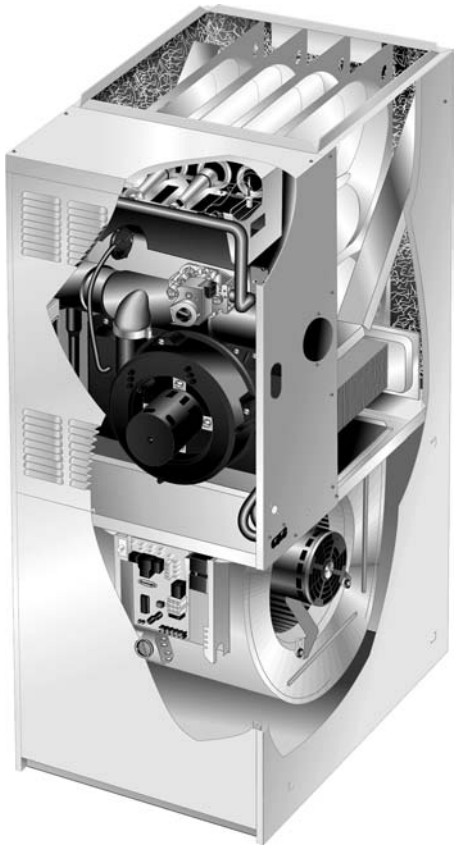
G41UF SERIES UNITS

G41UF series units are high-efficiency upflow gas furnaces manufactured with Lennox DuralokPlus™ aluminized primary and stainless steel secondary clamshell-type heat exchangers. G41UF units are available in heating input capacities of 44,000 to 132,000 Btuh (12.9 to 38.6 kW) and cooling applications from 2 through 5 tons (7.0 through 17.6 kW). Refer to Engineering Handbook for proper sizing.

Units are factory equipped for use with natural gas. A kit is available for conversion to LPG operation. All G41UF units are equipped with the Lennox SureLight® hot surface ignition system. The gas valve is redundant to assure safety shut-off as required by C.S.A.

The heat exchanger, burners and manifold assembly can be removed for inspection and service. The maintenance section gives a detailed description on how this is done.

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



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⚠ CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

⚠ WARNING

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

SPECIFICATIONS

Gas Heating Performance	**Model No.**	**G41UF-24B-045**	**G41UF-36B-045**	**G41UF-36B-070**	**G41UF-36C-090**	**G41UF-48C-090**
	Input - Btuh (kW)	44,000 (12.9)	44,000 (12.9)	66,000 (19.3)	88,000 (25.8)	88,000 (25.8)
	Output - Btuh (kW)	40,000 (11.7)	40,000 (11.7)	60,000 (17.6)	80,000 (23.4)	80,000 (23.4)
	[1]AFUE	90.0%	90.0%	90.0%	90.0%	90.0%
	High static (CSA) - in. w.g. (Pa)	0.5	0.5	0.5	0.5	0.5
	Temperature rise range - °F (°C)	35 - 65 (19 - 36)	25 - 55 (14 - 31)	35 - 65 (19 - 36)	50 - 80 (28 - 44)	45 - 75 (25 - 42)
Connections in. (mm)	Exhaust Pipe (PVC)	2 (51)	2 (51)	2 (51)	2 (51)	2 (51)
	Condensate Drain (PVCPipe) - i.d.	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)
	Condensate Drain (PVC Coupling) - o.d.	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)
	Gas pipe size IPS	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)
Indoor Blower	Wheel nominal diameter x width - in. (mm)	10 x 7 (254 x 178)	10 x 8 (254 x 203)	10 x 8 (254 x 203)	10 x 8 (254 x 203)	10 x 10 (254 x 254)
	Motor output - hp (W)	1/5 (149)	1/3 (249)	1/3 (249)	1/3 (249)	1/2 (373)
	Tons (kW) of add-on cooling	1 - 2 (3.5 - 7.0)	1 - 3 (3.5 - 10.5)	1 - 3 (3.5 - 10.5)	1 - 3 (3.5 - 10.5)	2 - 4 (7.0 - 14.0)
Shipping weight - 1 package		128 lbs. (58 kg)	131 lbs. (59 kg)	141 lbs (64 kg)	160 lbs. (73 kg)	164 lbs. (74 kg)
Electrical characteristics		120 volts - 60 hertz - 1 phase (less than 12 amps)				
OPTIONAL ACCESSORIES – MUST BE ORDERED EXTRA						
[4]Side Return Air Filter & Rack Kit - Number & size of filters		Single **44J22** or Ten Pack **66K63** - (1) 16 x 25 x 1 in. (406 x 635 x 25 mm)				
EZ Filter Base	Catalog Number - Shipping Weight	**73P56** - 7 lbs. (3 kg)			**73P57** - 8 lbs. (4 kg)	
	Dimensions - H x W x D - in. (mm)	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)	
	Number and size of field provided filter - in. (mm)	16 x 25 x 1 (406 x 635 x 25)			20 x 25 x 1 (508 x 635 x 25)	
Condensate Drain Heat Cable	6 ft. (1.8 m) long	**26K68**	**26K68**	**26K68**	**26K68**	**26K68**
	24 ft. (7.3 m) long	**26K69**	**26K69**	**26K69**	**26K69**	**26K69**
	50 ft. (15.2 m) long	**26K70**	**26K70**	**26K70**	**26K70**	**26K70**
Heat Cable Tape	Fiberglass - 1/2 in. (38 mm) x 66 ft. (20 m)	**39G04**	**39G04**	**39G04**	**39G04**	**39G04**
	Aluminum foil - 2 in. (25 mm) x 60 ft. (18 m)	**39G03**	**39G03**	**39G03**	**39G03**	**39G03**
[6]High Altitude Orifice Kit - Natural Gas		**47M82**	**47M82**	**47M82**	**47M82**	**47M82**
[3]High Altitude Pressure Switch Kit	4501-7500 ft. (1372-2286 m)	**- - -**	**- - -**	**- - -**	**46M94**	**46M94**
	7501-10,000 ft. (2286-3048 m)	**46M94**	**46M94**	**46M94**	**46M94**	**46M94**
LPG/Propane Kit	0-7500 ft. (0-2286 m)	**47M83**	**47M83**	**47M83**	**47M83**	**47M83**
	7501-10,000 ft. (2286-3048 m)	**47M81**	**47M81**	**47M81**	**47M81**	**47M81**
[5]Termination Kits	Roof - 2 inch (51 mm)	**15F75**	**15F75**	**15F75**	**15F75**	**15F75**
	Roof - 3 inch (76 mm)	**44J41**	**44J41**	**44J41**	**44J41**	**44J41**
	Wall Ring - 2 inch (51 mm)	**15F74**	**15F74**	**15F74**	**15F74**	**15F74**
Twinning Kit		**15L38**	**15L38**	**15L38**	**15L38**	**15L38**

[1]Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.
[3]Required for proper operation at altitudes over 4500 ft. (1370 m).
[4]Cleanable polyurethane frame type filter.
[5]Kits contain enough parts for two installations. Determine from venting tables proper exhaust pipe size and termination kit required.
[6]Required for proper operation at altitudes from 7501 to 10,000 ft. (2286 to 3048 m).
NOTE - Filters and provisions for mounting are not furnished and must be field provided.

SPECIFICATIONS

Gas Heating Performance	**Model No.**	**G41UF-60C-090**	**G41UF-48C-110**	**G41UF-60C-110**	**G41UF-60D-135**
	Input - Btuh (kW)	88,000 (25.8)	110,000 (32.2)	110,000 (32.2)	132,000 (38.7)
	Output - Btuh (kW)	80,000 (23.4)	100,000 (29.3)	100,000 (29.3)	120,000 (35.1)
	[1]AFUE	90.0%	90.0%	90.0%	90.0%
	High static (CSA) - in. w.g. (Pa)	0.5	0.5	0.5	0.5
	Temperature rise range - °F (°C)	25 - 55 (14 - 31)	50 - 80 (28 - 44)	40 - 70 (22 - 39)	45 - 75 (25 - 42)
Connections in. (mm)	Exhaust Pipe (PVC)	2 (51)	2 (51)	2 (51)	2 (51)
	Condensate Drain (PVC Pipe) - i.d.	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)
	Condensate Drain (PVC Coupling) - o.d.	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)
	Gas pipe size IPS	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)
Indoor Blower	Wheel nominal diameter x width - in. (mm)	11-1/2 x 10 (292 x 229)	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)	3/4 (560)	1/2 (373)	3/4 (560)	3/4 (560)
	Tons (kW) of add-on cooling	4 - 5 (14.0 - 17.5)	2 - 4 (7.0 - 14.0)	4 - 5 (14.0 - 17.5)	4 - 5 (14.0 - 17.5)
Shipping weight - 1 package		168 lbs. (76 kg)	173 lbs. (78 kg)	177 lbs. (80 kg)	194 lbs. (88 kg)
Electrical characteristics		120 volts - 60 hertz - 1 phase (less than 12 amps)			
OPTIONAL ACCESSORIES – MUST BE ORDERED EXTRA					
[4,6]Air Filter and Rack Kit - Number & size of filters		[5]Single **44J22** or Ten Pack **66K63 -** (1) 16 x 25 x 1 (406 x 635 x 25)			
EZ Filter Base	Catalog Number - Shipping Weight	**73P57** - 8 lbs. (4 kg)		**73P58** - 10 lbs. (5 kg)	
	Dimensions - H x W x D	4 x 21-5/8 x 28-5/8 in. (102 x 549 x 727 mm)		4 x 24-5/8 x 28-5/8 in. (102 x 625 x 727 mm)	
	Number and size of field provided filter	20 x 25 x 1 in. (508 x 635 x 25 mm)		24 x 24 x 1 in. (610 x 610 x 25 mm)	
Condensate Drain Heat Cable	6 ft. (1.8 m) long	**26K68**	**26K68**	**26K68**	**26K68**
	24 ft. (7.3 m) long	**26K69**	**26K69**	**26K69**	**26K69**
	50 ft. (15.2 m) long	**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**
[7]High Altitude Orifice Kit - Natural Gas Only		**47M82**	**47M82**	**47M82**	**47M82**
[3]High Altitude Pressure Switch Kit	4501-7500 ft. (1372-2286 m)	**46M94**	**46M94**	**46M94**	**- - -**
	7501-10,000 ft. (2286-3048m)	**46M94**	**46M94**	**46M94**	**46M95**
RAB Return Air Base		RAB60C (**12M71**)	- - - -	RAB60D (**12M72**)	RAB60D (**12M72**)
LPG/Propane Kit	0-7500 ft. (0-2286 m)	**47M83**	**47M83**	**47M83**	**47M83**
	7501-10,000ft. (2286-3048m)	**47M81**	**47M81**	**47M81**	**47M81**
[5]Termination Kits	Roof - 2 inch (51 mm)	**15F75**	**15F75**	**15F75**	**15F75**
	Roof - 3 inch (76 mm)	**44J41**	**44J41**	**44J41**	**44J41**
	Wall Ring - 2 inch (51 mm)	**15F74**	**15F74**	**15F74**	**15F74**
Twinning Kit		**15L38**	**15L38**	**15L38**	**15L38**

[1]Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.
[3]Required for proper operation at altitudes over 4500 ft. (1370 m).
[4]Cleanable polyurethane frame type filter.
[5]Kits contain enough parts for two installations. Determine from venting tables proper exhaust pipe size and termination kit required.
[6]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.
[7]Required for proper operation at altitudes from 7501 to 10,000 ft. (2286 to 3048 m).
NOTE - Filters and provisions for mounting are not furnished and must be field provided.

BLOWER PERFORMANCE

G41UF-24B-045 PERFORMANCE

External Static Pressure		Air Volume / Watts at Different Blower Speeds								
		High			Medium			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	1225	580	485	1000	470	365	820	385	290
0.10	25	1190	560	455	990	470	355	815	385	275
0.20	50	1160	545	435	970	460	340	805	380	265
0.30	75	1120	530	415	945	445	325	780	365	260
0.40	100	1070	505	395	910	430	305	755	355	245
0.50	125	1015	480	375	865	405	295	740	350	240
0.60	150	955	450	355	835	395	285	695	325	225
0.70	175	885	415	335	750	355	260	640	300	210
0.80	200	825	390	320	695	330	245	545	255	185
0.90	225	715	335	3000	600	285	220	435	205	170

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.

G41UF-36B-045 PERFORMANCE

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.

G41UF-36B-070 PERFORMANCE

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.

G41UF-36C-090 PERFORMANCE

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	1705	805	730	1395	660	605	1195	555	495	1010	475	410
0.10	25	1680	795	700	1390	650	585	1185	560	480	1005	475	395
0.20	50	1645	775	675	1380	650	560	1175	555	465	1000	470	390
0.30	75	1600	755	635	1365	645	535	1165	550	445	995	470	375
0.40	100	1560	735	615	1345	635	515	1155	545	425	990	465	360
0.50	125	1495	705	580	1305	615	500	1125	530	400	970	460	345
0.60	150	1415	665	540	1270	600	475	1080	510	375	940	445	320
0.70	175	1330	630	505	1205	570	435	1035	490	360	890	420	300
0.80	200	1255	590	485	1120	530	400	955	450	330	840	395	280
0.90	225	1135	535	450	1020	480	365	830	390	300	760	360	260

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 PERFORMANCE

G41UF-48C-090 PERFORMANCE

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.

G41UF-60C-090 PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter in order to maintain proper air velocity.

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	**2510**	**1185**	**1160**	**2350**	**1110**	**990**	**2145**	**1010**	**850**	1785	845	670
0.10	25	**2460**	**1160**	**1145**	**2310**	**1090**	**970**	**2095**	**990**	**825**	1780	840	660
0.20	50	**2395**	**1130**	**1125**	**2240**	**1060**	**940**	**2060**	**970**	**805**	1760	830	650
0.30	75	**2325**	**1095**	**1090**	**2175**	**1025**	**910**	**2015**	**950**	**775**	1735	820	630
0.40	100	**2225**	**1050**	**1050**	**2110**	**995**	**880**	**1950**	**920**	**745**	1720	810	620
0.50	125	**2135**	**1010**	**1015**	**2050**	**965**	**855**	**1900**	**895**	**725**	1665	785	600
0.60	150	**2025**	**955**	**975**	**1950**	**920**	**820**	**1820**	**860**	**700**	1600	755	575
0.70	175	**1950**	**920**	**950**	**1865**	**880**	**790**	1750	825	675	1535	725	555
0.80	200	**1845**	**870**	**915**	1760	830	755	1640	775	650	1450	685	530
0.90	225	1730	815	885	1640	775	720	1555	735	625	1340	630	510

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

G41UF-60C-090 PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2575	1215	1235	2360	1115	1030	2050	965	875	1790	845	720
0.10	25	2525	1195	1210	2320	1095	1010	2040	960	855	1775	835	710
0.20	50	2450	1155	1170	2270	1070	985	2025	955	840	1755	830	695
0.30	75	2375	1120	1140	2215	1045	955	1995	940	815	1740	820	680
0.40	100	2300	1085	1125	2155	1020	930	1970	930	800	1720	815	665
0.50	125	2210	1045	1075	2090	985	900	1915	905	775	1700	800	650
0.60	150	2140	1010	1030	2055	970	895	1875	885	755	1665	785	635
0.70	175	2080	980	1035	1975	935	865	1805	855	730	1610	760	615
0.80	200	2000	945	1010	1890	890	830	1730	815	705	1565	740	595
0.90	225	1905	900	970	1785	845	800	1640	775	675	1495	705	570

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

G41UF-48C-110 PERFORMANCE

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 PERFORMANCE

G41UF-60C-110 PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter in order to maintain proper air velocity.

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	**2550**	**1205**	**1300**	**2345**	**1105**	**1080**	**2055**	**970**	**895**	1740	820	715
0.10	25	**2500**	**1180**	**1270**	**2280**	**1075**	**1050**	**2025**	**950**	**855**	1730	815	720
0.20	50	**2410**	**1140**	**1225**	**2220**	**1050**	**1000**	**2000**	**945**	**840**	1715	810	695
0.30	75	**2350**	**1110**	**1190**	**2175**	**1025**	**965**	**1945**	**920**	**805**	1690	795	670
0.40	100	**2280**	**1075**	**1170**	**2115**	**995**	**940**	**1910**	**900**	**790**	1675	790	680
0.50	125	**2195**	**1035**	**1115**	**2035**	**960**	**910**	**1840**	**870**	**760**	1630	770	650
0.60	150	**2075**	**980**	**1065**	**1955**	**925**	**875**	1785	845	735	1585	750	630
0.70	175	**1980**	**935**	**1030**	**1860**	**880**	**845**	1705	805	700	1540	725	605
0.80	200	**1895**	**895**	**1005**	1770	835	810	1615	765	675	1475	695	580
0.90	225	1770	835	975	1640	775	770	1535	725	645	1415	670	565

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

G41UF-60C-110 PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2580	1215	1340	2330	1100	1100	2045	965	950	1760	830	745
0.10	25	2515	1190	1295	2295	1085	1075	2040	960	880	1740	820	745
0.20	50	2450	1155	1255	2255	1065	1040	2005	945	855	1735	820	730
0.30	75	2375	1120	1225	2200	1040	1015	1965	925	835	1715	810	710
0.40	100	2310	1090	1190	2145	1010	975	1925	910	815	1690	800	695
0.50	125	2200	1040	1135	2085	985	955	1870	880	780	1660	785	670
0.60	150	2130	1005	1105	2025	955	930	1825	860	770	1600	755	650
0.70	175	2045	965	1065	1930	910	890	1750	825	730	1575	745	625
0.80	200	1930	910	1025	1825	860	850	1650	780	695	1500	710	600
0.90	225	1820	860	980	1730	815	815	1555	735	660	1430	675	580

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

G41UF-60D-135 PERFORMANCE - Single Side Return Air - Air volumes in bold require field fabricated transition to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter in order to maintain proper air velocity.

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	**2550**	**1205**	**1340**	**2330**	**1100**	**1145**	**2035**	**960**	**955**	1725	815	775
0.10	25	**2490**	**1175**	**1305**	**2275**	**1075**	**1100**	**2025**	**955**	**900**	1720	810	755
0.20	50	**2430**	**1145**	**1285**	**2230**	**1050**	**1065**	**1990**	**940**	**890**	1715	810	740
0.30	75	**2355**	**1110**	**1235**	**2180**	**1030**	**1035**	**1955**	**920**	**855**	1700	800	715
0.40	100	**2285**	**1080**	**1210**	**2140**	**1010**	**1010**	**1910**	**900**	**830**	1680	790	700
0.50	125	**2200**	**1040**	**1160**	**2070**	**975**	**980**	**1865**	**880**	**805**	1645	775	675
0.60	150	**2100**	**990**	**1110**	**1985**	**935**	**935**	**1815**	**855**	**780**	1600	755	660
0.70	175	**2010**	**950**	**1075**	**1915**	**905**	**910**	1740	820	740	1545	730	630
0.80	200	**1910**	**900**	**1050**	**1845**	**870**	**875**	1670	790	720	1490	705	605
0.90	225	**1815**	**855**	**1005**	1735	820	835	1605	755	690	1420	670	580

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

G41UF-60D-135 PERFORMANCE - Bottom Return Air, Side Return Air with Optional RAB Return Air Base, Return Air from Both Sides or Return Air from Bottom and One Side.

External Static Pressure		Air Volume / Watts at Different Blower Speeds											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0.00	0	2585	1220	1370	2355	1110	1160	2075	980	985	1730	820	765
0.10	25	2530	1195	1335	2330	1100	1120	2075	980	945	1730	820	750
0.20	50	2475	1170	1300	2295	1085	1090	2050	970	920	1730	815	745
0.30	75	2410	1135	1260	2230	1050	1060	2010	950	890	1715	810	725
0.40	100	2355	1110	1230	2185	1030	1040	1975	930	865	1680	795	695
0.50	125	2275	1075	1190	2120	1000	995	1915	905	830	1650	780	685
0.60	150	2190	1035	1155	2045	965	960	1850	875	805	1615	765	660
0.70	175	2100	990	1125	1955	925	930	1785	840	780	1550	730	635
0.80	200	1995	945	1080	1855	875	890	1715	810	745	1500	710	615
0.90	225	1860	880	1020	1750	825	835	1635	770	720	1425	670	580

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

G41UF PARTS IDENTIFICATION

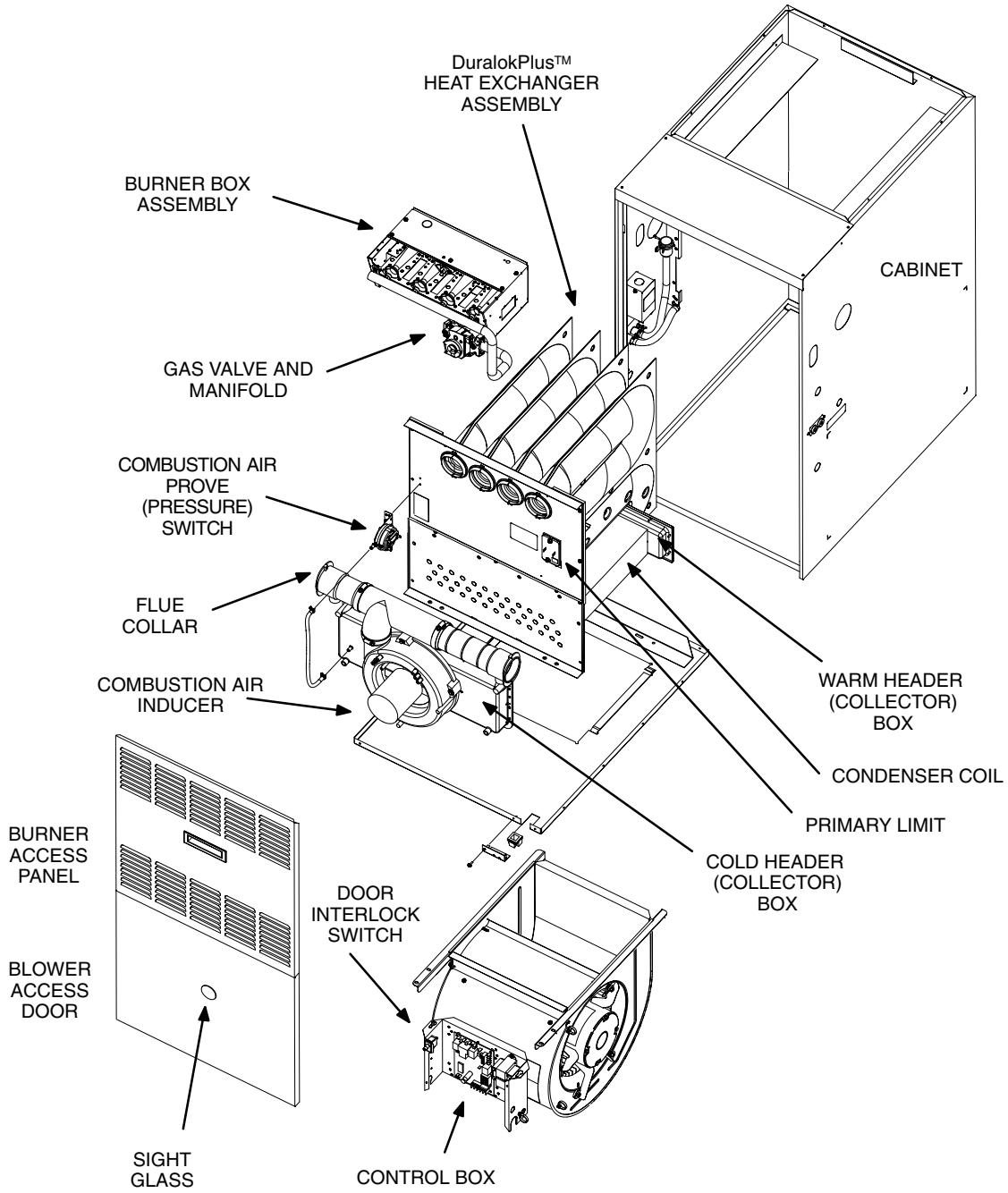


FIGURE 1

I-UNIT COMPONENTS

G41UF unit components are shown in figure 1. The combustion air inducer, gas valve and burners can be accessed by removing the burner access panel. The blower and control box can be accessed by removing the blower access door. G41UF units are designed for bottom and side return air.

A-Make-Up Box (Figure 2)

A field make-up box is provided for line voltage wiring. Line voltage wiring to unit is routed from the make up box. The "hot" wire is connected to the door switch and then from the switch to the SureLight board. The make-up box may be installed inside or outside the unit and on the unit left or right side (right side shown figure 2).

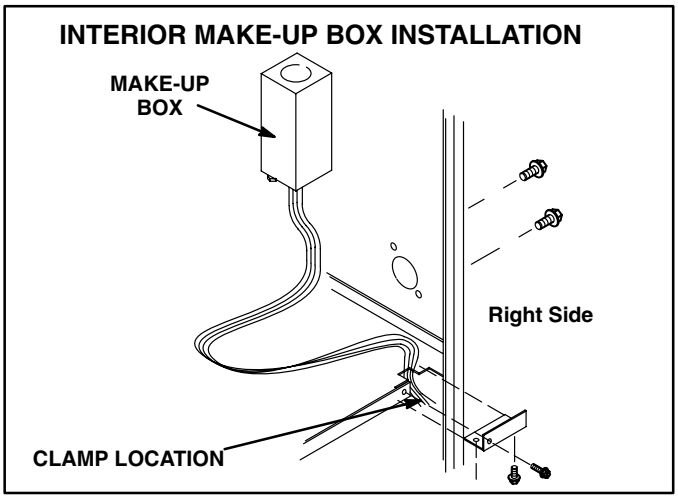


FIGURE 2

B-Control Box Components (Figure 3)

Unit transformer (T1) and SureLight control (A92) are located in the control box. In addition, a door interlock switch (S51) is located in the control box.

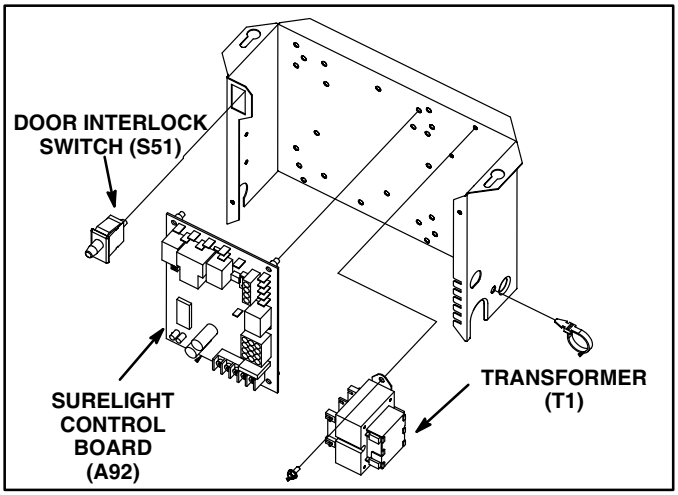


FIGURE 3

1. Control Transformer (T1)

A transformer located in the control box provides power to the low voltage 24 volt 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 120VAC is located on the control box. The switch is wired in series with line voltage. When the blower door is removed the unit will shut down.

⚠ WARNING

Shock hazard.
Disconnect power before servicing. Control 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.

3. Furnace Control (A92)

All G41UF model units are equipped with the Lennox SureLight ignition system. The system consists of ignition control board (figure 5 with control terminal designations in table 3), ignitor (figure 6) and sensor (figure 7). The board and ignitor work in combination to ensure furnace ignition and ignitor durability. The SureLight integrated board controls all major furnace operations. The board also features two LED lights for troubleshooting and two accessory terminals rated at (1) one amp. Tables 1 and 2 show jack plug terminal designations. See table 4 for troubleshooting diagnostic codes. The SureLight ignitor is made of durable silicon-nitride. Ignitor longevity is also enhanced by voltage ramping by the control board. The board finds the lowest ignitor temperature which will successfully light the burner, thus increasing the life of the ignitor.

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.

TABLE 1

SureLight BOARD J156 (J2) TERMINAL DESIGNATIONS	
PIN #	**FUNCTION**
1	Combustion Air Inducer Line
2	Ignitor Line
3	Combustion Air Inducer Neutral
4	Ignitor Neutral

TABLE 2

SureLight BOARD J58 (J1) TERMINAL DESIGNATIONS	
PIN #	**FUNCTION**
1	High Limit Output
2	Not Used
3	24V Line
4	Not Used
5	Rollout Switch In
6	24V Neutral
7	High Limit Input
8	Ground
9	Gas Valve In
10	Pressure Switch Out
11	Rollout Switch Out
12	Gas Valve Out

a-Electronic Ignition (See Figure 8)

On a call for heat the SureLight control monitors the combustion air inducer prove switch. The control will not begin the heating cycle if the prove switch is closed (by-passed). Once the prove switch is determined to be open, the combustion air inducer is energized. When the differential in the prove switch is great enough, the prove switch closes and a 15-second pre-purge begins. If the prove 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 during which the gas valve opens at 19 seconds for a 4-second trial for ignition. The ignitor stays energized during the 4 second trial until flame is sensed. If ignition is not proved during the 4-second period, the control will try four more times with an inter purge and warm-up time between trials of 35 seconds. After a total of five trials for ignition (including the initial trial), the control goes into Watchguard-Flame Failure mode. After a 60-minute reset period, the control will begin the ignition sequence again.

The SureLight control board has an added feature that prolongs the life of the ignitor. After a successful ignition, the SureLight control utilizes less power to energize the ignitor on successive calls for heat. The control continues to ramp down the voltage to the ignitor until it finds the lowest amount of power that will provide a successful ignition. This amount of power is used for 255 cycles. On the 256th call for heat, the control will again ramp down until the lowest power is determined and the cycle begins again. Each time 120V is removed and then re-applied, the control re-starts the learning process.

b-Fan Time Control

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 setting the dip switches located on the SureLight integrated control. The unit is shipped with a factory fan off setting of 90 seconds. 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 figure 4.

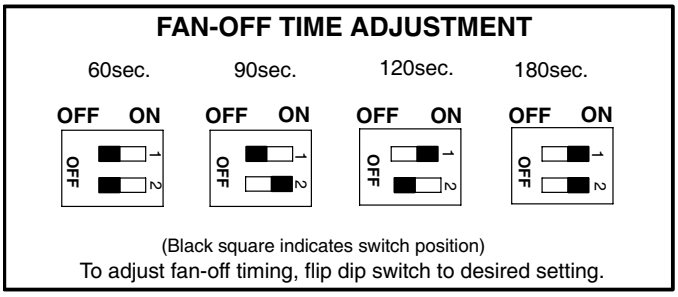


FIGURE 4

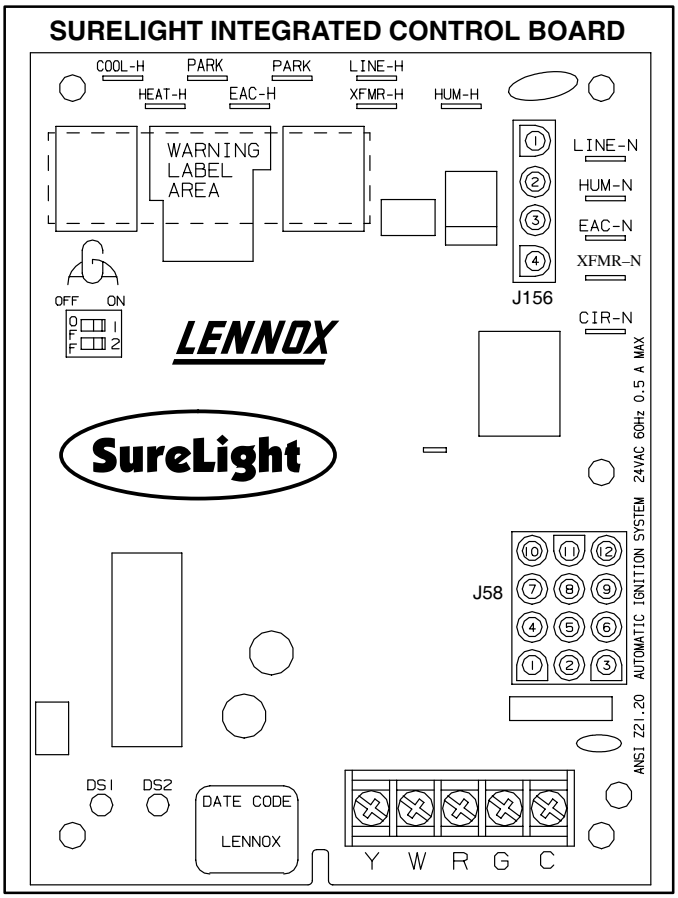


FIGURE 5

TABLE 3

TERMINAL DESIGNATIONS	
COOL-H 120V HOT	Blower Cooling Speed (120VAC)
HEAT-H	Blower Heating Speed-(120VAC)
EAC-H	Electronic Air Cleaner (120VAC)
HUM-H	Humidifier (120VAC)
XFMR-H	Transformer (120VAC)
LINE-H	Input (120VAC)
LINE-N 120V NEUT	Input (Neutral)
HUM-N	Humidifier (Neutral)
EAC-N	Electronic Air Cleaner (Neutral)
XFMR-N	Transformer (Neutral)
CIR-N	Blower (Neutral)
PARK	Alternate Blower Speeds (dead)
(FLAME SENSE)	Flame Sensor

4. Ignitor (Figure 6)

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. Ohm value should be 10.9 to 19.7

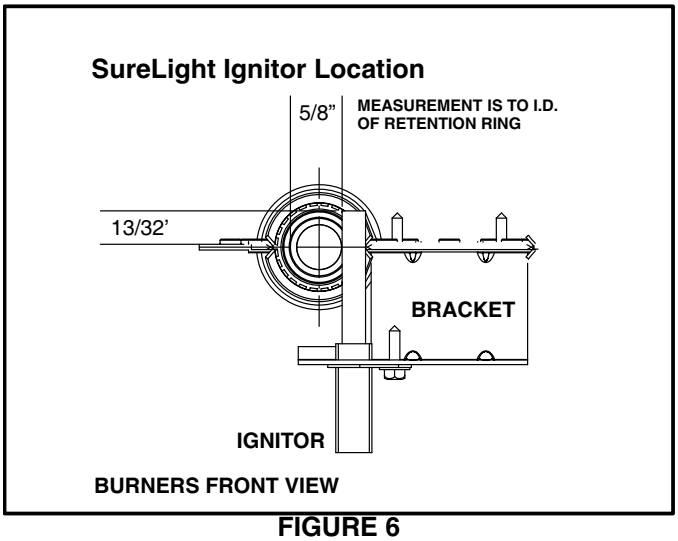


FIGURE 6

5. Flame Sensor (Figure 7)

A flame sensor is located on the left side of the burner support. The sensor is mounted on the bottom burner box plate and the tip protrudes into the flame envelope of the leftmost 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.

NOTE - The G41UF furnace contains electronic components that are polarity sensitive. Make sure that the furnace is wired correctly and is properly grounded.

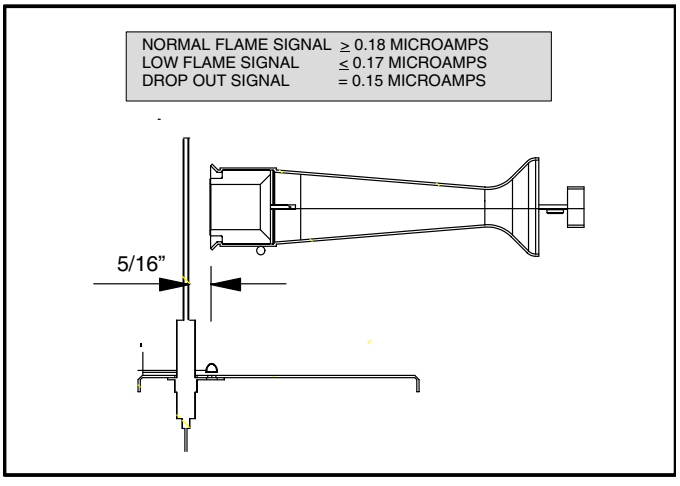


FIGURE 7

The SureLight board is equipped with two LED lights for troubleshooting. The diagnostic codes are listed below in table 4.

TABLE 4

DIAGNOSTIC CODES **Make sure to Identify LED'S Correctly.** **Refer to Installation Instructions for control board layout.**		
LED #1	**LED #2**	**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 or secondary limit switch open. Limit must close within 3 minutes or unit goes into 1 hour Watchgurad.
OFF	SLOW FLASH	Prove switch open. OR:Blocked inlet/exhaust vent; OR: Prove switch closed prior to activation of combustion air inducer.
ALTERNATING SLOW FLASH	ALTERNATING SLOW FLASH	Watchguard -- burners failed to ignite.
SLOW FLASH	OFF	Flame sensed without gas valve energized.
ON	SLOW FLASH	Rollout switch open. OR: 12-pin connector improperly attached.
ON ON OFF	ON OFF ON	Circuit board failure or control wired incorrectly.
FAST FLASH	SLOW FLASH	Main power polarity reversed. Switch line and neutral.
SLOW FLASH	FAST FLASH	Low flame signal. Measures below 0.18 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 to control below 75 volts.

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 = 0.16-0.17 microAmps.

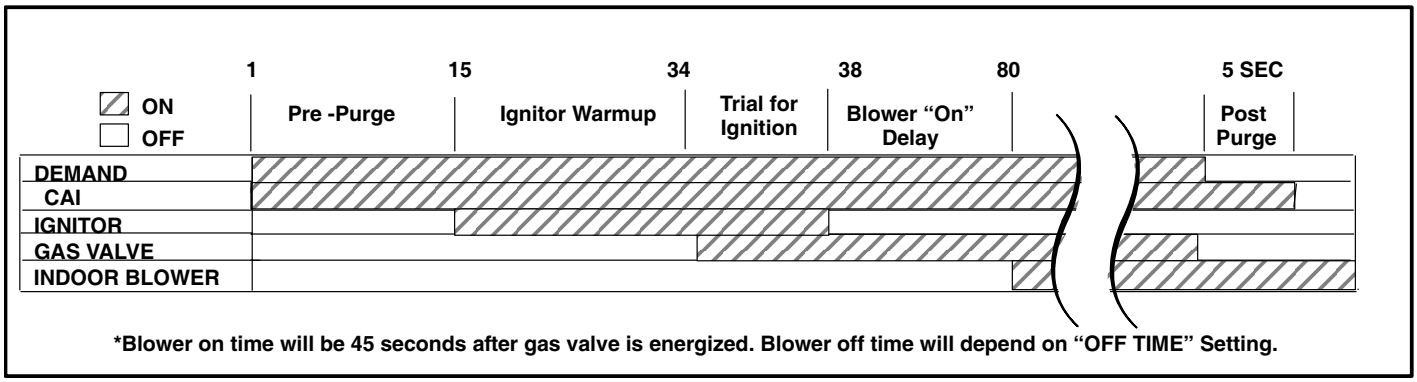


FIGURE 8

G41UF HEATING COMPONENTS

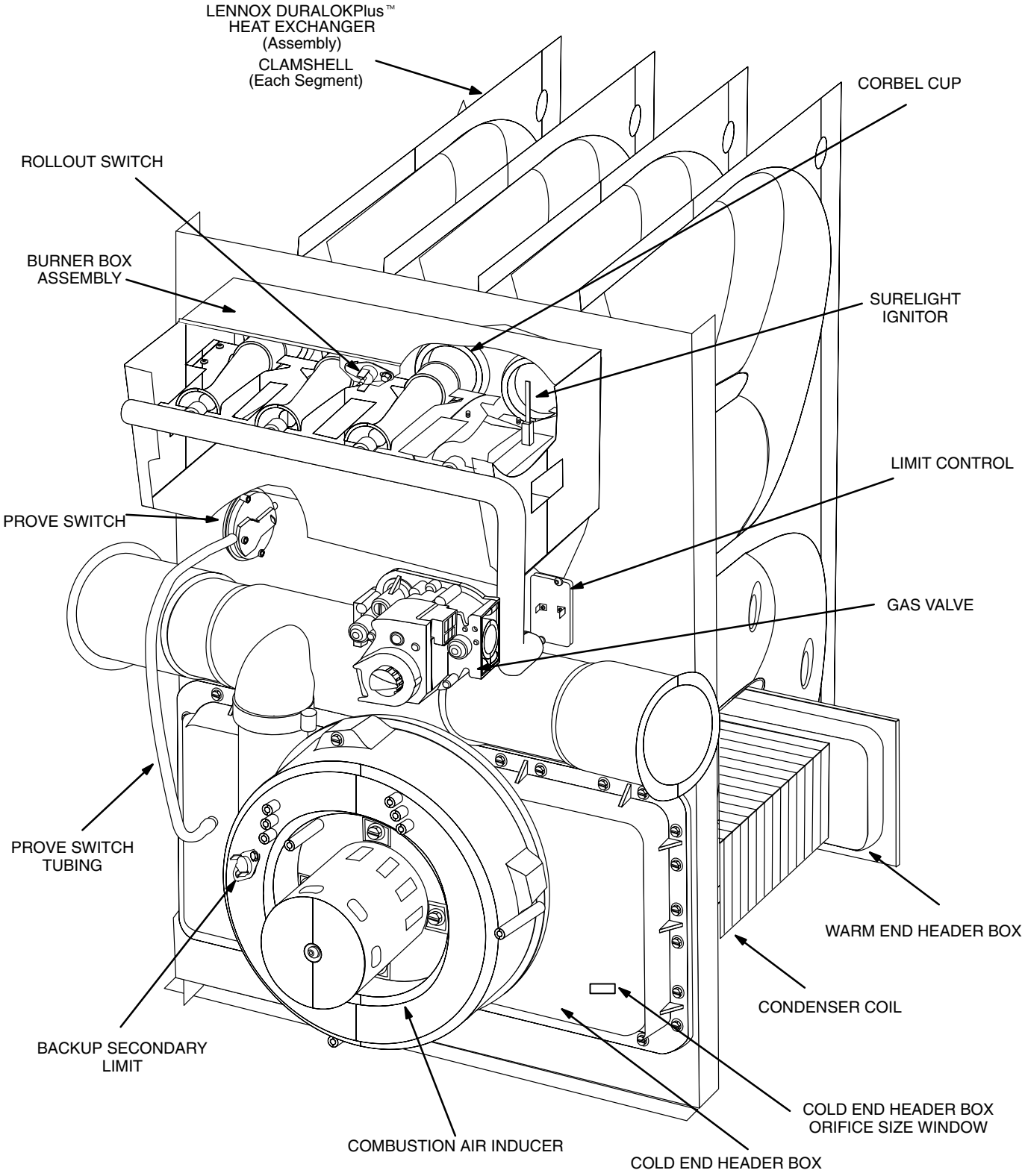


FIGURE 9

C-Heating Components (Figure 9)

Combustion air inducer (B6), primary limit control (S10), SureLight ignitor, burners, flame rollout switch (S47), gas valve (GV1), combustion air prove switch (S18), and clamshell heat exchangers are located in the heating compartment. The heating compartment can be accessed by removing the burner access panel.

1. Combustion Air Inducer (B6)

All G41UF units use a combustion air inducer to move air through the burners and heat exchanger during heating operation. The inducer uses a 120VAC motor. The motor operates during all heating operation and is controlled by burner ignition control A92. The inducer operates continuously while there is a call for heat. The ignition control is prevented from proceeding through the ignition sequence until combustion air inducer operation is sensed by the prove switch.

The prove switch connected to the plastic cold end header box is used to prove combustion air inducer operation. The switch monitors air pressure in the channel of the cold end header box. During normal operation, the pressure in the header box is negative. If the pressure drops (becomes more positive), the pressure switch opens. When the prove switch opens, the ignition control (A92) immediately closes the gas valve to prevent burner operation.

2. Primary Limit Control (S10)

Figure 10 shows the primary limit (S10) used on G41UF units. S10 is located on the heating vestibule panel. 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. The switch has a different setpoint for each unit model number. See Lennox Repair Parts handbook for set point.

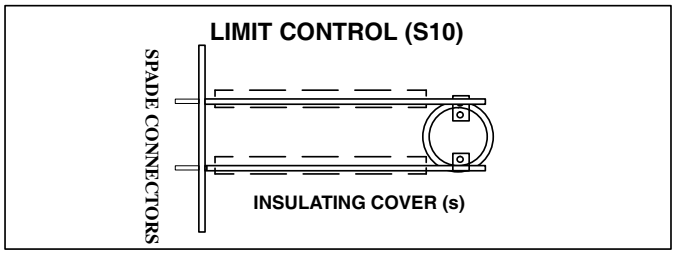


FIGURE 10

3. Backup Secondary Limit Control (S113) (G41UF-090, 110, 135 only)

Backup secondary limit control S113 is a N.C. auto-reset switch located on the combustion air inducer. See figure 9 for approximate location. 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°.

4. Burners / Gas Orifices (Figure 11)

All units use inshot burners. Burners are factory set and do not require adjustment. 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. For natural gas units the orifice size is .089" and for L.P. units .055". This size orifice is good for installation up to 7500' (for higher altitudes see table10). The orifice is threaded into the burner manifold. The burner is supported by the orifice and will easily slide off for service. Each orifice and burner are sized specifically to the unit. 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 (Figure 9) is fitted with a corbel cup (orifice) used to direct the flow of combustion products.

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

5. Clamshell Heat Exchanger

G41UF units use an aluminized steel primary and stainless steel secondary heat exchanger assembly. Table 5 shows how many heat exchanger clamshells are used per unit. 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.

TABLE 5

G41UF UNIT SIZE	NUMBER OF HEAT EXCHANGER CLAMSHELLS / BURNERS
G41UF-045	2
G41UF-070	3
G41UF-090	4
G41UF-110	5
G41UF-135	6

6. Cold End Header Box

The cold end header box on the G41UF is a single piece made of hard plastic. The box has an internal channel where the combustion air inducer (CAI) reads pressure at unit start up. The box has a single pressure tap for the CAI prove switch hose. A window is provided on the bottom right hand side to indicate box orifice size. See figure 9. The box orifice dictates the amount of flow the CAI will draw. See table 6 for orifice size per unit. If replacement is necessary the gaskets used to seal the box to the vestibule panel and the CAI to the box, must also be replaced.

TABLE 6

G41UF UNIT SIZE	Cold End Header Box Orifice Size
G41UF-045	0.750”
G41UF-070	1.0”
G41UF-090	1.125”
G41UF-110	1.375”
G41UF-135	1.750”

7. Flame Rollout Switch (S47)

Flame rollout switch S47 is a SPST N.C. high temperature limit located on the top side of the burner box assembly (see figure11). S47 is wired to the burner ignition control A92. When S47 senses flame rollout (indicating a blockage in the combustion passages), the flame rollout switch trips, and the ignition control immediately closes the gas valve. Switch S47 in all G41UF units is factory preset to open at 280°F ± 12°F (138°C ± 6.7°C) on a temperature rise. All flame rollout switches are manually reset.

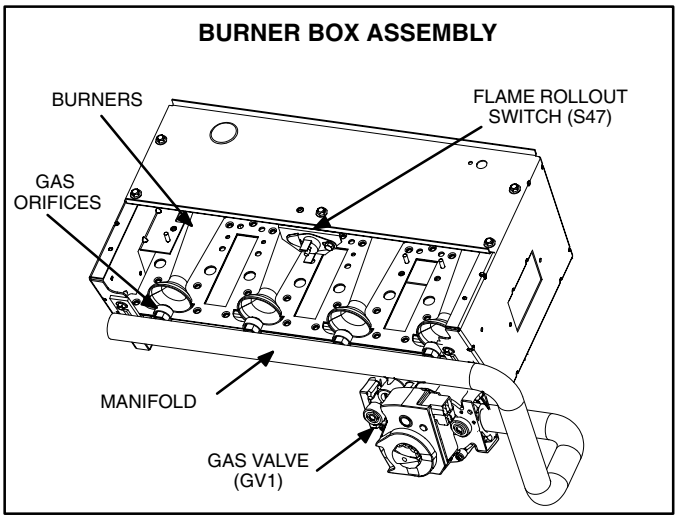


FIGURE 11

8. Gas Valve (GV1)

The G41UF uses a gas valve manufactured by Honeywell or White Rodgers (see figure 12). 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 are located on top of the valve. All terminals on the gas valve are connected to wires from the ignition control. 24V applied to the “MV” terminals on the Honeywell (M/C or 1/2 terminals on the White Rodgers) opens the main valve.

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

An LPG changeover kit is available. The kit includes burner orifices and a regulator conversion kit.

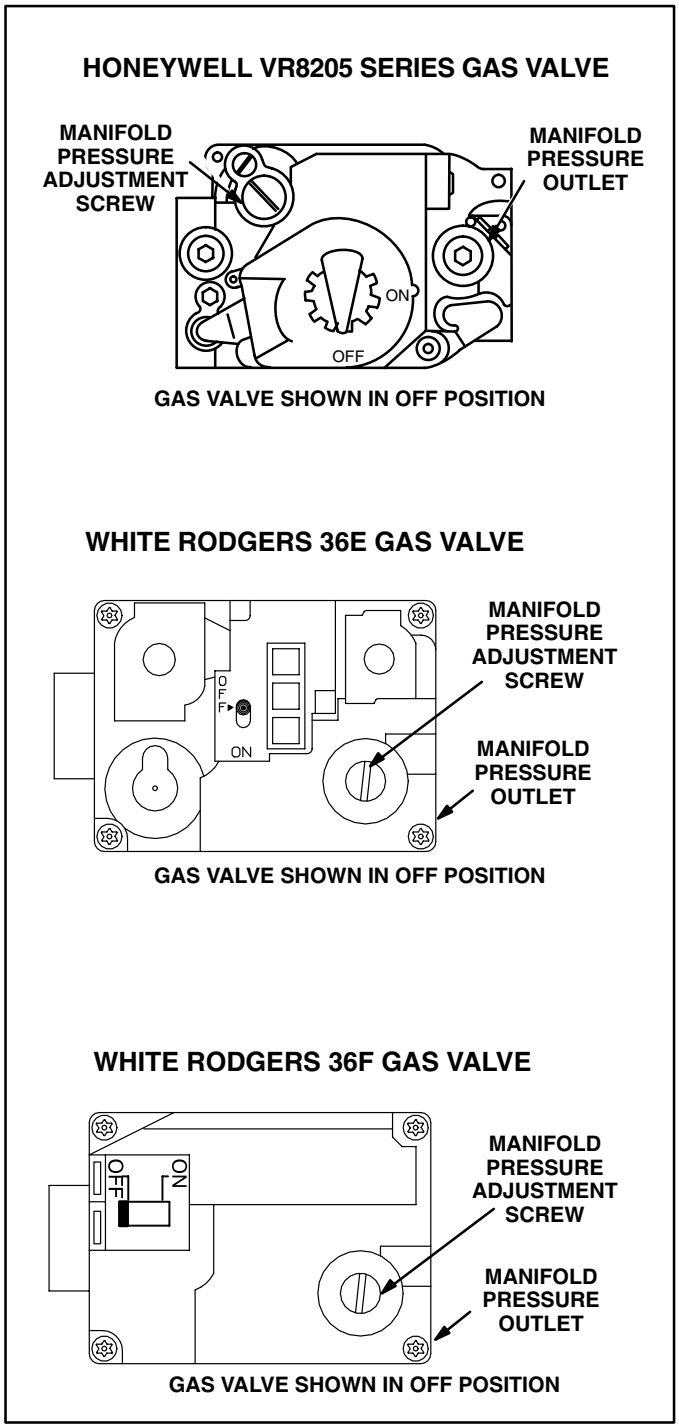


FIGURE 12

9. Combustion Air Prove Switch (S18)

G41UF series units are equipped with a combustion air prove switch located on the vestibule panel (figure 13). The switch is connected to the cold end header box housing by means of a flexible hose. It monitors negative air pressure in the cold end header box channel.

The switch is 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 start-up, 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 channel decreases to a certain set point. Set points vary depending on unit size. See table 7 for set point and HIGH ALTITUDE section for high altitude set point.The pressure sensed by the switch is negative relative to atmospheric pressure. If the flue becomes obstructed during operation, the switch senses a loss of negative pressure (pressure becomes more equal with atmospheric pressure) and opens the circuit to the furnace control and gas valve. A bleed port on the switch allows relatively dry air in the vestibule to purge switch tubing, to prevent condensate build up.

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

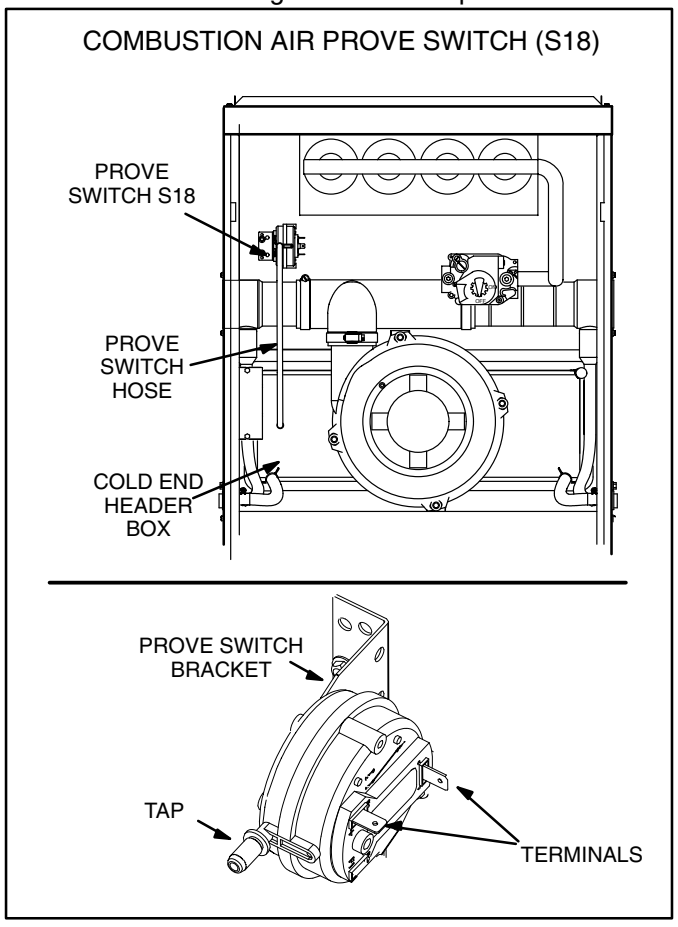


FIGURE 13

TABLE 7

G41UF Unit	Set Point
-045	1.95”
-070	1.95”
-090	1.95”
-110	1.95”
-135	1.60”

Measuring negative air pressure

Follow the steps below to measure negative air pressure in the channel of the cold end header box.

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

2 - Disconnect hose from the prove switch and install tee as shown in figure 14.

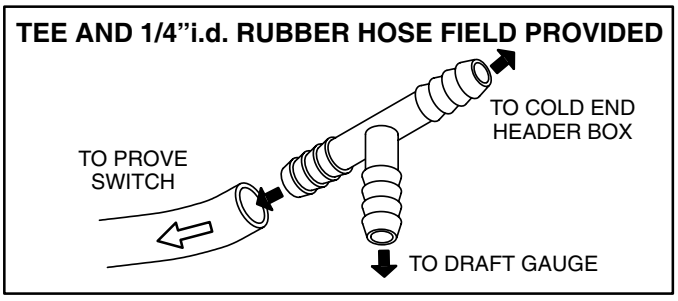


FIGURE 14

3 - Install an incline manometer (draft gauge) to open end of tee. The hose from the switch goes to the zero side of the gauge.

4 - Operate unit and observe draft gauge reading. *Readings will change as heat exchanger warms.* Take reading after unit has reached steady state (approximately 5 minutes). This will be the negative air pressure.

The pressure differential should be greater than those listed in table 7. See table 9 for HIGH ALTITUDE set points.

5 - Remove thermostat demand and allow to cycle off.

6 - Remove draft gauge and tee. Reinstall combustion air sensing hoses to the prove switch.

D-Blower Compartment (Figure 15)

Blower motor (B3) and capacitor (C4), are located in the blower compartment. The blower compartment can be accessed by removing the blower access panel.

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

All G41UF units use single-phase direct-drive blower motors. All motors are 120V permanent split capacitor motors to ensure maximum efficiency. See SPECIFICATIONS table at the front of this manual for more detail. See motor nameplate for capacitor ratings.

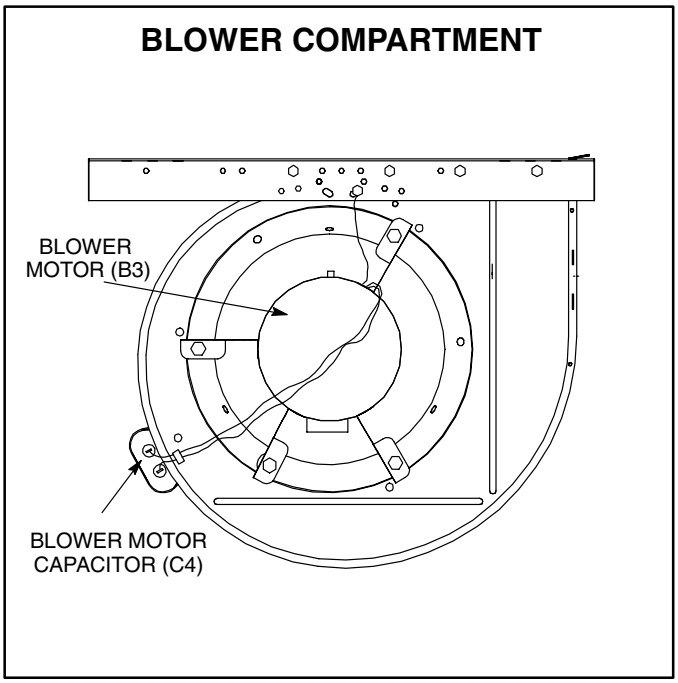


FIGURE 15

II-PLACEMENT AND INSTALLATION

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

A-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.

B-Venting Considerations

The thickness of construction through which vent pipes may be installed is 24" (610mm) maximum and 3" (76mm) minimum. If a G41UF 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, including drip leg, 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.

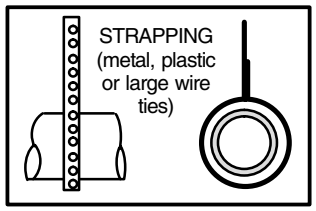


FIGURE 16

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.
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 60D-135 units. Street ell must be glued directly into flue collar to ensure condensate drainback during long, steady-state operation. See figure 18.

1. Choose the appropriate side for venting. Glue the field-provided exhaust vent pipe (or provided 2" diameter street ell) to the flue collar. Position the exhaust pipe as close to vertical as possible before transitioning to a horizontal run of pipe. It is permissible to deviate from vertical up to 30°; however, this may impair vent condensate drainback in some applications. All cement joints should be made according to the specifications outlined in ASTM D 2855. Refer to pipe and fittings specifications and gluing procedures.

⚠ 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.

TYPICAL VENTING AND CONDENSATE TRAP INSTALLATION (Right-Hand Exit Shown)

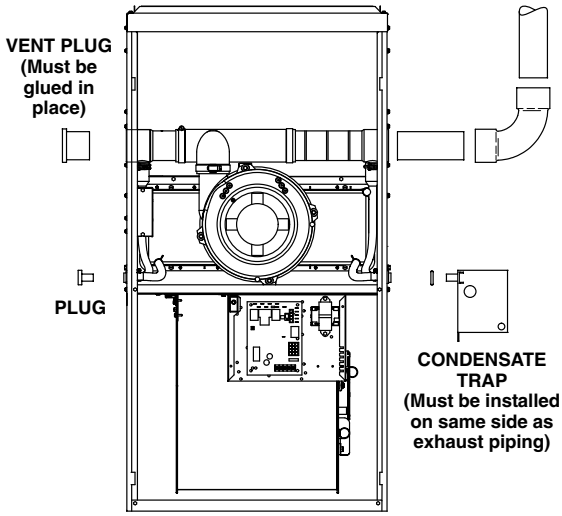
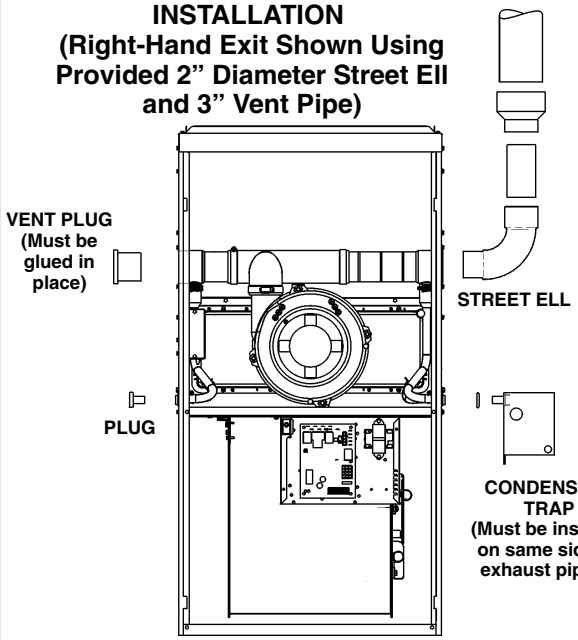


FIGURE 17

TYPICAL G41UF-60D-135 VENTING AND CONDENSATE TRAP INSTALLATION (Right-Hand Exit Shown Using Provided 2" Diameter Street Ell and 3" Vent Pipe)



NOTE - Transition to larger size vent pipe must be made in a vertical run of the vent pipe as illustrated.

FIGURE 18

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.

Testing for Proper Venting and Sufficient Combustion Air

⚠ 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 G41UF vent system has been completed, the following test should be conducted to ensure proper venting and sufficient combustion air has been provided to the G41UF, 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 G41UF or other 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-B149.1 Natural Gas and Propane Installation Code 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 installations combustion air is taken from indoors and the flue gases are discharged to the outdoors. The G41UF is then classified as a non-direct vent, Category IV gas furnace. In Non-Direct Vent installations 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 standards CSA-B149.1 of the Natural Gas and Propane Installation Codes in Canada for details.

Position termination ends according to locations given in figure 19. In addition, position termination ends so they are 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.

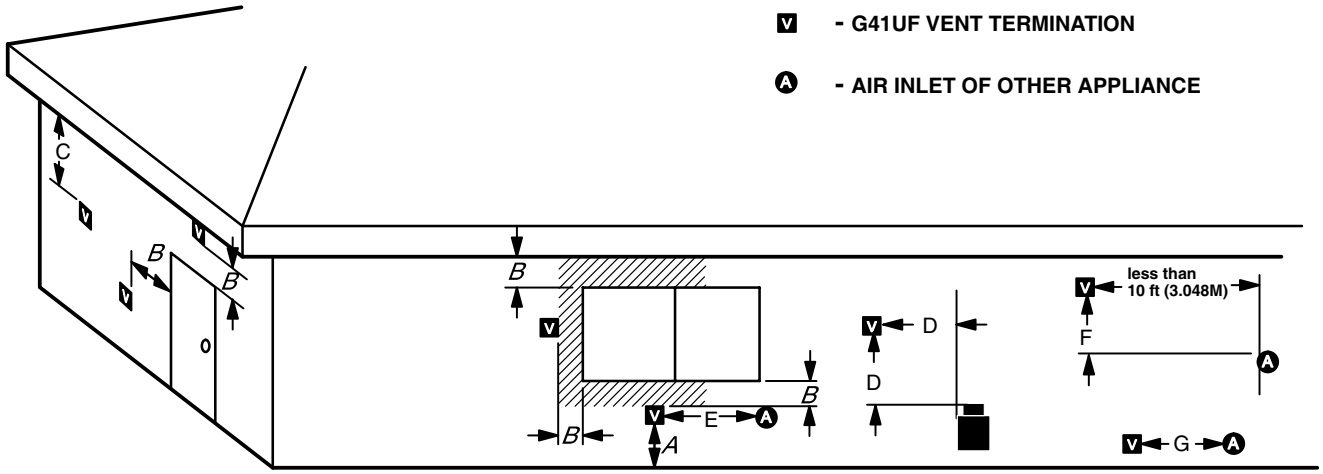
⚠ IMPORTANT

Exhaust outlet should not be located within 6 feet (1.8m) of dryer vent or combustion air inlet or outlet of another appliance. Piping should not exit less than 3 feet (.91m) from opening into another building.

⚠ IMPORTANT

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

VENT TERMINATION CLEARANCES FOR INSTALLATIONS IN THE USA AND CANADA*



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

B - *Clearance to window or door* -
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 ≤ 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*
for vent installations in USA - 12 in. (305mm).
for vent installations in Canada - 12 in. (305mm) minimum for appliances ≤ 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, alcoves, or courtyard areas.*

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 and from the current edition of CSA B149 Code for Canadian installations. Local codes or regulations may require different clearances.

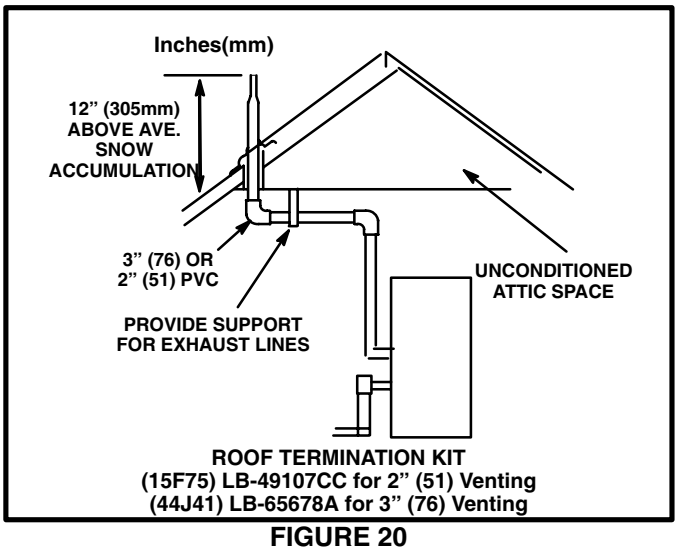
(II) In Non-Direct Vent installations, combustion air is taken from indoors and the flue gases are discharged to the outdoors.

FIGURE 19

Details of Exhaust Piping Terminations for Non-Direct Vent Installations.

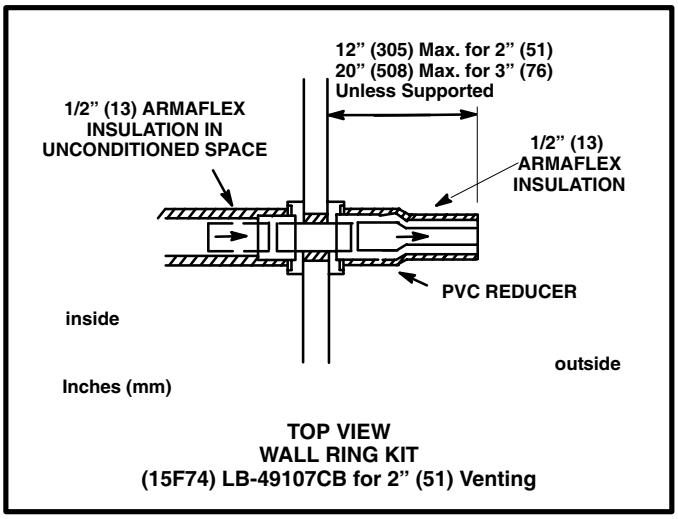
Exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 20 through 23 show typical terminations.

1. Exhaust piping must terminate straight out or up as shown. A 2" (51mm) X 1-1/2" (38mm) reducer for 2" (51mm) venting, 3" (76mm) x 2" (51mm) reducer for 3" (76mm) venting is recommended for use on the exhaust piping at the point where it exits the structure to improve the velocity of exhaust away from any intake piping.
2. On field supplied terminations for side wall exits, exhaust piping should extend a maximum of 12 inches (305mm) beyond the outside wall for 2" (51mm) pipe, or a maximum of 20 inches (508mm) for 3" (76mm) pipe, unless support is provided in the horizontal section. See figure 21.



ROOF TERMINATION KIT
(15F75) LB-49107CC for 2" (51) Venting
(44J41) LB-65678A for 3" (76) Venting

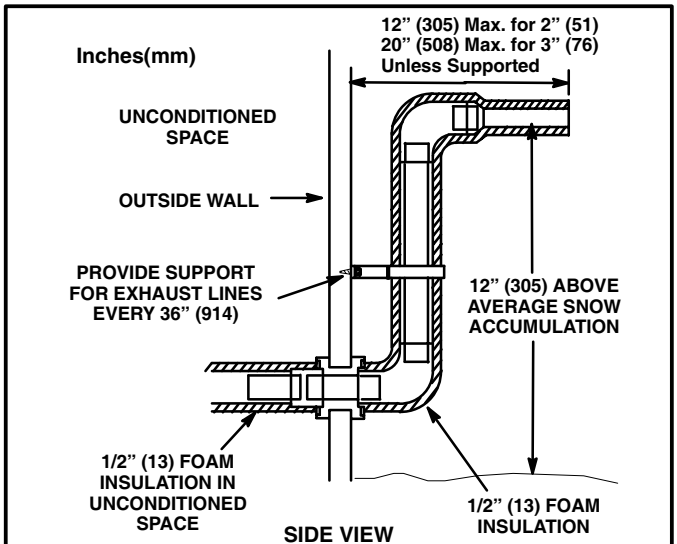
FIGURE 20



TOP VIEW
WALL RING KIT
(15F74) LB-49107CB for 2" (51) Venting

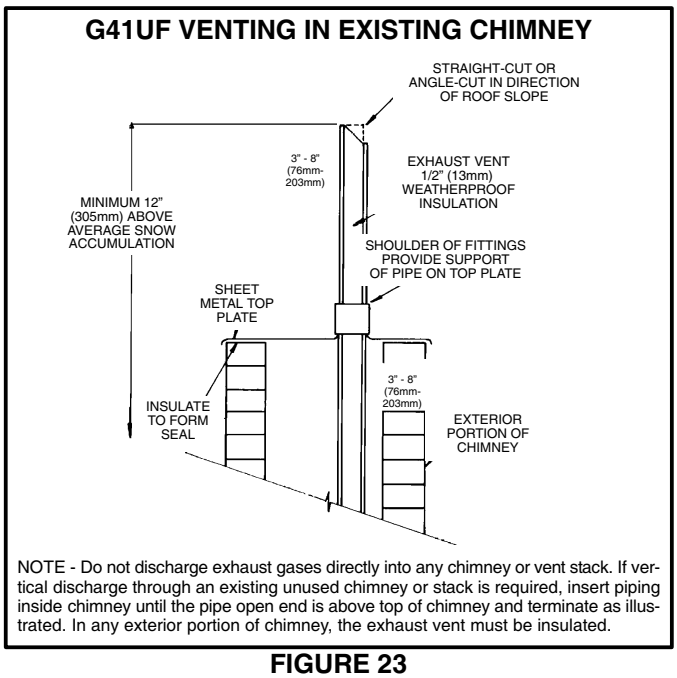
FIGURE 21

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 16. Refer to figure 22 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.



SIDE VIEW
WALL RING TERMINATION
(15F74) LB-49107CB for 2" (51) Venting

FIGURE 22



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 23

Condensate Piping

This unit is designed for either right- or left-side exit of condensate piping. Condensate drain line should be routed only within the conditioned space to avoid freezing of condensate and blockage of drain line. An electric heat cable should be used where condensate line is exposed to unconditioned areas.

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

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 24.

NOTE - Make sure that O-rings are properly positioned between trap and cabinet. O-rings provide a seal between the trap and the condensate collar. It is not necessary to apply glue or sealant.

NOTE - 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.

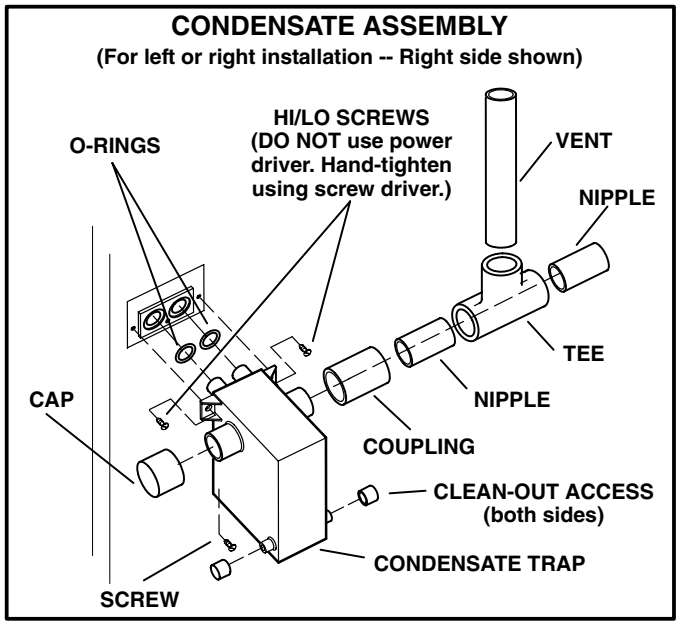


FIGURE 24

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 diamer 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 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 trap using a worm clamp. Do not overtighten the worm 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 - Glue the provided cap onto the unused condensate drain line stub.

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.

3 - Inspect condition of condensate traps and drain assembly. Disassemble and clean seasonally.

B-Heating Start-Up

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 G41UF 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 lever will not move or the knob will not push in or turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

Placing the furnace into operation:

G41UF units are equipped with a SureLight™ ignition system. Do <u>not</u> 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.

⚠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

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 - *White Rodgers 36E/36F Gas Valve* - Switch gas valve lever to **OFF**. See figure 25 for the White Rodgers 36F valve and figure 26 for the White Rodgers 36E valve.
Honeywell VR8205 Gas Valve - Turn knob on gas valve clockwise to **OFF**. Do not force. See figure 27.

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

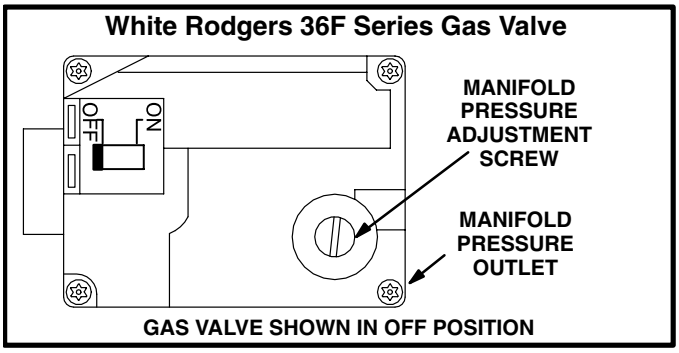


FIGURE 25

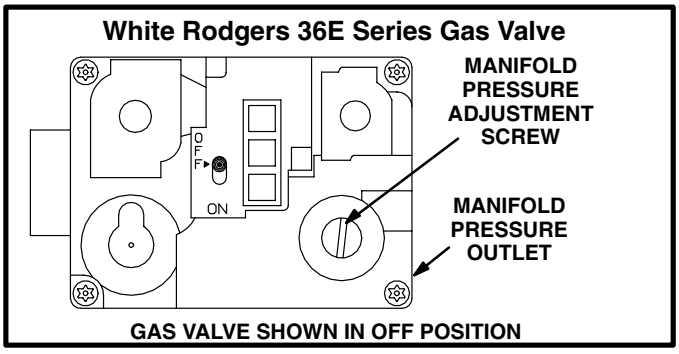


FIGURE 26

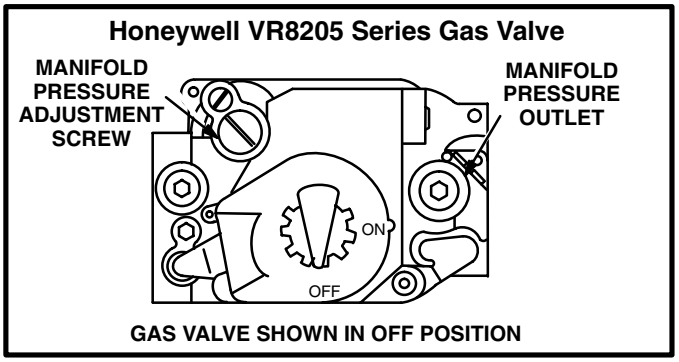


FIGURE 27

8 - *White Rodgers 36E/36F Gas Valve* - Switch gas valve lever to **ON**. See figure 25 for the White Rodgers 36F valve and figure 26 for the White Rodgers 36E valve.
Honeywell VR8205 Gas Valve - Turn knob on gas valve counterclockwise to **ON**. Do not force.

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

5 - Replace the upper access panel.

IV-HEATING SYSTEM SERVICE CHECKS

A-C.S.A. Certification

All units are C.S.A. design certified without modifications. Refer to the G41UF Operation and Installation Instruction Manual Information.

B-Gas Piping

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. See table 8 if gas pipe is suspect.

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

C-Testing Gas Piping

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig (14" W.C.). See figure 28. If the pressure is equal to or less than 0.5psig (14"W.C.), use the manual shut-off valve before pressure testing to isolate furnace from gas supply.

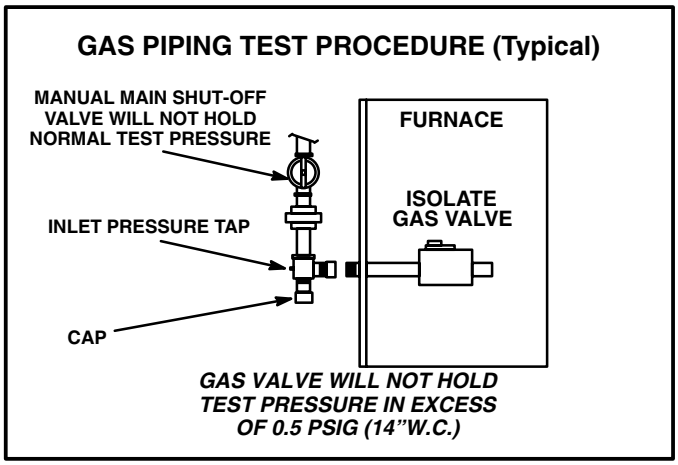


FIGURE 28

TABLE 8
GAS PIPE CAPACITY - FT³/HR (kL/HR)

Nominal Iron Pipe Size -Inches(mm)	Internal Diameter -Inches(mm)	Length of Pipe-Feet(m)									
		10 (3.048)	20 (6.096)	30 (9.144)	40 (12.192)	50 (15.240)	60 (18.288)	70 (21.336)	80 (24.384)	90 (27.432)	100 (30.480)
1/4 (6.35)	.364 (9.246)	43 (1.13)	29 (.82)	24 (.68)	20 (.57)	18 (.51)	16 (.45)	15 (.42)	14 (.40)	13 (.37)	12 (.34)
3/8 (9.53)	.493 (12.522)	95 (2.69)	65 (1.84)	52 (1.47)	45 (1.27)	40 (1.13)	36 (1.02)	33 (.73)	31 (.88)	29 (.82)	27 (.76)
1/2 (12.7)	.622 (17.799)	175 (4.96)	120 (3.40)	97 (2.75)	82 (2.32)	73 (2.07)	66 (1.87)	61 (1.73)	57 (1.61)	53 (1.50)	50 (1.42)
3/4 (19.05)	.824 (20.930)	360 (10.19)	250 (7.08)	200 (5.66)	170 (4.81)	151 (4.28)	138 (3.91)	125 (3.54)	118 (3.34)	110 (3.11)	103 (2.92)
1 (25.4)	1.049 (26.645)	680 (19.25)	465 (13.17)	375 (10.62)	320 (9.06)	285 (8.07)	260 (7.36)	240 (6.80)	220 (6.23)	205 (5.80)	195 (5.52)
1-1/4 (31.75)	1.380 (35.052)	1400 (39.64)	950 (26.90)	770 (21.80)	660 (18.69)	580 (16.42)	530 (15.01)	490 (13.87)	460 (13.03)	430 (12.18)	400 (11.33)
1-1/2 (38.1)	1.610 (40.894)	2100 (59.46)	460 (41.34)	1180 (33.41)	990 (28.03)	900 (25.48)	810 (22.94)	750 (21.24)	690 (19.54)	650 (18.41)	620 (17.56)
2 (50.8)	2.067 (52.502)	3950 (111.85)	2750 (77.87)	2200 (62.30)	1900 (53.80)	1680 (47.57)	1520 (43.04)	1400 (39.64)	1300 (36.81)	1220 (34.55)	1150 (32.56)
2-1/2 (63.5)	2.469 (67.713)	6300 (178.39)	4350 (123.17)	3520 (99.67)	3000 (84.95)	2650 (75.04)	2400 (67.96)	2250 (63.71)	2050 (58.05)	1950 (55.22)	1850 (52.38)
3 (76.2)	3.068 (77.927)	11000 (311.48)	7700 (218.03)	6250 (176.98)	5300 (150.07)	4750 (134.50)	4300 (121.76)	3900 (110.43)	3700 (104.77)	3450 (97.69)	3250 (92.03)
4 (101.6)	4.026 (102.260)	23000 (651.27)	15800 (447.39)	12800 (362.44)	10900 (308.64)	9700 (274.67)	8800 (249.18)	8100 (229.36)	7500 (212.37)	7200 (203.88)	6700 (189.72)

NOTE-Capacity given in cubic feet of gas per hour (kilo liters of gas per hour) and based on 0.60 specific gravity gas.

D-High Altitude

TABLE 9
Conversion Kit and Prove Switch Requirements at Varying Altitudes

Model Input Size	Gas	Altitude					
		0 - 4500 ft. (0 - 1372 m)		4,501 - 7500 ft. (1373 - 2286 m)		7501-10,000 ft. (2286 - 3048 m)	
		Required Conversion Kit	Prove Switch Kit & Set Point	Required Conversion Kit	Prove Switch Kit & Set Point	Required Conversion Kit an	Prove Switch Kit & Set Point
-045 -070	Nat.	N/A	No Change	N/A	No Change	47M82	46M94 - 1.80”
	LPG	47M83*	No Change	47M83*	No Change	47M81*	46M94 - 1.80”
-090 -110	Nat.	N/A	No Change	N/A	46M94 - 1.80”	47M82	46M94 - 1.80”
	LPG	47M83*	No Change	47M83*	46M94 - 1.80”	47M81*	46M94 - 1.80”
-135	Nat.	N/A	No Change	N/A	No Change	47M82	46M95 - 1.45”
	LPG	47M83*	No Change	47M83*	No Change	47M81*	46M95 - 1.45”

Prove switch is factory set. No adjustment necessary. All models use the factory installed prove switch from 0-4500 feet (0-1370 m).
*LPG/Propane conversion kit includes LP regulator.

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

The combustion air prove switches are factory-set and require no adjustment. Table 9 lists required prove switch changes and conversion kits at varying altitudes.The manifold pressure may require adjustment to ensure proper operation at higher altitudes. Refer to table 10 for proper manifold pressure settings and gas orifice at varying altitudes.

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.

TABLE 10
Manifold Pressure and Gas Orifice (Outlet) inches w.c.

Fuel	Altitude (feet)				
	0-4500	4501-5500	5501-6500	6501-7500	7501*-10,000
Nat Gas	3.5	3.3	3.2	3.1	3.5
Orifice	.089				.081
L.P. Gas	10.0	10.0	10.0	10.0	10.0
Orifice	.055				.052

**Conversion kit required for applications at altitudes above 7501 ft. above sea level.*

⚠ 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.

⚠ IMPORTANT

The furnace must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.45 kPa). See figure 28.

The furnace and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of the system at test pressures greater than 1/2 psig (3.45 kPa).

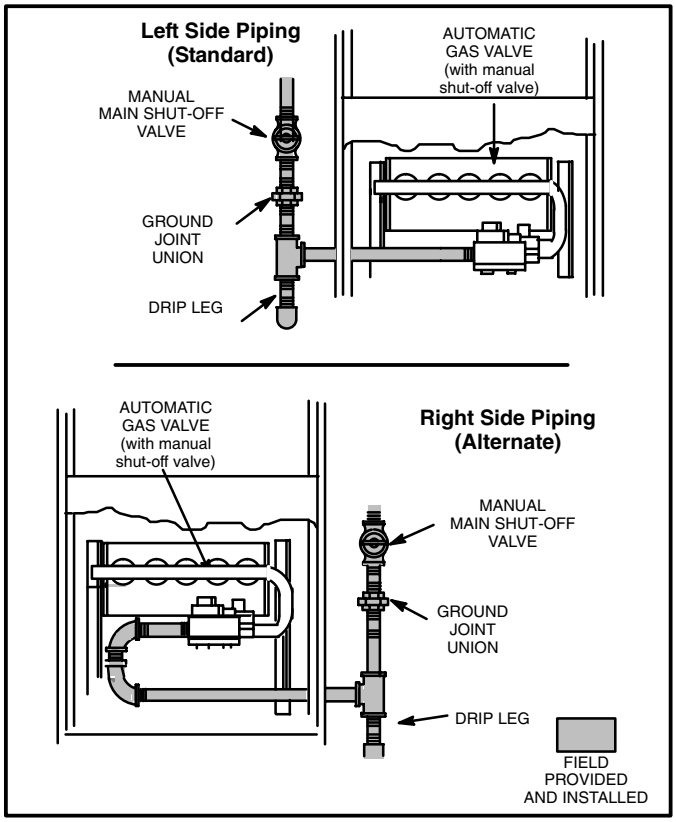


FIGURE 29

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.

⚠ WARNING

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

E-Testing Gas Supply Pressure

When testing supply gas pressure, connect test gauge to inlet pressure tap (field provided). 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. For natural gas units, operating pressure at unit gas connection must be between 4.5" W.C. and 13.0" W.C. For L.P. gas units, operating pressure at unit gas connection must be between 10.5" and 13.0" W.C.

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

F-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 operating pressure for the G41UF can be measured at any time the gas valve is open and is supplying gas to the unit. Normal manifold operating pressure for natural gas units is 3.5 in. W.C. $\pm$ 0.3 and 10.0 in. W.C. $\pm$ 0.7 for L.P.

⚠ 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.

Manifold Pressure Measurement and Adjustment

1 - Connect test gauge to outlet tap on gas valve.
2 - Start unit and allow 5 minutes for unit to reach steady state.
3 - While waiting for the unit to stabilize, notice the flame. Flame should be stable and should not lift from burner. Natural gas should burn blue. L.P. gas should burn mostly blue with some orange streaks.
4 - After allowing unit to stabilize for 5 minutes, adjust the manifold pressure on the gas valve if necessary. When reading manifold pressure, regulator cap must be installed.

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

G- 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 11 below. Adjust manifold pressure on gas valve to match time needed.

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

TABLE 11

GAS METER CLOCKING CHART				
G41UF Unit	Seconds for One Revolution			
	Natural		LP	
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft DIAL
-45	80	160	200	400
-70	51	102	129	258
-90	40	80	100	200
-110	33	66	82	164
-135	27	53	67	134
Natural-1000 btu/cu ft LP-2500 btu/cu ft				

H- Proper Combustion

Furnace should operate at least 15 minutes with correct manifold pressure and gas flow rate before checking combustions. Take sample beyond the flue outlet and compare to table 12. The maximum carbon monoxide reading should not exceed 100 ppm.

TABLE 12

G41UF Unit	CO_2%			
	Natural		LP	
	Min Pipe	Max Pipe	Min Pipe	Max Pipe
-24B-045	5.9 - 6.9	7.3 - 8.3	6.9 - 7.9	7.7 - 8.7
-36B-045	5.9 - 6.9	7.0 - 8.0	6.9 - 7.9	8.1 - 9.1
-36B-070	6.0 - 7.0	7.0 - 8.0	7.5 - 8.5	8.2 - 9.2
-36C-090	6.9 - 7.9	8.1 - 9.1	8.1 - 9.1	8.9 - 9.9
-48C-090	6.8 - 7.8	8.0 - 9.0	8.1 - 9.1	8.9 - 9.9
-60C-090	6.8 - 7.8	7.6 - 8.6	7.9 - 8.9	8.5 - 9.5
-48C-110	6.9 - 7.9	7.5 - 8.5	7.7 - 8.7	8.4 - 9.4
-60C-110	6.8 - 7.8	7.2 - 8.2	8.0 - 9.0	8.8 - 9.8
-60D-135	7.4 - 8.4	7.8 - 8.8	8.1 - 9.1	8.7 - 9.7

I-Flame Signal

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 30. The transducer converts microamps to volts on a 1:1 conversion. Flame signal for the SureLight control should read **0.18** or more microamps with a lockout signal of **0.15** microamps. A digital readout meter must be used. The transducer plugs into most meters.

To Measure Flame Signal:

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.

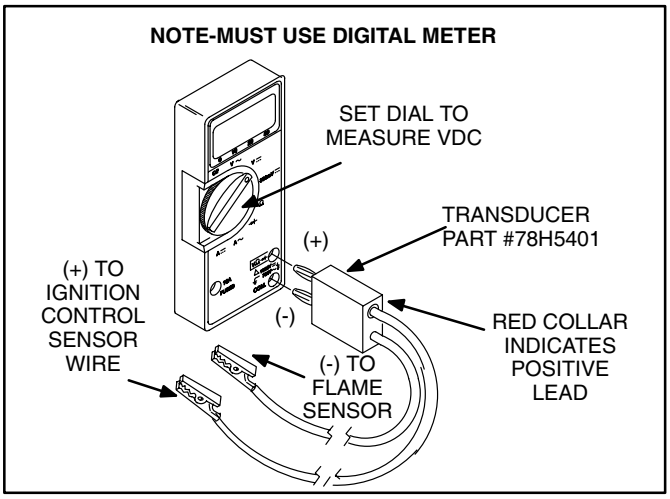


FIGURE 30

V-TYPICAL OPERATING CHARACTERISTICS

A-Blower Operation and Adjustment

NOTE- The following is a generalized procedure and does not apply to all thermostat controls.

1 - Blower operation is dependent on thermostat control system.

2 - Generally, blower operation is set at thermostat sub-base fan switch. With fan switch in ON position, blower operates continuously. With fan switch in AUTO position, blower cycles with demand or runs continuously while heating or cooling circuit cycles.

3 - In all cases, blower and entire unit will be off when the system switch is in OFF position.

B-Temperature Rise

Temperature rise for G41UF 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 "AIR 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 - Measure tap locations as shown in figure 31.

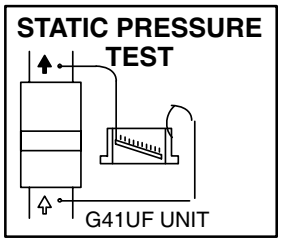


FIGURE 31

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 - Pressure drop must not exceed 0.5" W.C.

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

D-Blower Speed Taps Leaded Motors

Blower speed tap changes are made on the SureLight control board. See figure 5. Unused taps must be secured on two dummy terminals labeled "PARK" on the SureLight board. The heating tap is connected to the "HEAT-H" terminal and the cooling tap is connected to the "COOL-H" terminal. The continuous blower tap is the same as the heating tap. See table 13 for blower motor tap colors for each speed.

TABLE 13

BLOWER SPEED CHART					
UNIT	FACTORY CONNECTED SPEED TAPS				MOTOR SPEEDS AVAIL.
	COOL	HEAT	PARK	PARK	
24B-045	BLACK	RED	YELLOW	----	3
36B-045		YELLOW	RED	BROWN	4
36B-070					
36C-090					
48C-090					
48C-110					
60C-090					
60C-110					
60D-135					
BLOWER SPEED SELECTION HI ◄ ► LO					
SPEED TAPS	BLACK	YELLOW		RED	3
	BLACK	BROWN	YELLOW	RED	4

G41UF BLOWER REMOVAL

To Remove Blower:

Turn off line voltage power.

1 Disconnect thermostat wiring connections.

2 Disconnect blower leads from control board.

3 Loosen screws (2) and remove control box from unit. Holes are slotted so screws do not need to be removed.

4. Remove screws (2) and remove blower from unit.

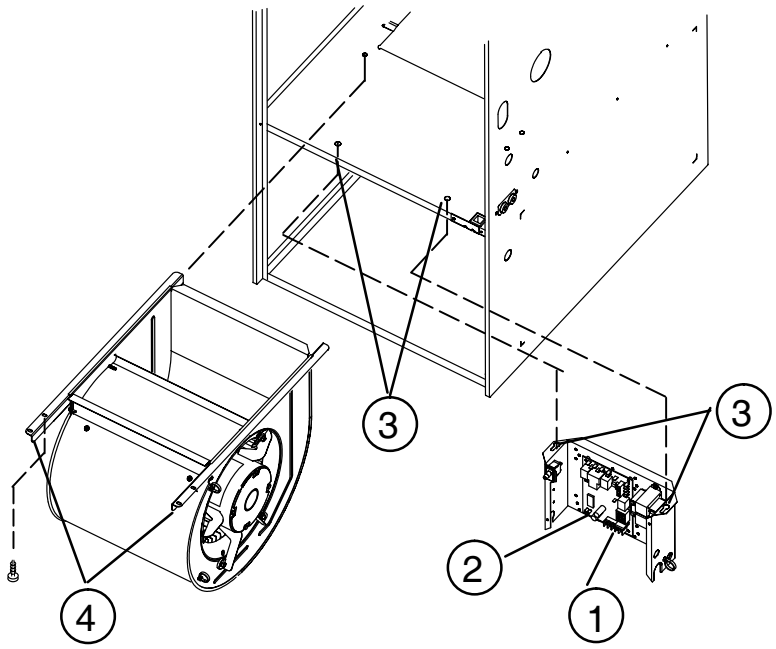


FIGURE 32

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:

A-Blower

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

⚠WARNING

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

B-Filters

All G41UF filters are installed external to the unit. 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.

C-Flue and Chimney

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

D-Electrical

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

E-Winterization 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.

F-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.

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 switch.

7 - Remove four burner box screws at the vestibule panel and remove burner box. Set burner box assembly aside.
NOTE - If necessary, clean burners at this time. Follow procedures outlined in Burner Cleaning section.

8 - Loosen three clamps and remove flexible exhaust tee.

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 both 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 - Disconnect the 2-pin plug from the combustion air inducer. Remove four screws which secure combustion air inducer to collector box Remove combustion air inducer assembly. Remove ground wire from vest panel.

13 - Disconnect combustion air pressure tubing from cold end header collector box.

14 - Mark and remove wires from pressure switch. Remove pressure switch. Keep tubing attached to pressure switch.

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 prove switch and reconnect prove switch wiring.

28 - Connect combustion air prove switch hosing from pressure switch to cold end header collector box.

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

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

31 - Reinstall electrical junction box.

32 - Reinstall the combustion air inducer. Reconnect the 2-pin plug to the wire harness and ground wire to vest panel.

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 - Reconnect wires to gas valve.

41 - Replace the blower compartment access panel.

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

43 - 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.

44 - Replace heating compartment access panel.

G-Cleaning Burners

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 four screws which secure burner box assembly to vest panel. Remove burner box from the unit.

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.

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

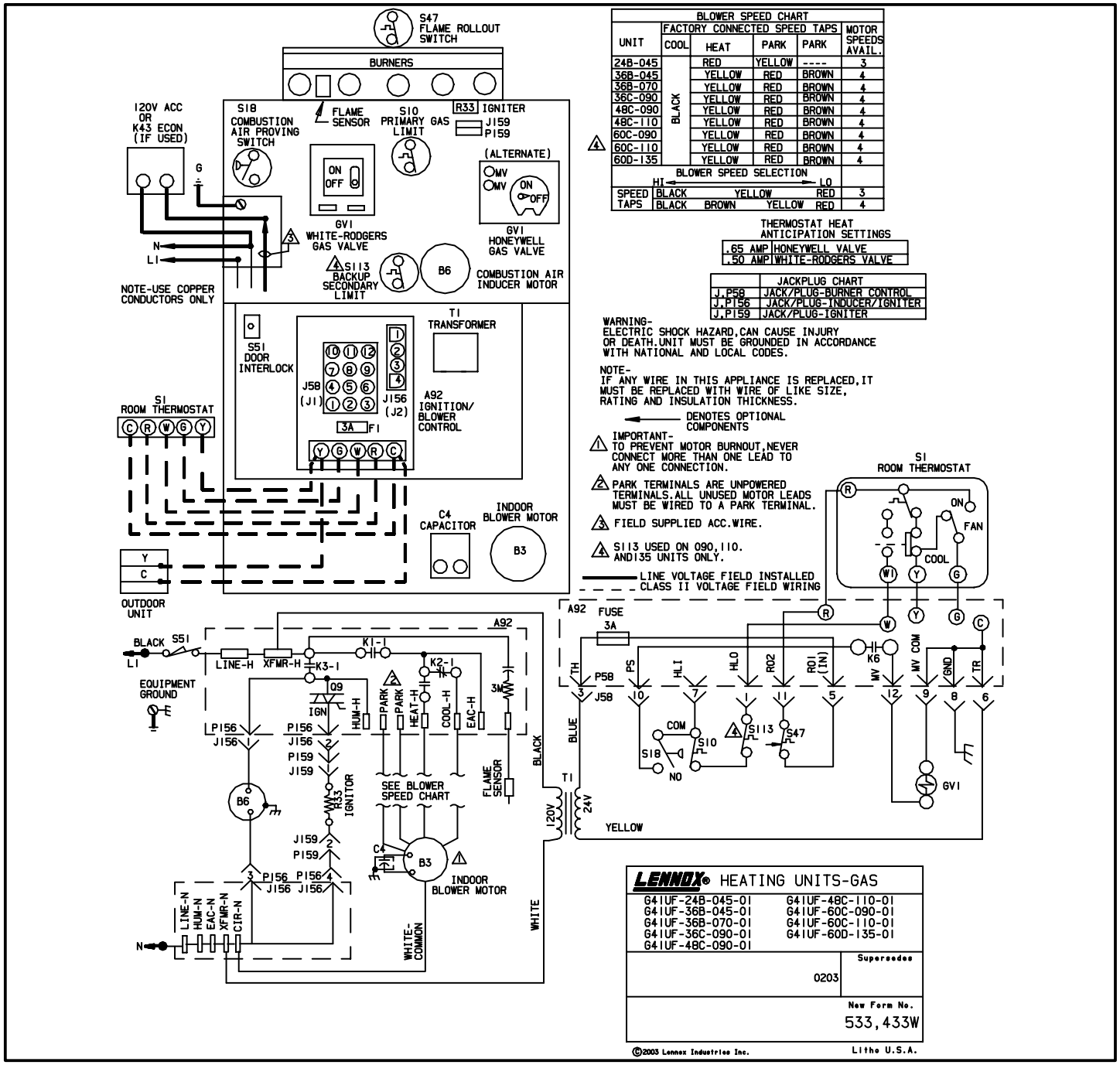
11 - Replace the blower compartment access panel.

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 DIAGRAM AND SEQUENCE OF OPERATION



1 - When there is a call for heat, W1 of the thermostat energizes W of the furnace control with 24VAC.

2 - S10 primary limit switch and S47 rollout switch are closed. Call for heat can continue.

3 - SureLight control (A92) energizes combustion air inducer B6. Combustion air inducer runs until S18 combustion air prove switch closes (switch must close within 2-1/2 minutes or control goes into 5 minute Watchguard Pressure Switch delay). Once S18 closes, a 15-second pre-purge follows.

4 - SureLight control (A92) energizes ignitor. A 20-second warm-up period begins.

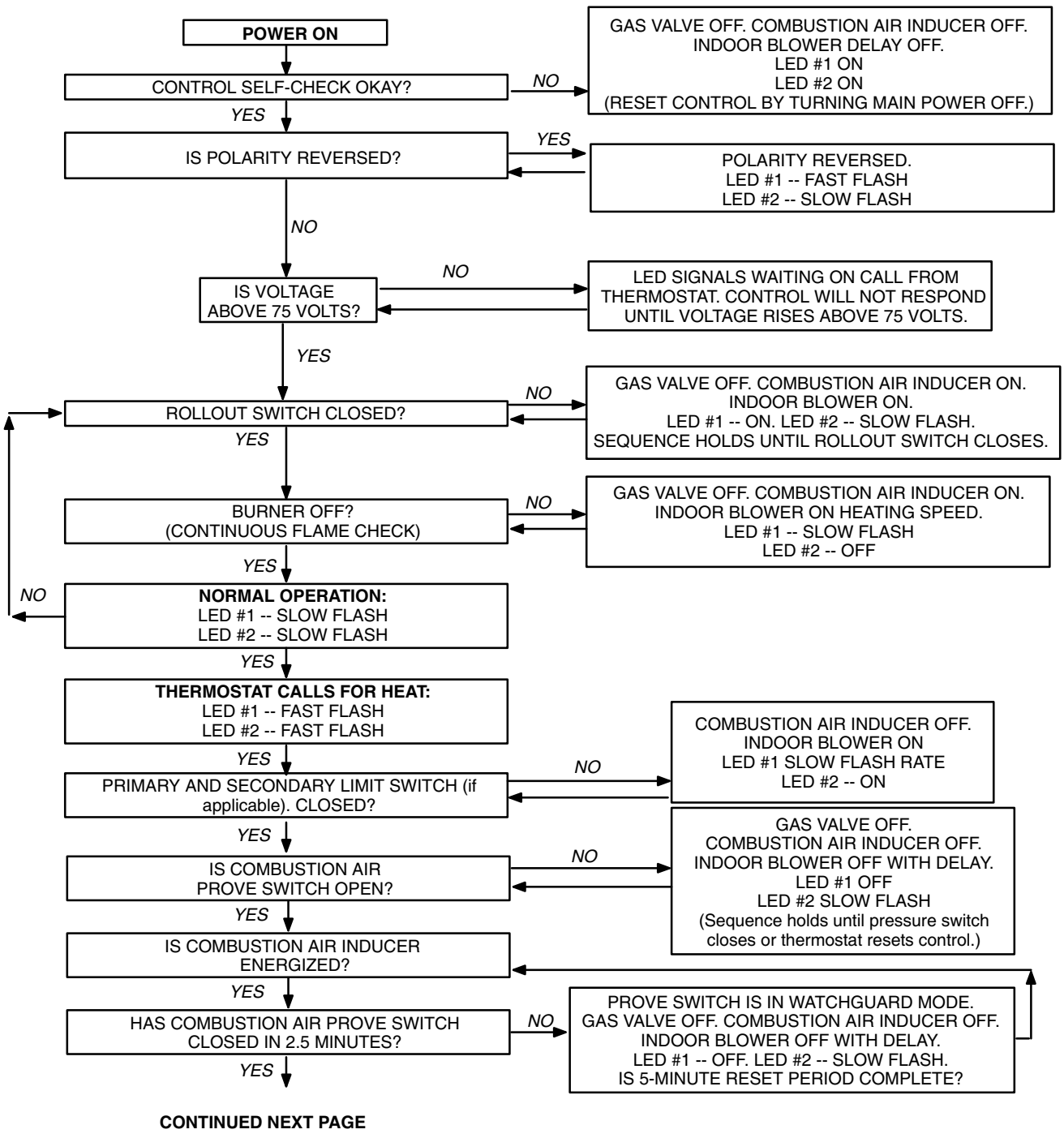
5 - Gas valve opens for a 4-second trial for ignition

6 - Flame is sensed, gas valve remains open for the heat call.

7 - After 45-second delay, SureLight control (A92) energizes indoor blower B3.

8 - When heat demand is satisfied, W1 of the indoor thermostat de-energizes W of the SureLight control which de-energizes the gas valve. Combustion air inducer B6 continues a 5-second post-purge period, and indoor blower B3 completes a selected OFF time delay.

HEATING SEQUENCE OF OPERATION



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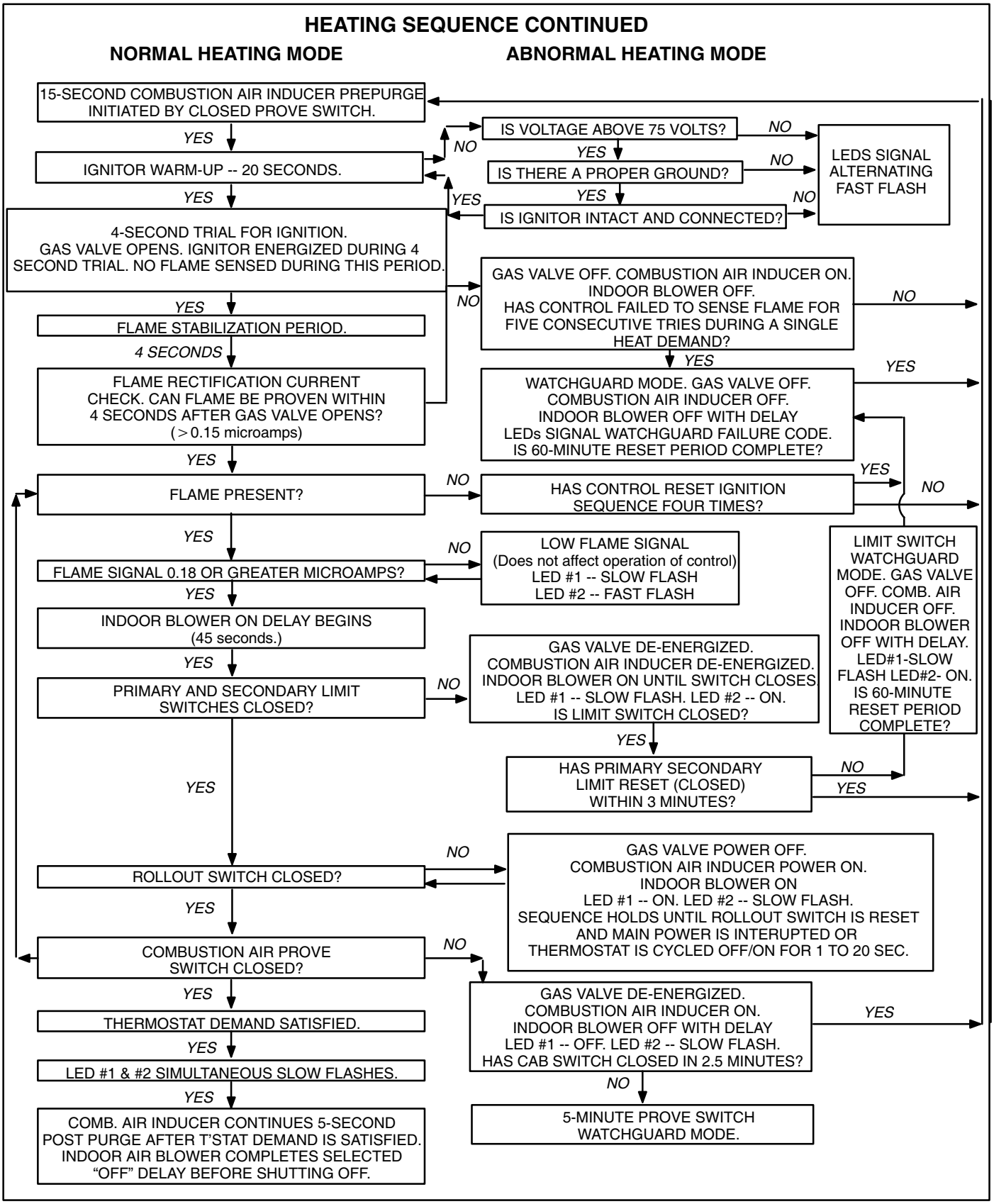
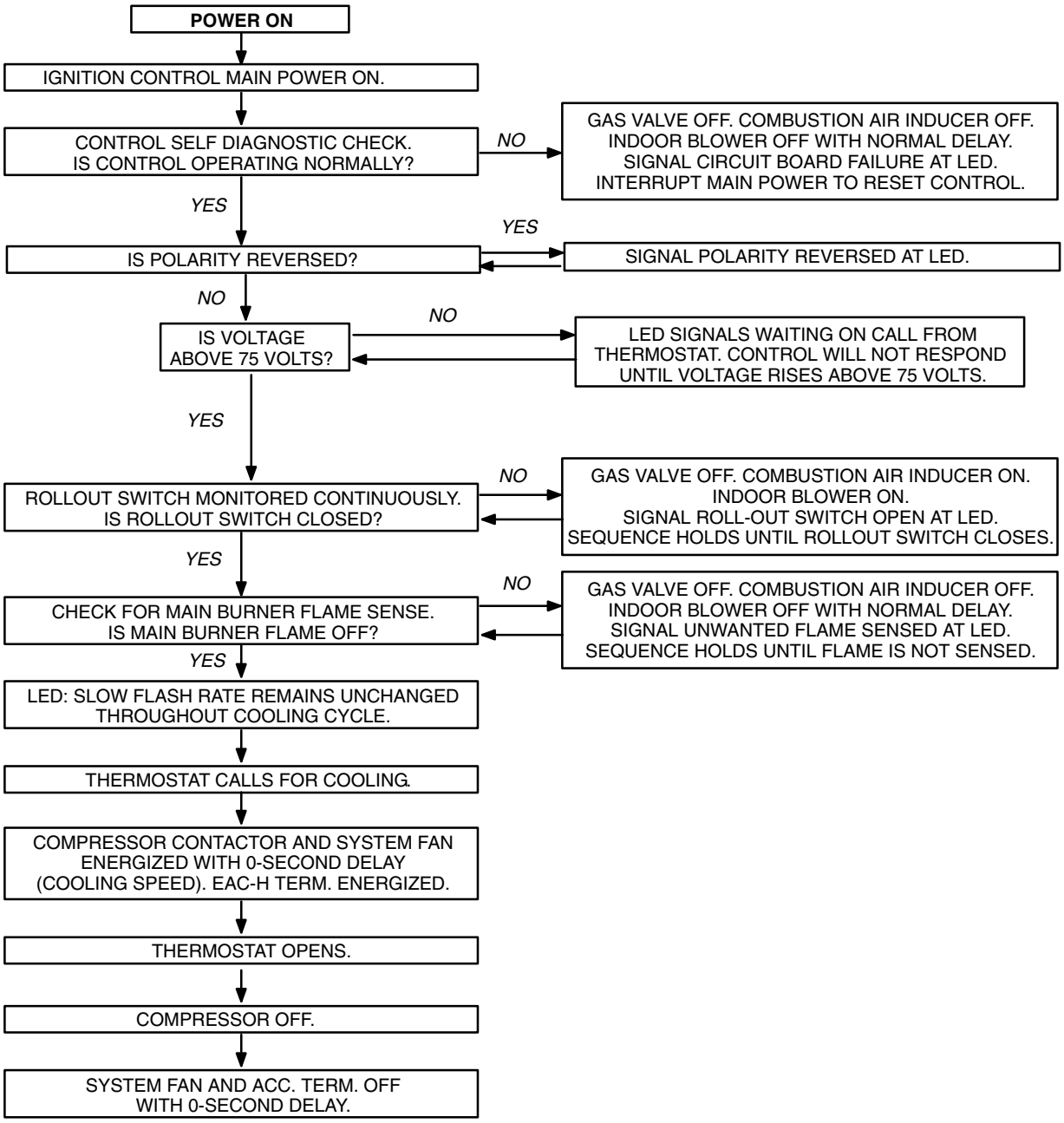
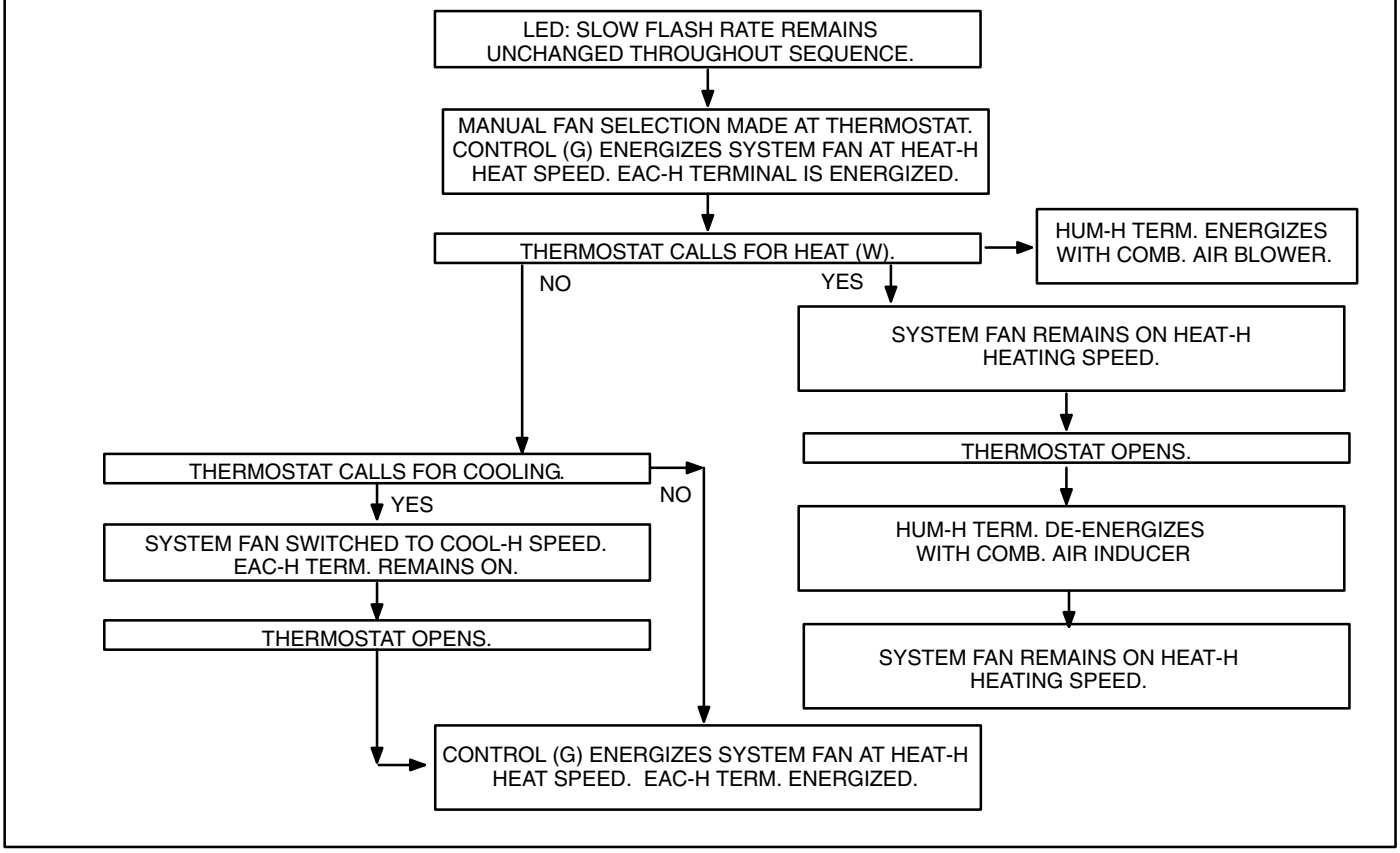
HEATING SEQUENCE CONTINUED



COOLING SEQUENCE OF OPERATION



SURELIGHT CONTROL
CONTINUOUS HEAT SPEED FAN SEQUENCE OF OPERATION



VIII-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 12 pin connector failure	**ACTION 1 -** Check 12-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 4-Pin connector is improperly attached to the circuit board.	**ACTION 1 -** Check 4-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 or 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 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 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.