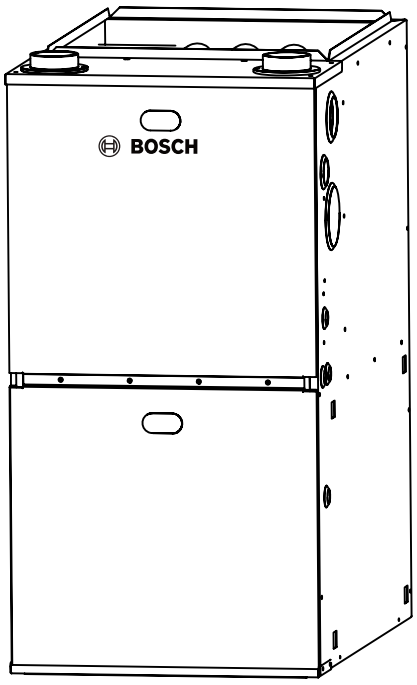
Bosch 96% AFUE Gas Furnace
BGH96 Model

Engineering Submittal Sheet

BOSCH

Overview and Certifications



AHRI CERTIFIED® www.ahridirectory.org
Residential Furnaces DOE 10 CFR Part 430

ETL LISTED c US
Intertek
3124627

ENERGY STAR

Product Features

Standard Features

- Up to 96% AFUE heating efficiency, ENERGY STAR rated
- 5-year parts limited warranty, 20 year heat exchanger limited warranty
- Reliable, proven two-stage design
- Compatibility with the Bosch Connected Control BCC100 Thermostat
- 3-way multipoise design allows for flexibility in multiple types of installations
- Field convertible gas type for hassle-free installation, all furnaces come standard with a natural gas to propane gas conversion kit
- Multi-speed ECM motors for all models for quiet and efficient operation
- Hot-surface ignition for dependable operation
- Durable aluminized steel tubular heat exchanger and stainless-steel (AL 29-4C alloy) secondary heat exchanger
- Pairs with Bosch IDS heat pump, reaching up to 18.5 SEER2, meeting heat pump ENERGY STAR requirements for some combinations
- LED fault diagnostics for quick and easy service calls

This product is not to be sold or installed in the State of California in the South Coast Air Quality Management District or San Joaquin Valley Air Basin territory.

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Product Features continued..

Cabinet Features

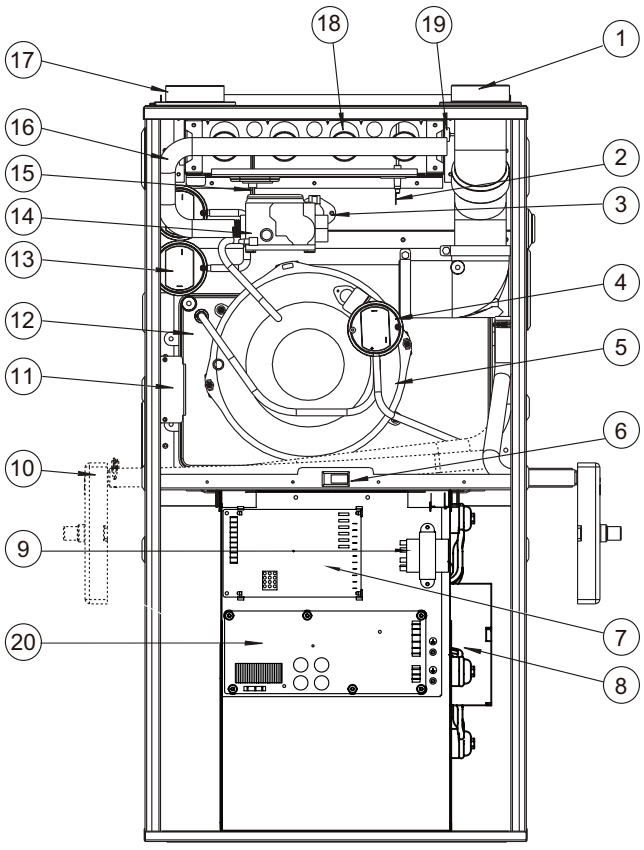
- Low profile (33.75”) cabinet can fit in tight spaces.
- Convenient left or right-hand connection for gas and electric service.
- Anti-rust: Painted, galvanized, 21 gauge steel cabinet, passes a 500 hours salt spray test
- Low noise: Fully insulated (fiberglass insulation) design helps minimize indoor noise levels
- 3-way multipoise design allows for flexibility in multiple types of installations
  - Upflow (side or bottom return)
  - Horizontal

Warranty*

All models installed in one or two family residential dwellings come standard with a 5 year limited warranty on parts and a 20 year limited warranty on primary & secondary heat exchangers. With registration of the product on bosch-climate.us, the 5 year limited warranty on parts shall be upgraded to 10 years, and the 20 year limited warranty on primary & secondary heat exchangers shall be upgraded to lifetime. Furnaces installed in applications other than one or two family residential dwellings will qualify for a 1 year limited warranty on parts and a 10 year limited warranty on the heat exchanger.

* For complete Warranty details please see: https://www.bosch-climate.us/support-center/product-warranty-library/gas-furnace-warranty.html

Key Components



COMPONENT IDENTIFICATION:

1. Outlet Flue Vent
2. Flame Sensor
3. Primary Limit Switch
4. Condensate Overflow Switch
5. Inducer
6. Door Switch
7. Integrated Control Module
8. Blower
9. Transformer
10. Condensate Trap
11. Juction Box
12. Condensate Collector
13. Pressure Switch
14. Two-Stage Gas Valve
15. Hot Surface Ignitor
16. Gas Manifold
17. Air Inlet
18. Burner
19. Rollout Limit Switch
20. Blower Contol Module

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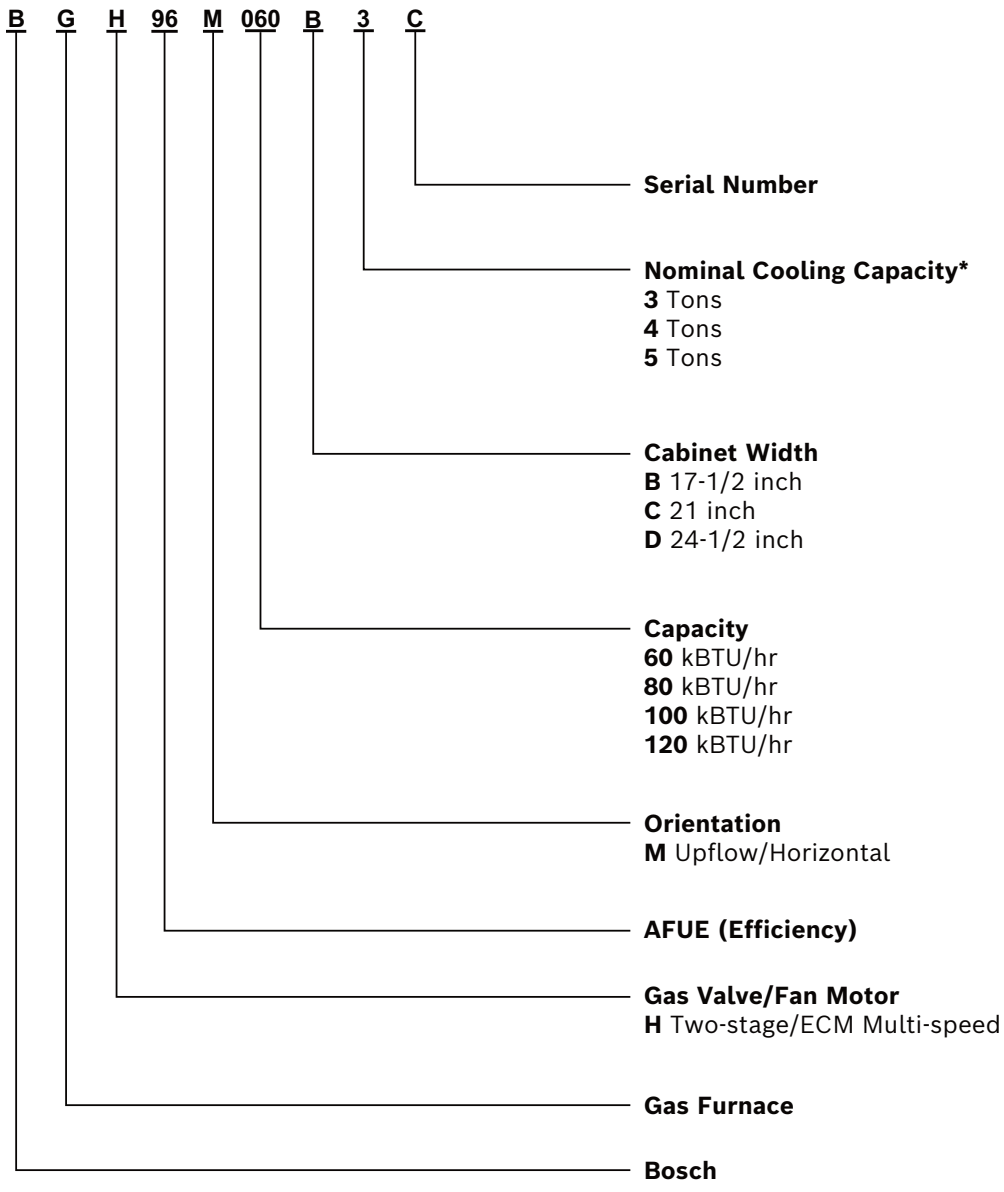
Model Nomenclature



* Nominal 350-400 CFM per 12,000 BTU/hr

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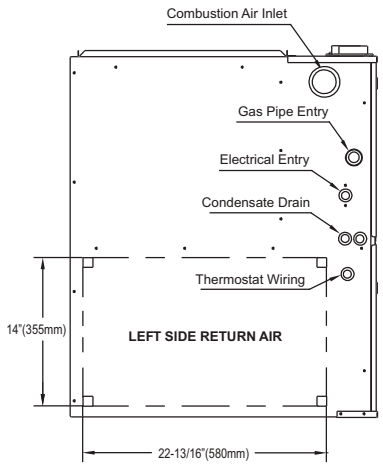
Dimensions and Connections



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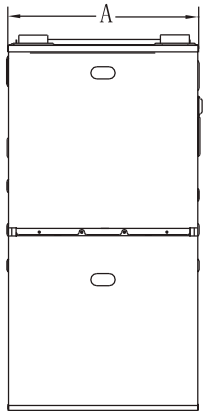
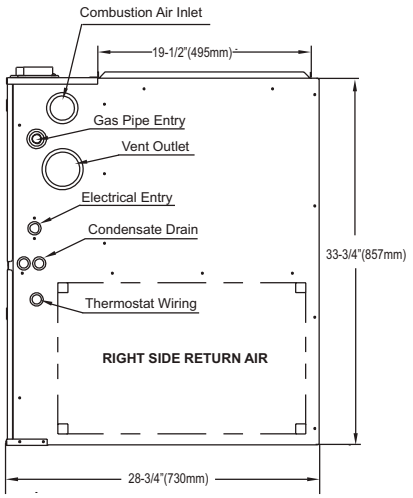


(Front)



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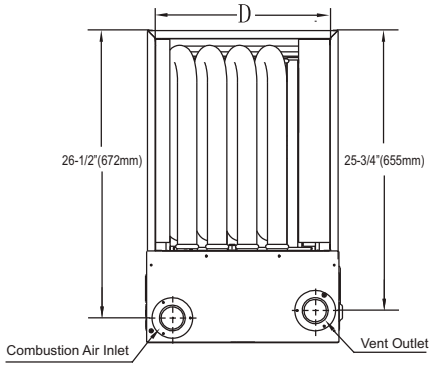
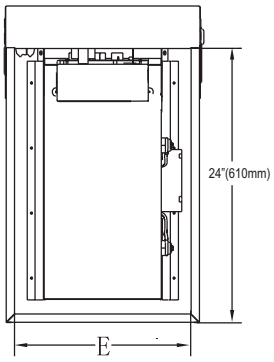


(Top)



(Bottom with panel removed)

Furnace Model	"A" Cabinet Width In. (mm)	"D" Supply- Air Width In. (mm)	"E" Return- Air Width In. (mm)	Shipping Weight lbs (kgs)
BGH96M060B3C	17.5 (445)	16 (407)	15-57/32 (427)	147.5 (66.9)
BGH96M080B3C	17.5 (445)	16 (407)	15-57/32 (427)	153 (69.4)
BGH96M080C4C	21 (534)	19.5 (496)	19-13/32 (493)	165 (74.8)
BGH96M100C5C	21 (534)	19.5 (496)	19-13/32 (493)	173 (78.5)
BGH96M100D5C	24.5 (623)	23 (585)	22-27/32 (581)	185 (83.9)
BGH96M120D5C	24.5 (623)	23 (585)	22-27/32 (581)	190 (86.1)

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Bosch 96% AFUE Gas Furnace
BGH96 Model

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Technical Specifications

Basic Product Information	Model			**BGH96M060B3C**	**BGH96M080B3C**	**BGH96M080C4C**	**BGH96M100C5C**	**BGH96M100D5C**	**BGH96M120D5C**
	Bosch Part Number			8733965433	8733965434	8733965435	8733965436	8733965437	8733965438
	Fuel Type			Natural Gas/ Propane Gas*	Natural Gas/ Propane Gas*	Natural Gas/ Propane Gas*	Natural Gas/ Propane Gas*	Natural Gas/ Propane Gas*	Natural Gas/ Propane Gas*
ENERGY STAR	ENERGY STAR Certified		Y/N	Y	Y	Y	Y	Y	Y
Gas Heating Performance	AFUE		%	96	96	96	96	96	96
	Input (High fire)	Natural Gas/Propane Gas (LP)	Btu/h	60000	80000	80000	100000	100000	120000
	Input (Low fire)	Natural Gas/Propane Gas (LP)	Btu/h	39000	52000	52000	70000	70000	84000
	Output (High fire)	Natural Gas/Propane Gas (LP)	Btu/h	57000	76000	76000	95000	95000	115000
	Output (Low fire)	Natural Gas/Propane Gas (LP)	Btu/h	37000	49000	49000	67000	67000	80500
	Air Temperature Rise		°F	30-60	35-65	35-65	35-65	35-65	40-70
	Design Max. Outlet Air Temperature		°F	160	165	165	165	165	170
Static Pressure	Certified EXT static pressure	Heating	in. WC	0.12	0.15	0.15	0.2	0.2	0.2
		Cooling	in. WC	0.5	0.5	0.5	0.5	0.5	0.5
Circulating Blower Data	Circulating Blower	Material	-	Metal					
		Type	-	ECM					
		Diameter blower wheel	Inch	12 3/8		12 6/8			
		Height blower wheel	Inch	8		11 1/4			
	Tons AC @ 0.5" ESP		tons	1.5/2/2.5/3	2.5/3/3.5/4	2.5/3/3.5/4	3.5/4/4.5/5	3.5/4/4.5/5	3.5/4/4.5/5
	Circuating Fan Motor	Motor Horsepower	HP	3/4			1		
	Air Flow (0.5 ESP in. WC)	High	CFM	1321	1214	1289	1774	1936	1916
	Air Flow (0.5 ESP in. WC)	Mid-High	CFM	1096	1037	1135	1514	1749	1760
	Air Flow (0.5 ESP in. WC)	Mid	CFM	865	855	896	1357	1528	1507
	Air Flow (0.5 ESP in. WC)	Mid-Low	CFM	740	728	813	1185	1381	1382
	Air Flow (0.5 ESP in. WC)	Low	CFM	552	568	615	1032	1174	1158
	Motor Speeds		# speeds	5**					
			settings	High/Mid-High/Mid/Mid-Low/Low					
			r/min	1050 (rated)					
Inducer Motor	Power Input	(High)	W	67±10%			64±10%		
	Power Input	(Low)	W	25±10%			39±10%		
Electrical Data	Power supply		V/Hz/PH	115V/60HZ/1PH					
	Max Overcurrent Protection (MOP***)		Amps	15			20		
	Blower motor full load (FLA)		Amps	8	8	7.8	11.5	10.5	10.5

* With factory supplied Natural Gas to LP Conversion Kit

** 5 selectable speeds via wiring, unit operates in two speeds in concert with HI/LOW fire operation

*** MOP refers to the maximum recommended fuse or breaker size.

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Technical Specifications Continued

Model				BGH96M060B3C	BGH96M080B3C	BGH96M080C4C	BGH96M100C5C	BGH96M100D5C	BGH96M120D5C
Combustion System Specifications	Max. Inlet Gas Press	Natural Gas	in. WC	10.5					
		Propane Gas (LP)	in. WC	13					
	Min. Inlet Gas Press	Natural Gas	in. WC	4.5					
		Propane Gas (LP)	in. WC	11					
	Natural Gas Manifold Pressure (High fire)		in. WC	3.5	3.6	3.6	3.6	3.6	3.6
	Natural Gas Manifold Pressure (Low fire)		in. WC	1.6	1.6	1.6	1.8	1.8	1.8
	Propane Gas Manifold Pressure (High fire)		in. WC	8.4	8.5	8.5	8.5	8.5	8.5
	Propane Gas Manifold Pressure (Low fire)		in. WC	3.7	3.7	3.7	4.3	4.3	4.3
	Natural Gas Factory Orifice (0-2000 feet)		#	45					
	Propane Gas (LP) Factory Orifice (0-2000 feet)*		#	55					
	Gas Connection Size		in. NPT	1/2					
	Igniton Device		-	Hot surface					
	Number of Burners		#	3	4	4	5	5	6
	Primary Heat Exchanger Diameter		Inch	1 6/8					
	Primary Heat Exchanger		# tubes	3	4	4	5	5	6
	Secondary Heat Exchanger Diameter		Inch	3/8					
	Secondary Heat Exchanger		# tubes	33	33	39	39	48	48
	Flue Vent Diameter		Inch	2“/3”	2“/3”	2“/3”	2“/3”	2“/3”	3”
Dip Switches	Heating Blower Control (Heating Off-Delay)		-	Adjustable: 90, 120, 150, 180 seconds					
	Cooling Blower Control (Cool Off-Delay)		-	Adjustable: 60, 90, 120, 150 seconds					
	Upstage W1 to W2 Delay		-	Adjustable: OFF, 10 minutes, AUTO, 20 minutes					
Cabinet Size	Cabinet Type		-	B	B	C	C	D	D
	Cabinet Size	Width	Inch	17.5	17.5	21	21	24.5	24.5
	Cabinet Size (DxH)	(DxH)	Inch	28-3/4 X 33-3/4					
Shipping Data	Packing Dimension (with pallet)	(WxDxH)	Inch	32×20×41	32×20×41	32×24×41	32×24×41	32×28×41	32×28×41
	Net Weight (unit only)		lbs	131	139	142	153.5	162	169
	Gross Weight (shipping weight with pallet & packaging)		lbs	162	168	186	191	204.0	210

*All Bosch 96% AFUE Gas Furnaces come standard with Natural Gas to LP Conversion Kits. These kits are only applicable for units installed at elevations between 0 and 2,000 feet.

For LP applications above 2000 ft elevation, the manifold and inlet gas pressure requirements remain the same as stated in this manual, the only change is to the orifices used. Refer Tables 14 & 15 in Section 9.2 of the Installation, Operation, and Maintenance Manual to determine which orifice to use based on your application.

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IDS Premium Connected + Cased Coil + 96% Furnace AHRI 210/240 System Performance Data

Nominal HP System Tonnage	Outdoor Unit Model	Indoor Unit Model	Furnace Model	Cooling Capacity (BTU/h)			Heating Capacity			CFM (High/Low)	
		Coils/Air Handlers		Total (BTU/h)	EER2[2]	SEER2[1]	Hi (BTU/h)"	HSPF2[3]	Low (BTU/h)[4]		
2T	BOVA-36RTB-M20S	BMAC2430ABTA	BGH96M060B3C	23800	11.7	18	24000	9	19600	750/550	❄
	BOVA-36RTB-M20S	BMAC2430ABTA	BGH96M080B3C	23800	11.7	18	24000	9	19600	750/550	❄
	BOVA-36RTB-M20S	BMAC2430BBTA	BGH96M060B3C	24000	12	18.5	24000	9	20000	750/550	❄
	BOVA-36RTB-M20S	BMAC2430BBTA	BGH96M080B3C	24000	12	18.5	24000	9	20000	750/550	❄
3T	BOVA-36RTB-M20S	BMAC3036ABTA	BGH96M060B3C	32800	10.6	17	34000	9	25000	1100/800	❄
	BOVA-36RTB-M20S	BMAC3036ABTA	BGH96M080B3C	32800	10.6	17	34000	9	25000	1100/800	❄
	BOVA-36RTB-M20S	BMAC3036BBTA	BGH96M060B3C	33600	11	17.5	34200	9	25000	1100/800	❄
	BOVA-36RTB-M20S	BMAC3036BBTA	BGH96M080B3C	33600	11	17.5	34200	9	25000	1100/800	❄
	BOVA-36RTB-M20S	BMAC3036CBTA	BGH96M080C4C	33600	11	17.5	34200	9	25000	1100/800	❄
	BOVA-36RTB-M20S	BMAC3036CBTA	BGH96M100C5C	33200	11	17.5	34200	9	25000	1100/1000	❄
	BOVA-36RTB-M20S	BMAC4248BBTA	BGH96M080B3C	33000	11	18	34200	9	25200	1100/800	❄
	BOVA-36RTB-M20S	BMAC4248CBTA	BGH96M100C5C	33000	11.7	18	34200	9	25600	1150/1000	❄
4T	BOVA-60RTB-M20S	BMAC4248BBTA	BGH96M080B3C	42500	11.7	16	43500	9	35000	1300/900	❄
	BOVA-60RTB-M20S	BMAC4248CBTA	BGH96M080C4C	42500	11.7	16	44500	9	35000	1300/900	❄
	BOVA-60RTB-M20S	BMAC4248CBTA	BGH96M100C5C	44000	11.7	16.5	46500	9	35600	1350/1150	❄
	BOVA-60RTB-M20S	BMAC4248DBTA	BGH96M100D5C	44500	11.7	16.5	47000	9	35600	1500/1150	❄
	BOVA-60RTB-M20S	BMAC4248DBTA	BGH96M120D5C	44500	11.7	17	47000	9	35600	1500/1150	❄
5T	BOVA-60RTB-M20S	BMAC4860CBTA	BGH96M100C5C	51500	11.4	17.5	53500	9	38000	1350/1150	❄
	BOVA-60RTB-M20S	BMAC4860DBTA	BGH96M100D5C	51500	11.7	18	54000	9	38500	1500/1150	❄
	BOVA-60RTB-M20S	BMAC4860DBTA	BGH96M120D5C	51500	11.7	18	54000	9	38500	1500/1150	❄

[1] Seasonal Energy Efficiency Ratio 2; Certified per AHRI 210/240

[2] Energy Efficiency Ratio 2; Certified per AHRI 210/240

[3] HSPF2 = Heating Seasonal Performance Factor; Certified per AHRI 210/240

[4] Jumper cut or dip switch off

Items in **bold** boxes meet the requirements for ENERGY STAR v6.1

❄ Items meet the requirements for ENERGY STAR V6.1 Cold Climate

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Air Delivery

The duct system should be designed and sized according to accepted national standards such as those published by: Air Conditioning Contractors Association (ACCA), Sheet Metal and Air Conditioning Contractors National Association (SMACNA) or American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) or consult The Air Systems Design Guidelines reference tables available from your local distributor. The duct system should be sized to handle the required system design CFM at the design external static pressure. The furnace airflow rates are provided in the table below.

Air Delivery - CFM (Without Filter) * **

Furnace size	Return-air inlet	Speed		External static pressure (in. WC)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
60B	Bottom or Sides	H	CFM	1339	1327	1338	1309	1321	1320	1342	1334	1316	1335
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	37	37.7	37.5	38.3	38.1	38.1	37.6	37.9	38.5	38.0
		Mid-H	CFM	1124	1118	1102	1106	1096	1099	1102	1109	1089	1105
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	44.2	44.5	45	45.1	45.6	45.5	45.5	45.3	46	45.6
		Mid	CFM	880	870	853	858	865	858	854	866	871	839
			Temp Rise-1st stage °F	36.7	37.2	37.9	37.8	37.6	38	38.2	37.8	37.6	39.1
			Temp Rise-2nd stage °F	56.3	57.0	58.1	58	57.5	58	58.4	57.7	57.4	59.7
		Mid-L	CFM	779	768	762	756	740	753	757	747	785	766
			Temp Rise-1st stage °F	41.4	42.0	42.4	43	43.8	43.1	43.0	43.6	41.6	42.7
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Low	CFM	553	586	543	569	552	562	584	572	575	567
			Temp Rise-1st stage °F	58.1	54.9	59	56.7	58.5	57.6	55.5	56.8	56.5	57.4
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
80B	Bottom or Sides	H	CFM	1230	1233	1222	1226	1214	1236	1255	1244	1249	1251
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	53.9	53.8	54.4	54.3	54.8	53.9	53.2	53.7	53.6	53.6
		Mid-H	CFM	1052	1052	1041	1044	1037	1034	1048	1046	1024	1076
			Temp Rise-1st stage °F	41.0	41.0	41.5	41.5	41.8	42.1	41.5	41.7	42.7	40.7
			Temp Rise-2nd stage °F	62.8	62.8	63.6	63.5	64	64.3	63.4	63.7	65.1	62.1
		Mid	CFM	849	861	854	853	855	844	855	848	834	859
			Temp Rise-1st stage °F	50.6	50.0	50.4	50.5	50.5	51.2	50.6	51.2	52.1	50.7
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Mid-L	CFM	754	771	765	764	728	761	782	739	758	758
			Temp Rise-1st stage °F	56.9	55.7	56.2	56.3	59.2	56.8	55.3	58.5	57.2	57.3
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Low	CFM	569	554	571	572	568	572	598	594	572	548
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
80C	Bottom or Sides	H	CFM	1303	1301	1281	1291	1289	1291	1290	1295	1298	1253
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	50.8	50.9	51.8	51.5	51.6	51.6	51.7	51.6	51.6	53.5
		Mid-H	CFM	1120	1127	1134	1130	1135	1138	1132	1143	1107	1112
			Temp Rise-1st stage °F	39	38	38.1	38.3	38.2	38.2	38.5	38.2	39.5	39
			Temp Rise-2nd stage °F	59.0	58.7	58.4	58.7	59	58.4	58.8	58.3	60.3	60.1
		Mid	CFM	908	894	896	902	896	894	864	891	935	880
			Temp Rise-1st stage °F	47.3	48.1	48.0	47.8	48.2	48.4	50.1	48.7	46.5	49.5
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Mid-L	CFM	818	819	825	800	813	803	831	838	791	802
			Temp Rise-1st stage °F	52	52.4	52.1	53.8	53.1	53.8	52.1	51.8	54.9	54.2
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Low	CFM	577	628	605	624	615	601	628	573	590	588
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--

* A filter is required for each return air inlet. This table shows the airflow performance without a filter. To determine airflow performance with a filter, if a 3/4 inch (19 mm) washable media filter is used, assume an additional 0.1 in. WC available external static pressure.

** The manufacturer default fan settings are based on model

-- Indicates unstable operating conditions.

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Bosch 96% AFUE Gas Furnace
BGH96 Model

Air Delivery - CFM (Without Filter) * **

Furnace size	Return-air inlet	Speed		External static pressure (in. WC)									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
100C	Bottom or Sides	H	CFM	1752	1764	1768	1781	1774	1786	1762	1802	1792	1786
			Temp Rise-1st stage °F										
			Temp Rise-2nd stage °F	47.5	47.3	47.3	47.0	47.3	47.0	47.7	46.8	47.2	47.4
		Mid-H	CFM	1512	1506	1536	1523	1514	1509	1529	1551	1565	1532
			Temp Rise-1st stage °F	38.6	38.8	38.1	38.5	38.8	39	38.6	38.1	37.9	38.8
			Temp Rise-2nd stage °F	54.8	55.1	54.1	54.6	55.1	55.3	54.7	54.0	53.6	54.8
		Mid	CFM	1354	1354	1362	1370	1357	1381	1389	1394	1416	1383
			Temp Rise-1st stage °F	42.9	43	42.8	42.6	43.1	42.4	42.3	42.2	41.7	42.7
			Temp Rise-2nd stage °F	61.1	61.1	60.8	60.6	61.2	60.3	60.0	59.9	59.0	60.5
		Mid-L	CFM	1165	1165	1176	1164	1185	1190	1186	1205	1174	1199
			Temp Rise-1st stage °F	49.7	49.7	49.3	49.9	49.2	49.0	49.2	48.6	49.9	49.0
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Low	CFM	994	1025	1018	1024	1032	1026	1035	988	1005	1041
			Temp Rise-1st stage °F	58.1	56.4	56.9	56.6	56.3	56.7	56.3	59	58.1	56.2
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
100D	Bottom or Sides	H	CFM	1926	1926	1931	1943	1936	1941	1960	1974	2015	2043
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	43.2	43.3	43.2	43.1	43.3	43.3	42.9	42.7	42.0	41.6
		Mid-H	CFM	1746	1752	1749	1748	1749	1763	1771	1776	1794	1791
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	47.5	47.4	47.6	47.7	47.7	47.4	47.3	47.2	46.9	47.0
		Mid	CFM	1488	1525	1525	1515	1528	1546	1501	1525	1546	1544
			Temp Rise-1st stage °F	39	38.2	38.2	38.6	38.3	37.9	39.1	38.6	38.2	38.3
			Temp Rise-2nd stage °F	55.6	54.3	54.4	54.8	54.4	53.9	55.5	54.7	54.1	54.2
		Mid-L	CFM	1348	1374	1341	1383	1381	1385	1408	1404	1400	1401
			Temp Rise-1st stage °F	43.0	42.3	43.3	42.1	42.2	42.2	41.6	41.8	42.0	42.0
			Temp Rise-2nd stage °F	61.2	60.2	61.7	59.9	60.1	60	59.1	59.3	59.6	59.6
		Low	CFM	1163	1186	1164	1167	1174	1178	1182	1129	1163	1172
			Temp Rise-1st stage °F	49.7	48.8	49.8	49.7	49.5	49.4	49.3	51.7	50.3	50
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
120D	Bottom or Sides	H	CFM	1926	1933	1915	1923	1916	1929	1971	1941	2036	1998
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	51.8	51.7	52.2	52.1	52.4	52.1	51.1	52.0	49.8	50.7
		Mid-H	CFM	1721	1747	1716	1749	1760	1768	1778	1783	1747	1788
			Temp Rise-1st stage °F	--	--	--	--	--	--	--	--	--	--
			Temp Rise-2nd stage °F	57.8	57.0	58.1	57.1	56.8	56.6	56.4	56.3	57.5	56.4
		Mid	CFM	1489	1497	1503	1504	1507	1488	1496	1518	1519	1568
			Temp Rise-1st stage °F	46.7	46.6	46.4	46.5	46.5	47.1	47.0	46.4	46.4	45.1
			Temp Rise-2nd stage °F	66.5	66.3	66.1	66.1	66.1	67.0	66.7	65.8	65.9	64
		Mid-L	CFM	1384	1360	1365	1384	1382	1383	1379	1401	1421	1414
			Temp Rise-1st stage °F	50.2	51.1	51.0	50.4	50.6	50.6	50.8	50.1	49.5	49.9
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--
		Low	CFM	1165	1175	1162	1158	1158	1184	1186	1204	1201	1185
			Temp Rise-1st stage °F	59.5	59.0	59.8	60	60.1	58.9	58.9	58.1	58.4	59.2
			Temp Rise-2nd stage °F	--	--	--	--	--	--	--	--	--	--

* A filter is required for each return air inlet. This table shows the airflow performance without a filter. To determine airflow performance with a filter, if a 3/4 inch (19 mm) washable media filter is used, assume an additional 0.1 in. WC available external static pressure.

** The manufacturer default fan settings are based on model

-- Indicates unstable operating conditions.

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Filters

Bosch does not supply filters or filter racks with furnace units. All filters must be field supplied according to the Manufacturer recommended high velocity filter sizes and specifications shown below.

Furnace cabinet width	Filter size		Filter type
	Side return	Bottom return	
17-1/2	16X25	16X25	High Velocity (600 FPM)
21	16X25	20X25	High Velocity (600 FPM)
24.5	16X25	24X25	High Velocity (600 FPM)

Dimension in inches

High Altitude Derating

In high altitude applications, a standard derate for altitude from National Fuel Gas Code ANSI Z223.1 of 4% per 1000 feet above sea level must be taken. Refer to the most recent version of ANSI Z223.1 for correct gas orifice based on your specific application. The orifices must be selected using the specifications listed in the table below. The furnace derate is 4% for each 1,000 feet above sea level. For Canada applications, regulation requires 10% derating between 2000-4500 ft. When an appliance is installed at elevations above 4500 ft, the certified high altitude input rating shall be reduced at the rate of 4% for each additional 1000 ft.

The table below is based upon a heating value of approximately 1,000 Btu/ft³. In some areas the gas supplier may artificially derate the gas in an effort to compensate for the effects of altitude. If the gas is artificially derated, the appropriate orifice size must be determined based upon the BTU/ft³ content of the derated gas and the altitude. Refer to the latest version of NFPA54/ANSI Z223.1 and information provided by the gas supplier to determine the proper orifice size.

High Altitude Derate Orifice Size Chart (Natural and LP Gas*)

Input Rate KBTU/H	Number of burners	Elevation (Ft) 0-2000		Elevation (Ft) 2000-4000		Elevation (Ft) 4000-6000		Elevation (Ft) 6000-8000		Elevation (Ft) 8000-10000	
		NG**	LP	NG**	LP	NG**	LP	NG**	LP	NG**	LP
60	3	45	55	47	56	48	57	49	58	50	59
80	4	45	55	47	56	48	57	49	58	50	59
100	5	45	55	47	56	48	57	49	58	50	59
120	6	45	55	47	56	48	57	49	58	50	59

* LP orifice based on 10 in. WC manifold pressure
** NG denotes natural gas

The input to the furnace must be checked AFTER reorificing. territory.

Units installed with natural gas at altitudes up to 2000 ft. above sea level may be installed without any modifications. Units installed above 2000 ft. of elevation must use orifices as specified in the above table.

For Canada applications, regulation requires 10% derating between 2000-4500 ft. When an appliance is installed at elevations above 4500 ft, the certified high altitude input rating shall be reduced at the rate of 4% for each additional 1000 ft.

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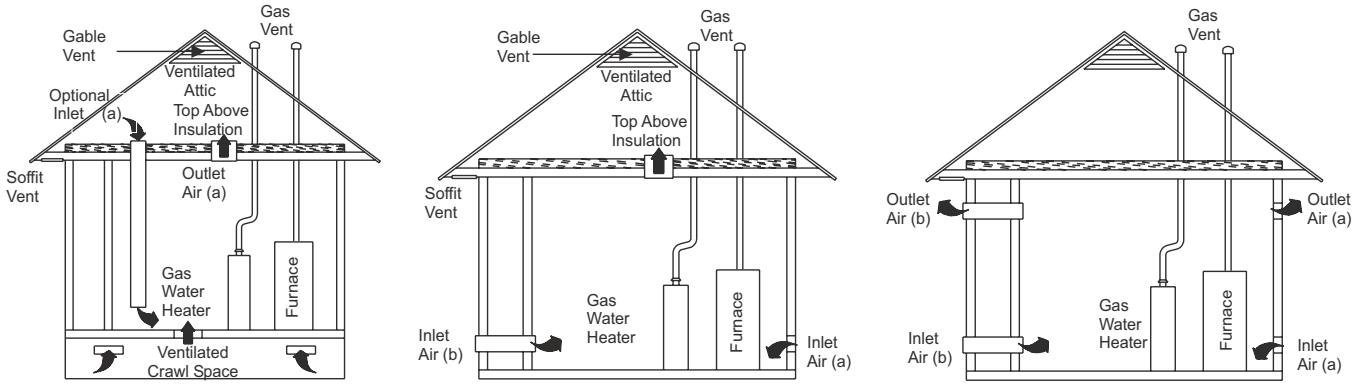
Venting

This Category IV, dual certified (AHRI and ETL) direct vent furnace is designed for residential applications. It may be installed without modification to the condensate system in a basement, garage, equipment room, alcove, attic or any other indoor location where all required clearance to combustibles and other restrictions are met*. The combustion air and the venting system must be installed in accordance with Section 5.3, Air for Combustion and Ventilation, of the National Fuel Gas Code Z223.1/NFPA 54 (latest edition), or Sections 7.2, 7.3 or 7.4 of CSA B149.1, National Gas and Propane Codes (latest edition) or applicable provisions of the local building code and these instructions.

This furnace requires a special venting system. This furnace is for use with schedule-40 PVC, PVC-DWV, CPVC, or ABS-DWV pipe, and **must not be vented in common with other gas-fired appliances**. Construction through which vent/air intake pipes may be installed is maximum 24 inches (610 mm), minimum 3/4 inches (19 mm) thickness (including roofing materials). Refer to Section 8 "Vent System" of the Installation, Operation, and Maintenance Manual, for installation instructions related to venting.

* The condensate from this unit is acidic, adhere to all local and national codes when draining condensate. If proper procedures are not followed, this may lead to property damage.

Outside and Ambient Combustion Air



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Equivalent Pipe Length

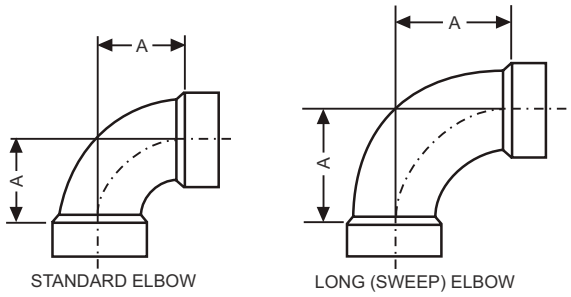
Maximum Equivalent Pipe Length		
Model Input kBTU/H (kW)	Pipe Size - Inches (cm)	Maximum Equivalent Length - Feet (m)
60 (17.6)	2 (5.1)	60 (18.2)
60 (17.6)	3 (7.6)	90 (27.4)
80 (23.4)	2 (5.1)	60 (18.2)
80 (23.4)	3 (7.6)	90 (27.4)
100 (29.3)	2 (5.1)	30 (9.1)
100 (29.3)	3 (7.6)	90 (27.4)
120 (35.1)	2 (5.1)	N/A
120 (35.1)	3 (7.6)	90 (27.4)

The following rules must also be followed:

1. Long radius (sweep) elbows are recommended. Standard elbows may be used, but since they have a longer equivalent length, they will reduce the total length of pipe that will be allowed. Short radius (plumbing vent) elbows are not allowed. The standard dimensions of the acceptable elbows are shown below.
2. The maximum equivalent length listed in Table 5, "Maximum Equivalent Pipe Length" is for the vent piping and the air intake piping separately. For example, if the table allows 60 equivalent feet for a particular model, then the vent can have 60 equivalent feet of pipe, AND the combustion air intake can have another 60 equivalent feet of pipe.
3. Three vent terminal elbows (two for the vent and one for the combustion air intake) are already accounted for and need not be included in the equivalent length calculation.
4. All combustion air and vent pipes and fittings must conform to American National Standards Institute (ANSI) and American Society for Testing and Materials (ASTM) standards, D1785 (Schedule 40 PVC), F441 (Schedule 40 CPVC), D2665 (PVC-DWV), F891 (PVC-DWV Cellular Core), D2661 (ABS-DWV) or D1527 (Schedule 40 ABS). Pipe cement and primer must conform to ASTM Standard D2564 (PVC), F493 (CPVC) or D2235 (ABS). If ABS pipe is to be used, any joint where ABS pipe is joined to PVC pipe must be glued with cement that is approved for use with BOTH materials. As an alternate, use all purpose cement, to bond ABS, PVC, or CPVC pipe when using fittings and pipe made of the same materials. Metallic materials must not be used for venting or air intake.
5. If a flexible connector is used in the vent system, it must be made of a material that is resistant to acidic exposure and to at least 225° F temperature. Flexible connectors are also allowed in the combustion air pipe.
6. All models are supplied with 2" vent connections. When the pipe must be increased to 3" diameter, the transition from 2" to 3" must be done as close to the furnace as possible. For upflow models, the transition from 2" to 3" should be done immediately above the furnace. For downflow or horizontal models, the transition from 2" to 3" pipe should be done immediately after exiting the furnace.
7. In Canada, vents shall be certified to ULC S636, Standard for Type BH Gas Venting Systems. IPEX System 636 PVC is certified to this standard.
8. In Canada, the first three feet (900 mm) of the vent must be readily accessible for inspection.
9. Minimum vent length for all models is 5 feet.

The equivalent length of the vent system is the total length of straight pipe PLUS the equivalent length of all of the elbows.

Elbow Dimensions



Elbow Dimensions	
Elbow	"A" Dimension
2" Standard	2-5/16"
3" Standard	3-1/16"
2" Sweep	3-1/4"
3" Sweep	4-1/16"

Equivalent Length of Fittings	
Fitting	Equivalent Length
2" 90º sweep elbow	5 feet of 2" pipe
2" 45º sweep elbow	2-1/2 feet of 2" pipe
2" 90º standard elbow	10 feet of 2" pipe
2" 45º standard elbow	5 feet of 2" pipe
3" 90º sweep elbow	5 feet of 3" pipe
3" 45º sweep elbow	2-1/2 feet of 3" pipe
3" 90º standard elbow	10 feet of 3" pipe
3" 45º standard elbow	5 feet of 3" pipe
2" corrugated connector	10 feet of 2" pipe
3" corrugated connector	10 feet of 3" pipe

Combustion Air Intake & Vent Connection Size (All Models)	
Connection Type	Size - Inches (cm)
Intake Pipe	2" (5.1)
Vent Pipe	2" (5.1)

Furnace vent pipe connections are sized for 2" (5.1 cm) pipe. Any pipe size change must be made outside the furnace cabinet in a vertical pipe section to allow proper drainage of condensate. An offset using two 45º (degree) elbows will be required for plenum clearance when the vent is increased to 3" (7.6 cm).

Example:

An 80,000 BTUH furnace requires 32 feet of pipe and four 90º elbows. Using 2" pipe and standard elbows, the total equivalent length will be:

32 feet of 2" pipe =	32 equivalent feet
4 - 90º standard 2" elbows =	(4x10) = 40 equivalent feet
Total =	72 equivalent feet of 2" pipe

This exceeds the 60 foot maximum equivalent length of 2" pipe allowed for that model and is thus not acceptable.

By using sweep elbows, the total equivalent length will be:

32 feet of 2" pipe =	32 equivalent feet
4 - 90º sweep 3" elbows =	(4x5) = 20 equivalent feet
Total =	52 equivalent feet of 2" pipe

This is less than the 60 foot maximum equivalent length of 2" pipe allowed for that model and is thus acceptable.

Alternatively, using 3" pipe and standard elbows, the total equivalent length will be:

32 feet of 3" pipe =	32 equivalent feet
4 - 90º standard 2" elbows =	(4x10))= 40 equivalent feet
Total =	72 equivalent feet of 3" pipe

This is less than the 90 foot maximum equivalent length of 3" pipe allowed for that model and is thus acceptable.

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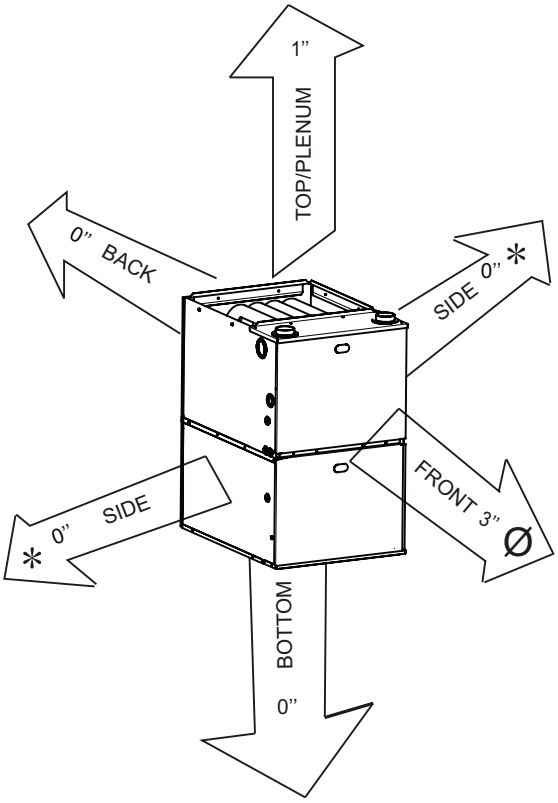
Required Clearance to Combustibles

This furnace may be installed on combustible flooring in an alcove or closet at minimum clearance as indicated below.

Minimum clearance from combustible construction

Clearance arrows do not change with furnace orientation



SIDES*	FRONT	BACK	TOP (PLENUM)
0"	3"	0"	1"

* When the unit is installed in the horizontal orientation, there must be 7" clearance in order to install the externally mounted drain trap.

Ø 24 inches is required for service and maintenance.

Horizontal installation in attic or crawl space

* Indicates supply or return sides when furnace is in the horizontal position. Line contact only permissible between lines formed by intersections of the side and back of the furnace cabinet and building joists, studs or frame.

Horizontal applications require a solid, supportive structure for installation (refer to the Installation, Operation & Maintenance Manual Section 7.2 “Horizontal Installation”).

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Electrical & Controls

Ratings & Physical / Electrical Data

Input		Output		Nominal Airflow	MAX. Unit Amps	AFUE	Air Temp. Rise		Max.Over-Current Protection	Min. Wire Size (AWG) @ 75 ft	Max. Outlet Air Temp	
MBH	kW	MBH	kW	CFM			° F	° C	Amps		° F	° C
60B3	17.6	57	16.4	1200	8	96	30-60	17-33	15	14	160	71
80B3	23.4	76	22.3	1200	8	96	35-65	19-36	15	14	165	74
80C4	23.4	76	22.3	1600	7.8	96	35-65	19-36	15	14	165	74
100C5	29.3	95	27.8	2000	11.5	96	35-65	19-36	20	14	165	74
100D5	29.3	95	27.8	2000	10.5	96	35-65	19-36	20	14	165	74
120D5	35.2	107	33.7	2000	10.5	95	40-70	22-39	20	14	170	77

Annual Fuel Utilization Efficiency (AFUE) numbers are determined in accordance with DOE Test procedures.

National Electrical Code (NFPA-70-latest edition) and all local codes.

The furnace shall be installed so that the electrical components are protected from water.

Sequence of Operations

1. Heating mode

In a typical system, a call for first stage heat is initiated by closing the W1 thermostat contacts. The inducer blower is energized at high speed and the control waits for the low pressure switch contacts to close. The humidifier (optional) is also energized at this time. Once the low pressure switch contacts close, a 15-second pre-purge is initiated. Then the inducer changes to low speed and the 120V ignitor is powered. At the end of the ignitor warm-up time, the first stage of the two-stage manifold gas valve is energized (low fire). Flame must be detected within 4 seconds. If flame is detected, the 45-second HEAT delay-to-fan-on period begins. After the delay-to-fan-on period ends, the control will energize the circulator fan at low heat speed. The electronic air cleaner (optional) will also energize at this time. For a two-stage thermostat, a call for second stage heat (W1 and W2) after a call for first stage heat will energize the inducer at high speed and the circulator at high heat speed. The second stage pressure switch contacts will close and energize the second stage gas valve (high fire). For a single-stage thermostat, when a call for heat occurs (W1), a 10, 20 minute or auto mode heat staging timer will be activated (timing is selectable with option switches S1-1 and S1-2 positions). Following this delay, the second stage heat is energized as above.

When the second stage of the thermostat is satisfied, the inducer motor is reduced to low speed and the second stage gas valve is de-energized. On the control, the circulator will remain at high heat speed for 30 seconds following the opening of the second stage gas valve and then is reduced to low heat speed. When the first stage of the thermostat is satisfied, the first stage gas valve is

de-energized and the HEAT delay-to-fan-off begins timing. The inducer will postpurge for an additional 15 seconds, then the inducer and humidifier will turn off. Upon completion of the HEAT delay-to-fan-off period, the circulator is turned off. The electronic air cleaner on the control is also de-energized at this time.

If flame is not detected during the trial-for-ignition period or if the flame is detected/sensed and then lost before completion of 10 seconds of establishment, the gas valve is de-energized, the ignitor is turned off, and the control goes into the “retry” sequence. The “retry” sequence provides a 60-second wait with the inducer interpurge following an unsuccessful ignition attempt (flame not detected). After this wait, the ignition attempt is restarted. Two retries will be attempted before the control goes into system lockout. If flame is established for more than 10 seconds after ignition, the controller will clear the ignition attempt (or retry) counter. If flame is lost after 10 seconds, the control will restart the ignition sequence.
A momentary loss of gas supply, flame blowout, or a shorted or open condition in the flame probe circuit will be sensed within 2 seconds. The gas valve will de-energize and the control will restart the ignition sequence. Recycles will begin and the burner will operate normally if the gas supply returns, or the fault condition is corrected, before the last ignition attempt. Otherwise, the control will go into system lockout. If the control has gone into system lockout, it may be possible to reset the control by a momentary power interruption of 10 seconds or longer.

Timing specifications

Event	Definition	Time
Pre-purge Time	The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion at the beginning of a furnace operating cycle prior to initiating ignition	15 seconds
Ignitor Warm-up Time	The length of time allowed for the ingiter to heat up prior to the initiation of gas flow	17 seconds
Trial for ignition Period (TFI)	The period of time between initiation of gas flow and the action to shut off the gas flow in the event of failure to establish proof of the supervised ignition source or the supervised main burner flame	4 seconds
Ignition Activation Period (IAP)	The period of time between energizing the main gas valve and deactivation of the igniter prior to the end of TFI	3 seconds
Retries	The additional attempts within the same thermostat cycle for ignition when the supervised main burner flame is not proven within the first TFI	2 times
Valve Sequence period	Valve sequence period = 4 seconds (TFI) x (1 initial try + 2 retries)	12 seconds
Inter-purge	The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion between the failed TFI and the retry period	60 seconds
Post-purge Time	The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion at the end of a furnace burner operating cycle. Post-purge begins at the loss of flame sense	15 seconds
Lock-Out Time	ANSI standard rated module timing	300 seconds
Heat Delay-To-Fan-On	The period of time between proof of the supervised main burner flame and the activation of the blower motor at heating speed	30 seconds
Heat Delay-To-Fan-Off*	The period of time between the loss of a call for heat and the deactivation of the blower motor at heating speed	*90/120/150/180 seconds
Cool Delay-To-Fan-On	The period of time after a thermostat demand for cool before energizing the circulator blower motor at cooling speed	1 second
Cool Delay-To-Fan-Off	The period of time between the loss of a call of cool and the deactivation of the blower motor at cooling speed	*60/90/120/150 seconds
Automatic Reset Time	After one (1) hour of internal or external lockout, the control will automatically reset itself and go into an auto restart purge for 60 seconds	60 minutes

* These times will vary depending on option switch position.

Optional Switch Positions

W2 Delay

DIP Switch (SW)		NOMINAL (MINUTES)
SW1-1	SW1-2	
OFF	OFF	OFF*
ON	OFF	10
OFF	ON	AUTO
ON	ON	20

* The factory default settings

Heat Off Delay

DIP Switch (SW)		NOMINAL (SECONDS)
SW1-3	SW1-4	
OFF	OFF	90*
ON	OFF	120
OFF	ON	150
ON	ON	180

* The factory default settings

Cool Off Delay

DIP Switch (SW)		NOMINAL (SECONDS)
SW2-3	SW2-4	
OFF	OFF	60*
ON	OFF	90
OFF	ON	120
ON	ON	150

* The factory default settings

When using a single stage thermostat, second stage delay is based on the setting of switch S1-1& S1-2 dip switches.

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