

TECHNICAL GUIDE

MODELS: GF9

GAS-FIRED CONDENSING / HIGH EFFICIENCY DOWNFLOW/HORIZONTAL FURNACES

91% AFUE

NATURAL GAS
60 - 120 MBH INPUT



This product was manufactured in a plant whose quality system is certified/registered as being in conformity with ISO 9001.

DESCRIPTION

These Category IV, highly efficient, compact, condensing type furnaces are designed for residential and commercial installations in a basement, closet, alcove, recreation room or garage where the ambient temperature is above 32°F, or higher. They may be either side wall or thru-roof vented using approved plastic type combustion air and vent piping. All units are factory assembled, wired and tested to assure dependable and economical installation and operation.

WARRANTY

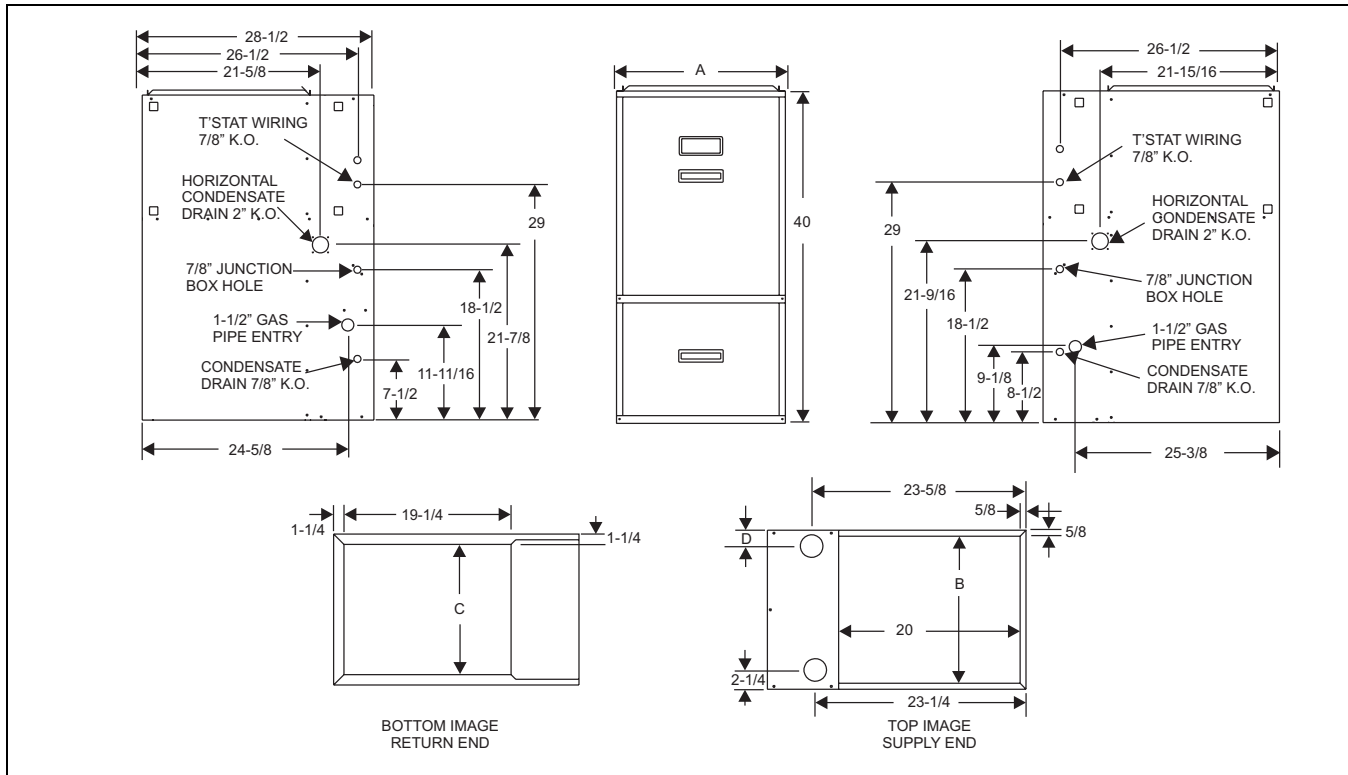
20- year limited warranty on the heat exchanger.

10-year warranty on the heat exchanger in commercial applications.

5-year limited parts warranty.

FEATURES

- Compact, easy to install, ideal height 40" cabinet
- Blower-off delay for cooling SEER improvement.
- Easy to connect power/control wiring.
- Built-in, high level self diagnostics with fault code display.
- Low unit amp requirement for easy replacement application.
- Integrated control module for reliable, economical operation.
- May be installed as either two-pipe (sealed combustion) or single pipe vent (using indoor combustion air)
- Top intake & vent connection allows downflow installation in narrow locations.
- Electronic Hot Surface Ignition saves fuel cost with increased dependability and reliability.
- Induced combustion system with inshot main burners for quiet, efficient operation.
- No special vent termination kit required.
- 100% shut off main gas valve for extra safety.
- PSC -four speed, direct drive motor with large, quiet blower.
- 24V, 40 VA control transformer and blower relay supplied for add-on cooling.
- Hi-tech tubular aluminized steel primary heat exchanger.
- Secondary (condensing) heat exchanger of 29-4C high-grade stainless steel.
- Timed on, adjustable off blower capability for maximum comfort.
- Easy toolist access from front of unit for cleaning, maintenance or service.
- Protection from intake, exhaust or condensate blockage.



BTUH (kW) Input/Output	CFM	Cabinet Size	Cabinet Dimension							
			A (in.)	A (cm)	B (in.)	B (cm)	C (in.)	C (cm)	D (in.)	D (cm)
60/55 (17.57/16.10)	1200 (33.98)	B	17-1/2	44.4	16-1/4	41.3	15-1/8	38.4	1-3/4	4.44
80/75 (23.42/21.96)	1200 (33.98)	B	17-1/2	44.4	16-1/4	41.3	15-1/8	38.4	1-3/4	4.44
80/75 (23.42/21.96)	1600 (45.31)	C	21	53.3	19-3/4	50.2	18-1/2	47.0	2-1/8	5.40
100/95 (29.28/27.82)	1600 (45.31)	C	21	53.3	19-3/4	50.2	18-1/2	47.0	2-1/8	5.40
100/95 (29.28/27.82)	2000 (56.63)	C	21	53.3	19-3/4	50.2	18-1/2	47.0	2-1/8	5.40
120/112 (35.14/32.80)	2000 (56.63)	D	24-1/2	62.2	23-1/4	59.1	21-7/8	55.6	2-1/2	6.35

COMBUSTION AIR SUPPLY AND VENT PIPING

MAXIMUM ELBOWS AND VENT LENGTHS										
Models Input BTUH (kW)	Pipe Size Inches (mm)	Maximum Number of Elbows*								Minimum Length
		1	2	3	4	5	6	7	8	
60,000 (17.6)	1-1/2 (38)	15	10	N/A	N/A	N/A	N/A	N/A	N/A	1.5
60,000 (17.6)	2 (51)	60	55	50	45	40	35	25	15	1.5
60,000 (17.6)	3 (76)	85	80	75	70	65	60	50	40	10
80,000 (23.4)/1200	2 (51)	60	55	50	45	40	35	25	15	1.5
80,000 (23.4)/1200	3 (76)	85	80	75	70	65	60	50	40	10
80,000 (23.4)/1600	2 (51)	25	20	15	10	N/A	N/A	N/A	N/A	1.5
80,000 (23.4)/1600	3 (76)	85	80	75	70	65	60	50	40	10
100,000 (29.3)	2 (51)	25	20	15	10	N/A	N/A	N/A	N/A	1.5
100,000 (29.3)	3 (76)	80	75	70	65	60	55	45	35	1.5
120,000 (35.1)	3 (76)	55	50	45	40	35	25	15	N/A	1.5

Three elbows (two in vent pipe and one in the air intake pipe) are already accounted for and need not be included in the elbow count from the Table above.

HIGH ALTITUDE PRESSURE SWITCH APPLICATION

Input (MBH) Upflow Models	Output (MBH)	4,500 To 10,000 Ft.
60/1200	55	1PS0901
80/1200	74	1PS0902
80/1600	74	1PS0903
100/1600	93	1PS0901
100/2000	93	1PS0901
120/2000	112	1PS0901

NOTE: For high altitude conversion, an orifice change may also be required. See Form 035-14460-001 for application information.

ELECTRICAL AND PERFORMANCE DATA

Input		Output		Nominal Airflow		Cabinet Width		AFUE	Air Temp. Rise	
MBH	kW	MBH	kW	CFM	m ³ /min	In.	mm	%	°F	°C
60	18	55	16.1	1200	34.0	17-1/2	444	91	40 - 70	22 - 39
80	23	74	21.7	1200	34.0	17-1/2	444	91	35 - 65	19 - 36
80	23	74	21.7	1600	45.3	21	533	91	40 - 70	22 - 39
100	29	93	27.3	1600	45.3	21	533	91	35 - 65	19 - 36
100	29	93	27.3	2000	56.6	21	533	91	35 - 65	19 - 36
120	35	112	32.8	2000	56.6	24-1/2	622	91	35 - 65	19 - 36

Input		Max. Outlet Air Temp.		Blower		Blower Size		Total Unit	Max. Over-current Protect	Min. Wire Size (awg) @ 75 ft. One Way
MBH	kW	°F	°C	HP	Amps	In.	mm	Amps		
60	18	170	76.7	1/2	7.0	11 x 8	279 x 203	9	20	14
80	23	170	76.7	1/2	7.0	11 x 8	279 x 203	9	20	14
80	23	170	76.7	3/4	10.2	11 x 10	279 x 254	12	20	14
100	29	175	79.4	3/4	10.2	11 x 10	254 x 254	12	20	14
100	29	175	79.4	1	12.7	11 x 11	279 x 279	14	20	12
120	35	175	76.7	1	12.7	11 x 11	279 x 279	14	20	12

* Wire size and overcurrent protection must comply with the National Electric Code.

NOTES:

1. For altitudes above 2000 ft. reduce capacity 4% for each 1000 ft. above sea level.
2. Wire size based on copper conductors, 60°C, 3% voltage drop.
3. Continuous return air temperature must not be below 55°F.

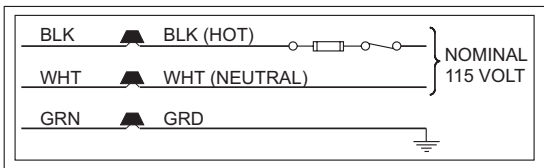
MODEL NUMBER	FILTER SIZE	ADD-ON COOLING		APPROX. OPER. WEIGHT
		TONS	CFM* @ .5 ESP	
GF9S060B12DH11	(2) 14 x 20	1-1/2, 2, 2-1/2, 3	1550	130
GF9S080B12DH11		2, 2-1/2, 3	1530	145
GF9S080C16DH11		3, 3-1/2, 4	1860	155
GF9S100C16DH11		3, 3-1/2, 4	1830	170
GF9S100C20DH11		3-1/2, 4, 5	2000	175
GF9S120D20DH11		3-1/2, 4, 5	2100	180

* ESP (External Static Pressure) .5" WG is at furnace outlet ahead of cooling coil.

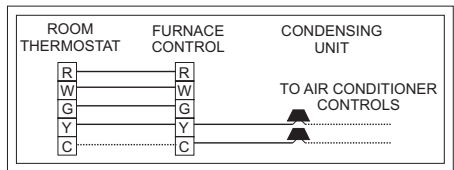
NOTES:

1. All filters must be high velocity cleanable type.

FIELD WIRING DIAGRAMS



POWER WIRING



BLOWER PERFORMANCE CFM

AIRFLOW WITH TOP RETURN																					
MODELS	Speed Tap	EXTERNAL STATIC PRESSURE, INCHES W.C. (kPa)																			
		0.1 (0.025)		0.2 (0.050)		0.3 (0.075)		0.4 (0.099)		0.5 (0.124)		0.6 (0.149)		0.7 (0.174)		0.8 (0.199)		0.9 (0.224)		1.0 (0.249)	
		CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min	CFM	m ³ /min
60/55/ 1200/B	High	1687	48	1652	47	1631	46	1595	45	1557	44	1511	43	1456	41	1382	39	1313	37	1211	34
	Medium High	1193	34	1183	33	1173	33	1162	33	1142	32	1115	32	1076	30	1036	29	982	28	950	27
	Medium Low	933	26	933	26	921	26	911	26	902	26	872	25	825	23	793	22	771	22	712	20
	Low	752	21	745	21	731	21	718	20	698	20	652	18	602	17	580	16	536	15	496	14
80/75/ 1200/B	High	1686	48	1658	47	1623	46	1572	44	1534	43	1465	41	1391	39	1305	37	1202	34	1091	31
	Medium High	1257	36	1223	35	1218	34	1203	34	1177	33	1142	32	1094	31	1026	29	939	27	874	25
	Medium Low	977	28	982	28	976	28	955	27	934	26	899	25	843	24	791	22	738	21	686	19
	Low	775	22	777	22	757	21	733	21	698	20	663	19	627	18	584	17	549	16	490	14
80/75/ 1600/C	High	2071	59	2026	57	1981	56	1935	55	1864	53	1796	51	1713	48	1625	46	1532	43	1401	40
	Medium High	1583	45	1590	45	1569	44	1554	44	1532	43	1502	43	1457	41	1409	40	1327	38	1221	35
	Medium Low	1256	36	1275	36	1275	36	1288	36	1275	36	1265	36	1232	35	1187	34	1126	32	1023	29
	Low	937	27	939	27	936	26	945	27	942	27	936	26	912	26	874	25	810	23	726	21
100/95/ 1600/C	High	1996	56	1961	56	1938	55	1896	54	1836	52	1779	50	1707	48	1625	46	1531	43	1399	40
	Medium High	1449	41	1480	42	1495	42	1488	42	1488	42	1449	41	1417	40	1368	39	1299	37	1208	34
	Medium Low	1167	33	1192	34	1192	34	1187	34	1202	34	1192	34	1182	33	1140	32	1097	31	1018	29
	Low	932	26	900	25	871	25	840	24	805	23	761	22	710	20	663	19	641	18	623	18
100/95/ 2000/C	High	2404	68	2320	66	2225	63	2138	61	2034	58	1924	54	1816	51	1692	48	1559	44	1422	40
	Medium High	2018	57	1955	55	1883	53	1815	51	1750	50	1670	47	1586	45	1497	42	1394	39	1246	35
	Medium Low	1626	46	1581	45	1531	43	1488	42	1418	40	1363	39	1291	37	1225	35	1123	32	964	27
	Low	1336	38	1291	37	1249	35	1205	34	1155	33	1091	31	1018	29	951	27	884	25	759	21
120/112/ 2000/D	High	2520	71	2432	69	2353	67	2251	64	2152	61	2042	58	1947	55	1815	51	1701	48	1525	43
	Medium High	2018	57	1979	56	1945	55	1911	54	1863	53	1779	50	1705	48	1599	45	1493	42	1353	38
	Medium Low	1586	45	1545	44	1501	42	1457	41	1407	40	1351	38	1287	36	1216	34	1081	31	926	26
	Low	1321	37	1266	36	1213	34	1163	33	1111	31	1071	30	987	28	864	24	763	22	700	20

1. Airflow expressed in standard cubic feet per minute (CFM) and in cubic meters per minute (m³/min).
2. Motor voltage at 115 V.

FILTER PERFORMANCE

The airflow capacity data published in the “Blower Performance” table listed above represents blower performance WITHOUT filters. To determine the approximate blower performance of the system, apply the filter drop value for the filter being used or select an appropriate value from the “Filter Performance” table shown.

NOTE: The filter pressure drop values in the “Filter Performance” table shown are typical values for the type of filter listed and should only be used as a guideline. Actual pressure drop ratings for each filter type vary between filter manufacturer.

FILTER PERFORMANCE - PRESSURE DROP INCHES W.C. AND (KPA)

AIRFLOW RANGE		MINIMUM OPENING SIZE		FILTER TYPE					
				DISPOSABLE		COARSE FIBER WASHABLE*		PLEATED	
CFM	m ³ /m	in ²	cm ²	In W.C.	kPA	In W.C.	kPA	In W.C..	kPA
0 - 750	0 - 21.4	230	584.2	0.01	0.00249	0.01	0.00249	0.15	0.03736
751 - 1000	21.25 - 28.32	330	838.2	0.05	0.01245	0.05	0.01245	0.20	0.04982
1001 - 1250	28.33 - 35.40	330	838.2	0.10	0.02491	0.10	0.02491	0.20	0.04982
1251 - 1500	35.41 - 42.48	330	838.2	0.10	0.02491	0.10	0.02491	0.25	0.06227
1501 - 1750	42.49 - 49.55	380	965.2	0.15	0.03736	0.14	0.03487	0.30	0.07473
1751 - 2000	49.56 - 56.63	380	965.2	0.19	0.04733	0.18	0.04484	0.30	0.07473
2001 & Above	56.64 - Above	463	1176.0	0.19	0.04733	0.18	0.04484	0.30	0.07473

*. Coarse Fiber Filters are the type supplied with furnace (if supplied).

APPLYING FILTER PRESSURE DROP TO DETERMINE SYSTEM AIRFLOW

To determine the approximate airflow of the unit with a filter in place, follow the steps below:

1. Select the filter type.
2. Determine the External System Static Pressure (ESP) without the filter.
3. Select a filter pressure drop from the table based upon the number of return air openings or return air opening size and add to the ESP from Step 3 to determine the total system static.
4. If total system static matches a ESP value in the airflow table (i.e. 0.20, 0.60, etc.) the system airflow corresponds to the intersection of the ESP column and Model/Blower Speed row.
5. If the total system static falls between ESP values in the table (i.e. 0.58, 0.75, etc.), the static pressure may be rounded to the nearest value in the table determining the airflow using Step 5 or calculate the airflow by using the following example.

Example: For a 130,000 Btuh furnace operating on high speed blower, it is found that total system static is 0.58" w.c. To determine the system airflow, complete the following steps:

1. Obtain the airflow values at 0.50" & 0.60" ESP.
Airflow @ 0.50": 2125 CFM
Airflow @ 0.60": 2035 CFM
2. Subtract the airflow @ 0.50" from the airflow @ 0.60" to obtain airflow difference.
 $2035 - 2125 = -90$ CFM
3. Subtract the total system static from 0.50" and divide this difference by the difference in ESP values in the table, 0.60" - 0.50", to obtain a percentage.
 $(0.58 - 0.50) / (0.60 - 0.50) = 0.8$
4. Multiply percentage by airflow difference to obtain airflow reduction.
 $(0.8) \times (-90) = -72$
5. Subtract airflow reduction value to airflow @ 0.50" to obtain actual airflow @ 0.58" ESP.
 $2125 - 72 = 2053$

UNIT CLEARANCES TO COMBUSTIBLES

APPLICATION	TOP	FRONT	REAR	LEFT SIDE	RIGHT SIDE	FLUE	FLOOR/BOTTOM	CLOSET	ALCOVE	ATTIC	LINE CONTACT
DOWNFLOW	1	3	0	0	0	0	1"	YES	YES	YES	NO
HORIZONTAL	0	3	0	1	1	0	COMBUSTIBLE	NO	YES	YES	YES†

*. Special floor base or air conditioning coil required for use on combustible floor.

†. Line contact only permitted between lines formed by the intersection of the rear panel and side panel (top in horizontal position) of the furnace jacket and building joists, studs or framing.

ACCESSORIES

PROPANE (LP) CONVERSION KIT -

1NP0347 - All units

This accessory conversion kit may be used to convert natural gas (N) units for propane (LP) operation. Conversions must be made by qualified distributor or dealer personnel.

CONCENTRIC VENT TERMINATION -

1CT0302 (2")

1CT0303 (3")

For use through rooftop, sidewall. Allows combustion air to enter and exhaust to exit through single common hole. Eliminates unsightly elbows for a cleaner installation.

COIL TRANSITION KIT -

1TK0917 - 17" Furnace

1TK0921 - 21" Furnace

1TK0924 - 24" Furnace

Required in downflow applications when using G*FD series coils.

CONDENSATE NEUTRALIZER KIT - 1NK0301

Neutralizer cartridge has a 1/2" plastic tube fittings for installation in the drain line. Calcium carbonate refill media is also available from the Source 1 Parts (p/n 026-30228-000).

HIGH ALTITUDE PRESSURE SWITCHES -

Used to convert units for operation at altitudes from 4,500 ft. to 10,000 ft. Refer to table on page 3 for proper pressure switch application. For Application See 035-14447-000.

FIELD INSTALLED ACCESSORIES - ELECTRICAL	
MODEL NO.	DESCRIPTION
2TB17700424	SUBBASE (24V) - One-stage heat/cool. Manual changeover, integral subbase. System Switch: Cool-Off-Heat. Fan Switch: Auto-On.
6ET03700324	THERMOSTAT- Electronic Non-Programmable. One Heat/One Cool. Manual Changeover, Integral Sub-base. System Switch: Cool-Off-Heat, Fan Switc: Auto-On.
6ET03701024	THERMOSTAT- Electronic 7 Day Programmable. One Heat/One Cool. Auto Changeover, Integral Sub-base. System Switch: Cool-Off-Heat, Fan Switc: Auto-On. Power Stealing.
6ET03700024	(TS) THERMOSTAT- Electronic 7 Day Programmable. Two Heat/Two Cool. Auto Changeover, Integral Sub-base. System Switch: Cool-Off-Heat. Fan Switch: Auto-On.
6TH13701024	THERMOSTAT- Electronic 7 Day Programmable. Heating Only, One-stage Heat, No Fan Switch. Horizontal, Mercury Bulb

NOTES

