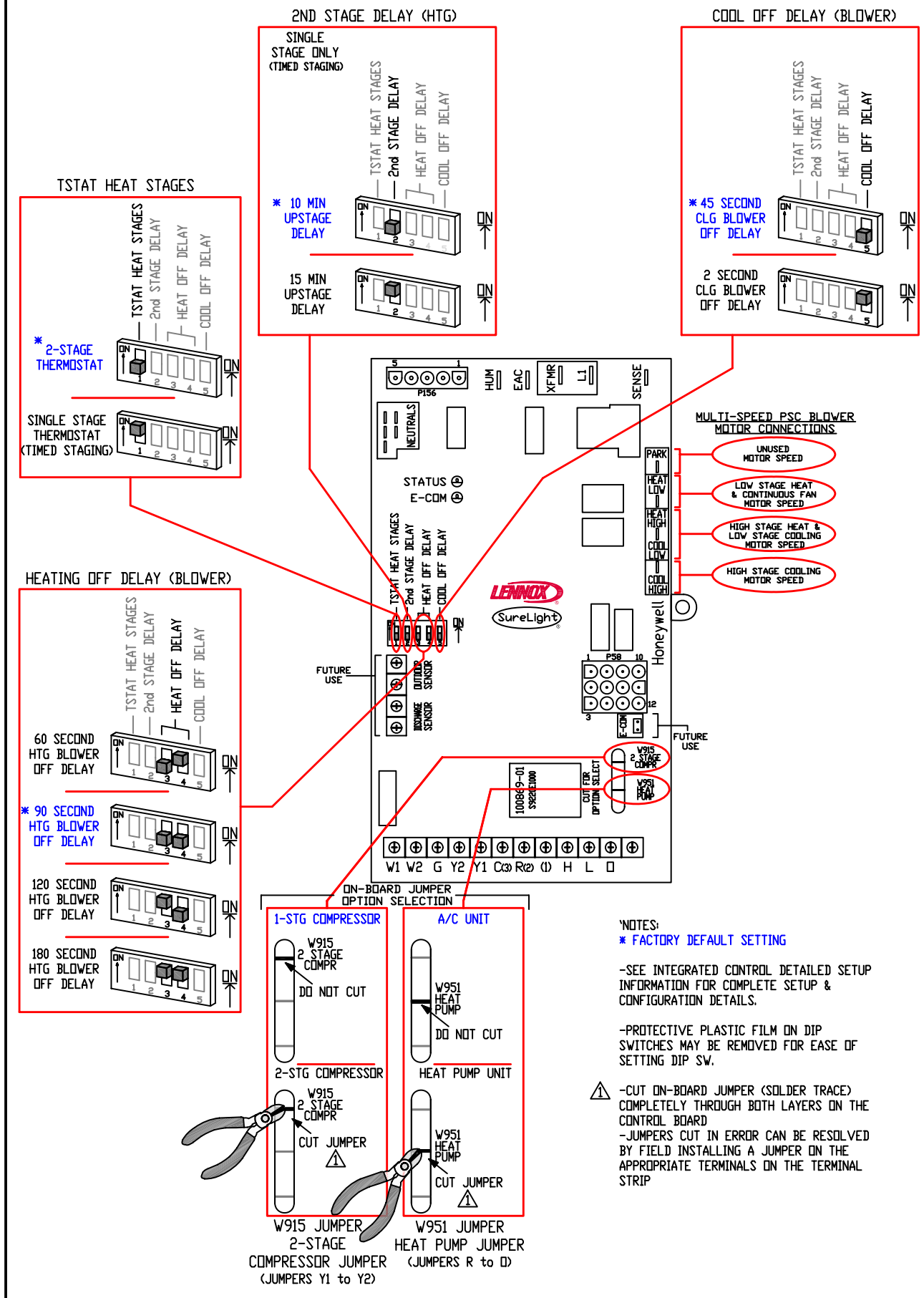


FIGURE 6

**TABLE 10**

<b>FLASH CODE (X + Y)</b>	<b>STATUS / ERROR DESCRIPTION</b>
<b>FLASH CODE DESCRIPTIONS</b>	
Pulse	A 1/4 second flash followed by four seconds of off time.
Heartbeat	Constant 1/2 second bright and 1/2 second dim cycles.
X + Y	LED flashes X times at 2Hz, remains off for two seconds, flashes Y times at 2Hz, remains off for four seconds, then repeats.
Pulse	Power on - Standby.
Heartbeat	Normal operation - signaled when heating demand initiated at thermostat.
<b>FLAME CODES</b>	
1 + 2	Low flame current -- run mode.
1 + 3	Flame sensed out of sequence -- flame still present.
<b>PRESSURE SWITCH CODES</b>	
2 + 3	Low pressure switch failed open.
2 + 4	Low pressure switch failed closed.
2 + 5	High pressure switch failed open.
2 + 6	High pressure switch failed closed.
2 + 7	Low pressure switch opened during ignition trial or heating demand.
<b>LIMIT CODE</b>	
3 + 1	Limit switch open.
<b>WATCHGUARD CODES</b>	
4 + 1	Watchguard -- Exceeded maximum number of retries.
4 + 2	Watchguard -- Exceeded maximum number of retries or last retry was due to pressure switch opening.
4 + 3	Watchguard -- Exceeded maximum number of retries or last retry was due to flame failure.
4 + 5	Watchguard -- Limit remained open longer than three minutes.
4 + 6	Watchguard -- Flame sensed out of sequence; flame signal gone.
4 + 7	Ignitor circuit fault -- Failed ignitor or triggering circuitry.
4 + 8	Low line voltage.
<b>HARD LOCKOUT CODES</b>	
5 + 1	Hard lockout -- Rollout circuit open or previously opened.
5 + 2	Control failed self check, internal error (control will restart if error recovers).
5 + 3	No Earth ground (control will restart if error recovers).
5 + 4	Reversed line voltage polarity (control will restart if the error recovers).
5 + 6	Low secondary (24VAC) voltage.

**Error Code Storage**

The ignition control stores the last ten error codes in memory. The codes are retained in case of power loss.

**Error Code Review**

- 1 - Short R (2) to (1). Within 1/2 second, the STATUS LED will stay lit continuously to indicate that the short was sensed.
- 2 - Continue to hold the short between R (2) to (1). After 5 seconds, STATUS LED will go from being continuously lit to off. This indicates that error code review is pending.
- 3 - Remove R (2) to (1) short within ten seconds of STATUS LED turning off. This activates error code review.
- 4 - Last ten error codes will be flashed on the STATUS LED.

- 5 - After final error code is indicated, STATUS LED will flash to indicate normal operation.

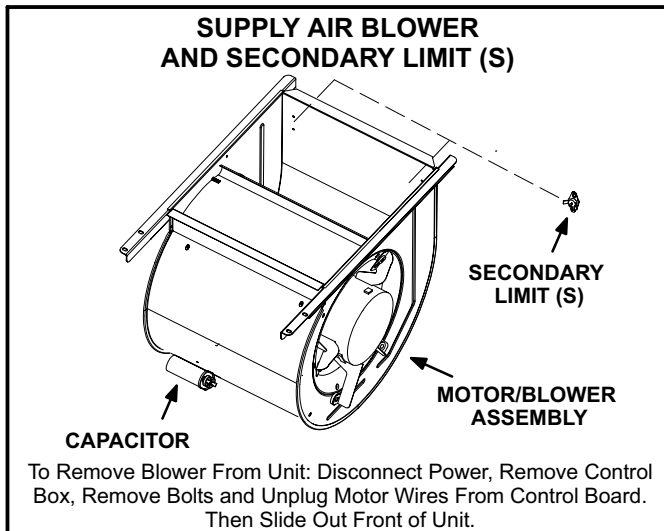
**Clearing Error Codes**

- 1 - Short R (2) to (1). Within 1/2 second, the STATUS LED will stay lit continuously to indicate that the short was sensed.
- 2 - Continue to hold the short between R (2) to (1). After 5 seconds, STATUS LED will go from being continuously lit to off.
- 3 - Continue to hold the short between R (2) to (1) beyond ten seconds after STATUS LED has turned off. STATUS LED will turn on, indicating that error codes have been cleared.
- 4 - Remove R (2) to (1) short. STATUS LED will flash to indicate normal operation.

## 6. Blower Motors and Capacitors

All G60UH(X) units use direct drive blower motors. All motors are 120V permanent split capacitor motors to ensure maximum efficiency. Ratings for capacitors will be on motor nameplate. See SPECIFICATIONS section for motor specifications.

*NOTE - Shafts on 1 HP motors have 2 flat sides and are matched with blower wheels with 2 set screws.*



**FIGURE 7**

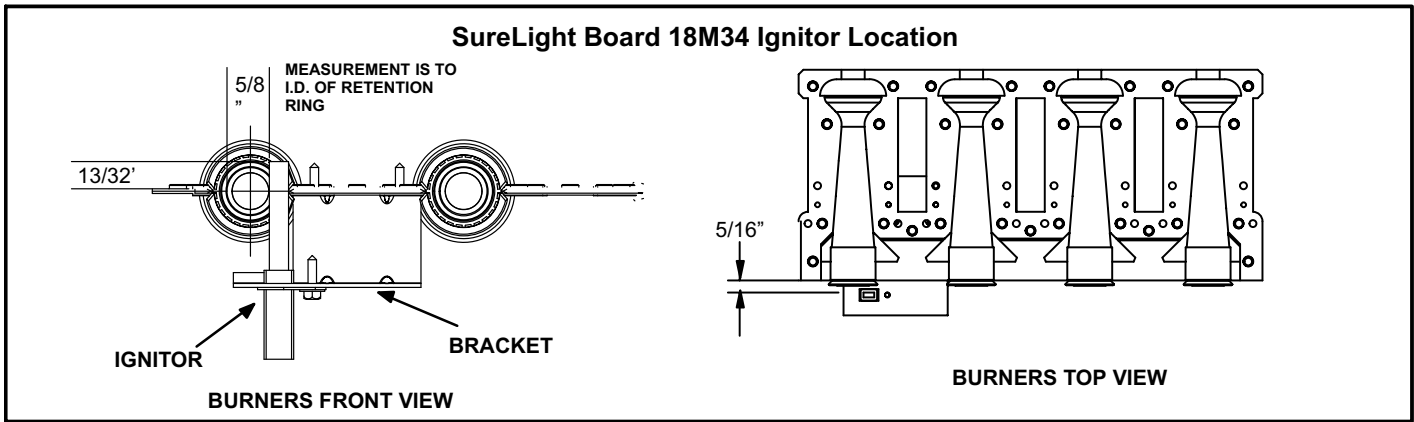
## 7. Ignitor

The SureLight ignitor is made of durable silicon nitride. Ignitor longevity is enhanced by controlling voltage to the ignitor. Board 18M34 finds the lowest ignitor temperature which will successfully light the burner, thus increasing the life of the ignitor. Due to this feature of the board, voltage cannot be measured so ignitor must be ohmed. Board 100869 provides a regulated 95 volts to the ignitor for consistent ignition and long ignitor life. Ohm value for ignitors with SureLight board 18M34 should be 10.9 to 19.7. Ohm value for ignitors with board 100869 should be 25 to 47. See figure 8 and 9 (make note of control board used) for ignitor location.

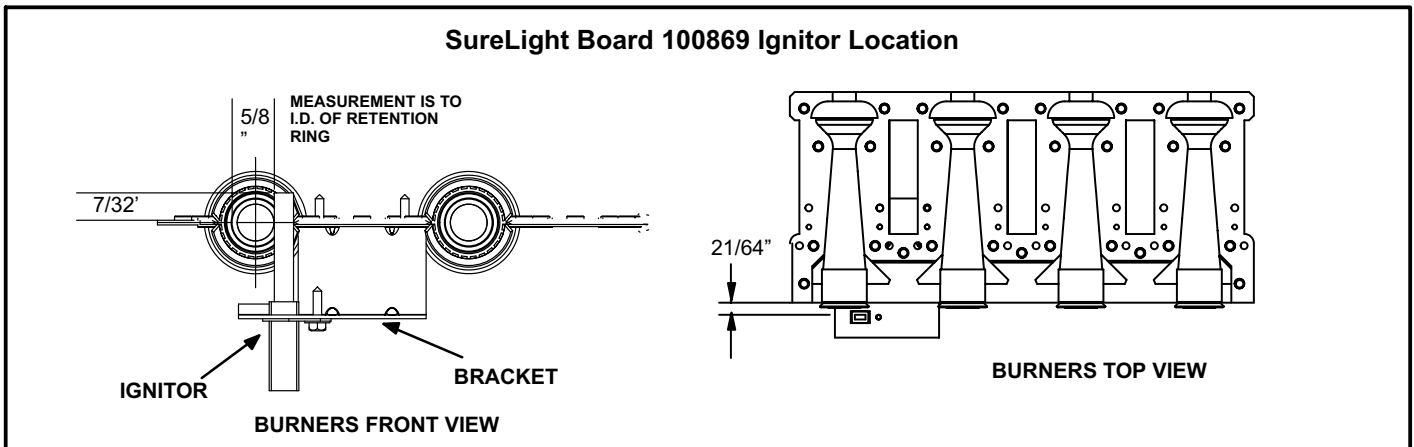
*NOTE - The G60UH(X) furnace contains electronic components that are polarity sensitive. Make sure that the furnace is wired correctly and is properly grounded.*

## 8. Flame Sensor

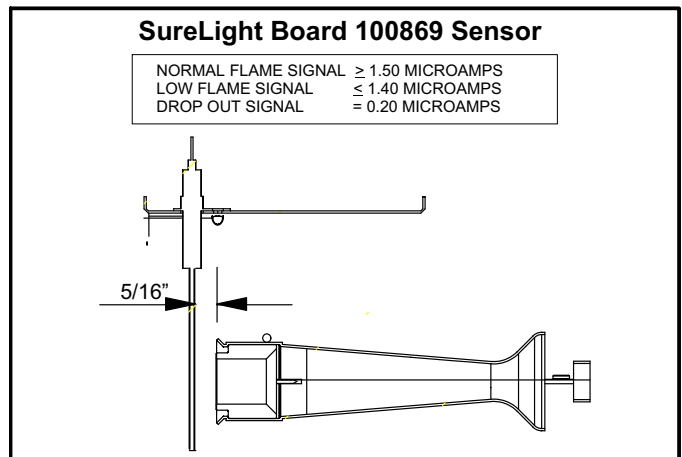
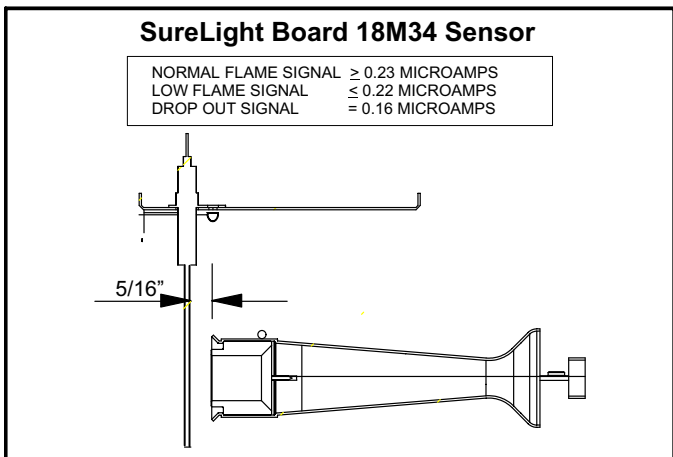
A flame sensor is located on the left side of the burner support. See figure 10 and 11 (make note of control board used). The sensor is mounted on the flame rollout plate and the tip protrudes into the flame envelope of the left-most burner. The sensor can be removed for service without removing any part of the burners. During operation, flame is sensed by current passed through the flame and sensing electrode. The SureLight control allows the gas valve to remain open as long as flame signal is sensed.



**FIGURE 8**



**FIGURE 9**



## 9. Combustion Air Inducer (B6)

All G60UH(X) units use a two-stage combustion air inducer to move air through the burners and heat exchanger during heating operation. The blower uses a 120VAC motor. The motor operates during all heating operation and is controlled by furnace / blower control A92. The inducer also operates for 15 seconds before burner ignition (pre-purge) and for 5 seconds after the gas valve closes (post-purge). The inducer operates on low speed during first-stage heat, then switches to high speed for second stage heat.

A proving switch connected to the combustion air inducer orifice plate is used to prove inducer operation. The combustion air inducer orifice will be different for each model. See table 11 for orifice sizes. The switch monitors air pressure in the inducer housing. During normal operation, the pressure in the housing is negative. If pressure becomes less negative (signifying an obstruction) the proving switch opens. When the proving switch opens, the furnace control (A92) immediately closes the gas valve to prevent burner operation.

TABLE 11

G60UH(X) Unit	C.A.I. Orifice Size
-045-1, -2	1.25"
-070-1, -2, -3	1.5"
-070-4 and later	1.438"
-090 all units	1.75"
-110-1, -2, -3	2.0"
-110-4 and later	1.875"
-135-1, -2, -3	2.25"
-135-4 and later	2.156"

### Horizontal Applications

The G60UH(X) furnace can be installed in horizontal applications.

The combustion air inducer may be rotated clockwise or counterclockwise by 90° to allow for vertical vent discharge in a horizontal application. Remove the four mounting screws, rotate the assembly (assembly consists of orifice plate, proving switch, gasket and combustion air inducer), then reinstall the mounting screws. See figure 12. Use the provided wire tie to bundle the pressure switch wires with the inducer motor power leads. **Route the wires away from moving parts and the heat of the inducer motor to prevent damage to the wires.** Use sheet metal shears to remove the cut out from the side of the cabinet. See figure 13. Use the two provided sheet metal screws to install the cut out on the top cap to cover the original flue outlet opening.

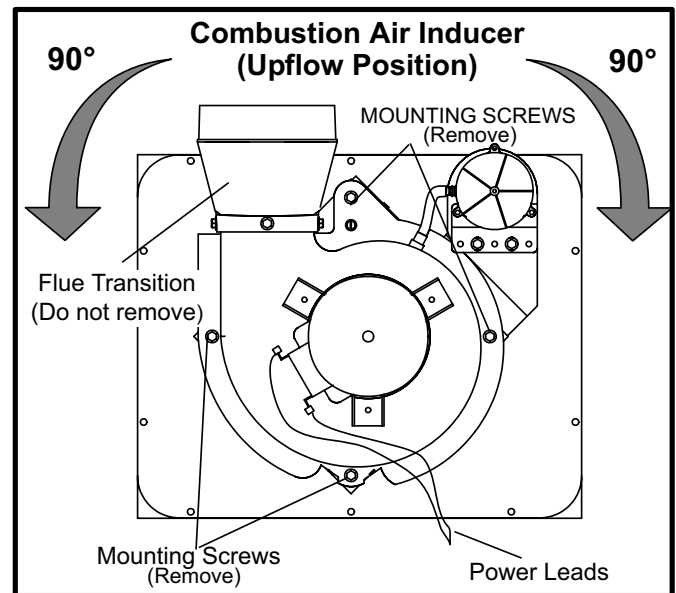


FIGURE 12

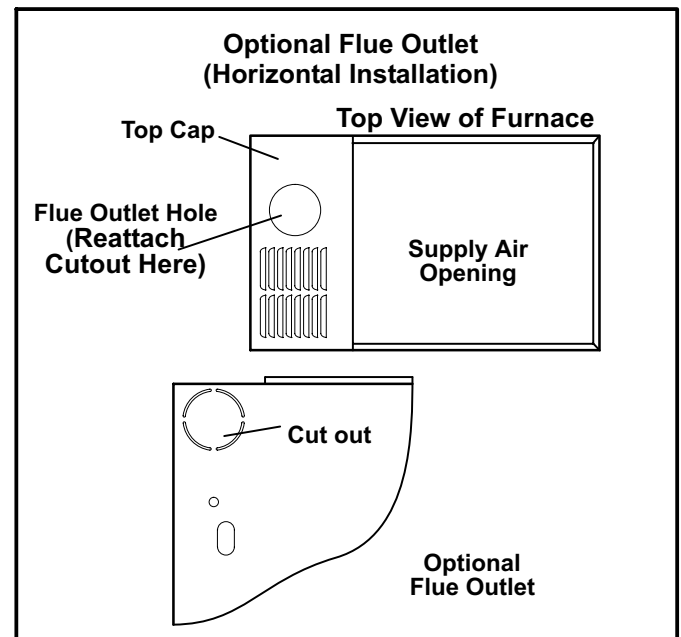


FIGURE 13

## 10. Flame Rollout Switches (S47)

On all G60UH -1, -2 and -3 units, flame rollout switch is a high temperature limit located on top of the burner box. Each furnace is equipped with two identical switches. One switch is located over the leftmost burner and the other switch is located over the rightmost burner. On G60UH-4 and later model units, the switches are located on a bracket inside the burner box. The limits are N.C. SPST manual-reset limits. When S47 senses rollout, the circuit breaks and the ignition control immediately stops ignition and closes the gas valve.

If unit is running and flame rollout is detected, the gas valve will close and ignition control will be disabled. Rollout can be caused by a blocked heat exchanger, flue or lack of combustion air. The switch is factory set to trip (open) at 210°F and cannot be adjusted. The switch can be manually reset. To manually reset a tripped switch, push the reset button located on the control.

## 11. Primary Limit Control (S10)

The primary limit (S10) on G60UH(X) units is located in the heating vestibule panel. When excess heat is sensed in the heat exchanger, the limit will open. If the limit is open, the furnace control energizes the supply air blower and closes the gas valve. The limit automatically resets when unit temperature returns to normal. The switch must reset within three minutes or the SureLight board will go into Watch guard for one hour. If the limit opens during a second stage heat call, the blower will operate on high heat for 30 seconds and then switch to low heat speed for the remainder of the 3 minute period. The switch is factory set (see face of switch) and cannot be adjusted. Replace switch with exact length and set point.

## 12. Secondary Limit Controls (S21)

The secondary limit (S21) on G60UH(X) units is located in the blower compartment on the back side of the blower housing. See figure 7. Blower speed chart on the wiring diagram show secondary limit quantities per unit. When excess heat is sensed in the blower compartment, the limit will open. If the limit is open, the furnace control energizes the supply air blower and closes the gas valve. The limit automatically resets when unit temperature returns to normal. G60UH-1 through -4 units use surface type limits factory set to open at 125°F. G60UH-5 units and later use air stream type limits factory set to open at 135°. The secondary limit cannot be adjusted.

## 13. Gas Valve

The G60UH(X) uses a two-stage gas valve manufactured by Honeywell (figure 15). The valve is internally redundant to assure safety shut-off. If the gas valve must be replaced, the same type valve must be used.

24VAC terminals and gas control knob or switch are located on the valve. All terminals on the gas valve are connected to wires from the electronic ignition control. 24V applied to the terminals energizes the valve.

Inlet and outlet pressure taps are located on the valve. A regulator adjustment screw is located on the valve.

LPG change over kits are available from Lennox. Kits include burner orifices and a gas valve regulator conversion kit.

## 14. Combustion Air Inducer Prove Switch (S18)

G60UH(X) series units are equipped with a dual combustion air proving switch (first and second stage) located on the combustion air inducer orifice bracket. The switch is connected to the combustion air inducer housing by means of a flexible silicone hose. It monitors negative air pressure in the combustion air inducer housing.

The switches are a single-pole single-throw proving switch electrically connected to the furnace control. The purpose of the switch is to prevent burner operation if the combustion air inducer is not operating or if the flue becomes obstructed.

On heat demand (first or second stage) the switch senses that the combustion air inducer is operating. It closes a circuit to the furnace control when pressure inside the combustion air inducer decreases to a certain set point.

Set points vary depending on unit size. See tables 12, 13 and 14. The pressure sensed by the switch is negative relative to atmospheric pressure. If the flue becomes obstructed during operation, the switch senses a loss of negative pressure (pressure becomes more equal with atmospheric pressure) and opens the circuit to the furnace control and gas valve. A bleed port on the switch allows relatively dry air in the vestibule to purge switch tubing, to prevent condensate build up.

The switch is factory set and is not field adjustable. It is a safety shut-down control in the furnace and must not be bypassed for any reason. If switch is closed or by-passed, the control will not initiate ignition at start up.

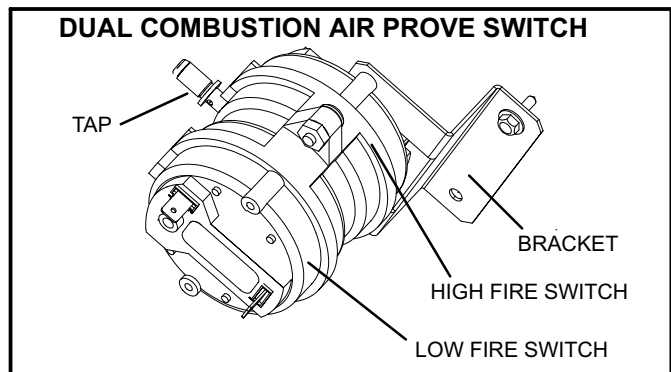


FIGURE 14

TABLE 12  
0' to 4500'

G60UH(X) Unit	Set Point High Heat	Set Point Low Heat
-045	0.40"	0.20"
-070	0.40"	0.20"
-090	0.45"	0.20"
-110	0.50"	0.20"
-135	0.50"	0.20"

TABLE 13\*  
4501' to 7500'

G60UH(X) Unit	Set Point High Heat	Set Point Low Heat
-045	0.40"	0.20"
-070	0.40"	0.20"
-090	0.40"	0.20"
-110	0.45"	0.20"
-135	0.45"	0.20"

\*Unit requires conversion kit at this altitude. See High Altitude table.

**TABLE 14\***  
**7501' to 10,000'**

G60UH(X) Unit	Set Point High Heat	Set Point Low Heat
-045	0.35"	0.20"
-070	0.35"	0.20"
-090	0.35"	0.20"
-110	0.40"	0.20"
-135	0.40"	0.20"

\*Unit requires conversion kit at this altitude. See High Altitude table.

## II-PLACEMENT AND INSTALLATION

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

## III-START-UP

### A-Preliminary and Seasonal Checks

- 1 - Inspect electrical wiring, both field and factory installed for loose connections. Tighten as required.
- 2 - Check voltage at disconnect switch. Voltage must be within range listed on the nameplate. If not, consult the power company and have voltage condition corrected before starting unit.

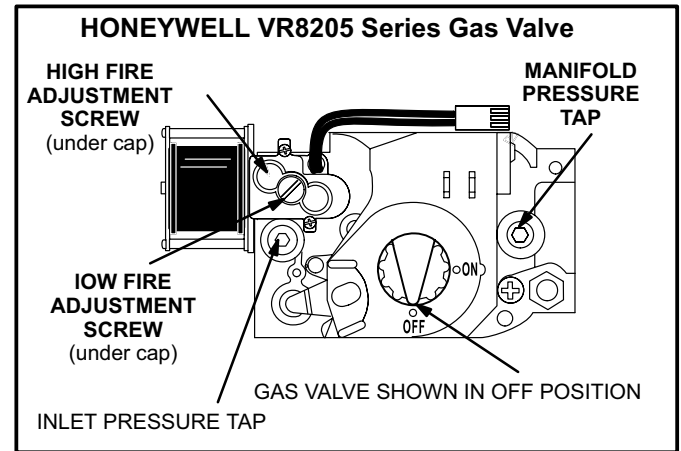
### B-Heating Start-Up

## ⚠ WARNING

**Shock and burn hazard.**

**G60UH(X) units are equipped with a hot surface ignition system. Do not attempt to light manually.**

- 1 - **STOP!** Read the safety information at the beginning of this section.
- 2 - Set the thermostat to the lowest setting.
- 3 - Turn off all electrical power to the unit.
- 4 - This furnace is equipped with an ignition device which automatically lights the burners. Do **not** try to light the burners by hand.
- 5 - Remove the upper access panel.
- 6 - *Honeywell VR8205 Gas Valve* - Turn knob on gas valve clockwise ➡ to **OFF**. Do not force. See figure 15.
- 7 - Wait five 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 next step.



**FIGURE 15**

8 - *Honeywell VR8205 Gas Valve* - Turn knob on gas valve counterclockwise ↶ to **ON**. Do not force. See figure 15.

- 9 - Replace the upper access panel.
- 10 - Turn on all electrical power to the unit.
- 11 - Set the thermostat to desired setting.

*NOTE - When unit is initially started, steps 1 through 11 may need to be repeated to purge air from gas line.*

### Turning Off Gas To Unit

- 1 - Set thermostat to lowest setting.
- 2 - Turn off all electrical power to unit if service is to be performed.
- 3 - Remove access panel.
- 4 - Turn knob on Honeywell valve clockwise ➡ to **OFF**. Do not force.
- 5 - Replace access panel.

## C-Safety or Emergency Shutdown

Turn off unit power. Close manual and main gas valves.

## D-Extended Period Shutdown

Turn off thermostat or set to "UNOCCUPIED" mode. Close all gas valves (both internal and external to unit) to guarantee no gas leak into combustion chamber. Turn off power to unit. All access panels and covers must be in place and secured.

## IV-HEATING SYSTEM SERVICE CHECKS

### A-C.S.A. Certification

All units are C.S.A. (formally A.G.A. and C.G.A. combined) design certified without modifications. Refer to the G60UH(X) Installation Instruction.

### B-Gas Piping

#### ⚠ CAUTION

If a flexible gas connector is required or allowed by the authority that has jurisdiction, black iron pipe shall be installed at the gas valve and extend outside the furnace cabinet.

#### ⚠ WARNING

Do not exceed 600 in-lbs (50 ft-lbs) torque when attaching the gas piping to the gas valve.

Gas supply piping should not allow more than 0.5" W.C. drop in pressure between gas meter and unit. Supply gas pipe must not be smaller than unit gas connection.

Compounds used on gas piping threaded joints should be resistant to action of liquefied petroleum gases.

### C-Testing Gas Piping

#### ⚠ IMPORTANT

In case emergency shutdown is required, turn off the main shut-off valve and disconnect the main power to 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 0.5psig (14" W.C.). See figure 16.

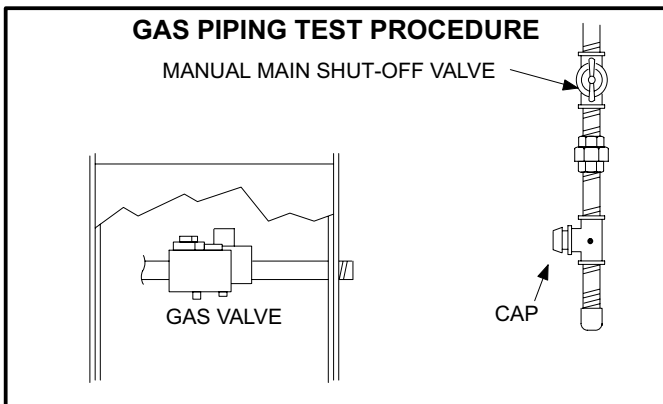


FIGURE 16

When checking piping connections for gas leaks, use preferred means. Kitchen detergents can cause harmful corrosion on various metals used in gas piping. Use of a 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.

### D-Testing Gas Supply Pressure

When testing supply gas pressure, connect test gauge to inlet pressure tap on the unit gas valve (GV1). See figure 15. Check gas line pressure with unit firing at maximum rate. Low pressure may result in erratic operation or underfire. High pressure can result in permanent damage to gas valve or overfire. See table 15 for operating pressure at unit gas connection (line).

On multiple unit installations, each unit should be checked separately, with and without units operating. Supply pressure must fall within range listed in table 15.

### E-Check Manifold Pressure

After line pressure has been checked and adjusted, check manifold pressure. Move pressure gauge to outlet pressure tap located on unit gas valve (GV1). Checks of manifold pressure are made as verification of proper regulator adjustment. Manifold pressure for the G60UH(X) can be measured at any time the gas valve is open and is supplying gas to the unit. See table 15 for normal operating manifold pressure. See HIGH ALTITUDE table (table of contents) for high altitude manifold pressures.

TABLE 15

All G60UHV Units	Natural	LP
Line Pressure WC"	4.5 - 10.5	11.0 - 13.0
Manifold Pressure High Heat WC"	3.5	10.0
Manifold Pressure Low Heat WC"	1.7	4.9

#### ⚠ IMPORTANT

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

The gas valve is factory set and should not require adjustment. All gas valves are factory regulated.

**Manifold Adjustment Procedure:**

- 1 - Connect a test gauge to manifold pressure tap on gas valve. See figure 15 for tap location. Start unit and allow 5 minutes for unit to reach steady state.
- 2 - While waiting for the unit to stabilize, notice the flame. Flame should be stable and should not lift from burner. Natural gas should burn blue. L.P. gas should burn mostly blue with some orange streaks.
- 3 - After allowing unit to stabilize for 5 minutes, record manifold pressure.

*NOTE-Shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to replace pressure tap plug.*

**F- Proper Gas Flow (Approximate)**

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for **two** revolutions of gas through the meter. (Two revolutions assures a more accurate time.) **Divide by two** and compare to time in table 16 below. If manifold pressure matches table 15 and rate is incorrect, check gas orifices for proper size and restriction.

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

**TABLE 16**

<b>GAS METER CLOCKING CHART</b>				
<b>G60UH Unit</b>	<b>Seconds for One Revolution</b>			
	<b>Natural</b>		<b>LP</b>	
	<b>1 cu ft Dial</b>	<b>2 cu ft Dial</b>	<b>1 cu ft Dial</b>	<b>2 cu ft DIAL</b>
-45	82	164	205	410
-70	55	110	136	272
-90	41	82	102	204
-110	33	66	82	164
-135	27	54	68	136
Natural-1000 btu/cu ft		LP-2500 btu/cu ft		

**⚠ IMPORTANT**

**For safety, shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to replace pressure tap plug.**

**G- Proper Combustion**

Furnace should operate minimum 15 minutes with correct manifold pressure and gas flow rate before checking combustion. See sections E- and F-. Take combustion sample beyond the flue outlet and compare to the tables below. The maximum carbon monoxide reading should not exceed 100 ppm.

**TABLE 17  
High Heat**

<b>Unit</b>	<b>CO<sub>2</sub>% For Nat</b>	<b>CO<sub>2</sub>% For L.P.</b>
G60UH-24A-045(X)	6.5 - 7.5	7.3 - 8.3
G60UH-24A-070	6.8 - 7.8	8.3 - 9.3
G60UH-36A-070(X)	7.2 - 8.2	8.0 - 9.0
G60UH-48B-070	7.2 - 8.2	8.0 - 9.0
G60UH-36B-090	7.5 - 8.5	8.5 - 9.5
G60UH-48B-090(X)	8.0 - 9.0	8.7 - 9.7
G60UH-36C-110	7.5 - 8.5	8.7 - 9.7
G60UH-48C-110	7.5 - 8.5	8.7 - 9.7
G60UH-60C-110(X)	7.3 - 8.3	8.5 - 9.5
G60UH-60D-135	7.5 - 8.5	8.5 - 9.5

**TABLE 18  
Low Heat**

<b>Unit</b>	<b>CO<sub>2</sub>% For Nat</b>	<b>CO<sub>2</sub>% For L.P.</b>
G60UH-24A-045(X)	4.0 - 5.0	4.0 - 5.0
G60UH-24A-070	4.2 - 5.2	5.0 - 6.0
G60UH-36A-070(X)	4.2 - 5.2	5.0 - 6.0
G60UH-48B-070	4.2 - 5.2	5.0 - 6.0
G60UH-36B-090	4.7 - 5.7	5.0 - 6.0
G60UH-48B-090(X)	4.8 - 5.8	5.2 - 6.2
G60UH-36C-110	4.5 - 5.5	5.3 - 6.3
G60UH-48C-110	4.7 - 5.7	5.3 - 6.3
G60UH-60C-110(X)	4.5 - 5.5	5.5 - 6.5
G60UH-60D-135	4.7 - 5.7	5.5 - 6.5

## H-Flame Signal

A microamp DC meter is needed to check the flame signal on the ignition control.

Flame (microamp) signal is an electrical current which passes from the furnace control through the sensor during unit operation. Current passes from the sensor through the flame to ground to complete a safety circuit.

### To Measure Flame Signal - Ignition Control:

A transducer (Part #78H5401 available from Lennox Repair Parts) is required to measure flame signal if meter used will not read a low micro amp signal. See figure 17. The transducer converts microamps to volts on a 1:1 conversion. See figures 10 and 11 for flame signal. A digital readout meter must be used. The transducer plugs into most meters. See figure 18 for proper use of transducer.

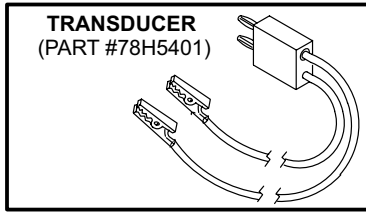


FIGURE 17

- 1 - Set the volt meter to the DC voltage scale. Insert transducer into the VDC and common inputs. Observe correct polarities. Failure to do so results in negative (-) values.
- 2 - Turn off supply voltage to control.
- 3 - Disconnect ignition control flame sensor wire from the flame sensor.
- 4 - Connect (-) lead of the transducer to flame sensor.
- 5 - Connect (+) lead of transducer to the ignition control sensor wire.
- 6 - Turn supply voltage on and close thermostat contacts to cycle system.
- 7 - When main burners are in operation for two minutes, take reading. Remember 1 DC volt = 1 DC microamp.

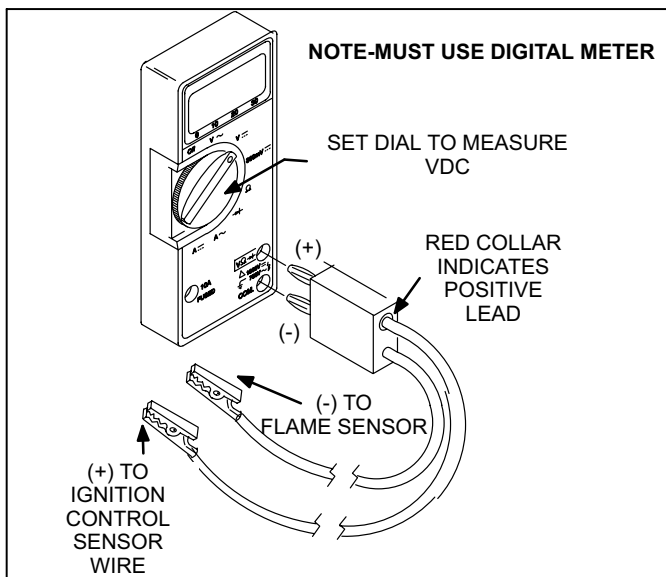


FIGURE 18

## V-TYPICAL OPERATING CHARACTERISTICS

### A-Blower Operation and Adjustment

- 1 - Blower operation is dependent on thermostat control system.
- 2 - Generally, blower operation is set at thermostat sub-base fan switch. With fan switch in ON position, blower operates continuously. With fan switch in AUTO position, blower cycles with demand or runs continuously while heating or cooling circuit cycles.
- 3 - Depending on the type of indoor thermostat, blower and entire unit will be off when the system switch is in OFF position.

### B-Temperature Rise

Temperature rise for G60UH(X) units depends on unit input, blower speed, blower horsepower and static pressure as marked on the unit rating plate. The blower speed must be set for unit operation within the range of "TEMP. RISE °F" listed on the unit rating plate.

### To Measure Temperature Rise:

- 1 - Place plenum thermometers in the supply and return air plenums. Locate supply air thermometer in the first horizontal run of the plenum where it will not pick up radiant heat from the heat exchanger.
- 2 - Set thermostat to highest setting.
- 3 - After plenum thermometers have reached their highest and steadiest readings, subtract the two readings. The difference should be in the range listed on the unit rating plate. If the temperature is too low, decrease blower speed. If temperature is too high, first check the firing rate. Provided the firing rate is acceptable, increase blower speed to reduce temperature. To change blower speed taps see the Blower Speed Taps section in this manual.

### C-External Static Pressure

- 1 - Tap locations shown in figure 19.
- 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 perma-gum. 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. For systems with non-ducted returns, leave the other end of the manometer open to the atmosphere.
- 3 - With only the blower motor 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 - External static pressure drop must not be more than 0.5" W.C.
- 5 - Seal around the hole when the check is complete.

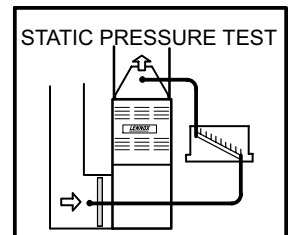


FIGURE 19

## D-Blower Speed Taps

Blower speed tap changes are made on the SureLight control board. See figure 4. The unused tap must be secured on dummy terminals "PARK" on the SureLight board. The high heating tap is connected to the "HI HEAT" terminal and the low heating / continuous blower tap is connected to the "LO HEAT" terminal. The cooling tap is connected to the "COOL" tap.

To change existing heat tap, turn off power then switch out speed tap on "HI HEAT" or "LO HEAT" with tap connected to "PARK". See wiring diagram for blower motor tap colors for each speed.

## VI-MAINTENANCE

### **WARNING**

**Disconnect power before servicing unit.**

### **CAUTION**

**Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.**

At the beginning of each heating season, a qualified technician should check the system as follows:

### A-Blower

Check the blower wheel for debris and clean if necessary. The blower motors are prelubricated for extended bearing life. No further lubrication is needed.

### **WARNING**

**The blower access panel must be securely in place when the blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.**

### B-Filters

All G60UH(X) filters are installed external to the unit. Filters should be inspected monthly. Clean or replace the filters when necessary to ensure that the furnace operates properly. Replacement filters must be rated for high velocity airflow.

## C-Flue And Chimney

Check the flue pipe, chimney and all connections for tightness and to make sure there is no blockage.

## D-Electrical

- 1 - Check all wiring for loose connections.
- 2 - Check for the correct voltage at the furnace (furnace operating).
- 3 - Check amp-draw on the blower motor.  
Motor Nameplate \_\_\_\_\_ Actual \_\_\_\_\_

## E-Heat Exchanger and Burners

*NOTE - Use papers or protective covering in front of the furnace during cleaning.*

Cleaning the heat exchanger requires a steel spring "snake," a reversible drill and a vacuum cleaner. The steel spring snake may be constructed by purchasing a 4 ft. long by 1/4 inch diameter steel wire cable and a 1/4 inch diameter wire brush. These items are available at a hardware store. Insert wire end of brush into the open end of the spring cable. Crimp the cable around the brush so that the brush is secured and will not come off during cleaning. Attach the other end of the cable to the reversible drill to complete the tool for cleaning the heat exchanger.

- 1 - Turn off both electrical and gas power supplies to furnace.
- 2 - Remove flue pipe and top cap from the unit. Label the pressure switch wires, then disconnect them.
- 3 - Remove the four screws that secure the combustion air inducer. Carefully remove the combustion air inducer to avoid damaging blower gasket. If gasket is damaged, it must be replaced to prevent leakage.
- 4 - Remove the collector box located behind the combustion air inducer. Be careful with the collector box gasket. If the gasket is damaged, it must be replaced to prevent leakage.
- 5 - Label the wires from gas valve and rollout switches, then disconnect them.
- 6 - Remove the four screws securing the burner box cover and remove the cover.

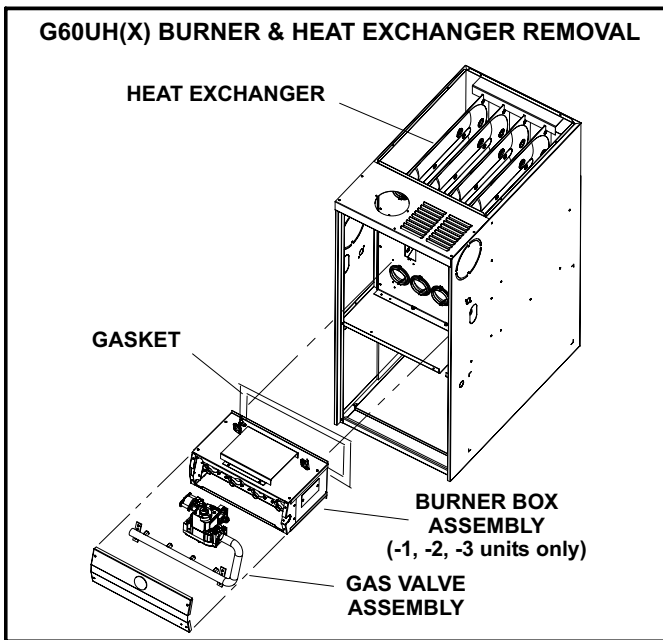


FIGURE 20

- 7 - Disconnect gas supply piping. Remove six screws securing the burner box / manifold assembly to the vestibule panel and remove the assembly from the unit. Take care not to damage the gasket.
- 8 - **NOx units only** - Remove the three screws that attach the NOx insert to the corbel at the entrance to each heat exchanger section. Carefully remove the NOx insert from each section. See figure 21.
- 9 - Insert the brush end of cable snake into the top of one of the heat exchanger openings. **Do not force the cable into the heat exchanger.** Insert the cable and operate the drill on slow speed. Move the cable in and out of the heat exchanger section three or four times or until sufficient cleaning is accomplished. Reverse drill and slowly work the cable out of opening.
- 10- Repeat procedure for each heat exchanger section.
- 11- After each of the top heat exchanger sections has been cleaned, insert the brush end of the cable snake into the bottom openings of each of the heat exchanger sections and clean as described in step 8.
- 12- Remove the cable from the heat exchanger. Use a vacuum cleaner to remove debris knocked loose during cleaning.
 

**NOTE - Safety glasses and surgical mask should be worn when using vacuum cleaner.**
- 13- Attach the exhaust end (positive pressure) of the vacuum cleaner to the top of the heat exchanger section. Any loose debris will be forced to the bottom of the heat exchanger section. Vacuum debris from bottom openings.
- 14- Replace collector box and combustion air inducer. Check gaskets for damage. Damaged gaskets must be replaced to avoid heat exchanger leaks. Replace all screws to the collector box and combustion air inducer. Failure to replace all screws may cause leaks.

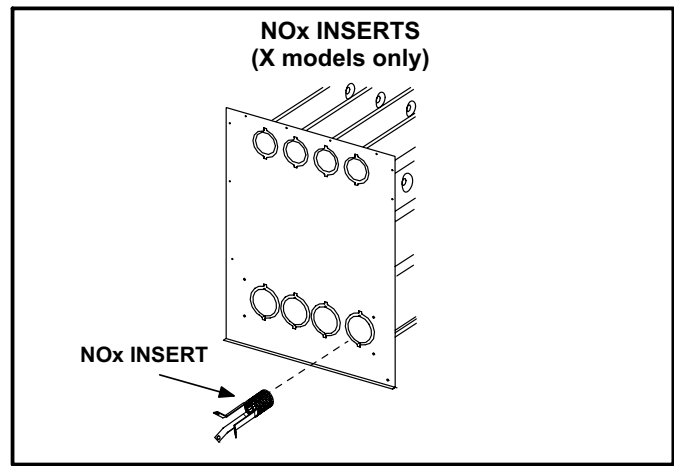


FIGURE 21

- 15- To clean the burner, run a vacuum cleaner with a soft brush attachment over the face of burners. Visually inspect inside the burners and crossovers for any blockage caused by foreign matter. Remove any blockage.
- 16- **NOx units only** - Reattach the NOx inserts to the corbels at the entrance to each heat exchanger opening. See figure 21.
- 17- Re-install gasket and burner box / manifold assembly onto the vestibule panel. Replace burner box cover and re-secure using screws.
 

**NOTE - Gasket must be replaced if it was damaged during disassembly.**
- 18- Reconnect wires to pressure switch, roll-out switches, gas valve and combustion air inducer. Refer to unit wiring diagram.
- 19- Re-install top cap and re-secure vent pipe to combustion air inducer outlet.
- 20- Reconnect gas supply piping.
- 21- Turn on power and gas supply to unit.
- 22- Set thermostat and check for proper operation.
- 23- Check all piping connections, factory and field, for gas leaks. Use a leak detecting solution or other preferred means.

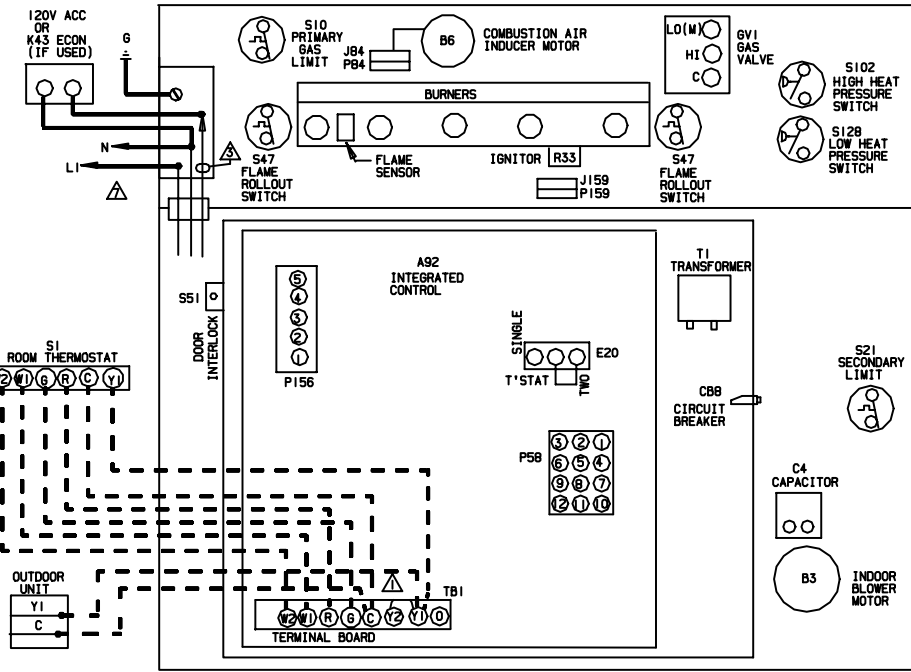
**⚠ CAUTION**

**Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed. Do not use matches, candles, flame or other sources of ignition to check for gas leaks.**

- 24- If a leak is detected, shut gas and electricity off and repair leak.
- 25- Repeat steps 23 and 24 until no leaks are detected.
- 26- Replace front access panel.

# VII- Wiring and Sequence of Operation

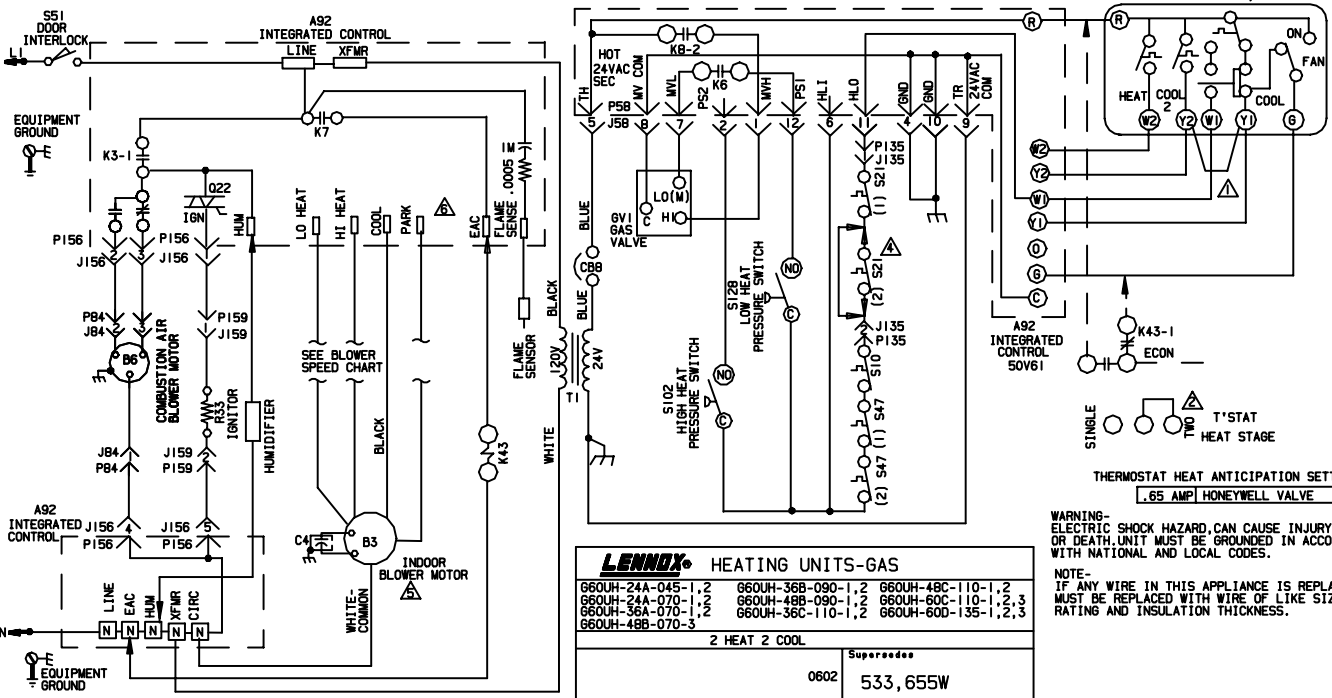
## G60UH-1, -2, -3



BLOWER SPEED CHART						
UNIT	FACTORY CONNECTED SPEED TAPS				MOTOR SPEEDS AVAIL.	SECONDARY LIMITS USED $\Delta$
	COOL	HI HEAT	LO HEAT	PARK		
24A-045	YELLOW	RED	-	-	3	N/A
24A-070	YELLOW	RED	-	-	3	2
36A-070	YELLOW	RED	BROWN	-	4	2
36B-090	BROWN	YELLOW	RED	-	4	1 (RIGHT)
48B-070	YELLOW	RED	BROWN	-	4	2
48B-090	YELLOW	RED	BROWN	-	4	2
36C-110	BROWN	YELLOW	RED	-	4	1 (RIGHT)
48C-110	BROWN	YELLOW	RED	-	4	1 (RIGHT)
60C-110	YELLOW	RED	BROWN	-	4	1 (RIGHT)
60D-135	YELLOW	RED	BROWN	-	4	2
HI BLOWER SPEED SELECTION $\rightarrow$ LO						
SPEED TAPS		BLACK	YELLOW	RED	3	
TAPS		BLACK	BROWN	YELLOW	RED	4

JACKPLUG CHART	
J.P58	JACK/PLUG-BURNER CONTROL
J.P84	JACK/PLUG-COMB. AIR INDUCER
J.P159	JACK/PLUG-SECONDARY LIMIT
J.P156	JACK/PLUG-INDUCER
J.P159	JACK/PLUG-IGNITOR

- $\Delta$  Y1 TO Y2 JUMPER FACTORY INSTALLED. LEAVE IN FOR ONE STAGE COOL THERMOSTAT. REMOVE JUMPER Y1 TO Y2 FOR TWO STAGE COOL THERMOSTAT.
- $\Delta$  FACTORY DEFAULT IS FOR A 2 STAGE THERMOSTAT
- $\Delta$  FIELD SUPPLIED ACC WIRE
- $\Delta$  FOR CORRECT NUMBER OF SECONDARY LIMITS USED, SEE SECONDARY LIMIT SECTION OF BLOWER SPEED CHART.
- $\Delta$  IMPORTANT- TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION.
- $\Delta$  PARK TERMINAL IS A UNPOWERED TERMINAL. ALL UNUSED MOTOR LEADS MUST BE WIRED TO THE PARK TERMINAL.
- $\Delta$  USE COPPER CONDUCTORS ONLY

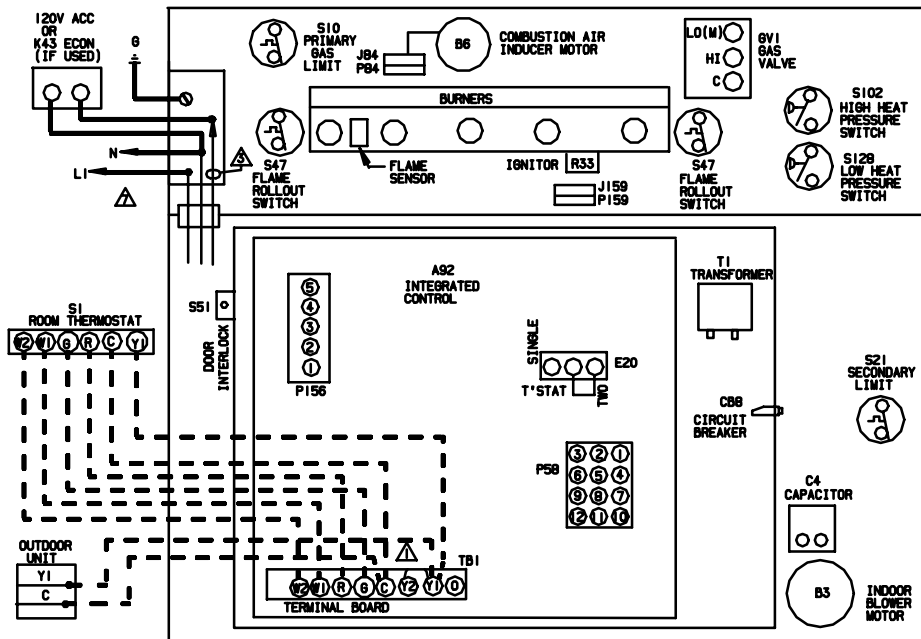


LENNOX HEATING UNITS-GAS		
660UH-24A-045-1,2	660UH-36B-090-1,2	660UH-48C-110-1,2
660UH-24A-070-1,2	660UH-48B-090-1,2	660UH-60C-110-1,2,3
660UH-36A-070-1,2	660UH-36C-110-1,2	660UH-60D-135-1,2,3
660UH-48B-070-3		
2 HEAT 2 COOL		
		Supersedes
		0602 533, 655W
		New Form No.
		534, 154W

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— LINE VOLTAGE FIELD INSTALLED  
 - - - CLASS II VOLTAGE FIELD WIRING  
 ← DENOTES OPTIONAL COMPONENTS

# G60UH-4, -5

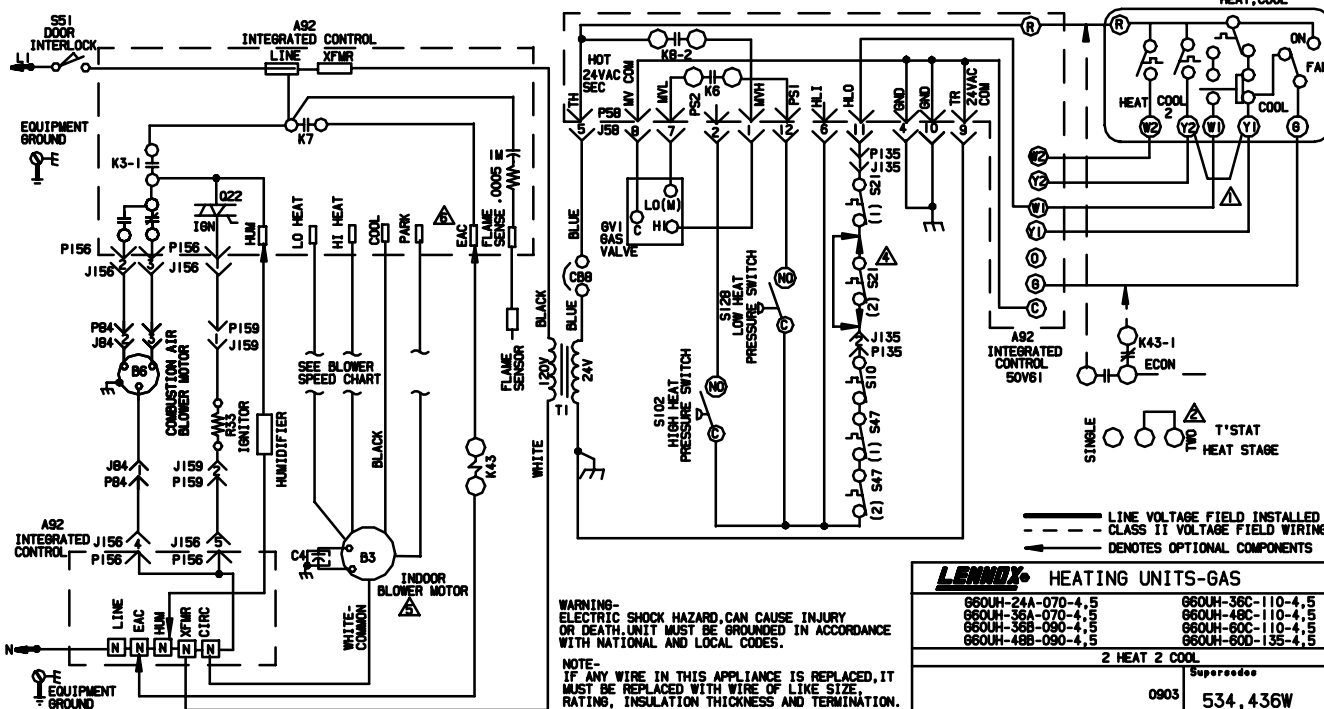


BLOWER SPEED CHART				
UNIT	FACTORY CONNECTED	SPEED TAPS	MOTOR SPEEDS AVAILABLE	SECONDARY LIMITS USED
24A-070	HI	LO	PARK	
36A-070	YELLOW	RED		3 2
36B-090	BROWN	YELLOW	BROWN	4 1 (RIGHT)
48B-090	BROWN	YELLOW	BROWN	4 2
36C-110	BROWN	YELLOW	RED	4 1 (RIGHT)
48C-110	BROWN	YELLOW	RED	4 1 (RIGHT)
60C-110	YELLOW	RED	BROWN	4 1 (RIGHT)
60D-135	YELLOW	RED	BROWN	4 2
HI BLOWER SPEED SELECTION → LO				
SPEED → BLACK YELLOW RED				
TAPS → BLACK BROWN YELLOW RED				

JACKPLUS CHART	
J.P58	JACK/PLUS-BURNER CONTROL
J.P84	JACK/PLUS-COMB. AIR INDUCER
J.P135	JACK/PLUS SECONDARY LIMIT
J.P156	JACK/PLUS-IGNITOR
J.P159	JACK/PLUS-IGNITOR

THERMOSTAT HEAT ANTICIPATION SETTING  
 .65 AMP HONEYWELL VALVE

- ⚠ Y1 TO Y2 JUMPER FACTORY INSTALLED. LEAVE IN FOR ONE STAGE COOL THERMOSTAT. REMOVE JUMPER Y1 TO Y2 FOR TWO STAGE COOL THERMOSTAT.
- ⚠ FACTORY DEFAULT IS FOR A 2 STAGE THERMOSTAT
- ⚠ FIELD SUPPLIED ACC WIRE
- ⚠ FOR CORRECT NUMBER OF SECONDARY LIMITS USED, SEE SECONDARY LIMIT SECTION OF BLOWER SPEED CHART.
- ⚠ IMPORTANT- TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION.
- ⚠ PARK TERMINAL IS A UNPOWERED TERMINAL. ALL UNUSED MOTOR LEADS MUST BE WIRED TO THE PARK TERMINAL.
- ⚠ USE COPPER CONDUCTORS ONLY



**WARNING-**  
ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

**NOTE-**  
IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, INSULATION THICKNESS AND TERMINATION.

LENEX HEATING UNIT-GAS	
660UH-24A-070-4,5	660UH-36C-110-4,5
660UH-36A-070-4,5	660UH-48C-110-4,5
660UH-36B-090-4,5	660UH-60C-110-4,5
660UH-48B-090-4,5	660UH-60D-135-4,5
2 HEAT 2 COOL	
0903	Supersedes 534, 436W
New Form No. 534, 547W	

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## Sequence of Operation G60UH-1 through -5

*Sequence depends on type thermostat used. G60UH units are applicable for single stage or two stage thermostats. Both type thermostats are described below. Thermostat jumper E20 dictates which mode unit will operate in. See flow chart for more sequence detail.*

### SureLight Control Self Check

When there is a call for heat, the SureLight integrated control runs a self check. The control checks for S10 primary limit, S21 secondary limit (s) and S47 rollout switch normally closed contacts. The control also checks for S102 high heat and S128 low heat prove switch normally open contacts. Once self check is complete and all safety switches are operational, heat call can continue.

### Two-Stage Thermostat, Two Stage Heat. Jumper E20 set at "TWO".

- 1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode. High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
- 2- SureLight control begins 20 second ignitor warm up period.
- 3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.
- 4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.
- 5- After 45 second delay, indoor blower B3 is energized on low heat speed.  
*The furnace will stay in this mode until first stage demand is satisfied OR a second stage heat demand is initiated.*
- 6- Second stage heat demand initiated. A 30 second second stage recognition period begins.
- 7- The combustion air inducer ramps up to high heat speed.
- 8- S102 high heat prove switch closes and the gas valve energizes second stage heat.
- 9- B3 indoor blower energizes on high heat speed.

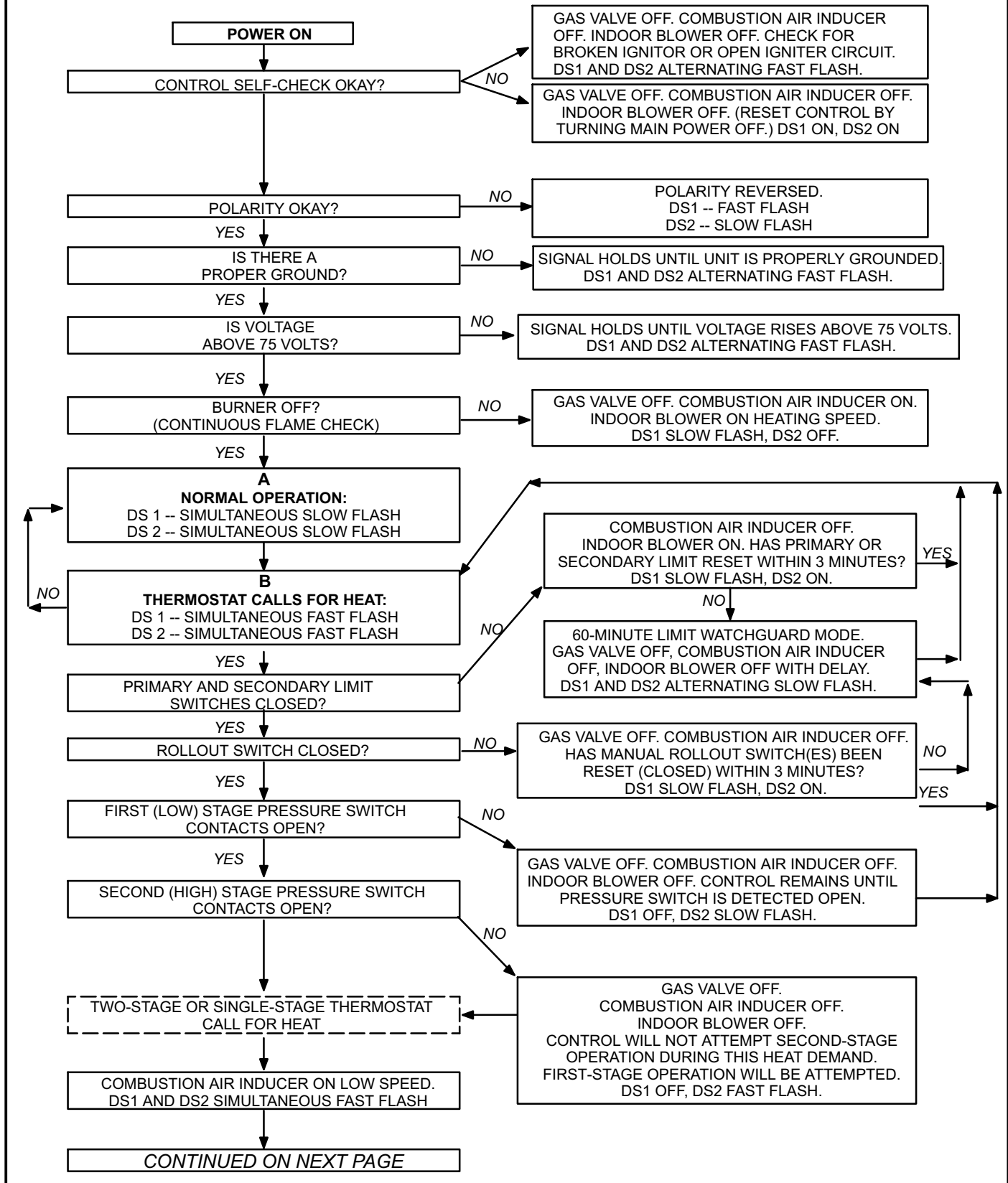
### Single-Stage Thermostat, Two Stage Heat. Jumper E20 set at "SINGLE"

- 1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
- 2- SureLight control begins 20 second ignitor warm up period.
- 3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.
- 4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.
- 5- After 45 second delay, indoor blower B3 is energized on low heat speed.
- 6- A 10 minute (factory set) or 15 minute (field set) second stage heat delay period begins.
- 7- After the delay the combustion air inducer ramps up to high heat speed.
- 8- S102 high heat prove switch closes and the gas valve energizes second stage heat.
- 9- B3 indoor blower energizes on high heat speed.

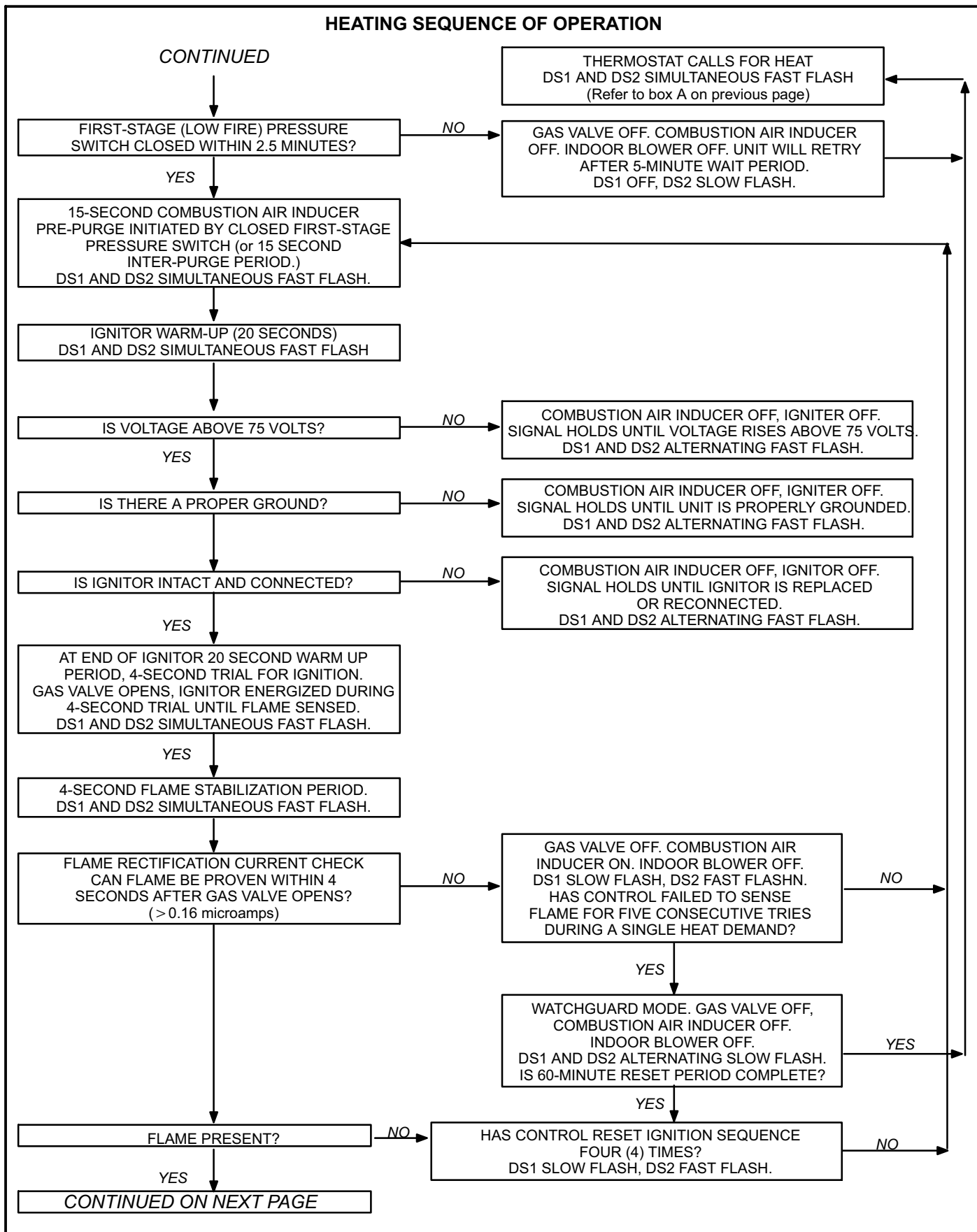
# FLOW CHART G60UH-1 through -5 units with SureLight Board 18M49

## HEATING SEQUENCE OF OPERATION NORMAL AND ABNORMAL HEATING MODE

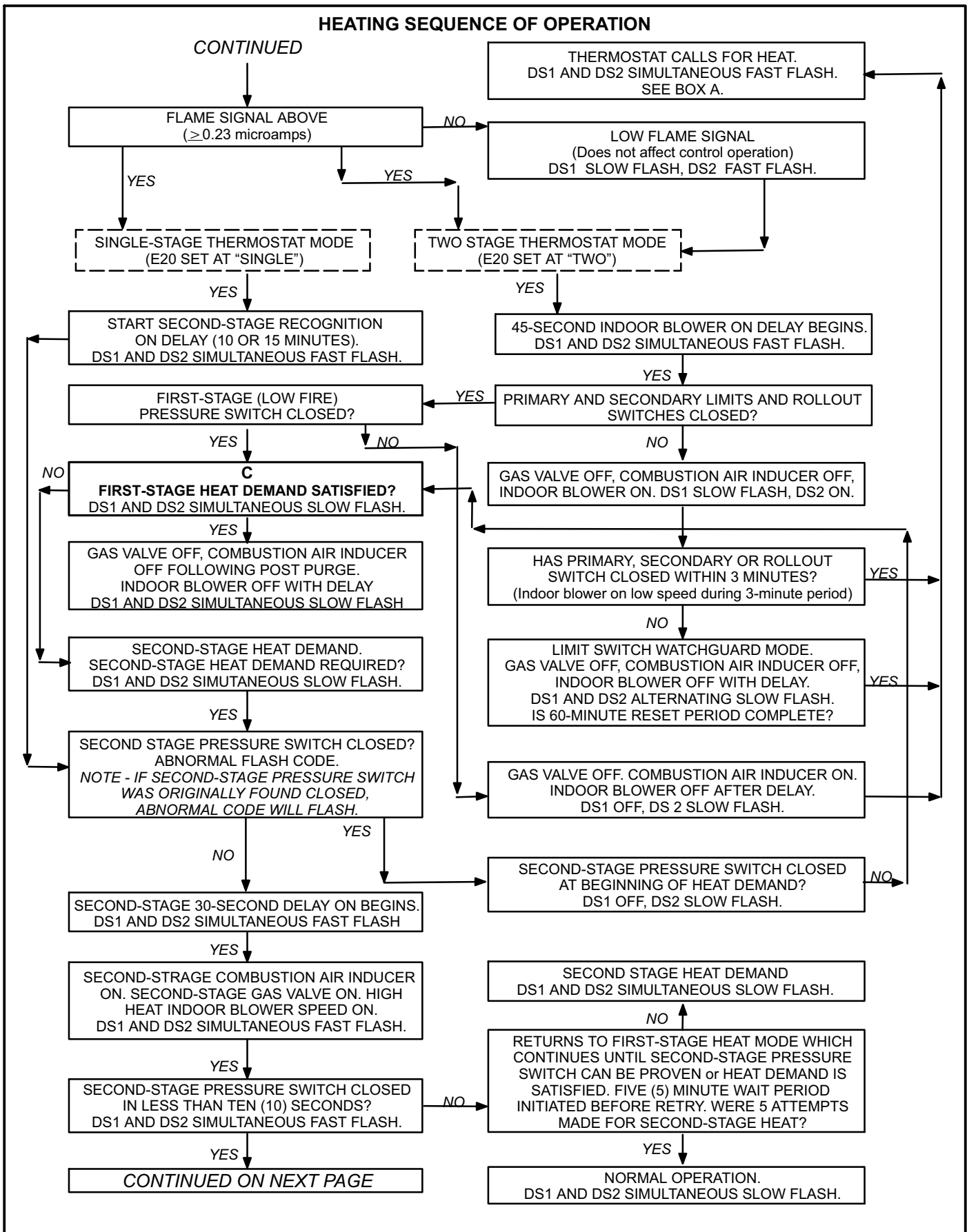
Slow flash rate equals 1Hz (one flash per second). Fast flash rate equals 3 Hz (three flashes per second).



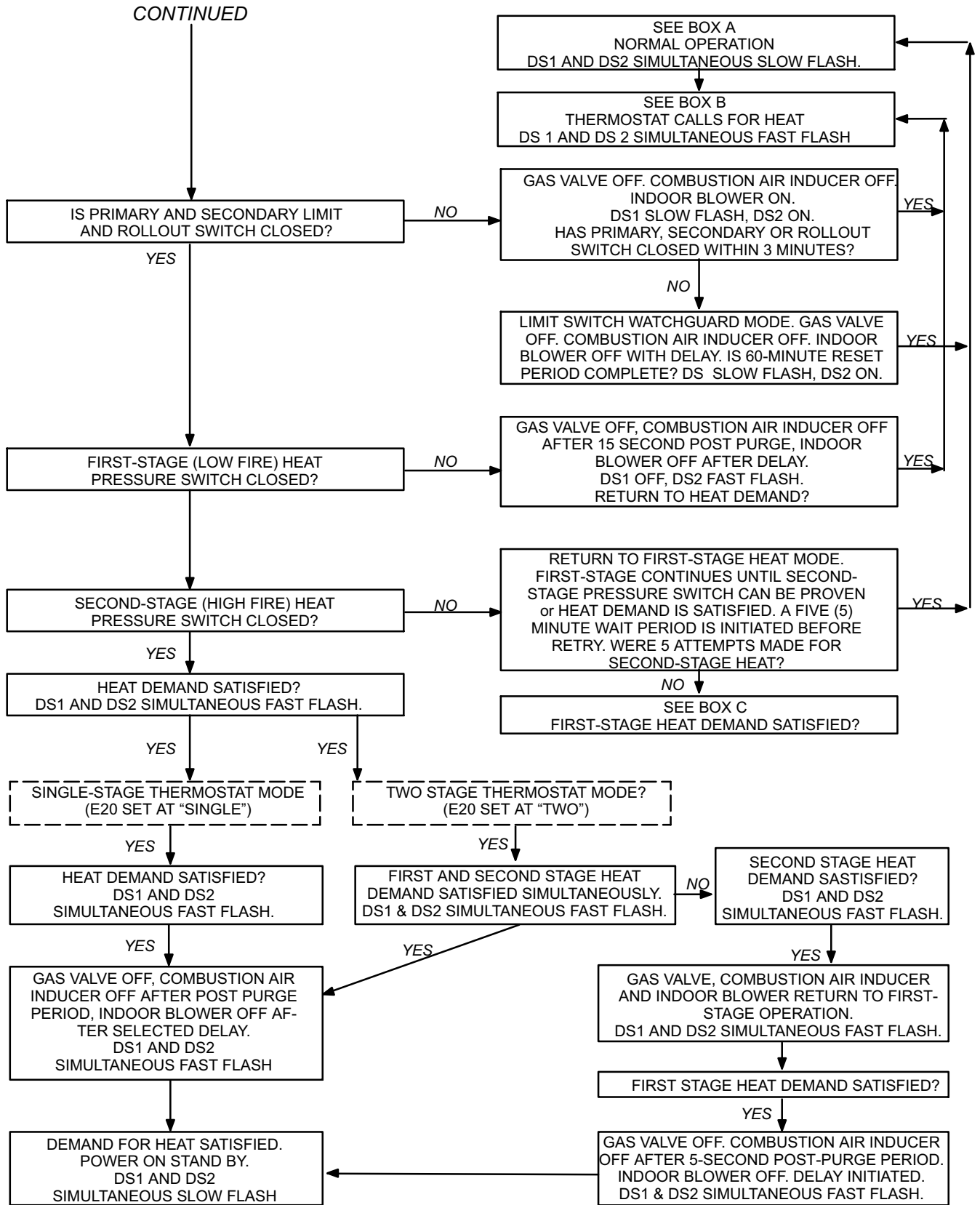
## HEATING SEQUENCE OF OPERATION



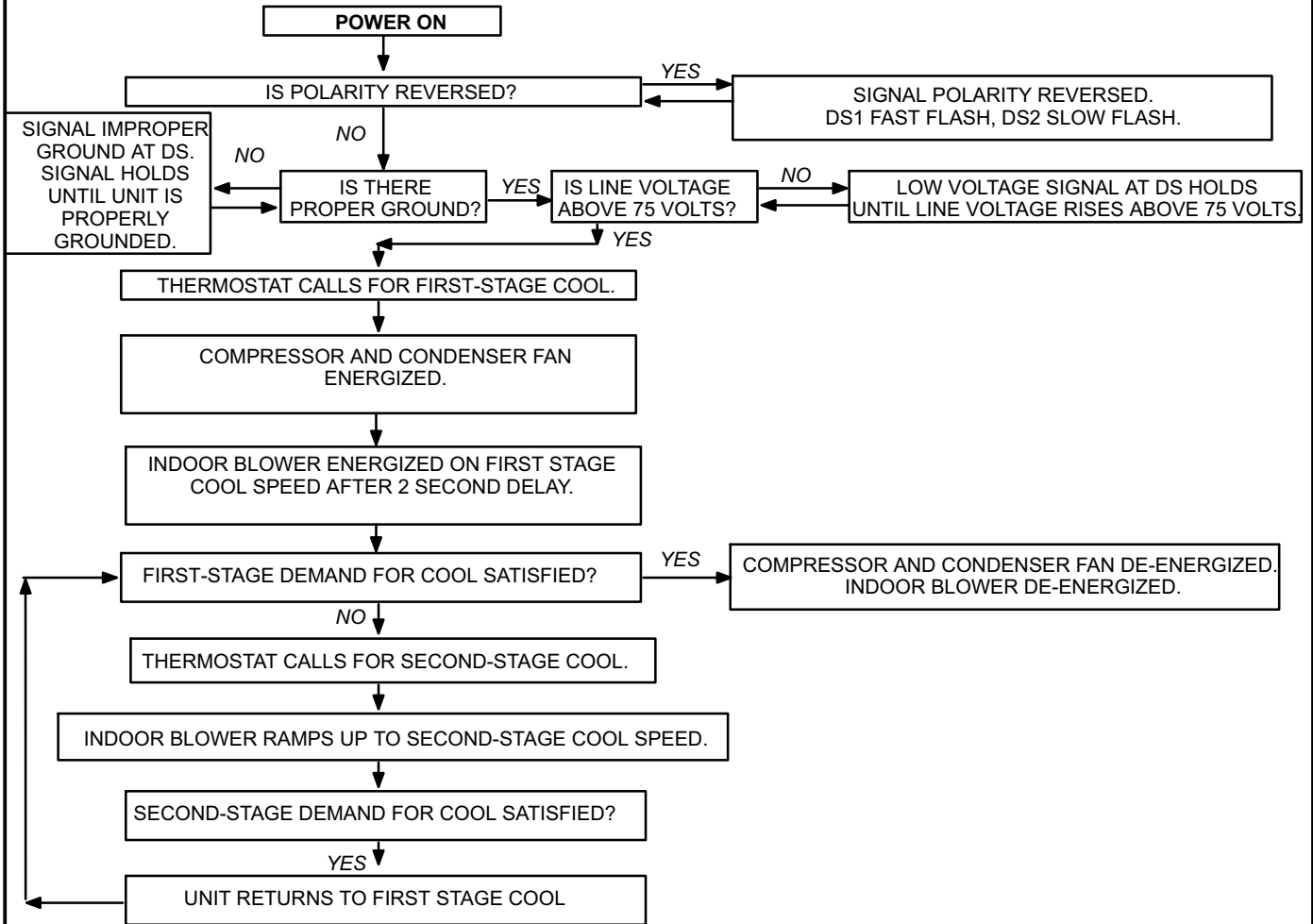
## HEATING SEQUENCE OF OPERATION



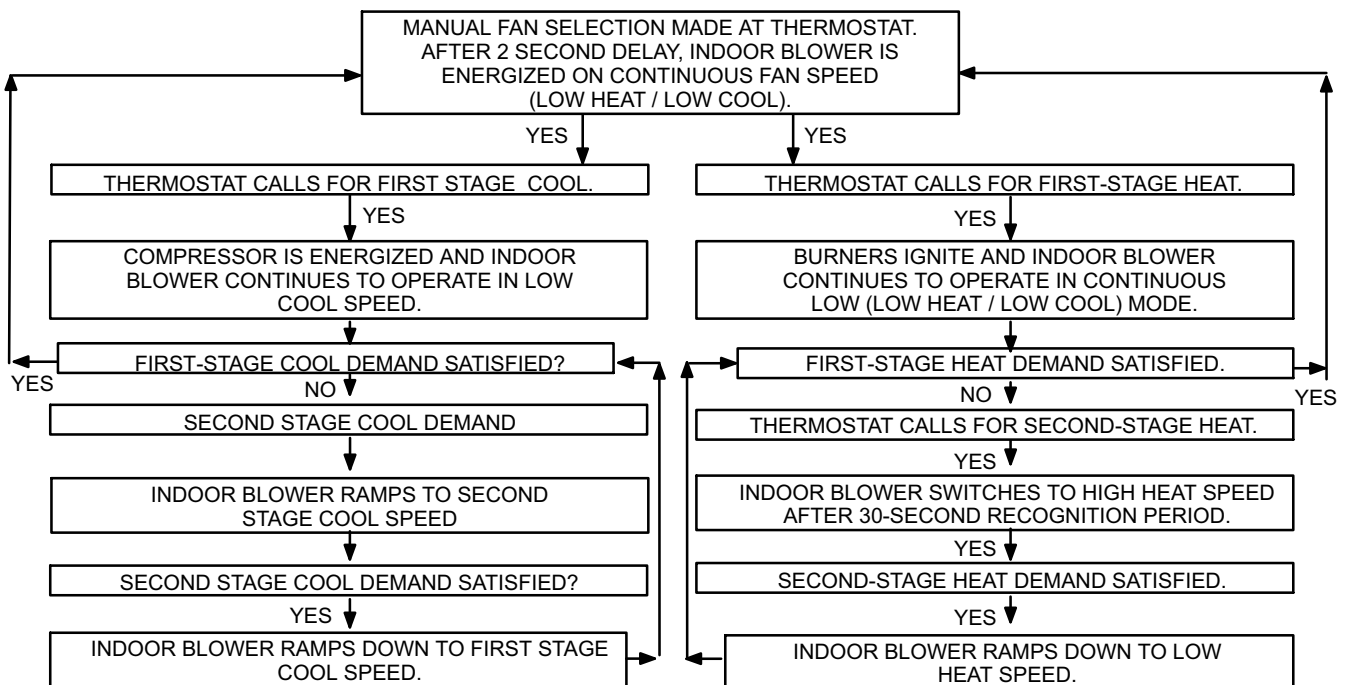
# HEATING SEQUENCE OF OPERATION



## COOLING SEQUENCE OF OPERATION

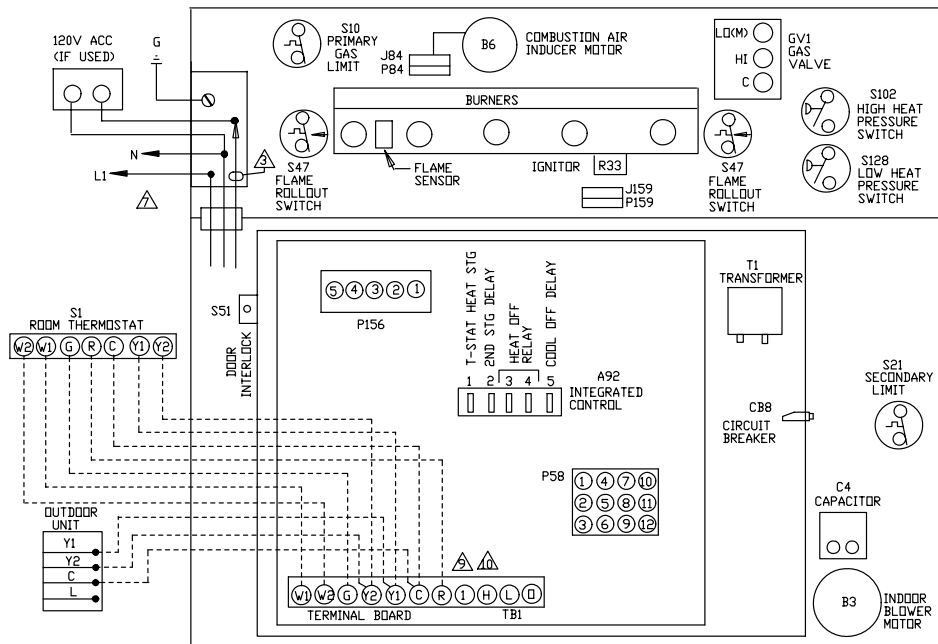


## CONTINUOUS LOW SPEED FAN SEQUENCE OF OPERATION



*NOTE - Continuous low speed fan and cooling low speed are equal to the low heat fan speed.*

# G60UH-7 and later



BLOWER SPEED CHART					
UNIT	FACTORY CONNECTED SPEED TAPS			MOTOR SPEEDS AVAIL	SECONDARY LIMITS USED $\Delta$
	COOL	HI HEAT	LO HEAT		
24A-070	YELLOW	RED	---	---	3 2
36A-070	YELLOW	RED	BROWN	---	4 2
36B-090	BROWN	YELLOW	RED	---	4 1 (RIGHT)
48B-090	YELLOW	RED	BROWN	---	4 2
36C-110	BROWN	YELLOW	RED	---	4 1 (RIGHT)
48C-110	BROWN	YELLOW	RED	---	4 1 (RIGHT)
60C-110	YELLOW	RED	BROWN	---	4 1 (RIGHT)
60D-135	YELLOW	RED	BROWN	---	4 2

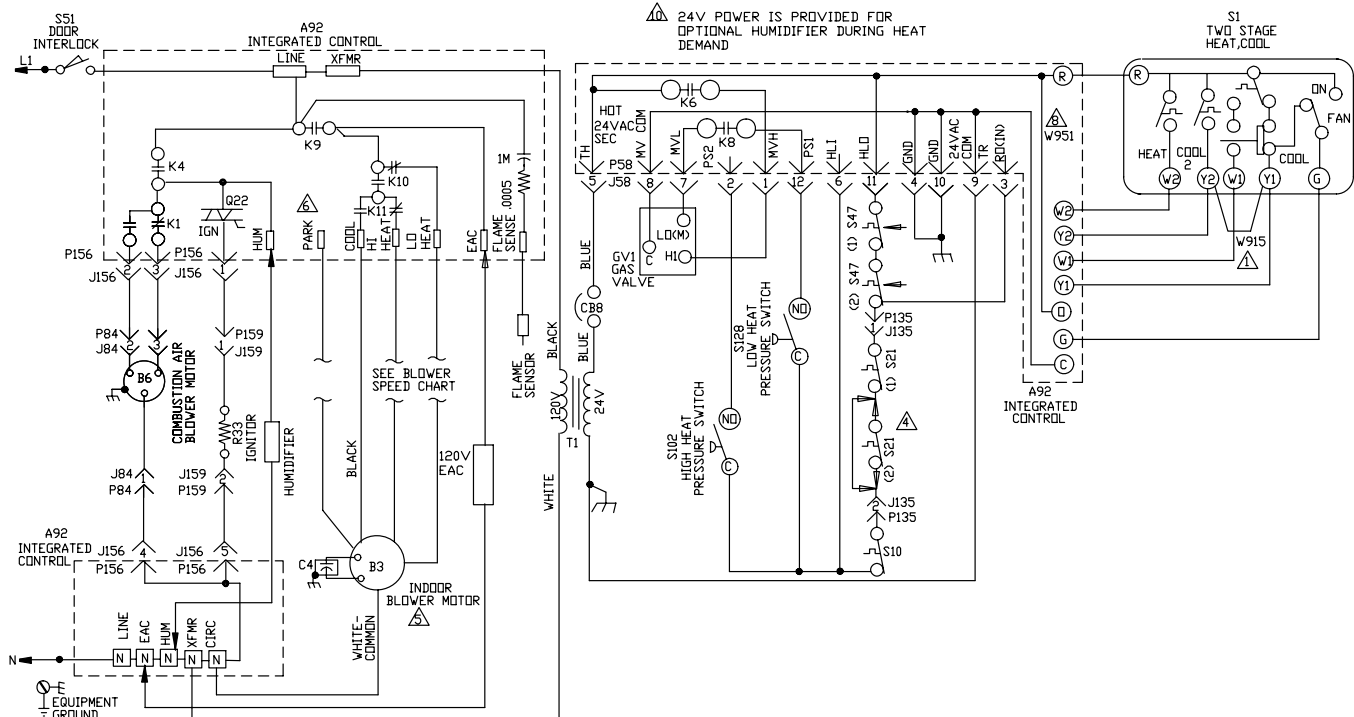
JACKPLUG CHART	
J.P58	JACK/PLUG-BURNER CONTROL
J.P84	JACK/PLUG-COMB. AIR INDUCER
J.P135	JACK/PLUG-SECONDARY LIMIT
J.P156	JACK/PLUG-IGNITOR
J.P159	JACK/PLUG-IGNITOR

THERMOSTAT HEAT ANTICIPATION SETTING  
 .65 AMP HONEYWELL VALVE

WARNING-  
 ELECTRIC SHOCK HAZARD,CAN CAUSE INJURY  
 OR DEATHUNIT MUST BE GROUNDED IN ACCORDANCE  
 WITH NATIONAL AND LOCAL CODES.

NOTE-  
 IF ANY WIRE IN THIS APPLIANCE IS REPLACED,IT  
 MUST BE REPLACED WITH WIRE OF LIKE SIZE,  
 RATING, INSULATION THICKNESS AND TERMINATION.

TYPICAL SYSTEM SHOWN FOR 2 HEAT/2 COOL WITH A  
 CONVENTIONAL THERMOSTAT. SEE INSTALLATION  
 INSTRUCTIONS FOR CONNECTION TO OTHER  
 EQUIPMENT AND ACCESSORIES



- $\Delta$  JUMPER W915 FROM Y1 TO Y2 IS FACTORY INSTALLED AT A92 CONTROL BOARD. LEAVE IN FOR ONE STAGE COOL THERMOSTAT. CUT JUMPER Y1 TO Y2 FOR TWO STAGE COOL THERMOSTAT
- $\Delta$  FACTORY DEFAULT IS FOR A 2 STAGE THERMOSTAT
- $\Delta$  FIELD SUPPLIED ACC WIRE
- $\Delta$  FOR CORRECT NUMBER OF SECONDARY LIMITS USED, SEE SECONDARY LIMIT SECTION OF BLOWER SPEED CHART.
- $\Delta$  IMPORTANT- TO PREVENT MOTOR BURNOUT, NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION.
- $\Delta$  PARK TERMINAL IS A UNPOWERED TERMINAL. ALL UNUSED MOTOR LEADS MUST BE WIRED TO THE PARK TERMINAL.
- $\Delta$  USE COPPER CONDUCTORS ONLY
- $\Delta$  CUT W951 JUMPER FROM Q TO R, LABELED 'HEAT PUMP', AT A92 CONTROL BOARD, WHEN USED FOR DUAL FUEL APPLICATIONS.
- $\Delta$  TERMINAL #1 IS USED FOR ERROR CODE RECALL ONLY. SEE INSTALLATION INSTRUCTIONS FOR DETAILS.

— LINE VOLTAGE FIELD INSTALLED  
 - - - CLASS II VOLTAGE FIELD WIRING  
 — DENOTES OPTIONAL COMPONENTS

LENNOX HEATING UNITS-GAS	
G60UH-24A-070	G60UH-36C-110
G60UH-36A-070	G60UH-48C-110
G60UH-36B-090	G60UH-60C-110
G60UH-48B-090	G60UH-60D-135
2 HEAT 2 COOL	
0906 Supersedes	
New Form No.	
535,291W	

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## **SureLight Board 100869 G60UH-7 and later**

*Sequence depends on type thermostat used. G0UH units are applicable for single stage or two stage thermostats. Both type thermostats are described below. Thermostat dip switch selection dictates which mode unit will operate in. See flow chart for more sequence detail.*

### **SureLight Control Self Check**

When there is a call for heat, the SureLight integrated control runs a self check. The control checks for S10 primary limit, S21 secondary limit (s) and S47 rollout switch normally closed contacts. The control also checks for S102 high heat and S128 low heat prove switch normally open contacts. Once self check is complete and all safety switches are operational, heat call can continue.

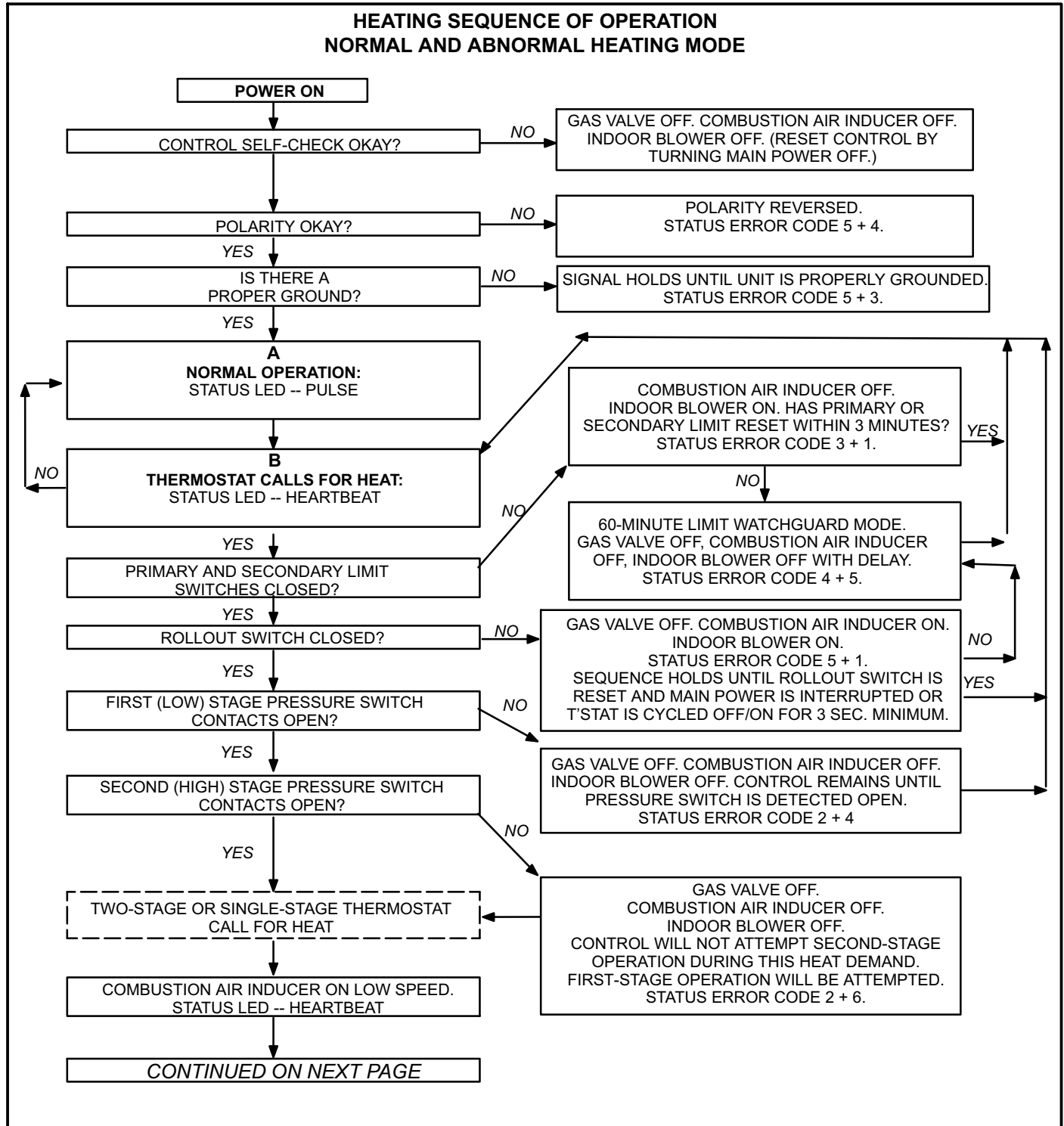
### **Two-Stage Thermostat, Two Stage Heat. Dip Switch set at "TWO".**

- 1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode. High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
- 2- SureLight control begins 20 second ignitor warm up period.
- 3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.
- 4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.
- 5- After 45 second delay, indoor blower B3 is energized on low heat speed.  
*The furnace will stay in this mode until first stage demand is satisfied OR a second stage heat demand is initiated.*
- 6- Second stage heat demand initiated. A 30 second second stage recognition period begins.
- 7- The combustion air inducer ramps up to high heat speed.
- 8- S102 high heat prove switch closes and the gas valve energizes second stage heat.
- 9- B3 indoor blower switches to high heat speed.

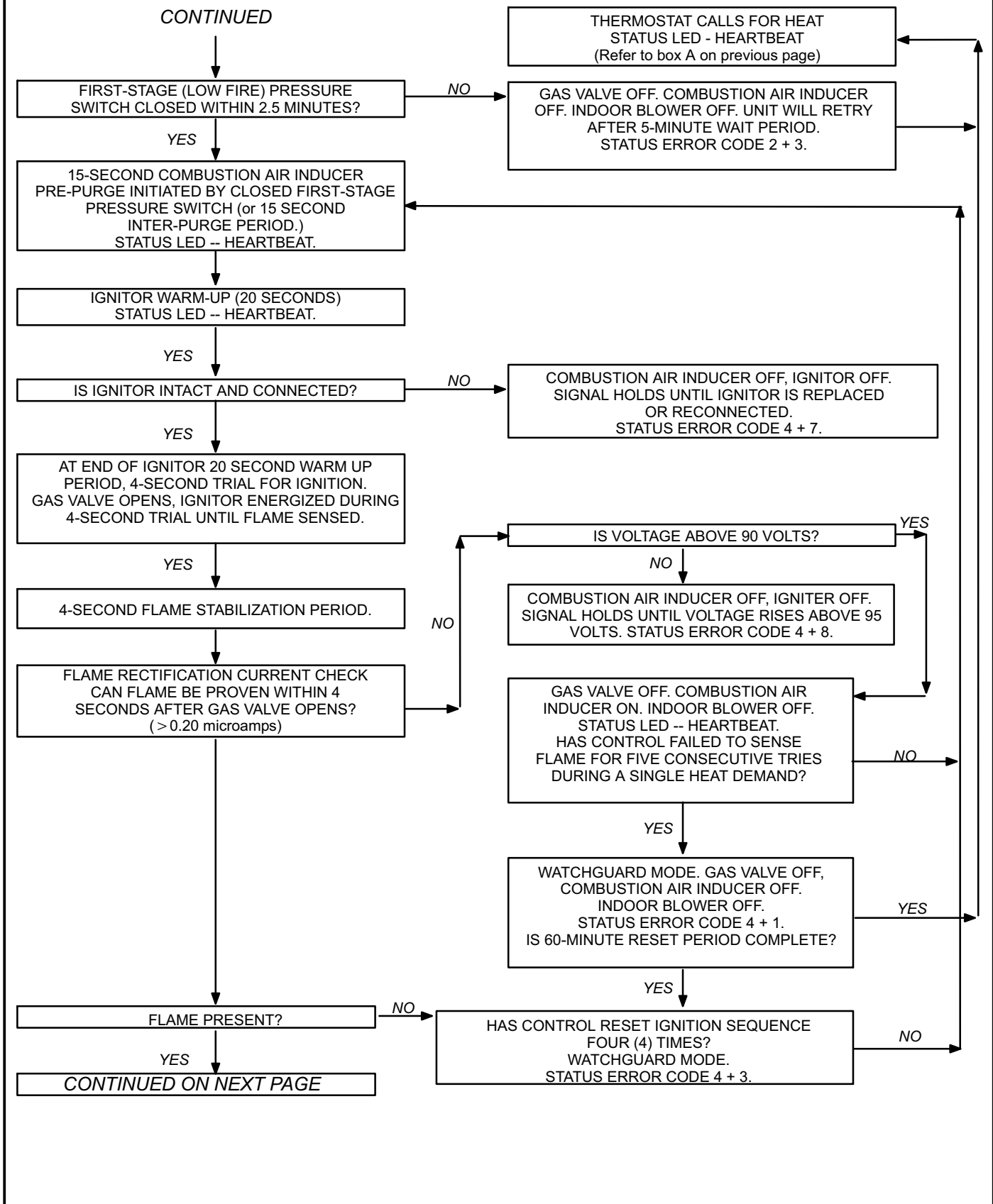
### **Single-Stage Thermostat, Two Stage Heat. Dip Switch set at "SINGLE"**

- 1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode. High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
- 2- SureLight control begins 20 second ignitor warm up period.
- 3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.
- 4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.
- 5- After 45 second delay, indoor blower B3 is energized on low heat speed.
- 6- A 10 minute (factory set) or 15 minute (field set) second stage heat delay period begins.
- 7- After the delay the combustion air inducer ramps up to high heat speed.
- 8- S102 high heat prove switch closes and the gas valve energizes second stage heat.
- 9- B3 indoor blower switches to high heat speed.

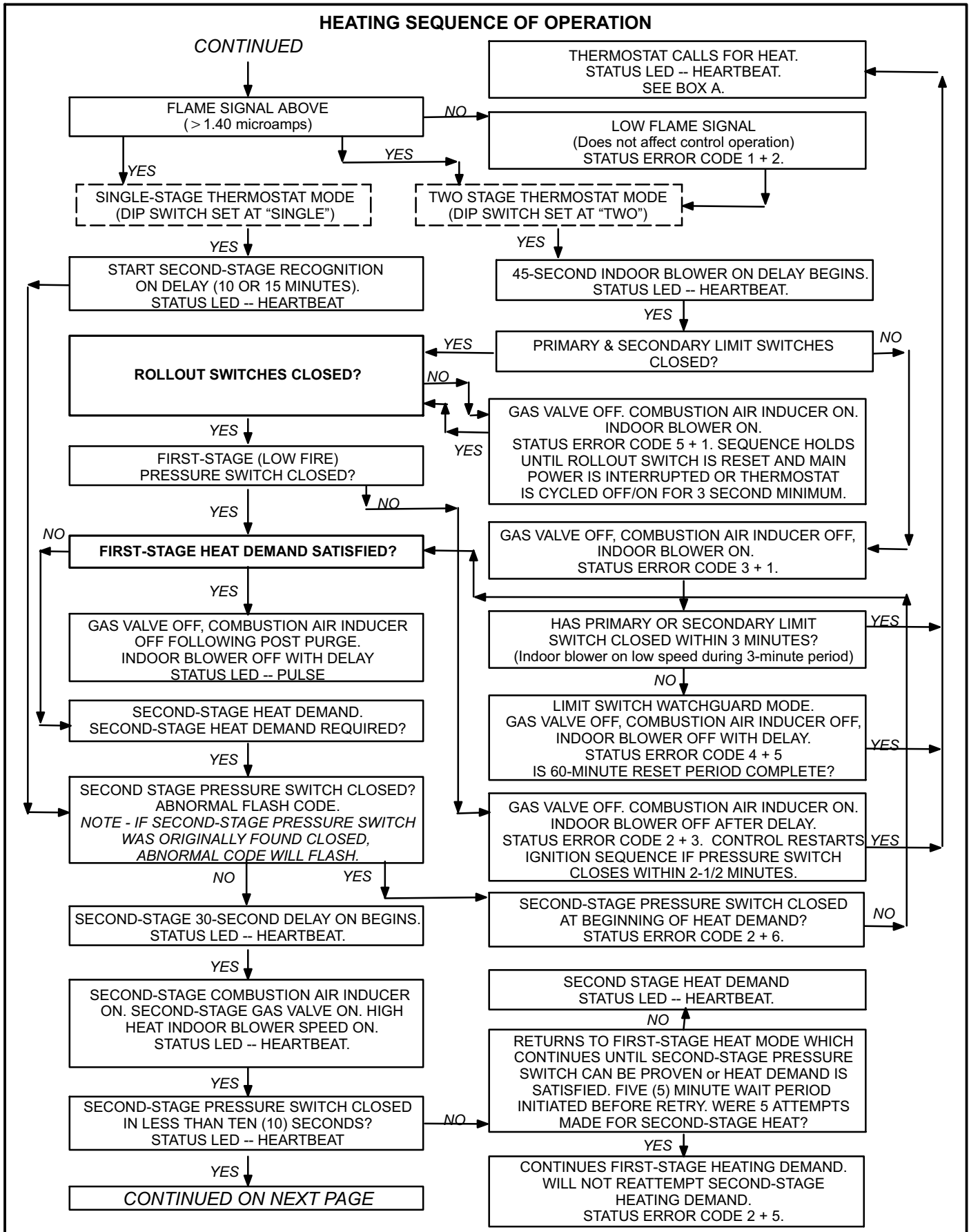
# Flow Chart G60UH-7 Units and later with SureLight Board 100869



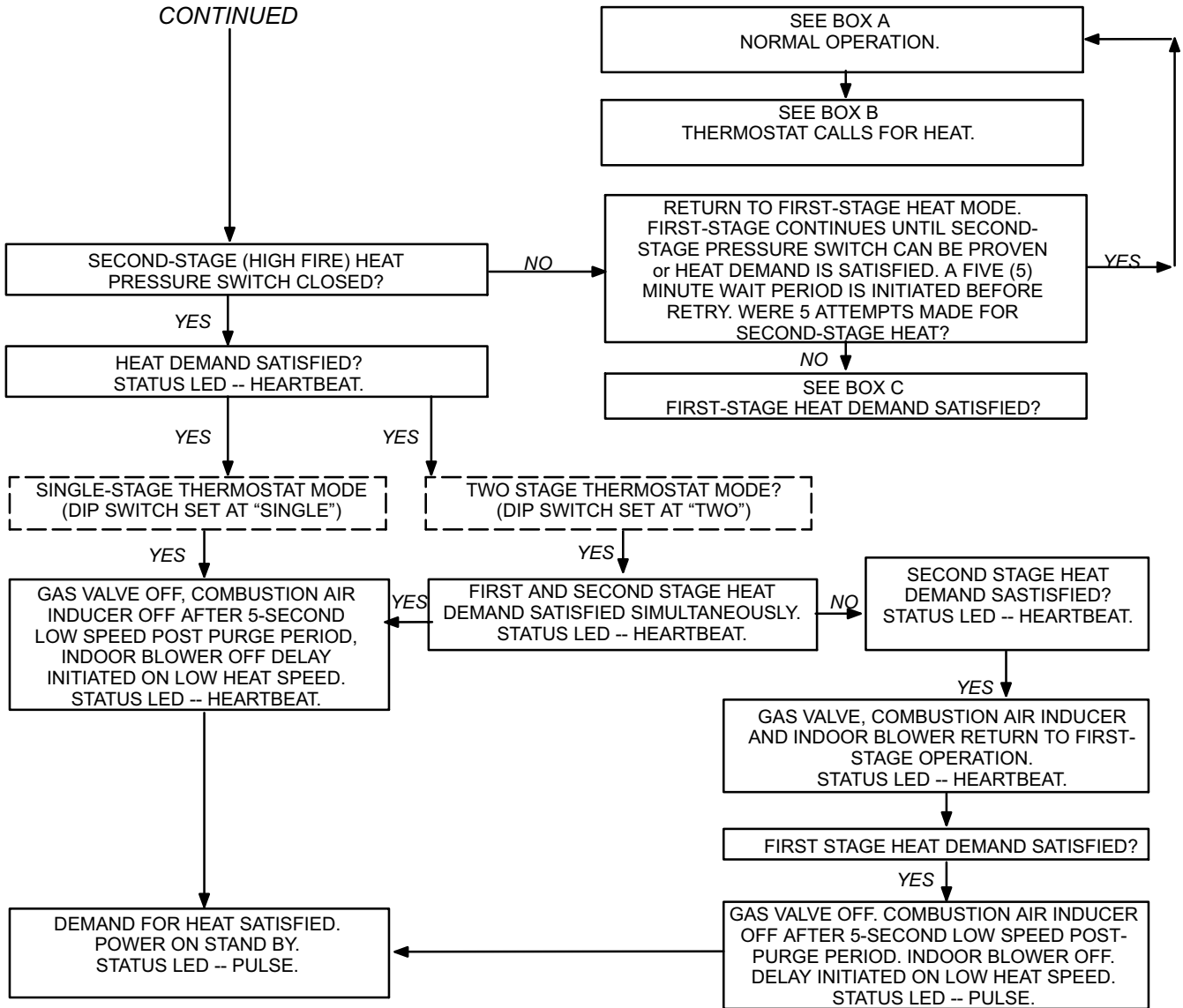
## HEATING SEQUENCE OF OPERATION



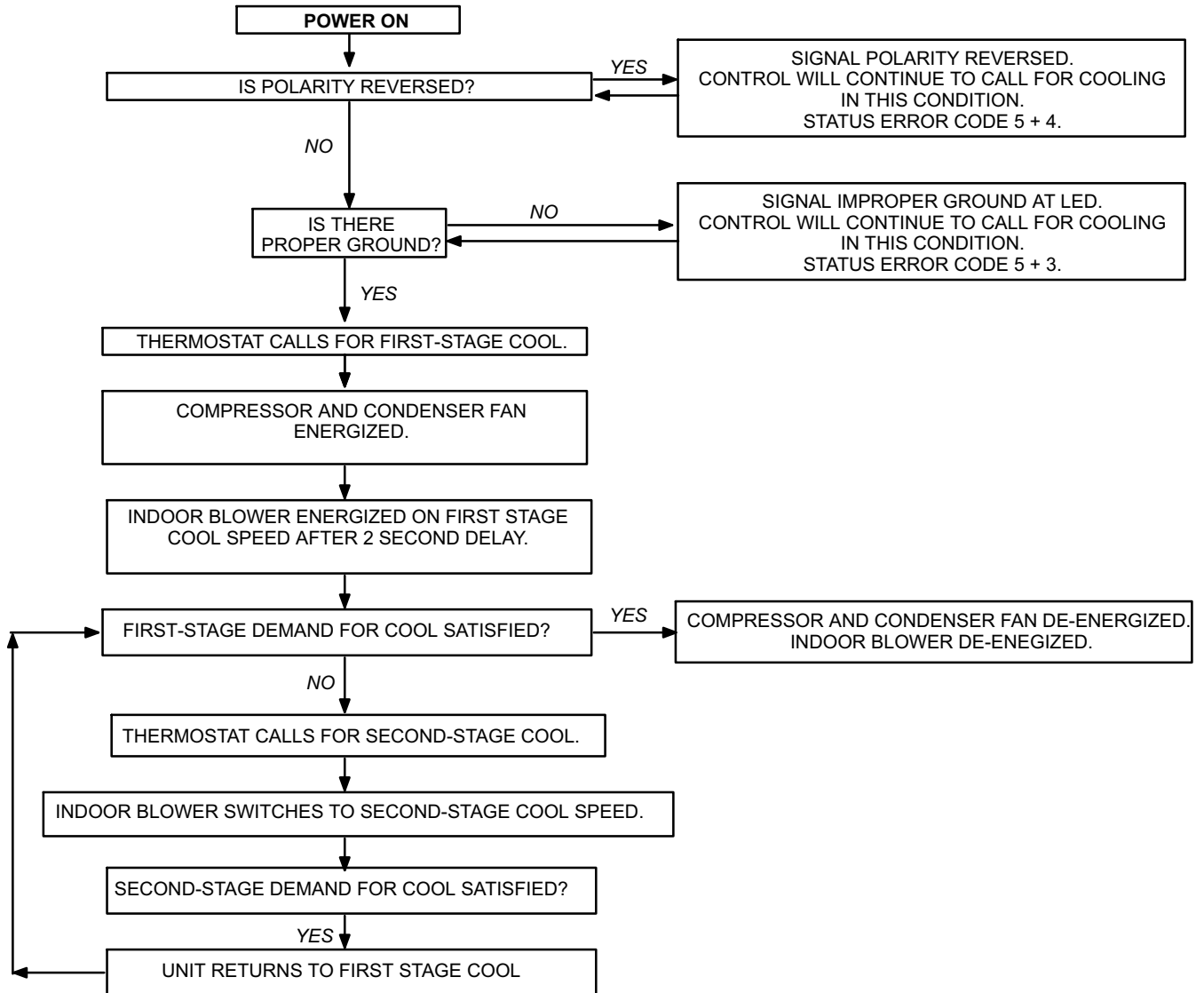
## HEATING SEQUENCE OF OPERATION



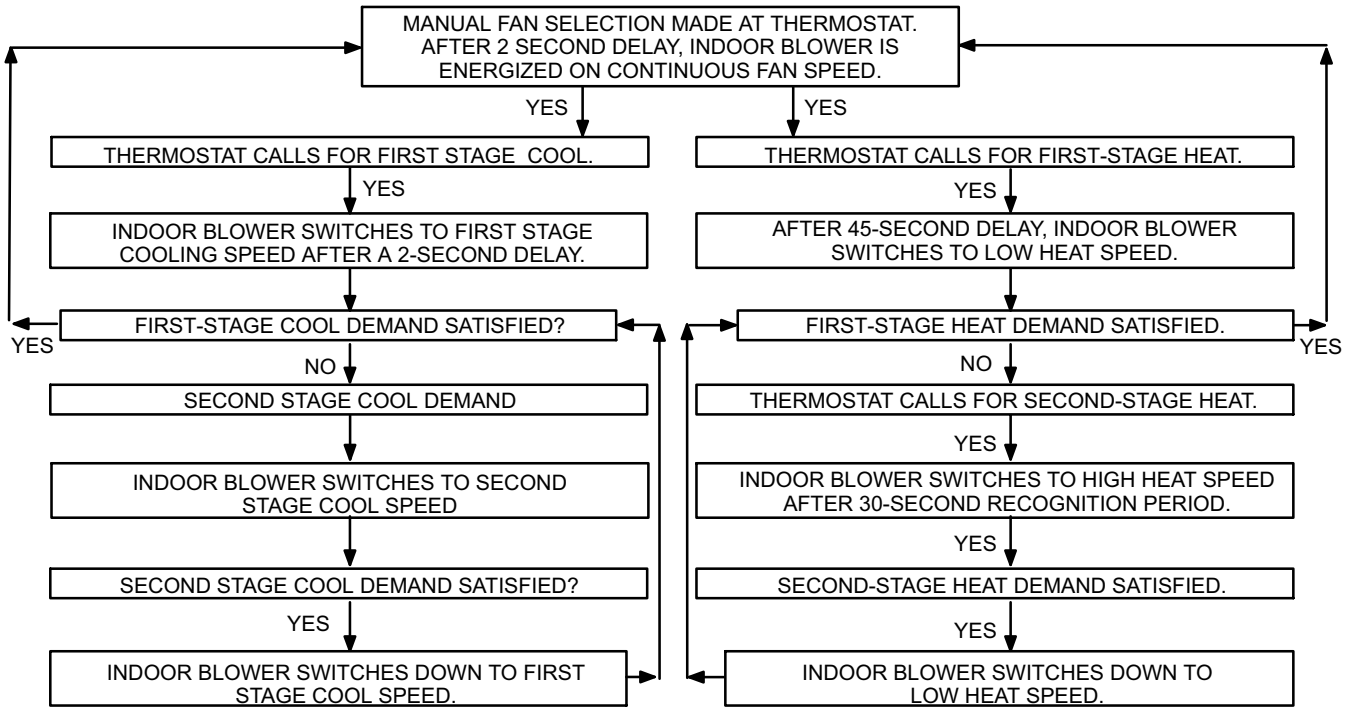
## HEATING SEQUENCE OF OPERATION



## COOLING SEQUENCE OF OPERATION



## CONTINUOUS LOW SPEED FAN SEQUENCE OF OPERATION



# VIII- Field Wiring Applications and Jumper Settings

## A-SureLight Board 18M49

### Field Wiring Applications

Thermostat	Jumper Settings (See figure 4)		Wiring Connections
	E20	Term. Strip Y1 to Y2	
1 Heat / 1 Cool <i>NOTE - Use dip switch 3 to set second-stage heat ON delay.</i> <i>ON-10 minutes. OFF-15 minutes.</i>	SINGLE	Leave Installed	
1 Heat / 2 Cool <i>NOTE - Use dip switch 3 to set second-stage heat ON delay.</i> <i>ON-10 minutes. OFF-15 minutes.</i>	SINGLE	Clip	
2 Heat / 2 Cool	TWO	Clip	
2 Heat / 1 Cool	TWO	Leave Installed	

### Field Wiring Applications (Continued)

Thermostat	Jumper Settings (See figure 4)		Wiring Connections
	E20	Term. Strip Y1 to Y2	
FM21 Heat Pump / 1 Cool	SINGLE	Leave Installed	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>*Disconnect existing furnace transformer and replace with 75VA, 24V transformer if defrost option to be used.</b></p> <p style="text-align: center;"><b>75VA, 24V TRANSFORMER*</b></p> <p><i>NOTE - Wiring connections to outdoor unit and thermostat made at FM21 control board per FM21 instructions.</i></p> </div> <div style="width: 50%; text-align: center;"> <p><b>CONTROL TERM. STRIP</b></p> <p>(DS)</p> <p>(W2)</p> <p>(W1) ——— (W1)</p> <p>(R) ——— (R)</p> <p>(G) ——— (G)</p> <p>(C) ——— (C)</p> <p>(Y2)</p> <p>(Y1)</p> <p>(O)</p> </div> <div style="width: 10%; text-align: center;"> <p><b>FM21</b></p> <p>(W1)</p> <p>(R)</p> <p>(G)</p> <p>(C)</p> </div> </div> <p style="text-align: right; margin-top: 10px;"><i>NOTE - Remove Y1/Y2 jumper for two-stage cooling.</i></p>

**B-SureLight Board 100869**

**TABLE 19**  
**Field Wiring Applications (Continued)**

Thermostat	Jumper Settings (See figure 5)			Wiring Connections
	DIP Switch 1	W915 Two-Stage Cooling	W951 Heat Pumps	
1Heat / 1 Cool <i>NOTE - Use DIP switch 2 to set second-stage heat ON delay.</i> <i>OFF-10 minutes.</i> <i>ON-15 minutes.</i>	ON	Intact	Intact	
1 Heat / 2 Cool <i>NOTE - Use DIP switch 2 to set second-stage heat ON delay.</i> <i>OFF-10 minutes.</i> <i>ON-15 minutes.</i>	ON	Cut	Intact	

**TABLE 20**  
**Field Wiring Applications (Continued)**

Thermostat	Jumper Settings (See figure 5)			Wiring Connections																											
	DIP Switch 1	W915 Two-Stage Cooling	W951 Heat Pumps																												
2 Heat / 2 Cool	OFF	Cut	Intact	<table border="0"> <tr> <td>S1 T'STAT</td> <td>CONTROL TERM. STRIP</td> <td>OUTDOOR UNIT</td> </tr> <tr> <td>W2</td> <td>W2</td> <td></td> </tr> <tr> <td>W1</td> <td>W1</td> <td></td> </tr> <tr> <td>R</td> <td>R</td> <td></td> </tr> <tr> <td>G</td> <td>G</td> <td></td> </tr> <tr> <td>C</td> <td>C</td> <td>C</td> </tr> <tr> <td>Y2</td> <td>Y2</td> <td>Y2</td> </tr> <tr> <td>Y1</td> <td>Y1</td> <td>Y1</td> </tr> <tr> <td></td> <td>O</td> <td></td> </tr> </table>	S1 T'STAT	CONTROL TERM. STRIP	OUTDOOR UNIT	W2	W2		W1	W1		R	R		G	G		C	C	C	Y2	Y2	Y2	Y1	Y1	Y1		O	
S1 T'STAT	CONTROL TERM. STRIP	OUTDOOR UNIT																													
W2	W2																														
W1	W1																														
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G	G																														
C	C	C																													
Y2	Y2	Y2																													
Y1	Y1	Y1																													
	O																														
2 Heat / 1 Cool	OFF	Intact	Intact	<table border="0"> <tr> <td>S1 T'STAT</td> <td>CONTROL TERM. STRIP</td> <td>OUTDOOR UNIT</td> </tr> <tr> <td>W2</td> <td>W2</td> <td></td> </tr> <tr> <td>W1</td> <td>W1</td> <td></td> </tr> <tr> <td>R</td> <td>R</td> <td></td> </tr> <tr> <td>G</td> <td>G</td> <td></td> </tr> <tr> <td>C</td> <td>C</td> <td>C</td> </tr> <tr> <td></td> <td>Y2</td> <td></td> </tr> <tr> <td>Y</td> <td>Y1</td> <td>Y1</td> </tr> <tr> <td></td> <td>O</td> <td></td> </tr> </table>	S1 T'STAT	CONTROL TERM. STRIP	OUTDOOR UNIT	W2	W2		W1	W1		R	R		G	G		C	C	C		Y2		Y	Y1	Y1		O	
S1 T'STAT	CONTROL TERM. STRIP	OUTDOOR UNIT																													
W2	W2																														
W1	W1																														
R	R																														
G	G																														
C	C	C																													
	Y2																														
Y	Y1	Y1																													
	O																														

## IX- Integrated Control Board Troubleshooting Guide

### A-SureLight Board 18M34

UPON INITIAL POWER UP, REMOVE ALL THERMOSTAT DEMANDS TO THE UNIT

<b>PROBLEM: 1 UNIT FAILS TO OPERATE IN THE COOLING, HEATING, OR CONTINUOUS FAN MODE</b>		
<b>Condition</b>	<b>Possible Cause</b>	<b>Corrective Action / Comments</b>
<p><b>1.1</b></p> <p>- Both diagnostic lights fail to light up.</p> <p>LED#1-Off LED#2-Off</p>	<p><b>1.1.1</b></p> <p>Main voltage 120V not supplied to unit.</p>	<p><b>ACTION 1</b> - Check 120V main voltage. Determine cause of main power failure.</p>
	<p><b>1.1.2</b></p> <p>Miswiring of furnace or improper connections.</p>	<p><b>ACTION 1</b> - Check for correct wiring of 120V to power make up box and transformer. <b>ACTION 2</b> - Check 24V wiring to control board.</p>
	<p><b>1.1.3</b></p> <p>Circuit breaker tripped or fails to close.</p>	<p><b>ACTION 1</b> - Replace circuit breaker if it is reset but does not have continuity. <b>ACTION 2</b> - If circuit breaker still trips, check for short.</p>
	<p><b>1.1.4</b></p> <p>Door interlock switch failure.</p>	<p><b>ACTION 1</b> - Check that door switch is activated when door is closed. <b>ACTION 2</b> - Check wire connections to switch, replace loose connectors. <b>ACTION 3</b> - Check continuity of switch in closed position. Replace if defective.</p>
	<p><b>1.1.5</b></p> <p>Transformer Failure.</p>	<p><b>ACTION 1</b> - Check that transformer output is 24V. Replace if defective.</p>
	<p><b>1.1.6</b></p> <p>Failed control board.</p>	<p><b>ACTION 1</b> - If all the above items have been checked, replace board.</p>
<p><b>1.2</b></p> <p>- Diagnostic lights flash the reverse polarity code.</p> <p>LED#1-Fast Flash, LED#2-Slow Flash.</p>	<p><b>1.2.1</b></p> <p>120V main power polarity reversed.</p>	<p><b>ACTION 1</b> - Check the 120V has line and neutral correctly input into control. <b>ACTION 2</b> - Reverse the line and neutral at the 120V field connection.</p>
<p><b>1.3</b></p> <p>- Diagnostic lights flash the improper main ground.</p> <p>LED#1-Alternating Fast Flash LED#2-Alternating Fast Flash</p>	<p><b>1.3.1</b></p> <p>Improper ground to the unit.</p>	<p><b>ACTION 1</b> - Check that the unit is properly ground. <b>ACTION 2</b> - Install a proper main ground to the unit</p>
	<p><b>1.3.2</b></p> <p>Open ignitor circuit.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections in the ignitor circuit. Check multi-plug connections for correct installation.</p>
	<p><b>1.3.3</b></p> <p>Broken or failed ignitor.</p>	<p><b>ACTION 1</b> - Unplug ignitor and read resistance across ignitor. If resistance does not read between 10.9 and 19.7 ohms, replace the ignitor.</p>
	<p><b>1.3.4</b></p> <p>Line voltage is below 75V.</p>	<p><b>ACTION 1</b> - Check that the line voltage is above 75V. Determine cause of voltage drop and supply correct voltage to the control.</p>

**PROBLEM 2: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER DOES NOT ENERGIZE**

Condition	Possible Cause	Corrective Action / Comments
<p align="center"><b>2.1</b></p> <p>- Unit operates with a cooling or continuous fan demand.                      - Combustion air inducer will not start with a Heating demand.                      - Diagnostic lights flash the limit failure mode.</p> <p>LED#1-Slow Flash, LED#2-On</p>	<p><b>2.1.1</b></p> <p>Primary Limit or secondary limit (if equipped ) or rollout switch open.</p>	<p><b>ACTION 1</b> - Check continuity across switch(es). Switches reset automatically upon cool down. <b>Rollout switch must be reset manually.</b></p> <p><b>ACTION 2</b> - Check for restrictions on blower inlet air (including filter) and outlet air. Determine cause for limit activation before placing unit back in operation.</p>
	<p><b>2.1.2</b></p> <p>Miswiring of furnace or improper connections at limit switch(es).</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
<p align="center"><b>2.2</b></p> <p>- Unit operates with a cooling and continuous fan demand.                      - Combustion air inducer will not start with a Heating demand.                      - Diagnostic lights flash the pressure switch failure code.</p> <p>LED#1-Off, LED#2-Slow Flash</p>	<p><b>2.2.1</b></p> <p>Miswiring of furnace or improper connections to combustion air inducer.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p><b>2.2.2</b></p> <p>Pressure switch stuck closed.</p>	<p><b>ACTION 1</b> - Check that the pressure switch is open without the combustion air inducer operating. Replace if defective.</p>

**PROBLEM 3: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR INDUCER DOES NOT ENERGIZE**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>3.3</b></p> <p>- Unit operates with a cooling and continuous fan demand.                      - Combustion air inducer will not start with a Heating demand.                      - Diagnostic lights flash the pressure switch failure code 2.5 minutes after heating demand.</p> <p>LED#1-Off, LED#2-Slow Flash</p>	<p><b>3.3.1</b></p> <p>Miswiring of furnace or improper connections to combustion air inducer.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p><b>3.3.2</b></p> <p>Combustion air inducer failure.</p>	<p><b>ACTION 1</b> - If there is 120V to combustion air inducer and it does not operate, replace combustion air inducer.</p>

**PROBLEM 4: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER ENERGIZES, IGNITOR IS NOT ENERGIZED.**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>4.1</b></p> <ul style="list-style-type: none"> <li>- Unit operates with a cooling and continuous fan demand.</li> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Diagnostic lights flash the pressure switch failure code 2.5 minutes after heating demand.</li> </ul> <p>LED#1-Off LED#2-Slow Flash</p>	<p align="center"><b>4.1.1</b></p> <p>Pressure switch does not close due to incorrect routing of the pressure switch line.</p>	<p><b>ACTION 1</b> - Check that the pressure switch line is correctly routed. Correctly route pressure switch line.</p>
	<p align="center"><b>4.1.2</b></p> <p>Pressure switch does not close due to obstructions in the pressure switch line.</p>	<p><b>ACTION 1</b> - Remove any obstructions from the the pressure switch line and/or taps.</p>
	<p align="center"><b>4.1.3</b></p> <p>Pressure switch line damaged</p>	<p><b>ACTION 1</b> - Check pressure switch line for leaks. Replace broken line if required.</p>
	<p align="center"><b>4.1.4</b></p> <p>Condensate in pressure switch line.</p>	<p><b>ACTION 1</b> - Check pressure switch line for condensate. Remove condensate from line.</p>
	<p align="center"><b>4.1.5</b></p> <p>Pressure switch does not close due to a low differential pressure across the pressure switch.</p>	<p><b>ACTION 1</b> - Check the differential pressure across the pressure switch. This pressure should exceed the set point listed on the switch. <b>ACTION 2</b> - Check for restricted inlet vent. Remove all blockage. <b>ACTION 3</b> - Check for proper vent sizing and run length. See installation instructions.</p>
	<p align="center"><b>4.1.6</b></p> <p>Wrong pressure switch installed in the unit, or pressure switch is out of calibration.</p>	<p><b>ACTION 1</b> - Check that the proper pressure switch is installed in the unit. Replace pressure switch if necessary.</p>
	<p align="center"><b>4.1.7</b></p> <p>Miswiring of furnace or improper connections at pressure switch.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p align="center"><b>4.1.8</b></p> <p>Pressure switch failure.</p>	<p><b>ACTION 1</b> - If all the above modes of failure have been checked, the pressure switch may have failed. Replace pressure switch and determine if unit will operate.</p>

<b>PROBLEM 5: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER ENERGIZES, IGNITOR IS ENERGIZED.</b>		
<b>Condition</b>	<b>Possible Cause</b>	<b>Corrective Action/Comments</b>
<p><b>5.1</b></p> <ul style="list-style-type: none"> <li>- Unit operates with a cooling and continuous fan demand.</li> <li>- Combustion air inducer energizes with Heating demand.</li> <li>- Ignitor is energized but unit fails to light.</li> </ul> <p>LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash</p>	<p><b>5.1.1</b></p> <p>Check that gas is being supplied to the unit.</p>	<p><b>ACTION 1</b> - Check line pressure at the gas valve. Pressure should not exceed 13" WC for both natural and propane. Line pressure should read a minimum 4.5" WC for natural and 8.0"WC for propane.</p>
	<p><b>5.1.2</b></p> <p>Miswiring of gas valve or loose connections at multi-pin control amp plugs or valve.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p><b>5.1.3</b></p> <p>Defective gas valve or ignition control.</p>	<p><b>ACTION 1</b> - Check that 24V is supplied to the gas valve approximately 35 seconds after heat demand is initiated. <b>ACTION 2</b> - Replace the valve if 24V is supplied but valve does not open. <b>ACTION 3</b> - Replace the control board if 24V is not supplied to valve.</p>
<b>PROBLEM 6: BURNERS LIGHT WITH A HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY</b>		
<b>Condition</b>	<b>Possible Cause</b>	<b>Corrective Action/Comments</b>
<p><b>6.1</b></p> <ul style="list-style-type: none"> <li>- Burners fire with a heating demand.</li> <li>- Burners light but unit shuts off prior to satisfying T-stat demand.</li> <li>- Diagnostic lights flash the pressure switch code.</li> </ul> <p>LED#1-Off LED#2-Slow Flash</p>	<p><b>6.1.1</b></p> <p>Low pressure differential at the pressure switch.</p>	<p><b>ACTION 1</b> - Check for restricted exhaust vent. Remove all blockage. <b>ACTION 2:</b> Check for proper vent sizing. See installation instructions.</p>
	<p><b>6.2</b></p> <ul style="list-style-type: none"> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Burners light but fail to stay lit.</li> <li>- After 5 tries the control diagnostics flash the watchguard burners failed to ignite code.</li> </ul> <p>LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash</p>	<p><b>6.2.1</b></p> <p>Sensor or sense wire is improperly installed.</p>
	<p><b>6.2.2</b></p> <p>Sensor or sense wire is broken.</p>	<p><b>ACTION 1</b> - Check for a broken sensor. <b>ACTION 2</b> - Test continuity across the sense wire. If wire or sensor are damaged replace the component.</p>
	<p><b>6.2.3</b></p> <p>Sensor or sensor wire is grounded to the unit.</p>	<p><b>ACTION 1</b> - Check for resistance between the sensor rod and the unit ground. <b>ACTION 2</b> - Check for resistance between the sensor wire and the unit ground. <b>ACTION 3</b> - Correct any shorts found in circuit.</p>
	<p><b>6.2.4</b></p> <p>Control does not sense flame.</p>	<p><b>ACTION 1</b> - Check the microamp signal from the burner flame. If the microamp signal is below 0.23 microamps, check the sense rod for proper location or contamination. <b>ACTION 2</b> - Replace, clean, or relocate flame sense rod. If rod is to be cleaned, use steel wool or replace sensor. DO NOT CLEAN ROD WITH SAND PAPER. SAND PAPER WILL CONTRIBUTE TO THE CONTAMINATION PROBLEM. <b>NOTE:</b> Do not attempt to bend sense rod. <b>ACTION 3</b> - Check that there is proper ground to burner box. Repair as necessary.</p>

**PROBLEM 6: BURNERS LIGHT WITH HEATING DEMAND BUT UNIT SHUTS DOWN  
PREMATURELY (CONT.)**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>6.3</b></p> <ul style="list-style-type: none"> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Burners light.</li> <li>- Roll-out switch trips during the heating demand.</li> <li>- Diagnostic lights flash limit / roll-out switch failure.</li> </ul> <p>LED#1-Slow Flash LED#2-On</p>	<p align="center"><b>6.3.1</b></p> <p align="center">Unit is firing above 100% of the nameplate input.</p>	<p><b>ACTION 1</b> - Check that the manifold pressure matches value listed on nameplate. See installation instructions for proper procedure.</p> <p><b>ACTION 2</b> - Verify that the installed orifice size match the size listed on the nameplate or installation instructions.</p> <p><b>ACTION 3</b> - Check the input rate to verify rate matches value listed on nameplate.</p>
	<p align="center"><b>6.3.2</b></p> <p align="center">Gas orifices leak at the manifold connection.</p>	<p><b>ACTION 1</b> - Tighten orifice until leak is sealed. <b>NOTE:</b> Be careful not to strip orifice threads.</p> <p><b>ACTION 2</b> - Check for gas leakage at the threaded orifice connection. Use approved method for leak detection (see unit instructions).</p>
	<p align="center"><b>6.3.3</b></p> <p align="center">Insufficient flow through the heat exchanger caused by a sooted or restricted heat exchanger.</p>	<p><b>ACTION 1</b> - Check for sooting deposits or other restrictions in the heat exchanger assembly. Clean assembly as outlined in instruction manual.</p> <p><b>ACTION 2</b> - Check for proper combustion. See IV-Heating System Service Checks section G-.</p>
	<p align="center"><b>6.3.4</b></p> <p align="center">Burners are not properly located in the burner box.</p>	<p><b>ACTION 1</b> - Check that the burners are firing into the center of the heat exchanger openings. Correct the location of the burners if necessary.</p>
	<p align="center"><b>6.3.5</b></p> <p align="center">Poor Venting</p>	<p><b>ACTION 1</b> -Check vent pipe and remove any obstructions</p> <p><b>ACTION 2</b> - Check for correct exhaust vent installation. See instructions</p>
	<p align="center"><b>6.3.6</b></p> <p align="center">Improper burner cross-overs</p>	<p><b>ACTION 1</b> - Remove burner and inspect the cross-overs for burrs, or any restriction or if crossover is warped. Remove restriction or replace burners.</p>
<p align="center"><b>6.4</b></p> <ul style="list-style-type: none"> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Burners light roughly and the unit fails to stay lit.</li> <li>- Diagnostic lights flash watchguard flame failure.</li> </ul> <p>LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash</p>	<p align="center"><b>6.4.1</b></p> <p align="center">Poor Venting</p>	<p><b>ACTION 1</b> -Check vent pipe and remove any obstructions</p> <p><b>ACTION 2</b> - Check for correct exhaust vent installation. See instructions</p>
	<p align="center"><b>6.4.2</b></p> <p align="center">Improper burner cross-overs</p>	<p><b>ACTION 1</b> - Remove burner and inspect the cross-overs for burrs, or any restriction or if crossover is warped. Remove restriction or replace burners.</p>
	<p align="center"><b>6.4.3</b></p> <p align="center">Burrs in gas orifices</p>	<p><b>ACTION 1</b> - Remove gas orifices and inspect. Remove any burrs that are present or replace orifice.</p>

**PROBLEM 6: BURNERS LIGHT WITH HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY (CONT.)**

<p align="center"><b>6.5</b></p> <ul style="list-style-type: none"> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Burners light.</li> <li>- Diagnostic lights flash watch guard flame failure.</li> <li>- NOTE" Unit might go into 60 minute Watchguard mode depending on intermittent nature of sensor signal.</li> </ul> <p>LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash</p>	<p align="center"><b>6.5.1</b></p> <p>Loose sensor wire connection causes intermittent loss of flame signal.</p>	<p><b>ACTION 1</b> - Check that the sensor is properly located.</p> <p><b>ACTION 2</b> - Check that the sense wire is properly attached to both the sensor and the control. Pay extra attention to the pin connectors.</p>
	<p align="center"><b>6.5.2</b></p> <p>Poor ground to burner box</p>	<p><b>ACTION 1</b> - Check for proper ground and repair as necessary.</p>
	<p align="center"><b>6.5.3</b></p> <p>Prove Switch opens 5 times during a single demand</p>	<p><b>ACTION 1</b> - Inspect vent pipe installation and for any restriction. Remove restriction.</p> <p><b>ACTION 2</b> - Check prove switch reliability.</p>

**PROBLEM 7: CONTROL SIGNALS LOW FLAME SENSE DURING HEATING MODE**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>7.0</b></p> <ul style="list-style-type: none"> <li>- Unit operates correctly but the diagnostic lights flash low flame sense code.</li> </ul> <p>LED#1-Slow Flash LED#2-Fast Flash</p>	<p align="center"><b>7.1.1</b></p> <p>Sense rod is improperly located on the burner.</p>	<p><b>ACTION 1</b> - Check the sense rod for proper location on the burner. Properly locate the sense rod or replace if rod cannot be located correctly.</p>
	<p align="center"><b>7.1.2</b></p> <p>Sense rod is contaminated.</p>	<p><b>ACTION 1</b> - Check sense rod for contamination or coated surface. Clean the sense rod with steel wool or replace sensor. DO NOT USE SAND PAPER TO CLEAN ROD. SAND PAPER WILL CONTRIBUTE TO THE CONTAMINATION PROBLEM.</p>

**PROBLEM 8: INDOOR BLOWER FAILS TO OPERATE IN COOLING, HEATING, OR CONTINUOUS FAN MODE**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>8.0</b></p> <ul style="list-style-type: none"> <li>- Indoor blower fails to operate in continuous fan, cooling, or heating mode.</li> </ul>	<p align="center"><b>8.1.1</b></p> <p>Miswiring of furnace or improper connections at control or indoor blower motor.</p>	<p><b>ACTION 1</b> - Correct wiring and/or replace any loose connections. Check for correct wiring and loose connections.</p>
	<p align="center"><b>8.1.2</b></p> <p>120V is not being supplied to the indoor air blower or blower motor failure.</p>	<p><b>ACTION 1</b> - Check for 120V at the various calls for indoor blower by energizing "Y", "G", and "W" individually on the low voltage terminal strip. Note that when "W" is energized, the blower is delayed 45 seconds. If there is 120V to each motor tap but the blower does not operate, replace the motor.</p>
	<p align="center"><b>8.1.3</b></p> <p>Defective control board</p>	<p><b>ACTION 1</b> - If there is not 120V when "Y", "G", or "W" is energized, replace the control.</p>
	<p align="center"><b>8.1.4</b></p> <p>Defective run capacitor</p>	<p><b>ACTION 1</b> - Replace capacitor</p>

## B-SureLight Board 100869

UPON INITIAL POWER UP, REMOVE ALL THERMOSTAT DEMANDS TO THE UNIT

<b>PROBLEM: 1 UNIT FAILS TO OPERATE IN THE COOLING, HEATING, OR CONTINUOUS FAN MODE</b>		
<b>Flash Code LED X + Y</b>	<b>Possible Cause</b>	<b>Corrective Action / Comments</b>
<p><b>1.1</b></p> <p>- Diagnostic lights fail to light up.</p> <p><b>LED OFF</b></p>	<p><b>1.1.1</b></p> <p>Main voltage 120V not supplied to unit.</p>	<p><b>ACTION 1</b> - Check 120V main voltage. Determine cause of main power failure.</p>
	<p><b>1.1.2</b></p> <p>Miswiring of furnace or improper connections.</p>	<p><b>ACTION 1</b> - Check for correct wiring of 120V to power make up box and transformer. <b>ACTION 2</b> - Check 24V wiring to control board.</p>
	<p><b>1.1.3</b></p> <p>Circuit breaker tripped or fails to close.</p>	<p><b>ACTION 1</b> - Replace circuit breaker if it is reset but does not have continuity. <b>ACTION 2</b> - If circuit breaker still trips, check for short.</p>
	<p><b>1.1.4</b></p> <p>Door interlock switch failure.</p>	<p><b>ACTION 1</b> - Check that door switch is activated when door is closed. <b>ACTION 2</b> - Check wire connections to switch, replace loose connectors. <b>ACTION 3</b> - Check continuity of switch in closed position. Replace if defective.</p>
	<p><b>1.1.5</b></p> <p>Transformer Failure.</p>	<p><b>ACTION 1</b> - Check that transformer output is 24V. Replace if defective.</p>
	<p><b>1.1.6</b></p> <p>Failed control board.</p>	<p><b>ACTION 1</b> - If all the above items have been checked, replace board.</p>
<p><b>1.2</b></p> <p>Diagnostic light flashes the reverse polarity code.</p> <p><b>LED 5 + 4</b></p>	<p><b>1.2.1</b></p> <p>120V main power polarity reversed.</p>	<p><b>ACTION 1</b> - Check the 120V has line and neutral correctly input into control. <b>ACTION 2</b> - Reverse the line and neutral at the 120V field connection.</p>
<p><b>1.3</b></p> <p>- Diagnostic light flash the improper main ground.</p> <p><b>LED 5 + 3</b></p>	<p><b>1.3.1</b></p> <p>Improper ground to the unit.</p>	<p><b>ACTION 1</b> - Check that the unit is properly ground. <b>ACTION 2</b> - Install a proper main ground to the unit</p>
<p><b>1.4</b></p> <p>- Diagnostic light flashes ignitor circuit fault.</p> <p><b>LED 4 + 7</b></p>	<p><b>1.4.1</b></p> <p>Open ignitor circuit.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections in the ignitor circuit. Check multi-plug connections for correct installation.</p>
	<p><b>1.4.2</b></p> <p>Broken or failed ignitor.</p>	<p><b>ACTION 1</b> - Unplug ignitor and read resistance across ignitor. If resistance does not read between 25 and 47 ohms, replace the ignitor.</p>
<p><b>1.5</b></p> <p>- Diagnostic light flashes low line voltage</p> <p><b>LED 4 + 8</b></p>	<p><b>1.5.1</b></p> <p>Line voltage is below 90V.</p>	<p><b>ACTION 1</b> - Check that the line voltage is above 90V. Determine cause of voltage drop and supply correct voltage to the control.</p>

**PROBLEM 2: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER DOES NOT ENERGIZE**

Flash Code LED X + Y	Possible Cause	Corrective Action / Comments
<p align="center"><b>2.1</b></p> <p>Unit operates with a cooling or continuous fan demand. Combustion air inducer will not start with a Heating demand. Diagnostic lights flash the limit failure mode.</p> <p align="center">LED 3 + 1</p>	<p align="center"><b>2.1.1</b></p> <p>Primary Limit or secondary limit (if equipped ) open.</p>	<p><b>ACTION 1</b> - Check continuity across switch(es). Switches reset automatically upon cool down.</p> <p><b>ACTION 2</b> - Check for restrictions on blower inlet air (including filter) and outlet air. Determine cause for limit activation before placing unit back in operation.</p>
	<p align="center"><b>2.1.2</b></p> <p>Miswiring of furnace or improper connections at limit switch(es).</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
<p align="center"><b>2.2</b></p> <p>Unit operates with a cooling and continuous fan demand. Combustion air inducer will not start with a Heating demand. Diagnostic lights flash the pressure switch failure code.</p> <p align="center">LED 2 +4</p>	<p align="center"><b>2.2.1</b></p> <p>Miswiring of furnace or improper connections to combustion air inducer.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p align="center"><b>2.2.2</b></p> <p>Prove switch stuck closed.</p>	<p><b>ACTION 1</b> - Check that the prove switch is open without the combustion air inducer operating. Replace if defective.</p>
<p align="center"><b>2.3</b></p> <p>Unit operates with a cooling or continuous fan demand. Combustion air inducer will not start with a Heating demand. Diagnostic lights flash the open rollout failure mode.</p> <p align="center">LED 5 + 1</p>	<p align="center"><b>2.3.1</b></p> <p>Rollout Switch Open.</p>	<p><b>ACTION 1</b> - Check continuity across rollout switches. Rollout switches must be manually reset.</p> <p><b>ACTION 2</b> - Look for restrictions in vent pipe or combustion air inlet or heat exchanger. Determine cause before placing unit in operation.</p>

**PROBLEM 3: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR INDUCER DOES NOT ENERGIZE**

Condition	Possible Cause	Corrective Action/Comments
<p align="center"><b>3.3</b></p> <p>Unit operates with a cooling and continuous fan demand. Combustion air inducer will not start with a Heating demand. Diagnostic lights flash the pressure switch failure code 2.5 minutes after heating demand.</p> <p align="center">LED 2 + 3</p>	<p align="center"><b>3.3.1</b></p> <p>Miswiring of furnace or improper connections to combustion air inducer.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p align="center"><b>3.3.2</b></p> <p>Combustion air inducer failure.</p>	<p><b>ACTION 1</b> - If there is 120V to combustion air inducer and it does not operate, replace combustion air inducer.</p>

**PROBLEM 4: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR INDUCER ENERGIZES, IGNITOR IS NOT ENERGIZED.**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<p align="center"><b>4.1</b></p> <ul style="list-style-type: none"> <li>- Unit operates with a cooling and continuous fan demand.</li> <li>- Combustion air inducer energizes with a heating demand.</li> <li>- Diagnostic lights flash the pressure switch failure code 2.5 minutes after heating demand.</li> </ul> <p align="center"><b>LED 2 + 3</b></p>	<p align="center"><b>4.1.1</b></p> <p>Prove switch does not close due to obstruction in vent pipe.</p>	<p><b>ACTION 1</b> - Check for restricted vent. Remove all blockage. <b>ACTION 2:</b> Check for proper vent sizing. See installation instructions.</p>
	<p align="center"><b>4.1.2</b></p> <p>Prove switch does not close due to incorrect routing of the prove switch line.</p>	<p><b>ACTION 1</b> - Check that the prove switch line is correctly routed. Correctly route prove switch line.</p>
	<p align="center"><b>4.1.3</b></p> <p>Prove switch does not close due to obstructions in the prove switch line.</p>	<p><b>ACTION 1</b> - Remove any obstructions from the the prove switch line and/or taps.</p>
	<p align="center"><b>4.1.4</b></p> <p>Prove switch line damaged</p>	<p><b>ACTION 1</b> - Check prove switch line for leaks. Replace broken line if required.</p>
	<p align="center"><b>4.1.5</b></p> <p>Condensate in prove switch line.</p>	<p><b>ACTION 1</b> - Check prove switch line for condensate. Remove condensate from line.</p>
	<p align="center"><b>4.1.6</b></p> <p>Prove switch does not close due to a low differential pressure across the prove switch.</p>	<p><b>ACTION 1</b> - Check the differential pressure across the prove switch. This pressure should exceed the set point listed on the switch. <b>ACTION 2</b> - Check for restricted inlet vent. Remove all blockage. <b>ACTION 3</b> - Check for proper vent sizing and run length. See installation instructions.</p>
	<p align="center"><b>4.1.7</b></p> <p>Wrong prove switch installed in the unit, or prove switch is out of calibration.</p>	<p><b>ACTION 1</b> - Check that the correct prove switch is installed in the unit. Replace prove switch if necessary.</p>
	<p align="center"><b>4.1.8</b></p> <p>Miswiring of furnace or improper connections at prove switch.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p align="center"><b>4.1.9</b></p> <p>Prove switch failure.</p>	<p><b>ACTION 1</b> - If all the above modes of failure have been checked, the prove switch may have failed. Replace prove switch and determine if unit will operate.</p>

**PROBLEM 5: UNIT FIRES ON LOW FIRE, FAILS TO GO TO HIGH FIRE OPERATION**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<p><b>5.1</b></p> <ul style="list-style-type: none"> <li>- Unit lights normally during low fire</li> <li>- Call for high fire inducer switches to high fire for 10 seconds then back to low fire.</li> <li>- Diagnostic lights flash the high pressure switch failure to close.</li> </ul> <p><b>LED 2 + 5</b></p>	<p><b>5.1.1</b></p> <p>Prove switch does not close due to obstruction in vent pipe.</p>	<p><b>ACTION 1</b> - Check for restricted vent. Remove all blockage.  <b>ACTION 2:</b> Check for proper vent sizing. See installation instructions.</p>
	<p><b>5.1.2</b></p> <p>Prove switch does not close due to incorrect routing of the prove switch line.</p>	<p><b>ACTION 1</b> - Check that the prove switch line is correctly routed. Correctly route prove switch line.</p>
	<p><b>5.1.3</b></p> <p>Prove switch does not close due to obstructions in the prove switch line.</p>	<p><b>ACTION 1</b> - Remove any obstructions from the the prove switch line and/or taps.</p>
	<p><b>5.1.4</b></p> <p>Prove switch line damaged</p>	<p><b>ACTION 1</b> - Check prove switch line for leaks. Replace broken line if required.</p>
	<p><b>5.1.5</b></p> <p>Condensate in prove switch line.</p>	<p><b>ACTION 1</b> - Check prove switch line for condensate. Remove condensate from line.</p>
	<p><b>5.1.6</b></p> <p>Prove switch does not close due to a low differential prove across the prove switch.</p>	<p><b>ACTION 1</b> - Check the differential pressure across the prove switch. This pressure should exceed the set point listed on the switch.  <b>ACTION 2</b> - Check for restricted inlet vent. Remove all blockage.  <b>ACTION 3</b> - Check for proper vent sizing and run length. See installation instructions.</p>
	<p><b>5.1.7</b></p> <p>Wrong prove switch installed in the unit, or prove switch is out of calibration.</p>	<p><b>ACTION 1</b> - Check that the correct prove switch is installed in the unit. Replace prove switch if necessary.</p>
	<p><b>5.1.8</b></p> <p>Miswiring of furnace or improper connections at prove switch.</p>	<p><b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.</p>
	<p><b>5.1.9</b></p> <p>Prove switch failure.</p>	<p><b>ACTION 1</b> - If all the above modes of failure have been checked, the prove switch may have failed. Replace prove switch and determine if unit will operate.</p>

**PROBLEM 6: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER ENERGIZES, IGNITOR IS ENERGIZED.**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<b>6.1</b>  Unit operates with a cooling and continuous fan demand. Combustion air inducer energizes with Heating demand. Ignitor is energized but unit fails to light.	<b>6.1.1</b>  Check that gas is being supplied to the unit.	<b>ACTION 1</b> - Check line pressure at the gas valve. Pressure should not exceed 13" WC for both natural and propane. Line pressure should read a minimum 4.5" WC for natural and 8.0"WC for propane.
	<b>6.1.2</b>  Miswiring of gas valve or loose connections at multi-pin control amp plugs or valve.	<b>ACTION 1</b> - Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
LED 4 + 1	<b>6.1.3</b>  Defective gas valve or ignition control.	<b>ACTION 1</b> - Check that 24V is supplied to the gas valve approximately 35 seconds after heat demand is initiated. <b>ACTION 2</b> - Replace the valve if 24V is supplied but valve does not open. <b>ACTION 3</b> - Replace the control board if 24V is not supplied to valve.

**PROBLEM 7: BURNERS LIGHT WITH A HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<b>7.1</b>  Burners fire with a heating demand. Burners light but unit shuts off prior to satisfying T-stat demand. Diagnostic lights flash the prove switch code.	<b>7.1.1</b>  Low pressure differential at the prove switch.	<b>ACTION 1</b> - Check for restricted exhaust vent. Remove all blockage. <b>ACTION 2:</b> Check for proper vent sizing. See installation instructions.
LED 2 + 3		
<b>7.2</b>  Combustion air inducer energizes with a heating demand. Burners light but fail to stay lit. After 5 tries the control diagnostics flash the watchguard burners failed to ignite code.	<b>7.2.1</b>  Sensor or sense wire is improperly installed.	<b>ACTION 1</b> - Check that sensor is properly located and that the sense wire is properly attached to both the sensor and the control.
	<b>7.2.2</b>  Sensor or sense wire is broken.	<b>ACTION 1</b> - Check for a broken sensor. <b>ACTION 2</b> - Test continuity across the sense wire. If wire or sensor are damaged replace the component.
LED 4 + 3	<b>7.2.3</b>  Sensor or sensor wire is grounded to the unit.	<b>ACTION 1</b> - Check for resistance between the sensor rod and the unit ground. <b>ACTION 2</b> - Check for resistance between the sensor wire and the unit ground. <b>ACTION 3</b> - Correct any shorts found in circuit.
	<b>7.2.4</b>  Control does not sense flame.	<b>ACTION 1</b> - Check the microamp signal from the burner flame. If the microamp signal is below normal microamps, check the sense rod for proper location or contamination. <b>ACTION 2</b> - Replace, clean, or relocate flame sense rod. If rod is to be cleaned, use steel wool or replace sensor. DO NOT CLEAN ROD WITH SAND PAPER. SAND PAPER WILL CONTRIBUTE TO THE CONTAMINATION PROBLEM. <b>NOTE:</b> Do not attempt to bend sense rod. <b>ACTION 3</b> - Check that there is proper ground to burner box. Repair as necessary.

**PROBLEM 7: BURNERS LIGHT WITH HEATING DEMAND BUT UNIT SHUTS DOWN  
PREMATURELY (CONT.)**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<p align="center"><b>7.3</b></p> <p>Combustion air inducer energizes with a heating demand. Burners light. Roll-out switch trips during the heating demand. Diagnostic lights flash roll-out switch failure.</p> <p align="center">LED 5 + 1</p>	<p align="center"><b>7.3.1</b></p> <p>Unit is firing above 100% of the nameplate input.</p>	<p><b>ACTION 1</b> - Check that the manifold pressure matches value listed on nameplate. See installation instructions for proper procedure. <b>ACTION 2</b> - Verify that the installed orifice size match the size listed on the nameplate or installation instructions. <b>ACTION 3</b> - Check the input rate to verify rate matches value listed on nameplate.</p>
	<p align="center"><b>7.3.2</b></p> <p>Gas orifices leak at the manifold connection.</p>	<p><b>ACTION 1</b> - Tighten orifice until leak is sealed. <b>NOTE:</b> Be careful not to strip orifice threads. <b>ACTION 2</b> - Check for gas leakage at the threaded orifice connection. Use approved method for leak detection (see unit instructions).</p>
	<p align="center"><b>7.3.3</b></p> <p>Insufficient flow through the heat exchanger caused by a sooted or restricted heat exchanger.</p>	<p><b>ACTION 1</b> - Check for sooting deposits or other restrictions in the heat exchanger assembly. Clean assembly as outlined in instruction manual. <b>ACTION 2</b> - Check for proper combustion. See IV-Heating System Service Checks section G-.</p>
	<p align="center"><b>7.3.4</b></p> <p>Burners are not properly located in the burner box.</p>	<p><b>ACTION 1</b> - Check that the burners are firing into the center of the heat exchanger openings. Correct the location of the burners if necessary.</p>
	<p align="center"><b>7.3.5</b></p> <p>Poor Venting</p>	<p><b>ACTION 1</b> - Check vent pipe and remove any obstructions <b>ACTION 2</b> - Check for correct exhaust vent installation. See instructions</p>
	<p align="center"><b>7.3.6</b></p> <p>Improper burner cross-overs</p>	<p><b>ACTION 1</b> - Remove burner and inspect the cross-overs for burrs, or any restriction or if crossover is warped. Remove restriction or replace burners.</p>
<p align="center"><b>7.4</b></p> <p>Combustion air inducer energizes with a heating demand. Burners light roughly and the unit fails to stay lit. Diagnostic lights flash watchguard flame failure.</p> <p align="center">LED 4 + 3</p>	<p align="center"><b>7.4.1</b></p> <p>Poor Venting</p>	<p><b>ACTION 1</b> - Check vent pipe and remove any obstructions <b>ACTION 2</b> - Check for correct exhaust vent installation. See instructions</p>
	<p align="center"><b>7.4.2</b></p> <p>Improper burner cross-overs</p>	<p><b>ACTION 1</b> - Remove burner and inspect the cross-overs for burrs, or any restriction or if crossover is warped. Remove restriction or replace burners.</p>
	<p align="center"><b>7.4.3</b></p> <p>Burrs in gas orifices</p>	<p><b>ACTION 1</b> - Remove gas orifices and inspect. Remove any burrs that are present or replace orifice.</p>

**PROBLEM 7: BURNERS LIGHT WITH HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY (CONT.)**

Flash Code LED X + Y	Possible Cause	Corrective Action/Comments
<b>7.5</b> Combustion air inducer energizes with a heating demand. - Burners light. Diagnostic lights flash watch guard flame failure. NOTE" Unit might go into 60 minute Watchguard mode depending on intermittent nature of sensor signal.	<b>7.5.1</b> Loose sensor wire connection causes intermittent loss of flame signal.	<b>ACTION 1</b> - Check that the sensor is properly located. <b>ACTION 2</b> - Check that the sense wire is properly attached to both the sensor and the control. Pay extra attention to the pin connectors.
LED 4 + 3	<b>7.5.2</b> Poor ground to burner box	<b>ACTION 1</b> - Check for proper ground and repair as necessary.

**PROBLEM 8: CONTROL SIGNALS LOW FLAME SENSE DURING HEATING MODE**

Condition	Possible Cause	Corrective Action/Comments
<b>8.0</b> Unit operates correctly but the diagnostic lights flash low flame sense code.	<b>8.1.1</b> Sense rod is improperly located on the burner.	<b>ACTION 1</b> - Check the sense rod for proper location on the burner. Properly locate the sense rod or replace if rod cannot be located correctly.
LED 1 + 2	<b>8.1.2</b> Sense rod is contaminated.	<b>ACTION 1</b> - Check sense rod for contamination or coated surface. Clean the sense rod with steel wool or replace sensor. DO NOT USE SAND PAPER TO CLEAN ROD. SAND PAPER WILL CONTRIBUTE TO THE CONTAMINATION PROBLEM.

**PROBLEM 9: INDOOR BLOWER FAILS TO OPERATE IN COOLING, HEATING, OR CONTINUOUS FAN MODE**

Condition	Possible Cause	Corrective Action/Comments
<b>9.0</b> - Indoor blower fails to operate in continuous fan, cooling, or heating mode.	<b>9.1.1</b> Miswiring of furnace or improper connections at control or indoor blower motor.	<b>ACTION 1</b> - Correct wiring and/or replace any loose connections. Check for correct wiring and loose connections.
	<b>9.1.2</b> 120V is not being supplied to the indoor air blower or blower motor failure.	<b>ACTION 1 - PSC MOTORS</b> Check for 120V at the various calls for indoor blower by energizing "Y", "G", and "W" individually on the low voltage terminal strip. Note that when "W" is energized, the blower is delayed 45 seconds. If there is 120V to each motor tap but the blower does not operate, replace the motor. <b>ACTION 1 - VARIABLE SPEED MOTORS for operation of the VSM see NO TAG</b>
	<b>9.1.3</b> Defective control board	<b>ACTION 1 - PSC MOTORS</b> If there is not 120V when "Y", "G", or "W" is energized, replace the control.