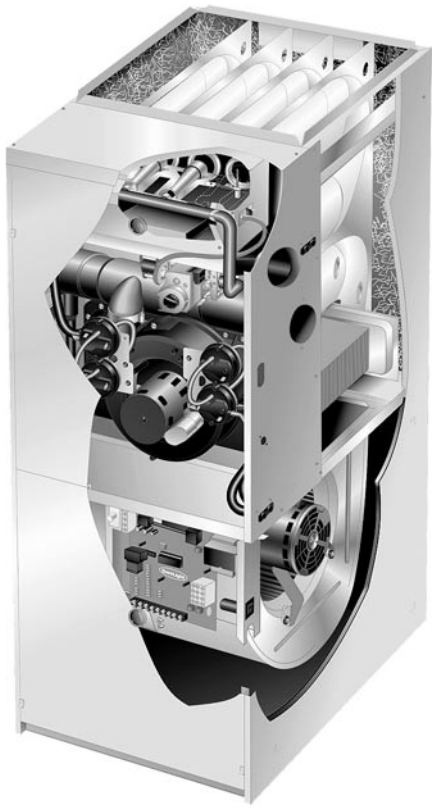
G61MP SERIES UNITS

G61MP series units are high-efficiency multi-position (upflow, downflow, horizontal right and left) gas furnaces manufactured with Lennox Duralok Plus™ heat exchangers formed of aluminized steel. G61MP units are available in heating capacities of 44,000 to 132,000 Btuh (13.0.0 to 38.6 kW) and cooling applications from 2 to 5 tons (7.0 kW to 17.5 kW)) 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. G61MP model units are equipped with the Two-Stage Integrated SureLight control. All G61MP units meet the California Nitrogen Oxides (NO_x) 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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⚠ 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.**	**G61MP-36B-045**	**G61MP-36B-070**	**G61MP-48C-090**	**G61MP-60C-090**
	High Fire	Input - Btuh (kW)	44,000 (12.9)	66,000 (19.3)	88,000 (25.8)	88,000 (25.8)
		Output - Btuh (kW)	41,000 (12.0)	62,000 (18.2)	83,000 (24.3)	84,000 (24.6)
		Temperature rise range - °F (°C)	25 - 55 (14 - 31)	35 - 65 (21 - 39)	35 - 65 (21 - 39)	25 - 55 (14 - 31)
	Low Fire	Input - Btuh (kW)	30,000 (8.8)	45,000 (13.2)	60,000 (17.6)	60,000 (17.6)
		Output - Btuh (kW)	28,000 (8.2)	43,000 (12.6)	57,000 (16.7)	58,000 (17.0)
		Temperature rise range - °F (°C)	10 - 40 (6 - 24)	20 - 50 (12 - 30)	25 - 55 (14 - 31)	15 - 45 (9 - 27)
		[1] AFUE	94.1%	94.1%	94.1%	94.1%
		California Seasonal Efficiency	83.5%	86.0%	87.3%	84.4%
		High static (CSA) - in. w.g. (Pa)	0.5	0.5	0.5	0.5
Connections in.		[2] Intake Pipe (PVC)	2	2	2	2
		[2] Exhaust Pipe (PVC)	2	2	2	2
		Condensate Drain Trap (PVC pipe) - i.d.	1/2	1/2	1/2	1/2
		with field supplied (PVC coupling) - o.d.	3/4	3/4	3/4	3/4
		hose with hose clamp - i.d. x o.d.	1-1/4 x 1	1-1/4 x 1	1-1/4 x 1	1-1/4 x 1
		Gas pipe size IPS	1/2	1/2	1/2	1/2
Indoor Blower		Wheel nominal diameter x width - in. (mm)	10 x 8 (254 x 203)	10 x 8 (254 x 203)	10 x 10 (254 x 254)	11-1/2 x 10 (292 x 229)
		Motor output - hp (W)	1/3 (249)	1/3 (249)	1/2 (373)	1 (746)
		Tons (kW) of add-on cooling	2.5 - 3 (8.8 - 10.5)	2.5 - 3.5 (8.8 - 12.3)	3 - 4 (10.5 - 14.0)	4 - 5 (14.0 - 17.5)
Shipping Data		lbs. (kg) - 1 package	136 (62)	146 (66)	168 (76)	176 (80)
Electrical characteristics			120 volts - 60 hertz - 1 phase (less than 12 amps)			
OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA						
[3] **Air Filter and Rack Kit Size of filter**		Horizontal (end)	**87L96 -** 18 x 25 x 1 in. (457 x 635 x 25 mm)		**87L97 -** 20 x 25 x 1 in. (508 x 635 x 25 mm)	
		Side Return	Single **44J22** or Ten Pack **66K63** - (1) 16 x 25 x 1 in. (406 x 635 x 25 mm)			
Condensate Drain Heat Cable		6 ft. (1.8 m)	**26K68**	**26K68**	**26K68**	**26K68**
		24 ft. (7.3 m)	**26K69**	**26K69**	**26K69**	**26K69**
		50 ft. (15.2 m)	**26K70**	**26K70**	**26K70**	**26K70**
Heat Cable Tape		Fiberglass - 1/2 in. (38 mm) x 66 ft. (20 m)	**39G04**	**39G04**	**39G04**	**39G04**
		Aluminum foil - 2 in. (25 mm) x 60 ft. (18 m)	**39G03**	**39G03**	**39G03**	**39G03**
EZ Filter Base		Catalog Number - Ship. Weight - lbs. (kg)	**73P56** - 7 (3)	**73P56** - 7 (3)	**73P57** - 8 (4)	**73P57** - 8 (4)
		Dimensions - H x W x D - in. (mm)	4 x 17-5/8 x 28-5/8 (102 x 448 x 727)	4 x 17-5/8 x 28-5/8 (102 x 448 x 727)	4 x 21-5/8 x 28-5/8 (102 x 549 x 727)	4 x 21-5/8 x 28-5/8 (102 x 549 x 727)
		Size of field provided filter - in. (mm)	16 x 25 x 1 (406 x 635 x 25)	16 x 25 x 1 (406 x 635 x 25)	20 x 25 x 1 (508 x 635 x 25)	20 x 25 x 1 (508 x 635 x 25)
Down-Flow Additive Base			**11M60**	**11M60**	**11M61**	**11M61**
[4] **High Altitude Orifice Kit -** Natural Gas			**59M16**	**59M16**	**59M16**	**59M16**
[4] **High Altitude Pressure Switch Kit - Order two each**		7501-10,000ft. (2286-3048m	**- - -**	**56M06**	**- - -**	**- - -**
Horizontal Support Frame Kit - Ship. Weight - lbs. (kg)			**56J18** - 18 (8)	**56J18** - 18 (8)	**56J18** - 18 (8)	**56J18** - 18 (8)
LPG/Propane Kit		0-7500 ft. (0-2286 m)	**59M13**	**59M13**	**59M13**	**59M13**
		7501-10,000 ft. (2286-3048 m)	**59M14**	**59M14**	**59M14**	**59M14**
Natural to LPG/Propane Kit			**59M87**	**59M87**	**59M87**	**59M87**
RAB Return Air Base			- - -	- - -	- - -	RAB60C (**12M71**)
[5] **Termination Kits Direct Vent Applications Only**	**Concentric**	1-1/2 inch (38 mm)	**60G77**	**60G77**	- - -	- - -
		2 inch (51 mm)	- - -	- - -	**33K97**	**33K97**
		3 inch (76 mm)	- - -	- - -	**60L46**	**60L46**
	Wall	Close Couple - 2 inch (51 mm)	**22G44**	**22G44**	**- - -**	- - -
		3 inch (76 mm)	**44J40**	**44J40**	**44J40**	**44J40**
		Close Couple WTK - 2 inch (51 mm)	**30G28**	**30G28**	**- - -**	- - -
[5,6] **Termination Kits Direct Vent or Non-Direct Vent**	**Roof**	2 inch (51 mm)	**15F75**	**15F75**	**15F75**	**15F75**
		3 inch (76 mm)	**44J41**	**44J41**	**44J41**	**44J41**
	Wall	Wall Ring Kit 2 inch (51 mm)	**15F74**	**15F74**	**15F74**	**15F74**

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

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

2 Determine from venting tables proper exhaust pipe size and termination kit required.

3 Cleanable polyurethane frame type filter.

4 Required for proper operation at altitudes from 7501 to 10,000 ft. (2286 to 3048 m).

5 See Installation Instructions for specific venting information.

6 Kits contain enough parts for two, non-direct vent installations.

SPECIFICATIONS

Gas Heating Performance		**Model No.**	**G61MP-48C-110**	**G61MP-60C-110**	**G61MP-60D-135**
	High Fire	Input - Btuh (kW)	110,000 (32.2)	110,000 (32.2)	132,000 (38.7)
		Output - Btuh (kW)	104,000 (30.5)	104,000 (30.5)	124,000 (36.3)
		Temperature rise range - °F (°C)	45 - 75 (25 - 42)	35 - 65 (21 - 39)	40 - 70 (24 - 42)
	Low Fire	Input - Btuh (kW)	75,000 (22.0)	75,000 (22.0)	90,000 (26.4)
		Output - Btuh (kW)	72,000 (21.1)	72,000 (21.1)	86,000 (25.2)
		Temperature rise range - °F (°C)	30 - 60 (18 - 36)	25 - 55 (14 - 31)	30 - 60 (18 - 36)
		[1] AFUE	94.1%	94.1%	94.1%
		California Seasonal Efficiency	88.4%	87.0%	87.7%
		High static (CSA) - in. w.g. (Pa)	0.5	0.5	0.5
Connections in.		[2] Intake Pipe (PVC)	2	2	3
		[2] Exhaust Pipe (PVC)	2	2	3
		Condensate Drain Trap (PVC pipe) - i.d.	1/2	1/2	1/2
		with field supplied (PVC coupling) - o.d.	3/4	3/4	3/4
		hose with hose clamp - i.d. x o.d.	1-1/4 x 1	1-1/4 x 1	1-1/4 x 1
		Gas pipe size IPS	1/2	1/2	1/2
Indoor Blower		Wheel nominal diameter x width - in. (mm)	10 x 10 (254 x 254)	11-1/2 x 10 (292 x 229)	11-1/2 x 10 (292 x 229)
		Motor output - hp (W)	1/2 (373)	1 (746)	1 (746)
		Tons (kW) of add-on cooling	3 - 4 (10.5 - 14.0)	4 - 5 (14.0 - 17.5)	4 - 5 (14.0 - 17.5)
Shipping Data		lbs. (kg) - 1 package	178 (81)	186 (84)	206 (93)
Electrical characteristics			120 volts - 60 hertz - 1 phase (less than 12 amps)		

OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA

[3, 4] **Air Filter and Rack Kit - Size of filter**		Horizontal (end)	**87L97 -** 20 x 25 x 1 in. (508 x 635 x 25 mm)		**87L98 -** 25 x 25 x 1 in. (635 x 635 x 25 mm)
		Side Return	[5] Single **44J22** or Ten Pack **(66K63) -** (1) 16 x 25 x 1 in. (406 x 635 x 25 mm)		
Condensate Drain Heat Cable		6 ft. (1.8 m)	**26K68**	**26K68**	**26K68**
		24 ft. (7.3 m)	**26K69**	**26K69**	**26K69**
		50 ft. (15.2 m)	**26K70**	**26K70**	**26K70**
Heat Cable Tape		Fiberglass - 1/2 in. (38 mm) x 66 ft. (20 m)	**39G04**	**39G04**	**39G04**
		Aluminum foil - 2 in. (25 mm) x 60 ft. (18 m)	**39G03**	**39G03**	**39G03**
[4] **EZ Filter Base**		Catalog Number - Shipping Weight	**73P57** - 8 lbs. (4 kg)	**73P58** - 10 lbs. (5 kg)	**73P58** - 10 lbs. (5 kg)
		Dimensions - H x W x D - in. (mm)	4 x 21-5/8 x 28-5/8 (102 x 549 x 727)	4 x 24-5/8 x 28-5/8 (102 x 625 x 727)	4 x 24-5/8 x 28-5/8 (102 x 625 x 727)
		Size of field provided filter - in. (mm)	20 x 25 x 1 (508 x 635 x 25)	24 x 24 x 1 (610 x 610 x 25)	24 x 24 x 1 (610 x 610 x 25)
Down-Flow Additive Base			**11M61**	**11M61**	**11M62**
[5] **High Altitude Orifice Kit -** Natural Gas Only			**59M16**	**59M16**	**59M16**
[6] **High Altitude Pressure Switch Kit - Order two each**		4501-10,000 ft. (1372-3048 m)	**- - -**	**- - -**	**56M93**
Horizontal Support Frame Kit - Ship. Weight - lbs. (kg)			**56J18** - 18 (8)	**56J18** - 18 (8)	**56J18** - 18 (8)
LPG/Propane Kit		0-7500 ft. (0-2286 m)	**59M13**	**59M13**	**59M13**
		7501-10,000ft. (2286-3048m)	**59M14**	**59M14**	**59M14**
Natural to LPG/Propane Kit			**59M87**	**59M87**	**59M87**
RAB Return Air Base			- - - -	RAB60C (**12M71**)	RAB60D (**12M72**)
[7] **Termination Kits - Direct Vent Applications**	**Concentric Roof/Wall**	2 inch (51 mm)	**33K97**	**33K97**	**- - -**
		3 inch (76 mm)	**60L46**	**60L46**	**60L46**
	Wall	Close-Coupled 3 inch (76 mm)	**44J40**	**44J40**	**44J40**
[7,8] **Termination Kits Direct Vent or Non-Direct Vent**	**Roof**	2 inch (51 mm)	**15F75**	**15F75**	**- - -**
		3 inch (76 mm)	**44J41**	**44J41**	**44J41**
	Wall	Ring Kit 2 inch (51 mm)	**15F74**	**15F74**	[9] **15F74**

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

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

2 Determine from venting tables proper exhaust pipe size and termination kit required.

3 Cleanable polyurethane frame type filter.

4 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.

5 Required for proper operation at altitudes from 7501 to 10,000 ft. (2286 to 3048 m).

6 Required for proper operation at altitudes over 4500 ft. (1370 m).

7 See Installation Instructions for specific venting information.

8 Kits contain enough parts for two, non-direct vent installations.

9 Non-direct vent applications only.

BLOWER DATA

G61MP-36B-045 PERFORMANCE (Less Filter)

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
0.00	25	1555	735	630	1410	665	585	1190	560	520	1030	485	435
0.10	25	1515	715	605	1385	655	555	1190	560	485	1020	480	415
0.20	50	1470	695	580	1345	635	520	1170	550	455	1010	475	400
0.30	75	1410	665	555	1310	620	495	1155	545	440	1000	470	385
0.40	100	1350	640	535	1250	590	465	1120	530	410	980	465	360
0.50	125	1290	610	505	1205	570	450	1080	510	390	950	450	345
0.60	150	1220	575	485	1145	540	420	1020	480	365	905	430	320
0.70	175	1145	540	460	1080	510	400	975	460	345	860	405	300
0.80	200	1050	495	425	985	465	365	870	410	320	785	370	285
0.90	225	945	445	410	900	425	345	825	390	305	730	345	270

NOTES - All air data is measured external to unit without filter (not furnished - field provided).
Air volume based on bottom air return air. Actual air volume may vary on side return air applications.

G61MP-36B-070 PERFORMANCE (Less Filter)

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
0.00	0	1640	775	660	1415	665	575	1160	545	485	1005	475	410
0.10	25	1600	755	635	1395	660	550	1160	545	460	1000	470	385
0.20	50	1540	725	605	1370	650	525	1160	545	445	995	470	375
0.30	75	1495	705	580	1345	635	505	1145	540	425	990	465	365
0.40	100	1420	670	545	1275	605	480	1125	530	395	965	455	345
0.50	125	1360	640	525	1245	590	450	1080	510	375	945	445	325
0.60	150	1275	600	490	1165	550	410	1025	485	350	900	425	305
0.70	175	1170	555	465	1085	515	385	965	430	335	860	405	295
0.80	200	1080	510	440	1010	475	360	865	410	310	775	365	270
0.90	225	945	445	400	840	395	320	765	360	275	710	335	245

NOTES - All air data is measured external to unit without filter (not furnished - field provided).
Air volume based on bottom air return air. Actual air volume may vary on side return air applications.

G61MP-48C-090 PERFORMANCE (Less Filter)

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
0.00	0	2180	1030	930	1835	865	790	1520	715	630	1280	605	510
0.10	25	2135	1005	885	1825	860	750	1510	710	610	1275	600	495
0.20	50	2085	985	840	1810	855	720	1505	710	580	1270	600	475
0.30	75	2030	955	800	1775	835	685	1500	705	565	1265	595	460
0.40	100	1940	915	760	1735	820	650	1480	700	535	1250	590	440
0.50	125	1865	880	725	1660	785	600	1430	675	505	1215	575	425
0.60	150	1740	820	670	1590	750	575	1380	650	475	1175	555	410
0.70	175	1645	775	640	1475	695	520	1290	610	450	1105	520	375
0.80	200	1540	725	600	1340	630	465	1175	555	405	1020	480	355
0.90	225	1335	630	540	1170	555	440	1070	505	375	950	450	330

NOTES - All air data is measured external to unit without filter (not furnished - field provided).
Air volume based on bottom air return air. Actual air volume may vary on side return air applications.

G61MP-48C-110 PERFORMANCE (Less Filter)

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
0.00	0	2160	1020	880	1880	890	755	1490	705	602	1235	580	485
0.10	25	2100	990	850	1855	875	730	1480	700	585	1230	580	475
0.20	50	2035	960	805	1815	860	690	1475	695	560	1225	580	460
0.30	75	1965	925	750	1755	830	650	1475	695	545	1220	575	445
0.40	100	1885	890	725	1715	810	625	1465	690	510	1215	575	430
0.50	125	1780	840	680	1630	770	580	1420	670	490	1150	540	400
0.60	150	1690	800	660	1550	735	550	1360	640	460	1110	525	380
0.70	175	1575	745	620	1410	665	505	1210	570	405	1035	490	350
0.80	200	1375	650	550	1230	580	450	1125	530	380	970	460	325
0.90	225	1225	580	520	1120	530	415	1050	495	365	885	420	310

NOTES - All air data is measured external to unit without filter (not furnished - field provided).
Air volume based on bottom air return air. Actual air volume may vary on side return air applications.

BLOWER DATA

G61MP-60C-090 PERFORMANCE (Less Filter) - 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) 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
0.00	0	**2835**	**1335**	**1495**	**2340**	**1105**	**1155**	**1800**	**850**	**895**	1440	680	695
0.10	25	**2785**	**1315**	**1475**	**2345**	**1105**	**1135**	**1805**	**855**	**865**	1515	715	690
0.20	50	**2715**	**1280**	**1435**	**2275**	**1075**	**1080**	**1825**	**860**	**845**	1560	735	685
0.30	75	**2620**	**1235**	**1380**	**2260**	**1065**	**1035**	**1840**	**870**	**825**	1600	755	680
0.40	100	**2550**	**1205**	**1350**	**2230**	**1055**	**1015**	**1845**	**870**	**815**	1620	765	670
0.50	125	**2450**	**1155**	**1305**	**2175**	**1025**	**990**	**1850**	**870**	**790**	1615	765	655
0.60	150	**2365**	**1115**	**1270**	**2130**	**1005**	**940**	**1830**	**865**	**775**	1615	760	640
0.70	175	**2240**	**1060**	**1205**	**2070**	**975**	**915**	**1815**	**855**	**760**	1595	755	620
0.80	200	**2185**	**1030**	**1190**	**1965**	**925**	**865**	1775	840	745	1555	735	605
0.90	225	**2015**	**950**	**1150**	**1820**	**860**	**820**	1690	800	715	1440	680	580

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

G61MP-60C-090 PERFORMANCE (Less Filter) - 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
0.00	0	2840	1340	1450	2345	1105	1105	1895	895	900	1515	715	700
0.10	25	2765	1305	1415	2365	1115	1080	1950	920	885	1580	745	700
0.20	50	2695	1270	1385	2345	1105	1050	1985	935	870	1620	765	695
0.30	75	2605	1230	1335	2315	1090	1030	1990	940	850	1645	775	690
0.40	100	2530	1195	1300	2265	1070	990	1990	940	825	1665	785	675
0.50	125	2420	1140	1260	2210	1045	955	1970	930	800	1675	790	665
0.60	150	2330	1100	1220	2145	1010	925	1930	910	775	1665	785	650
0.70	175	2250	1060	1190	2050	965	885	1875	885	745	1645	775	630
0.80	200	2135	1010	1140	2000	945	865	1810	855	715	1620	765	615
0.90	225	2030	960	1090	1885	890	830	1720	810	685	1560	735	590

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

G61MP-60C-110 PERFORMANCE (Less Filter) - 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) 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
0.00	0	**2625**	**1240**	**1350**	**2310**	**1090**	**1080**	**1885**	**890**	**885**	1515	715	700
0.10	25	**2570**	**1215**	**1330**	**2325**	**1095**	**1060**	**1910**	**900**	**865**	1575	745	700
0.20	50	**2410**	**1135**	**1305**	**2285**	**1080**	**1035**	**1930**	**910**	**845**	1620	765	690
0.30	75	**2425**	**1145**	**1265**	**2230**	**1055**	**990**	**1925**	**905**	**825**	1635	770	675
0.40	100	**2335**	**1100**	**1220**	**2175**	**1025**	**950**	**1910**	**900**	**810**	1640	775	660
0.50	125	**2270**	**1070**	**1195**	**2120**	**1000**	**935**	**1895**	**895**	**785**	1640	775	640
0.60	150	**2170**	**1025**	**1155**	**2045**	**965**	**885**	**1860**	**875**	**765**	1630	770	630
0.70	175	**2110**	**995**	**1130**	**1950**	**920**	**855**	1795	845	730	1590	750	610
0.80	200	**2035**	**960**	**1090**	**1885**	**890**	**820**	1745	825	705	1540	725	580
0.90	225	**1900**	**895**	**1055**	1760	830	780	1665	785	680	1470	695	565

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

BLOWER DATA

G61MP-60C-110 PERFORMANCE (Less Filter) - 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
0.00	0	2720	1285	1385	2410	1135	1090	2055	970	935	1620	765	710
0.10	25	2665	1255	1355	2385	1125	1075	2025	955	885	1730	815	735
0.20	50	2585	1220	1315	2350	1110	1015	2030	955	865	1680	795	690
0.30	75	2505	1180	1275	2290	1080	990	2025	955	840	1695	800	675
0.40	100	2435	1150	1250	2235	1055	940	2030	960	830	1695	800	660
0.50	125	2350	1110	1205	2170	1025	930	1975	930	790	1735	820	665
0.60	150	2255	1065	1185	2100	990	895	1915	905	765	1720	810	650
0.70	175	2160	1020	1150	2005	945	840	1865	880	730	1680	795	635
0.80	200	2020	955	1090	1905	900	825	1810	855	710	1625	765	610
0.90	225	1910	900	1050	1820	860	795	1705	805	675	1540	725	590

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

G61MP-60D-135 PERFORMANCE (Less Filter) - 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) 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
0.00	0	**2665**	**1260**	**1440**	**2325**	**1095**	**1100**	**1865**	**880**	**890**	1410	665	690
0.10	25	**2615**	**1235**	**1405**	**2310**	**1090**	**1065**	**1915**	**905**	**865**	1465	690	685
0.20	50	**2530**	**1195**	**1370**	**2280**	**1075**	**1055**	**1925**	**910**	**850**	1570	740	675
0.30	75	**2470**	**1165**	**1330**	**2235**	**1055**	**1015**	**1920**	**905**	**825**	1590	750	670
0.40	100	**2380**	**1125**	**1290**	**2175**	**1025**	**985**	**1910**	**900**	**805**	1590	750	655
0.50	125	**2310**	**1090**	**1265**	**2120**	**1000**	**965**	**1890**	**890**	**790**	1595	755	645
0.60	150	**2200**	**1035**	**1230**	**2055**	**970**	**935**	**1835**	**865**	**765**	1580	745	630
0.70	175	**2120**	**1000**	**1190**	**1970**	**930**	**900**	1790	845	740	1545	730	605
0.80	200	**2025**	**955**	**1160**	**1890**	**890**	**875**	1720	810	710	1515	715	590
0.90	225	**1930**	**910**	**1110**	**1800**	**850**	**835**	1655	780	685	1440	680	570

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

G61MP-60D-135 PERFORMANCE (Less Filter) - 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
0.00	0	2730	1290	1465	2425	1145	1125	2055	970	915	1560	735	680
0.10	25	2670	1260	1440	2400	1135	1100	2065	975	890	1590	750	675
0.20	50	2600	1225	1400	2365	1115	1070	2045	965	865	1620	765	665
0.30	75	2525	1190	1360	2315	1095	1045	2035	960	845	1615	760	655
0.40	100	2445	1155	1325	2260	1065	1015	2020	955	820	1615	760	645
0.50	125	2360	1115	1280	2195	1035	985	1960	925	790	1610	760	635
0.60	150	2290	1080	1255	2130	1005	965	1900	895	755	1600	755	615
0.70	175	2205	1040	1220	2035	960	910	1825	860	730	1570	740	600
0.80	200	2110	995	1195	1945	915	880	1765	830	710	1540	725	580
0.90	225	1970	930	1120	1835	865	830	1680	795	690	1540	725	545

NOTES - All air data is measured external to unit without filter (not furnished - field provided).

G61MP PARTS ARRANGEMENT

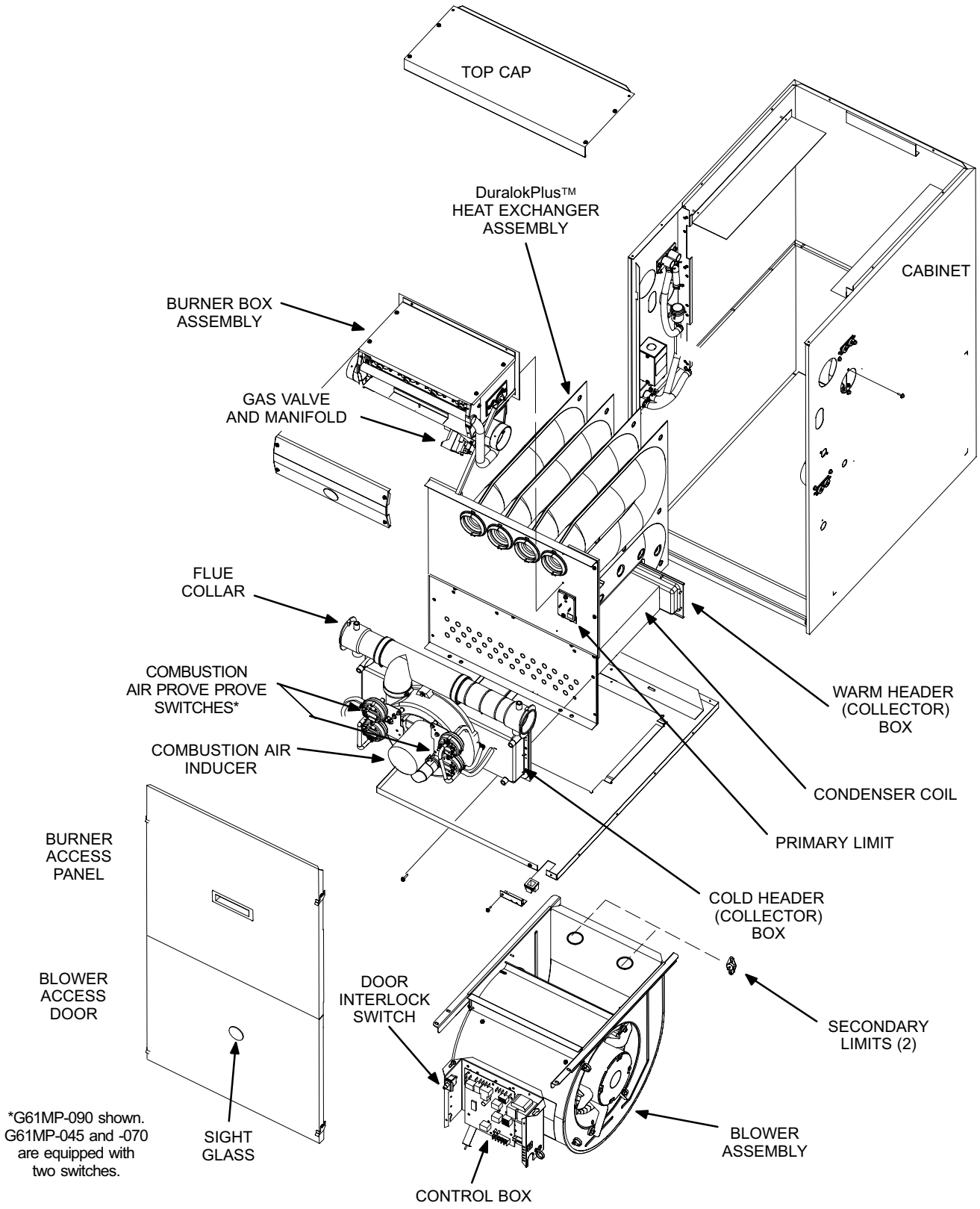


FIGURE 1

I-UNIT COMPONENTS

G61MP 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.

G61MP 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.

A-Control Box

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.

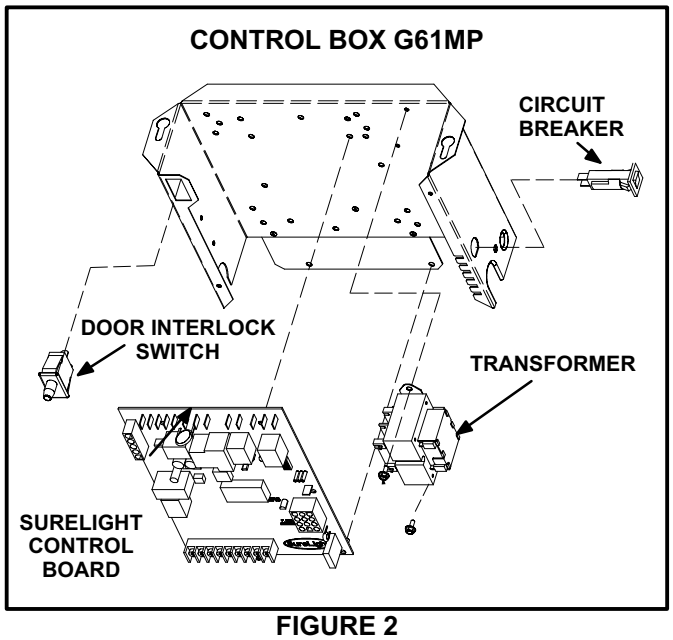


FIGURE 2

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.

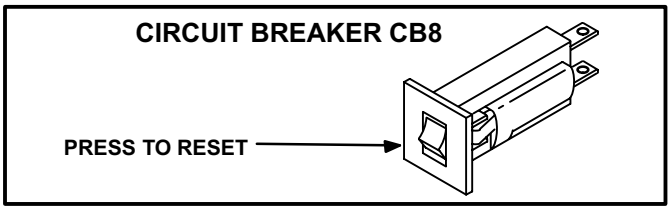


FIGURE 3

⚠ 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)

All G61MP 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 7). 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 cod*es.*

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 sec-

onds. 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.

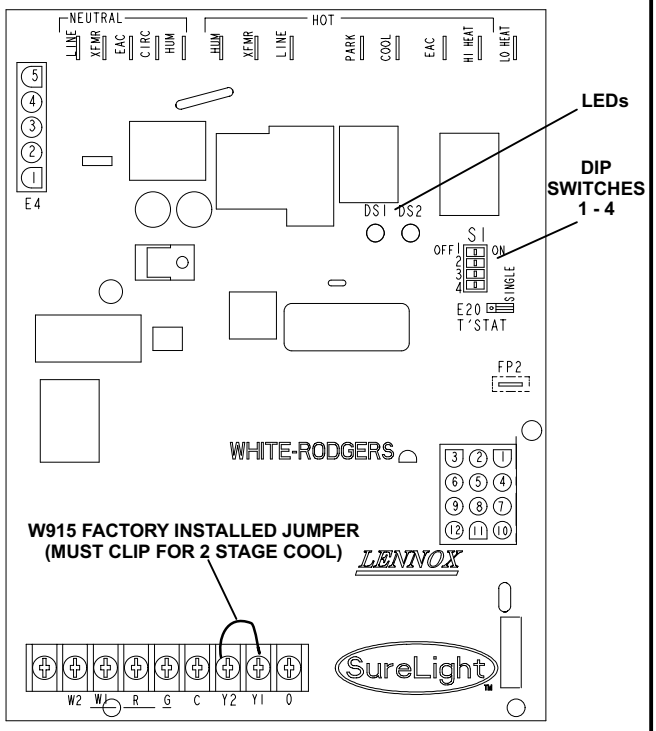
TABLE 2
Cooling Fan Off Delay

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.

TWO-STAGE INTEGRATED CONTROL BOARD



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	HIigh 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.		
DS1	**DS2**	**DESCRIPTION**
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, backup secondary or rollout limit switch open. Limits must close within 3 minutes or unit goes into 1 hour Watchguard.
OFF	SLOW FLASH	Low prove switch open; OR: Blocked inlet/exhaust vent; OR: Low prove switch closed prior to activation of combustion air inducer.
OFF	FAST FLASH	High prove switch open; OR: Blocked inlet/exhaust vent; OR: High prove 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.

B-Blower Compartment

1. Blower Motor (B3) and Capacitor (C4)

All G61MP 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.

2. Secondary Limit Controls (S21)

The secondary limits (S21) on G61MP units are located in the blower compartment on the back side of the blower housing. See figure 5. All G61MP units are equipped with two secondary limts. 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. The switch is factory set to open at 125°F and cannot be adjusted.

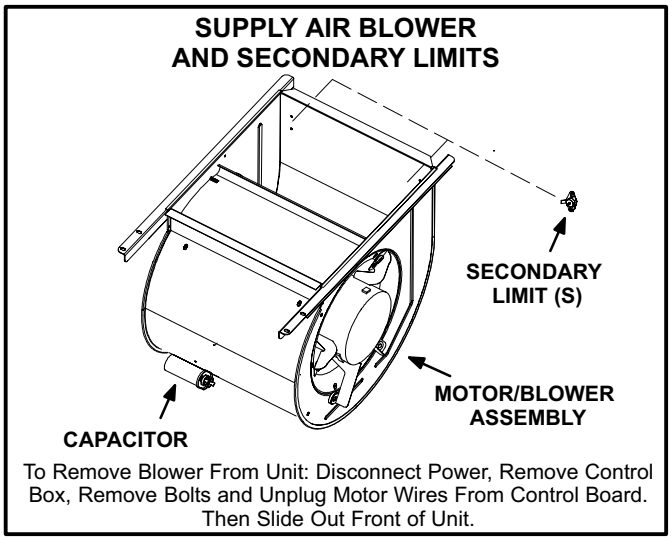


FIGURE 5

C-Heating Components

3. Flame Sensor

A flame sensor is located on the left side of the burner support. See figure 6. The sensor is mounted through the bottom of the burner box 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.

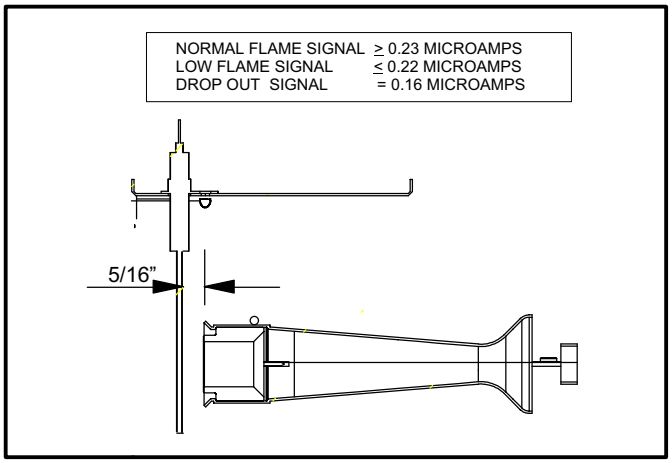


FIGURE 6

4. Ignitor

The SureLight ignitor is made of durable silicon nitride. Ignitor longevity is enhanced by controlling voltage to the ignitor. The board 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. Ohme value should be 10.9 to 19.7. See 7 for ignitor location.

NOTE - The G61MP furnace contains electronic components that are polarity sensitive. Make sure that the furnace is wired correctly and is properly grounded.

5. Burners (Figure 7)

All units use inshot burners. Burners are factory set and do not require adjustment. The manifold brackets are slotted so burners can be removed as an assembly for service. Burner maintenance and service is detailed in the MAINTENANCE section of this manual. Each burner uses an orifice which is precisely matched to the burner input and is threaded into the burner manifold. All G61MP natural gas units are fitted with .089" sized orifices. See "SPECIFICATIONS" tables for LP kits and high altitude.

A flame retention ring in the end of each burner maintains correct flame length and shape and keeps the flame from lifting off the burner head. In addition, the burner entrance to each clamshell is fitted with a corbel cup (orifice) used to direct the flow of combustion products.

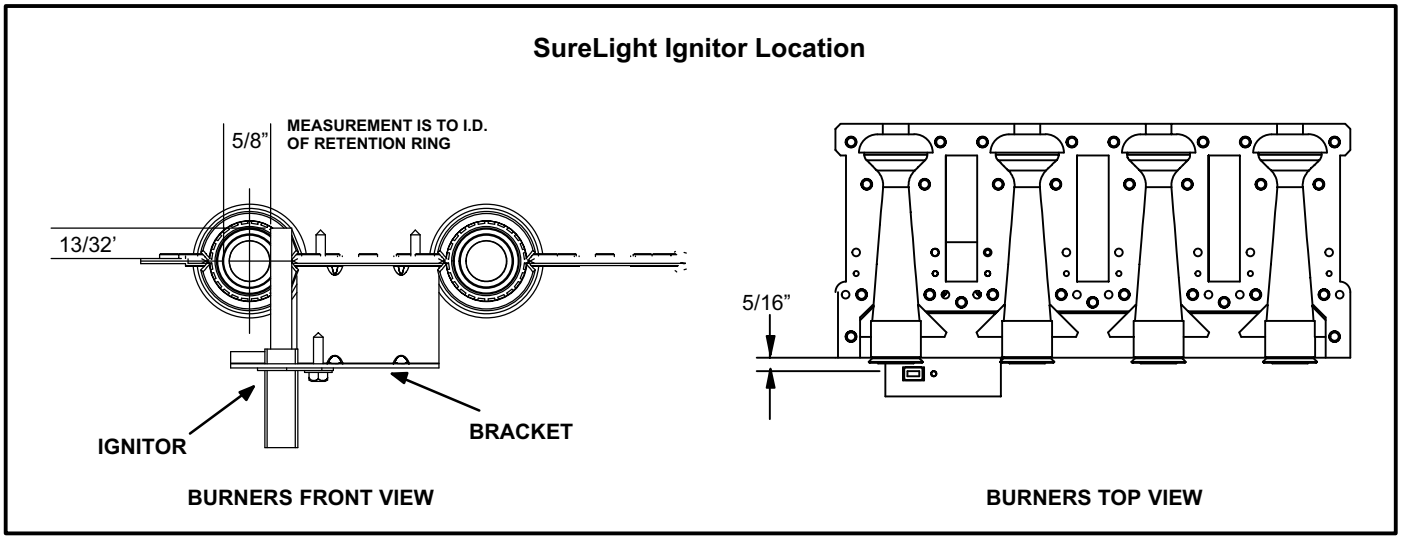


FIGURE 7

6. Clamshell Heat Exchanger

G61MP units use an aluminized steel primary and stainless steel secondary heat exchanger assembly. Heat is transferred to the air stream from all surfaces of the heat exchanger. The shape of the heat exchanger ensures maximum efficiency.

The combustion air inducer pulls fresh air through the air intake box. This air is mixed with gas in the burner venturi and at the corbel orifices. The gas / air mixture is then burned at the entrance of each clamshell. Combustion gases are then pulled through the primary and secondary heat exchangers and exhausted out the exhaust vent pipe.

7. Flame Rollout Switches (S47)

Flame rollout switch S47 is a high temperature limit located on each side of the burner box. Each furnace is equipped with two identical switches. The limit is a N.C. SPST manual-reset limit connected in series with the primary limit S10. 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 250°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.

8. Primary Limit Control (S10)

Figure 8 shows the primary limit (S10) used on G61MP units located in the heating vestibule panel. S10 is provided with a shield on some models (figure 8) and must not be removed. Note orientation of shield and limit if limit is replaced. When excess heat is sensed in the heat exchanger, the limit will open. Once the limit opens, the furnace control energizes the supply air blower and de-energizes the gas valve. The limit automatically resets when unit temperature returns to normal. The switch is factory set and cannot be adjusted.

9. Backup Secondary Limit Control (S113) (G61MP-090, 110, 135 only)

Backup secondary limit control S113 is a N.C. auto-reset switch located on the combustion air inducer. S113 acts as a backup to primary limit S10 in the event of an indoor blower failure. S113 contacts open when temperature on the CAI reaches 142°.

10. Gas Valve (GV1)

The G61MP uses a two-stage gas valve manufactured by Honeywell (figure 35) or White Rodgers (figure 36). The valves are 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 kit s are available from Lennox. Kits include burner orifices and a gas valve regulator conversion kit.

The burner box is sealed and operates under a negative pressure. A pressure hose is connected from the burner box to the gas valve. The gas valve senses the pressure in the burner box and changes gas valve outlet (manifold) pressure based on changes in the burner box pressure. The intent is to compensate for different vent configurations which can greatly affect the rate of the unit.

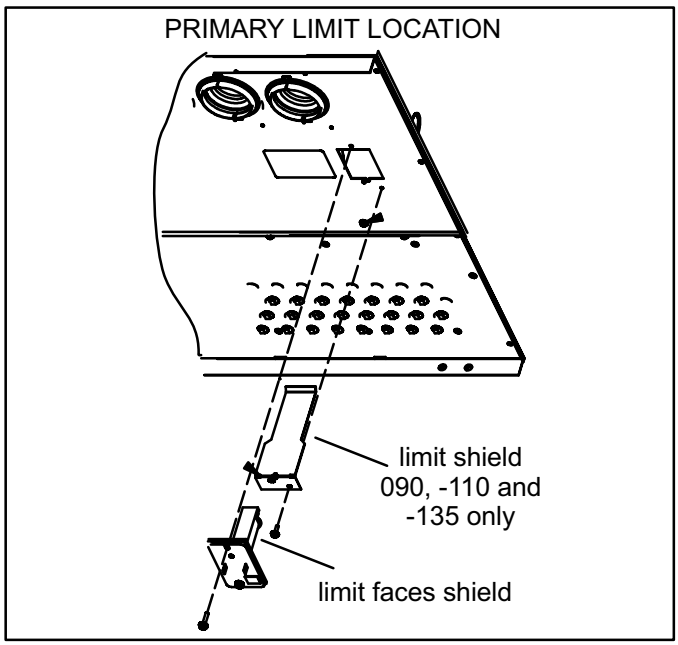


FIGURE 8

11. Combustion Air Inducer Prove Switch (S18)

All G61MP units are equipped with combustion air prove switches located on the combustion air inducer housing. G61MP-045 and -070 (figure 10) units have two combustion air proving switches. G61MP-090, -110 and -135 units are equipped with *two* dual prove switch “assemblies” consisting of two switches acting as one. See figure 9. The switches are connected to the cold end header box by means of a flexible hose that monitors negative air pressure in the cold end header box.

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 cold end header box decreases to a certain set point.

Set points vary depending on unit size. See tables 8, 9 and 10. The pressure sensed by the switch is negative. If the air intake vent pipe or outlet vent pipe becomes obstructed during operation, the switch senses a change of negative 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 by-passed for any reason. If switch is closed or by-passed, the control will not initiate ignition at start up.

DUAL COMBUSTION AIR PROVE SWITCH
G61MP-090, -110 & -135

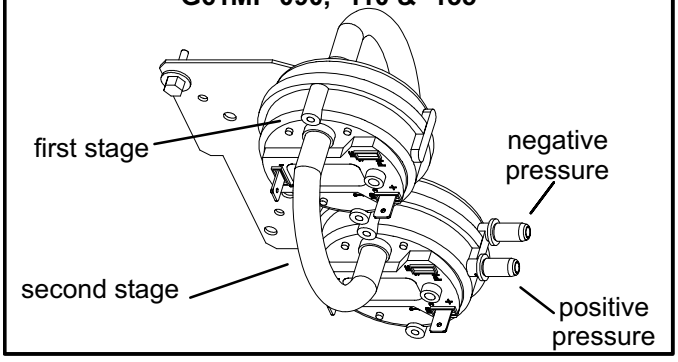


FIGURE 9

To troubleshoot the prove switches, temporarily jumper them. The unit will not fire with the switches jumpered. Therefore, the prove switches must be bypassed after the combustion air inducer is activated. This will determine if the prove switches and furnace are operating properly. However, this may not indicate if the sealed combustion system is operating properly.

Checks of pressure differential can aid in troubleshooting. When measuring the pressure differential, readings should be taken at the prove switch. Lack of differential usually indicates problems in the intake or exhaust piping, but may indicate problems in the heat exchanger, condensing coil, header boxes, combustion inducer or other components.

Measuring pressure differential

The differential pressure is the difference in pressure measured across the cold end header box orifice.

1 - Remove thermostat demand and allow unit to cycle off.

2 - Install a tee in the negative (-) line and a tee in the positive (+) line running from one of the prove switches to the cold end header box.

3 - Install a manometer with hose from the negative (-) side of the manometer to the tee installed in the negative (-) line and with hose from the positive (+) side of the manometer to the tee in the positive (+) line.

NOTE - Both sides of the cold end header box are negative. However the (+) port reads less negative pressure than the (-) port.

CAI & COLD END HEADER BOX ASSEMBLY
(-045 & 070 SHOWN)

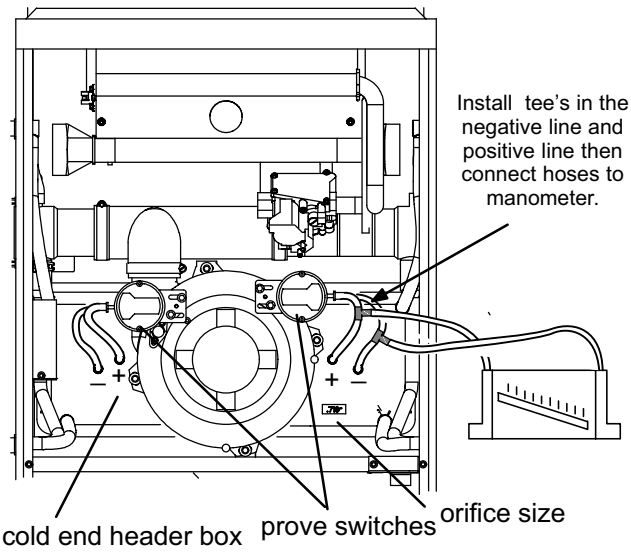


FIGURE 10

4 - Operate unit and observe manometer reading. *Readings will change as heat exchanger warms.*
a. Take one reading immediately after start-up.
b. Take a second reading after unit has reached steady state (approximately 5 minutes). This will be the pressure differential.

The pressure differential should be greater than those listed in table 8, 9 or 10.

5 - Remove thermostat demand and allow to cycle off.

6 - Remove manometer and tee's. Reinstall combustion air sensing hoses to the prove switch.

7 - Repeat steps 1 through 6 for the other prove switch.

12. Combustion Air Inducer (B6)

All G61MP units use a combustion air inducer to move air through the burners and heat exchanger during heating operation. The blower uses a PSC 120VAC motor. The motor operates during all heating operation and is controlled by the ignition control A3. Blower operates continuously while there is a call for heat. The burner ignition control will not proceed with the ignition sequence until combustion air inducer operation is sensed by the proving switches.

The CAI is installed on the cold end header box. The cold end header box is a single piece made of hard plastic. The box has an internal channel where the combustion air inducer creates negative pressure at unit start up. The channel contains an orifice used to regulate flow created by the CAI. The box has pressure taps for the CAI prove switch hoses.

The prove switches measure the pressures across the CAI orifice or difference in the channel and the box. A window is provided on the bottom right hand side of the box to indicate orifice size. See figure 10. See table 7 for orifice size per unit. **If replacement is necessary the gaskets used to seal the box to the vestbule panel and the CAI to the box, must also be replaced.**

TABLE 7

G61MP Unit	C.A.I. Orifice Size
-045	.719”
-070	.938”
-090	1.063”
-110	1.313”
-135	1.688”

TABLE 8
0’ to 4500’

G61MP Unit	Set Point Second Stage	Set Point First Stage
-045	0.95”	0.95”
-070		
-090	0.85”	0.50”
-110		
-135	0.60”	0.35”

TABLE 9*
4501’ to 7500’

G61MP Unit	Set Point Second Stage	Set Point First Stage
-045	0.95”	0.95”
-070		
-090	0.75”	0.50”
-110	0.85”	0.50”
-135	0.55”	0.35”

**Unit may require conversion kit at this altitude. See High Altitude table.*

TABLE 10*
7501’ to 10,000’

G61MP Unit	Set Point Second Stage	Set Point First Stage
-045	0.95”	0.95”
-070	0.85”	0.85”
-090	0.60”	0.35”
-110	0.85”	0.50”
-135	0.55”	0.35”

**Unit may require conversion kit at this altitude. See High Altitude table.*

TABLE 11
OUTDOOR TERMINATION KITS AND CORRESPONDING EQUIVALENCIES

UNIT MODEL	VENT PIPE DIA. (in.)	Vent Pipe Length Equivalency (feet)								
		Outdoor Exhaust Accelerator (Dia. X Length)	Outdoor Exhaust Accelerator (Dia. X Length)	1-1/2" Concentric Kit	2" Concentric Kit	3" Concentric Kit	2" Wall Plate Kit	3" Wall Plate Kit	2" Wall Kit with Vent Extension	2" Wall Ring Kit
		1-1/2" X 12"	2" X 12"	71M80	60M29	60L46	22G44	44J40 81J20	30G28	15F74
36B-045	2	4	**Not Allowed**	**12**	**Not Allowed**	**Not Allowed**	4	4*	**4**	**4**
	2-1/2	5	**Not Allowed**	**15**	**Not Allowed**	**Not Allowed**	5	5*	**5**	**5**
	3	7	**Not Allowed**	**21**	**Not Allowed**	**Not Allowed**	7	7*	**7**	**7**
	4	14	**Not Allowed**	**42**	**Not Allowed**	**Not Allowed**	14	14*	**14**	**14**
36B-070	2	**4**	**Not Allowed**	12	**Not Allowed**	**Not Allowed**	**4**	**4***	4	4
	2-1/2	**5**	**Not Allowed**	15	**Not Allowed**	**Not Allowed**	**5**	**5***	5	5
	3	**8**	**Not Allowed**	24	**Not Allowed**	**Not Allowed**	**8**	**8***	8	8
	4	**14**	**Not Allowed**	42	**Not Allowed**	**Not Allowed**	**14**	**14***	14	14
60C-090	2	**Not Allowed**	**1**	**Not Allowed**	3	3	**Not Allowed**	**1**	**Not Allowed**	1**
	2-1/2	**Not Allowed**	**2**	**Not Allowed**	6	6	**Not Allowed**	**2**	**Not Allowed**	2**
	3	**Not Allowed**	**2**	**Not Allowed**	6	6	**Not Allowed**	**2**	**Not Allowed**	2**
	4	**Not Allowed**	**4**	**Not Allowed**	12	12	**Not Allowed**	**4**	**Not Allowed**	4**
60C-110	2-1/2	**Not Allowed**	2	**Not Allowed**	**6**	**6**	**Not Allowed**	2	**Not Allowed**	**2***
	3	**Not Allowed**	2	**Not Allowed**	**6**	**6**	**Not Allowed**	2	**Not Allowed**	**2***
	4	**Not Allowed**	4	**Not Allowed**	**12**	**12**	**Not Allowed**	4	**Not Allowed**	**4***
60D-135	3	**Not Allowed**	6	**Not Allowed**	**Not Allowed**	15	**Not Allowed**	6	**Not Allowed**	6***
	4	**Not Allowed**	10	**Not Allowed**	**Not Allowed**	25	**Not Allowed**	10	**Not Allowed**	10***

**Requires field-provided and installed 1-1/2" exhaust accelerator.*
***Requires field-provided and installed 2" exhaust accelerator.*
****For use only in non-direct vent applications, when snow riser is not required. Requires field-provided and installed 2" exhaust accelerator.*

A-Vent Piping Guidelines

The G61MP can be installed as either a Non-Direct Vent or a Direct Vent gas central furnace.

NOTE - In Non-Direct Vent installations, combustion air is taken from indoors and flue gases are discharged outdoors. In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors.

Intake and exhaust pipe sizing in Direct Vent applications and exhaust pipe sizing in Non-Direct Vent applications -- Size pipe according to tables 12 and 13. Table 12 lists the *minimum* equivalent vent pipe lengths permitted. Table 13 lists the *maximum* equivalent pipe lengths permitted.

Maximum vent length is defined as:

Total length (linear feet) of pipe,
Plus Equivalent length (feet) of fittings,
Plus Equivalent length (feet) of termination.
NOTE - Include ALL pipe and ALL fittings, both in doors and outdoors.

Regardless of the diameter of pipe used, the standard roof and wall terminations described in section *Exhaust Piping Terminations* should be used. Exhaust vent termination pipe is sized to optimize the velocity of the exhaust gas as it exits the termination. Refer to table 14.

**NOTE - The exhaust pipe should be offset a minimum of 12 inches to avoid the possibility of water droplets being released from the exhaust termination. The minimum exhaust vent length is 15 ft. Shorter exhaust vent lengths may result in the discharge of water droplets from the exhaust termination, in spite of the 12-inch vertical offset.*

Each 90° elbow (including those provided with the furnace) of any diameter is equivalent to 5 feet (1.52m) of vent pipe of the same diameter. Two 45° elbows are equivalent to one 90° elbow of the same diameter. One 45° elbow is equal to 2.5 feet (.76m) of vent pipe of the same diameter.

In some applications which permit the use of several different sizes of vent pipe, a combination vent pipe may be used. Contact the Application Department for assistance in sizing vent pipe in these applications.

NOTE - The flue collar on all models is sized to accommodate 2" Schedule 40 flue pipe. When vent pipe which is larger than 2" must be used in an upflow application, a 2" elbow must be applied at the flue collar in order to properly transition to the larger diameter flue pipe. This elbow must be added to the elbow count used to determine acceptable vent lengths. Assign an equivalent feet value to this elbow according to the larger size pipe being used. Contact the Application Department for more information concerning sizing of vent systems which include multiple pipe sizes.

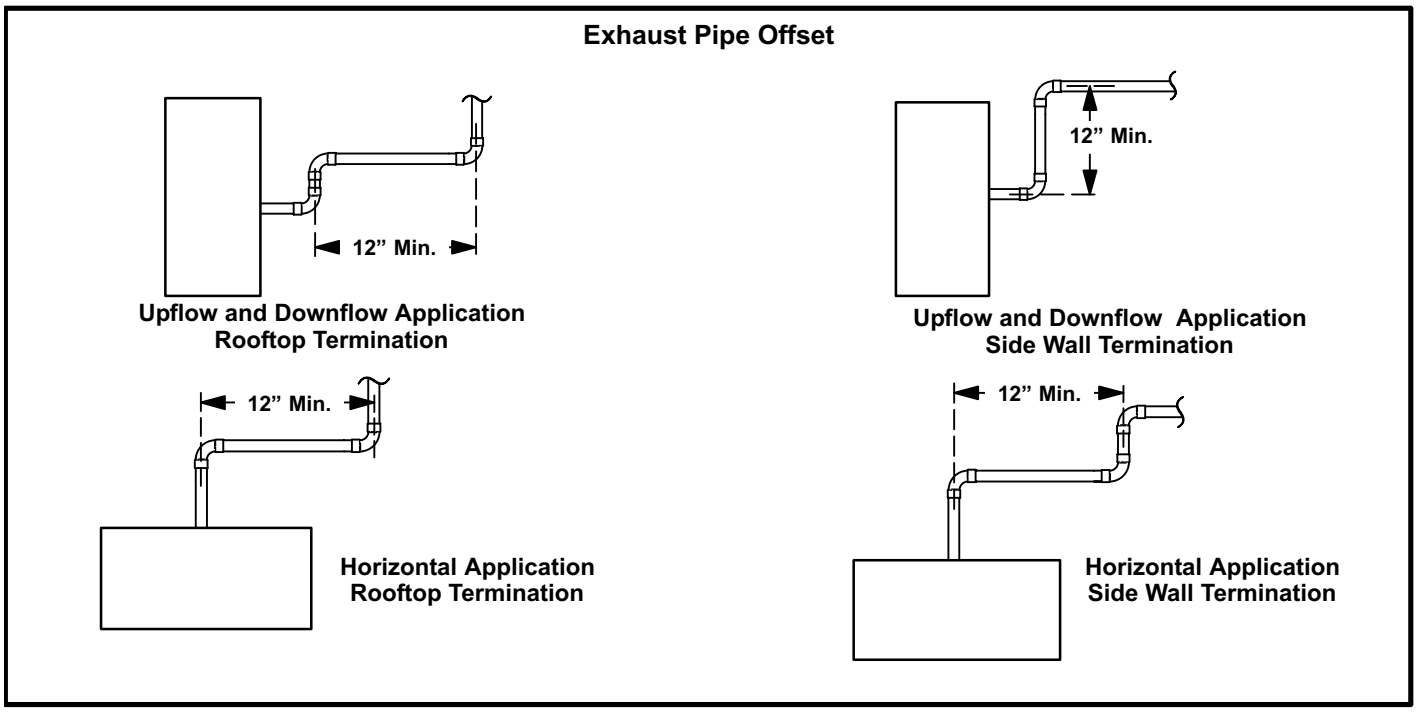


FIGURE 11

Use the following steps to correctly size vent pipe diameter.

1 - Determine the vent termination and its corresponding equivalent feet value according to table 11.

2 - Determine the number of 90° elbows required for both indoor and outdoor (e.g. snow riser) use. Calculate the corresponding equivalent feet of vent pipe.

3 - Determine the number of 45° elbows required for both indoor and outdoor use. Calculate the corresponding equivalent feet of vent pipe.

4 - Determine the length of straight pipe required.

5 - Add the total equivalent feet calculated in steps 1 through 4 and compare that length to the maximum values given in table 12 for the proposed vent pipe diameter. If the total equivalent length required exceeds the maximum equivalent length listed in the appropriate table, evaluate the next larger size pipe.

TABLE 12
MINIMUM VENT PIPE LENGTHS

G61MP MODEL	MIN. EQUIV. VENT LENGTH	EXAMPLE
045, 070, 090	15 ft.*	5 ft. plus 2 elbows of 2", 2-1/2", 3" or 4" diameter pipe
110**		5 ft. plus 2 elbows of 2-1/2" 3" or 4" diameter pipe
135***		5 ft. plus 2 elbows of 3" or 4" diameter pipe

**Any approved termination may be added to the minimum equivalent length listed.*

***G61MP-48C-110 and G61MP-60C-110 must have 90° street ell (supplied) installed directly into unit flue collar.*

****G61MP-60D-135 must have 3" to 2" reducing ell (supplied) installed directly into unit flue collar.*

TABLE 13
MAXIMUM VENT PIPE LENGTHS

ALTITUDE	G61MP MODEL	MAXIMUM EQUIVALENT VENT LENGTH FEET			
		2" dia.	2-1/2" dia.	3" dia.	4" dia.
0 - 4500 (0 - 1371 m)	045	59	65	77	234
	070	59	65	78	214
	090	26	42	72	204
	110*	n/a	32	72	179
	135**	n/a	n/a	***61	160
4501-7500 (1372-2286 m)	045	59	65	77	234
	070	59	65	78	214
	090	26	42	72	204
	110*	n/a	32	72	179
	135**	n/a	n/a	***46	160
7501 - 10000 (2287 - 3048 m)	045	59	65	77	234
	070	59	65	78	214
	090	26	42	72	204
	110*	n/a	32	72	179
	135**	n/a	n/a	***46	160

n/a -- Not allowed.
**G61MP-48C-110 and G61MP-60C-110 must have 90° street ell (supplied) installed directly into unit flue collar.*
***G61MP-60D-135 must have 3" to 2" reducing ell (supplied) installed directly into unit flue collar.*
****90° elbows used in configuration of G61MP-60D-135 vent, must be limited to 3" sweep elbows.*

B-PVC Joint Cementing Procedure

All cementing of joints should be done according to the specifications outlined in ASTM D 2855.

⚠ WARNING

DANGER OF EXPLOSION!

Fumes from PVC glue may ignite during system check. Allow fumes to dissipate for at least 5 minutes before placing unit into operation.

1 - Measure and cut vent pipe to desired length.

2 - Debur and chamfer end of pipe, removing any ridges or rough edges. If end is not chamfered, edge of pipe may remove cement from fitting socket and result in a leaking joint.

3 - Clean and dry surfaces to be joined.

4 - Test fit joint and mark depth of fitting on outside of pipe.

5 - Uniformly apply liberal coat of PVC primer for PVC or ABS cleaner for ABS to inside socket surface of fitting and male end of pipe to depth of fitting socket.

6 - Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement should be applied lightly but uniformly to inside of socket. Take care to keep excess cement out of socket. Apply second coat to end of pipe.

NOTE - Time is critical at this stage. Do not allow primer to dry before applying cement.

7 - Immediately after applying last coat of cement to pipe, and while both inside socket surface and end of pipe are wet with cement, forcefully insert end of pipe into socket until it bottoms out. Turn pipe 1/4 turn during assembly (but not after pipe is fully inserted) to distribute cement evenly.

NOTE - Assembly should be completed within 20 seconds after last application of cement. Hammer blows should not be used when inserting pipe.

8 - After assembly, wipe excess cement from pipe at end of fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient solvent.

9 - Handle joints carefully until completely set.

C- Venting Practices

The thickness of construction through which vent pipes may be installed is 24" (610mm) maximum and 3" (76mm) minimum. If a G61MP furnace replaces a furnace which was commonly vented with another gas appliance, the size of the existing vent pipe for that gas appliance must be checked. Without the heat of the original furnace flue products, the existing vent pipe is probably oversized for the single water heater or other appliance. The vent should be checked for proper draw with the remaining appliance.

1. Use recommended piping materials for exhaust piping.
2. Secure all joints so that they are gas-tight using approved cement.

   Suspend piping using hangers at a minimum of every 5 feet (1.52m) for schedule 40 PVC and every 3 feet (.91m) for ABS-DWV, PVC-DWV, SPR-21 PVC, and SDR-26 PVC piping. A suitable hanger can be fabricated by using metal or plastic strapping or a large wire tie.

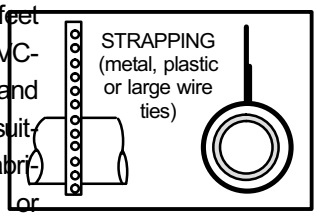


FIGURE 12

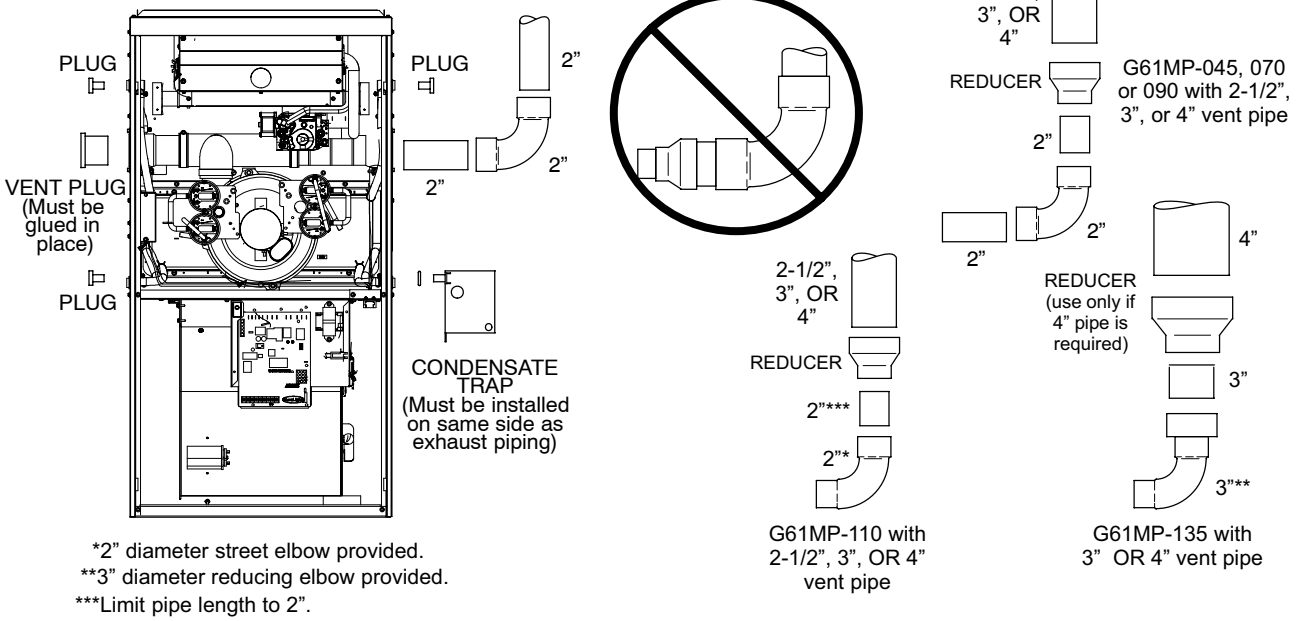
3. In areas where piping penetrates joists or interior walls, hole must be large enough to allow clearance on all sides of pipe through center of hole using a hanger.
4. Isolate piping at the point where it exits the outside wall or roof in order to prevent transmission of vibration to the structure.
5. When furnace is installed in a residence where unit is shut down for an extended period of time, such as a vacation home, make provisions for draining condensate collection trap and lines.

Exhaust Piping

NOTE - A 2" diameter street ell is strapped to the blower deck of 48C-110 and 60C-110 units. Street ell ***must be*** *glued directly into the unit flue collar. See figure 13. A 3" to 2" reducing ell is strapped to the blower deck of the 60D-135 units.* ***In upflow or downflow applications,*** *the reducing ell* ***must be*** *glued directly into the unit flue collar.*

1. Choose the appropriate side for venting in upflow or downflow positions. Exhaust piping exits from the top of the unit in horizontal air discharge applications. Glue the field-provided exhaust vent pipe (or provided street ell or reducing ell in upflow or downflow applications) to the flue collar. All cement joints should be made according to the specifications outlined in ASTM D 2855. Refer to pipe and fittings specifications and gluing procedures.

TYPICAL EXHAUST PIPE CONNECTIONS AND CONDENSATE TRAP INSTALLATION
IN UPFLOW OR DOWNFLOW DIRECT OR NON-DIRECT VENT APPLICATIONS
(Right-Hand Exit in Upflow Application Shown)

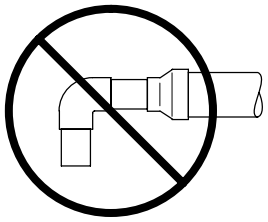


*2" diameter street elbow provided.
**3" diameter reducing elbow provided.
***Limit pipe length to 2".

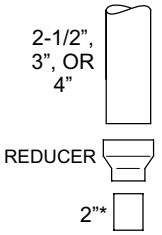
FIGURE 13

TYPICAL EXHAUST PIPE CONNECTIONS
HORIZONTAL DIRECT OR NON-DIRECT VENT APPLICATIONS
(Horizontal Right-Hand Air Discharge Application Shown)

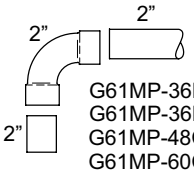
**Limit pipe length to 2" in G61MPV-110 and -135 applications.*



DO NOT transition from smaller to larger pipe size in horizontal runs.



G61MP-36B-045
G61MP-36B-070
G61MP-48C-090
G61MP-60C-090
G61MP-48C-110*
G61MP-60C-110*
G61MP-60C-135*



G61MP-36B-045
G61MP-36B-070
G61MP-48C-090
G61MP-60C-090

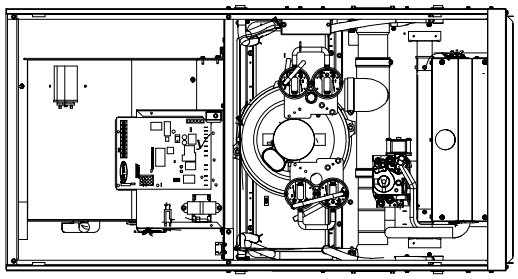


FIGURE 14

⚠ IMPORTANT

Exhaust piping and condensate trap must be installed on the same side of the unit.

2. All horizontal runs of exhaust pipe must slope back toward unit. A minimum of 1/4" (6mm) drop for each 12" (305mm) of horizontal run is mandatory for drainage. Horizontal runs of exhaust piping must be supported every 5 feet (1.52m) using hangers.

   NOTE - Exhaust piping should be checked carefully to make sure there are no sags or low spots.

3. On the opposite side of the cabinet, glue the provided 2" vent plug into the unused flue collar.
4. Route piping to outside of structure. Continue with installation following instructions given in piping termination section.

⚠ CAUTION

Do not discharge exhaust into an existing stack or stack that also serves another gas appliance. If vertical discharge through an existing unused stack is required, insert PVC pipe inside the stack until the end is even with the top or outlet end of the metal stack.

⚠ CAUTION

The exhaust vent pipe operates under positive pressure and must be completely sealed to prevent leakage of combustion products into the living space.

Intake Piping

The G61MP furnace may be installed in either **direct vent** or **non-direct vent** applications. In non-direct vent applications, when intake air will be drawn into the furnace from the surrounding space, the indoor air quality must be considered and guidelines listed in Combustion, Dilution and Ventilation Air section must be followed.

The G61MP unit is designed for either left-side or right-side air intake connections in either upflow or downflow applications. In horizontal applications, air intake must be brought in through the top. Intake air piping is independent of exhaust piping.

Follow the next four steps when installing the unit in **direct vent applications,** where combustion air is taken from outdoors and flue gases are discharged outdoors. **The provided air intake screen must not be used in direct vent applications.**

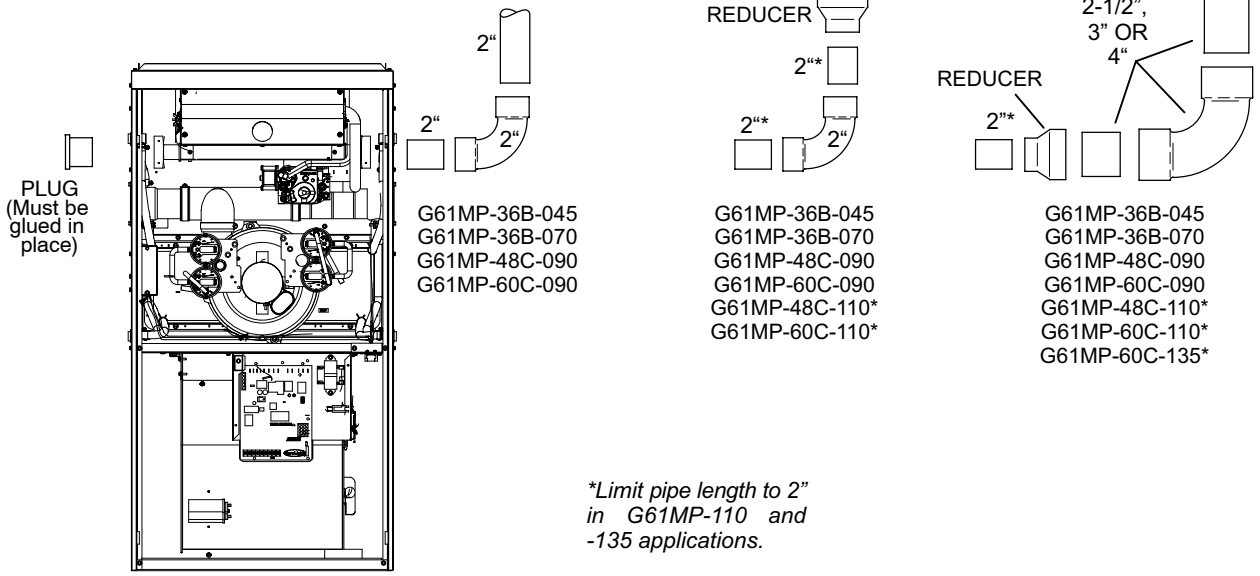
1 - Cement intake piping in slip connector located on the side of the burner box.

2 - Use a #7 sheet metal screw to secure the intake pipe to the connector, if desired. A pilot indentation is provided in the slip connector to assist in locating and starting the fastener.

3 - Glue the provided 2" plug into the unused air intake connector on the opposite side of the cabinet.

4 - Route piping to outside of structure. Continue with installation following instructions given in general guide lines for piping terminations and in intake and exhaust piping terminations for direct vent sections. Refer to figure 15 for pipe sizes.

TYPICAL AIR INTAKE PIPE CONNECTIONS
UPFLOW OR DOWNFLOW DIRECT VENT APPLICATIONS
(Right-Hand Exit in Upflow Application Shown)



**Limit pipe length to 2" in G61MP-110 and -135 applications.*

FIGURE 15

TYPICAL AIR INTAKE PIPE CONNECTIONS
HORIZONTAL DIRECT VENT APPLICATIONS
(Horizontal Right-Hand Air Discharge Application Shown)

**Limit pipe length to 2" in G51MP-110 and -135 applications.*

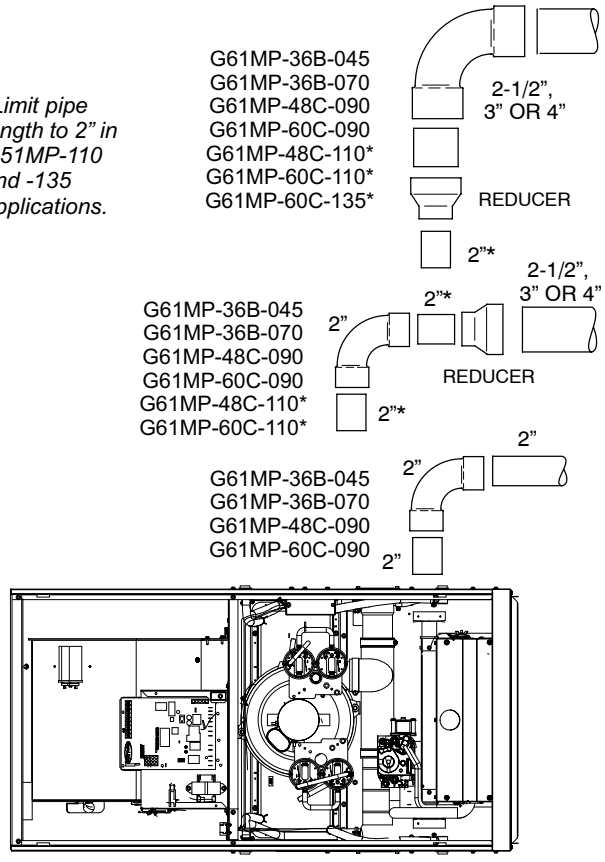
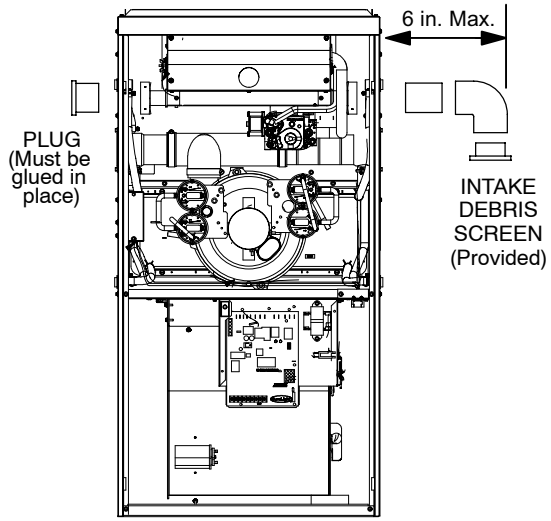


FIGURE 16

Follow the next three steps when installing the unit in **Non-Direct Vent applications** where combustion air is taken from indoors and flue gases are discharged outdoors**.**

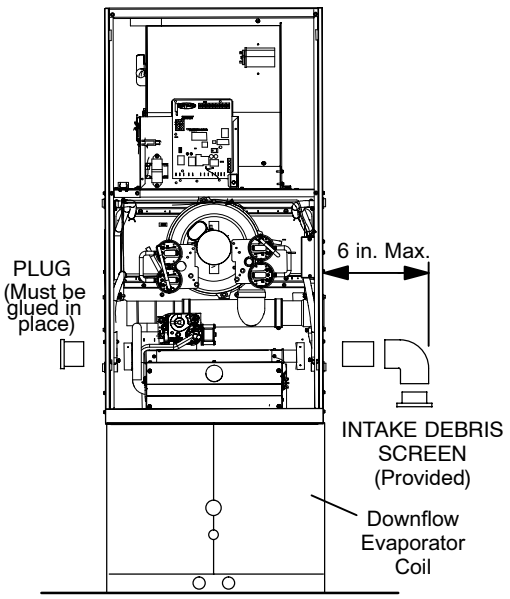
TYPICAL AIR INTAKE PIPE CONNECTIONS
UPFLOW OR HORIZONTAL NON-DIRECT
VENT APPLICATIONS
(Right-Hand Exit in Upflow Application Shown)

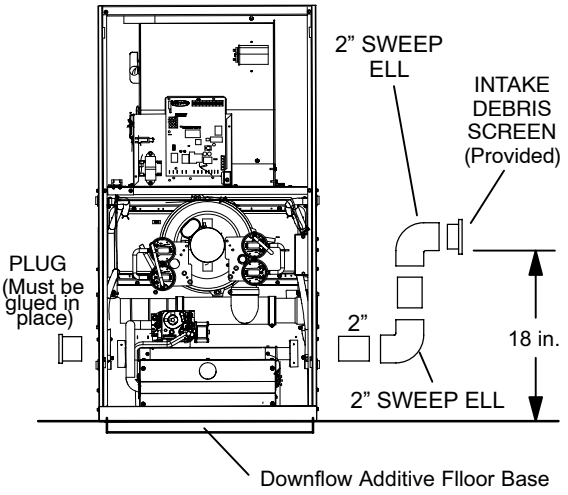


NOTE - Debris screen and elbow may be rotated, so that screen may be positioned to face forward, backward or downward.

FIGURE 17

TYPICAL AIR INTAKE PIPE CONNECTIONS
DOWNFLOW NON-DIRECT VENT APPLICATIONS
(Right-Hand Exit in Downflow Applications Shown)





NOTE - Debris screen and sweep ell may be rotated, so that screen may be positioned to face forward, backward or to the side.

FIGURE 18

1 - Use field-provided materials and the factory-provided air intake screen to route the intake piping as shown in figures 17 and 18. Maintain a minimum clearance of 3" (76mm) around the air intake opening. The air intake opening (with the protective screen) should always be directed either downward or straight out. Use 2" pipe and fittings only and make sure that the air intake does not extend more than 6" beyond the G61MP cabinet. **The air intake connector must not be located near the floor. To avoid this complication in downflow applications which do not include a downflow evaporator coil,** the intake air routing should be modified as shown in figure 18.

2 - Use a #7 sheet metal screw to secure the intake pipe to the connector, if desired. A pilot indentation is provided in the slip connector to assist in locating and starting the fastener.

3 - Glue the provided 2" plug into the unused air intake connector on the opposite side of the cabinet.

Testing for Proper Venting and Sufficient Combustion Air (Non-Direct Vent Applications Only)

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD!

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death.
The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation.

After the G61MP gas furnace has been started, the following test should be conducted to ensure proper venting and sufficient combustion air has been provided to the G61MP, as well as to other gas-fired appliances which are separately vented. The test should be conducted while all appliances (both in operation and those not in operation) are connected to the venting system being tested. If the venting system has been installed improperly, or if provisions have not been made for sufficient amounts of combustion air, corrections must be made as outlined in the previous section.

1 - Seal any unused openings in the venting system.

2 - Visually inspect the venting system for proper size and horizontal pitch. Determine there is no blockage or restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.

3 - To the extent that it is practical, close all building doors and windows and all doors between the space in which the appliances connected to the venting system are located and other spaces of the building.

4 - Close fireplace dampers.

5 - Turn on clothes dryers and any appliances not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan.

6 - Follow the lighting instruction to place the appliance being inspected into operation. Adjust thermostat so appliance will operate continuously.

7 - Test for spillage of flue gases at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of match or candle, or smoke from a cigarette, cigar.

8 - If improper venting is observed during any of the above tests, the venting system must be corrected or sufficient combustion/make-up air must be provided. The venting system should be re-sized to approach the minimum size as determined by using the appropriate tables in appendix G in the current standards of the National Fuel Gas Code ANSI-Z223.1/NPFA 54 in the U.S.A., and the appropriate Natural Gas and Propane appliances venting sizing tables in the current standard of the CSA-B149 Natural Gas and Propane Installation Codes in Canada.

9 - After determining that each appliance remaining connected to the common venting system properly vents when tested as indicated in step 3, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous condition of use.

General Guidelines for Vent Terminations for Non-Direct Vent Installations.

In Non-Direct Vent applications, combustion air is taken from indoors and the flue gases are discharged to the outdoors. The G61MP is then classified as a non-direct vent, Category IV gas furnace. In Non-Direct Vent applications, the vent termination is limited by local building codes. In the absence of local codes, refer to the current National Fuel Gas Code ANSI Z223-1/NFPA 54 in U.S.A., and current CSA-B149 Natural Gas and Propane Installation Codes in Canada for details.

Position termination end according to location given in figure 19. In addition, position termination end so it is free from any obstructions and above the level of snow accumulation (where applicable). The termination should be at least 12 inches (305mm) from any opening through which flue products could enter the building.

At vent termination, care must be taken to maintain protective coatings over building materials (prolonged exposure to exhaust condensate can destroy protective coatings). It is recommended that the exhaust outlet not be located within 6 feet (1.8m) of a condensing unit because the condensate can damage the painted coating.

NOTE - If winter design temperature is below 32°F (0°C), exhaust piping should be insulated with 1/2" (13mm), Armaflex or equivalent when run through unheated space. Do not leave any surface area of exhaust pipe open to outside air; exterior exhaust pipe should be insulated with 1/2" (13mm) Armaflex or equivalent. In extreme cold climate areas, 3/4" (19mm) Armaflex or equivalent may be necessary. Insulation on outside runs of exhaust pipe must be painted or wrapped to protect insulation from deterioration. Exhaust pipe insulation may not be necessary in some specific applications.

NOTE - During extremely cold temperatures, below approximately 20°F (6.7°C), units with long runs of vent pipe through unconditioned space, even when insulated, may form ice in the exhaust termination that prevents the unit from operating properly. Longer run times of at least 5 minutes will alleviate most icing problems. Also, a heating cable may be installed on exhaust piping and termination to prevent freeze-ups. Heating cable installation kit is available from Lennox. See Condensate Piping section for part numbers.

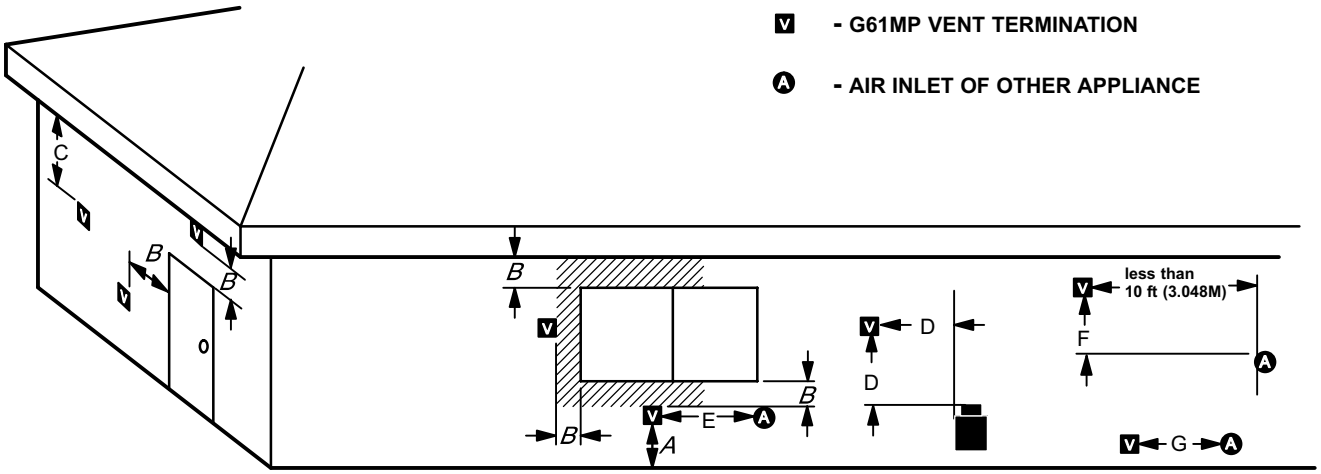
⚠ IMPORTANT

Do not use screens or perforated metal in exhaust terminations. Doing so will cause freeze-ups and may block the terminations.

⚠ IMPORTANT

For Canadian Installations Only:
In accordance to CSA International B149 installation codes, the minimum allowed distance between the combustion air intake inlet and the exhaust outlet of other appliances shall not be less than 12 inches (305mm).

VENT TERMINATION CLEARANCES
FOR INSTALLATIONS IN THE USA AND CANADA*



A - *Clearance above grade* - 12 in. (305mm) minimum.

B - *Clearance to window or door* that may be opened -
for vent installations in USA - 12 in. (305mm) minimum.
for vent installations in Canada - 12 in. (305mm) minimum for appliances $\leq$ 100,000 Btuh (30 kW);
36 in. (0.9m) minimum for appliances > 100,000 Btuh (30 kW).

C - *Do not position terminations directly under roof eaves.*

D - *Clearance to electric meters, gas meters, regulators, and relief equipment* -
for vent installations in USA - 48 in (1219mm) minimum.
for vent installations in Canada - see current edition of CSA B149 Code.

E - *Clearance to non-mechanical air supply inlet* or outlet
for vent installations in USA - 48 in. (1219mm) minimum horizontal and below, 12 in. (305mm) minimum above.
for vent installations in Canada - 12 in. (305mm) minimum for appliances $\leq$ 100,000 Btuh (30 kW);
36 in. (0.9m) minimum for appliances > 100,000 Btuh (30 kW).

F - *Clearance to mechanical air supply inlet* --
for vent installations in USA - 36 in. minimum (914mm**).**

G - *Clearance to mechanical air supply inlet* --
for vent installations in Canada - 72 in. (1829mm) minimum.

H - *Do not point terminations into recessed areas such as window wells, stairwells or alcoves.*

J - *Do not position terminations directly above a walkway.*

* Note -
(I) Dimensions are from the current edition of The National Fuel Gas Code - ANSI-Z223.1/NFPA 54 for USA installations. In Canada, refer to current edition of CSA B149 installation codes. Local codes or regulations may require different clearances.

(II) In Non-Direct Vent installations, combustion air is taken from indoors and the flue gases are discharged to the outdoors.

FIGURE 19

Details of Intake and Exhaust Piping Terminations for Direct Vent Installations

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged to outdoors.

Intake and exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 20 through 28 show typical terminations.

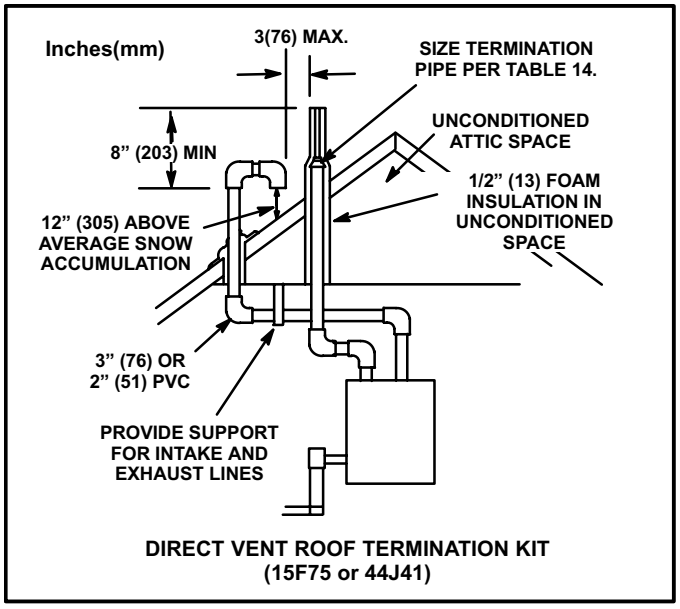
1. Exhaust and intake exits must be in same pressure zone. Do not exit one through the roof and one on the side. Also, do not exit the intake on one side and the exhaust on another side of the house or structure.
2. Intake and exhaust pipes should be placed as close together as possible at termination end (refer to illustrations). Maximum separation is 3" (76mm) on roof terminations and 6" (152mm) on side wall terminations.
3. If necessary, install a field-provided reducer to adapt larger vent pipe size to termination pipe size.
4. On roof terminations, the intake piping should terminate straight down using two 90° elbows (See figure 20).
5. Exhaust piping must terminate straight out or up as shown. In rooftop applications, a reducer may be required on the exhaust piping at the point where it exits the structure to improve the velocity of exhaust away from the intake piping. See table 14.

   NOTE - Care must be taken to avoid recirculation of exhaust back into intake pipe.
6. On field supplied terminations for side wall exits, exhaust piping should extend a minimum of 12 inches (305mm) beyond the outside wall. Intake piping should be as short as possible. See figure 21.
7. On field supplied terminations, a minimum separation distance between the end of the exhaust pipe and the end of the intake pipe is 8 inches (203mm).
8. If intake and exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported every 3 ft. (.9m) as shown in figure 12. Refer to figure 24 for proper piping method. In addition, WTK wall termination kit must be extended for use in this application. See figure 27. When exhaust and intake piping must be run up an outside wall, the exhaust piping is reduced to 1-1/2" (38mm) after the final elbow. The intake piping may be equipped with a 90° elbow turndown. Using turndown will add 5 feet (1.5m) to the equivalent length of the pipe.
9. Based on the recommendation of the manufacturer, a multiple furnace installation may use a group of up to four termination kits WTK assembled together horizontally, as shown in figure 26.

TABLE 14
EXHAUST PIPE TERMINATION SIZE REDUCTION

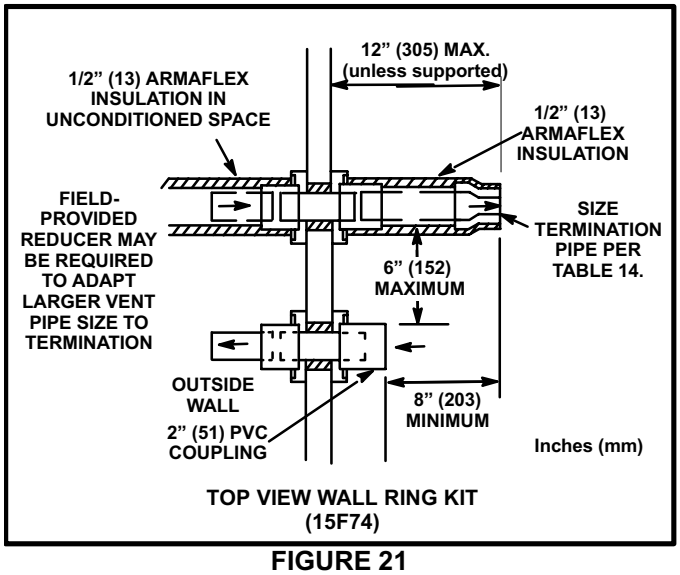
G61MP MODEL	Exhaust Pipe Size	Termination Pipe Size
045 and 070	2", 2-1/2", 3" or 4"	1-1/2"
090	2", 2-1/2", 3" or 4"	2"
110	2-1/2", 3" or 4"	2"*
135	3" or 4"	2"*

**Approved 3" concentric termination kit terminates with 2-5/8" ID pipe.*



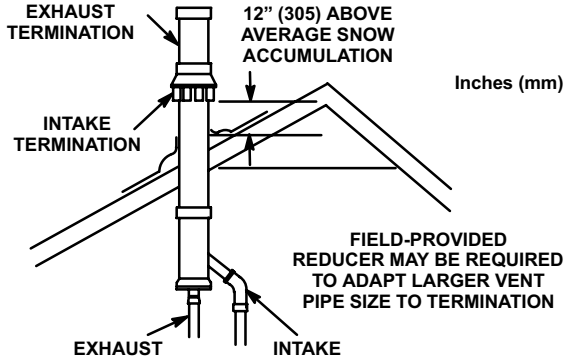
DIRECT VENT ROOF TERMINATION KIT (15F75 or 44J41)

FIGURE 20



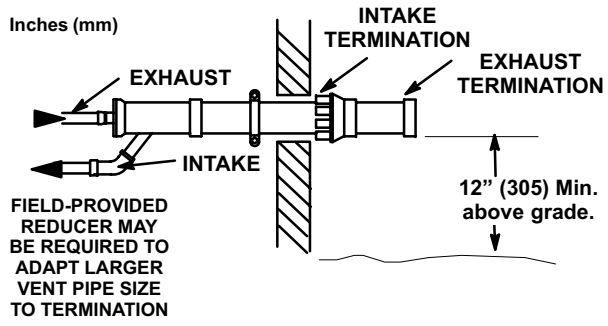
TOP VIEW WALL RING KIT (15F74)

FIGURE 21



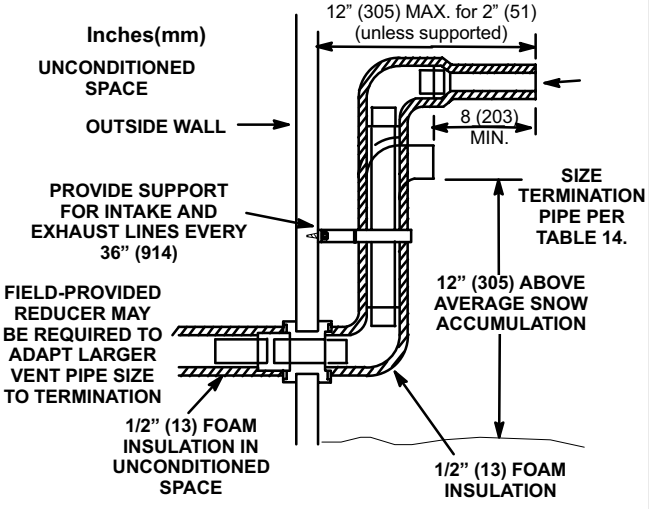
DIRECT VENT CONCENTRIC ROOFTOP TERMINATION
(71M80, 69M29 or 60L46)

FIGURE 22



DIRECT VENT CONCENTRIC WALL TERMINATION
(71M80, 69M29 or 60L46)

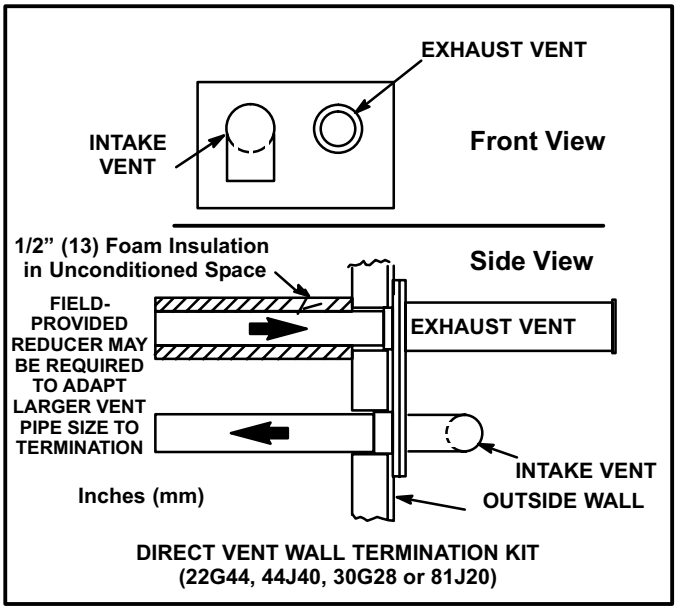
FIGURE 23



SIDE VIEW
DIRECT VENT WALL RING TERMINATION
(15F74)

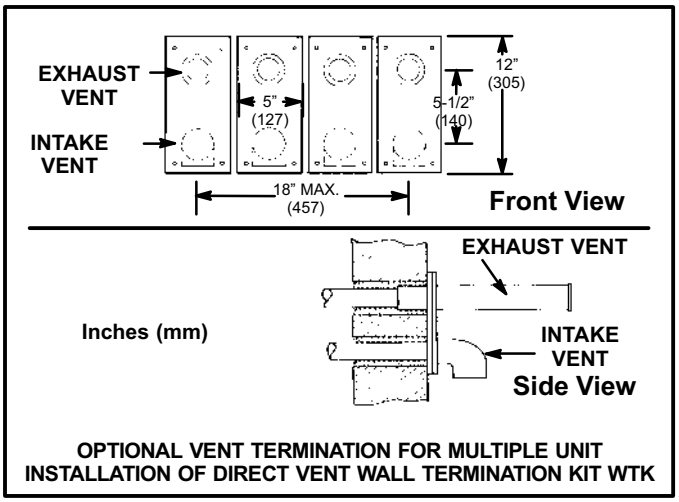
See venting table 12 for maximum venting lengths with this arrangement.

FIGURE 24



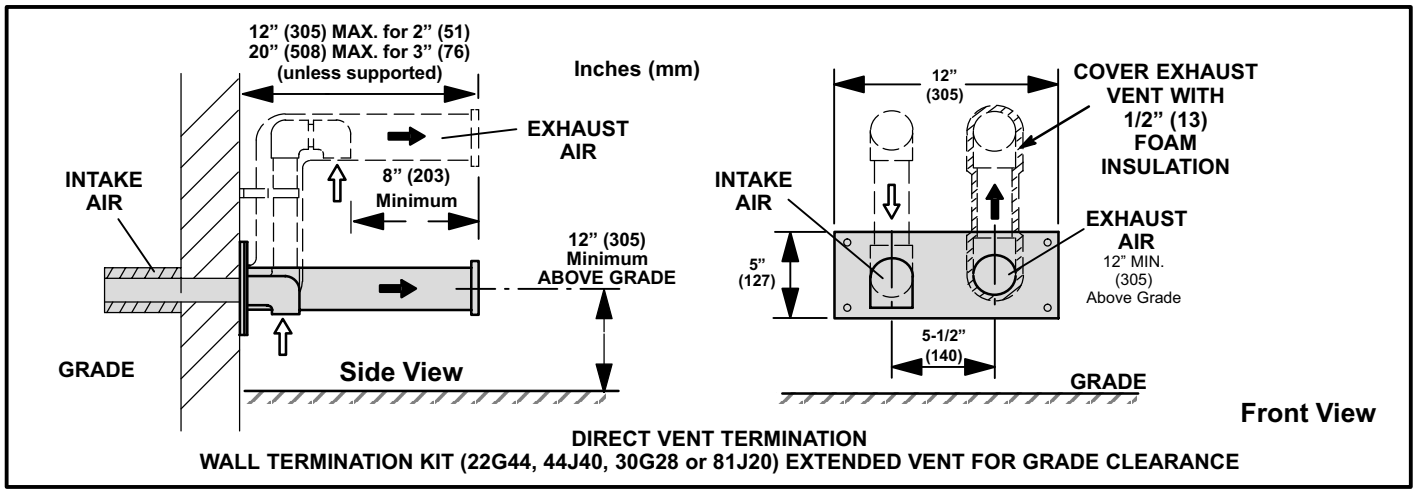
DIRECT VENT WALL TERMINATION KIT
(22G44, 44J40, 30G28 or 81J20)

FIGURE 25



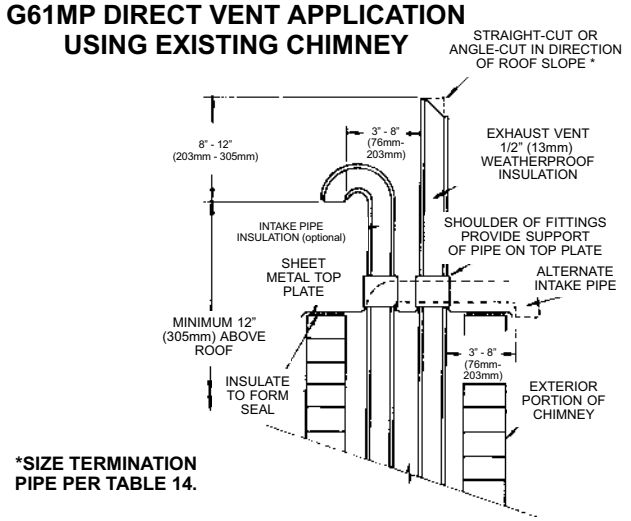
OPTIONAL VENT TERMINATION FOR MULTIPLE UNIT INSTALLATION OF DIRECT VENT WALL TERMINATION KIT WTK

FIGURE 26



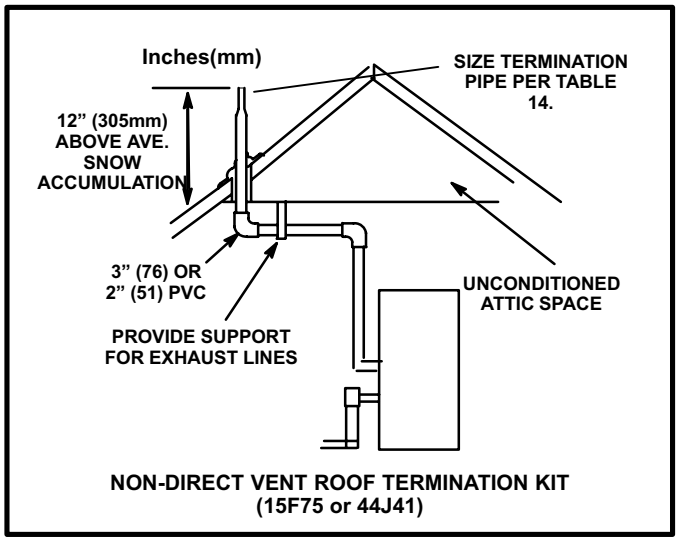
DIRECT VENT TERMINATION
WALL TERMINATION KIT (22G44, 44J40, 30G28 or 81J20) EXTENDED VENT FOR GRADE CLEARANCE

FIGURE 27



NOTE - Do not discharge exhaust gases directly into any chimney or vent stack. If vertical discharge through an existing unused chimney or stack is required, insert piping inside chimney until the pipe open end is above top of chimney and terminate as illustrated. In any exterior portion of chimney, the exhaust vent must be insulated.

FIGURE 28



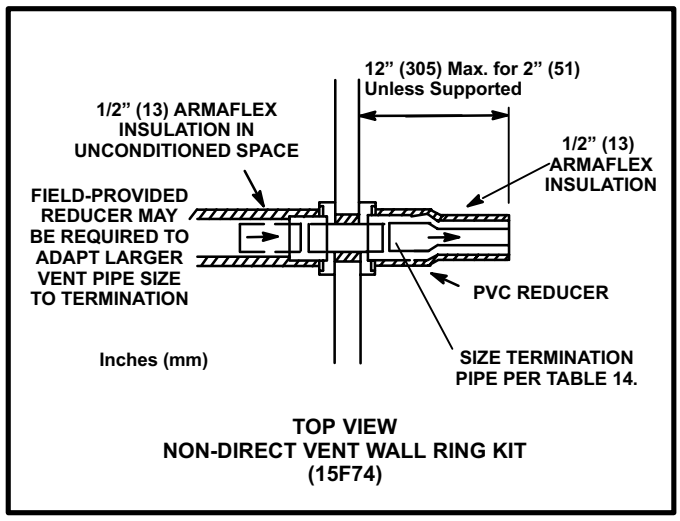
NON-DIRECT VENT ROOF TERMINATION KIT
(15F75 or 44J41)

FIGURE 29

Details of Exhaust Piping Terminations for Non-Direct Vent Applications

Exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 29 through 32 show typical terminations.

1. Exhaust piping must terminate straight out or up as shown. The termination pipe must be sized as listed in table 14.The specified pipe size ensures proper velocity required to move the exhaust gases away from the building.
2. On field supplied terminations for side wall exits, exhaust piping should extend a maximum of 12 inches (305mm) beyond the outside wall, unless support is provided in the horizontal section. See figure 30.



TOP VIEW
NON-DIRECT VENT WALL RING KIT
(15F74)

FIGURE 30

3. If exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported every 3 feet (.9m) as shown in figure 12. Refer to figure 31 for proper piping method. When exhaust piping must be run up an outside wall, any reduction in exhaust pipe size must be done after the final elbow.

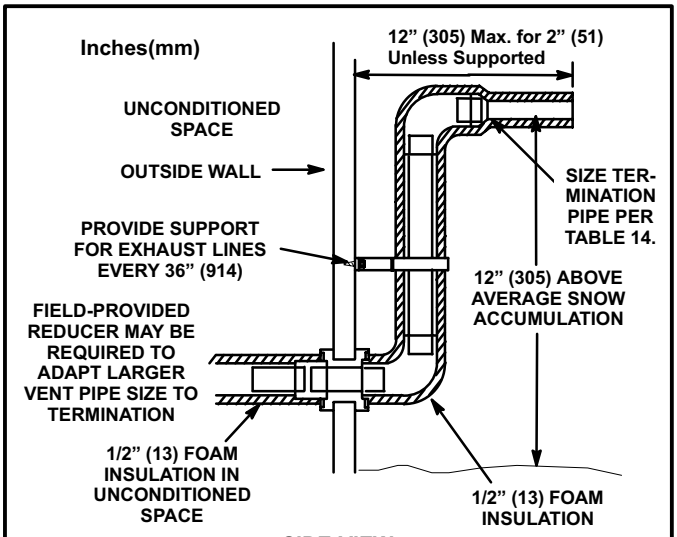


FIGURE 31

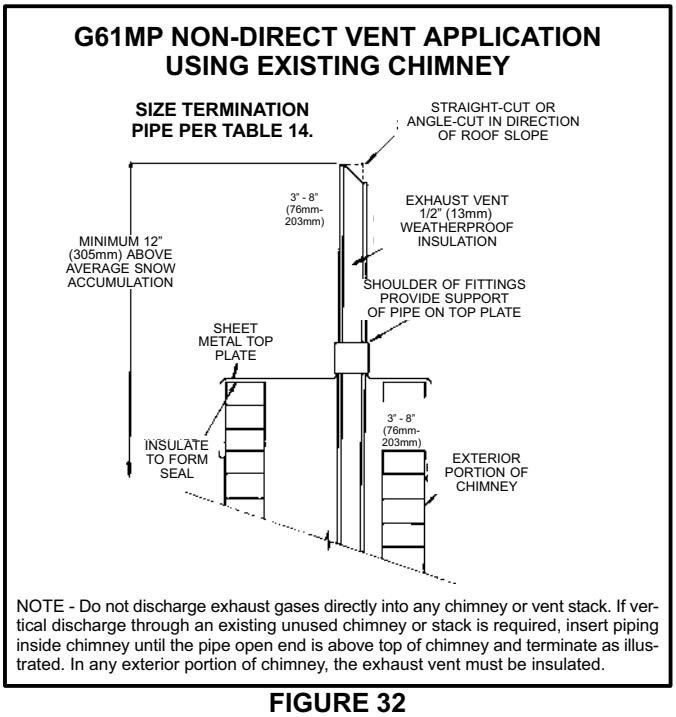


FIGURE 32

Condensate Piping

This unit is designed for either right- or left-side exit of condensate piping in either upflow or downflow applications; however, it must be installed on the same side of the unit as the exhaust piping. In horizontal applications, the condensate trap should extend below the unit. A 5-1/2" service clearance is required for the condensate trap. Refer to figure for condensate trap locations.

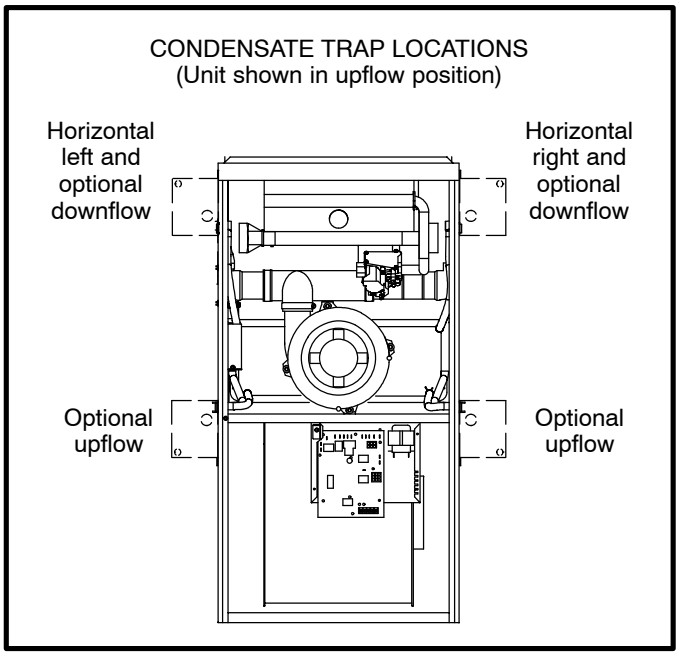


FIGURE 33

1 - Determine which side condensate piping will exit the unit. Remove plugs from the condensate collar at the appropriate location on the side of the unit.

NOTE - The condensate trap is factory-shipped with two rubber O-rings and two rubber clean-out caps installed. Check to make sure that these items are in place before installing the trap assembly.

2 - Install condensate trap onto the condensate collar. Use provided HI/LO screws to secure two upper flanges of the trap to the collar. Use provided sheet metal screw to secure bottom trap flange to side of unit. See figure 34.

NOTE - In upflow and downflow applications, condensate trap must be installed on the same side as exhaust piping.

⚠ CAUTION

DO NOT use a power driver to tighten screws which secure condensate trap to cabinet. Screws should be hand-tightened using a screw driver to avoid the possibility of damage to the trap assembly.

3 - Glue the field-provided coupling or pipe to the trap. Install a tee and vent pipe near the trap.

NOTE - The condensate trap drain stubs (both sides) have an outer diameter which will accept a standard 3/4" PVC coupling. The inner diameter of each stub will accept standard 1/2" diameter PVC pipe.

NOTE - Vinyl tubing may be used for condensate drain. Tubing must be 1-1/4" OD X 1" ID and should be attached to the drain stubs on the trap using a hose clamp.

4 - Glue the field-provided drain line to the tee. Route the drain line to an open drain. As an alternate, clear vinyl tubing may be used to drain condensate away from the trap. Secure the vinyl tubing to the drain stubs on the trap using a hose clamp. Do not overtighten the

hose clamp.

Condensate line must be sloped downward away from condensate trap to drain. If drain level is above condensate trap, condensate pump must be used. Condensate drain line should be routed within the conditioned space to avoid freezing of condensate and blockage of drain line. If this is not possible, a heat cable kit may be used on the condensate trap and line. Heating cable kit is available from Lennox in various lengths; 6 ft. (1.8m) - kit no. 18K48; 24 ft. (7.3m) - kit no. 18K49; and 50 ft. (15.2m) - kit no. 18K50.

⚠ CAUTION

Do not use copper tubing or existing copper condensate lines for drain line.

5 - If unit will be started immediately upon completion of installation, prime trap per procedure outlined in Unit Start-Up section.

6 - Glue the provided cap onto the unused condensate drain line stub.

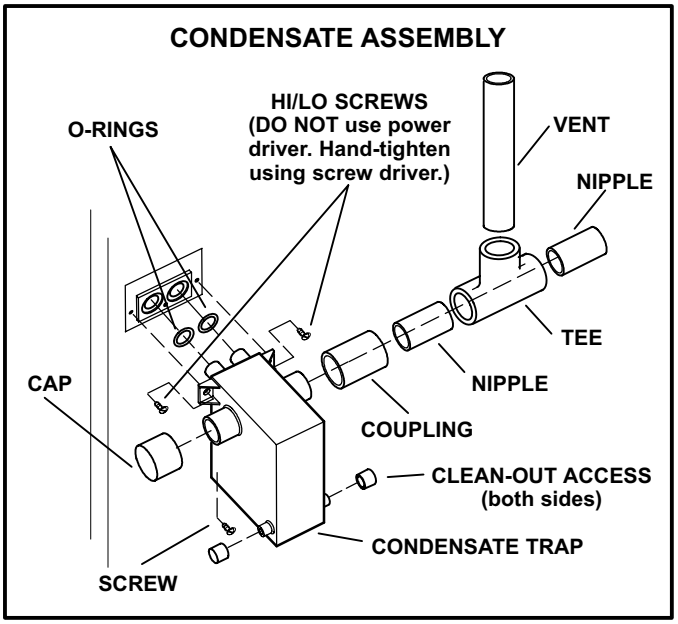


FIGURE 34

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

FOR YOUR SAFETY READ BEFORE OPERATING

⚠ WARNING

Shock and burn hazard.

G61MP units are equipped with a hot surface ignition system. Do not attempt to light manually.

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

The gas valve on the G61MP may be equipped with either a gas control knob or gas control lever. Use only your hand to push the lever or turn the gas control knob. Never use tools. If the the lever will not move or the knob will not push in or turn by hand, do not try to repair it. Force or attempted repair may result in a fire or explosion.

Placing the furnace into operation:

G61MP units are equipped with a SureLight® ignition system. Do not attempt to manually light burners on this furnace. Each time the thermostat calls for heat, the burners will automatically light. The ignitor does not get hot when there is no call for heat on units with SureLight® ignition system.

Priming Condensate Trap

The condensate trap should be primed with water prior to start-up to ensure proper condensate drainage. Either pour 10 fl. oz. (300 ml) of water into the trap, or follow these steps to prime the trap:

1 - Follow the lighting instructions to place the unit into operation.

2 - Set the thermostat to initiate a heating demand.

3 - Allow the burners to fire for approximately 3 minutes.

4 - Adjust the thermostat to deactivate the heating demand.

5 - Wait for the combustion air inducer to stop. Set the thermostat to initiate a heating demand and again allow the burners to fire for approximately 3 minutes.

6 - Adjust the thermostat to deactivate the heating demand and again wait for the combustion air inducer to stop. At this point, the trap should be primed with sufficient water to ensure proper condensate drain operation.

⚠ WARNING

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or death.

Gas Valve Operation (Figures 35 and 36)

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.

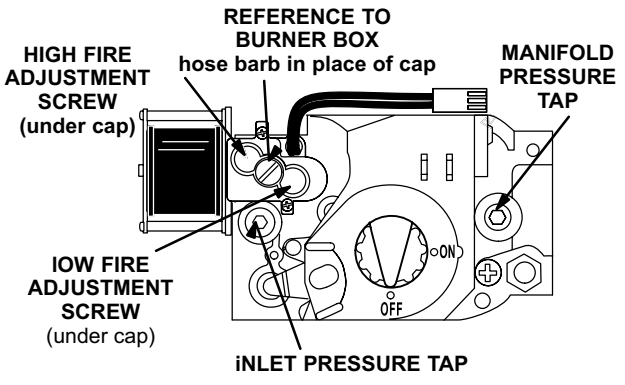
5 - Remove the upper access panel.

6 - *Honeywell VR8205 Gas Valve* - Turn knob on gas valve clockwise ↷ to **OFF**. Do not force. See figure 35.

White Rodgers 36E Gas Valve - Switch gas valve lever to **OFF**. See figure 36 for the White Rodgers 36E valve.

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.

HONEYWELL VR8205 Series Gas Valve



GAS VALVE SHOWN IN OFF POSITION

FIGURE 35

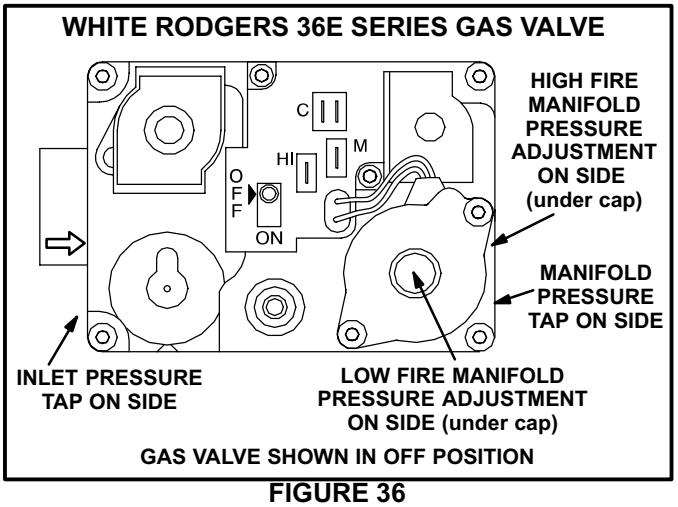


FIGURE 36

8 - *Honeywell VR8205 Gas Valve* - Turn knob on gas valve counterclockwise to **ON**. Do not force.
White Rodgers 36E Gas Valve - Switch gas valve lever to **ON**. See figure 36 for the White Rodgers 36E valve.

9 - Replace the upper access panel.

10- Turn on all electrical power to 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.

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

Turning Off Gas to Unit

1 - Set the thermostat to the lowest setting.

2 - Turn off all electrical power to the unit if service is to be performed.

3 - Remove the upper access panel.

4 - *Honeywell VR8205 Gas Valve* - Turn knob on gas valve clockwise to **OFF**. Do not force.
White Rodgers 36E Gas Valve - Switch gas valve lever to **OFF**.

5 - Replace the upper 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 G61MP 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 37.

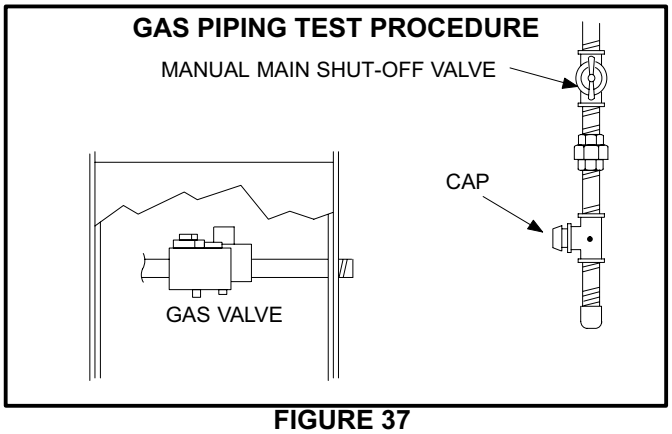


FIGURE 37

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 gas valve. See figures and 35 and 36. 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.

TABLE 15

All G61MP Units	Natural	LP
Line Pressure WC"	4.5 - 10.5	11.0 - 13.0

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 G61MP can be measured at any time the gas valve is open and is supplying gas to the unit. See table 19 for manifold pressures.

⚠ 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 *sensing atmospheric pressure.*

Manifold Pressure Measurement & Adjustment

NOTE - Pressure test adapter kit (10L34) is available from Lennox to facilitate manifold pressure measurement.

1 - Connect test gauge to outlet tap on gas valve.
2 - Disconnect pressure sensing hose from gas valve.
3 - Start unit on low heat and allow 5 minutes for unit to reach steady state.
4 - 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.
5 - After allowing unit to stabilize for 5 minutes, record manifold pressure and compare to value given in table 19.
6 - Repeat steps 3, 4 and 5 on high heat.

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

NOTE - During this test procedure, the unit will be overfiring:

- Operate unit only long enough to obtain accurate reading to prevent overheating heat exchanger.
- Attempts to clock gas meter during this procedure will be inaccurate. Measure gas flow rate only during normal unit operation.

7 - When test is complete remove obstruction from hose and return hose to gas valve barbed fitting.

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

GAS METER CLOCKING CHART				
G61MP Unit	Seconds for One Revolution			
	Natural		LP	
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft DIAL
-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

Unit	CO_2% For Nat	CO_2% For L.P.
G61MP-36B-045	6.5 - 7.5	7.4 - 8.4
G61MP-36B-070	6.5 - 7.5	7.4 - 8.4
G61MP-48C-090	6.9 - 7.9	7.8 - 8.8
G61MP-60C-090	6.9 - 7.9	7.8 - 8.8
G61MP-48C-110	7.2 - 8.2	8.1 - 9.1
G61MP-60C-110	7.2 - 8.2	8.1 - 9.1
G61MP-60D-135	7.4 - 8.4	8.3 - 9.3

TABLE 18
Low Heat

Unit	CO_2% For Nat	CO_2% For L.P.
G61MP-36B-045	4.8 - 5.8	5.3 - 6.3
G61MP-36B-070	4.8 - 5.8	5.3 - 6.3
G61MP-48C-090	5.1 - 6.1	5.9 - 6.9
G61MP-60C-090	5.1 - 6.1	5.9 - 6.9
G61MP-48C-110	5.3 - 6.3	6.1 - 7.1
G61MP-60C-110	5.3 - 6.3	6.1 - 7.1
G61MP-60D-135	5.7 - 6.7	6.7 - 7.7

H- High Altitude

NOTE - In Canada, certification for installations at elevations over 4500 feet (1372 m) is the jurisdiction of local authorities.

The manifold pressure may require adjustment to ensure proper operation at higher altitudes. Refer to table 19 for proper manifold pressure settings at varying altitudes and required pressure switch changes and conversion kits at varying altitudes.

The combustion air pressure switches are factory-set and require no adjustment.

NOTE - A natural to L.P. propane gas changeover kit is necessary to convert this unit. Refer to the changeover kit installation instruction for the conversion procedure.

I- Condensate pH Range

The condensate is mildly acidic and can be measured with pH indicators. The pH scale is a measurement of acidity and alkalinity. The following scale shows the relative pH of some common liquids as compared with condensate of G61MP units. The concentration of the acidity of all these fluids including the condensate is very low and harmless.

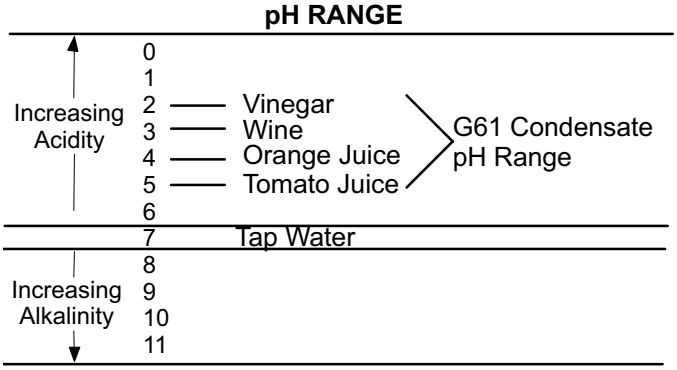


TABLE 19
Conversion Kit Requirements and Manifold Pressures

Model Input Size	Gas	Altitude						Manifold Pressure at all altitudes			
		0-4500 ft. (0-1372 m)		4501-7500 ft. (1373-2286 m)		7501-10,000 (2287-3048 m)		Low Fire		High Fire	
		Required Conversion Kit	Pressure Switch	Required Conversion Kit	Pressure Switch	Required Conversion Kit	Pressure Switch	in. w.c.	kPa	in. w.c.	kPa
-045	Nat	N/A	No Change	N/A	No Change	59M16	No Change	1.7	0.42	3.5	0.87
	LPG	59M13	No Change	59M13	No Change	59M14	No Change	4.9	1.22	10.0	2.5
-070	Nat	N/A	No Change	N/A	No Change	59M16	56M06	1.7	0.42	3.5	0.87
	LPG	59M13	No Change	59M13	No Change	59M14	56M06	4.9	1.22	10.0	2.5
-090	Nat	N/A	No Change	N/A	75M22	59M16	56M21	1.7	0.42	3.5	0.87
	LPG	59M13	No Change	59M13	75M22	59M14	56M21	4.9	1.22	10.0	2.5
-110	Nat	N/A	No Change	N/A	No Change	59M16	No Change	1.7	0.42	3.5	0.87
	LPG	59M13	No Change	59M13	No Change	59M14	No Change	4.9	1.22	10.0	2.5
-135	Nat	N/A	No Change	N/A	59M93	59M16	56M93	1.7	0.42	3.5	0.87
	LPG	59M13	No Change	59M13	59M93	59M14	56M93	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 (0-1370 m).

J-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:

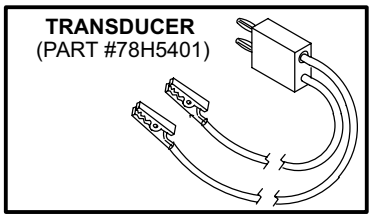


FIGURE 38

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 38. The transducer converts microamps to volts on a 1:1 conversion. Flame signal for the SureLight control should read **0.23 or greater** microamps with a lockout signal of **0.16** microamps. A digital readout meter must be used. The transducer plugs into most meters. See figure 39 for proper use of transducer.

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.

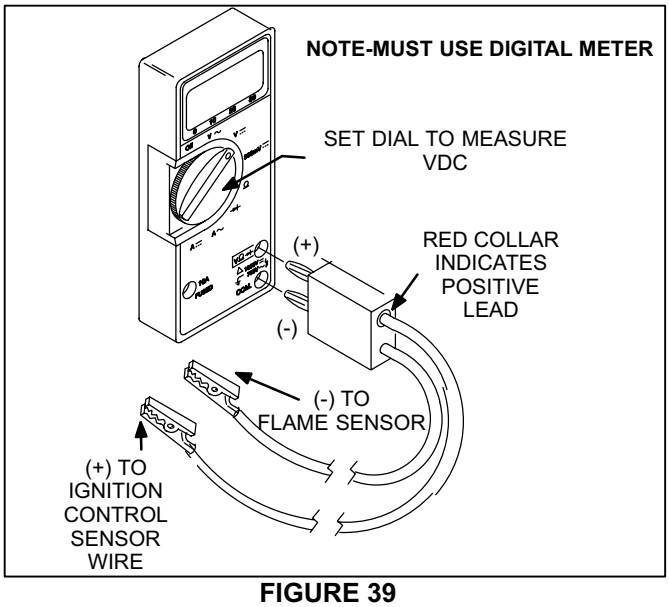


FIGURE 39

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 subbase 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 G61MP 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 40.

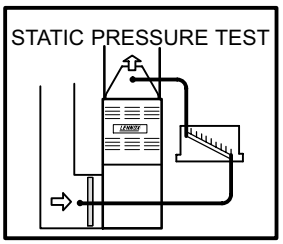


FIGURE 40

2 - Punch a 1/4" diameter hole in supply and return air plenums. Insert manometer hose flush with inside edge of hole or insulation. Seal around the hose with permagum. Connect the zero end of the manometer to the discharge (supply) side of the system. On ducted systems, connect the other end of manometer to the return duct as above. 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 0.8" W.C.

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

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 table 20 for blower motor tap colors for each speed.

TABLE 20

BLOWER SPEED CHART					
UNIT	FACTORY CONNECTED SPEED TAPS				MOTOR SPEEDS AVAIL.
	COOL	HI HEAT	LO HEAT	PARK	
36B-045	BLACK	YELLOW	RED	BROWN	4
36B-070		BROWN	YELLOW	RED	4
48C-090		BROWN	YELLOW	RED	4
60C-090		BROWN	YELLOW	RED	4
48C-110		BROWN	YELLOW	RED	4
60C-110		BROWN	YELLOW	RED	4
60D-135		BROWN	YELLOW	RED	4
HI ← BLOWER SPEED SELECTION → LO					
SPEED TAPS	BLACK YELLOW RED				3
	BLACK BROWN YELLOW RED				4

VI-MAINTENANCE

⚠WARNING

ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.
Improper servicing could result in dangerous operation, serious injury, death, or property damage.
Before servicing, disconnect all electrical power to furnace.
When servicing controls, label all wires prior to disconnecting. Take care to reconnect wires correctly.
Verify proper operation after servicing.

At the beginning of each heating season, system should be checked as follows by a qualified service technician:

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.

Filters

Filters should be inspected monthly. Clean or replace the filters when necessary to ensure proper furnace operation. Replacement filters must be rated for high velocity airflow. Table 21 lists recommended filter sizes.

TABLE 21

Furnace Cabinet Size	Filter Size	
	Side Return	Bottom Return
17-1/2"	16 X 25 X 1 (1)	16 X 25 X 1 (1)
21"	16 X 25 X 1 (1)	20 X 25 X 1 (1)
24-1/2"	16 X 25 X 1 (2)	24 X 25 X 1 (1)

Exhaust and air intake pipes

Check the exhaust and air intake pipes and all connections for tightness and to make sure there is no blockage.

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_____

Winterizing and Condensate Trap Care

1 - Turn off power to the unit.
2 - Have a shallow pan ready to empty condensate water.
3 - Remove the drain plug from the condensate trap and empty water. Inspect the trap then reinstall the drain plug.

Cleaning Heat Exchanger

If cleaning the heat exchanger becomes necessary, follow the below procedures and refer to figure 1 when disassembling unit. Use papers or protective covering in front of furnace while removing heat exchanger assembly.

⚠ IMPORTANT

Safety glasses and surgical mask should be worn when cleaning heat exchanger and or burner assembly.

1 - Turn off electrical and gas supplies to the furnace.
2 - Remove the upper and lower furnace access panels.
3 - Mark all gas valve wires and disconnect them from valve.
4 - Remove gas supply line connected to gas valve. Remove gas valve/manifold assembly.
5 - Remove sensor wire from sensor. Disconnect 2-pin plug from the ignitor.
6 - Disconnect wires from flame roll-out switches.
7 - Remove burner box cover and remove four burner box screws at the vestibule panel and remove burner box. Set burner box assembly aside. G61MP-135 only - Remove and discard two additional shipping screws. See figure 41.
NOTE - If necessary, clean burners at this time. Follow procedures outlined in Burner Cleaning section.
8 - Loosen three clamps and remove flexible exhaust tee.

G61MP-135 ONLY

Remove and discard two shipping screws.

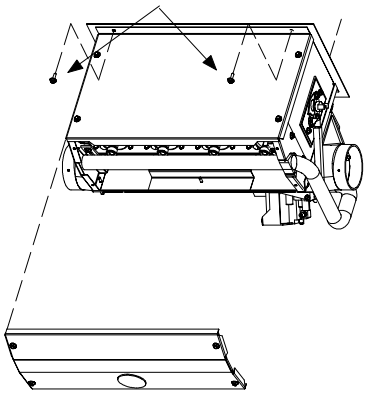


FIGURE 41

9 - Remove 3/8 inch rubber cap from condensate drain plug and drain. Replace cap after draining.

10 - Disconnect condensate drain line from the condensate trap. Remove condensate trap (it may be necessary to cut drain pipe). Remove screws that secure condensate collars to either side of the furnace and remove collars. Remove drain tubes from cold end header collector box.

11 - Disconnect condensate drain tubing from flue collar. Remove screws that secure both flue collars into place. Remove flue collars. It may be necessary to cut the exiting exhaust pipe for removal of the fittings.

12 - Mark and disconnect all combustion air pressure tubing from cold end header collector box.

13 - Mark and remove wires from pressure switches. Remove pressure switches. Keep tubing attached to pressure switches.

14 - Disconnect the 3-pin plug from the combustion air inducer. Disconnect the two wires to the backup secondary limit, if applicable. Remove four screws which secure combustion air inducer to collector box. Remove combustion air inducer assembly. Remove ground wire from vest panel.

15 - Remove electrical junction box from the side of the furnace.

16 - Mark and disconnect any remaining wiring to heating compartment components. Disengage strain relief bushing and pull wiring and bushing through the hole in the blower deck.

17 - Remove the primary limit from the vestibule panel.

18 - Remove two screws from the front cabinet flange at the blower deck. Spread cabinet sides slightly to allow clearance for removal of heat exchanger.

19 - Remove screws along vestibule sides and bottom which secure vestibule panel and heat exchanger assembly to cabinet. Remove two screws from blower rail which secure bottom heat exchanger flange. Remove heat exchanger from furnace cabinet.

20 - Back wash heat exchanger with soapy water solution or steam. **If steam is used it must be below 275°F (135°C) .**

21 - Thoroughly rinse and drain the heat exchanger. Soap solutions can be corrosive. Take care to rinse entire assembly.

22 - Reinstall heat exchanger into cabinet making sure that the clamshells of the heat exchanger assembly are resting on the support located at the rear of the cabinet. Remove the indoor blower to view this area through the blower opening.

23 - Re-secure the supporting screws along the vestibule sides and bottom to the cabinet.

24 - Reinstall cabinet screws on front flange at blower deck.

25 - Reinstall the primary limit on the vestibule panel.

26 - Route heating component wiring through hole in blower deck and reinsert strain relief bushing.

27 - Reinstall electrical junction box.

28 - Reinstall the combustion air inducer. Reconnect the 3-pin plug to the wire harness. Reconnect the two wires to the backup secondary limit, if applicable.

29 - Reinstall pressure switches and reconnect pressure switch wiring.

30 - Carefully connect combustion air pressure switch hosing from pressure switches to proper stubs on cold end header collector box.

31 - Reinstall condensate collars on each side of the furnace. Reconnect drain tubing to collector box.

32 - Reinstall condensate trap on same side as exhaust pipe. Reconnect condensate drain line to the condensate trap.

33 - Use securing screws to reinstall flue collars to either side of the furnace. Reconnect exhaust piping and exhaust drain tubing.

34 - Replace flexible exhaust tee on combustion air inducer and flue collars. Secure using three existing hose clamps.

35 - Reinstall burner box assembly in vestibule area.

36 - Reconnect flame roll-out switch wires.

37 - Reconnect sensor wire and reconnect 2-pin plug from ignitor.

38 - Secure burner box assembly to vestibule panel using four existing screws. **Make sure burners line up in center of burner ports.**

39 - Reinstall gas valve manifold assembly. Reconnect gas supply line to gas valve.

40 - Reinstall burner box cover.

41 - Reconnect wires to gas valve.

42 - Replace the blower compartment access panel.

43 - Refer to instruction on verifying gas and electrical connections when re-establishing supplies.

44 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.

45 - Replace heating compartment access panel.

Cleaning the Burner Assembly

1 - Turn off electrical and gas power supplies to furnace. Remove upper and lower furnace access panels.

2 - Mark all gas valve wires and disconnect them from the valve.

3 - Disconnect the gas supply line from the gas valve. Remove gas valve/manifold assembly.

4 - Mark and disconnect sensor wire from the sensor. Disconnect 2-pin plug from the ignitor at the burner box.

5 - Remove burner box cover and remove four screws which secure burner box assembly to vest panel. Remove burner box from the unit. G61MP-135 only - Remove and discard two additional shipping screws. See figure 41.

6 - Use the soft brush attachment on a vacuum cleaner to gently clean the face of the burners. Visually inspect the inside of the burners and crossovers for any blockage caused by foreign matter. Remove any blockage.

7 - Reconnect the sensor wire and reconnect the 2-pin plug to the ignitor wiring harness.

8 - Reinstall the burner box assembly using the existing four screws. Make sure that the burners line up in the center of the burner ports.

9 - Reinstall the gas valve manifold assembly. Reconnect the gas supply line to the gas valve. Reinstall the burner box cover.

10 - Reconnect the gas valve wires to the gas valve.

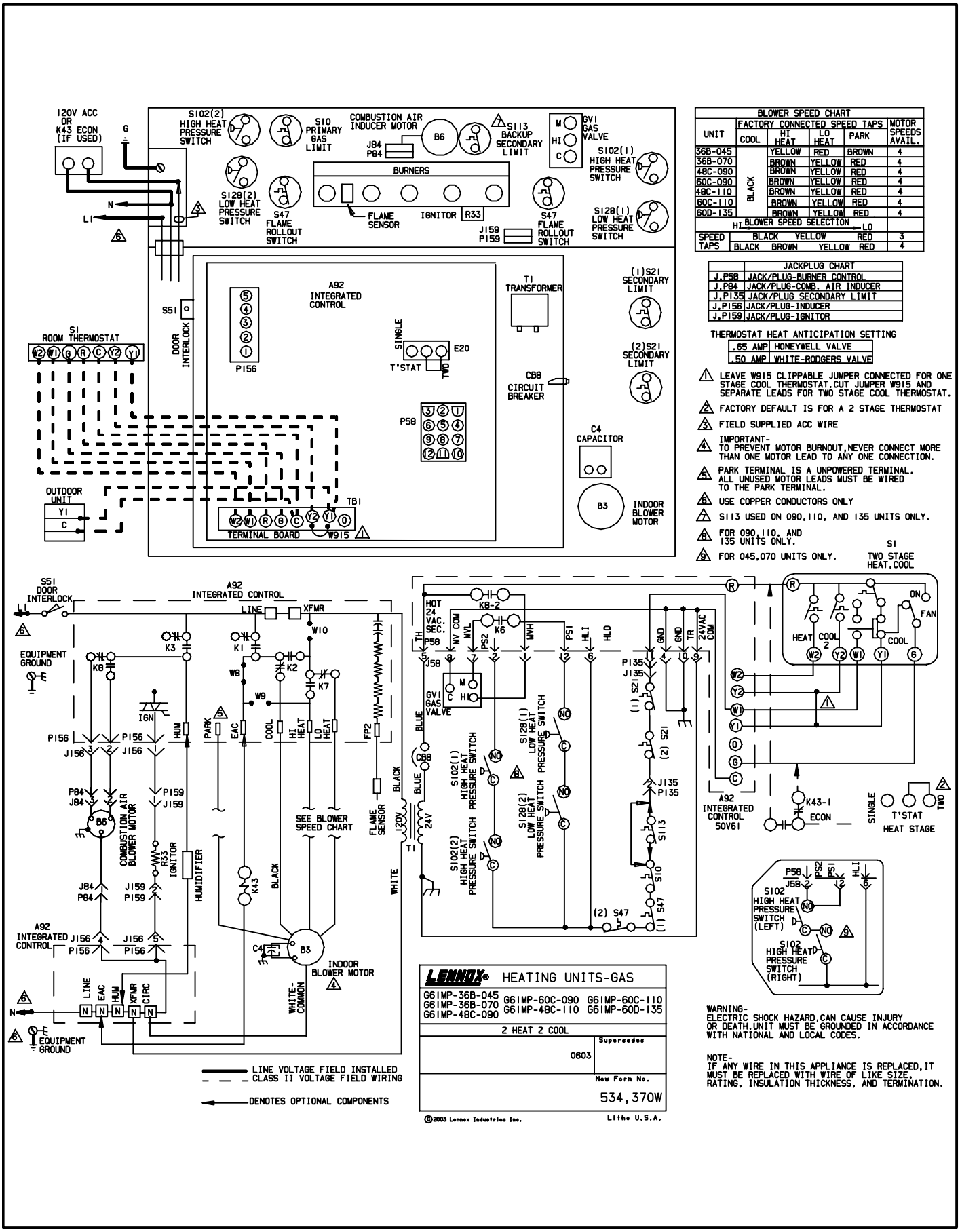
11 - Replace the blower compartment access panel.

12 - Refer to instruction on verifying gas and electrical connections when re-establishing supplies.

13 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.

14 - Replace heating compartment access panel.

VII- Wiring and Sequence of Operation



BLOWER SPEED CHART						
UNIT	FACTORY CONNECTED SPEED TAPS				MOTOR SPEEDS AVAIL.
	COOL	HI HEAT	LO HEAT	PARK	
36B-045	BLACK	YELLOW	RED	BROWN	4
36B-070		BROWN	YELLOW	RED	4
48C-090		BROWN	YELLOW	RED	4
60C-090		BROWN	YELLOW	RED	4
48C-110		BROWN	YELLOW	RED	4
60C-110		BROWN	YELLOW	RED	4
60D-135		BROWN	YELLOW	RED	4
HI ← BLOWER SPEED SELECTION → LO					
SPEED TAPS	BLACK	YELLOW		RED	3
	BLACK	BROWN	YELLOW	RED	4

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-INDUCER
J.P159	JACK/PLUG-IGNITOR

THERMOSTAT HEAT ANTICIPATION SETTING

.65 AMP	HONEYWELL VALVE
.50 AMP	WHITE-RODGERS VALVE

1. LEAVE W915 CLIPPABLE JUMPER CONNECTED FOR ONE STAGE COOL THERMOSTAT.CUT JUMPER W915 AND SEPARATE LEADS FOR TWO STAGE COOL THERMOSTAT.
2. FACTORY DEFAULT IS FOR A 2 STAGE THERMOSTAT
3. FIELD SUPPLIED ACC WIRE
4. IMPORTANT- TO PREVENT MOTOR BURNOUT,NEVER CONNECT MORE THAN ONE MOTOR LEAD TO ANY ONE CONNECTION.
5. PARK TERMINAL IS A UNPOWERED TERMINAL. ALL UNUSED MOTOR LEADS MUST BE WIRED TO THE PARK TERMINAL.
6. USE COPPER CONDUCTORS ONLY
7. S113 USED ON 090,110, AND 135 UNITS ONLY.
8. FOR 090,110, AND 135 UNITS ONLY.
9. FOR 045,070 UNITS ONLY.

S1 TWO STAGE HEAT,COOL

LENNOX® HEATING UNITS-GAS

G61MP-36B-045 G61MP-60C-090 G61MP-60C-110
G61MP-36B-070 G61MP-48C-110 G61MP-60D-135
G61MP-48C-090

2 HEAT 2 COOL

Supersedes 0603

New Form No. 534,370W

Litho U.S.A.

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.

Sequence of Operation

Sequence depends on type thermostat used. G61MP 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 satified 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.

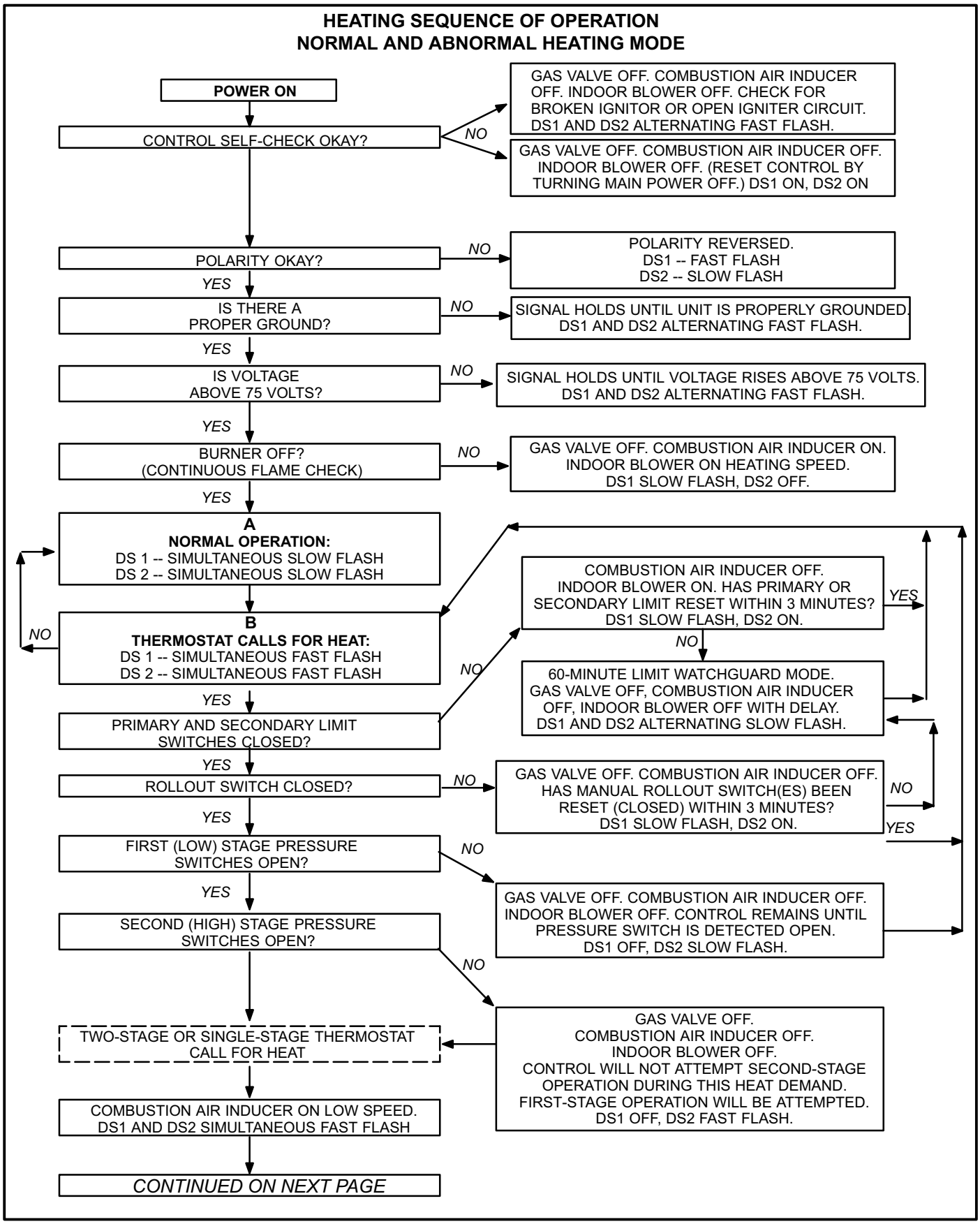
6- A 10 minute (factory set) or 15 minute (field set) second stage heat delay period begins.

7- After the delay the combustion air inducer ramps up to high heat speed.

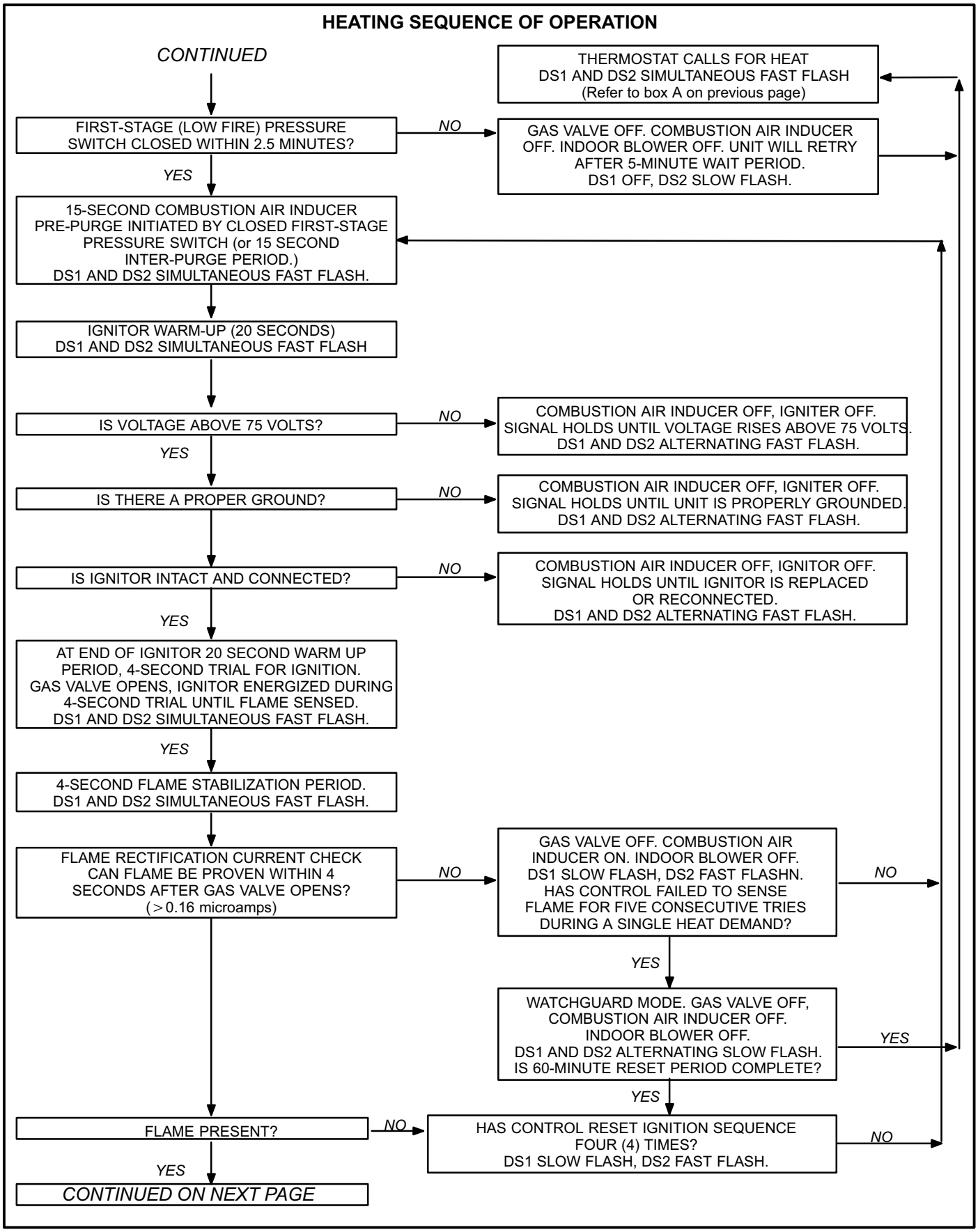
8- S102 high heat prove switch closes and the gas valve energizes second stage heat.

9- B3 indoor blower energizes on high heat speed.

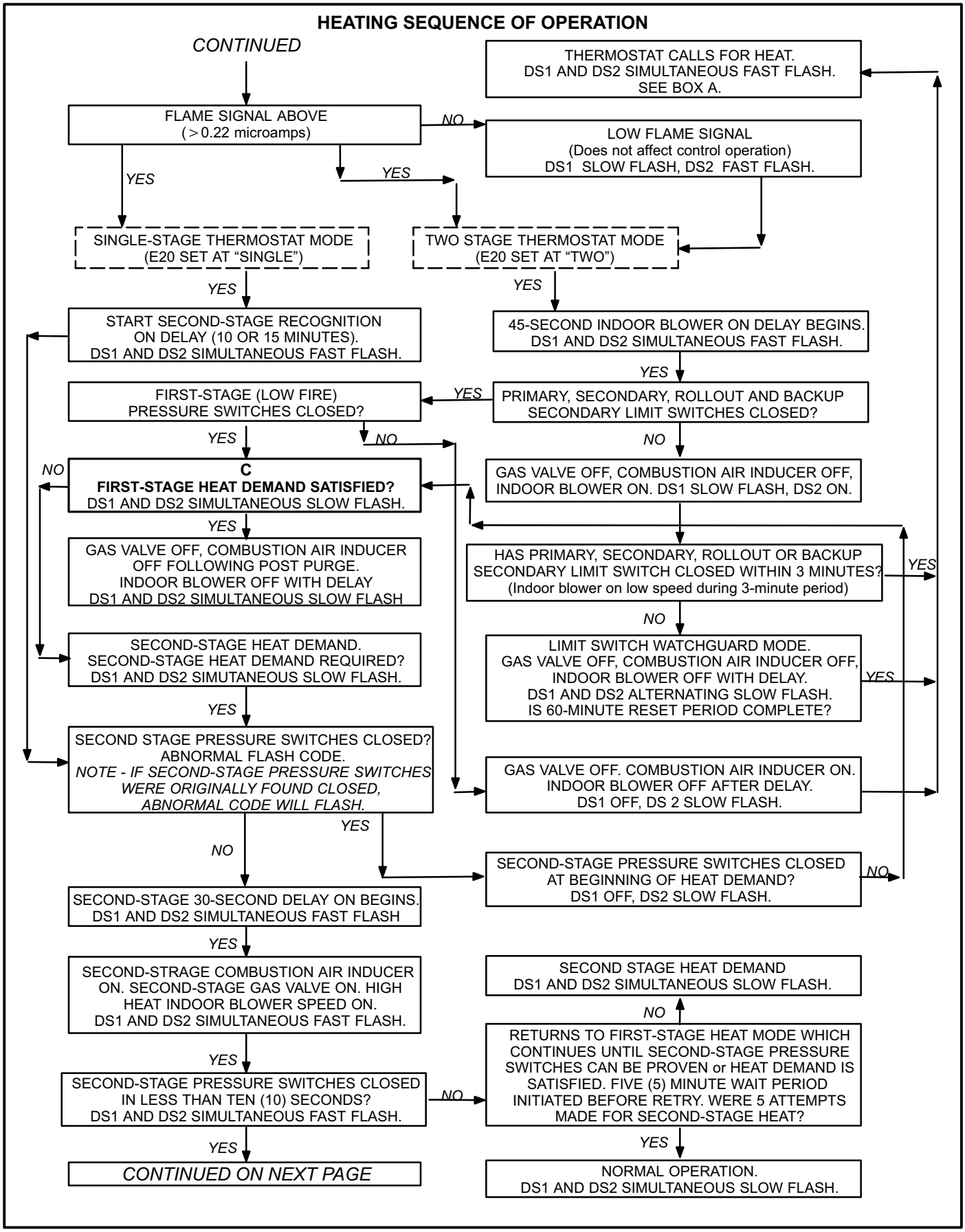
HEATING SEQUENCE OF OPERATION
NORMAL AND ABNORMAL HEATING MODE



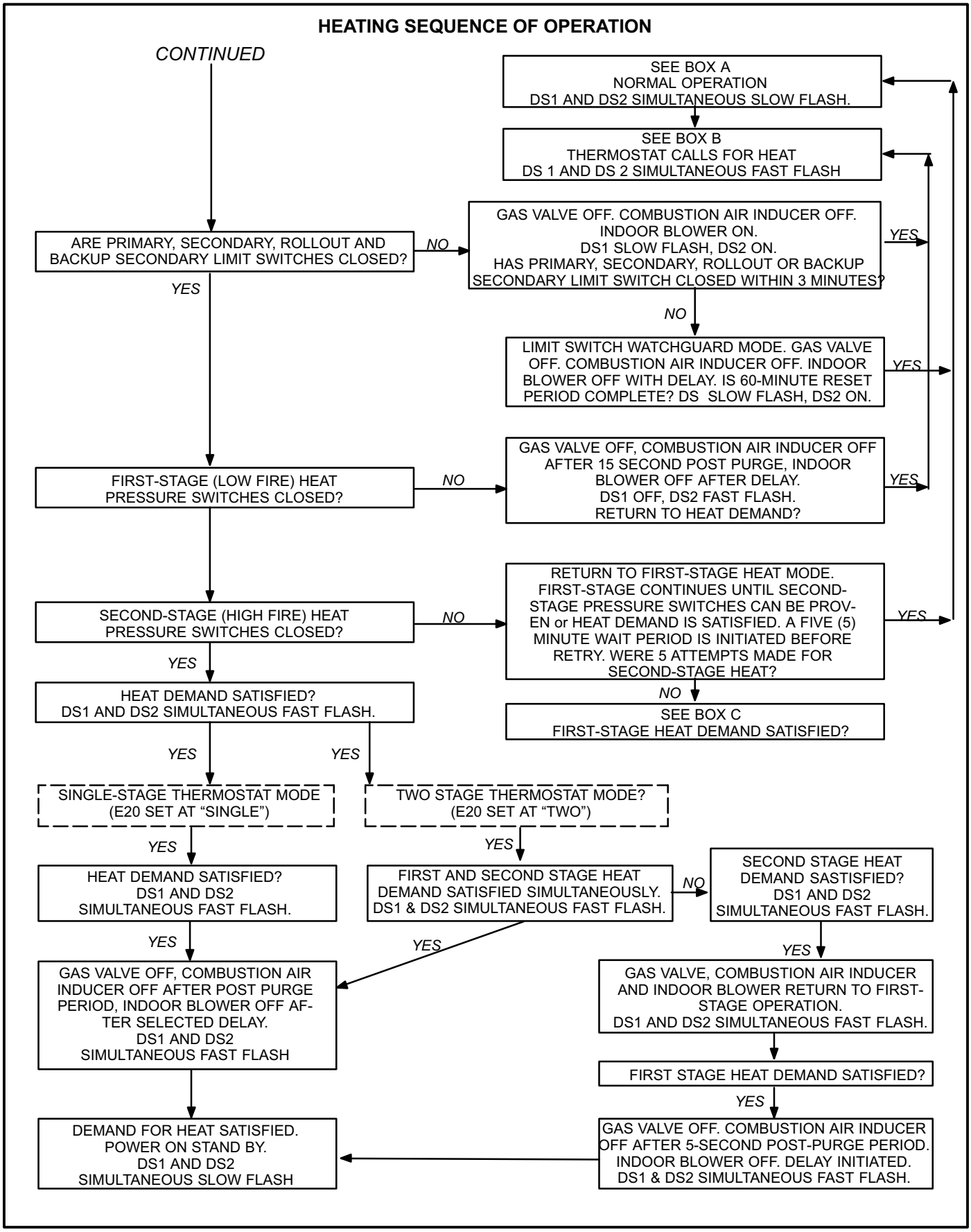
HEATING SEQUENCE OF OPERATION



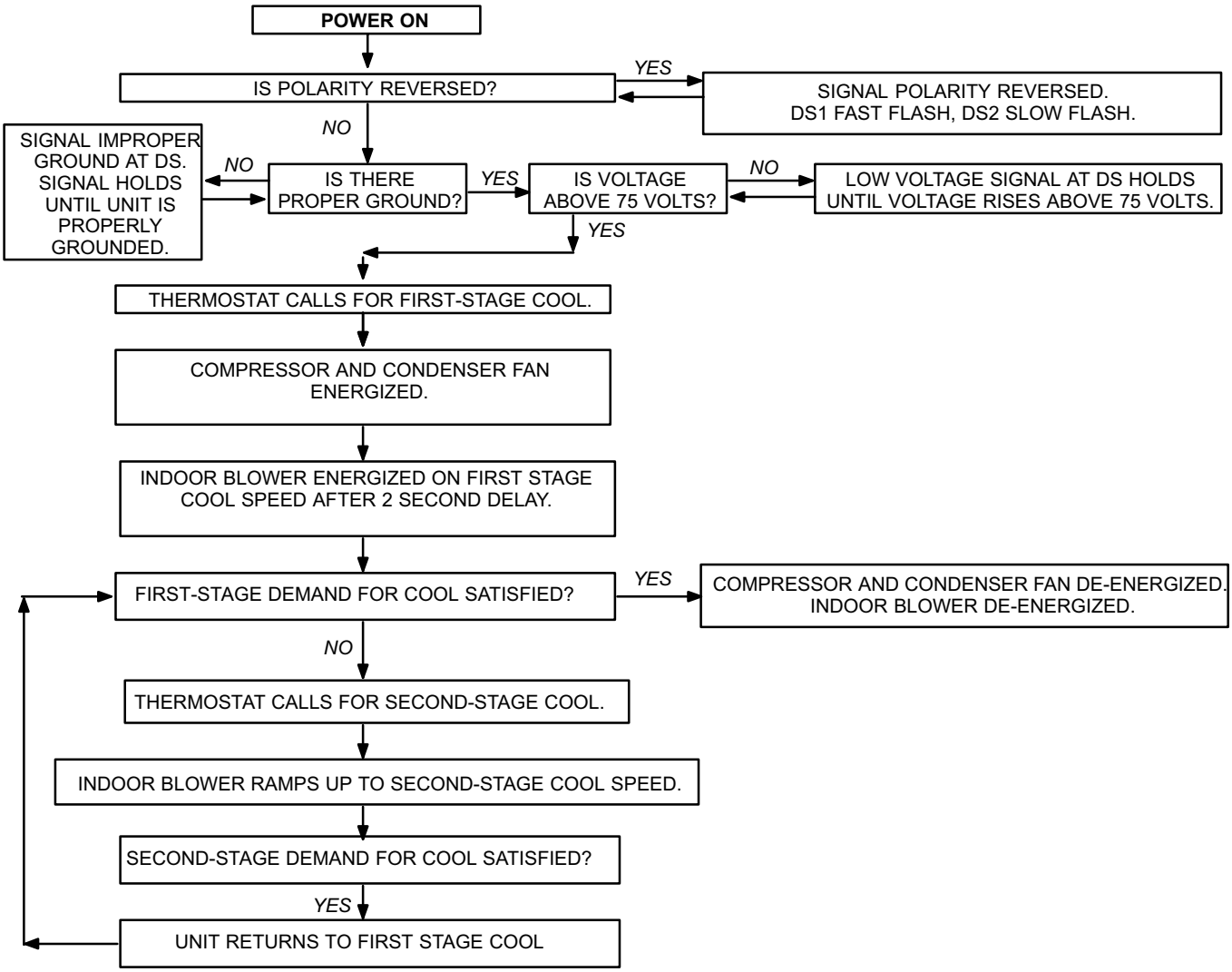
HEATING SEQUENCE OF OPERATION



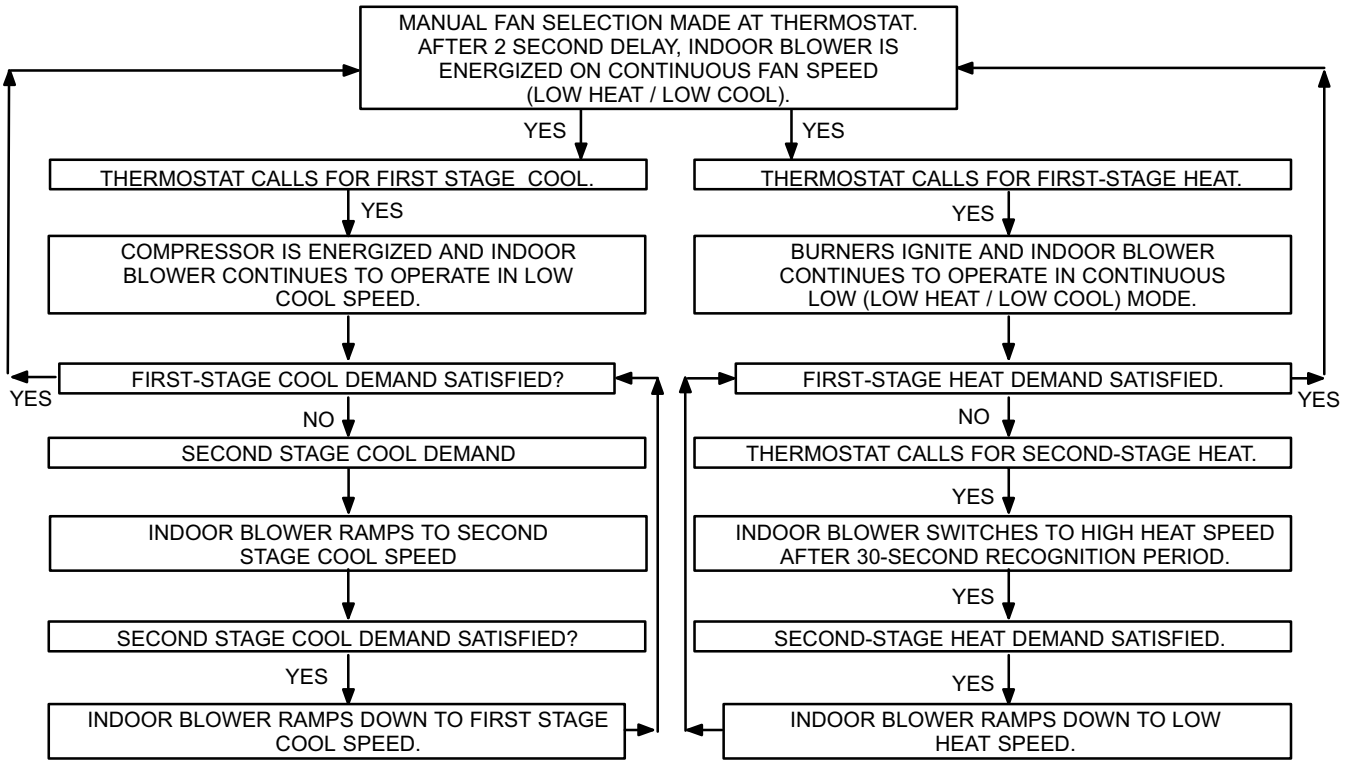
HEATING SEQUENCE OF OPERATION



COOLING SEQUENCE OF OPERATION



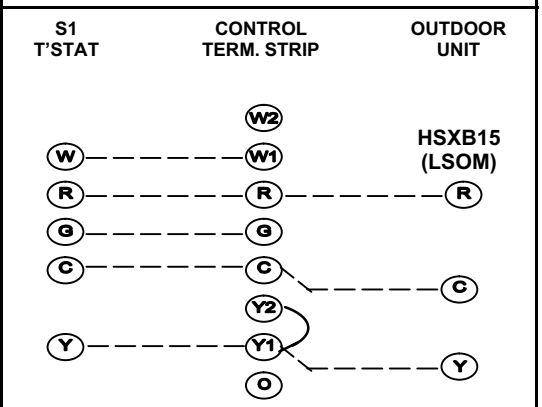
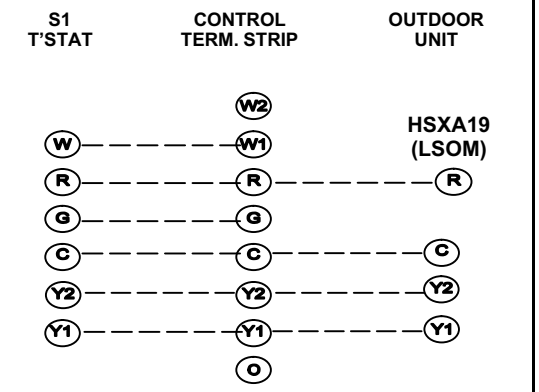
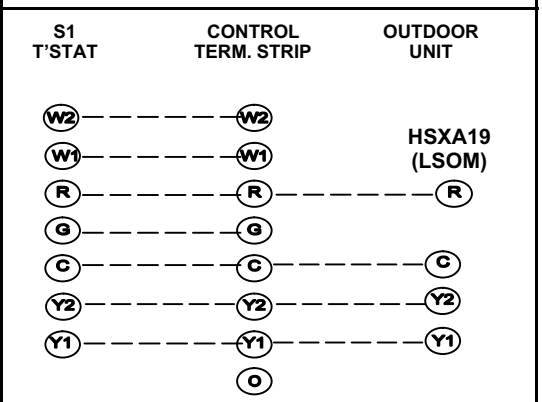
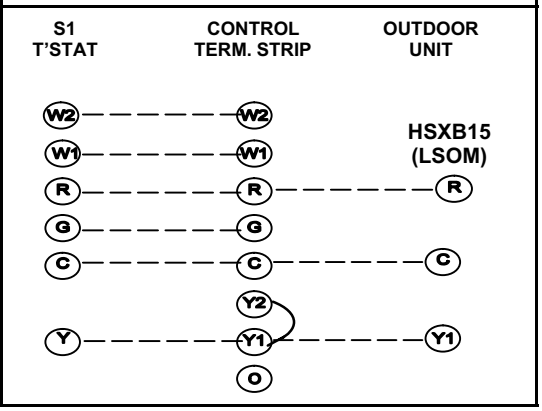
CONTINUOUS LOW SPEED FAN SEQUENCE OF OPERATION



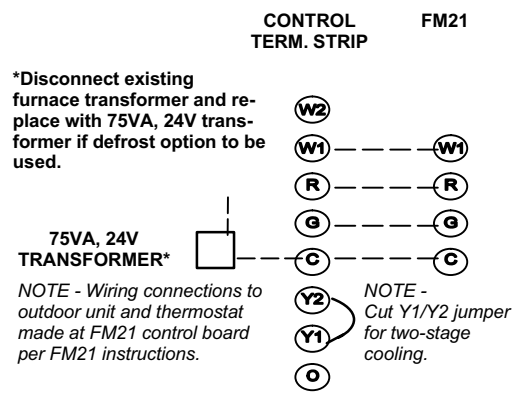
NOTE - Continuous low speed fan and cooling low speed are equal to the low heat fan speed.

VIII- Field Wiring Applications and Jumper Settings

Field Wiring Applications

Thermostat	Jumper Settings (See figure 4)		Wiring Connections
	E20	W915 Y1 to Y2	
1 Heat / 1 Cool *NOTE - Use dip switch 3 to set second-stage heat ON delay. ON-10 minutes. OFF-15 minutes.*	SINGLE	Leave Installed	
1 Heat / 2 Cool *NOTE - Use dip switch 3 to set second-stage heat ON delay. ON-10 minutes. OFF-15 minutes.*	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	W915 Y1 to Y2	
FM21 Heat Pump / 1 Cool	SINGLE	Leave Installed	

IX-SURELIGHT® CONTROL TROUBLESHOOTING CHART

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

PROBLEM: 1 UNIT FAILS TO OPERATE IN THE COOLING, HEATING, OR CONTINUOUS FAN MODE		
Condition	**Possible Cause**	**Corrective Action / Comments**
1.1 - Both diagnostic lights fail to light up. LED#1-Off LED#2-Off	**1.1.1** Main voltage 120V not supplied to unit.	**ACTION 1 -** Check 120V main voltage. Determine cause of main power failure.
	1.1.2 Miswiring of furnace or improper connections.	**ACTION 1 -** Check for correct wiring of 120V to power make up box and transformer. **ACTION 2** - Check 24V wiring to control board.
	1.1.3 Blown fuse	**ACTION 1 -** Replace fuse. **ACTION 2 -** If fuse still blows, check for short.
	1.1.4 Door interlock switch failure.	**ACTION 1 -** Check that door switch is activated when door is closed. **ACTION 2 -** Check wire connections to switch, replace loose connectors. **ACTION 3 -** Check continuity of switch in closed position. Replace if defective.
	1.1.5 Transformer Failure.	**ACTION 1 -** Check that transformer output is 24V. Replace if defective.
	1.1.6 Failed control board.	**ACTION 1 -** If all the above items have been checked, replace board.
1.2 - Diagnostic lights flash the roll-out code. LED#1-On, LED#2-Slow Flash	**1.2.1** Roll-out switch open.	**ACTION 1 -** Manually reset the roll-out switch by pushing the top button. **ACTION 2 -** Determine the cause of the roll-out switch activation before leaving furnace.
	1.2.2 Roll-out switch failure.	**ACTION 1 -** Check continuity across roll-out switch. Replace roll-out switch if switch is reset but does not have continuity.
	1.2.3 Miswiring or improper connections at roll-out switch.	**ACTION 1 -** Check wiring connections to switch.
	1.2.4 9 pin connector failure	**ACTION 1 -** Check 9-pin connector for proper connection to control board. **ACTION 2 -** Check continuity of the multi plug pin.
1.3 - On initial power-up the comb. air inducer does not energize. - Diagnostic lights flash the reverse polarity code. LED#1-Fast Flash, LED#2-Slow Flash.	**1.3.1** 120V main power polarity reversed.	**ACTION 1 -** Check the 120V has line and neutral correctly input into control. **ACTION 2 -** Reverse the line and neutral at the 120V field connection.
1.4 - On initial power up the combustion air inducer does not energize. - Diagnostic lights flash normal power on operation. LED#1-Slow Flash LED#2-Slow Flash	**1.4.1** Open combustion air inducer motor circuit.	**ACTION 1 -** Check for 120V to combustion air inducer. If no power, check wire and connections.
	1.4.2 Failed combustion air inducer motor.	**ACTION 1 -** If power is present at blower, replace blower.

PROBLEM 1: UNIT FAILS TO OPERATE IN THE COOLING, HEATING, OR CONTINUOUS FAN MODE		
Condition	**Possible Cause**	**Corrective Action / Comments**
1.5 **-** Diagnostic lights flash the improper main ground. LED#1-Alternating Fast Flash LED#2-Alternating Fast Flash	**1.5.1** Improper ground to the unit.	**ACTION 1 -** Check that the unit is properly ground. **ACTION 2 -** Install a proper main ground to the unit
	1.5.2 6-Pin connector is improperly attached to the circuit board.	**ACTION 1 -** Check 6-pin connector for proper installation. Correctly insert connector into control.
	1.5.3 Line voltage is below 75V.	**ACTION 1 -** Check that the line voltage is above 75V. Determine cause of voltage drop and supply correct voltage to the control.
	1.5.4 Open ignitor circuit.	**ACTION 1 -** Check for correct wiring and loose connections in the ignitor circuit. Check mult-plug connections for correct installation.
	1.5.5 Broken or failed ignitor.	**ACTION 1 -** Unplug ignitor and read resistance across ignitor. If resistance does not read between 10.9 and 19.7 ohms, replace the ignitor.
PROBLEM 2: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER DOES NOT ENERGIZE		
Condition	**Possible Cause**	**Corrective Action / Comments**
2.1 **-** 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. LED#1-Slow Flash, LED#2-On	**2.1.1** Primary, secondary or backup secondary (if equipped) limit open.	**ACTION 1 -** Check continuity across switch(es). Switches reset automatically upon cool down. **ACTION 2 -** Check for restrictions on blower inlet air (including filter) and outlet air. Determine cause for limit activation before placing unit back in operation.
	2.1.2 Miswiring of furnace or improper connections at limit switch(es).	**ACTION 1 -** Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
2.2 - 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. LED#1-Off, LED#2-Slow Flash	**2.2.1** Miswiring of furnace or improper connections to combustion air inducer.	**ACTION 1 -** Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
	2.2.2 Prove switch stuck closed.	**ACTION 1 -** Check that the prove switch is open without the combustion air inducer operating. Replace if defective.

PROBLEM 2: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR INDUCER DOES NOT ENERGIZE (CONT.).		
Condition	**Possible Cause**	**Corrective Action/Comments**
2.3 - 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. LED#1-Off, LED#2-Slow Flash	**2.3.1** Miswiring of furnace or improper connections to combustion air inducer.	**ACTION 1 -** Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
	2.3.2 Combustion air inducer failure.	**ACTION 1 -** If there is 120V to combustion air inducer and it does not operate, replace combustion air inducer.
PROBLEM 3: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR INDUCER ENERGIZES, IGNITOR IS NOT ENERGIZED.		
Condition	**Possible Cause**	**Corrective Action/Comments**
3.1 - Unit operates with a cooling and continuous fan demand. - Combustion air inducer energizes with a heating demand. - Diagnostic lights flash the pressure switch failure code 2.5 minutes after heating demand. LED#1-Off LED#2-Slow Flash	**3.1.1** Prove switch does not close due to incorrect routing of the pressure switch lines.	**ACTION 1 -** Check that the prove switch lines are correctly routed. Correctly route pressure switch lines.
	3.1.2 Prove switch does not close due to obstructions in the pressure lines.	**ACTION 1 -** Remove any obstructions from the the pressure lines and/or taps.
	3.1.3 Prove switch lines damaged	**ACTION 1 -** Check prove switch lines for leaks. Replace any broken lines.
	3.1.4 Condensate in prove switch line.	**ACTION 1 -** Check prove switch lines for condensate. Remove condensate from lines.
	3.1.5 Prove switch does not close due to a low differential pressure across the prove switch.	**ACTION 1 -** Check the differential pressure across the prove switch. This pressure should exceed the set point listed on the switch. **ACTION 2 -** Check for restricted inlet vent. Remove all blockage. **ACTION 3 -** Check for proper vent sizing and run length.
	3.1.6 Wrong prove switch installed in the unit, or prove switch is out of calibration.	**ACTION 1 -** Check that the proper prove switch is installed in the unit. Replace prove switch if necessary.
	3.1.7 Miswiring of furnace or improper connections at prove switch.	**ACTION 1 -** Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
	3.1.8 Prove switch failure.	**ACTION 1 -** 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.

PROBLEM 4: UNIT FAILS TO FIRE IN THE HEATING MODE, COMBUSTION AIR BLOWER ENERGIZES, IGNITOR IS ENERGIZED.		
Condition	**Possible Cause**	**Corrective Action/Comments**
4.1 - Unit operates with a cooling and continuous fan demand. - Combustion air inducer energizes with Heating demand. - Ignitor is energized but unit fails to light. LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash	**4.1.1** Check that gas is being supplied to the unit.	**ACTION 1 -** 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.
	4.1.2 Miswiring of gas valve or loose-connections at multi-pin control amp plugs or valve.	**ACTION 1 -** Check for correct wiring and loose connections. Correct wiring and/or replace any loose connections.
	4.1.3 Defective gas valve or ignition control.	**ACTION 1 -** Check that 24V is supplied to the gas valve approximately 35 seconds after heat demand is initiated. **ACTION 2 -** Replace the valve if 24V is supplied but valve does not open. **ACTION 3 -** Replace the control board if 24V is not supplied to valve.
PROBLEM 5: BURNERS LIGHT WITH A HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY		
Condition	**Possible Cause**	**Corrective Action/Comments**
5.1 - Burners fire with a heating demand. - Burners light but unit shuts off prior to satisfying T-stat demand. - Diagnostic lights flash the pressure switch code. LED#1-Off LED#2-Slow Flash	**5.1.1** Low pressure differential at the prove switch.	**ACTION 1 -** Check for restricted intake and exhaust vent. Remove all blockage. **ACTION 2:** Check for proper vent sizing. See installation instructions.
	5.1.2 Wrong concentric vent kit used for terminating the unit.	**ACTION 1 -** Check vent termination kit installed. See Placement and Installation section.
	5.1.3 Condensate drain line is not draining properly.	**ACTION 1 -** Check condensate line for proper vent slope, and any blockage. Condensate should flow freely during operation of furnace. Repair or replace any improperly installed condensate lines.
	5.1.4 Low pressure differential at the prove switch.	**ACTION 1 -** Check for restricted intake and exhaust. Remove all blockage. **ACTION 2:** Check for proper vent sizing. See installation instructions.
5.2 - 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. LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash	**5.2.1** Sensor or sense wire is improperly installed.	**ACTION 1 -** Check that sensor is properly located and that the sense wire is properly attached to both the sensor and the control.
	5.2.2 Sensor or sense wire is broken.	**ACTION 1 -** Check for a broken sensor. **ACTION 2 -** Test continuity across the sense wire. If wire or sensor are damaged replace the component.
	5.2.3 Sensor or sensor wire is grounded to the unit.	**ACTION 1 -** Check for resistance between the sensor rod and the unit ground. **ACTION 2 -** Check for resistance between the sensor wire and the unit ground. **ACTION 3 -** Correct any shorts found in circuit.
	5.2.4 Control does not sense flame.	**ACTION 1 -** Check the microamp signal from the burner flame. If the microamp signal is below normal, check the sense rod for proper location or contamination. **ACTION 2 -** 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. **NOTE:** Do not attempt to bend sense rod.

PROBLEM 5: BURNERS LIGHT WITH HEATING DEMAND BUT UNIT SHUTS DOWN PREMATURELY (CONT.)		
Condition	**Possible Cause**	**Corrective Action/Comments**
5.3 - Combustion air inducer energizes with a heating demand. - Burners light. - Roll-out switch trips during the heating demand. - Diagnostic lights flash roll-out failure. LED#1-On LED#2-Slow Flash	**5.3.1** Unit is firing above 100% of the nameplate input.	**ACTION 1 -** Check that the manifold pressure matches value listed on nameplate. See installation instructions for proper procedure. **ACTION 2 -** Verify that the installed orifice size match the size listed on the nameplate or installation instructions. **ACTION 3 -** Check gas valve sensing hose to insure no leaks are present. **ACTION 4 -** Check the input rate to verify rate matches value listed on nameplate.
	5.3.2 Gas orifices leak at the manifold connection.	**ACTION 1 -** Tighten orifice until leak is sealed. **NOTE:** Be careful not to strip orifice threads. **ACTION 2 -** Check for gas leakage at the threaded orifice connection. Use approved method for leak detection (see unit instructions).
	5.3.3 Air leakage at the connections between the primary heat exchanger, secondary heat exchanger, and combustion air blower.	**ACTION 1 -** Check for air leakage at all joints in the heat exchanger assembly. Condition will cause high CO2 with high CO. **ACTION 2 -** Seal leakage if possible, replace heat exchanger if necessary, tag and return heat exchanger to proper Lennox personnel.
	5.3.4 Insufficient flow through the heat exchanger caused by a sooted or restricted heat exchanger.	**ACTION 1 -** Check for sooting deposits or other restrictions in the heat exchanger assembly. Clean assembly as outlined in instruction manual. **ACTION 2 -** Check for proper combustion.
	5.3.5 Burners are not properly located in the burner box.	**ACTION 1 -** Check that the burners are firing into the center of the heat exchanger openings. Correct the location of the burners if necessary.
5.4 **-** Combustion air inducer energizes with a heating demand. - Burners light roughly and the unit fails to stay lit. - Diagnostic lights flash watchguard flame failure. LED#1-Alternating Slow Flash LED#2-Alternating Slow Flash	**5.4.1** Recirculation of flue gases. This condition causes rough ignitions and operation. Problem is characterized by nuisance flame failures.	**ACTION 1 -** Check for proper flow of exhaust gases away from intake vent. Remove any obstacles in front of the intake and exhaust vent which would cause recirculation. **ACTION 2 -** Check for correct intake and exhaust vent installation. See instructions
	5.4.2 Improper burner cross-overs	**ACTION 1 -** Remove burner and inspect the cross-overs for burrs, or any restriction or if crossover is warped. Remove restriction or replace burners.

PROBLEM 6: CONTROL SIGNALS LOW FLAME SENSE DURING HEATING MODE		
Condition	**Possible Cause**	**Corrective Action/Comments**
6.0 - Unit operates correctly but the diagnostic lights flash low flame sense code. LED#1-Slow Flash LED#2-Fast Flash	**6.1.1** Sensor rod is improperly located on the burner.	**ACTION 1 -** Check the sensor rod for proper location on the burner. Properly locate the sensor rod or replace if rod cannot be located correctly.
	6.1.2 Sensor rod is contaminated.	**ACTION 1 -** Check sensor rod for contamination or coated surface. Clean the sensor rod with steel wool or replace sensor. DO NOT USE SAND PAPER TO CLEAN ROD. SAND PAPER WILL CONTRIBUTE TO THE CONTAMINATION PROBLEM.
PROBLEM 7: INDOOR BLOWER FAILS TO OPERATE IN COOLING, HEATING, OR CONTINUOUS FAN MODE		
Condition	**Possible Cause**	**Corrective Action/Comments**
7.0 - Indoor blower fails to operate in continuous fan, cooling, or heating mode.	**7.1.1** Miswiring of furnace or improper connections at control or indoor blower motor.	**ACTION 1-** Correct wiring and/or replace any loose connections. Check for correct wiring and loose connections.
	7.1.2 120V is not being supplied to the indoor air blower or blower motor failure.	**ACTION 1 -** 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.
	7.1.3 Defective control board	**ACTION 1 -** If there is not 120V when ”Y”, ”G”, or ”W” is energized, replace the control.
	7.1.4 Defective run capacitor	**ACTION 1 -** Replace capacitor
PROBLEM 8: RF STATIC DURING TIME FOR IGNITION		
Condition	**Possible Cause**	**Corrective Action/Comments**
8.0 - AM radio interference.	**8.1.2** Ignitor operation	**ACTION 1 -** Call Technical Support, Dallas.

SERVICE NOTES