660 EF/EFO

INDOOR MODEL/OUTDOOR MODEL

Installation must conform with local codes, or in the absence of local codes, the National Fuel Gas Code, ANSI Z223.1/NFPA 54.

When applicable, installation must conform with the Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280 or the Canadian Standard CAN/CSA-Z240 MH Mobile Homes, Series M86. (660 EFO only)

ENERGY STAR

EFFICIENCY RATING CERTIFIED
ama

INDOOR MODEL 660 EF- Natural Gas/Liquefied Petroleum (LP) Gas
OUTDOOR MODEL 660 EFO- Natural Gas/Liquefied Petroleum (LP) Gas

Warning: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.
In the Commonwealth of Massachusetts this product must be installed by a licensed plumber or gas fitter.

Upon completion of the installation, these instructions should be handed to the user of the appliance for future reference.

What to do if you smell gas

- Close gas valve. Open windows.
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. 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.

DESIGN CERTIFIED

CERTIFIED

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Index

1 Important Safety Information

To prevent damage to property and injury to the user, the icons shown below will be used to warn of varying levels of danger. Every indication is critical to the safe operation of the water heater and must be understood and observed. Potential dangers from accidents during installation and use are divided into the following four categories. Closely observe these warnings; they are critical to your safety.

Icons warning of risk level

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Danger: DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Warning: WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Caution: CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Attention Installers

- In order to use the water heater safely, read this installation manual carefully, and follow the installation instructions.
- Failures and damage caused by erroneous work or work not as instructed in this manual are not covered by the warranty.
- Check that the installation was done properly in accordance with this Installation Manual upon completion.
- After completing installation, please either place this Installation Manual in a plastic pouch and attach it to the side of the water heater (or the inside of the pipe cover or recess box if applicable), or hand it to the customer to retain for future reference.

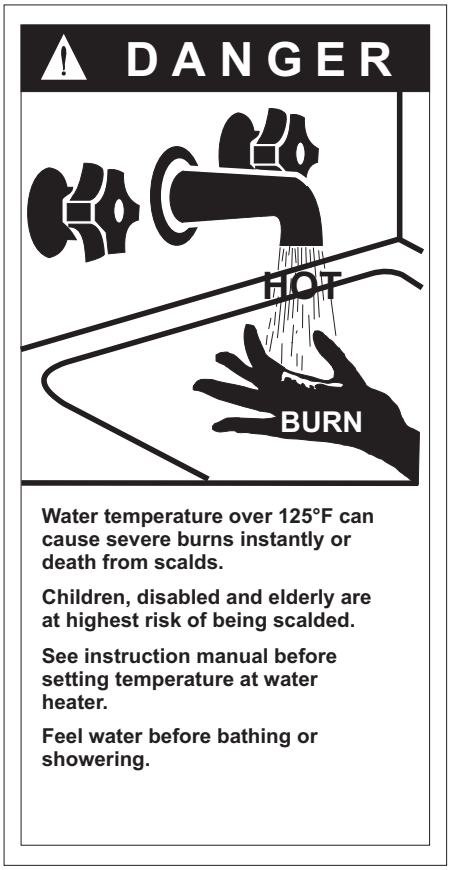


Fig. 1

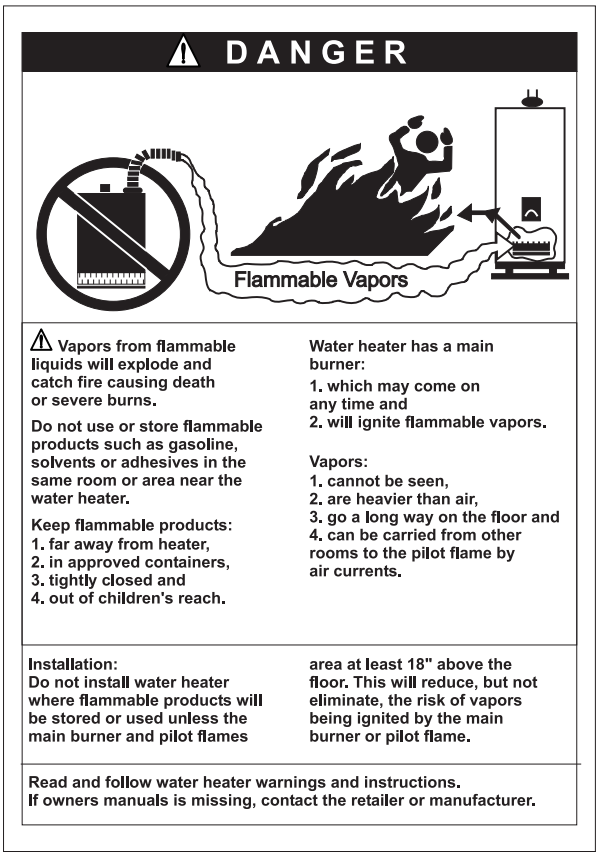


Fig. 2

Danger: [660 EF] - do not install outdoors!
Do not use the water heater if the exhaust pipe is displaced, has holes, is clogged or is corroded.

Danger: [660 EFO] - do not install indoors!
This will cause carbon monoxide poisoning and a potential fire hazard.

Danger: Do not allow anyone to change the water temperature while hot water is being used!
To prevent scalding, do not change the water temperature to a higher setting.

Warning: If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

Warning: This water heater does not have a pilot. It is equipped with an ignition device that automatically lights the burner. Do not try to light the burner by hand.

Warning: BEFORE OPERATING smell all around the water heater area for evidence of leaking gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
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 inyour building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Warning:
Use only your hand to turn the gas valve knob. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion.

Warning:
Do not use this water heater if any part has been under water. Immediately call a qualified service technician to inspect the water heater and to replace an damaged parts.

Warning:
When a gas leak is noticed:
1. Stop use immediately
2. Close the gas valve
3. [When installing indoors] Open windows and doors.

Warning:
If you detect abnormal combustion or abnormal odors, or during an earthquake, tornado or fire:
1. Turn off the hot water supply
2. Turn off the power to the water heater
3. Turn off gas and water supply valve.
4. Call the nearest Bosch agent.

Warning: Explosion Hazard!
If the temperature and pressure relief valve is dripping or leaking, have a qualified service technician replace it. Do not plug or remove the valve. Failure to follow these instructions can result in fire or explosion, and personal injury or death.

Warning:
Check the temperature of the running hot water before entering the shower. Check the temperature before stepping into the bath tub.

Warning:
Do not place the exhaust vent terminal in an indoor environment by means of adding walls and ceiling (do not enclose using corrugated sheets, etc.). Carbon monoxide poisoning or fire may occur as a result.

Warning:
Leave the proper clearance between the water heater and nearby objects (trees, timber, boxes with flammable materials etc.).

Warning:
Do not use combustible chemicals such as oil, gasoline, benzene etc. in the near the heater or the exhaust vent terminal.

Warning:
Do not place combustibles such as laundry, newspapers, oils etc. near the heater or the exhaust vent terminal.

Warning: [660 EF only]
Carbon Monoxide Poisoning Hazard.
Do not install this water heater in a mobile home, recreation vehicle or on a boat.

Warning: [660 EFO only]
Carbon Monoxide Poisoning Hazard.
Do not install this water heater in a recreation vehicle or on a boat.

Warning:
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

Warning:
Do not place or use a spray can near the heater or the exhaust vent terminal.

Warning:
Installation and service must be performed by a qualified installer, service agency or the gas supplier.

Warning: [When installing indoors 660 EF]
Check the air supply vent for dust or obstructions.

Warning:
If this unit will be installed in a beauty salon or other location where hair spray or aerosols will be used, locate the unit in a separate area that is supplied with fresh air from outdoors.

Warning:
Do not use hair spray or spray detergent in the vicinity of the heater.

Warning:
Do not allow small children to play unsupervised in the bathroom. Do not allow small children to bathe unsupervised.

Warning:
Do not touch the powercord with wet hands.

Warning:
Consult the nearest Bosch agent if the water heater location needs to be changed.

Warning:
Contact a qualified service technician for any necessary repairs, service or maintenance.

Warning:
Contact Bosch before using with a solar pre-heater.

Warning:
California Proposition 65 lists chemical-substances known to the state to cause cancer, birth defects, death, serious illness or other reproductive harm. This product may contain such substances, be their origin from fuel combustion (gas, oil) or components of the product itself.

Warning:
The gas conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in the instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury, or death. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

Caution:
Be sure to electrically ground the unit.

Caution:
Keep power cord free of dust.

Caution:
Do not use the water heater for other than hot water supply, shower and bath.

Caution:
Do not use a broken or modified power cord. Do not bind, bend or stretch power cords. Do not scratch, modify, or subject them to impact or force.

Caution:
To prevent burns or scalding, turn off the power button or power supply and wait until the equipment cools before performing maintenance.

Caution:
Do not turn off the water heater while someone is bathing.

Caution:
Do not cover the water heater and the exhaust vent terminal, store trash or debris near it, or in any way block the flow of fresh air to the unit.

Caution:
Do not install in locations where excessive dust or debris will be in the air.

Caution:
Do not touch the exhaust vent (pipe, terminal) during or immediately after operation of the water heater.

Caution:
Do not drink water that has been inside the unit for an extended period of time. Do not drink the first use of hot water from the unit in the morning.

Caution:
Clean the filter on the water inlet as frequently as required by the quality of your local water.

Caution:
Keep the area around the unit clean. If boxes, weeds, cobwebs, cockroaches etc. are in the vicinity of the unit, damage or fire can result.

Caution:
Do not install the equipment where the exhaust will blow on walls or windows.

Caution:
Treat hard, acidic or otherwise impure supply water with approved methods to ensure full warranty coverage.

Caution:
Problems resulting from scale formation are not covered by the warranty.

Caution:
Check ignition during use and extinction after use.

Caution:
Do not run water through the unit when unit is not on. When discharging hot water, make sure the unit is ON. If water is run through the unit with the unit OFF, water may condense inside the unit and cause incomplete combustion or damage to the internal electrical components. For single-handle fixtures or valves, discharge water setting the handle completely to the water side.

Caution:
This unit is only approved for installation up to 1350m (4500 ft.) above sea level. For installations at higher elevations, contact Bosch Thermotechnology Corp. for Instructions.

Caution:
Do not disassemble the remote controller. Do not use benzene, oil or fat detergents to clean the remote controller. This may cause deformation. Do not get the remote controller wet. Although it is water resistant, too much water can cause damage. Do not splash water on the remote controller. Do not expose the remote controller to steam. Do not locate the remote controller near stoves or ovens, this may cause damage or failure.

Caution:
Preventing damage from freezing (see section 6.2). Damage can occur from frozen water within the device and pipes even in warm environments. Be sure to read below for appropriate measures. Repairs for damage caused by freezing are not covered by the warranty.

Caution:
Take necessary measures to prevent freezing of water and leakage of gas when leaving the unit unused for long periods of time (see section 6.2).

Caution:
If it is snowing, check the air inlet, exhaust gas vent and exhaust vent terminal for blockage.

Caution:
Do not use parts other than those specified for this equipment.

2 Appliance details

2.1 Features

Parts included with the unit

- Tapping Screw
- Installation Manual/user manual with warranty inside (this document)
- Cross Recess Head Screw (660 EFO NG, 660 EFO LP)
- Power Cord (660 EF NG, 660 EF LP).

Accessories (Bosch part #)

- Optional Remote Control to operate with the appliance BRC01US for USA, BRC01CA for Canada
- Isolation Valves (includes pressure relief valve)
- Remote Controller Outdoor Junction Box (BOJB)
- Remote Controller cord 3m (10ft) BRC10CORD
- Remote Controller cord 8m (26ft) BRC26CORD
- Recess Box BRBKIT (for 660 EFO only)
- Pipe Cover (BPCKIT).

BOSCH is constantly improving its products, therefore specifications are subject to change without prior notice.

2.2 Specifications (Technical data)

Approved in US/Canada

Capacity

Maximum flow rate: 5.3 GPM (20 l/min) at a 45°F (25°C) rise.

Maximum Input

140,000 Btu/h (41,03 kW)

Minimum Input

20,000 Btu/h (5.67 kW)

Temperature Control

Selection range: 100°F (37°C) - 160°F (70°C)

Default temperature: 120°F (50°C)

Temperature Settings using the remote controller:
USA
100- 150 °F (5°F intervals), 160 °F
Canada
37-48°C (In 1°C intervals), 50-70°C (In 5°C intervals)

Gas Requirement

Gas connection (inches) - ¾"

Inlet gas pressure under operation (with a high hot water flow rate)

- Propane: 8" - 14" water column
- Natural Gas: 4" - 10.5" water column.

Power Supply Consumption

- Freeze Prevention 141W.

Water

- Hot water connection (inches) - ¾"
- Cold water connection (inches) - ¾"
- Minimum water flow: 0.5 gallon/minute (2 l/m)
  Note: The capacity may differ slightly, depending on the water pressure, water supply, piping conditions, and water temperature
- Water pressure recommend: 29 to 70 psi
- Connections:
  – Bottom of heater

Dimensions

- Depth (in): 6.7" (170 mm)
- Width (in): 13.8" (350 mm)
- Height (in): 20.5" (520 mm)
- Weight: 36 pounds (16.3 kg).

Gas types

Natural Gas.
LP Gas.

Voltage

120 V AC (60 Hz) nominal

Safety devices

- Flame Rod
- Thermal Fuse
- Lightning Protection Device (ZNR)
- Overheat Prevention Device
- Freezing Prevention Device
- Fan Rotation Detector.

If this water heater is being installed at an elevation of 2,000' (610m) or higher, disconnect the connector labeled "High Elevation Disconnect". This connector is located inside the unit.

2.3 Before Installation

Danger: Checkup!
Check the fixing brackets and vent pipe yearly for damage or wear. Replace if necessary.

Danger: Check the gas!
- Check that the rating plate indicates the correct type of gas.
- Check that the gas supply line is sized for 140,000 BTU for 660 EF, 660 EFO.)

Model/*Modèle* : 660EFO
Gas type/*Le type de gaz* : LP Gas/*GPL*
Input/*Debit calorifique* : Max. 140,000 BTU
~ Min. 20,000 BTU
Recovery Rate/*Calibre de recouvrement* : 140 Gal/hr./530 l/hr.
Inlet Gas Pressure/*Pression de gaz entrée* : Min. 8.0 ~ Max.14.0" W.C.
Manifold Gas Pressure/*Pression d'admission* : Min. 0.7 ~ Max. 2.8" W.C.
Water Supply Pressure/*Pression d'eau max.* : Min. 15 psi ~ Max.150 psi
Electrical Rating/*Régime nominal électrique* : AC 120 Volts 60Hz, less than 2 amperes
Suitable for water (potable) heating and space heating/*Pour chauffage de l'eau (potable) et des locaux*
Suitable for installation in a manufactured home(mobile home)
/Pour installation dans une maison préfabriquée(mobile)
For gas conversion information, contact Bosch Thermotechnology Corp
/Pour l' information de conversion de gaz, contact Bosch Thermotechnology Corp
ANSI Z21. 10.3b-2008/CSA 4.3b-2008 Low NOx Approved by SCAQMD

	0 - 2,000 Ft. (0 - 610 m)	2,000 - 4,500 Ft.* (610 - 1,370 m*)
Input/*Entrée*	140,000 Btu/h Max.	135,000 Btu/h Max.
Output/*Rendement*	115,000 Btu/h Max.	111,000 Btu/h Max.
Orifice size/ *Dimension des injecteurs*	1.5 mm	1.5 mm
Manifold Pressure/ *Pression à la tubulure d'alimentation*	2.8" W.C. Max.	2.8" W.C. Max.
Altitude for which factory equipped/ *Altitude pour laquelle l'usine a équipé*	0 - 2,000 ft.(0 - 610 m)	2,000 - 4,500 ft*. (610 - 1,370 m*)
Gas Type */ Type de Gaz*	LP Gas/*GPL*	LP Gas/*GPL*

* Installations above 2000 ft (610 m) require an adjustment. See Installation Instructions for details./ *Installations au-dessus de 2000 ft (610 m) exigent un ajustement. Voir les instructions d'installation pour des détails.*

SERIAL NUMBER (*NUMÉRO DE SÉRIE*) @@@@.@@ - @@@@@@
Made in Japan/*Fabriqué au JAPON* NR99 +++++

Fig. 3 Ex. For LP Gas 660 EFO

Warning: Check the power!
The power supply required is 120VAC, at 60Hz. May result in fire or electric shock.

Warning: Use Extreme Caution if Using With a Solar Pre-Heater!
Using this unit with a solar pre-heater can lead to unpredictable output temperatures and possibly scalding. If absolutely necessary, use mixing valves to ensure output temperatures do not get to scalding levels.

Caution: Do Not Use Equipment for Purposes Other Than Those Specified!
Do not use for other than increasing the temperature of the water supply, as unexpected accidents may occur as a result.

Caution: Check Water Supply Quality!
If the water supply is in excess of 6 grains per gallon (100 mg/L) of hardness, acidic or otherwise impure, treat the water with approved methods in order to ensure full warranty coverage.

2.4 Dimensions (660 EF)

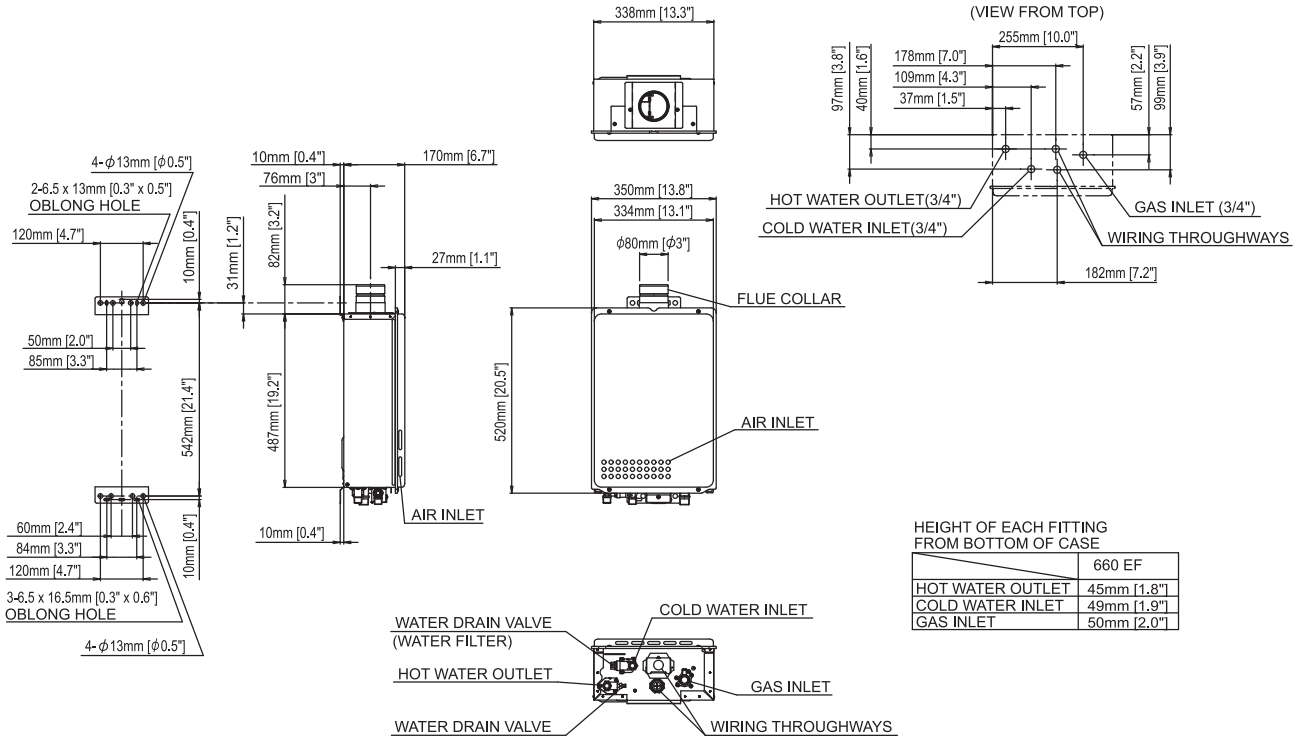


Fig. 4 Dimensions

2.5 Dimensions (660 EFO)

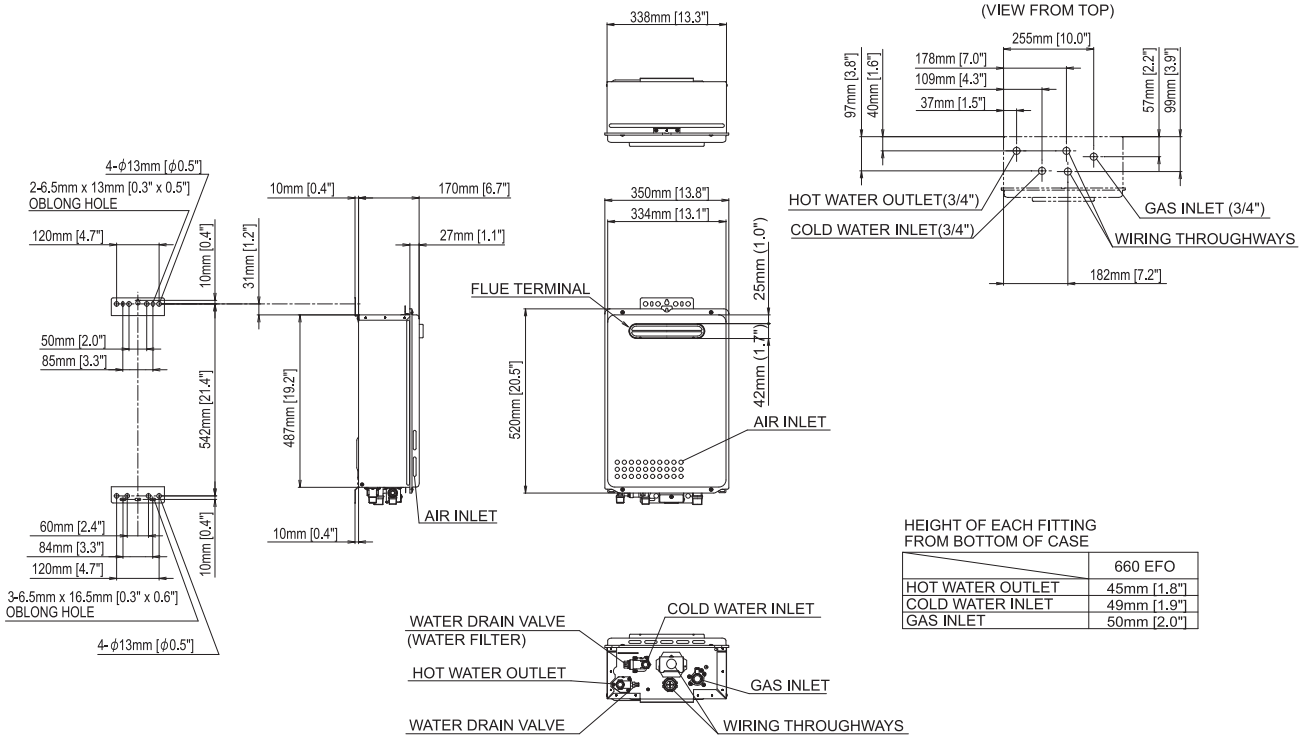


Fig. 5 Dimensions

3 Installation instructions

3.1 Specialized tools

The following specialized tools may be required for installation:

- Manometer
- Multimeter
- Combustion Gas Analyzer.

3.2 Introduction

Please follow these instructions. Failure to follow instructions may result in:

- ▶ Damage or injury.
- ▶ Improper operation.
- ▶ Loss of warranty.

Warning: The water heater must be installed by a qualified installer in accordance with these instructions. If improperly installed, a hazardous condition such as explosion or carbon monoxide poisoning could result. Bosch Thermotechnology Corp. is not responsible for improperly installed appliances.

3.3 Venting (660 EF only)

Warning:
CARBON MONOXIDE POISONING!
Follow all vent system requirements in accordance with relevant local or state regulation,or, in the absence of local or state code, in the U.S. to the National Fuel Gas Code ANSIZ233.1/NFPA 54 – latest edition, and in Canada, in accordance with NSCNGPI.

3.3.1 Vent piping

- Bosch Vent System is suggested for the vent system. If Bosch Vent is not used, a UL listed category III ventsystem must be used
- Follow the vent pipe manufacturer's installation instructions.

660 EF	
Pipe diameter	3'' (75mm)

Table 1

No. of elbows	Max. Straight Vent Length[1)]
3	15' (4.5m)
2	25' (7.5m)
1	35' (10.6m)

Table 2

1) Not including the termination.

- Make the vertical section of the exhaust ventas short as possible
- Maintain the same vent pipe diameter from the heater flue to the vent termination.

Clearances

Manufacturer and Product	Enclosed		Unenclosed	
	Hort.	Vert.	Hort.	Vert.
Bosch Vent System	10" (250mm) (sides) 15" (375mm) (top) 6" (150mm) (bottom)	4" (100mm)	1" (25mm)	1" (25mm)

Table 3

Clearances vary by manufacturer, refer to the UL approved clearances when using materials other than Bosch Vent System.

- The first vertical run from the top of the heater should be no longer than 0.9m (3')
- Make sure vent pipe is gas tight and will not leak. Use silicon sealant wherever necessary
- Do not common vent or connect more than one appliance to this venting system
- The total vent length including horizontal & vertical-vent runs should be no less than 3' (0.9m).
- Do not store hazardous or flammable substances near the vent termination and check that the termination is not blocked in any way
- Steam or condensed water may come out from the vent termination. Select the location for the termination so as to prevent injury or property damage
- If snow is expected to accumulate, take care the end of the pipe is not covered with snow or hit by falling lumps of snow
- Consult the vent pipe manufacturer's installation instructions for chimney connections.

Appliance Adapters

When using a vent system other than Bosch Vent, an appliance adapter will be required to properly connect the vent to this appliance. Consult the manufacturer's instructions for the proper appliance adapter.

Horizontal Vent Termination

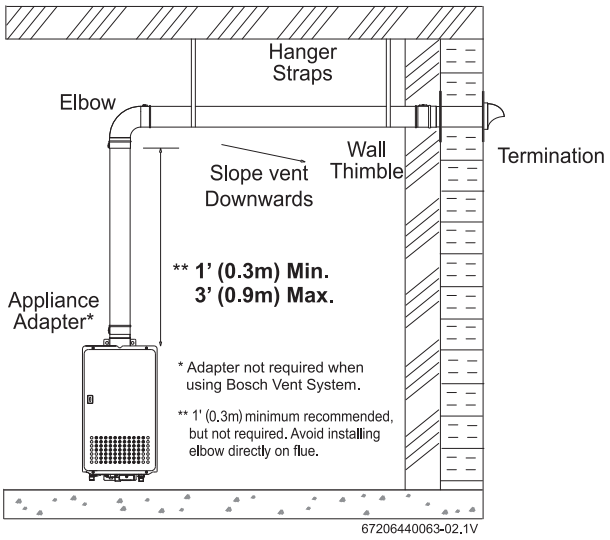


Fig. 6

- Terminate at least 12" (300mm) above grade or above snow line.
- Terminate at least 7' (2.1m) above a public walkway, 6' (1.8m) from the combustion air intake of any appliance, and 3' (0.9m) from any other building opening, gas utility meter, service regulator etc.
- Terminate at least 3' (0.9m) above any forced air inlet within 10' (3m), 4' (1.2m) below, 4' (1.2m) horizontally from or 1' (0.3m) above any door, window, or gravity air inlet into any building per National Fuel Gas Code ANSI Z223.1/NFPA 54.
- Slope the horizontal vent 1/4" downwards for every 12" (300mm) toward the termination.
- In the Commonwealth of Massachusetts a carbon monoxide detector is required for all side wall horizontally vented gas fuel equipment.

Vertical Vent Termination

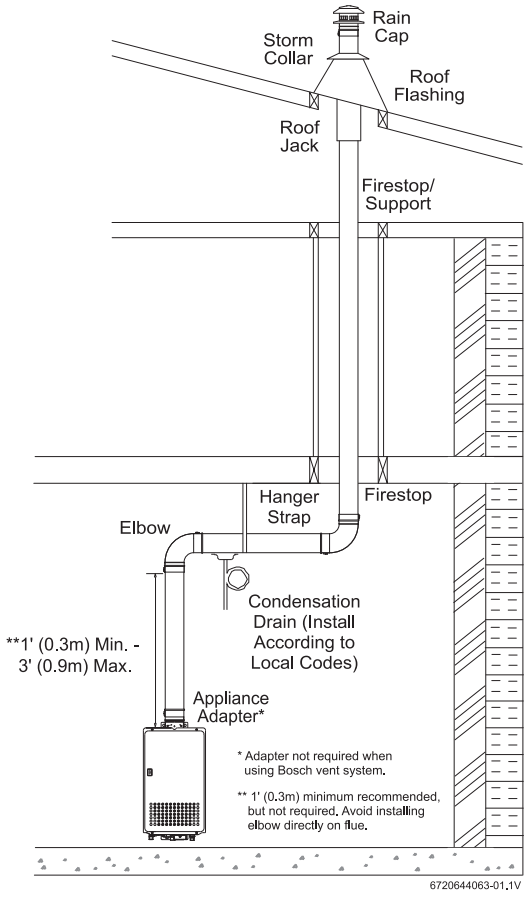
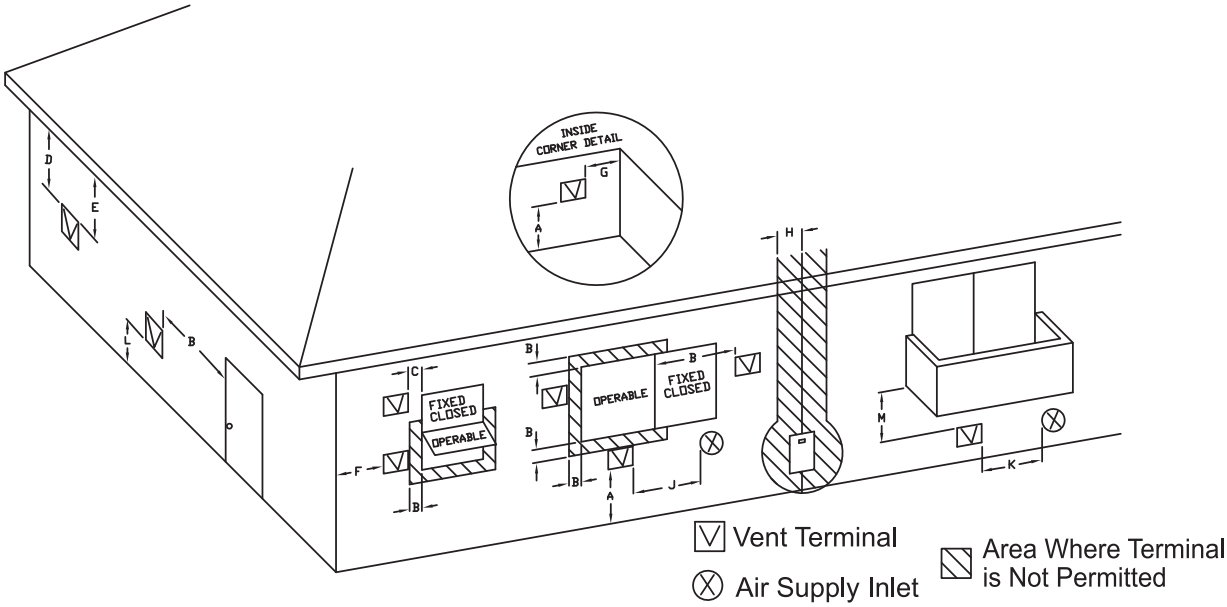


Fig. 7

- Terminate at least 6' (1.8m) from the combustion air intake of any appliance, and 3' (0.9m) from any other building opening, gas utility meter, service regulator etc.
- Enclose exterior vent systems below the roofline to limit condensation and protect against mechanical failure.
- When the vent penetrates a floor or ceiling and is not running in a fire rated shaft, a firestop and support is required.
- When the vent termination is located not less than 8' (2.4m) from a vertical wall or similar obstruction, terminate above the roof at least 2' (0.6m), but not more than 6' (1.8m), in accordance with the National Fuel Gas Code ANSI Z223.1/NFPA 54.
- Provide vertical support every 12' (3.6m) or as required by the vent pipe manufacturer's instructions.
- Slope the horizontal vent 1/4" for every 12" (300mm) towards the drain tee.
- A short horizontal section is recommended to prevent debris from falling into the water heater.
- Install a condensation drain in the horizontal section of the venting. For installations in tight spaces where there is not enough room to install two elbows and a horizontal drain tee, a vertical drain tee may be substituted.

Clearance Requirements from Vent Terminations to Building Openings

*All clearance requirements are in accordance with ANSI Z21.10.3 and the National Fuel Gas Code, ANSI Z223.1 and in Canada, in accordance with NSCNGPIC.



	Clearance	Indoor Installation (See p.9)	Outdoor Installation (See p.10)
A	Above grade, veranda, porch, deck, or balcony	12"(300mm) [300mm (12")]	12"(300mm) [300mm (12")]
B	Window or door that may be opened	4' (1.2m) below or to the side of opening, or 1' (0.3m) above opening [900mm (36")]	12"(300mm) [900mm (36")]
C	Permanently closed window	*	*
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 0.6m (2') from the center of the terminal	*	*
E	Unventilated soffit	*	*
F	Outside corner	*	*
G	Inside corner	*	*
H	Each side of center line extended above meter/regulator assembly	3' (0.9m) within a height 15' (4.5m) above meter/regulator assembly	3' (0.9m) within a height 15' (4.5m) above meter/regulator assembly
I	Service regulator vent outlet	3' (0.9m)	3' (0.9m)
J	Nonmechanical air supply inlet or combustion air inlet to any other appliance	4' (1.2m) below or to the side of opening, or 1' (0.3m) above opening [36" (900mm)]	12" (300mm) [36" (900mm)]
K	Mechanical air supply inlet	3' (0.9m) above if within 10' (3m) [6' (1.8m)]	3' (0.9m) above if within 10' (3m) [6' (1.8m)]
L	Above paved sidewalk or paved driveway located on public property	[7' *** (2.1m)***]	[7' *** (2.1m)***]
M	Under veranda, porch, deck, or balcony	*[12" (300mm) - Canada Only]****	*[12" (300mm) - Canada Only]****

[ ]= indicates clearances required in Canada
* Maintain clearances in accordance with local installation codes and the requirements of the gas supplier
*** A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
**** Permitted only if veranda,porch,deck,or balcony is fully open on a minimum of two sides beneath the floor.

Fig. 8

3.3.2 Clearance Requirements from Vent Terminations to Building Openings

All clearance requirements are in accordance with ANSI Z21.10.3 and the National Fuel Gas Code, ANSI Z223.1 and in Canada, in accordance with NSCNGPIC.

Vent Clearances When Heater is Installed Indoors (For 660 EF appliance)

Maintain the following clearances to any opening in any building:

- 4' (1.2m) below, 4' (1.2m) horizontally from, or 1' (0.3m) above any door, operable window, or gravity air inlet into any building. 3' (0.9m) above any forced air inlet within 10' (3m).

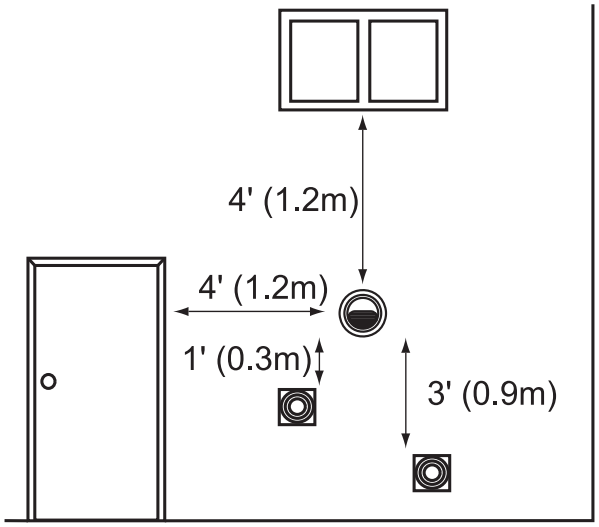


Fig. 9

For Installations in Canada, clearances are as follows: To windows, doors, & gravity air inlets: 36" (900mm). To forced air inlets: 6' (1.8m). These clearance requirements hold true for all of the above situations: Indoor.

Outdoor Clearances to Opening into any Building (For 660 EFO appliance)

Maintain the following clearances to any opening in any building:

- 1' (0.3m) below, 1' (0.3m) horizontally from, or 1' (0.3m) above any door, operable window, or gravity air inlet into any building. 3' (0.9m) above any forced air inlet within 10' (3m).

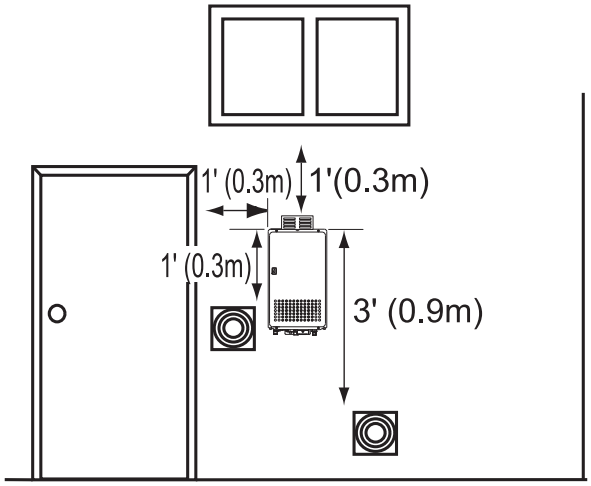


Fig. 10

Vent Clearances When Heater is Installed in a Recess Box (For 660 EFO appliance)

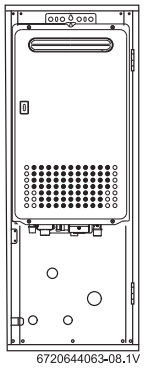


Fig. 11 Recess box installation with cover removed

Maintain the following clearances to any opening in any building:

- 1' (0.3m) below, 1' (0.3m) horizontally from, or 1' (0.3m) above any door, operable window, or gravity air inlet into any building. 3' (0.9m) above any forced air inlet within 10' (3m).

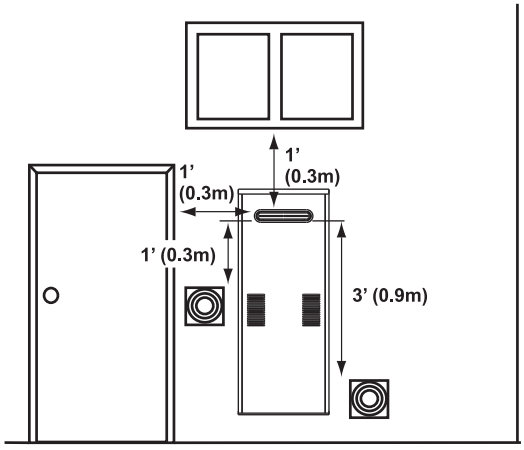


Fig. 12

For Installations in Canada, clearances are as follows: To windows, doors, & gravity air inlets: 36" (900mm). To forced air inlets: 6' (1.8m).

3.4 Combustion air requirements

Combustion Air

Supply combustion air to the units as per the National Fuel Gas Code, ANSI Z223.1 and in Canada, in accordance with NSCNGPIC.

- Provide two permanent openings to allow circulation of combustion air.
- Make each opening 180 square inches if they provide indoor air, and 100 square inches for outdoor air.
- If the unit is installed in a mechanical closet, provide a 24" (600mm) clearance in front of the unit to the door.
- If combustion air will be provided through a duct, size the duct to provide 60 cubic feet of fresh air per minute.

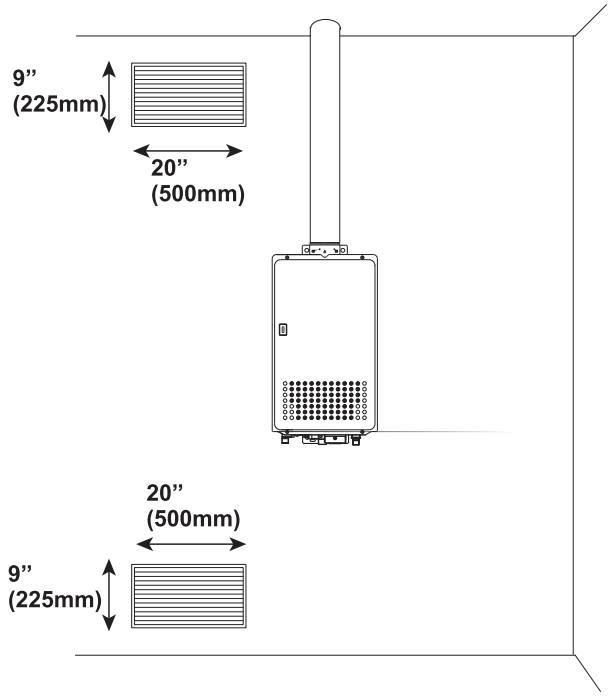


Fig. 13

Attention residents of the Commonwealth of Massachusetts:

In the Commonwealth of Massachusetts the following regulation went into effect on 12/30/2005:

(a)For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

a.In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an at tic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.

b. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS. Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE. A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

4. INSPECTION. The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.

(b)EXEMPTIONS: The following equipment is exempt from 248 CMR 5.08(2)(a)1 through 4:

1. The equipment listed in Chapter 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and

2. Product approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURERS REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM REQUIRED. When the manufacturer of Product Approved side wall horizontally mounted gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for the installation of the equipment and the venting shall include:

1. Detailed instructions for the installation of the venting system or the venting system components: and

2. A complete parts list for the venting system design or venting system.

(d) MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED. When the manufacturer of a product approved side wall horizontally vented gas fueled equipment does not provide the parts for the venting of flue gases, but identifies "special venting systems," the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and

2. The "special venting systems" shall be product approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all products approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

3.5 Choosing Installation Site

Locate the appliance in an area where leakage from the unit or connections will not result in damage to the area adjacent to the appliance or to the lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance. The pan must not restrict combustion air flow.

Danger: Install the exhaust vent (terminal) so that there are no obstacles around the termination and so that exhaust can't accumulate. Do not enclose the termination with corrugated metal or other materials.

Danger: Model 660 EFO is for outdoor installation only. Never install it indoors. Do not enclose the termination with corrugated metal or other materials. This will cause carbon monoxide poisoning and a potential fire hazard.

Warning: Avoid places where fires are common, such as those where gasoline, benzene and adhesives are handled, or places in which corrosive gases (ammonia, chlorine, sulfur, ethylene compounds, acids) are present. Using the incorrect voltage may result in fire or cracking.

Warning: Avoid installation in places where dust or debris will accumulate. Dust may block the air-supply opening, causing the performance of the device fan to drop and incomplete combustion to occur as a result.

Warning: Avoid installation in places where special chemical agents (e.g., hair spray or spray detergent) are used. Ignition failures and malfunction may occur as a result.

Warning: [660 EF only]
Carbon Monoxide Poisoning Hazard.
Do not install this water heater in amobile home, recreation vehicle or on a boat.

Warning: [660 EFO only]
Carbon Monoxide Poisoning Hazard.
Do not install this water heater in a recreational vehicle or on a boat.

Caution: Install the water heater in a location where it is free from obstacles and stagnant air.

Caution: Consult with the customer concerning the location of installation.

Caution: Do not install the water heater near staircases or emergency exits.

Caution: Do not install the water heater where the exhaust will blow on outer walls or material not resistant to heat. Also consider the surrounding trees and animals. The heat and moisture from the water heater may cause discoloration of walls and resinous materials, or corrosion of aluminum materials.

Caution: Do not locate the vent termination directed towards a window or any other structure which has glass or wired glass facing the termination.

Caution: [660 EF]
Avoid installation above gas ranges or stoves.

Caution: [660 EF]
Avoid installation between the kitchen fan and stove. If oily fumes or a large amount of steam are present in the installation location, take measures to prevent the fumes and steam from entering in the equipment.

Caution:
Install in a location where the exhaust gas flow will not be affected by fans or range hoods.

Caution:
Take care that noise and exhaust gas will not affect neighbors. Avoid installation on common walls as the unit will make some operational noises while it is running.

Caution:
Make sure that the location allows installation of the exhaust vent as specified.

State of California:
The water heater must be braced, anchored or strapped to avoid moving during an earthquake. Contact local utilities for code requirements in your area or call: 1-866-330-2730 and request instructions.

The Commonwealth of Massachusetts:
1) The outdoor units (EFO) can only be used if they are for summer use only.
2)The water heater can be used for hot water only and not in a combination of domestic and space heating.

For Venting Manufacturers Requirements, see websites or phone numbers listed below:
Bosch Vent System www.boschpro.com

3.6 Installation Clearances

Warning: Before installing, check for the following:
Install in accordance with relevant building and mechanical codes, as well as any local, state or national regulations, or in the absence of local and state codes, to the National Fuel Gas Code ANSIZ223.1/NFPA 54 – latest edition. In Canada, see NSCNGPIC for detailed requirements.

For 660 EF
Required Clearances From Heater

- Maintain the following clearance from both combustible and non-combustible materials.

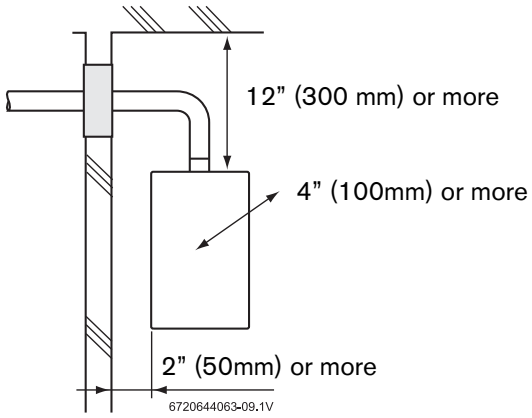


Fig. 14

Cooking Equipment

- If the unit will be installed in the vicinity of a permanent kitchen range or stove that has the possibility of generating steam that contains fats or oils, use a dividing plate or other measure to ensure that the unit is not exposed to air containing such impurities
- The dividing plate should be of noncombustible material of a width greater than the water heater.

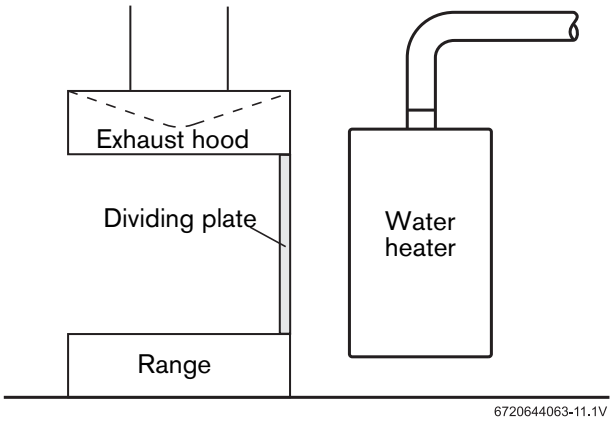


Fig. 15

Securing of space for repair/inspection

- If possible, leave 8" (200mm) or more on either side of the unit to facilitate inspection.
- If possible, leave 24" (600mm) or more in front of the unit to facilitate maintenance and service if necessary.
- If possible, leave 3" (75mm) or more above and below the vent pipe to facilitate inspection and repair if necessary.

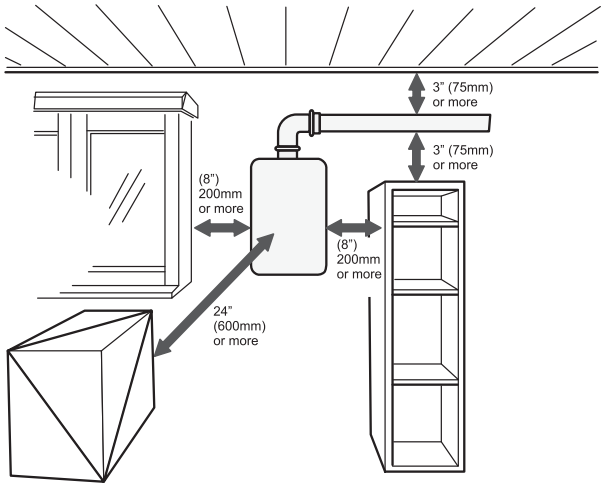
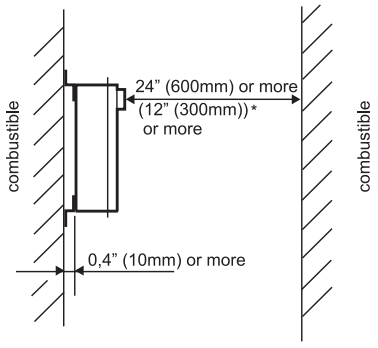


Fig. 16

For 660 EFO
Required Clearances From Heater

- Maintain the following clearance from both combustible and non-combustible materials.

* ( ) indicates the distance when installing a heat insulating board (non-combustible material other than metal, with thickness of 0.1" (2.5mm) or more) or "section of building effectively finished with non-combustible material." Note, however, that combustion failure may occur to the unit as exhaust gas reflects from the wall. Provide clear-ance of 24" (600mm) or more in the front of the unit to facilitate inspection and repair.



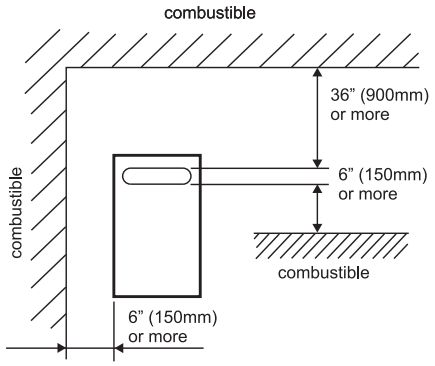


Fig. 17

Surrounding the area of installation

- When installing the unit in a common side corridor, provide a clearance of 47" (1175mm) or more in front of the unit.
- Set the bottom edge of the exhaust port about 84" (2100mm) from the corridor floor.

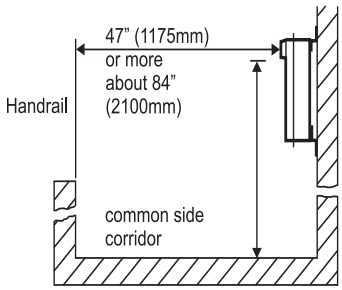


Fig. 18

- When installing the unit on a balcony, etc., secure an evacuation route of 24" (600mm) or more in width.
- Provide clearance of 24" (600mm) or more in front of the unit to facilitate inspection and repair. Do install the unit such as the wall of the second floor where the unit is out of reach.

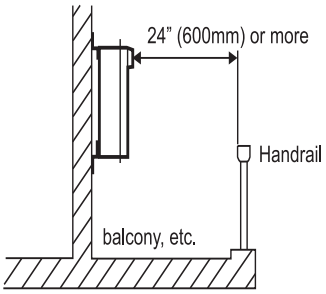


Fig. 19

3.7 Installation

3.7.1 Securing to the wall

Be sure to:

- The weight of the device will be applied to the wall. If the strength of the wall is not sufficient, reinforcement must be done to prevent the transfer of vibration.
- Do not drop or apply unnecessary force to the device when installing. Internal parts maybe damaged and may become highly dangerous.
- Install the unit on a vertical wall and ensure that it is level.

3.7.2 Locating Scew Holes

Caution:

- When installing with bare hands, take caution to not inflict injury.
- Be careful not to hit electrical wiring, gas, or water piping while drilling holes.

1. Drill a single screw hole, making sure to hit a stud.

2. Insert and tighten the screw and hang the unit by the upper wall mounting bracket.

3. Determine the positions for the remaining four screws (two for the top bracket and two for the bottom), and remove the unit.

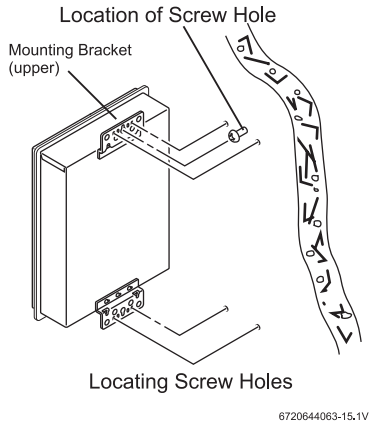


Fig. 20

3.7.3 Mounting

4. Drill holes for the remaining four screws.

5. Hang the unit again by the first screw, and then insert and tighten the remaining four screws.

6. Take waterproofing measures so that water does not enter the building from screws mounting the device.

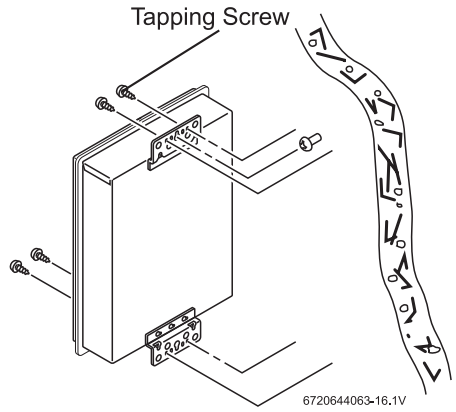


Fig. 21

3.7.4 Structure

- Make sure the unit is installed securely so that it will not fall or move due to vibrations or earthquakes.

3.7.5 Installations at Elevations Above 2,000' (610m)

- If this water heater is being installed at an elevation of 2,000' (610m) or higher, disconnect the connector labeled "High Elevation Disconnect" as illustrated on the right. This connector is located inside the unit.
- Disconnect power to the water heater before disconnecting this connector. Failure to perform this step will result in a flashing light on the unit or a "73" code displayed on the optional remote controller and a cease in operation. If this occurs, disconnect, then reconnect power to the water heater to reset the system.

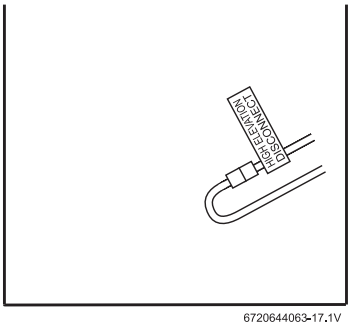


Fig. 22

3.8 Gas piping

Follow the instructions from the gas supplier.

The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig (3.5 kPa).
The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig (3.5 kPa).
The appliance and its gas connections must be leak tested before placing the appliance in operation.
The inlet gas pressure must be within the range specified. This is for the purposes of input adjustment.
In order to choose the proper size for the gas line, consult local codes or the National Fuel Gas Code ANSI Z223.1.

Gas Pressure

Size the gas line according to total btuh demand of the building and length from the meter or regulator so that the following supply pressures are available even at maximum demand:

- Natural Gas Supply Pressure
  Min.4" WC
  Max.10.5" WC
- LP Gas Supply Pressure
  Min.8" WC
  Max.14" WC.

Gas Meter

- Select a gas meter capable of supplying the entire btuh demand of all gas appliances in the building.

Gas Connection

- Do not use piping with a diameter smaller than the inlet diameter of the water heater.
- Gas flex lines are not recommended unless they are rated for 140,000 btuh (660 EF/660 EFO).
- Install a gas shutoff valve on the supply line.
- Use only approved gas piping materials.

Measuring Gas Pressure

- In order to check the gas supply pressure to the unit, a tap is provided on the gas inlet. Remove the hex head philips screw from the tap, and connect a manometer using a silicon tube.
- In order to check the gas manifold pressure, a pair of taps are provided on the gas valve inside the unit.The pressure can be checked either by removing the hex-head philips screw and connecting a manometer with a silicon tube, or by removing the 1/8" NPT screw with an allen wrench and connecting the appropriate pressure gauge.

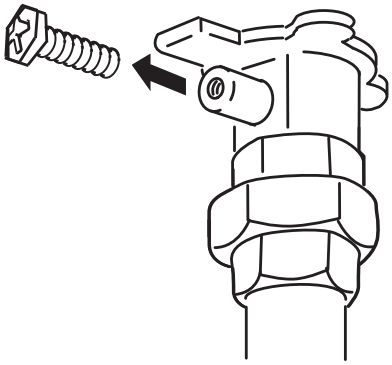
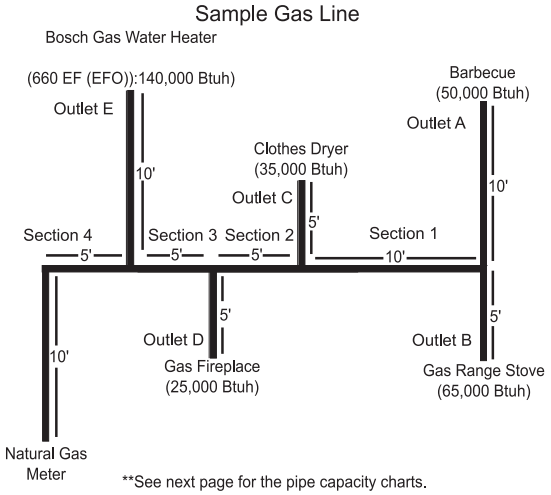


Fig. 23



Instructions

1. Size each outlet branch starting from the furthest using the Btuh required and the length from the meter.
2. Size each section of the main line using the length to the furthest outlet and the Btuh required by everything after that section.

Sample Calculation

Outlet A: 45' (13.5m) (Use 50' (15m)), 50,000 Btuh requires 1/2"
Outlet B: 40' (12m), 65,000 Btuh requires 1/2"
Section 1: 45' (13.5m) (Use 50' (15m)), 115,000 Btuh requires 3/4"
Outlet C: 30' (9m), 35,000 Btuh requires 1/2"
Section 2: 45' (13.5m) (Use 50' (15m)), 150,000 Btuh requires 3/4"
Outlet D: 25' (7.5m) (Use 30' (9m)), 25,000 Btuh requires 1/2"
Section 3: 45' (13.5m) (Use 50' (15m)), 175,000 Btuh requires 1"
Outlet E: 25' (7.5m) (Use 30' (9m)),
140,000 Btuh requires 3/4" (660EF (EFO))
Section 4: 45' (13.5m) (Use 50' (15m)),
315,000 Btuh requires 1-1/4" (660EF (EFO))

Gas Line Sizing For a BOSCH Gas Water Heater

Gas Line Sizing for a Bosch Gas Water Heater

Adapted from UPC 1997

Maximum **Natural Gas** Delivery Capacity in Cubic Feet per Hour (0.60 Specific Gravity, 0.5" WC Pressure Drop)

Pipe Size	Length in Feet										
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'
1/2"	174	119	96	82	73	66	61	56	53	50	44
3/4"	363	249	200	171	152	138	127	118	111	104	93
1"	684	470	377	323	286	259	239	222	208	197	174
1 1/4"	1404	965	775	663	588	532	490	456	428	404	358
1 1/2"	2103	1445	1161	993	880	798	734	683	641	605	536
2"	4050	2784	2235	1913	1696	1536	1413	1315	1234	1165	1033
2 1/2"	6455	4437	3563	3049	2703	2449	2253	2096	1966	1857	1646
3"	11,412	7843	6299	5391	4778	4329	3983	3705	3476	3284	2910
3 1/2"	16,709	11,484	9222	7893	6995	6338	5831	5425	5090	4808	4261
4"	23,277	15,998	12,847	10,995	9745	8830	8123	7557	7091	6698	5936

Contact the Gas Supplier for Btu/Cubic Ft. of the Supplied Gas. 1000 BTU/Cubic Ft. is a Typical Value

Maximum **Liquified Petroleum** (Undiluted) Delivery Capacity in Thousands of Btuh (0.5" WC Pressure Drop)

Pipe Size	Length in Feet												
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
1/2"	275	189	152	129	114	103	96	89	83	78	69	63	55
3/4"	567	393	315	267	237	217	196	185	173	162	146	132	112
1"	1071	732	590	504	448	409	378	346	322	307	275	252	213
1 1/4"	2205	1496	1212	1039	913	834	771	724	677	630	567	511	440
1 1/2"	3307	2299	1858	1559	1417	1275	1181	1086	1023	976	866	787	675
2"	6221	4331	3465	2992	2646	2394	2205	2047	1921	1811	1606	1496	1260

** For reference only. Please consult gas pipe manufacturer for actual pipe capacities.

Maximum Capacity of Flex TracPipe® in Cubic Feet per Hour of **Natural Gas** (0.60 Specific Gravity, 0.5" WC Pressure Drop)

Pipe Size	Length in Feet											
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	150'	200'
3/4"	206	147	121	105	94	86	80	75	71	67	55	48
1"	383	269	218	188	168	153	141	132	125	118	94	82
1 1/4"	614	418	334	284	251	227	209	194	181	171	137	116
1 1/2"	1261	888	723	625	559	509	471	440	415	393	320	277
2"	2934	2078	1698	1472	1317	1203	1114	1042	983	933	762	661

Maximum Capacity of Flex TracPipe® in Thousands of Btuh **Liquified Petroleum** (0.5" WC Pressure Drop)

Pipe Size	Length in Feet											
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	150'	200'
3/4"	325	232	191	166	149	136	126	118	112	106	87	76
1"	605	425	344	297	265	241	222	208	197	186	143	129
1 1/4"	971	661	528	449	397	359	330	307	286	270	217	183
1 1/2"	1993	1404	1143	988	884	805	745	696	656	621	506	438
2"	4638	3285	2684	2327	2082	1902	1761	1647	1554	1475	1205	1045

** For reference only. Please consult gas pipe manufacturer for actual pipe capacities.
TracPipe® is a registered trademark of Omega Flex.

Maximum Capacity for Gas Flex Connectors in Cubic Feet per Hour of **Natural Gas** (0.60 Specific Gravity, 0.5" WC Pressure Drop)

Pipe Size	Length in Inches					
	12"	24"	36"	48"	60"	72"
1/2"	180	150	125	106	93	86
3/4"	—	290	255	215	197	173
1"	—	581	512	442	397	347
1 1/4"	—	1470	1200	1130	960	930

Maximum Capacity for Gas Flex Connectors in Thousands of Btuh **Liquified Petroleum** (0.5" WC Pressure Drop)

Pipe Size	Length in Inches					
	12"	24"	36"	48"	60"	72"
1/2"	288	240	200	169	149	137
3/4"	—	465	409	344	315	278
1"	—	930	825	708	638	556
1 1/4"	—	2352	1920	1808	1536	1488

** For reference only. Please consult gas pipe manufacturer for actual pipe capacities.

3.9 Water piping

Installation and service must be performed by a qualified plumber. In the Commonwealth of Massachusetts, this product must be installed by a licensed plumber or gas fitter in accordance with the Massachusetts Plumbing and Fuel Gas Code 248 CMR Sections 2.00 and 5.00. Observe all applicable codes.

This appliance is suitable for potable water and space heating applications. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and replace any part of the control system and gas control which has been under water. If the water heater is installed in a closed water supply system, such as one having a backflow preventer in the coldwater supply line, means shall be provided to control thermal expansion. Contact the water supplier or a local plumbing inspector on how to control this situation. A pressure relief valve must be installed near the hot water outlet that is rated in accordance with and complying with either The Standard for Relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22, orThe ANSI/ ASME Boiler and Pressure Vessel Code, Section IV(Heating Boilers). This pressure relief valve must be capable of an hourly Btu rated temperature steam discharge of 140,000 Btuh for 660 EF-(O)). Multiple valves may be used. The pressure relief capacity must not exceed 150 psi. No valve shall be placed between the relief valve and the water heater. The relief valve must be installed such that the discharge will be conducted to a suitable place for disposal when relief occurs. No reducing coupling or other restriction may be installed in the discharge line. The discharge line must be installed to allow complete drainage of both the valve and the line. If this unitis installed with a separate storage vessel, the separate vessel must have its own temperature and pressure relief valve. This valve must also comply with The Standard for Relief Valves and Automatic Gas Shutoff Devices for HotWater Supply Systems, ANSI Z21.22. (in the U.S. only). A temperature relief valve is not required, but if one is used,do not install the valve with the probe directly in the flow of water. This may cause unwarranted discharge of the valve. Piping and components connected to the water heater shall be suitable for use with potable water. Toxic chemicals, such as those used for boiler treatment, shall not be introduced into the potable water. A water heater used to supply potable water may not be connected to any heating system or components previously used with a nonpotable water heating appliance. When water is required in one part of the system at a higher temperature than in the rest of the system, means such as a mixing valve shall be installed to temper the water to reduce the scald hazard.

- Flush water through the pipe to clean out metal powder, sand and dirt before connecting it.
- Perform the following insulation measures for prevention of freezing.
- Take appropriate heat insulation measures (e.g., wrapping with heat insulation materials, using electric heaters) according to the climate of the region to prevent from freezing.
- Make sure that there are no water leaks from the cold and hot water supply pipes, then insulate the pipes completely.
- Be sure to also completely insulate the water supply valve and the cold and hot water connections on the water heater (refer to the Fig. 24).
- Do not cover the water drain plug with insulation so that water in the pipe can be drained (refer to the Fig. 24).

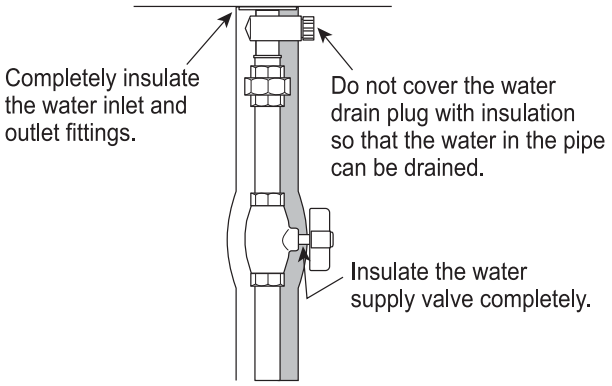


Fig. 24

- Use a union coupling or flexible pipe for connecting the pipes to reduce the force applied to the piping.
- Do not use piping with a diameter smaller than the coupling.
- When feed water pressure is too high, insert a depressurizing valve, or take water hammer prevention measures.
- Avoid using joints as much as possible to keep the piping simple.
- Avoid piping in which an air lock can occur.

If installing the unit on a roof:

If the unit is installed on a roof to supply water to the levels below, make sure that the water pressure supplied to the unit does not drop below 29 psi. It may be necessary to install a pump system to ensure that the water pressure is maintained at this level. Check the pressure before putting the unit into operation. Failure to supply the proper pressure to the unit may result in noisy operation, shorter lifetime of the unit, and may cause the unit to shut down frequently.

Supply water piping

- Do not use PVC, iron, or any piping which has been treated with chromates, boiler seal or other chemicals.
- Mount a check valve and a shut off valve (near the inlet).
- In order for the client to use the water heater comfortably, 29 to 70 psi of pressure is needed from the water supply. Be sure to check the water pressure. If the water pressure is low, the water heater cannot perform to its full capability, and may become a source of trouble for the client.

Drain piping

- Expansion water may drop from the pressure prevention device and wet the floor. If necessary, provide drain piping or use a drain hose to remove the water.

Hot water piping

- Do not use lead, PVC, iron or any piping which has been treated with chromates, boiler seal or other chemicals.
- The longer the piping, the greater the heat loss. Try to make the piping as short as possible.
- Use mixing valves with low water resistance. Use shower heads with low pressure loss.
- If necessary, use a pump or other means to ensure that the supply water pressure to the inlet of the heater does not fall below 29 psi when the maximum amount of water is being demanded. Install a pressure meter on the inlet to confirm proper water pressure.

Damage to the water heater as a result of poor water quality is not covered by the Limited Warranty. To ensure full warranty coverage, treat or condition water that exceeds the target levels provided in this table. Source: EPA National Secondary Drinking WaterRegulations (40 CFR Part 143.3)

Description	Max. Levels
Total Hardness[1)]	100 mg/L (6 gpg) or less
Aluminum	0.05 to 0.2 mg/L or less
Chloride	0.05 to 0.2 mg/L or less
Copper	1 mg/L or less
Iron	0.3 mg/L or less
Manganese	0.05 mg/L or less
pH	6.5 - 8.5
Total Dissolved Solids	500 mg/L or less
Zinc	5 mg/L or less
Sulfate ion	250 mg/L or less
Residual chlorine	4 mg/L or less

Table 4

1) Maximum limit suggested by Bosch.

3.10 Water Treatment

If this water heater will be installed in an application where the supply water is hard, the water must be treated with either a water softener, which removes the hardness, or by using sequestering agents, that reduce the amount of scale deposits. Refer to the below tables for suggested treatment and maintenance measures to be taken based on the water hardness level. Damage to the water heater as a result of water in excess of 6 gpg (100 mg/L) of hardness is not covered by the Bosch Thermotechnology Corp. Limited Warranty.

When installing a water softener, consult with the manufacturer for proper sizing and installation guidelines; the below diagram is for reference only.

Residential Use Treatment Guidelines

Type of Water	Hardness Level	Treatment Device	Flush Frequency [1)]
Soft	0-1 gpg (0-17 mg/L)	None	None
Slightly Hard	1-3 gpg (17-51 mg/L)	None	None
Moderately Hard	3-6 gpg (51-100 mg/L)	Water Softener	Once a Year
Hard	6-10 gpg (100-171 mg/L)	Water Softener	Once a Year
Very hard	10-14 gpg (171-239 mg/L)	Water Softener	Softener Required
Extremely Hard	> 14 gpg (> 239 mg/L)	Water Softener	Softener Required

Table 5

1) Install Bosch Isolation Valves to allow for flushing.

Comercial Use Treatment Guidelines

Type of Water	Hardness Level	Treatment Device	Flush Frequency 1)
Soft	0-1 gpg (0-17 mg/L)	None	None
Slightly Hard	1-3 gpg (17-51 mg/L)	None	None
Moderately Hard	3-6 gpg (51-100 mg/L)	Water Softener Suggested	Once a Year2)
Hard	6-10 gpg (100-171 mg/L)	Water Softener Suggested	Twice a Year3)
Very hard	10-14 gpg (171-239 mg/L)	Water Softener	Softener Required
Extremely Hard	> 14 gpg (> 239 mg/L)	Water Softener	Softener Required

Table 6

1) Install Bosch Isolation Valves to allow for flushing.
2) Flushing is required if a water softener is not installed.
3) Flushing is required if a water softener is not installed.

3.11 Plumbing Applications

Refer to section 11 for Limited Warranty.

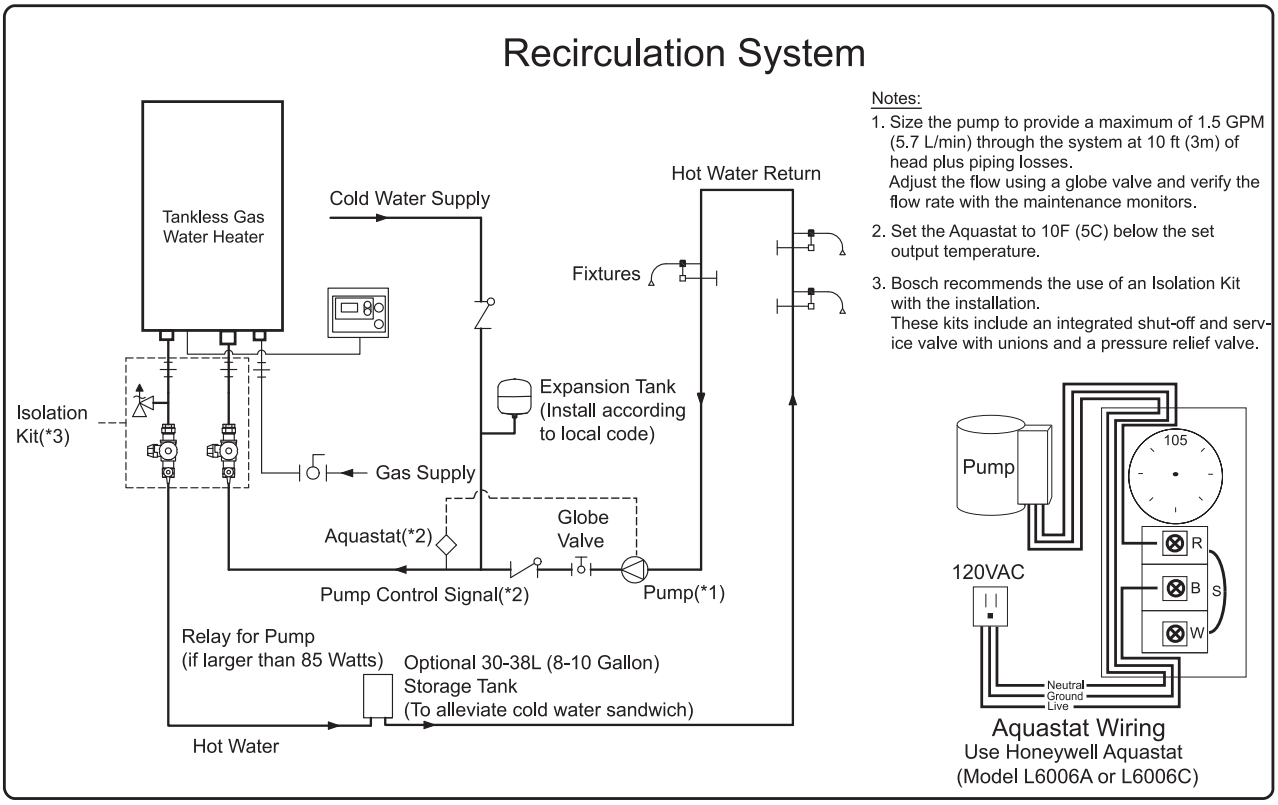


Fig. 25

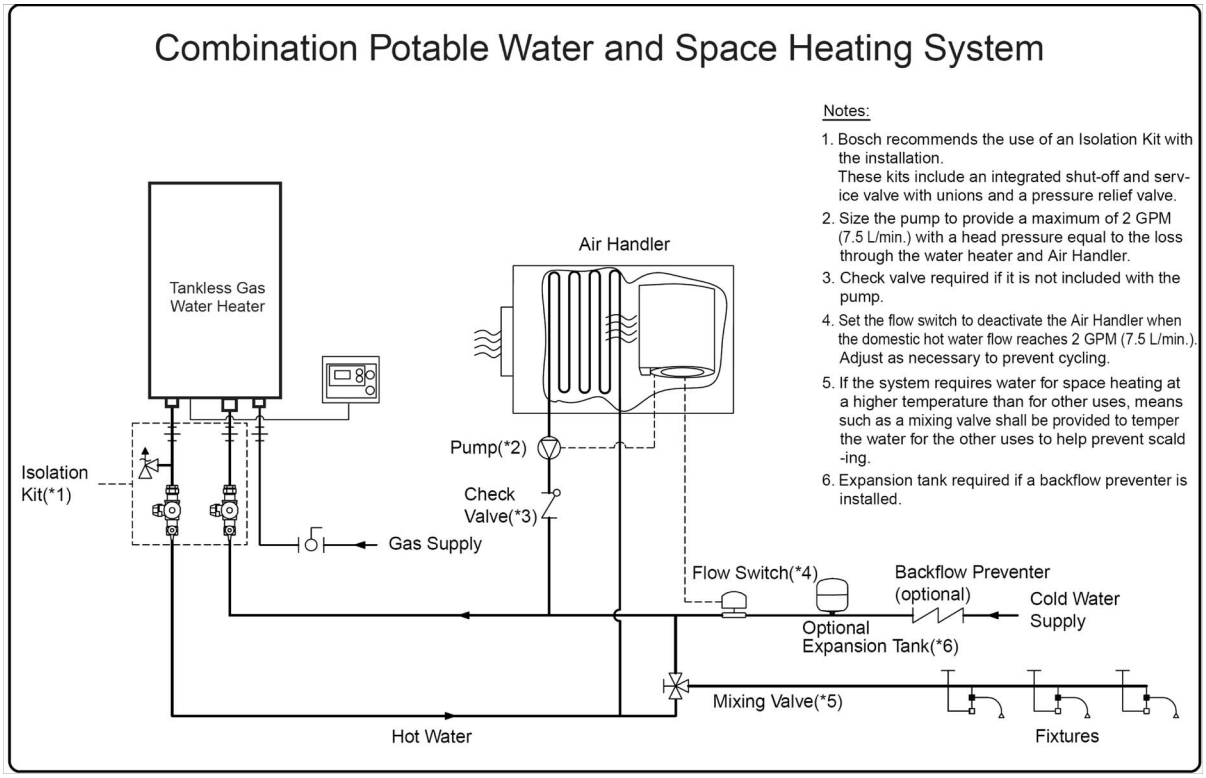


Fig. 26

4 Electrical Wiring

4.1 Electrical wiring

Consult a qualified electrician for the electrical work.

Warning: Do not connect electrical power to the unit until all electrical wiring has been completed.

Warning: This appliance must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70. In Canada, the latest CSA C22.1 Electrical Code.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Caution: Verify proper operation after servicing.

Caution: Field wiring to be performed at time of appliance installation.

Warning: Electrical Shock Hazard!
Do not turn power on until electrical wiring is finished. Disconnect power before servicing. Failure to do so may result in death or serious injury from electrical shock.

- The electrical supply required by the water heater is120VAC at 60 Hz. The power consumption may be up to 141W. Use an appropriate circuit.
- Do not disconnect the power supply when not in use. When the power is off, the freeze prevention in the water heater will not activate, resulting in possible freezing damage.
- Do not let the power cord contact the gas piping.

Warning:
Tie the redundant power cord outside the water heater. Putting the redundant length of cord inside the water heater may cause electrical interference and faulty operation.

Ground

- To prevent electrical shock, provide a ground with resistance less than100Ω. An electrician should do this work.
- A grounding screw is provided on the back in the junction box.

Warning:
Do not connect the ground to the city water or gas piping. Do not tie the ground to a telephone line.

Breaker Installation

- Mount a device which shuts off the electrical path automatically (leakage breaker) when electrical leakage is detected.

Power cord connection

1. Remove the screw (one) of the junction box and open the cover of the junction box.

2. Connect the grounding wire to the ground screw in the cover.

3. Crimp the outdoor power cord to the power cord of the unit.

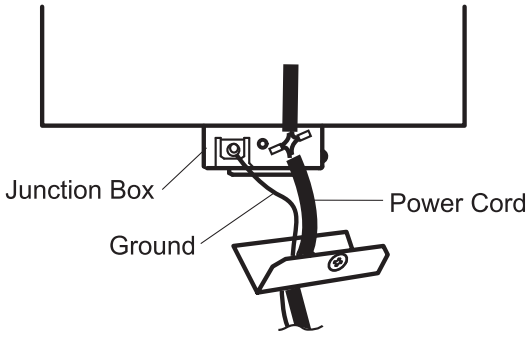


Fig. 27

Caution:
Electrostatic discharge can affect electronic components. Take precautions to prevent electrostatic discharges from personnel or hand tools during the water heater installation and servicing to protect product's electronic control.

4.2 Remote Controller

Applicable Model

660 EF (O)	
Remote Controller	BRC01US for USA, BRC01CA for Canada

Table 7

Install the remote controller according to the instructions in section 4.3 (page 31).

- The 660 EF can be programmed so that it will default to one of three temperatures 140°F, 130°F, 120°F (60°C, 55°C, 50°C) when the temperature selection wire is not connected. To change the default temperature, connect the temperature selection wire as shown in the below diagram.

Note: If the "160°F (70°C) connector" is being used, the unit will automatically default to a temperature of 120°F (50°C) for safety if the remote controller is not installed.

- The water heater has been factory set to allow a maximum temperature setting of 120°F (50°C). To access higher temperature settings with the optional remote controller installed, follow the below steps. The unit can only be set to temperatures in the range of 145-160°F (60°C-70°C) when the optional remote controller is installed.

When setting the maximum temperature to 125-140°F (50-60°C)

1. Turn the water heater off by pressing the ON/OFF button on the remote controller.

2. Press and hold the FLOW METER ALARM SET button until a sound is heard (2 sec.) and "120°F (50°C)" appears on the display.

3. Set the upper limit of the hot water supply temperature to 125°F, 130°F (55°C) or 140°F (60°C) using the UP and DOWN setting buttons.

4. To put the water heater back into operation, press the ON/OFF button on the remote controller. To keep the water heater off, let the unit sit for 30 sec. to return to the original display.

When setting the maximum temperature to 125-160°F (55-70°C)

1. Turn the water heater off by pressing the ON/OFF button on the remotecontroller.

2. Disconnect electrical power to the water heater.

3. Remove the front cover of the water heater (4 screws).

4. Locate the bag of temperature selection wires attached to the inside of the unit in the bottom left corner.

5. Connect the temperature selection wire labeled "160°F" to the circuit board as shown on the right.

6. Replace the front cover of the water heater (4 screws).

7. Reconnect electrical power to the water heater, but do not turn it on.

8. Press and hold the FLOW METER ALARM SET button until a sound is heard (2 sec.) and "120°F (50°C)" appears on the display.

9. Set the upper limit of the hot water supply temperature to 130°F (55°C) ,140°F, 150°F, 160°F (60°C, 65°C, 70°) Cusing the UP and DOWN setting buttons.

10. To put the water heater back into operation, press the ON/OFF button on the remote controller. To keep the water heater off, let the unit sit for 30 sec. to return to the original display.

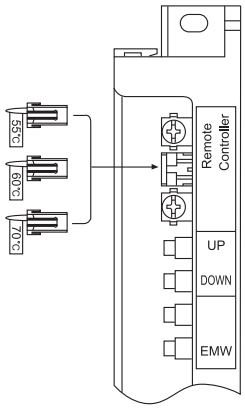


Fig. 28

Warning:
When changing the temperature, make sure to confirm with the customer that the temperature of the hot water will be very high and that there is a risk of scalding.

Warning:
Water temperatures above 125°F (52°C) can cause severe burns or death from scalding.

Connecting Remote Controller Cord to Unit

- Keep the remote controller cord away from the freeze prevention heaters in the unit.
- Tie the redundant cord outside the water heater. Do not put the extra length inside the equipment.
- The remote controller cord can be extended up to 300' (90m) with 18AWG wire.
- Use a Y type terminal with a resin sleeve. (Without the sleeve, the copper wire may corrode and cause problems).

- Be sure to hand tighten when screwing to the terminal block. Power tools may cause damage to the terminal block.

Remote controller cord

- For extensions, a 26' (7.8m) cord can be purchased (Part # BRC26CORD) or use 18AWG wire.
- Install according to the National Electrical Code and all applicable local codes.

1. Leave enough slack so that the remote controller cord will not be damaged if the unit is removed from the wall.

2. Remove the front cover of the heater (4 screws).

3. Pass the remote controller cord through the wiring throughway and into the unit.

4. Connect the Y terminals at the end of the remote controller cord to the terminal block.

5. Secure the remote controller cord with a clamp.

6. Insert the front cover.

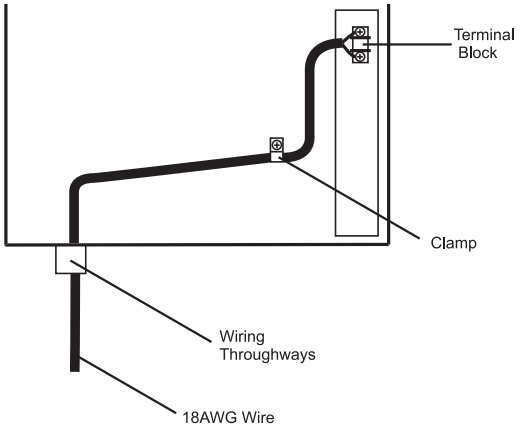


Fig. 29

4.3 Remote Controller Installation Guide

For Installers:
Read this installation guide carefully before carrying out installation.

Note:

- Do not connect power to the water heater before the remote controller has been properly installed.
- Recommended installation location of the remote controller is in a bathroom.

Included Parts List

Part Name	Quantity
Remote Controller	1
Wall Packing	1
Phillips Roundhead Wood Screw	2
Wall Anchor	2

Table 8

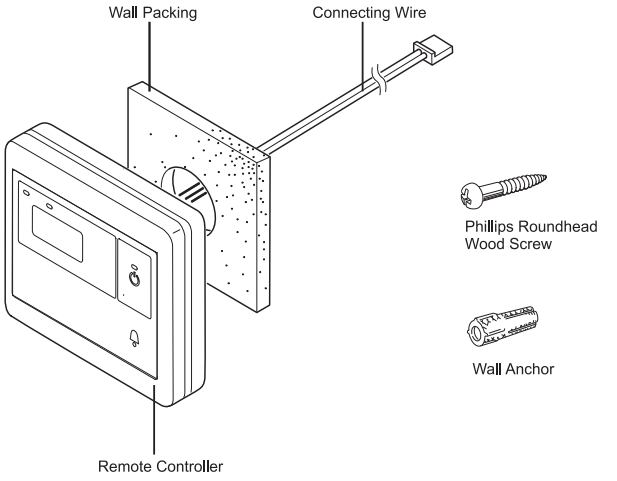


Fig. 30

Note: Do not disassemble the remote controller.

Notes on the Installation Location

- The remote should be installed in an easily accessible location.
- Avoid installing in a place where water or steam can come into contact with the controller.
- Avoid locations where special chemical agents (e.g., benzene, fatty and oily detergents) are used.
- Avoid outdoor installation, or installation in an indoor location where it will be exposed to direct sunlight.

Connection of Remote Controller Cord

- White Connector To Remote Controller.
- Y-shaped Terminals (two- core) To Water Heater.
- Confirm the connection with the labels at both ends of the remote controller cord.
- A 26' (7.8m)cord can be purchased separately (Part # BRC26CORD).
- The remote controller cord can be extended up to 300' (90m). by splicing the cord and using 18 gauge wire to extend the cord to the appropriate length.

Installation

1. Apply Wall Packing to the rear side of the remote controller.

2. Connect the remote controller wires to the separate remote controller cord.

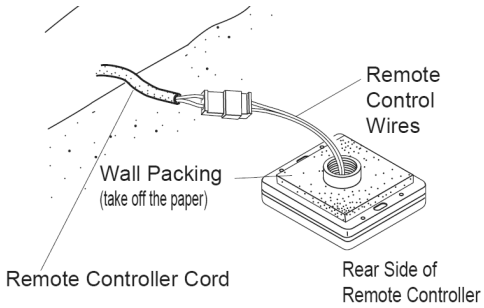


Fig. 31

3. Remove the cover of the remote control, mark the location of the screw holes, and drill holes for the wall anchors.

4. Insert the wall anchors, screw the remote control to the wall and replace the cover.

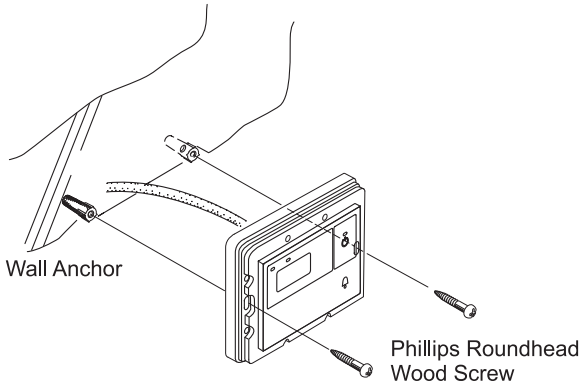


Fig. 32

Installing the Remote Controller Outdoor Junction Box

1. Insert the remote controller wires through the wall pipe and secure the wall pipe to the remote controller. Locate the remote controller wall packing, slide it over the pipe and wires, and apply it to the rear side of the remote.

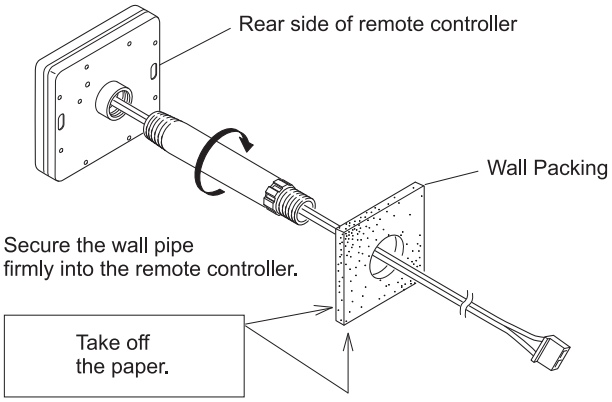


Fig. 33

2. Drill a Ø1"-1/4" (Ø32mm) hole in the wall where the remote controller will be installed.

Note: Do not install the remote controller in a location that is exposed to moisture, direct sunlight, or chemical agents. These can damage the remote controller.

3. Insert the wall pipe containing the remote controller wires through the hole.

4. Slide the junction box packing and the junction box over the remote controller wires and wall pipe protruding from the outside wall.

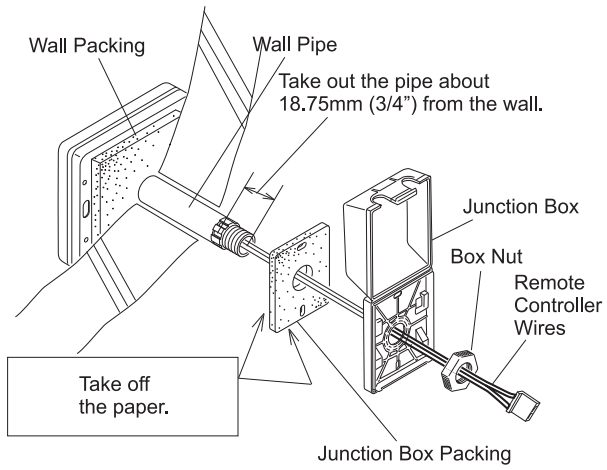


Fig. 34

5. Slide the box nut over the remote controller wires and screw it to the wall pipe.

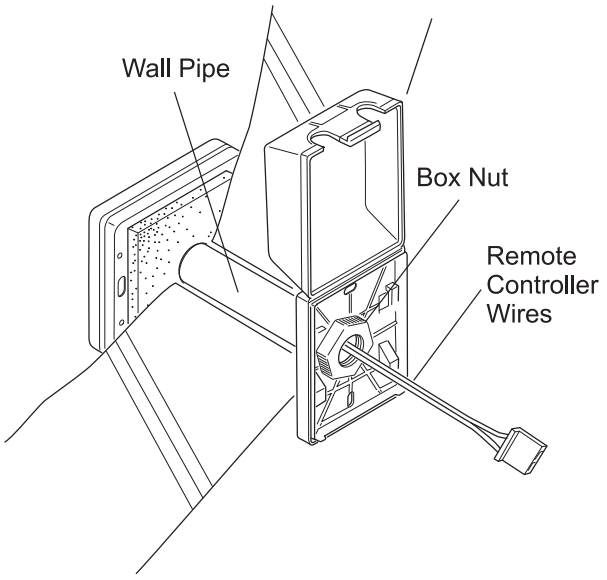


Fig. 35

6. Connect the remote controller wires to the separate remote controller cord inside the box. Wind the excess remote controller wire on the provided hooks as illustrated below.

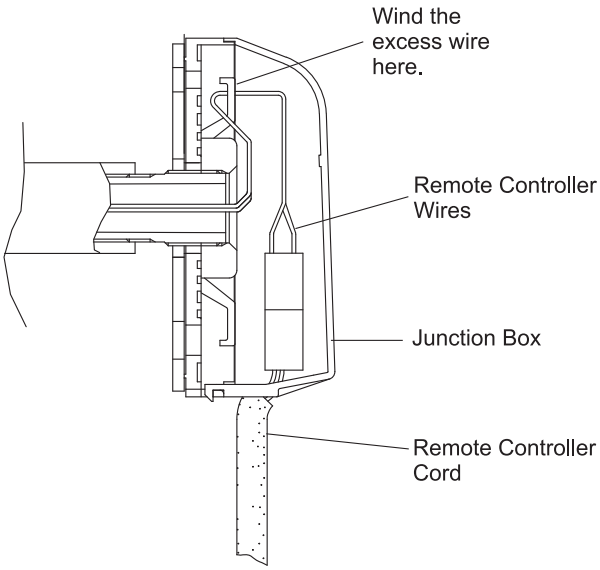


Fig. 36

Tie the redundant length of the remote controller cord outside the junction box.

7. Close the junction box.

5 Operation instructions

The installer should test operate the unit, explain to the customer how to use the unit, and give the owner this manual before leaving the installation.

5.1 Trial Operation

Preparation

1. Open a hot water fixture to confirm that water is available, and then close the fixture.

2. Open the gas supply valve.

3. Turn on the power supply. Using the remote controller, turn on the PowerOn/Off button (the Operation lamp will turn on).

4. Open a hot water fixture and confirm that the Burner On lamp comes on, and that hot water is being produced. (If necessary, repeat until the air in the gas piping is bled out).
White smoke may be noticed from the exhaust vent during cold weather. However, this is not a malfunction of the unit.
If an “11” error code appears on the remote controller, turn the unit off and then back on again, and then open a hot water fixture again.

5. Change the temperature setting on the remote controller and check that the water temperature changes.
If the water heater does not operate normally, refer to “Troubleshooting” in this Manual.
After the trial operation, clean the filter in the cold water inlet.

Caution: Handling after trial operation
If the unit will not be used immediately, close off all gas and water shutoff valves, drain all of the water out of the unit and the plumbing system to prevent the unit and system from freezing, and bleed the gas out of the gas line.
Freezing is not covered by the warranty.

Warning:
A fire or explosion may result if these instructions are not followed, which may cause lose of life, personal injury or property damage.

Lighting Instructions

This water heater does not have a pilot. It is equipped with an ignition device that automatically lights the burner.
Do not try to light the burner by hand.

1. Read the safety information in the installation manual or on the front of the water heater.

2. Turn off all electrical power to the unit.

3. Do not attempt to light the burner by hand.

4. Turn the gas control manual valve (external to the unit) clockwise to the off position.

5. Wait five minutes to clear out any gas. If the smell of gas remains, stop, and contact your gas supplier from a neighbor's phone.

6. Turn the gas control manual valve counterclockwise to the on position.

7. Turn on electric power to the unit.

8. The unit will now operate whenever hot water is called for. If the unit will not operate, follow the shutdown instructions and call a service technician.

Shutdown Instructions

1. Stop any water demand.

2. Turn off electric power.

3. Turn the gas control manual valve clockwise to the off position.
Should overheating occur, or the gas supply fail to shut off, turn off the manual control valve to the appliance.

5.2 Initial Operation

Before the first use of your water heater, make the following preparations.

Follow steps 1 through 4.

1. Open the water supply valve.

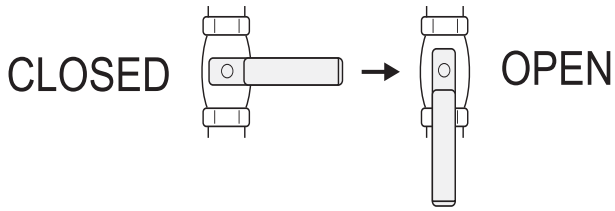


Fig. 37

2. Open a hot water fixture to confirm that water is available, and then close the fixture again.

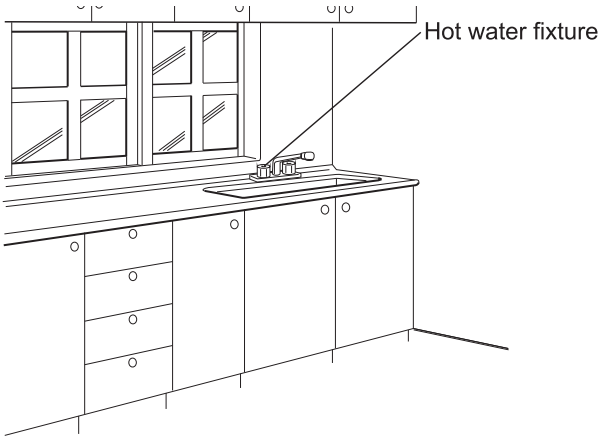


Fig. 38

3. Open the gas supply valve.

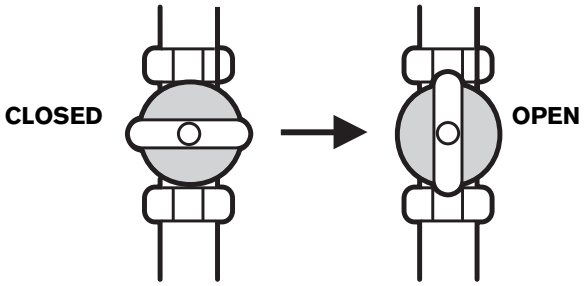


Fig. 39 closed and open on valves

4. Turn on the power.

Warning:
Do not touch with wet hands.

5.3 How to Use (Not using the remote controller)

Setting and Using the Water Heater

The factory temperature setting is 120 °F (50 °C) (fixed). Mix with cold water with a mixing valve or at the fixture for desired temperature.

1. Check that electrical power is connected.

2. Turn on hot water.

3. Mix for desired temperature.

4. Turn off the hot water.

The electrical power does not need to be disconnected between uses.

If you want to the temperature to be changed to 130 °F (55 °C) or 140 °F (60 °C), contact the installer or Bosch.

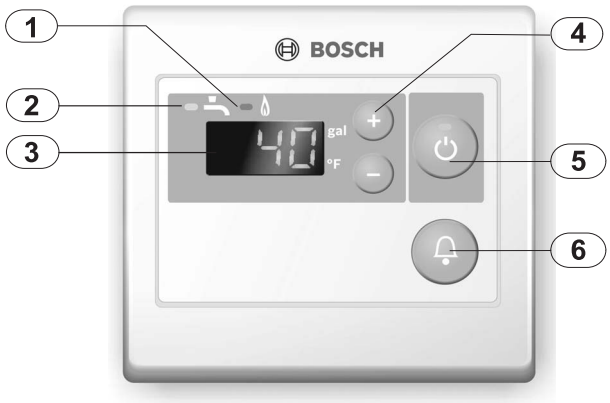
Danger: To prevent scalding
Hot Water Heater temperatures over 125 °F (52 °C) can cause severe burns instantly or death from scalding.
Children, disabled and elderly are at the highest risk of being scalded.
Feel water temperature before bathing or showering.
Temperature limiting valves are available (installer supplied).

5.4 How to Use (Using the remote controller)

Setting and Using the Water Heater

The illustration below shows the remote controller display. What is actually displayed depends on how the water heater is set.

USA REMOTE CONTROL (PART N# BRC01US)



CANADA REMOTE CONTROL (PART N# BRC01CA)

Fig. 40

1 Burner On Indicator
2 Priority Indicator
3 Temperature Setting
4 Setting Buttons
5 Power ON/OFF Button
6 Flow Meter Alarm Set Button

- **Burner ON Indicator**
  When burning, the indicator is lit
- **Priority Indicator**
  When this indicator is lit,the hot water temperature-can be set
- **Temperature Setting**
  (Ex.: 110°F (40°C))
- **Flow Meter Setting**
  The display will flash after hitting the flow meter alarm set button
- **Error Code**
  A number will flash if a failure occurs
- **Setting Buttons**
  For setting the hot water temperature, the flow meter alarm, and other settings
- **Power ON/OFF Button**
  For turning theheater on and off
- **Flow Meter Alarm Set Button**
  For setting the flowmeter alarm.

Before use, remove the protective sheet from the remote controller surface.

Starting with the Power OFF

1. Check that electrical power is connected
The temperature will be displayed on the remote control thermostat.

Danger: To prevent scalding
Hot Water Heater temperatures over 125°F (52°C) can cause severe burns instantly or death from scalding.

Danger: To prevent scalding
Children, disabled and elderly are at the highest risk of being scalded. Feel water temperature before bathing or showering.Temperature limiting valves are available (installer supplied).

Danger: To prevent scalding
When setting the unit to130°F (60°C) or higher, the temperature display will flash for 10 seconds and emit a tone as a high temperature warning.

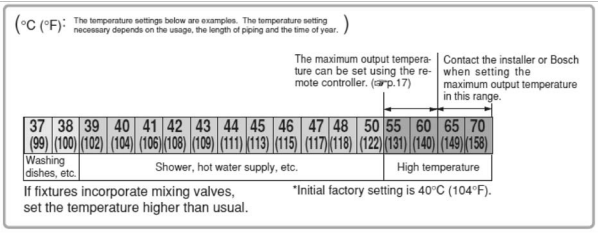
Danger: To prevent scalding
Take caution when using the unit again after setting to 125°F (52°C) or higher. Always check the set temperature before use.

Danger: To prevent scalding
Do not allow anyone to change the water temperature while hot water is running.

2. Set temperature
Always check the temperature setting before use. Check the indicator lights.

3. Turn ON hot water

4. Turn OFF the hot water.



- For most residential applications, the recommended setting temperature is 120°F (50°C) or less. For applications that occasionally require a higher temperature setting, locate the remote controller in a convenient location.
- Consult local codes for minimum operating temperatures.

5.4.1 Flow Meter Alarm

Preparation: Plug the bath drain

Starting with the Power OFF

1. Press the Power ON/OFF Button
The temperature will be displayed on the remote control thermostat.

2. Set temperature
Always check the temperature setting before use. Check the indicator lights.

3. Adjust flow meter alarm setting
Press the flow meter alarm set button (the setting will flash on the display) and adjust with the setting buttons. Choose the flow meter alarm setting from the following options: 10 - 60 gallons (40 – 240 L) (In 5 gallons (20 L) intervals), 70 gallons (260 L), 80 gallons (300 L), 90 gallons (340 L),100 gallons (380L), 262 gallons (990 L).

The alarm will not sound if it is set for 262 gallons (990 L).

Flow meter setting will be (ex. 48 gallons (180 L).
The level can only be adjusted while the indicator is flashing.
After ten seconds, the remote will again display the temperature.

4. Turn on hot water
The temperature will be displayed on the remote control thermostat.

5. Turn off the hot water when the alarm sounds
The alarm will sound when the set level has been reached. Stop the water.

An alarm will sound for ten seconds when the flow reaches the set level.
The water will continue to run unless it is manually turned off.

The alarm will not sound if it is set for 262 gallons (990 L).

If the flow meter alarm is being used to indicate when a tub is full:

- If any hot water is being used besides what is going into the tub, the alarm will sound before the tub is full.
- If there was water in the tub before the fill began, or if the water is not shut off manually when the alarm sounds, the tub may overflow
- If there was water in the tub before the fill began, the temperature in the tub after it is full maybe different from the temperature setting.

5.4.2 Muting the Remote Controller

The remote controller will emit a sound when any button is pushed. This sound can be muted if it is desired.

Initial factory setting is with sound.

1. Hold the Power ON/OFF Button for five seconds

- The flow meter alarm cannot be muted.
- The high temperature warning tone when setting the unit to 125°F (55°C) or higher will not emit a sound when muted.

5.4.3 Adjusting the Maximum Output Temperature

1. Turn OFF the power.

2. Press and hold the flowmeter alarm set button until a sound is heard (2 sec.).

3. Change the temperature using the setting buttons.

USA
The upper limit of the hot water supply temperature can be changed to 100°F,105°F, 110°F, 115°F, 120°F, 125°F, 130°F, 135°F, 140°F.

Canada
The upper limit of the hot water supply temperature can be changed to 37°C, 38°C, 39°C, 40°C, 41°C, 42°C , 43°C, 44°C, 45°C, 46°C , 47°C, 48°C, 50°C, 55°C or 60°C.

4. Set the Power button to ON when continuing to using the unit as is. Otherwise, let the unit sit for 30 sec.

6 Maintenance and service

Periodically check the following to ensure proper operation of the water heater.

- The venting system must be examined periodically by a qualified service technician to check for any leaks or corrosion.
- The burner flame must be checked periodically for a proper blue color and consistency.
- If the flame does not appear normal, the burner may need to be cleaned.
- If the burner needs to be cleaned, it must be performed by a qualified service technician.
- Do not obstruct the flow of combustion and ventilation air.
- The pressure relief valve must be operated once a year to ensure that it is functioning properly and there is no obstruction. Turn the power off to the unit before opening the relief valve, and make sure that water draining out of the valve will not cause any damage.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water system. Contact the water supplier or a local plumbing inspector on how to correct this situation. Do not plug the relief valve.

Warning:
There is a scald potential if the output temperature is set too high.
Should overheating occur, or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.
Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.
Periodically check and clean the filter inside the cold water inlet of the unit.

6.1 Regular Maintenance

6.1.1 Periodic Inspection

Caution:
To prevent burns or scalding, turn off the power button or power supply and wait until the equipment cools before performing maintenance.

Check:

- For laundry, newspaper, timber, oil, spray cans and other combustible materials near the appliance.
- For abnormal sounds during operation.
- For abnormalities in external appearance, discoloration or flaws.
- For proper operation of pressure relief valve.
- For water leaks from the equipment and piping.
- For dust and soot in the exhaust vent or exhaust vent terminal.
- For dust or debris in the air inlet.

6.1.2 Periodic Maintenance

Equipment

Wipe the outside surface with a wet cloth, then dry the surface. Use a neutral detergent to clean any stains.

Remote Controller

Wipe the surface with a wet cloth.

- Do not use benzene, oil or fatty detergents to clean the remote controller; deformation may occur.
- The remote controller is water resistant but not water proof. Keep it as dry as possible.

Water Drain Valve (with Water Filter)

If the water drain valve (with water filter) is covered with debris, the hot water may not run smoothly, or the unit may put out cold water. Check and clean the filter as explained below.

Caution:
To avoid burns, wait until the equipment cools down before draining the water. The appliance will remain hot after it is turned off.

1. Close the water supply valve.

2. Open all hot water fixtures.

3. With a bucket ready, remove the inlet and outlet drain plugs (about 0.2 gallons (0.95L) will drain out).

4. Take the water drain valve (with water filter) out of the inlet. (See Fig. 41).

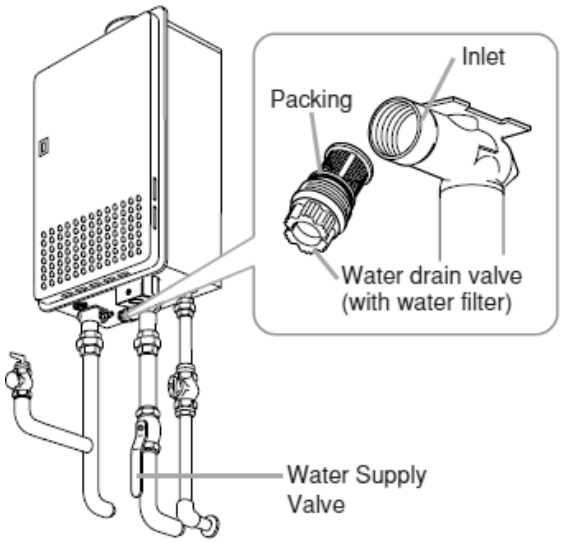


Fig. 41

5. Clean the water drain valve (with water filter) with a brush under running water.

6. Replace the water drain valve (with water filter) and close the drain plugs (take care not to lose the packing).

7. Close all hot water fixtures.

8. Open the water supply valve and check that water does not leak from the drain plugs or water drain valve (with water filter).

6.1.3 Optional Maintenance

Isolation Valves

- Isolation valves may be purchased as an accessory from Bosch. They allow for full diagnostic testing and easy flushing of the system
- The kit includes two full port isolation valves and a pressure relief valve for the hot side. Contact Bosch for more information.

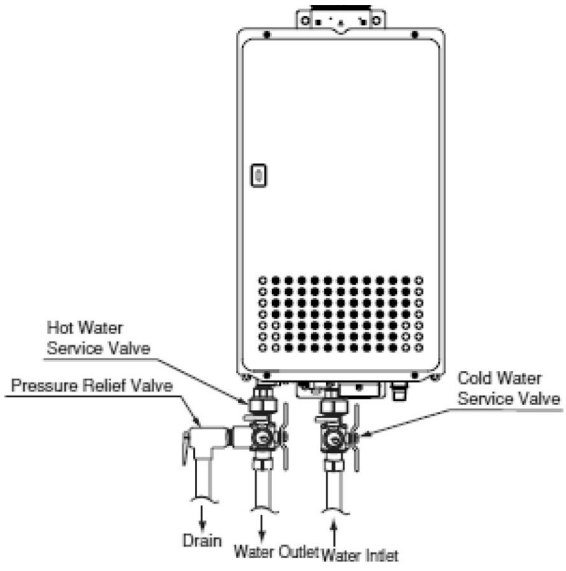


Fig. 42

6.2 Preventing Damage from Freezing

Caution: Damage can occur from frozen water within the device and pipes even in warm environments. Be sure to read below for appropriate measures.

Caution: Repairs for damage caused by freezing are not covered by the warranty.

Freezing is prevented within the device automatically by the freeze-prevention heater

Freezing cannot be prevented when the power plug is unplugged. Do not remove the power plug from the wall outlet (Freezing will be prevented regardless of whether the operation switch is ON or OFF).

- In normal operation, freezing is prevented within the device automatically unless the outside temperature without wind is below -5°F (-21°C) (indoor installation) or -4°F (-20°C) (outdoor installation).
- The freeze prevention heaters will not prevent the plumbing external to the unit from freezing. Protect this plumbing with insulation, heat tape or electric heaters, solenoids, or pipe covers. If there remains a freezing risk, contact the nearest Bosch agent.

Take the measures below for extremely cold temperatures (Only using the remote controller)

Outside temperature including wind chill factor less than -5°F (-21°C) (indoor installation) or -4°F (-20°C) (outdoor installation). This method can protect not only to the heater, but also to the water supply, water piping and mixing valves.

1. Turn off the power.

2. Close the gas supply valve.

3. Open a hot water fixture, and keep a small stream of hot water running 0.1 gallon (400cc)/minute or about 0.2" (4mm) thick).
If there is a mixing valve, set it to the highest level.

4. The flow may become unstable from time to time. Check the flow 30 minutes later. In general, it is not advisable to run water through the unit when it is OFF, but in this case freeze prevention is more important.

- Remember to set mixing valves and fixtures to their original levels before using the unit again to prevent scalding.
- If there is still a risk that the unit will freeze, drain the unit as shown on the next page.

If water will not flow because it is frozen

1. Close the gas and water valves.
2. Turn off the power button.

3. Open the water supply valve from time to time to check whether water is running.

4. When the water is flowing again, check for water leaks from the equipment and piping before using.

If the heater or the piping is frozen, do not use the heater or it may get damaged.

If the water heater will not be used for a long period of time, drain the water

Drain the water as follows:

Caution:
To avoid burns, wait until the equipment cools down before draining the water.The appliance will remain hot after it is turned off.

Drain water into a bucket to prevent water damage.

1. Close the gas valve.

2. (Not using the remote controller)

Fully open one of the hot water fixtures.

(Using the remote controller)
Turn off ther power button.

3. (Not using the remote controller)

Turn off the power supply after 20 seconds or more pass from operation of 2.

Do not touch with wet hands.

(Using the remote controller)

Turn off the power supply.

Do not touch with wet hands.

4. Close the water supply valve.

5. Fully open all hot water fixtures.

6. Turn the drain plug to the left to open, and then remove.

7. Check that the water is completely drained, close all the drain plugs and the hot water fixtures after 10 minutes or more pass from operation of 6.

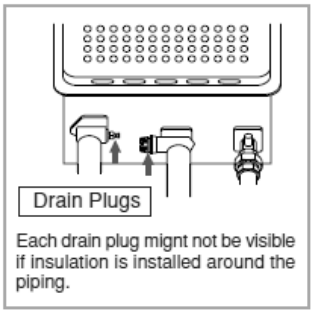


Fig. 43

Turning the Unit Back On

1. Check that all drain plugs are inserted.

2. Check that all hot water fixtures are closed.

3. Follow the procedure on p. 35 “Initial operation”, steps 1 through 4.

7 Troubleshooting

7.1 Initial Operation

Unit does not attempt to ignite when water is running.	Check for reversed plumbing or crossed pipes.
	Check the water drain valve filter.
Unit attempts to ignite but fails.	Reset unit and try again. There may be air in the gas line.
	Have a professional check the gas supply pressure.

Table 9

7.2 Temperature

Hot water is not available when a fixture is opened.	Are the gas and water supply valves fully open?
	Is the water supply cut off?
	Is the hot water fixture sufficiently open?
	Is the gas being cut off by the gas meter? (Can other gas devices such as stoves be used?)
	(For LP) Is there enough gas in the tank? (Can other gas devices such as stoves be used?)
	Is the water drain valve filter clogged?
	(Using the remote controller) Is the power button turned on?
No water is available when a fixture is opened.	Is the water supply cut off?
	Is the heater frozen?
The hot water is not the correct temperature.	Is the hot water fixture sufficiently open?
(Using the remote controller) Water takes time to become hot when turning the hot water fixture.	Have you allowed enough time for the cold water in the pipes to drain out?
The water is too hot.	Is the water supply valve fully open?
	(Using the remote controller) Is the water temperature setting appropriate?
	If the water supply temperature is high, it is possible for the temperature to be higher than the temperature set on the remote controller.
	If only a small amount of hot water is demanded, it is possible for the temperature to be higher than the temperature set on the remote controller.

Table 10

The water is not hot enough.	Is the gas supply valve fully open?
	(Using the remote controller) Is the water temperature setting appropriate?
	If the amount of hot water required is very high, it is possible for the temperature to be lower than the temperature set on the remote controller. Decrease the amount of hot water passing through the unit and the temperature should stabilize.
The water is cold when only a single fixture is open.	The unit will not heat the water if the flow rate is less than 0.5 GPM (2L/min.). Open the fixture more or open other fixtures so that a greater flow passes through the unit, and the unit should begin heating again.
Fluctuations in hot water temperatures.	Clean the water filter of any debris.
	(Using the remote controller) Set water temperature at 115°F (48°C) to 120°F (50°C). This will allow you to use a higher flow of hot water thus meeting the minimum flow requirement of 0.5 GPM (2L/min.)
(Using the remote controller) Setting temperature cannot rise.	Is the maximum temperature setting appropriate?

Table 10

7.3 Amount of Hot Water

The amount of hot water at a certain fixture is not constant.	When hot water is demanded at other fixtures, the amount available may be reduced. The maximum flow available from the 660 EF, 660 EFO is 5.3 GPM (20.0L/min.) at a 45°F (25°C) temperature rise.
	Pressure fluctuations and other plumbing conditions can cause the temperature and pressure at a fixture to be unstable, but it should stabilize after a short time.
	There are some types of hot water taps that discharges large volumes of hot water at first but stabilize after time.
	To keep the temperature stable, the heater limits the amount of water that can flow through it to a small amount initially, but the amount increases over time.
The amount of hot water in the tubis less/more than the set amount.	When hot water is used for other fixtures while filling the bath tub, the tub will not fill as much.
	If there is water in the tub already, or when filling is stopped and restarted, the tub will fill more.
The flow meter alarm does not sound even when filled to the set amount.	The flow meter alarm is set to sound when hot water is continuously discharged for the set volume of water. If mixing valves are used, or if cold water is mixed with hot water at the fixture, the tub will fill more than the setting of the flow meter alarm.
Amount of hot water available has decreased over time.	Is the water filter clogged?

Table 11

7.4 Remote Controller

The light on the power button does not come on.	Has there been a power failure?
	Is the power connected properly?
The water temperature changes after a power failure or when the power is disconnected.	The temperature setting and the flow meter alarm setting may both need to be reset after a power outage.
The plastic on the surface or buttons of the remote controller has torn, peeled, or air bubbles inside.	The surface of the remote controller is affixed with aprotective sheet (to prevent surface scratching, etc.) at time of shipment. This sheet can be removed or left as it is. When leaving the protective sheet on, areas frequently touched may tear or peel. However, the remote controller will not malfunction from water entering such torn or peeled areas. To restore the appearance of the remote controller surface, simply remove the protective sheet.

Table 12

7.5 Sounds

The fan can be heard after operation is stopped. A motor can be heard when turning the unit ON or OFF, when opening or closing a fixture, or after the unit has been running for a while.	These noises indicate the proper operation of devices which are designed to let the unit reignite more quickly, and ensure the water temperature is stable.

Table 13

7.6 Others

The heater stops burning during operation.	Are the gas and water supply valves fully open?
	Is the water supply cut off?
	Is the hot water fixture sufficiently open?
	Is the gas being cut off by the gas meter? (Can other gas devices such as stoves be used?)
	(For LP) Is there enough gas in the tank? (Can other gas devices such as stoves be used?)
White smoke comes out of the exhaust vent (terminal) on a cold day.	This is normal. The white smoke is actually steam.
The hot water is turbid.	This is harmless. Small bubbles appear as the air in the water is heated and depressurized rapidly to atmospheric pressure.
The water appears blue. The bath tub/wash-basin has turned blue.	Coloration to a blue color may be noticed from small traces of copper ion contained in the water and fat (furring). However, there are not problems concerning health. Coloration of the bath tub/wash-basin can be prevented by cleaning frequently.

Table 14

7.7 Check for an Error Code (Using the remote controller)

Error displays on the remote controller

If there is a problem with the unit, a numerical error code will flash on the remote controller. If this occurs, take appropriate measures as listed below. When an error code appears, the display and the operation light will flash together.

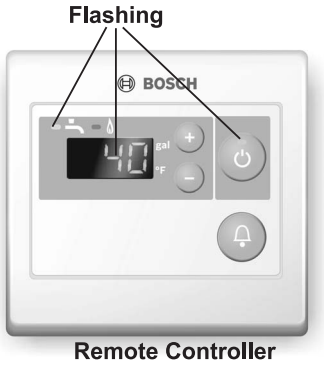


Fig. 44

Error Code	Cause	Action
11	Ignition error.	Check whether the gas valve is open. Press the power button to turn the unit off, open a hot water fixture, and turn the unit back on. If the flashing number doesn't return the problem is solved.
90	Abnormal combustion, low gas supply pressure.	Have a professional check the gas supply pressure. Contact the nearest Bosch agent.
99	Abnormal combustion.	Contact the nearest Bosch agent.

Table 15

Contact Bosch Thermotechnology if:

- Any other error code appears.
- An error code is indicated again after the above actions were followed.
- There are any other questions.

8 Follow- up Service

8.1 Requesting Service

First follow the instructions in the troubleshooting section. If the error is not corrected, contact Bosch Thermotechnology Corp. at 1-866-330-2730.

We will need to know:

- The Model (check the rating plate)
- Date of purchase (see the warranty)
- Details of problem...(flashing error codes, etc., in much detail as possible)
- Your name, address, and telephone number
- Desired date of visit.

A request for service may be rejected if the water heater is installed in a location where working on the unit may be dangerous. Contact a plumber.

8.2 Gas conversion

If you move to a region that uses a diferent type of gas or if the local gas supply is converted, replacement of the gas manifold and adjustment of the appliance will be necessary. This work must be performed by either Bosch or a qualified service agency and will be charged foreven during the warranty period. The qualified installer will also be responsible for purchasing the gas conversion kit directly from the manufacturer. For more information, contact Bosch Thermotechnology Corp. at 1-866-330-2730.

Warning:
The gas conversion kit shall be installed by a qualified service agency[1)] in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in the instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury, or death. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

1) A qualified service agency is any individual, firm, corporation, or company which either in person or through a representative is engaged in and is responsible for the connection, utilization, repair or servicing of gas utilization equipment or accessories; who is experienced in such work, familiar with all precautions required, and has compiled with all of the requirements of the authority having jurisdiction.

Warning:
Before the gas conversion is performed, verify the proper gas conversion kit with your water heater model on the table provided below.

Conversion Kit	Model	Conversion Type
660NGKIT	660 EF/ 660 EFO	Propane to Natural Gas
660LPKIT	660 EF/ 660 EFO	Natural Gas to Propane

Table 16

The following parts are supplied in the conversion kit. These items will replace the existing parts that are currently installed in the unit. Make sure that all parts are replaced and properly installed by a qualified service agency.

A remote controller and a digital gas manometer are required to complete the installation. Do not proceed if this equipment is not immediately available.

- Manifold plate
- O-ring
- Conversion Kit Label.

After the necessary parts have been replaced on the unit, the remote controller is then used to adjust the settings on the water heater for use with the proper gas type. The gas pressure values at both the gas supply inlet fitting and at the manifold inlet on the unit are verified by the installer. Proper adjustments will be made to ensure safe and eficient operation. Once this is completed, a final gas leak check will be performed to confirm that all parts have been securely installed.

Warning:
If you notice the smell of gas at any time after the installation has been completed, turn the water heater off and contact your gas supplier immediately.

9 Interior components diagram

9.1 660 EF Interior components

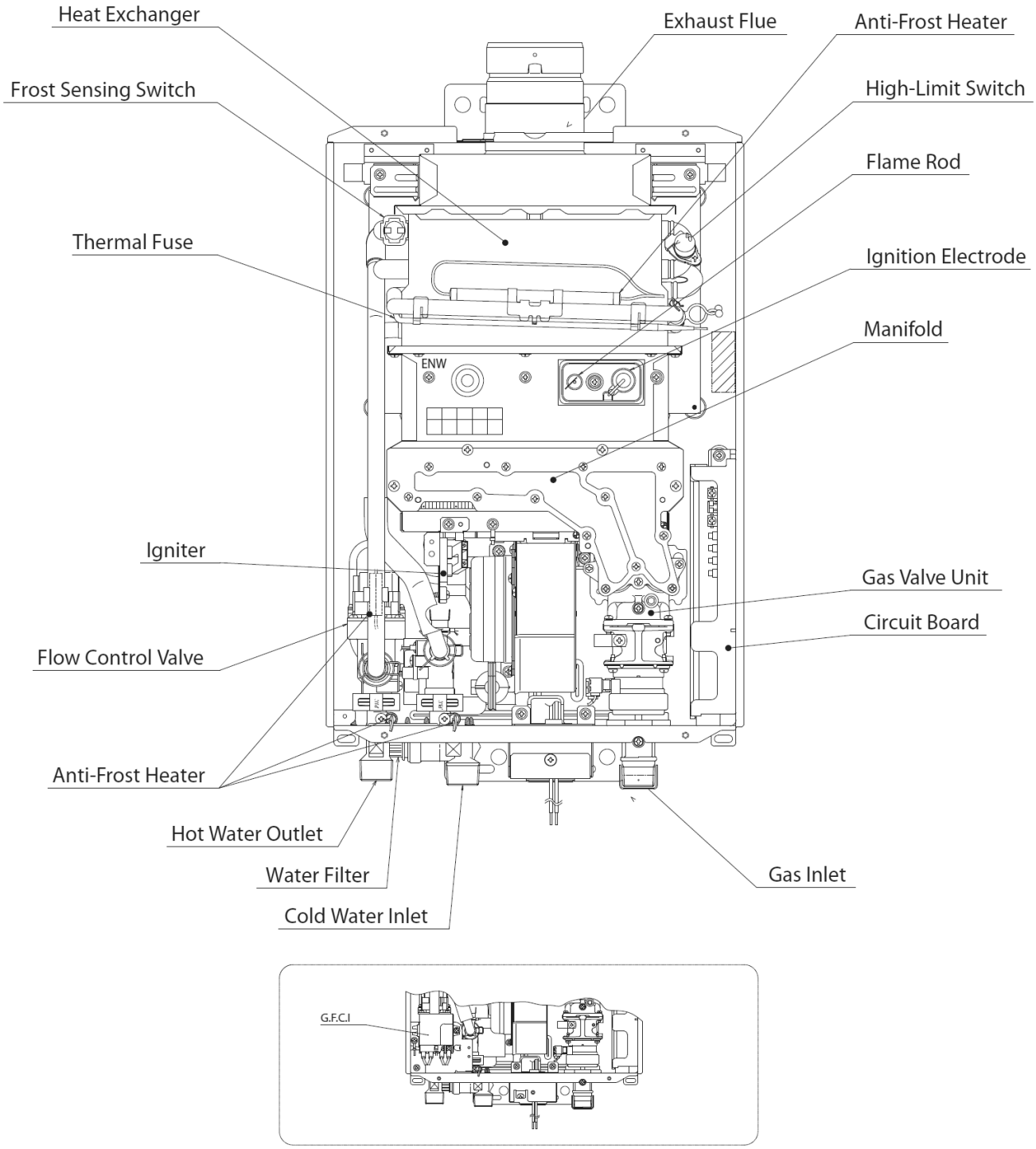


Fig. 45 Components

9.2 660 EFO Interior components

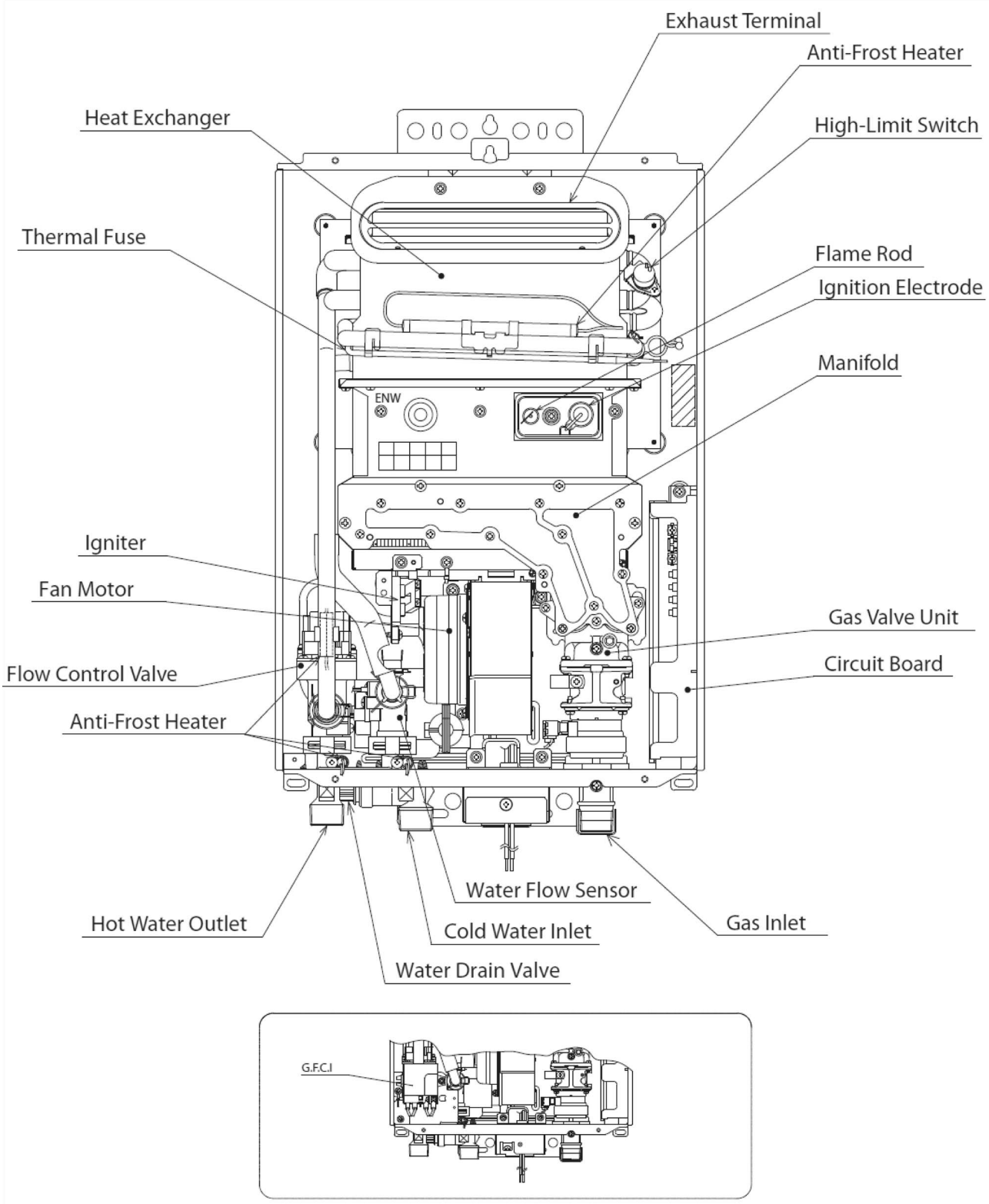


Fig. 46 Components

10 Protecting the environment

Packing

The packing box may be fully recycled as confirmed by the recycling symbol .

Components

Many parts in the heater can be fully recycled in the end of the product life. Contact your city authorities for information about the disposal of recyclable products.

Saving water resources:

- Make sure you close all the taps after any use. Avoid leaving the taps dripping. Repair any leaking tap.
- Define the temperature you want, in the appliance or with the remote control. This way you have the precise water flow needed (mixing cold water to regulate temperature will increase the water flow with consequent waste of water).

11 Limited Warranty

General

BOSCH PRO tankless water heaters are warranted by the Manufacturer (BOSCH) through *Bosch Thermotechnology Corp.*
Bosch Thermotechnology Corp. will furnish a replacement heat exchanger and will furnish a replacement of any other part which fails in normal use and service within the applicable periods specified below, in accordance with the terms of this warranty. The *Bosch Thermotechnology Corp.* replacement will be warranted for the unexpired portion of the original warranty. This warranty will be valid only for water heaters in possession of the original purchaser as recorded on the warranty card.

The Heat Exchanger

If the heat exchanger fails within Fifteen (15) years after the original installation and operation, *Bosch Thermotechnology Corp.* will furnish a replacement heat exchanger. However, if the water heater is used within an approved hot water recirculation and supplied with circulated water, this heat exchanger warranty is limited to three (3) years from date of original installation and operation. If the water heater is installed in other than a single family dwelling, this heat exchanger warranty is limited to two (2) years from date of original installation and operation.

Exceptions

This warranty will not apply:

- **1.** to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with the printed instructions provided;
- **2.** to damage or abuse, accident, neglect or freezing and other acts of nature;
- **3.** to damage resulting from operation with either the flame sensor rod or overheat sensor removed;
- **4.** to failure of the heat exchanger resulting from the operation of the water heater in a corrosive atmosphere or at water temperatures exceeding the maximum rating, or if the water heater is not supplied with potable water;
- **5.** to defects or damage cause by any attachment or modification, including any energy-saving device;
- **6.** to damage resulting from scale deposits and/or highly mineralized / unsoftened water supply.

All Other Parts

If any other part fails within five (5) years after original installation and operation, *Bosch Thermotechnology Corp.* will furnish a replacement part free of charge.

Service Labor Costs

This warranty does not cover any labor costs associated with service, removal or re-installation of part(s). All such costs must be borne by the Purchaser. Additionally, this warranty does not cover any labor costs associated with service, removal, installation or re-installation of the original water heater or a replaced water heater.

NOTE: the water heater must be free of damaging scale deposits and not subject to gas pressures greater than those shown on the rating plate, which must not be altered, defaced or removed**.**

How to Make a Claim

Any claim for warranty parts should be made to your local dealer or distributor:

BOSCH THERMOTECHNOLOGY CORP.

50 Wentworth Avenue

Londonderry, NH 03053

Tel. 866-330-2730

www.boschpro.com

In most cases, the dealer or distributor will be able to promptly honor your claim and subsequently notify *Bosch Thermotechnology Corp.*. However, all replacements are made subject to validation by *Bosch Thermotechnology Corp.* of in-warranty coverage. The damaged or defective item must be made available in exchange for the replacement.

Miscellaneous

No one is authorized to make any other warranties on behalf of *Bosch Thermotechnology Corp.*. It is expressly understood that the replacement warranty of *Bosch Thermotechnology Corp.* shall be in lieu of any and all other warranties, express or implied, including warranties of merchantability or fitness for a particular use or purpose, and further that *Bosch Thermotechnology Corp.* shall not be liable for any loss or damage directly or indirectly arising from the use of the hot water heater, or for any consequential damages arising from such use (including damages from water leakage). *Bosch Thermotechnology Corp.* sole liability with respect to any defect shall be for the replacement of the defective part(s). Some states do not allow such limitations and exclusions, so the above may not apply to you.
This warranty gives specific legal rights. You may also have other rights which vary from state to state.

Installer Checklist to be completed by installer upon installation

Serial Number ___ ___ ___ ___ ___ ___ ___ ___
(8 digit serial number is located on rating plate on right side panel)

Gas Pressure Reading Static_____ Operating_____

Building Water Pressure _____ Range if on Well system _____

Installing Company _____

Installer name _____

Address _____

Phone _____

Installation manual should be left with the owner after the installation is tested and completed

Replacement Parts available from:

BOSCH THERMOTECHNOLOGY CORP.

50 Wentworth Avenue
Londonderry, NH 03053 USA
Tel. 866-330-2730
www.boschpro.com

Bosch Termotecnologia SA
Estrada de Cacia
3801 - 856 Aveiro - PORTUGAL