# GWH 450 ES

**Temperature Modulated with Electronic Ignition - Normal duty**
**Suitable for recirculating potable water only**

PRO TANKLESS™ by BOSCH

PHCC PLUMBING-HEATING-COOLING CONTRACTORS ASSOCIATION

## GWH-450-ES-N - Natural Gas
## GWH-450-ES-L - 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 vapor 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 operate 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.

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# 1 Warning

**For your safety**

Do not store or use gasoline or other flammable, combustible or corrosive vapors and liquids in the vicinity of this or any other appliance.

**Warning:** Carefully plan where you install the heater. Correct combustion air supply and flue pipe installation are very important. If a gas appliance is not installed correctly, fatal accidents can result from lack of air, carbon monoxide poisoning or fire.

**Warning:** Exhaust gas must be vented to outside using proper vent material suitable for category III vent systems and temperatures up to 480°F. Vent and combustion air connector piping must be sealed gas-tight to prevent possibility of flue gas spillage, carbon monoxide emissions and risk of fire, resulting in severe personal injury or death.

**Warning:** Place the recirculating water heater in a location where water leaks will do NO DAMAGE to adjacent areas or lower floors.

**Warning:** Field wiring connections and electrical grounding must comply with local codes, or in the absence of local codes, with the latest edition of the National Electric Code, ANSI/NFPA 70, or in Canada, all electrical wiring must comply with the local codes and the Canadian Electrical Code, CSA C22.1 Part 1.

**Warning:** Shock hazard line voltage is present. Before servicing the recirculating water heater, turn off the electrical power to the recirculating water heater at the main disconnect or circuit breaker. Failure to do so could result in severe personal injury or death.

**Warning:** The recirculating water heater must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures equal to or more than 0.5 psig.

FCC:
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

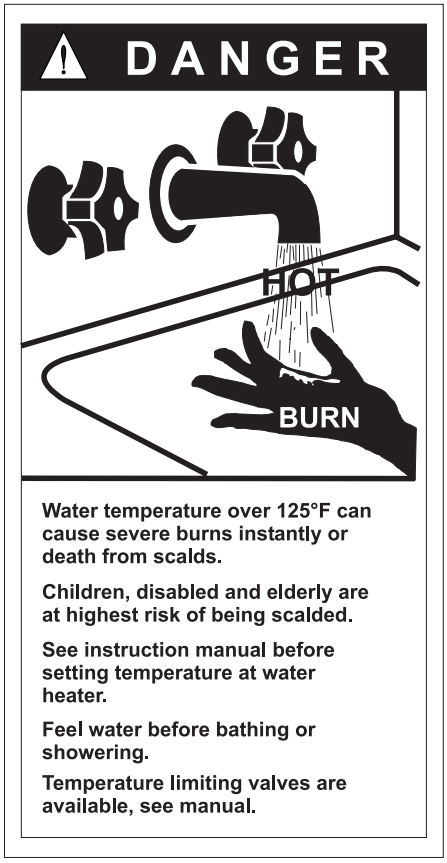



*Fig. 1*

# 2 Appliance details

## 2.1 Features

Parts

- Sealed combustion burner.

Safety

- Ionization flame sensor
- Over temperature protection.

High quality materials for long working life

- Copper heat exchanger
- Compact space saver: mounts on a wall with supplied bracket.

Features

- LED to display temperatures, burner operation and diagnostic error codes.
- On/Off button and separate temperature controls for domestic and heating
- Reset button
- Failure code for diagnostics and repair
- Freeze prevention cycle.

Accessories

- Horizontal vent kit
- Pump manifold
- 12 kOhm DHW thermistor.

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

## 2.2 GWH-450-ES Specifications (Technical data)

Approved in US/Canada

**Capacity**

GWH450 Maximum flow rate: 4.5 GPM (17 l/min) at a 45°F (25°C) rise.

**Maximum output**

GWH450 - 98,400 Btu/h (28.8 kW)

**Maximum input**

GWH450 - 120,000 Btu/h (35.1 kW)

**Efficiency in %**

Recovery efficiency 82%

**Min. Output**

GWH450 - 34,200 Btu/h (10 kW)

**Temperature Control**

Selection range: 100°F (40°C) - 140°F (60°C)

**Gas Requirement**

Gas connection (inches) - ¾”

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

- Propane: 11” - 14” water column
- Natural Gas: 5.5” - 8” water column.

* To measure Gas Pressure, see Measuring Gas Pressure, chapter 3.8.

**Venting**

3" AL 29-4C Stainless Steel exhaust.
See chapter 3.6 for Venting.

**Water**

- Hot water connection (inches) - ¾”
- Cold water connection (inches) - ¾”
- Connections:
  – Bottom of heater

**Combustion**

- NOx ≤ 55 ppm
- CO ≤ 250 ppm
- $CO_2$ level (see table 4 for correct restrictor dimension).

**Dimensions**

- Depth (in): 11 ¾” (300 mm)
- Width (in): 15 ¾” (400 mm)
- Height (in): 27 ½” (700 mm)
- Weight: 47 pounds (21 kg).

**Gas types**

Natural Gas.
Liquid Propane.
Converting the gas type can only be done by a certified gas technician. Call Bosch Water Heating for conversion information.

**Voltage**

120 V AC (50/60 Hz)

**Amperage**

IDLE - 40 mA
Operation - ≤ 1,5 A

**Noise**

≤ 50 db (A)

**Safety devices**

- Flame failure device (Ionisation flame control)
- Over heat prevention (temperature limiter)
- Pressure switch (exaust protective faulty).

**Water resistant**

IP X4 (protection against water drops)

## 2.3 Unpacking the GWH-450-ES heater

This water heater is packed securely.

The box includes:

- Wall-mounted gas water heater
- Bracket and screws for wall hanging the water heater
- Exhaust vent adaptor (with 4 screws and gasket provided)
- Combustion air inlet adaptor (with 4 screws and gasket provided)
- Installation manual
- Product registration card
- Energy Guide label
- Safety water pressure valve
- Air deflector
- Restrictors.

**Do not lose this manual**. Please complete and return the enclosed product registration card.

**Before installing the unit, be certain you have the correct heater for your type of Gas - Propane or Natural Gas.** Identification labels are found on the shipping box, and on the rating plate which is located on the right side panel of the cover.

**To remove front cover**

The front cover is secured with two screws to prevent unauthorized access. Always secure the control panel and front cover with these screws.

▶ Loosen the two Philips head screws located as shown in fig. 2.

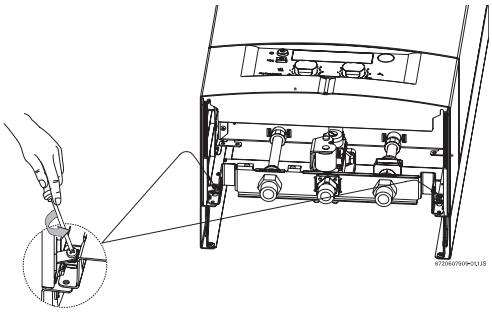


*Fig. 2 Screws*

▶ Pull control panel outwards and then pull it downwards.

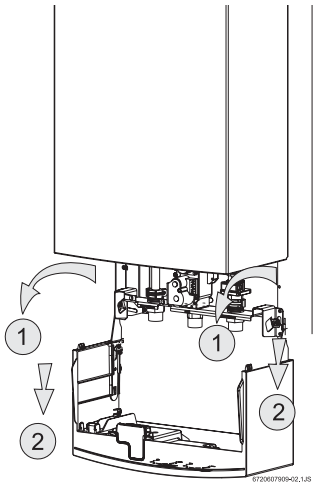



*Fig. 3 Service position to access water and electric systems.*

▶ Lift front cover panel upward and remove.

**The GWH-450-ES is not approved or designed for:**

- Manufactured (mobile) homes, RV's or boats
- Outdoor installation
- Combination venting with other appliances.

## 2.4 General rules to follow for safe operation

- **1.** You should follow these instructions when you install your water heater. In the United States: The installation must conform with local codes or, in the absence of local codes, the National Fuel Gas Code ANSI Z223.1/NFPA 54.
  In Canada: The Installation should conform with CGA B149.(1,2) INSTALLATION CODES and /or local installation codes.
- **2.** Carefully plan where you install the water heater. Correct combustion air supply and vent pipe installation are very important. If not installed correctly, fatal accidents can be caused by lack of air, carbon monoxide poisoning or fire.
- **3. The National Fire Codes do not allow UNSEALED gas fired water heater installations in bathrooms, bedrooms or any occupied rooms normally kept closed.** See chapter 3.2 and 3.5.
- **4.** You must vent your water heater. See section on VENTING.
- **5.** The appliance and its gas connection must be leak tested before placing the appliance in operation.
  The appliance must be isolated from the gas supply piping system by closing its individual manual gas shutoff valve (not supplied with water heater) during any pressure testing at pressures in excess of ½ Psig (3.5 kPa).
- **6.** Keep water heater area clear and free from combustibles and flammable liquids. Do not locate the heater over any material which might burn.
- **7. Correct gas pressure** is critical for the optimum operation of this water heater. Gas piping must be sized to provide the required pressure at the maximum output of the water heater, while all the other gas appliances are in operation. Check with your local gas supplier, and see the section on connecting the gas supply.
- **8.** Should overheating occur or the gas supply fail to shut off, turn off the gas supply at the manual gas shut off valve, on the gas line. Note: manual gas shutoff valve is not supplied with the water heater.
- **9.** Do not use this appliance if any part has been underwater. 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 underwater.

## 2.5 Cascading function

GWH-450-ES always work as master.
Cascading enables the appliance to be connected in parallel with up to 4 World 1 appliances. World 1 will only start, if it gets a signal from the GWH-450-ES and will (at a defined power output level) give this signal to the next appliance. That means, the appliance works always as a Master to the next appliance and always as a Slave to the one before.

For more detailed information about this feature, consult the instructions supplied with the accessorie:

- 7 709 003 617.

## 2.6 Dimensions and minimum installation clearances

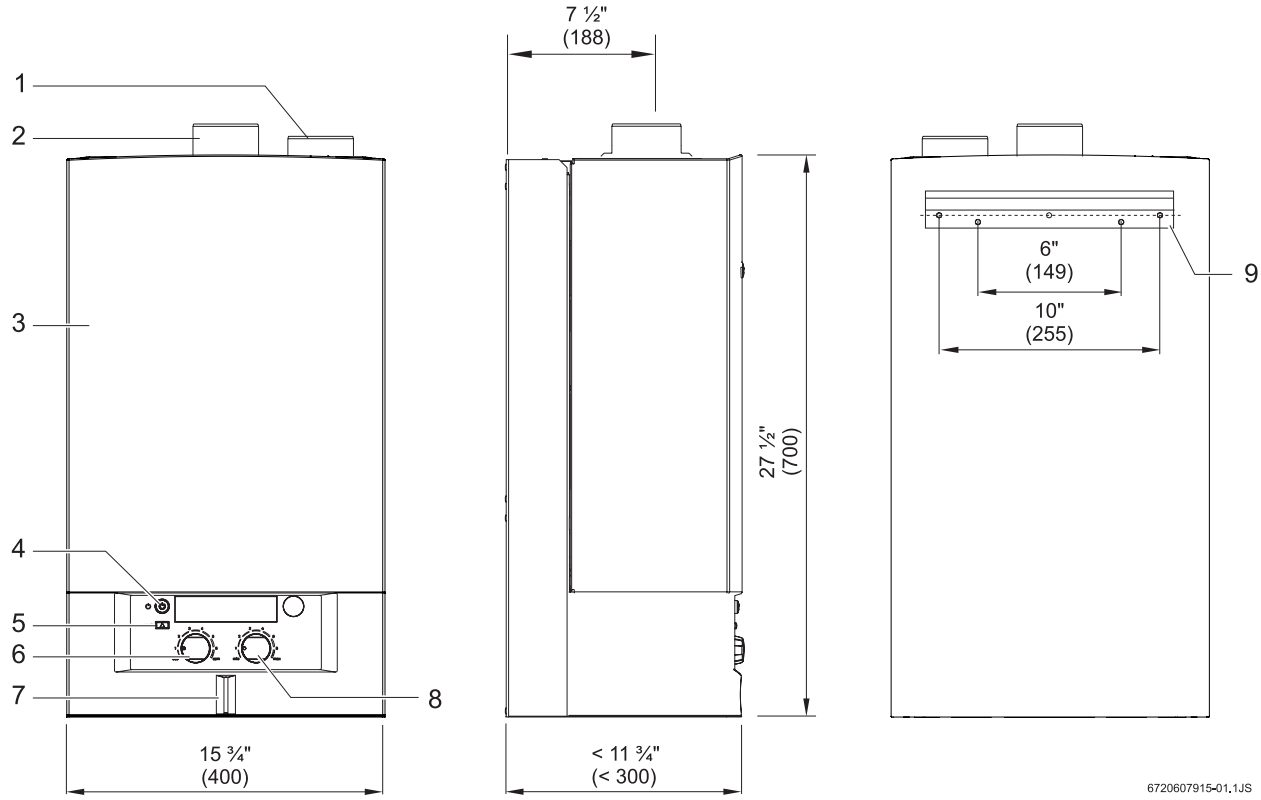



*Fig. 4 Dimensions*

**1** Combustion air inlet adapter (right side only)
**2** Exhaust adapter with $CO_2$ measuring point
**3** Front cover
**4** On/Off button
**5** Reset button
**6** ECO flow thermostat
**7** LED - (ON) warning light (blinks when in lock out)
**8** Hot water thermostat
**9** Mounting plate

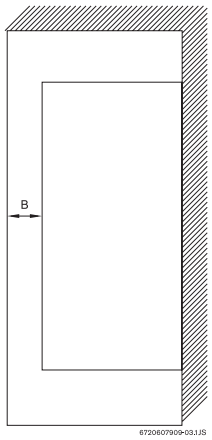



*Fig. 5 Minimum clearances*

| | Model GWH-450-ES |
|---|---|
| **TOP** | 12” |
| **FRONT (B)** | 4” |
| **BACK** | 0” |
| **SIDES** | ½” |
| **BOTTOM** | 12” |
| **VENT DIAMETER** | 3” |

*Table 1 Minimum clearances*

## 2.7 Applications

**Caution:** the water heater which will be used to supply potable water shall not be connected to any heating system or component(s) previously used with a nonpotable water heating appliance.

### Introduction

The application designs provided in this manual are general guides to be used when installing this recirculating water heater. Additional application designs are available from Bosch Water Heating.

### Instantaneous water heater (direct tank load version)

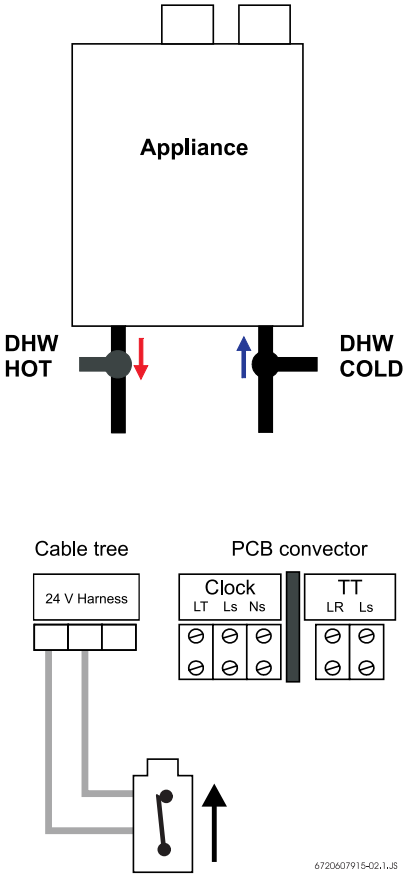



*Fig. 6*

# 3 Installation instructions

## 3.1 Introduction

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

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

Please contact BBT North America with any questions.

## 3.2 Proper location for installing your water heater

Carefully select the location of the water heater. For your safety and for proper operation, you must provide combustion air to the water heater and a proper exhaust vent system.
Follow the guidelines below:

- ▶ **1.** Locate the water heater where venting, gas and plumbing connections are feasible and convenient.
- ▶ **2.** The hot water lines should be kept short to save energy. Centrally locating the water heater is best. It is always best to have hot water lines insulated.

**Warning:** The water in this water heater is cold and always remains cold except for the times the burners are on. In the event of power outage in conjunction with freezing temperatures, it is recommended that the heater be drained. See chapter 5 for draining instructions.

**Warning:** Flammable materials, gasoline, pressurized containers, or any other items or articles that are potential fire hazards must NOT be placed on or adjacent to the water heater. The appliance area must be kept free of all combustible materials, gasoline and other flammable vapors and liquids.

## 3.3 Water heater placement and clearances

The GWH-450-ES is design certified for installation on a combustible wall (see 3.4 Mounting installation) provided the floor covering below the water heater is noncombustible. For installations in an alcove or closet, maintain the minimum clearances to combustible and non-combustible materials listed below. See also fig. 5.

A. Top 12 inches (305 mm)
B. Front 4 inches (100 mm)
C. Back 0 inches
D. Sides ½ inches (12 mm)
E. Bottom 12 inches (305 mm)

Clearances from any exhaust vent pipe are dependent upon the clearance requirements of the stainless steel vent pipe manufacturer. Single wall stainless steel (AL29-4C) vent pipe (vent type rated for Category III appliances) must be used when exhaust venting this appliance. See 3.6 Venting.

## 3.4 Mounting installation

**Warning:** before starting installation:

- ▶ check that there are no loose parts inside the appliance
- ▶ check the gas type of the water heater matches the gas supply you will be connecting to the heater.
- ▶ ensure that gas pipe, gas valve, fan and burner have no damage and are properly fitted.

Front cover should be removed (see instructions on page 5) in order to inspect components visually.

- ▶ Secure the wall mounting bracket provided with the water heater to a wall surface.

**Warning:** Do not install this appliance on a carpeted wall. The water heater must be mounted on a wall using appropriate anchoring materials.

If wall is a stud wall sheathed with plasterboard, it is recommended that support board(s), either 1x4.s or 1/2" (minimum) plywood first be attached across a pair of studs. Then attach the heater's bracket to the upper support board. The water heater should be kept level on the wall surface. See Fig. 7.

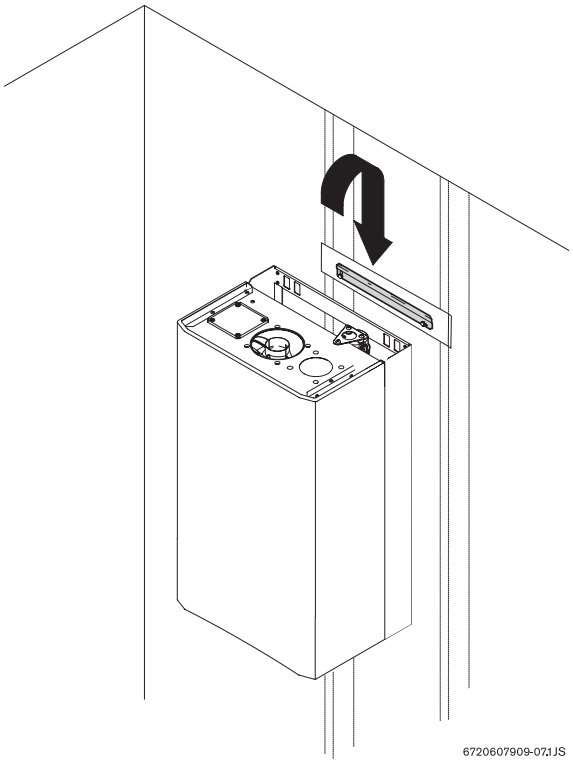



*Fig. 7 Mounting the water heater*

## 3.5 Combustion air requirements

**Warning:** In areas where freezing temperatures are common the twin pipe system is recommended. A negative air condition may result in cold air being drawn across the heat exchanger coil causing it to freeze and burst. This failure is not covered under the manufactures warranty.

**Warning:** When installed in an environment where corrosive chemicals or dirty air are present the twin pipe system is required.

### Twin pipe

The GWH-450-ES is designed as a sealed combustion appliance. It is recommended that the combustion air be provided by a dedicated 3" pipe to the outside. The combustion air pipe may be constructed of aluminum flex, PVC or any other rigid or semi rigid sealed 18 inch. The combustion air inlet should be located in such a manner as to provide a 3 foot clearance from the exhaust vent terminator. See Fig. 18 Letter I.
The maximum length of the combustion air inlet is 39 feet with one elbow. Subtract 6 feet for additional elbows. Maximum number of elbows permitted is 4.

### Single pipe

Although it is permissible to draw combustion air from the inside, it is not the manufacturer's recommended installation method. Always install a 3 inch elbow on the top right side of the combustion air inlet to prevent foreign object from falling into the unit (see Fig. 17).
If a single pipe installation is performed. Use the following guidelines when providing adequate combustion air for the recirculating water heater as well as any other appliances that may consume air in the space. Always follow local codes if more stringent.

- **Appliances located in unconfined spaces:**
  - **a)** An unconfined space is one whose volume is greater than 50 cubic feet (1.42 cubic meter) per 1000 Btu per hour (292.81 Watts) of the combined rating of all appliances installed in the space. That would be 6200 cubic feet (175.6 cubic meter) for the GWH-450-ES alone.
  - **b)** In unconfined spaces in buildings of conventional frame, masonry, or metal construction, infiltration air is normally adequate to provide air for combustion.
- **Appliances located in confined spaces:**
  The confined space must be provided with two permanent openings, one commencing within 12 inches (304.8mm) of the top and one commencing within 12 inches (304.8mm) of the bottom of the enclosure. Each opening must have a minimum free area of one square inch per:
  - 1000 Btu/hr (292.81 Watts) if all air is taken from inside the building
  - 2000 Btu/hr (585.62 Watts) if all air is taken from the outside by horizontal ducts
  - 4000 Btu/hr (1171.24 Watts)if all air is taken from the outside by direct openings.

Or the confined space must be provided with one permanent opening or duct that is within 12 inches (304.8mm) of the ceiling of the enclosure. This opening must have a minimum free area of one square inch per:

- 3000 Btu/hr (878.43 Watts) if all air is taken from the outside by a direct opening.

Louvers, grills and screens have a blocking effect, when used, increase the sizes of your openings by 400% for wood louvers (as wood type will reduce the free air by 75%) and 135% for metal louvers (as metal will reduce the free air by 30%). Refer to the National Fuel Gas Code for complete information. In buildings of tight construction all air should be taken from outside.

## 3.6 Venting

**Warning:** Do not reduce the vent (exhaust and combustion) pipe sizes and do not common vent with any other vented appliance or stove.

**Warning:** Failure to vent the exhaust gases to the outside with sealed stainless steel vent pipe (AL29-4C) may result in dangerous flue gases filling the space in which it is installed.

**Warning:** Do not mix vent pipe or joining methods from different manufactures.

| | Z flex | Protech | Heat Fab |
|---|---|---|---|
| **3" VENTING** 3" Horizontal Terminal | TEE Only | TEE Only | 9390 TEE |

*Table 2 Terminals/Adapters Part Numbers*

**Caution:** The vent system must be installed by a qualified agency in accordance with these instructions. If improperly installed a hazardous condition such as explosion or Carbon Monoxide poisoning could result. Bosch Water Heating will not be responsible for improperly installed appliances.

Establish vent clearances that comply with the vent manufacturer's specifications. In all cases follow local codes. See Table 3.

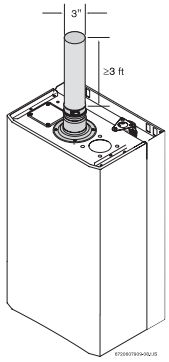
| | Diam. | Max length | Material |
|---|---|---|---|
| **Exhaust Vent** | 3 inches | 39 feet with 1 elbow | Sealed stainless steel (AL29-4C) |
| **Intake Vent** | 3 inches | 39 feet with 1 elbow | Aluminum flex, PVC or any other rigid or semi rigid sealed 3 pipe |

*Table 3 Venting Specifications*

The appliance should be located as close to the point of termination as possible. The maximum vent length is 39 feet (12 m) with one 90 degree elbow. Subtract 6 feet from the total vent length for each additional 90° elbow used (a maximum of four 90° elbows are permitted in the total vent length), or subtract 3 feet for every 45° elbow used. Horizontal sections of vent must pitch ¼" for every foot of horizontal length, to prevent the pooling of condensate, and be supported at 4 foot intervals with overhead hangers.

**Note:** Listed thimbles or collars are necessary to pass through wall and ceiling partitions. If the vent system passes through combustible areas where the vent clearance requirements cannot be maintained, it is permissible to chase straight sections of sealed 3 inch single wall vent through 4 inch (or greater) Type-B vent. The distance to combustibles using this chase technique is 1 inch. **Note: Type-B vent should never be used as the actual exhaust vent system for the appliance, as it is not gas tight.**

### Minimum exhaust vent size and length




The minimum exhaust vent length is 3 feet.
The use of a 90 degree elbow is equivalent to 6 ft in vent length.
The use of 45 degree elbow is equivalent to 3 ft in vent length.

*Fig. 8*

### Maximum exhaust vent and combustion air inlet lengths

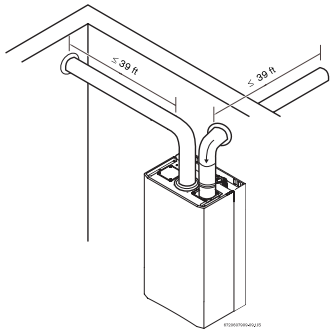



*Fig. 9*

Note: reduce 6 ft for each 90° elbow used after the first one, reduce 3 ft for each 45° elbow.

### Exhaust vent conditions

**Caution:** Any horizontal flue system fitted to the appliance must incline towards the appliance at an angle of 3% to prevente condensate dripping from the flue terminal.

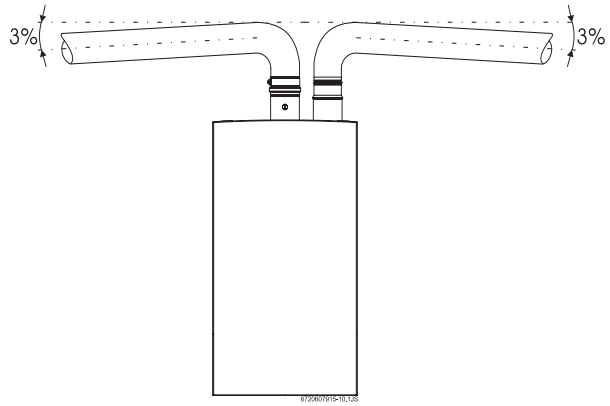



*Fig. 10 Side vent*

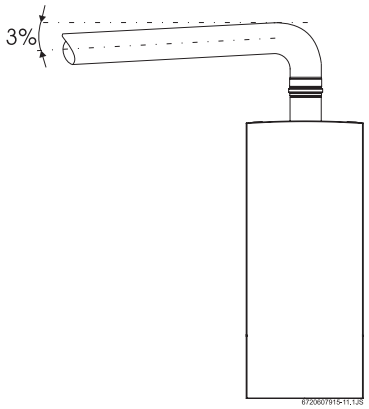



*Fig. 11 Rear vent*

**Vent Safety System**

The GWH-345/450-ESR will shut down if inadequate exhaust venting is detected or a lack of combustion air is provided to the unit; see troubleshooting section on page 24. See error code to confirm error, correct the problem and then reset the heater before operating.

**Attaching the exhaust and air inlet connection adaptors to the top of the heater**

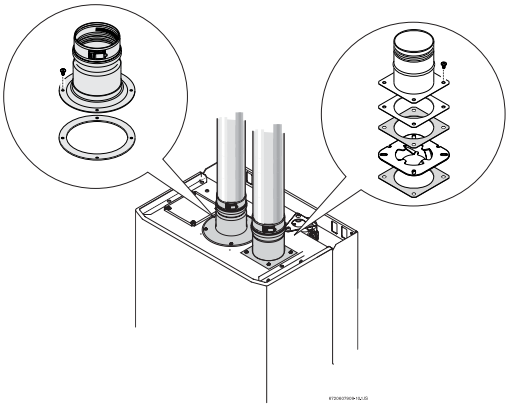


*Fig. 12 Mounting sequence*

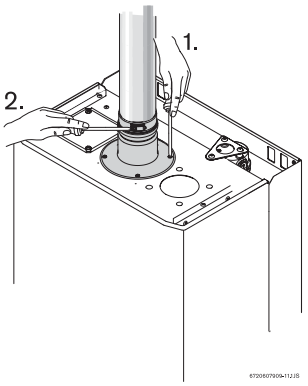



*Fig. 13 Exhaust*

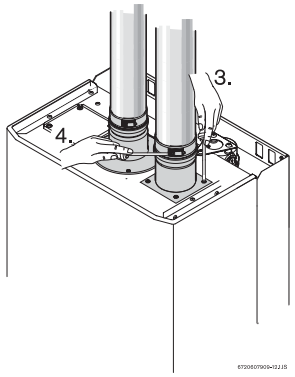



*Fig. 14 Air inlet*

- Attach the flue gas exhaust accessory (8 705 504 142) to the top of the unit (position 1) using the 4 screws and gasket provided, and fully insert 3" stainless steel vent pipe into the accessory and tighten the clamp (position 2).
- Place first gasket into fresh air intake.
- Place air deflector.
- Place second gasket and then the restrictor on top of deflector (use table 4 for the correct side).
- Attach the combustion air inlet accessory (8 705 504 141) to the top of the unit (position 3) using the 4 screws and gasket provided, and fully insert 3" combustion air pipe into the accessory and tighten the clamp (position 4). NOTE: The appliance has the possibility to mount the combustion air inlet accessory only on the top right side of the heater. The left side must be kept sealed.

**Restrictor definition**

Use table below to define which restrictor to be used.

| | Total equivalent length (ft) | Restrictor Ø |
|---|---|---|
| GWH450 NG | 18 -28 | 44 |
| | 28 -40 | 47 |
| | 40 -65 | 50 |
| | 65 -100 | 55 |
| | | |
| GWH450 LPG | 18 -28 | 47 |
| | 28 -50 | 50 |
| | 50 -75 | 55 |
| | 75 -100 | 60 |

*Table 4 Restrictors*

**Selecting a restrictor (sample)**

Described example was done taking as example Fig. 15.

Use table below to define which restrictor to be used.

| | Part | 3 feet | 1 foot | 90° | 45° | out/in | Total equivalent length |
|---|---|---|---|---|---|---|---|
| Comb, gas steel | Number of parts | 10 | ----- | 1 | ----- | 1 | 48.0 |
| | Equivalent length/part | 3.0 | 1.0 | 6.0 | 3.0 | 12.0 | |
| | Total equivalent length/part | 30.0 | ----- | 6.0 | ----- | 12.0 | |
| Comb, gas steel | Number of parts | 6 | ----- | 1 | ----- | 1 | 15.0 |
| | Equivalent length/part | 1.5 | 0.5 | 3.0 | 1.5 | 3.0 | |
| | Total equivalent length/part | 9.0 | ----- | 3.0 | ----- | 3.0 | |
| | **Part** | **4 feet** | **1 foot** | **90°** | **-----** | **-----** | |
| Fresh air PVC | Number of parts | ----- | ----- | ----- | ----- | ----- | 0 |
| | Equivalent length/part | 2.0 | 0.5 | 1.0 | ----- | ----- | |
| | Total equivalent length/part | ----- | ----- | ----- | ----- | ----- | |
| | | | | | | **Total:** | **63** |

*Table 5 Selecting a restrictor*

In above example, total equivalent length is 63 feets. Using table 4 we conclude that the restrictor to be used is:

- GWH450ES NG - restrictor 50
- GWH450ES LPG - restrictor 55.

Above table should be used to define the correct restrictor for each type of installation.

### 3.6.1 Venting options

Installing this water heater as a room sealed (TWIN PIPE SYSTEM) is the recommended method. Contact Bosch Water Heating or dealer for available vent termination kits and vent materials for this water heater.

**Room sealed installation (TWIN PIPE SYSTEM)**

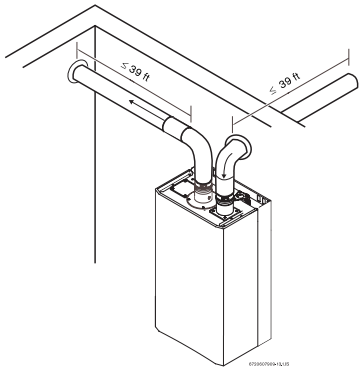



*Fig. 15*

Combustion air pipe: ≤ 39 ft (12 m)
Exhaust vent pipe: ≤ 39 ft (12 m)

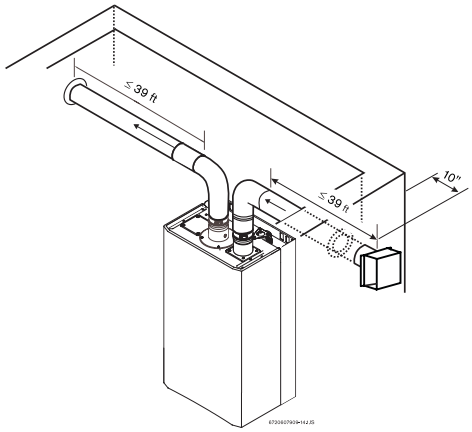



*Fig. 16*

Combustion air pipe: ≤ 39 ft (12 m)

Note: reduce 6 ft for each 90° elbow used after the first one, reduce 3 ft for each 45° elbow.
A maximum of four 90-degree elbows are permitted in both the exhaust and combustion air vent lengths.

**Open combustion installation (SINGLE PIPE SYSTEM)**

Not recommended in cold climate areas, see Chapter 3.5.

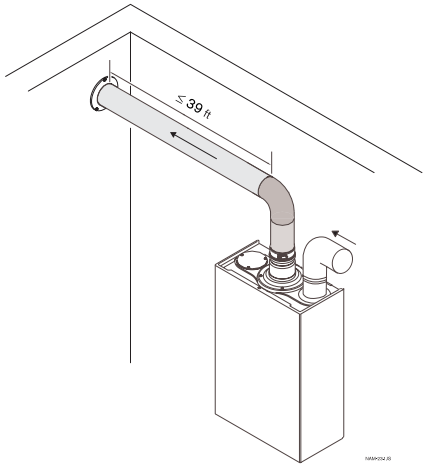



*Fig. 17*

Exhaust vent pipe: ≤ 39 ft (12 m)

The exhaust vent system must vent directly to the outside of the building and an adequate amount of indoor combustion air must be provided for this installation. See chapter 3.5.
Connecting a one piece 90 degree elbow pipe to the combustion air inlet adaptor is necessary, this will prevent debris or objects from ever falling into the inlet opening.
Note: reduce 6 ft for each 90° elbow used after the first one, reduce 3 ft for each 45° elbow.
A maximum of three 90-degree elbows are permitted.

## Recommended exhaust vent terminator position

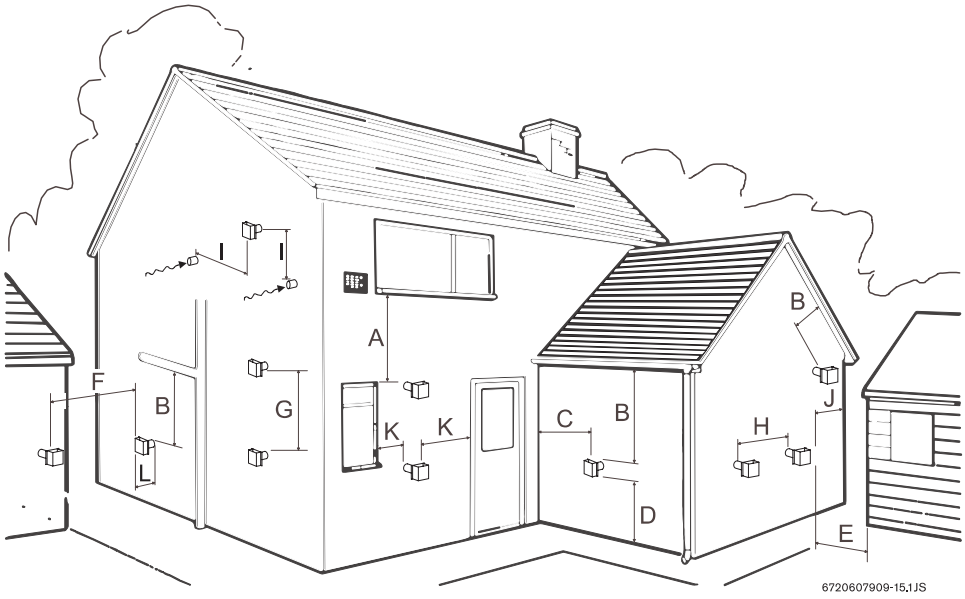



*Fig. 18*

| Ref. | Description | Minimum distance |
|---|---|---|
| **A** | Directly below an opening; operable windows, doors and any non-mechanical fresh air openings | 12 in (twin pipe installation)<br>48 in (single pipe installation) |
| **B** | Below a gutter, sanitary pipework or eaves | 24 in |
| | Below a gutter, sanitary pipework or eaves, protected by metal shielding | 12 in |
| **C** | From any internal corner | 12 in |
| **D*** | Above ground or snow pack | 12 in |
| | Above a paved sidewalk | 7 ft |
| **E** | From an opposing wall or structure facing the termination | 24 in |
| | From the relief valve of a lp gas regulator | 36 in |
| **F** | From a terminator facing a terminator | 48 in |
| **G** | Vertically between two exhaust vent terminators on the same wall | 60 in |
| **H** | Horizontally between two exhaust vent terminators on the same wall | 12 in |
| **I**** | Horizontally and vertically from combustion air inlet of a two system GWH-450-ES | 18 in |
| | From the gravity combustion air inlet any other equipment | 48 in |
| **J** | From any external corner | 12 in |
| **K** | Horizontally from an opening; operable windows, doors and any non-mechanical fresh air openings | 12 in |
| **L** | From wall on exhaust applications | 10 in |

*Table 6*

* Subject to local codes and anticipated snow level

** Other equipment that operates with a mechanical air inlet may require greater distances, reference manufacturer's instructions

**Supporting the exhaust vent system**

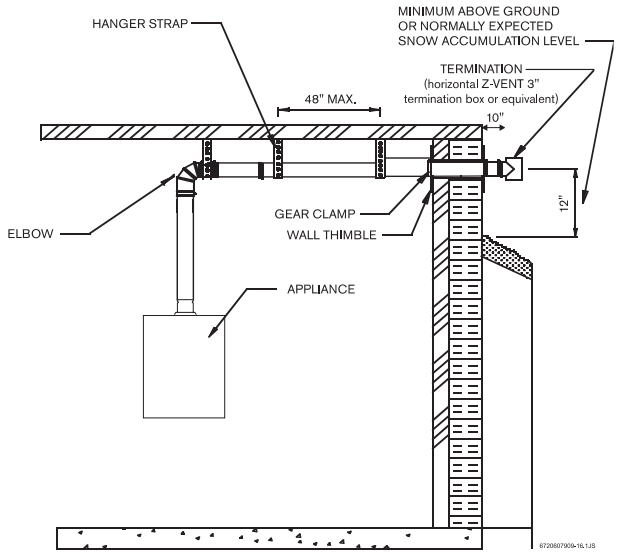



*Fig. 19 Horizontal side wall venting installation (combustion air piping not being shown)*

Note: Pitch vent away from heater

## 3.7 Gas piping & connections

Before connecting the gas supply, check the rating plate on the right side of the heater to be sure that the heater is rated for the same gas to which it will be connected.
In the United States: The installation must conform with local codes or, in the absence of local codes, the National Fuel Gas Code ANSI Z223.1/NFPA 54.
In Canada: The Installation should conform to CGA B149 INSTALLATION CODES and/or local installation codes.

**Warning:** DO NOT connect to an unregulated or high pressure propane line or to a high pressure commercial natural gas line.

**Warning:** The water heater must be isolated from the gas supply piping system during any pressure testing of that system at test pressures equal to or more than 0.5 psig. If overpressure has occurred, such as through improper testing of the gas lines or malfunction of the supply system, the gas valve must be checked for safe operation.

### GAS CONNECTIONS

- Install a manual gas shut off valve, on the gas supply line.
- Install a union when connecting gas supply.
- The minimum diameter required for any appliance connector used is ¾".
- National Fuel Gas Code requires that a sediment trap (drip leg) be installed on gas appliances not so equipped. The drip leg must be accessible and not subject to freezing conditions. Install in accordance with the recommendations of the serving gas supplier.

When connections are made, check for gas leaks at all joints. Apply some gas leak detection solution to all gas fittings. Bubbles are a sign of a leak. A combustible gas detector may also be used to detect for leaks.

**Danger:** If you have a leak, shut off the gas. Tighten appropriate fittings to stop leak. Turn the gas on and check again with a gas leak detection solution. Never test for gas leaks using a match or flame.

### GAS LINE SIZING

The gas supply piping should be sized according to the applicable code for a maximum draw of 120,000 BTUH. Measure the length of gas supply line and use the tables in Fig. 21 or the gas line manufacturer's sizing tables to determine the pipe diameter necessary to accommodate the BTU demand of the unit. If there are more gas drawing appliances on the line, size the gas line according to the total maximum amount of BTU draw for all appliances.

**Note:** Under sizing the gas line may result in diminished output and improper operation. See chapter 3.8 for the procedure to confirm gas pressure.

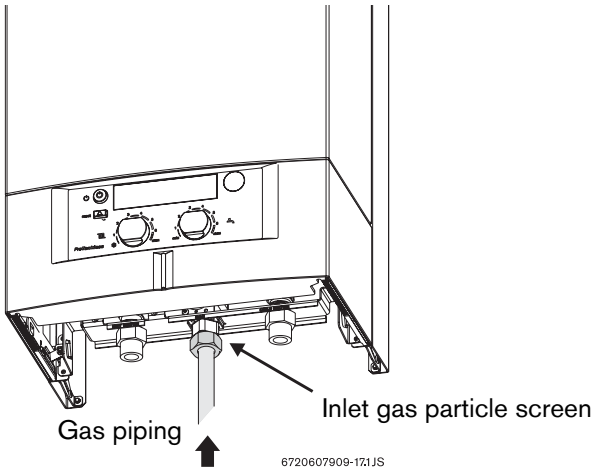



*Fig. 20*

## FOR NATURAL GAS

Maximum Capacity of pipe in Cubic Feet of Gas per Hour for Gas Pressure of 0.5 Psig or less and a Pressure drop of 0.3 in Water Column (0.75mbar).(Based on a 0.60 Specific Gravity Gas) Btu numbers given in thousands.

Follow boxed numbers for piping just one GWH-345/450-ESR (example: ¾" B.I. Natural Gas pipe for 20 ft (6.1m). will handle 190,000 btu's (55.7 kWh). For multiple appliances combine the total btu input load and then refer to applicable chart below.

| Nominal Iron Pipe Size, inches | Internal Diameter inches | Length of Black Iron Pipe, Feet | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 125 | 150 | 175 | 200 |
| 1/4 | 0.364 | 32 | 22 | 18 | 15 | 14 | 12 | 11 | 11 | 10 | 9 | 8 | 8 | 7 | 6 |
| 3/8 | 0.493 | 72 | 49 | 40 | 34 | 30 | 27 | 25 | 23 | 22 | 21 | 18 | 17 | 15 | 14 |
| 1/2 | 0.622 | 132 | 92 | 73 | 63 | 56 | 50 | 46 | 43 | 40 | 38 | 34 | 31 | 28 | 26 |
| 3/4 | 0.824 | 278 | 190 | 152 | 130 | 115 | 105 | 96 | 90 | 84 | 79 | 72 | 64 | 59 | 55 |
| 1 | 1.049 | 520 | 350 | 285 | 245 | 215 | 195 | 180 | 170 | 160 | 150 | 130 | 120 | 110 | 100 |
| 1 1/4 | 1.380 | 1050 | 730 | 590 | 500 | 440 | 400 | 370 | 350 | 320 | 305 | 275 | 250 | 225 | 210 |
| 1 1/2 | 1.610 | 1600 | 1100 | 890 | 760 | 670 | 610 | 560 | 530 | 490 | 460 | 410 | 380 | 350 | 320 |
| 2 | 2.067 | 3050 | 2100 | 1650 | 1450 | 1270 | 1150 | 1050 | 990 | 930 | 870 | 780 | 710 | 650 | 610 |

Length of Flexible Corrugated Stainless Steel Tubing (CSST), Feet

| Tube size, inches | EHD* | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| 1/2 | 18 EHD | 82 | 58 | 47 | 41 | 37 | 34 |
| 3/4 | 23 EHD | 161 | 116 | 96 | 83 | 75 | 68 |
| 1 | 30 EHD | 330 | 231 | 188 | 162 | 144 | 131 |
| 1 1/4 | 37 EHD | 639 | 456 | 374 | 325 | 292 | 267 |

* EHD = Equivalent Hydraulic Diameter. The greater the value of EHD, the greater the gas capacity of the tubing.

## FOR LP GAS

Maximum Capacity of Pipe in Thousands of BTU per Hour of Undiluted Petroleum Gases (at 11 inches Water Column Inlet Pressure) (Based on a Pressure Drop of 0.5 Inch Water Column).

* EHD = Equivalent Hydraulic Diameter. The greater the value of EHD, the greater the gas capacity of the tubing.

| Nominal iron pipe Inches | Black Iron Pipe Length of Pipe, Feet | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 20 | 30 | 40 | 50 | 60 | 80 | 100 | 125 | 150 | 200 |
| 1/2 | 291 | 200 | 160 | 137 | 122 | 110 | 94 | 84 | 74 | 67 | 58 |
| 3/4 | 608 | 418 | 336 | 287 | 255 | 231 | 197 | 175 | 155 | 140 | 120 |
| 1 | 1145 | 787 | 632 | 541 | 480 | 434 | 372 | 330 | 292 | 265 | 227 |

Length of Flexible Corrugated Stainless Steel Tubing (CSST), Feet

| Tube size inches | EHD* | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| 1/2 | 18 EHD | 129 | 91 | 74 | 64 | 58 | 53 |
| 3/4 | 23 EHD | 254 | 183 | 151 | 131 | 118 | 107 |
| 1 | 30 EHD | 521 | 365 | 297 | 256 | 227 | 207 |
| 1 1/4 | 37 EHD | 971 | 661 | 528 | 449 | 397 | 359 |

Maximum Capacity of Semi-Rigid (flexible, non corrugated) Tubing in Thousands of BTU per Hour of Undiluted Liquefied Petroleum Gases (at 11 inches Water Column Inlet Pressure).

(Based on a Pressure Drop of 0.5 Inch Water Column)

* Source National Fuel Gas Code NFPA 54, ANSI Z223.1 - No Additional Allowance is necessary for an ordinary number of fittings

| Copper Outside diameter Inch | Length of Tubing, Feet | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 3/8 | 39 | 26 | 21 | 19 | – | – | – | – | – | – |
| 1/2 | 92 | 62 | 50 | 41 | 37 | 35 | 31 | 29 | 27 | 26 |
| 5/8 | 199 | 131 | 107 | 90 | 79 | 72 | 67 | 62 | 59 | 55 |
| 3/4 | 329 | 216 | 181 | 145 | 131 | 121 | 112 | 104 | 95 | 90 |

*Fig. 21*

National Fuel Gas Code requires that a sediment trap (drip leg) be installed on gas appliances not so equipped. Also, a manual gas shut off valve must be installed on the gas supply line within close proximity of the water heater and be visible from the water heater.

**Warning:** The water heater must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures equal to or more than 0.5 psig.

The water heater must not be piped with gas supply pressures in excess of 0.5 psig. If overpressure has occurred, such as through improper testing of the gas lines or malfunction of the supply system, the gas valve must be checked for safe operation.
When connections are made, check for gas leaks at all joints. Apply some soapy water to all gas fittings. Soap bubbles are a sign of a leak.

**Danger:** If you have a leak, shut off the gas. Tighten appropriate fittings to stop leak. Turn the gas on and check again with a soapy solution. Never test for gas leaks using a match or flame.

## 3.8 Measuring gas pressure

### Connecting manometer

- Turn power off.
- Shut off gas supply.
- Remove front cover and locate the inlet gas measuring point (see Fig. 22).
- Loosen screw inside test point fitting (do not remove) and connect manometer tube on test point.

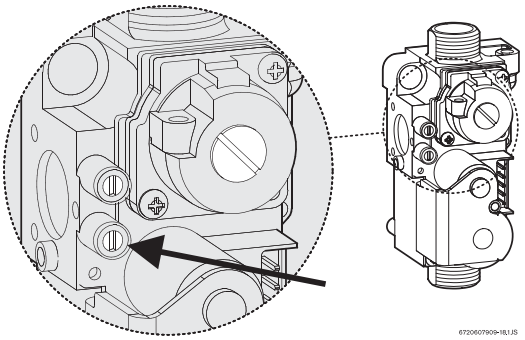


*Fig. 22 Gas pressure measuring (lower tapping)*

### Static pressure test

- Turn gas supply on.
- Operate all other gas appliances on same gas piping system at maximum output.
- Record static pressure reading in table 7.

### Operating pressure test

- Press On/Off button to turn heater On.
- After 10 seconds, press and hold the reset button ⚠.
- Rotate the recirculating water temperature selector (left knob) to the minimum and then to maximum.
- Release the reset button and the display should show * blinking.
- Place a demand for heat by turning thermostat control to maximum.
- Record operating pressure reading in table 7.

Note: after verification tight the screw inside the test point.

Operating gas pressures lower than 5" W.C. for natural gas or 11" W.C. for LP will result in improper operation and must be corrected. See Chapter 3.7 for gas line sizing requirements.

| |
|---|
| **Static** Gas Pressure Reading (see Chapter **3.8**)<br><br>enter here: _____ |
| **Operating** Gas Pressure Reading (see Chapter **3.8**)<br><br>enter here: _____ |

*Table 7*

## 3.9 Water connections

- When facing the water heater, the ¾" return is on the bottom right and the supply is on the bottom left. Install the heater centrally in the building if possible and make piping runs as short as possible.

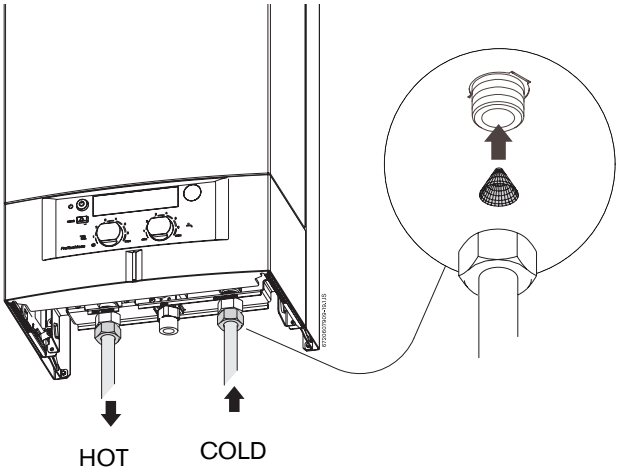



*Fig. 23*

- The use of a union when connecting both water pipes to the return and supply connections are recommended, this will facilitate any necessary servicing.
- Although water piping throughout the building may be other than copper, we recommend that copper or suitably rated stainless steel flex line piping be used for the water connections for 1.5' on either side of the water heater (follow local codes if more stringent).
- Never sweat any rigid piping directly to or beneath the water connections, damage can occur to the internal parts of the heater from heating of the pipe.
- Plastics or other PEX type plumbing line materials are not suitable for connecting directly to the water heater.
- Keep water inlet and outlet pipes to no less than ¾" (19.05mm) diameter to allow the full flow capacity.
- If the cold and hot connections to the heater are reversed, the water heater will not function. Be certain there are no loose particles or dirt in the piping. Blow out or flush the lines before connecting to the water heater.
- Full port valves should be installed on both the cold water supply and hot water outlet lines to facilitate servicing the water heater (see Fig. 24).
- For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07 and 3.45bar).

**Connecting the pressure relief valve (PRV)**

A listed pressure relief valve supplied with the heater must be installed at the time of installation. No valve is to be placed between the PRV and the water heater. No reducing coupling or other restriction may be installed in the discharge line. The discharge line must be a minimum of 4" above a drain and installed such that it allows complete drainage of both the PRV and the line. The location of the PRV must be readily accessible for servicing or replacement, and be mounted as close to the water heater as possible. See Fig. 24. To install the PRV, a suitable fitting connected to an extension on a "T" fitting can be sweated to the hot water line.
Support all piping.

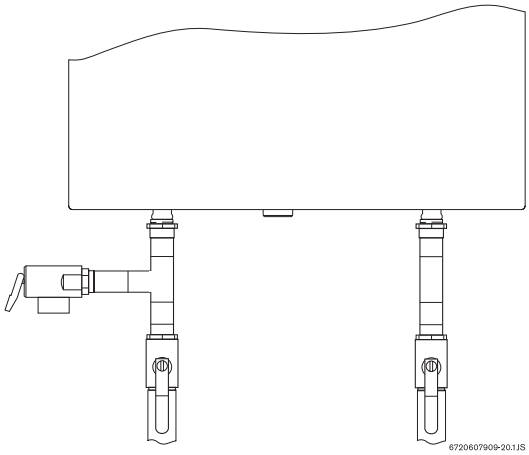



*Fig. 24 Plumbing Connections and Pressure Relief Valve*

## 3.10 Electrical connections

**Warning:** For safety reasons, disconnect the power supply to the heater before any service or testing is performed.

**Warning:** This water heater must be electrically grounded in accordance with the most recent edition of the National Electrical Code. NFPA 70. In Canada, all electrical wiring to the heater should be in accordance with local codes and the Canadian Electrical Code, CSA C22.1 Part 1. Do not rely on the gas or water piping to ground the metal parts of the water heater.

The GWH-450-ES requires an electrical power supply from a 120VAC 60Hz circuit and must be properly grounded.
A means for switching off the 120VAC power supply must be provided.
The heater is wired as shown in the wiring diagram (chapter 4.7, Fig. 29).

# 4 Operating instructions

Before proceeding with the operation of the water heater make sure that the system is filled with water:

- Turn off power supply to water heater.
- Open the cold water inlet supply to the water heater fully.
- Open a hot water faucet to permit the water to fill the water heater and the piping and to eliminate the air trapped in the system.
- Close the hot water faucet after the water flows freely and all the air has escaped from the system. Turn on power supply to heater. The water heater is now ready to operate.

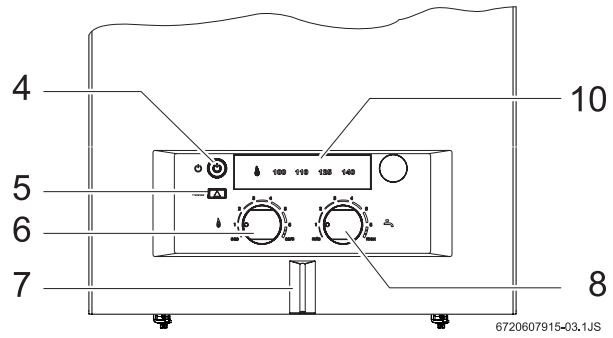



*Fig. 25*

**4** On/Off switch
**5** Reset button
**6** ECO flow selector
**7** LED - (ON) warning light (blinks when appliance in lock out)
**8** Hot water temperature selector
**10** LED to display error codes and temperatures

## 4.1 For your safety read before operating your water heater

**Warning:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

**WHAT TO DO IF YOU SMELL GAS**

- Do not try to operate any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbors phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- Use only your hand to press the on/off control switch. Never use tools. Follow these instructions exactly. If control switch is jammed, close the gas supply and call a qualified service technician. Attempted forceful repair may result in a fire or explosion.
- 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.

## 4.2 Startup instructions

- **1.** STOP! Read the previous safety information.
- **2.** The gas valve must be shut off by putting the ON/OFF switch to position OFF. Wait five (5) minutes to clear out any gas. If you smell gas, STOP! Follow "B" in the safety information above. If you do not smell gas, go to the next step.
- **3.** This appliance is equipped with electronic ignition for lighting the main burners. When turning the water heater on, follow these instructions exactly.
- **4.** Press the ON/OFF switch to the ON position. In this position, the water heater is ready to use.
- **5.** Close the TT (thermostat) connection to activate heater.
- **6.** The burners will remain on until the heat demand is met.

**NOTE: upon installation or after gas line work has been done, air in the gas line may cause a lockout error. Reset the unit (Fig. 25, pos. 52). The water heater will reattempt ignition.**

When the water heater is in operation you will hear its power vent fan and burner operating. After a call for heat, the power vent fan will continue to operate for up to 60 seconds to exhaust all flue gases.

**TO TURN OFF GAS TO APPLIANCE**

- Turn off the manual gas shut off on the supply line to the water heater and set the ON/OFF switch to the OFF) position. Note: a manual gas shut off valve is not supplied with the water heater.

## 4.3 Power

### On

To start the appliance:

- press the ON/OFF button.
  LED (fig. 25) goes orange.
  When the burner is working, the LED display shows the symbol .

Wait approximately 10 seconds, during this period the appliance will perform a self test.

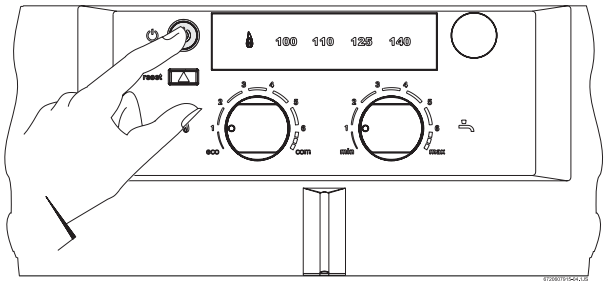



*Fig. 26*

### Off

To shut down the appliance:

- press the ON/OFF switch to OFF position.

## 4.4 Water temperature

Water temperature can be regulated in a range of 100°F to 140°F. The regulator permanently modulates the burner flame according to current demand.
To select water temperature outlet:

- Rotate thermostat in order to adapt water temperature (ranging from 100°F to 140°F).
  If the burner is working, symbol goes green.

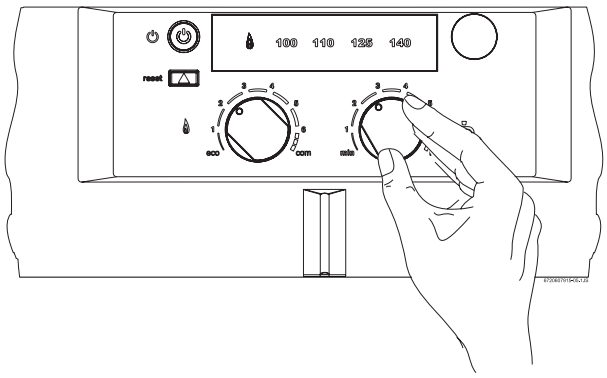



*Fig. 27*

## 4.5 Power adjustment

**Note:** only when using the 12 kOhm DHW thermistor.

- Connect thermistor to blue wire with terminal block.

Power can be set from 70% to 100% of full power in thermostat (Fig. 28).

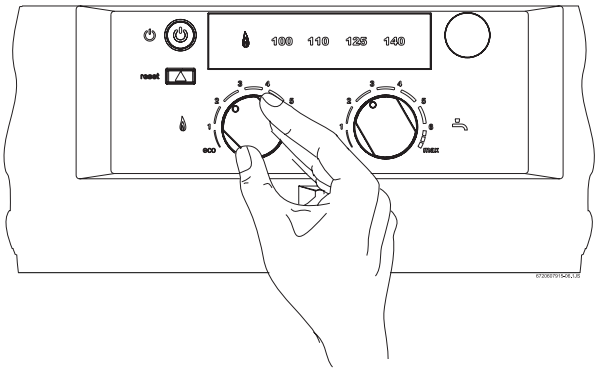



*Fig. 28*

| Thermostat knob position | DHW temp. | Confort regulation |
|---|---|---|
| Min. | approx. 100°F (38°C) | ECO - 75% of full power |
| Max. | approx. 140°F (60°C) | COM - 100% of full power |

*Table 8*

## 4.6 Freeze prevention

- Do not disconnect the electric supply.
- Do not install in unheated areas which can experience freezing temperatures.
- Do NOT use non-potable additives like glycol.

### Freeze Prevention

A kit is available to prevent heat exchanger from freezing. For more detailed information about this feature, consult the instructions supplied with the accessory X XXX XXX XXX.

## 4.7 Electrical diagram

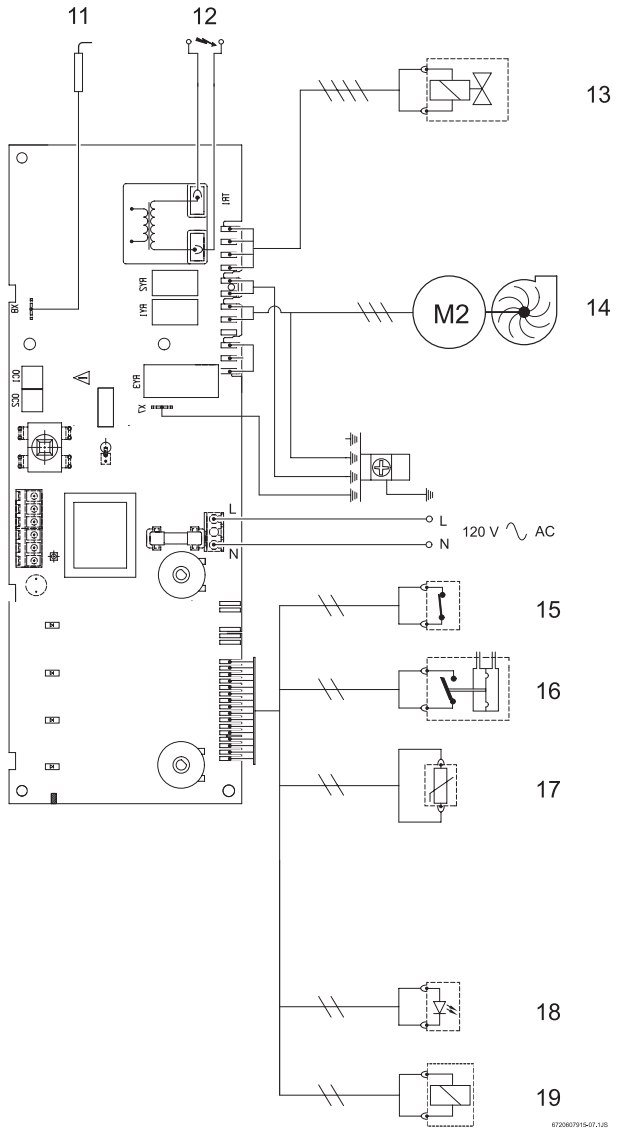



*Fig. 29 Electrical scheme*

**11** Control electrode
**12** Spark plug
**13** Gas valve
**14** Fan
**15** Temperature limiter
**16** Differential pressure switch
**17** Primary circuit temperature sensor
**18** LED
**19** Flow switch

# 5 Maintenance and service

**Warning:** Always turn off the electrical power supply, turn off the manual gas valve and turn off the manual water control valves whenever servicing.

The unit should be checked once a year by a gas technician. If repairs are needed, the repairs should be done by a gas technician

### To remove front cover

- ▶ Loosen the two Philips head screws located as shown in fig. 2).
- ▶ Pull control panel upwards and then pull it downwards.
- ▶ Lift front cover panel upward and remove.

### Yearly maintenance

Reference diagrams on pages 27 and 28.

- Venting system
- Unclip 4 access clip to inspect and clean burner assembly
- Manual operation of the pressure relief valve to insure correct operation
- As indicated by reduced flow, flush the heat exchanger with a descaling solution if mineral build up is evident. Scale build up will shorten the life of the water heater, descale heat exchanger thoroughly and repeat annually depending on mineral content of ground water.

# 6 Troubleshooting

| Fault Indication | Possible Cause | Check |
|---|---|---|
| Orange LED + 100°F flashing | Shut down by the temperature limiter (over temperature). | • Check position of heating NTC<br>• Check temperature limiter, cables<br>• Check system with air, air vent. |
| Orange LED + 110°F flashing | No Flame detected (no ignition). | • Check gas inlet pressure, gas type, air inside gas pipe<br>• Check flame, ignition<br>• Check burner pressure, injectors<br>• Check ionisation sensor, cable<br>• Check electronic unit. |
| Orange LED + 125°F flashing | "false flame" (error during self check of electronic). | • Check humidity at Electronic<br>• Check cables, sensor contacts (corrosion)<br>• Check flame inside Burner chamber<br>• Check electronic unit. |
| Orange LED + 140°F flashing | Shut down because of low voltage. | • Check power supply<br>• Check electronic unit. |
| Orange LED + 100°F + 140°F flashing | Shut down by pressure switch. | • Check chimney, fresh air tube and combustion gas tube<br>• Check ventilator, Venturi / silicone tubes<br>• Check pressure switch (short, opened)<br>• Check cables, electronic. |
| Orange LED + 110°F + 140°F flashing | NTC defect (no function) | • Check NTC<br>• Check cable (opened, short)<br>• Check electronic unit. |
| LED of the appliance doesn't start up, no function. | No mains voltage supply, fuse blown, transformer etc. defect | • Check mains voltage supply<br>• Check fuse<br>• Check electronic unit. |
| Noise; boiling noise (over heating), no correct function. | Low circulation, air inside installation, bad heat transfer. | • Check air in system, air vent<br>• Check circulation<br>• Check heat exchanger<br>• Check gas type, injectors, gas valve. |
| Low temperature (sanitary water). | To low burner power, burner ON / OFF. | • Check air vent<br>• Check Adjustment of gas, gas valve<br>• Check NTC<br>• Check electronic unit. |
| Insufficient water flow. | • Low water pressure<br>• Filter, taps or heat exchanger with dirt. | • Check inlet pressure<br>• Check filter, taps, heat exchanger and clean. |

*Table 9*

**Error codes and diagnostics**

The following table is a diagnostic indicator and it does not solve all the technical problems that may occur with the appliance. It is very important to retain a good working knowledge of the appliance , its electrical and hydraulic layout and functional operation.

| Malfunction | Cause | Solution |
|---|---|---|
| **Orange LED + 100°F** - The appliance shuts down shortly after the ignition. | Over heating detected by the temperature limit stat. | • Check if there is any obstruction on central heating circuit<br>• Purge the central heating installation<br>• Check if the pump is moving<br>• Check the temperature limit stat[1)]. |
| **Orange LED + 110°F** | Lack of ionisation signal. | • Check the gas supply<br>• Check the complete ignition system. |
| **Orange LED + 125°F** | Ionisation signal detected with the burner stopped. | • Check the sensor electrode<br>• Check the control unit. |
| **Orange LED + 140°F** | Gas valve is not being detected. | • Check the electrical connections to the primary NTC sensor and the primary NTC sensor itself. |
| **Orange LED + 110°F + 140°F** | Primary NTC temperature sensor disconnected or in short circuit. | • Check the electrical connections to the primary NTC sensor and the primary NTC sensor itself. |
| **Orange LED + 140°F** | Supply voltage inferior to 90 V.a.c. | • Check electrical supply installation. |
| The appliance only ignite after several attempts. | Air on the gas pipes. | • Purge the gas supply pipes. |
| The appliance does not ignite. | Lack of electrical supply. | • Check the electrical supply. |
| Reduced flow on the domestic hot water circuit | Low inlet water pressure<br><br>Dirt on the filter | • Check the supply water pressure<br><br>• Check the filters on the appliance and on the taps. |

*Table 10*

1) Service or replacement of the high temperature limit switch, contact authorized responsible.

Lock out of the appliance signalised by the blinking of the orange LED and LCD indication is done by safety reasons. After solving the problem, it is necessary to press the reset button in order that the appliance starts working again.

# 7 GWH-450-ES Functional scheme

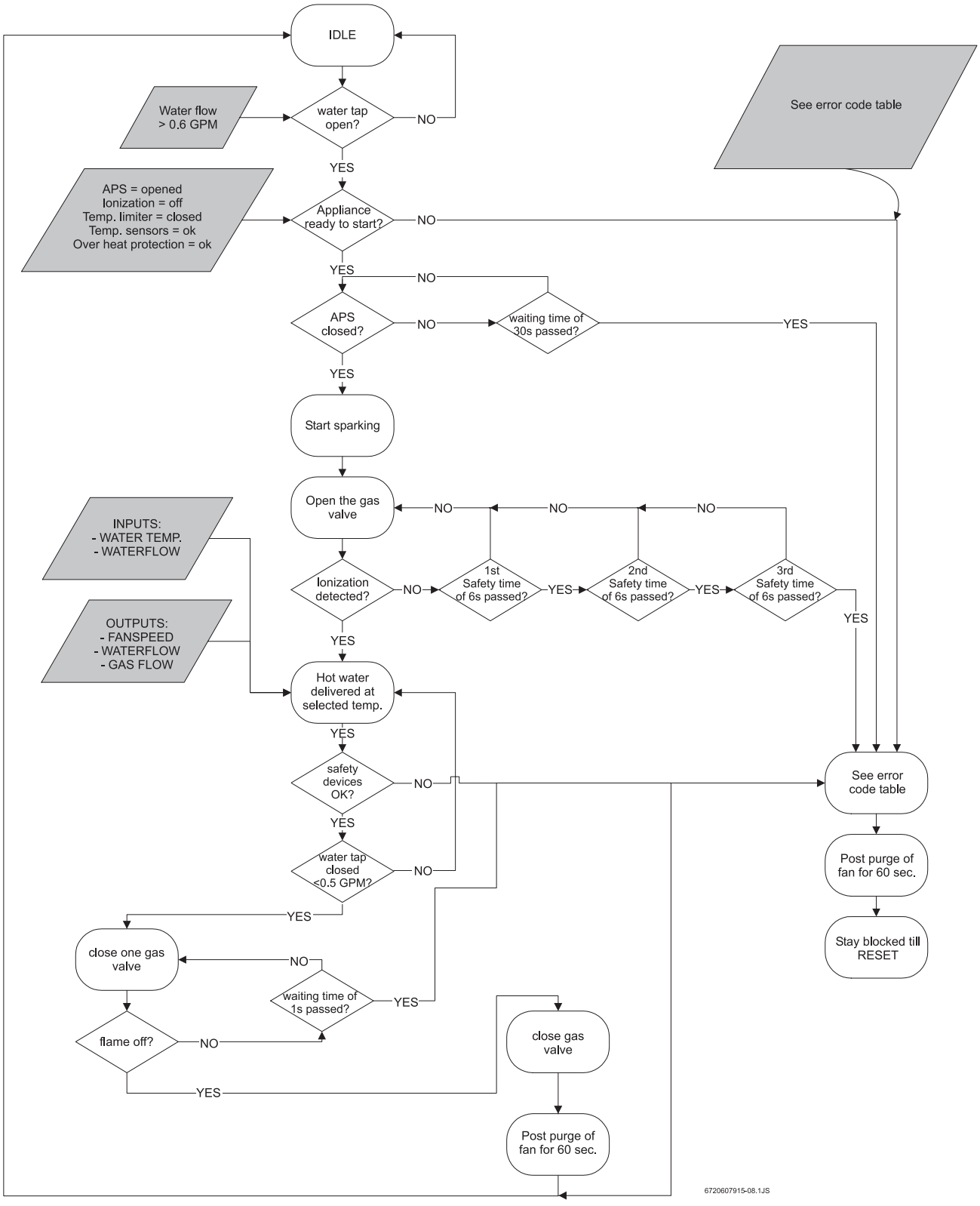



*Fig. 30 Functional scheme*

# 8 Interior components diagram and parts list

## 8.1 Interior components

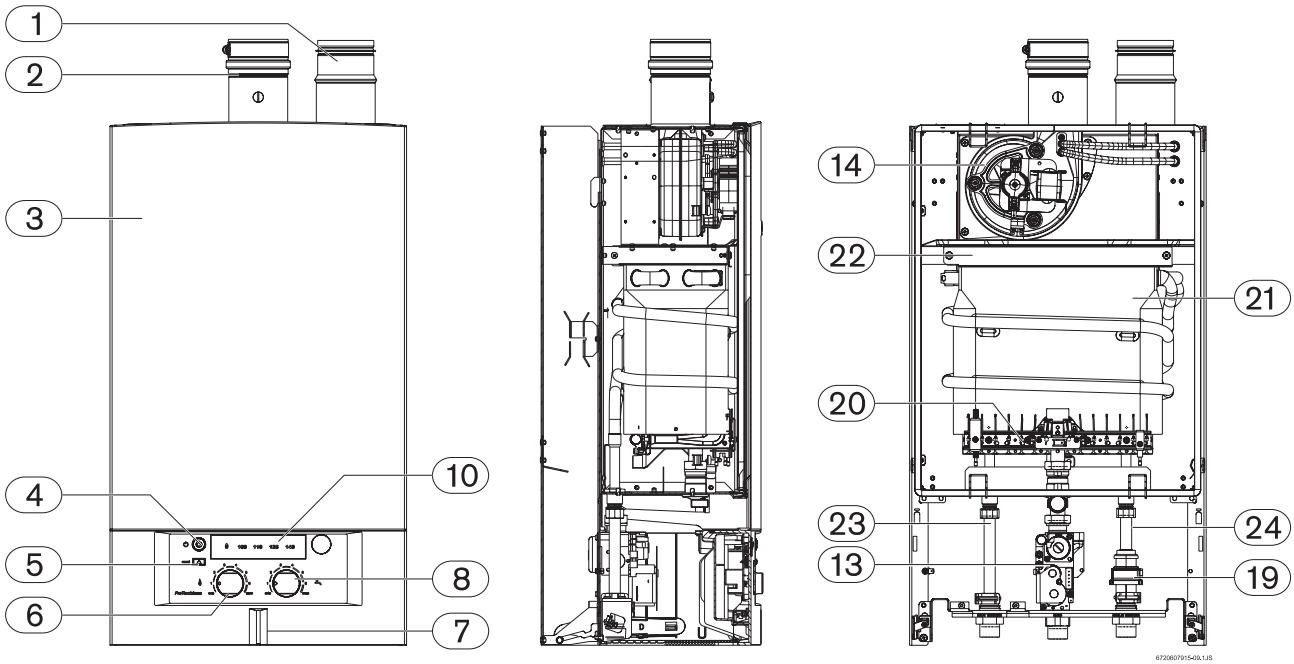



*Fig. 31 Components*

**1** Combustion air inlet adapter (right side only)
**2** Exhaust adapter with $CO_2$ measuring point
**3** Front cover
**4** On/Off button
**5** Reset button
**6** ECO flow selector
**7** LED - (ON) warning light (blinks when appliance in lock out)
**8** Hot water temperature selector
**10** LED to display error codes and temperatures
**13** Gas valve
**14** Fan
**19** Flow switch
**20** Main burner
**21** Heat exchanger
**22** Holding bracket
**23** Hot water pipe
**24** Cold water pipe

## 8.2 Components diagram

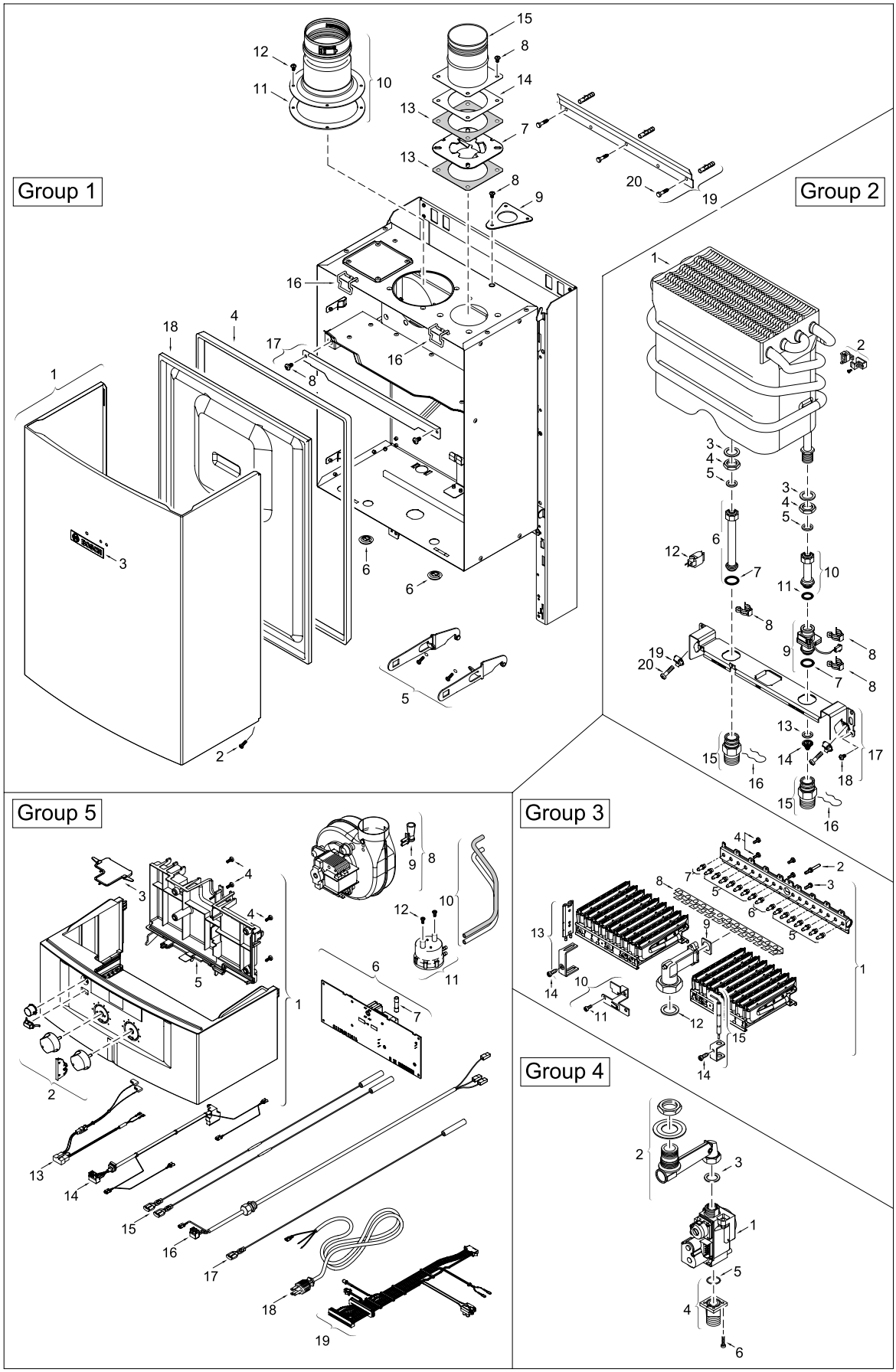



*Fig. 32 Components Diagram*

## 8.3 Parts list

| Item | Description | Reference |
|---|---|---|
| | **GROUP 1** | |
| 1 | Front cover | 8 705 431 223 0 |
| 2 | Screw no. 10 x 22mm (10x) | 2 910 612 435 0 |
| 3 | Trade mark badge | 8 701 103 140 0 |
| 4 | Gasket | 8 704 701 077 0 |
| 5 | Support set | 8 708 006 130 0 |
| 6 | Grommet set | 8 710 203 039 0 |
| 7 | Deflector plate | 8 700 100 376 0 |
| 8 | Screw M4,8x9,5 (10x) | 8 703 403 012 0 |
| 9 | Angle bracket | 8 708 003 218 0 |
| 10 | Adapter | 8 705 504 149 0 |
| 11 | Washer | 8 716 140 939 0 |
| 12 | Screw no8x3/8" phillips (10x) | 2 910 612 424 0 |
| 13 | Washer | 8 711 004 022 0 |
| 14 | Throttle disc set | 8 709 918 780 0 |
| 15 | Adapter | 8 705 504 148 0 |
| 16 | Clip (10x) | 8 701 201 032 0 |
| 17 | Holding bracket | 8 701 302 235 0 |
| 18 | Cover | 8 701 302 225 0 |
| 19 | Fixing bracket | 8 708 003 143 0 |
| 20 | Fixing set | 8 709 918 681 0 |
| | **GROUP 2** | |
| 1 | Heat exchanger | 8 705 406 329 0 |
| 2 | Temperature limit 104°C | 8 707 206 204 0 |
| 3 | Washer 25OD X 21ID X 2MM (10x) | 8 700 103 125 0 |
| 4 | Locknut G 1/2" | 8 713 300 018 0 |
| 5 | Fibre washer 18.6 X 13.5 X 1.5 (10x) | 8 710 103 045 0 |
| 6 | Cold water pipe | 8 700 703 163 0 |
| 7 | O-ring (10x) | 8 700 205 135 0 |
| 8 | Clamp spring | 8 716 102 607 0 |
| 9 | Flow switch | 8 707 406 034 0 |
| 10 | Pipe | 8 700 703 161 0 |
| 11 | O-ring | 8 700 205 134 0 |
| 12 | Temperature sensor | 8 700 400 015 0 |
| 13 | Washer (10x) | 8 700 103 109 0 |
| 14 | Water strainer | 8 700 507 079 0 |
| 15 | Connection bush | 8 703 305 326 0 |
| 16 | Wireform spring (10x) | 8 714 606 002 0 |
| 17 | Fixing bracket | 8 701 309 158 0 |
| 18 | Screw (10x) | 8 743 401 019 0 |
| 19 | Cage nut | 8 703 309 001 0 |
| 20 | Screw M 5.0X20 DIN 7985 | 2 910 642 162 0 |
| | **GROUP 3** | |
| 1 | Main burner | 8 708 120 622 0 |
| 2 | Screw (10x) | 8 703 404 089 0 |

*Table 11*

| Item | Description | Reference |
|---|---|---|
| 3 | Screw(10x) | 8 703 401 069 0 |
| 4 | Screw M4 x 12 phillips (10x) | 2 910 952 122 0 |
| 5 | Nozzle (125) (10x) | 8 708 202 116 0 |
| 6 | Nozzle (120) (10x) | 8 708 202 124 0 |
| 7 | Nozzle (120) (10x) | 8 708 202 124 0 |
| 8 | Crossignition bridge | 8 711 304 337 0 |
| 9 | Washer (10x) | 8 701 003 010 0 |
| 10 | Angle bracket | 8 711 304 287 0 |
| 11 | Screw (10x) | 2 910 619 409 0 |
| 12 | Washer 1" (10x) | 8 710 103 060 0 |
| 13 | Ignition electrode | 8 708 107 008 0 |
| 14 | Screw m3.5x6 phillips steel (10x) | 2 910 642 082 0 |
| 15 | Sensing electrode | 8 708 107 009 0 |
| | **GROUP 4** | |
| 1 | Gas valve | 8 707 021 333 0 |
| 2 | Connector | 8 705 202 126 0 |
| 3 | Washer- fibre 24OD X 16ID X 2MM | 8 700 103 014 0 |
| 4 | Connection bush | 8 703 305 325 0 |
| 5 | O-ring (10x) | 8 700 205 144 0 |
| 6 | Screw (10x) | 2 912 601 120 0 |
| | **GROUP 5** | |
| 1 | Cabinet front panel | 8 707 207 221 0 |
| 2 | Rotary handles | 8 702 000 309 0 |
| 3 | Cover | 8 705 400 069 0 |
| 4 | Screw (10x) | 8 703 403 074 0 |
| 5 | Cover | 8 705 400 056 0 |
| 6 | Printed circuit | 8 708 300 193 0 |
| 7 | Fusing element T3,15A (10x) | 1 904 522 745 0 |
| 8 | Centrifugal blower | 8 707 204 061 0 |
| 9 | Differential pressure line | 8 703 305 302 0 |
| 10 | Set of hose | 8 700 703 049 0 |
| 11 | Pressure differential | 8 707 406 074 0 |
| 12 | Screw tapping no6 x 9.5 (10x) | 2 910 612 410 0 |
| 13 | Cable | 8 704 401 313 0 |
| 14 | Cable | 8 704 401 312 0 |
| 15 | Set of cables | 8 704 401 309 0 |
| 16 | Cable | 8 704 401 308 0 |
| 17 | Set of cables | 8 704 401 310 0 |
| 18 | Power supply cord | 8 704 401 267 0 |
| 19 | Cable 24V | 8 704 401 295 0 |

*Table 11*

# 9 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.
- Whenever possible use taps with built-in water flow limiters. They will give you the same comfort level while saving water.
- 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).

**For increased safety shut off the appliance from the main water supply if your are staying away from home for a considerable time.**
**At below freezing temperatures, disconnect the plumbing connections to the heater and allow the heater to drain.**
**To prevent any freeze damage, introduce short bursts of compressed air (20-40 psi) through these connections to remove the residual water in the horizontal pipes and water valve.**

# 10 Fifteen Year Limited Warranty

### General

BOSCH PRO water heaters are warranted by the Manufacturer (BOSCH) through Controlled Energy Corp. Controlled Energy Corp. (Bosch Water Heating) 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 Water Heating 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 Water Heating will furnish a replacement heat exchanger. However, 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.

### All Other Parts

If any other part fails within three (3) years after original installation and operation, Bosch Water Heating will furnish a replacement part free of charge.

### Shipping costs

In addition to supplying the replacement part(s), Bosch Water Heating will provide ground service delivery for these parts. Expedited or upgraded shipping will be charged to the customer.

### 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 or re-installation of the original water heater or a replaced water heater. Certain service labor allowances are available to PHCC member contractors, dependent on prior authorization by Bosch Water Heating.

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, distributor or to Bosch Water Heating. If Bosch Water Heating, please contact the Technical Support Department:

Controlled Energy Corp.
340 Mad River Park
Waitsfield, VT 05673
Phone: 866-330-2730
www.protankless.com

In most cases, the dealer or distributor will be able to promptly honor your claim and subsequently notify Bosch Water Heating. However, all replacements are made subject to validation by Bosch Water Heating 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 Water Heating. It is expressly understood that the replacement warranty of Bosch Water Heating 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 Water Heating 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 Water Heating's 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 performed 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 _____

* See Chapter 3.8 and gas pressure table (to be filled out by installer)

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


Replacement Parts available from North American Distributor

CONTROLLED ENERGY CORP.

340 Mad River Park

Waitsfield, Vermont 05673

Phone 866-330-2730

Fax (802) 496-6924

www.protankless.com

techsupport@protankless.com

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