TECHNICAL GUIDE

MODELS: GF9

GAS-FIRED
CONDENSING / HIGH EFFICIENCY
UPFLOW FURNACES

92% AFUE

NATURAL GAS
60 - 120 MBH OUTPUT

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 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.
- Solid removable bottom panel allows easy application.
- Easy access from front of unit for cleaning, maintenance or service.
- Protection from intake, exhaust or condensate blockage.
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- Side return filter rack provided for field installation

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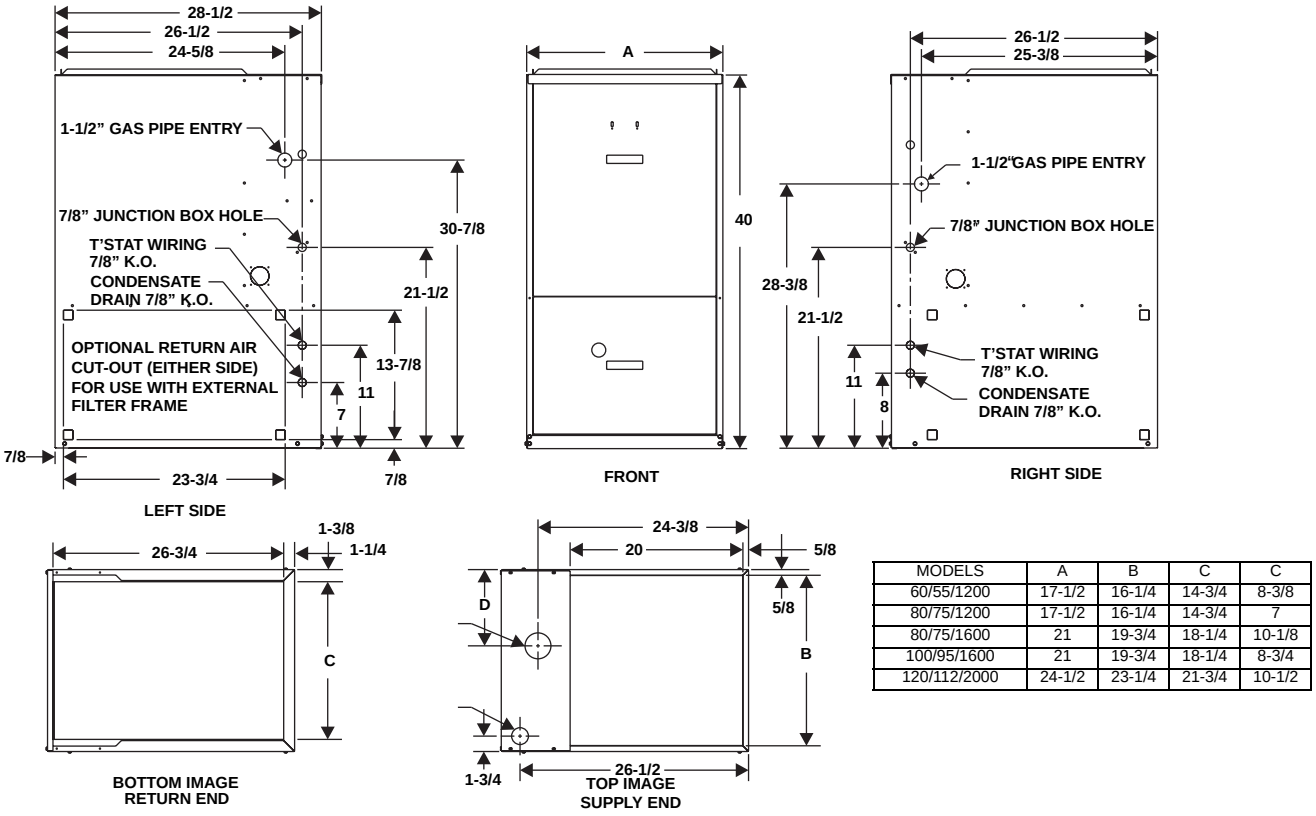


MODELS	A	B	C	C
60/55/1200	17-1/2	16-1/4	14-3/4	8-3/8
80/75/1200	17-1/2	16-1/4	14-3/4	7
80/75/1600	21	19-3/4	18-1/4	10-1/8
100/95/1600	21	19-3/4	18-1/4	8-3/4
120/112/2000	24-1/2	23-1/4	21-3/4	10-1/2

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)	30	25	20	10	N/A	N/A	N/A	N/A	5
60,000 (17.6)	2 (51)	60	55	50	45	40	30	20	10	5
60,000 (17.6)	3 (76)	85	80	75	70	65	60	50	40	20
80,000 (23.4)	1-1/2 (38)	20	15	N/A	N/A	N/A	N/A	N/A	N/A	5
80,000 (23.4)	2 (51)	60	55	50	45	40	30	20	10	5
80,000 (23.4)	3 (76)	85	80	75	70	65	60	50	40	20
100,000 (29.3)	2 (51)	25	20	15	N/A	N/A	N/A	N/A	N/A	5
100,000 (29.3)	3 (76)	85	80	75	70	65	60	50	40	20
120,000 (35.1)	3 (76)	75	70	65	60	55	45	35	25	5

HIGH ALTITUDE PRESSURE SWITCH APPLICATION

Input (MBH)	Output (MBH)	2,000 Ft to 6,000 Ft.	> 6,000 To 10,000 Ft.
Upflow Models			
60	55	1PS0309	1PS0309
80/1200	75	1PS0309	1PS0309
80/1600	75	1PS0309	1PS0309
100	95	1PS0307	1PS0307
120	111	1PS0309	1PS0309

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	92.2	40 - 70	22 - 39
80	23	74	21.7	1200	34.0	17-1/2	444	92	45 - 75	25 - 42
80	23	76	22.3	1600	45.3	21	533	94.3	45 - 75	25 - 42
100	29	93	27.3	1600	45.3	21	533	92.2	45 - 75	25 - 42
120	35	112	32.8	2000	56.6	24-1/2	622	92	40 - 70	22 - 39

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	175	79.4	1/2	7.0	11 x 8	279 x 203	9	20	14
80	23	175	79.4	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
120	35	170	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.

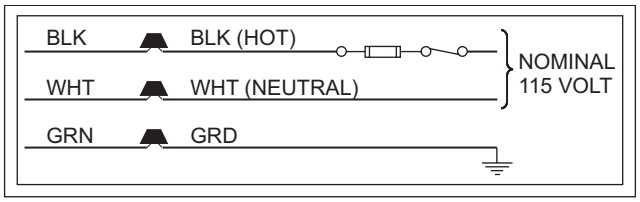
MODEL NUMBER	FILTER SIZE		ADD-ON COOLING		APPROX. OPER. WEIGHT
	SIDE	BOTTOM	TONS	CFM* @ .5 ESP	
GF9S060B12UP11	16 x 25	16 x 25	1-1/2, 2, 2-1/2, 3	1465	130
GF9S080B12UP11	16 x 25	16 x 25	1-1/2, 2, 2-1/2, 3	1465	145
GF9S080C16UP11	16 x 25	20 x 25	2-1/2, 3, 3-1/2, 4	1830	155
GF9S100C16UP11	16 x 25	20 x 25	2-1/2, 3, 3-1/2, 4	1830	170
GF9S120D20UP11	(2) 16 x 25	22 x 25	3, 3-1/2, 4, 5	2220	180

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

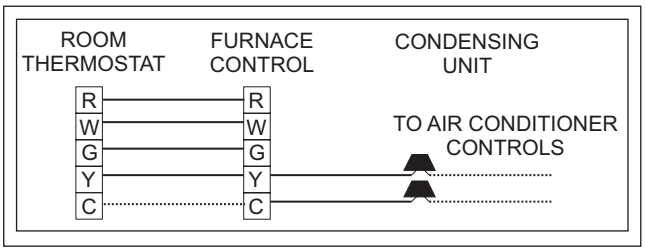
NOTES:

1. All filters must be high velocity cleanable type.
2. Air flows above 1800 CFM require either return from two sides or one side plus bottom.

FIELD WIRING DIAGRAMS



POWER WIRING



BLOWER PERFORMANCE CFM

AIRFLOW WITH BOTTOM OR ONE SIDE RETURN																					
MODELS	Speed Tap	EXTERNAL STATIC PRESSURE, INCHES W.C. (kPa)																			
Input/ Airflow/cabinet		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
80/1200/B 60/1200/B	HIGH	1650	47	1605	45	1570	44	1525	43	1465	41	1410	40	1350	38	1275	36	1170	33	1060	30
	M-HI	1165	33	1185	34	1175	33	1165	33	1150	33	1140	32	1100	31	1050	30	970	27	875	25
	M-LO	895	25	915	26	935	26	940	27	940	27	920	26	905	26	860	24	815	23	750	21
	LOW	710	20	725	21	725	21	725	21	720	20	700	20	685	19	660	19	625	18	560	16
100/1600/C 80/1600/C	HIGH	1960	56	1955	55	1925	55	1890	54	1830	52	1765	50	1695	48	1615	46	1600	45	1485	42
	M-HI	1565	44	1560	44	1560	44	1575	45	1545	44	1530	43	1475	42	1425	40	1365	39	1260	36
	M-LO	1230	35	1275	36	1285	36	1300	37	1310	37	1300	37	1280	36	1245	35	1190	34	1070	30
	LOW	930	26	945	27	965	27	975	28	975	28	975	28	975	28	950	27	910	26	850	24
120/2000/D	HIGH	2560	72	2485	70	2410	68	2320	66	2220	63	2135	60	2035	58	1920	54	1785	51	1650	47
	M-HI	2090	59	2050	58	1990	56	1970	56	1885	53	1820	52	1760	50	1675	47	1545	44	1405	40
	M-LO	1695	48	1675	47	1665	47	1615	46	1565	44	1510	43	1460	41	1385	39	1285	36	1140	32
	LOW	1175	33	1150	33	1135	32	1110	31	1085	31	1055	30	1005	28	980	28	970	27	845	24
AIRFLOW WITH TWO SIDE RETURNS OR WITH BOTTOM AND ONE SIDE RETURN																					
MODELS	Speed Tap	EXTERNAL STATIC PRESSURE, INCHES W.C. (kPa)																			
Input/ Airflow/cabinet		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
120/2000/D	HIGH	2615	74	2535	72	2450	69	2385	68	2285	65	2175	62	2075	59	1945	55	1825	52	1670	47
	M-HI	2055	58	2045	58	2015	57	1985	56	1932	55	1855	53	1785	51	1730	49	1605	45	1470	42
	M-LO	1690	48	1650	47	1620	46	1600	45	1570	44	1525	43	1470	42	1395	40	1300	37	1200	34
	LOW	1345	38	1335	38	1335	38	1285	36	1250	35	1230	35	1180	33	1115	32	1010	29	850	24

1. Airflow expressed in standard cubic feet per minute (CFM) and in cubic meters per minute (m^3/min).
2. Return air is through side opposite motor (left side).
3. Airflows above 1800 CFM (50.97 m^3/min) require either return from two sides or one side plus bottom.
4. 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 below.

NOTE: The filter pressure drop values in the “Filter Performance” table shown below 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				HOGS HAIR*				PLEATED			
	1 Opening		2 Openings		1 Opening		2 Opening		1 Opening		2 Opening		1 Opening		2 Opening	
	Sq. in.	m^2	Sq. in.	m^2	In w.c.	Pa	In w.c.	Pa	In w.c.	Pa	In w.c.	Pa	In w.c.	Pa	In w.c.	Pa
0 - 750	230	.15			0.01	2.5			0.01	2.5			0.15	37		
751 - 1000	330	.21			0.04	10			0.03	7.5			0.20	50		
1001 - 1250	330	.21			0.08	20			0.07	17			0.20	50		
1251 - 1500	330	.21			0.08	20			0.07	17			0.25	62		
1501 - 1750	380	.25	658	.42	0.14	35	0.08	20	0.13	32	0.06	15	0.30	75	0.17	42
1751 - 2000	380	.25	658	.42	0.17	42	0.09	22	0.15	37	0.07	17	0.30	75	0.17	42
2001 & Above	463	.30	658	.42	0.17	42	0.09	22	0.15	37	0.07	17	0.30	75	0.17	42

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. Select the number of return air openings or calculate the return opening size in square inches to determine the proper filter pressure drop.
3. Determine the External System Static Pressure (ESP) without the filter.
4. 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.
5. 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.
6. 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 with 2 return openings and 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) x (-90) = -72

5. Subract airflow reduction value to airflow @ 0.50" to obtain actual airflow @ 0.58" ESP.

   2125 - 72 = 2053

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.

CONDENSATE NEUTRALIZER KIT - 1NK0301
Neutralizer cartidge has a 1/2" plastic tube fittings for installation in the drain line. Calcium carbonate refill media is also avaiable from the Source 1 Parts (p/n 026-30228-000).

EXTERNAL BOTTOM RACK W/FILTER -
Provides a cleanable, high velocity type filter and rack. Attaches to the bottom of the furnace.

1BR0317 - For 17-1/2" cabinets

1BR0321 - For 21" cabinets

1BR0324 - For 24-1/2" cabinets

EXTERNAL SIDE RETURN FILTER RACK -

1SF0101 - Fits all cabinet sizes

Attaches to side of furnace cabinet in side return applications. Holds any 16x25x1 permanent or disposable filter.

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 2 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 7 Day 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

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036-21547-001 Rev. A (0903)
Supersedes: Nothing

Unitary Products Group

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Norman OK 73069