

Bosch 96% AFUE Gas Furnace BGH96 Model

Condensing Gas Furnace



BOSCH

User's Information Manual



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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings



Warnings in this document are identified by a warning triangle printed against a grey background. Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- ▶ **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- ▶ **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- ▶ **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- ▶ **NOTICE** is used to address practices not related to personal injury.

Important information



This symbol indicates important information where there is no risk to people or property.

1.2 Safety

Please read all instructions in the manual and retain all manuals for future reference.



INSTALLER: This manual must be left with the equipment user.

USER: Please keep this booklet of information for future reference.



WARNING:

- ▶ Untrained personnel (homeowners) may only clean and replace filters and replace fuses as required by basic maintenance. **All other operations, including installation, repair, and service must be performed by a qualified installer, service agency, or the gas supplier.**



WARNING: FIRE OR EXPLOSION HAZARD

- ▶ Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- ▶ WHAT TO DO IF YOU SMELL GAS:
 - Do not try to light any appliance.
 - Do not touch any electrical switch; do not use any phone in your building.
 - Leave the building immediately.
 - Immediately call your gas supplier from a safe location. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- ▶ Installation and service must be performed by a qualified installer, service agency, or the gas supplier.



WARNING: FIRE OR EXPLOSION HAZARD

- ▶ Do not use this furnace if any part has been under water. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. A qualified service agency should be contacted to inspect the furnace and to replace all gas controls, control system parts, and electrical parts that have been wet, or the furnace if deemed necessary.

**WARNING: FIRE OR EXPLOSION HAZARD**

- ▶ The furnace is designed and approved for use with Natural Gas and Propane Gas (LP) ONLY.
- ▶ DO NOT BURN ANY LIQUID FUEL OR SOLID FUEL IN THIS FURNACE.
- ▶ Burning any unapproved fuel will result in damage to the furnace's heat exchanger, which could result in Fire, Personal Injury, and/or Property Damage.

**WARNING:**

- ▶ This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**WARNING: FIRE, EXPLOSION, ELECTRICAL SHOCK, AND CARBON MONOXIDE POISONING HAZARD**

- ▶ Failure to follow this warning could result in dangerous operation, serious injury, death, or property damage. Improper installation, adjustment, alteration, maintenance, or use could cause carbon monoxide poisoning, explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified service agency, local gas supplier, or your distributor for information or assistance.

**WARNING: FIRE HAZARD**

- ▶ The furnaces must be kept free and clear of insulating materials. Inspect surrounding area to ensure insulation material is at a safe distance when installing furnaces or adding insulation materials. Insulation materials may be combustible.

See Section 3, Fig. 3 as seen in the Installation, Operation, and Maintenance Manual for required clearances to combustible construction.

Maintain a 1 in. clearance from combustible materials to supply air ductwork for a distance of 36 in. horizontally from the furnace. See NFPA 90B or local code for further requirements.
- ▶ These furnaces SHALL NOT be installed directly on carpeting, tile, or any other combustible material other than wood flooring.

**WARNING: CARBON MONOXIDE POISONING HAZARD**

- ▶ Failure to follow instructions could result in severe personal injury or death due to carbon-monoxide poisoning, if combustion products infiltrate into the building.
- ▶ Check that all openings in the outside wall around the vent (and air intake) pipe(s) are sealed to prevent infiltration of combustion products into the building.
- ▶ Check that furnace vent (and air intake) terminal(s) are not obstructed in any way during all seasons.

**CAUTION:**

- ▶ Before heating season begins, a qualified installer or service agency must examine the furnace to ensure that:
 1. All flue gas carrying areas external to the furnace (i.e. chimney, vent connector) are clear and free of obstructions.
 2. The vent connector is in place, slopes upward and is physically sound without holes or excessive corrosion.
 3. The return-air duct connection(s) is physically sound, is sealed to the furnace cabinet, and terminates outside the space containing the furnace.
 4. The physical support of the furnace is sound without sagging, cracks, gaps, etc around the base so as to provide a seal between the support and the base.
 5. There are no obvious signs of deterioration of the furnace.
 6. The burner flames are positioned correctly by comparing with pictorial sketches of the main burner flame (see Section 12, Fig 42 in the Installation, Operation, and Maintenance Manual).

**WARNING: FIRE, EXPLOSION**

- ▶ Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.

**WARNING:**

- ▶ Furnace operation requires air for combustion and ventilation. Do not block or obstruct air openings on furnace or spacing around furnace required for supplying sufficient combustion air and ventilation.

2 Introduction

This Bosch 96% AFUE Gas Furnace has been designed for quality, performance, and comfort, for years to come! Bosch strongly recommends that you read through this manual to learn about how the furnace operates, as well as some basic maintenance and up-keep to ensure your furnace is always running at its optimal performance.

3 Furnace Components

The furnace below is shown in the upflow orientation (your furnace may have been installed in a different orientation)

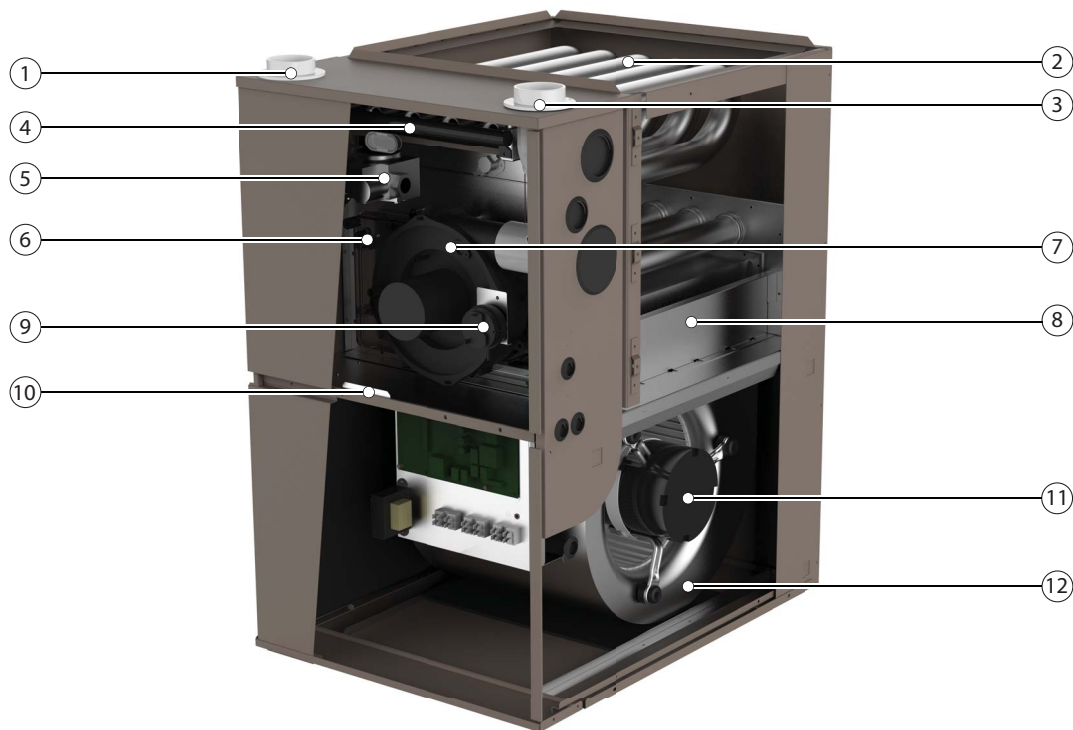


Figure 1

Component Identification:

- | | |
|---------------------------|-----------------------------|
| 1. Air Inlet | 7. Inducer |
| 2. Primary Heat Exchanger | 8. Secondary Heat Exchanger |
| 3. Exhaust | 9. Pressure Switch |
| 4. Burners | 10. Door Safety Switch |
| 5. Gas Valve | 11. Circulating Fan Motor |
| 6. Condensate Collector | 12. Circulating Fan Blower |

4 Operating Your Furnace

4.1 Furnace Start-Up

1. Close the manual gas shutoff valve external to the furnace.
2. Turn off the electrical power to the furnace.
3. Set the room thermostat to the lowest possible setting.
4. Remove the burner access panel.



WARNING:

- This furnace is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

5. Push the gas valve switch to the OFF position (See Fig. 2).

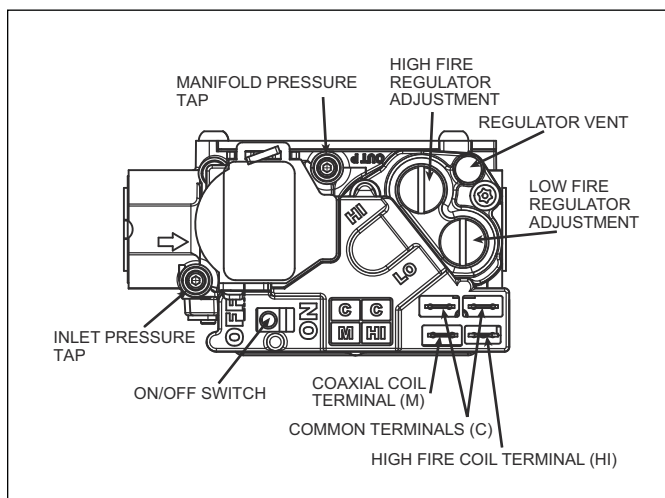


Figure 2

6. Wait five minutes to clear out any gas. Then smell for gas including near the floor.
7. If gas can be smelled following the five minute waiting period, repeat step 6. If you have waited more than 10 minutes and still smell gas, check for leaks using a soap and water solution.
8. If you do not smell gas after five minutes, push the gas valve switch to the ON position (See Fig. 2).



WARNING: FIRE AND EXPLOSION HAZARD

- Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections.

9. Replace the burner access panel on the front of the furnace.
10. Open the manual gas valve external to the furnace.
11. Turn on the electrical power supply to the furnace.
12. Set the room thermostat to slightly above room temperature. This signals the furnace to start (the inducer motor starts and the hot surface igniter energizes).

13. After 17-21 seconds, the gas valve energizes, letting gas flow to the burners, where it is then ignited.



If flame is not detected, the furnace control goes into the "retry" sequence. The "retry" sequence provides a 60-second wait following an unsuccessful ignition attempt (a flame not detected). After this wait, the ignition sequence is restarted with an additional 2 seconds of ignitor warm-up time. If this ignition attempt is unsuccessful, one more retry will be made before the control goes into system lock out.

14. If the burner flame is proven, the blower motor is energized on HEAT-H speed 30 seconds after the gas valve is energized.
15. Set the room thermostat to the desired temperature. The furnace is now running correctly and will be controlled by the thermostat.



There is an approximate 48 second delay between thermostat energizing and burner firing.

4.2 Furnace Shutdown

In case of furnace malfunction, you may need to shut it down. Use the following procedure to do this.

1. Set the thermostat to OFF or it's lowest temperature setting.
2. Turn off the electrical power supply to the furnace.
3. Turn OFF the main gas supply to the appliance at the manual valve, outside of the appliance cabinet.
4. Remove the burner access panel.
5. Move the appliance gas valve switch to the "OFF" position (See Fig. 2).
6. Replace burner access panel.
7. If the furnace was shut down due to malfunction, contact your contractor immediately.

5 Routine Maintenance

5.1 Annual Inspection



WARNING:

- ▶ The furnace must be inspected by a qualified installer or service agency at least once per year.
- ▶ Homeowners: Homeowners may only clean and replace filters and replace fuses as required by basic maintenance. All other operations, including installation, repair, and service must be performed by a qualified installer, service agency, or the gas supplier.



Service Reminder:

Call your service technician if the unit will not operate. Before calling, always check the following to be sure service is required:

1. Check that electrical disconnect switches are **ON**.
2. Check all wiring for loose connections.
3. Check room thermostat for proper setting.
4. Replace any blown fuses or reset circuit breakers.
5. Gas valve should be **ON**.
6. Air filter should not be clogged/dirty, which will limit air flow.
7. Is gas turned on at the meter?
8. Is manual main shut-off valve open?

Record the model and serial number of the furnace. These numbers are available on the warning label located on the blower access panel.

Serial Number: _____

Model Number: _____

Your qualified service professional must perform the following checks at the beginning of the heating season. This will ensure that all furnace components are in proper working order and that the heating system functions appropriately.

1. The Venting System

- a. All flue gas carrying areas external to the furnace (i.e. chimney, vent connector, vent pipe) are clear and free of obstructions.
- b. Inspect heat exchangers and blowers for corrosion, deterioration, or deposits of debris. Remove any obstructions.
- c. The vent connector is in place, slopes upward and is physically sound without holes or excessive corrosion.
- d. The return-air duct connection(s) is physically sound, is sealed to the furnace casing, and terminates outside the space containing the furnace.
- e. The physical support of the furnace is sound without sagging, cracks, gaps, etc. around the base so as to provide a seal between the support and the base.
- f. There are no obvious signs of deterioration of the furnace.
- g. The burner flames are in good adjustment (by comparison with pictorial sketches or drawings of the main burner flame. Refer to the Installation, Operation, and Maintenance Manual for more information).

- h. In applications which include a cooling coil, the condensate drain and trap should be checked for leaks and cracks. The trap must be filled with water and the drain and trap should be cleaned.

2. The Blower

The bearings in the induced draft blower and circulator blower motors are permanently lubricated by the manufacturer. No further lubrication is required. Check motor windings for accumulation of dust which may cause overheating. Clean as necessary.

3. The Flame Sensor

Under some conditions the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator causing a drop in the flame sense signal. If the flame sense signal drops too low. The furnace will not sense flame and will lock out. The flame sensor should be carefully cleaned by a qualified servicer using emery cloth or steel wool. Following cleaning the flame sense signal should be 1 to 6 microamps at 115 volts.

4. The Heat Exchanger

Inspect the heat exchanger for excessive rust, cracks, or holes. Visual inspection is always best, but requires training and practice. There are tools (field supplied) available to assist, such as inspection cameras and dye penetration inspection systems. Inspect the metal flue for rust or holes, and make sure it's supported properly.

NOTICE:

- ▶ If the heat exchangers get a heavy accumulation of soot and carbon, they must be replaced rather than cleaning them. A heavy build-up of soot and carbon indicates that a problem exists which needs to be corrected, such as improper adjustment of manifold pressure, insufficient or poor quality combustion air, incorrect size or damaged manifold orifice(s), improper gas, or a restricted heat exchanger. In these scenarios, the heat exchanger assembly must be replaced.

5. Condensate Drain

Inspect all condensate drain tubes and condensate trap assembly for leaks and proper drainage.

5.2 Filters

A return air filter is not supplied with this furnace; however the installer will supply filter(s) at the time of installation. Filters are installed external to the unit. Have your installer instruct you on how to access your filters for routine maintenance.

Filter Maintenance

Improper filter maintenance is the most common cause of inadequate heating or cooling performance. Inspect filters every month and clean (permanent) or replace (disposable) as required. When replacing a filter, it must be replaced with a filter of the same type and size. Become familiar with filter location and procedures for removal cleaning and replacing them. If help is needed, contact the installer of the furnace or a qualified service agency.

Filter Removal Procedure

1. Turn OFF electrical power to the furnace.
2. Remove filter cabinet door.
3. Slide out filter.
4. If the filter is damaged, replace it with a new one.
5. For reusable filters, use cold tap water and mild liquid detergent (if needed) to rinse the filter.
6. Once dry, reinstall filter.
7. Replace filter cabinet door.
8. Turn ON electrical power to furnace.

Depending on the installation, differing filter arrangements can be applied. A media air filter or electronic air cleaner can be used as an alternate filter. If a filter replacement is necessary, follow the filter sizes given in the Recommended Minimum Filter size (Table 1) to ensure proper unit performance. Also, be sure the replacement filter is rated for high airflow. For further details, call your contractor or distributor.

Upright Filter Removal

To remove filters from an external filter rack in an upright upflow installation, follow the directions provided with the external filter rack kit. Clean, wash and dry a permanent filter. When using a permanent filter, both sides should be sprayed with a dust adhesive as recommended on the adhesive container. Spray adhesives for use with permanent filters can be found at some hardware stores.



Be sure airflow direction arrow points towards the blower.

Inspect filter. If the dirty filter is the disposable type, replace dirty filter with the same type and size filter. If the dirty filter is a permanent filter, clean as follows:

- Clean, wash and dry a permanent filter. When using a permanent filter, both sides should be sprayed with a dust adhesive as recommended on the adhesive container.
- If badly torn or uncleanable, these filters must be replaced by equal size permanent, high velocity filters. Throwaway filters must not be used as replacement for permanent filters.

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)

Table 1 Manufacturer recommended high velocity filter sizes - Inch

5.3 Burners

Periodically during the heating season perform a visual check of the burner flames. Turn the furnace on at the thermostat. Wait a few minutes since any dislodged dust will alter the normal flame appearance. Flames should be stable quiet soft and blue with slightly orange tips. They should not be yellow. They should extend directly outward from the burner ports without curling downward, floating, or lifting off the ports. Contact a qualified service agent at once if an abnormal flame appearance should develop.



WARNING:

- Only a qualified contractor, installer or service agency can clean the burners if the burners get a heavy accumulation of soot and carbon.

5.4 Replacement Parts

Replacement parts as well as information regarding parts are available through your contractor or distributor. All service must be performed by a qualified professional installer. When ordering any of the listed functional parts, be sure to provide the furnace model and serial numbers with the order, this information is available on the warning label located on the blower access panel. Common spare parts are listed below.

Cabinet Parts

- Panel, Top
- Panel, Lower Front

Electronics

- Transformer
- Main PCB Board
- Door Switch
- Pressure Switches
- Limit Switch(es)
- Capacitor

Blower Parts

- Motor
- Blower Assembly (with wheel)
- Motor Bracket assembly

Heating Parts

- Inducer
- Ignitor
- NG Orifice / LP Orifice
- Burner
- Burner tray
- Gas Valve
- Flame Sensor
- Heat exchanger assembly
- Gas Manifold assembly
- Rollout switch - resettable

United States

Bosch Thermotechnology Corp.
65 Grove Street
Watertown, MA 02472

Tel: 866-642-3198
Fax: 603-965-7581
www.boschheatingandcooling.com