BOSCH

AquaStar

INSTALLATION AND OPERATING INSTRUCTIONS FOR AUTOMATIC INSTANTANEOUS TYPE WATER HEATERS FOR USE WITH NATURAL AND LIQUEFIED PETROLEUM GAS

MODEL 38B LP and NG

Suitable for heating potable water only

Not approved for space heating purposes

Intended for low flow domestic hot water applications with steady cold water inlet temperatures

WARNING: 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.

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

In the Commonwealth of Massachusetts this product must be installed by a licensed plumber or gas fitter.

WARNING

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

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.

WHAT TO DO IF YOU SMELL GAS

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **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.**

TABLE OF CONTENTS

6 720 606 446 US (06.01) AL

This well engineered, gas water heater has all the features a water heater should have:
It operates on the principle of heating water instantaneously "on demand". When a hot water faucet is opened, cold water flows through the coils of the heat exchanger in the Aquastar. This same flow opens the gas valve, and the burners are ignited by the pilot flame. The heat exchanger coils absorb the heat generated by the burners and transfer heat to the water. When the hot water faucet is shut off, the gas valve automatically closes and the burners turn off. Your hot water faucet is an ignition key to turn on the water heater, giving you control over your hot water energy use. Each time you turn off your hot water faucet, you also shut off the water heater.

FEATURES

- High Quality Materials for Long Working Life.
- Copper heating coils for endless supply of hot water.
- Safety thermocouple at pilot burner.
- Automatic overheating protection shut-off sensor.
- Stainless steel burners with stabilized blue flame.
- Built-in corrosion resistant draft inducer.
- Compact space saver: mounts on a wall with two hooks.
- Easily removable one-piece cover.
- Easy one person installation.
- Adjustable water flow restrictor to ensure that water flow demand will not exceed the heating capacity of the heater.
- Easy pilot flame lighting with push button piezo ignition.

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

AquaStar 38B LP and 38B NG Specifications

Gas Input max.: 40,000 Btu/hr
min.: 20,000 Btu/hr

Water Connection 1/2" Thread fitting NPT

H x W x D 25 3/8" x 10 5/8" x 9 1/8"

Vent 4"

Gas Connection 1/2" NPT thread

Min. Water Pressure 13 Psi at 1.3 GPM

Max. Water Pressure 150 Psi

Shipping Weight 20 LB

Net Weight 18 LB

0.5 GPM at 90° rise

1.3 GPM at 45° rise

Min. Water Flow 1/2 gal/min

LP GAS Supply Pressure
(before Aquastar regulator) min.: 11" W.C.
max.: 14" W.C.*

Required LP GAS Pressure at inlet tap while Aquastar is operating: 10.5" W.C.

LP GAS Burner Manifold pressure while Aquastar is operating at maximum input: 9.0" W.C.

Natural Gas Supply Pressure
(before Aquastar regulator) min.: 7" W.C.
max.: 14" W.C.*

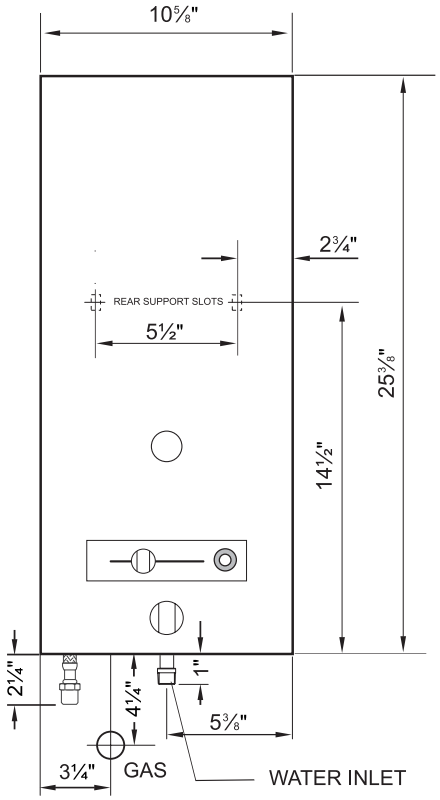
Required Natural Gas Pressure at inlet tap while Aquastar is operating: 5.7" W.C.

Natural Gas Burner Manifold pressure while Aquastar is operating at maximum input: 3.3" W.C.

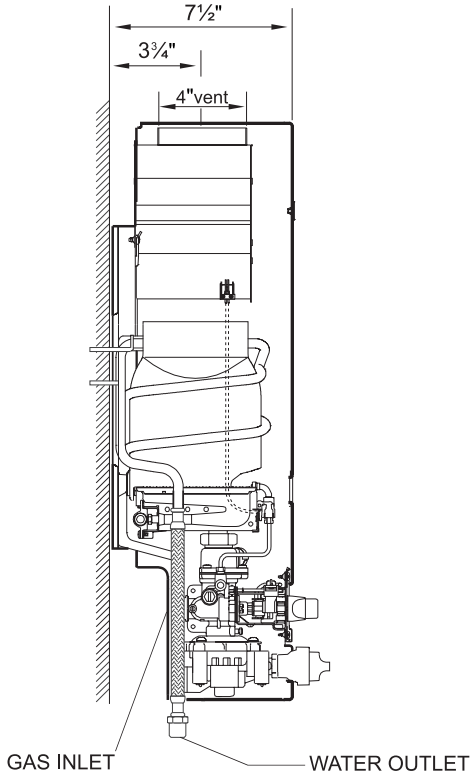
* Inlet gas pressure before Aquastar regulator must not exceed this value. Pressure may need to be adjusted for high altitudes, see page 10.

UNPACKING THE AQUASTAR HEATER

This heater is packed securely. The box includes two water connection fittings, a gas pressure regulator, a gas supply elbow with gasket, a gas shut off valve, a pressure relief valve, two hooks for hanging the heater, this manual, a warranty statement and a warranty registration card. **Do not lose this manual, as there is a charge for replacement.** Please complete and return the enclosed warranty registration card.

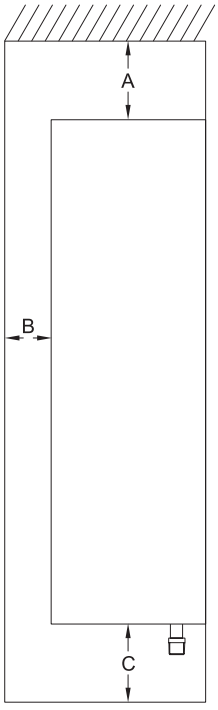


FRONT VIEW



SIDE VIEW

MINIMUM INSTALLATION CLEARANCES FROM COMBUSTIBLE AND NON COMBUSTIBLE MATERIALS



	MODEL 38B
TOP (A)	12 "
FRONT (B)	4 "
BACK	0 "
SIDES	4 "
FLOOR (C)	12 "
VENT DIAMETER	4 "

AQUASTAR MODEL 38B

GENERAL RULES TO FOLLOW FOR SAFE OPERATION

1. You should follow these instructions when you install your 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 heater. Correct combustion air supply and flue 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 place where you install the heater must have enough ventilation. The National Fire Codes do not allow gas fired water heater installation in bathrooms, bedrooms or any occupied rooms normally kept closed. See the section below on locating the heater. The 38B is not approved for boat or RV installations.

4. You must vent your heater. See section on VENTING, Page 6.

5. The appliance must be disconnected from the gas supply piping system during any pressure testing at pressures in excess of 1/2 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 more than 1/2 Psig (3.5Kpa). The appliance and its gas connection must be leak tested before placing the appliance in operation.

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 heater (see specifications on page 2). Gas piping must be sized to provide the required pressure at the maximum output of the 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.

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.

PROPER LOCATION FOR INSTALLING YOUR HEATER

Carefully select the location of your new heater. For your safety and for proper heater operation, you must provide an abundant supply of combustion air and a proper venting installation.
The heater may still operate even when improperly vented. It will, however, be less efficient and could eventually damage the heater. It could even result in human sickness or death due to oxygen deprivation and carbon monoxide poisoning.

Follow the guidelines below:

1. Place your heater as close to a vent or chimney as possible.

2. National building codes require that you do not install this appliance in bathrooms, bedrooms, unvented closet or any occupied rooms normally kept closed. The 38B is not approved for boat or RV installations.

3. Simultaneous operation of other appliances such as exhaust fans, ventilation systems clothes dryers, fireplaces or wood stoves could create a vacuum effect in your home which could cause dangerous combustion by-products to spill back into your home rather than venting to the outside through the flue. Confirm that your Aquastar is venting properly when all these other appliances are running. See section on venting.

Do not obstruct the flow of combustion and ventilation air to the appliance. If installed near a clothes dryer it is very important that the dryer be properly vented. Failure to properly vent a dryer could result in a gradual accumulation of lint on the water heater fin coils and burners, leading to a dangerous condition of vent blockage and poor unsafe combustion.

4. Your hot water lines should be kept short to save energy. It is always best to have hot water lines insulated.

⚠ **WARNING:** The water in this water heater is cold and always remains cold exept for the times that hot water is being used **DO NOT INSTALL IN AN AREA WHERE IT COULD FREEZE.**
This heater is neither designed for nor approved for outside installation.
Drain the heater entirely if freezing temperatures are anticipated in area where heater is installed by disconnecting both the inlet and outlet water connections. Additionally, remove the drain plug under the water valve. See Fig 0.

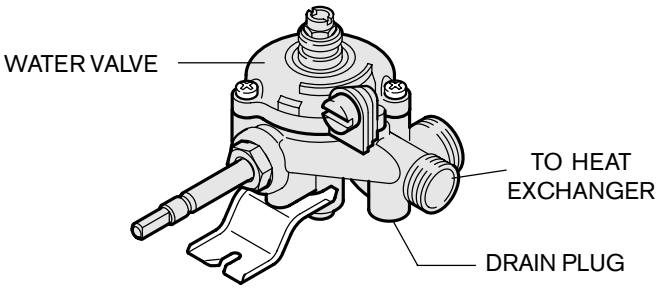


Fig. 0 - Water heater drain plug

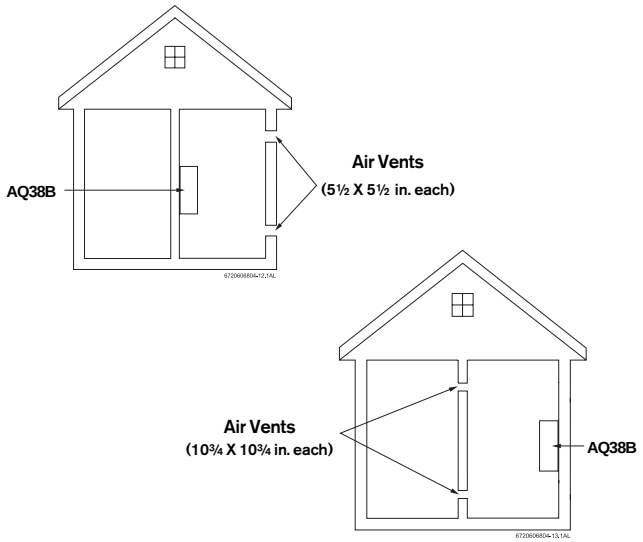
⚠ **WARNING: Flammable materials, gasoline, pressurized containers, or any other items or articles that are potentially fire hazards must NOT be placed on or adjacent to the heater. The appliance area must be kept free of all combustible materials, gasoline and other flammable vapors and liquids.**
This product is not approved for manufactured homes (mobile home), recreational vehicles (RV) or boats. Reference ANSI Z21.10.3.
This product is neither designed or approved for outside installations.

COMBUSTION AIR REQUIREMENT

The AquaStar water heater holds cold water in its copper heat exchanger and brass water valve when not in use. Because of this, any cold air that comes in through the unit's vent pipe is capable of freezing these components. This Installation Manual specifies the minimum vertical vent pipe and the amount of combustion air required for this unit. When all requirements are followed, the unit will operate properly and safely. However, there may still be a risk of freezing due to negative draft if all the combustion appliances in the area are not being supplied with a sufficient amount of make-up air. A wood stove or furnace can rob the make-up air in the AquaStar's vent pipe, leaving the cold infiltrating air capable of freezing the cold water in the AquaStar heat exchanger. More make up air is the solution. Follow the instructions on venting and checking adequacy of make up air. A HVAC specialist should be used to design solutions for providing more make-up air if necessary.

Observe the following instructions concerning combustion air.
Appliances located in confined spaces:
The confined space must be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure. Each opening must have a minimum free area of one square inch per:
- 1000 Btu/hr if all air is taken from inside the building.
- 2000 Btu/hr if all air is taken from the outside by horizontal ducts.
- 4000 Btu/hr if all air is taken from the outside by direct openings or vertical ducts.

Or the confined space must be provided with one permanent opening or duct that is within 12 inches of the ceiling of the enclosure. This opening must have a minimum free area of one square inch per:
-3000 Btu/hr if all air is taken from the outside by a direct opening or vertical duct.
Louvers, grills and screens have a blocking effect. If the effective free area is not known, increase the sizes of your openings by 75% if your louvers are wood and by 30% if your louvers are metal. Refer to the National Fuel Gas Code for complete information. In buildings of tight construction all air should be taken from outside. That would be 2000 cubic feet for the Aquastar 38B alone.



CLEARANCES

The Aquastar 38 B is design certified for installation on a combustible wall and for installation in an alcove or closet with the minimum clearances to combustible and non - combustible construction listed below

A. Top 12 inches (305 mm)
B. Front 4 inches (102mm)
C. Back 0 inches
D. Sides 4 inch (102mm)
E. Bottom 12 inches (306 mm)

Clearance from vent is dependent upon the clearance rating of the venting material used. For example: type B-1 vent is approved for 1 inch clearance.

Note: Typically, the minimum clearance to combustible materials should not be less than 6" for single wall flue pipe. Note that this clearance can be reduced if combustible materials are protected as per table VI of the National Fuel Gas Code or if Type B gas vent is used.

MOUNTING INSTALLATION

The Aquastar 38 B is design certified for mounting on a wall.
Secure the two L shaped hooks, which are provided with heater, to a wall surface. Place them 5 ½" apart as shown in Fig. 1.
Do not install this appliance on a carpeted wall or over floor covering which is combustible, such as carpet. The 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 and then the heater should be attached to the support boards. See Fig 1.**
Expansion and contraction of piping due to changing water temperature in the pipes imparts movement to the heater which, if mounted directly to a brittle, friable board, such as plasterboard, can cause failure of mounting.

In earthquake-prone zones, BBTNA recommends that installers use a large washer and lag screw through the existing holes used to hang the heater to affix the upper third of the heater to the mounting board. To affix the lower third of the heater, BBTNA recommends that two new holes be drilled in the heater's frame, each one 16 inches below the top two holes, and that washers and lag screws be used to secure the lower portion of the heater to a spacing board.

Before installing the unit, be certain you have the correct heater for your type of Gas – Propane or Natural Gas

Appliances located in unconfined spaces:

a) An unconfined space is one whose volume is greater than 50 cubic feet per 1000 Btu per hour of the combined rating of all appliances installed in the space. That would be 2000 cubic feet for the AquaStar 38B alone.

b) In unconfined spaces in buildings of conventional frame, masonry, or metal construction, infiltration is normally adequate to provide air for combustion, ventilation, and dilution of flue gasses.

Identification labels are found on the shipping box, and on the rating plate which is located on the right side panel of the cover. Also, each burner orifice is stamped with a number (79 for LPG and 120 for Natural Gas).

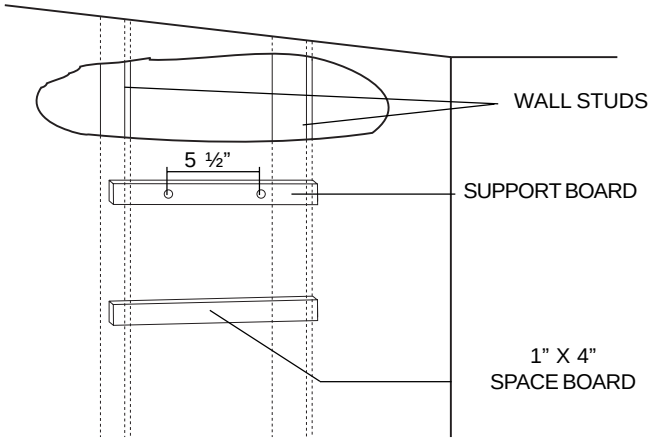


Fig. 1 - Mounting the Heater

VENTING

Vent pipe connection. WARNING: Do not reduce the vent pipe size.

The heater must be vented to the outside following all local ordinances and specifications for installing a gas appliance vent or chimney. The heater must be located as close as practicable to a vertically rising chimney or vent that has a listed vent cap at its termination point. The venting system must be designed and constructed so as to develop a positive flow adequate to remove flue gasses to the outdoors.

Consult the National Fuel Gas Code if the vent will have elbows or share venting with another natural draft appliance. The heater should never be common vented with a mechanically vented appliance. Single wall vent pipe is not recommended, if used consult the National Fuel Gas Code.

Horizontally venting to a sidewall vent terminator or a vertically constructed vent stack along an outside wall of a building is not permissible. A Powervent with a proof-of-draft safety interlock device, is required and is available in order to sidewall vent. Contact your dealer. **In the Commonwealth of Massachusetts: Powervented applications must utilize proof-of-draft safety interlock device.**

VERTICAL GAS VENT: A 4 inch diameter gas vent constructed of double wall Type B gas vent is recommended. Any gas vent section that is greater than 45 degrees from the vertical is considered horizontal. Horizontal sections must slope upwards at least ¼ inch for every foot of its horizontal length and be properly supported. Keep the horizontal section short and avoid too many elbows. The minimum vertical gas vent height allowed is 6 feet; horizontal vent connectors and elbows are not to be considered in the total gas vent height. All gas vent sections must be secured to each other with sheet metal screws and be properly supported.

The gas vent constructed of double wall Type B gas vent must terminate above the roof surface with a listed vent cap at a height that's in accordance with Figure A or B and their table, provided they are at least 8 feet (2.4 m) from a vertical wall or similar obstruction. All other gas vents that are not able to terminate within the minimum specified height allowed must terminate not less than 2 feet (0.6 m) above the highest point where it's passed through the roof and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m).

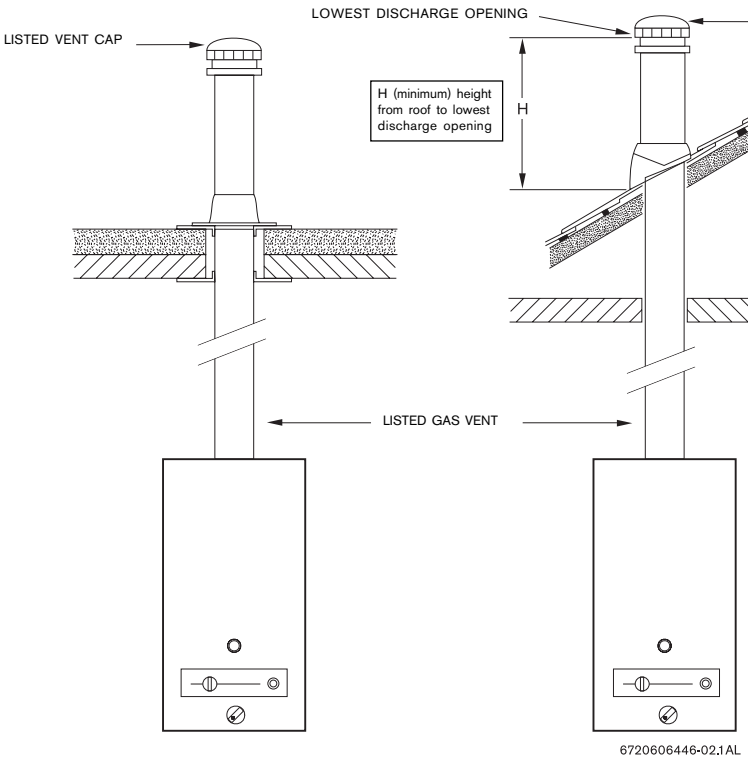


Figure A **Figure B**

GAS VENT TERMINATIONS FOR LISTED VENT CAPS		
Roof pitch	**H (minimum) feet**	**meters**
Flat to 6/12	1.0	0.30
6/12 to 7/12	1.25	0.38
Over 7/12 to 8/12	1.5	0.46
Over 8/12 to 9/12	2.0	0.61
Over 9/12 to 10/12	2.5	0.76
Over 10/12 to 11/12	3.25	0.99
Over 11/12 to 12/12	4.0	1.22
Over 12/12 to 14/12	5.0	1.52
Over 14/12 to 16/12	6.0	1.83
Over 16/12 to 18/12	7.0	2.13
Over 18/12 to 20/12	7.5	2.27
Over 20/12 to 21/12	8.0	2.44

MASONRY CHIMNEY: Masonry chimneys shall be built and installed in accordance with NFPS 211 or local codes. A minimum 4" diameter gas vent pipe (metal double wall Type B), or an approved clay flue liner or a listed chimney lining system must be used when venting into a naturally drafting, internal masonry chimney. Local codes may require the use of both gas vent *and* an approved lining system when venting into a masonry chimney. The Commonwealth of Massachusetts requires the use of a listed liner. Lining systems include approved clay flue lining, a listed chimney lining system or other approved material that will resist corrosion, erosion, softening, or cracking from exhaust flue gases at temperatures up to 1800 degrees F. The lining system must be listed for use with naturally drafting, draft hood equipped gas appliances. Follow local codes and refer to NFGC 54 and NFPA 58.

When connecting the water heater to a masonry chimney the following connector guidelines must be followed for safe and proper operation: An approved gas vent connector must be attached to the top of the water heater and rise vertically at least 12" before entering into an approved gas vent connector elbow. Any gas vent section that is greater than 45 degrees from the vertical is considered horizontal. If a horizontal vent connector is to be used to connect the vertical gas vent connector on the top of the water heater to the masonry chimney, that approved horizontal gas vent connector must be kept as short as possible and must be sloped upwards at least ¼" per foot of its length. This connector must be supported throughout its horizontal length. This horizontal gas vent connection may be no greater than 75% of the total vertical gas flue vent within the chimney. Also, an approved thimble or collar must be used when penetrating a masonry chimney.

A) Existing INTERIOR Masonry Chimney

The metal gas vent pipe should be permanently mounted inside the masonry chimney. Double wall Type B gas vent is recommended. The masonry chimney may have to be tile or metal lined before the insertion of the gas vent pipe; check local codes for clarification. The lining material must be listed for use only with naturally drafting, draft hood equipped gas appliances. Follow manufactures instructions for installation of listed lining material. You may not vent any other fuel burning appliances into any free space remaining in the chimney. The minimum vertical gas vent length within the masonry chimney should be no less than 5 ft (1.5 m); the vent terminator should extend at least 3 feet (0.9 m) above where the chimney meets the roofline and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m). The top of the gas vent should have an approved vent terminator. See Figure C.

B) Tile Lined INTERIOR Masonry Chimney

The masonry chimney must have an approved liner, ceramic tile, clay or metal. The masonry chimney must be able to accommodate the spent fuel gasses; consult a HVAC engineer for chimney capacity. A common venting like-fuel appliance into this lined masonry chimney is permissible. The chimney's diameter must be large enough to adequately draft the spent fuel gasses. See NFPA 54 for guidelines. A HVAC engineer will be required to spec a chimney system. The minimum vertical chimney length should be no less than 5 ft (1.5 m); the termination point should extend at least 3 feet (0.9 m) above where the chimney meets the roofline and at least 2 feet (0.6 m) higher than any vertical wall or similar obstruction within 10 feet (3.1 m). See Figure C.

C) EXTERIOR masonry Chimney

Refer to the National Fuel Gas Code and consult a local HVAC professional.

MASONRY CHIMNEYS

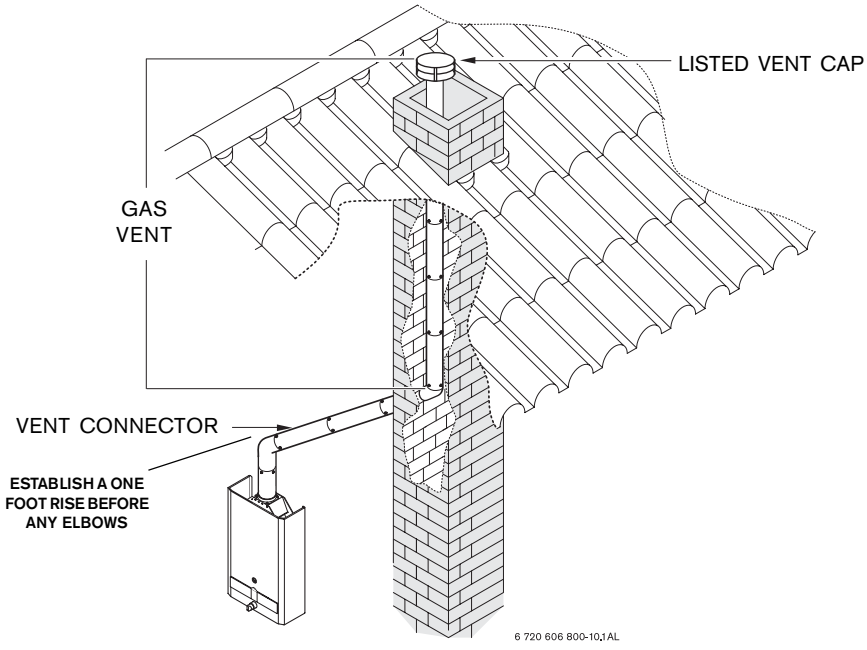


Figure C

To check the draft:
Close all doors and windows to the outside.
Turn on all appliances that force air out of the building. These include all exhaust/ventilation fans, furnaces, clothes dryers, wood burning stoves, etc.
Open all doors between the AquaStar and these other appliances.
Run the unit for at least 10 minutes. Then hold an ordinary mirror at the side above the front shell. Any flue gases backdrafting will cause the mirror to fog. This is a serious health hazard and must be corrected. Poor venting can result in soot building up inside the heater, overheating of the heater and freezing of the heat exchanger in a freezing environment. The mirror will remain clear with a properly functioning draft.

⚠ **WARNING**

Note: The burners of an instantaneous "on demand" water heater such as the AquaStar are only on at the time that hot water is actually being used, the vent pipe is therefore cold except for the short durations when hot water is being used, it is therefore very important that the venting and air supply be adequate to provide a good positive draft as soon as the burners turn on.
The AquaStar 38B instantaneous water heaters have built-in draft diverters and are designed for indoor installation only. The draft diverter outlet must be connected to an unobstructed vent of the same size, or larger.

In Canada, CAN/CGA-B149 Installation Code for detailed requirements
In U.S.A., ANSI Z223.1 - NFPA 54, National Fuel Gas Code for detailed requirements.

GAS CONNECTIONS and Gas Regulator

Before connecting the gas supply, check the rating plate on the right side of the front cover 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 with CGA B149 INSTALLATION CODES and /or local installation codes.
NOTE: The Aquastar 38 B is supplied with a gas pressure regulator that must be installed on the heater before attaching the gas supply line. See figure 2. Place the gas regulator between the gas supply connection (which comes with a manual shutoff valve) and the gas fitting wich is connected to the heater's gas inlet. There is a pressure tap on this gas fitting. The regulator supplied with the heater is preset for the gas shown on the rating plate to the correct pressure. It is an appliance level regulator designed for low inlet pressure (less than 1/2 Psig or 15" W.C.) DO NOT connect to an unregulated or high pressure propane line or to a high pressure commercial natural gas line.

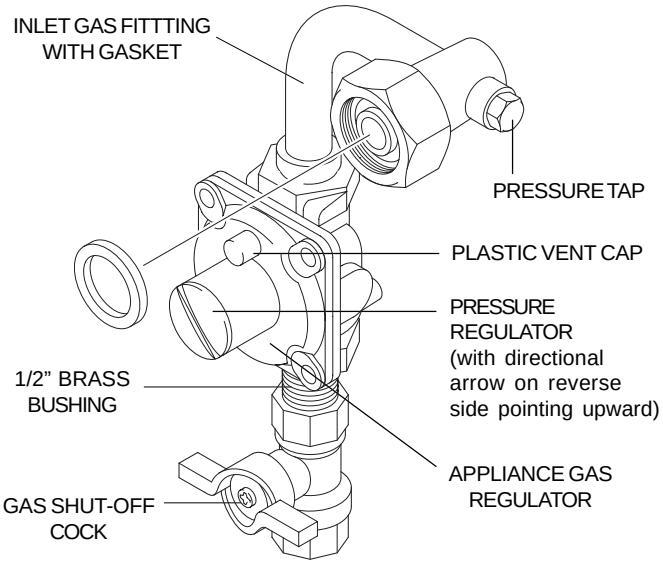


Fig. 2 - Gas Pressure Regulator

The pressure regulator provided with the heater is adjusted to deliver the proper gas pressure (as indicated on the rating plate and in the manual for altitude up to 2000 feet (660 meters) above sea level. On appliances being installed above 2000 ft (660 meters) elevation, the inlet gas pressure should be set at installation to the value shown below.

NOTE: The gas pressures specified below refer to pressures taken at the pressure tap on the gas inlet pipe just above the regulator (See Fig 2). These readings should be taken while the heater is operating at full input — i.e. maximum water flow with the temperature dial selector turned all the way clockwise.

MAXIMUM INLET GAS FLOW PRESSURE SETTING

Altitude	Natural Gas inches W.C:	Liquid Propane inches W.C:
0' - 2.000 ft	5.7"	10.5"
2.000 ft - 4.500 ft	4.6"	8.4"

Above 4.500 ft consult your local gas supplier.

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.

⚠ **WARNING: The heater 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 0.5 psig.**

The water heater must be isolated from the gas supply piping system by closing the manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or more than 0.5 psig.

The water heater, including the pressure regulator provided with it, must not be operated at 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 and regulator must be checked for safe operation.

Make sure that the regulator vent is protected against blockage.

When your connections are made, check for gas leaks at all joints (not just the ones you made). Apply some soapy water to all gas fittings and gas valve. **Soap bubbles are a sign of a leak.**

NOTE: Do not apply soap solution to pilot filter screen or pilot orifice area. If you have a leak, shut off the gas. After verifying that required gaskets are in place, 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**.

WATER CONNECTIONS

Install the heater centrally in the building if possible and make hot water piping runs as short as possible When facing the heater, the cold water inlet will be on the right and the hot water outlet on the left.

Although water piping throughout the building may be other than copper, copper or galvanized piping should be used when connecting to the heaters ½" male NPT connectors (follow local codes if more stringent). Plastics or other PEX type plumbing line materials are not suitable for connecting directly to the water heater. Keep water inlet pipe to no less than ½" (19.05mm) diameter to allow the full flow capacity. If the cold and hot connections to the heater are reversed, the heater will not function.

The 38B is provided with one rigid elbow connector that must be connected to the cold inlet fitting of the brass water valve, no pipe dope or thread tape is to be used at this joint. The outlet flexible connector is supplied attached to the heat exchanger, the supplied 3/8" washer and 3/8"x1/2" brass fitting should be attached to it to allow a ½" NPT connection to be made. See Fig. 3.

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 heater. For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07-3.45 bar).

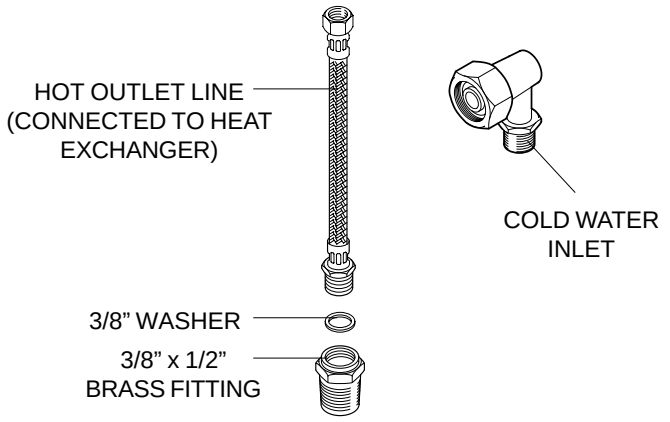


Fig. 3 - Water connections

Connecting the pressure relief valve (PRV)

A listed pressure relief valve supplied with the heater must be installed at the time of installation. Should a discharge line be added to the PRV no valve is to be placed between the PRV and the heater. No reducing coupling or other restriction may be installed in the discharge line. The discharge line must be 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 4. To install the PRV, a suitable fitting connected to an extension on a "T" fitting can be sweated to the hot water line.

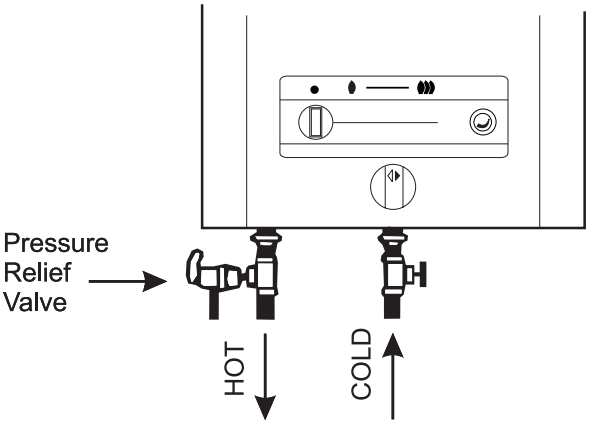


Fig. 4 - Pressure Relief Valve

OPERATING INSTRUCTIONS

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

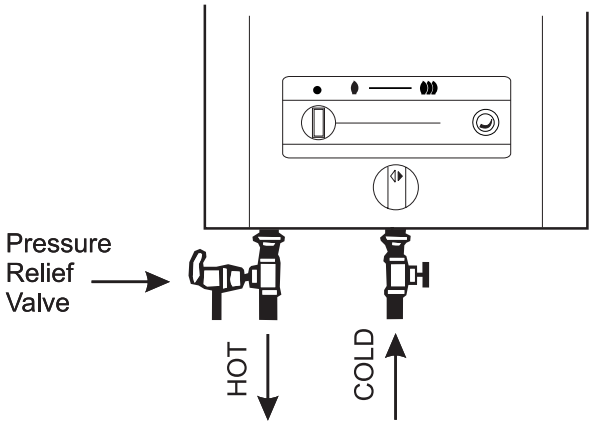


Fig. 5 - Water Piping

Open the cold water inlet supply to the heater fully.
Open a hot water faucet to permit the water to fill the 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. The water heater is now ready to operate.

FOR YOUR SAFETY READ BEFORE LIGHTING THE PILOT

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

A. This appliance has a piezo-igniter for lighting the pilot burner. When lighting the pilot, follow these instructions exactly.
B. BEFORE LIGHTING smell all around the appliance area for 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 electric 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.

C. Use only your hand to push in or turn the gas control buttons. Never use tools. If a button will not push in, check to make sure the buttons are being pushed in the proper sequence. Follow these instructions exactly. If control button(s) are jammed, close the gas supply and call a qualified service technician. Attempted forceful repair may result in a fire or explosion.
D. 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.

LIGHTING INSTRUCTIONS (as seen on front cover of heater)

1. STOP! Read the safety information on the front panel of the heater.
2. The Gas valve must be turned off by sliding the gas valve button (○) to the far left under the OFF (●) mark.
3. Wait five (5) minutes to clear out any gas. If you smell gas, STOP! Follow "B" in the safety information above on this plate. If you don't smell gas, go to next step.
4. The pilot burner is located behind the peephole in the front center of the jacket directly below the lighting instructions on the front panel of the heater.
5. Slide the gas valve button to the right, to the pilot position ( ).
6. Fully depress gas valve button (○)and light pilot by pressing hard on pilot igniter button ( ). This step may have to be repeated.
7. Observe the pilot flame through the peephole. The gas valve button should be held down at least 15 seconds with pilot burning. When the gas valve button is released, the pilot should continue to burn.

- If the gas valve button does not pop up when released, stop and immediately call your service technician or gas supplier.
- If pilot does not stay lit, repeat steps 1 through 7.
- If pilot will not stay lit after several tries, slide the gas valve button to the left, under the OFF (●) mark and call service technician or gas supplier.

8. When the pilot remains on, slide the gas valve button to the right, to the ON ( ) position. The heater will now fire when water is drawn at a rate of 1/2 gallon or more per minute.

NOTE: If main burner should fail to ignite, make sure pilot is burning. If not, repeat lighting steps 1 through 7.

TO TURN OFF GAS TO APPLIANCE

Slide the gas valve button (○) to the far left, under the OFF (●) mark and close the heater's individual shut-off valve.

SETTING THE WATER TEMPERATURE

To adjust the temperature on your AquaStar, turn on a hot water faucet to its maximum flow.At the water heater, turn the large temperature adjustment knob located beneath the main gas controls on the front of the heater all the way to the right (clockwise). See Fig 6. This will produce a temperature rise of approximately 90°F at a flow rate of .5 gallons per minute (gpm). Turning the dial all the way to the left (counterclockwise) will increase the water flowing through the heater, and will produce a temperature rise of approximately 45°F at a flow rate of 1.3 gpm. Given that average incoming water temperatures are 50°F, this heater will produce water between 140° and 95° at these flow rates. Thus one can obtain a higher flow rate, but at cooler temperatures.

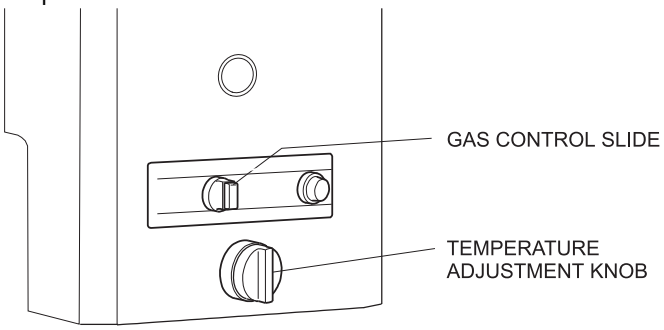


Fig. 6 - Water Flow Control Knob

The position you select on the temperature adjustment knob will depend on the temperature of the incoming water (50°F is average in the U.S.). If you plan to supply the AquaStar 38 B, with preheated water (i.e.) solar installation, the unit could overheat. It will then shut off on safety when the outlet temperature reaches 185°F. For a lower temperature rise, the heater can be set for minimum burner output by sliding the gas valve control to the pilot setting symbol ( ).

MAINTENANCE AND SERVICE (see maintenance table on back)

Approximately once a year, the AquaStar should be checked and cleaned. To remove the front cover, first remove the incandescent particle tray, then pull off the temperature adjustment knob, unscrew and remove the plastic collar and unscrew the central screw located at the bottom of the front cover. Pull main cover out toward you and lift up and out. THE FOLLOWING OPERATIONS SHOULD BE PERFORMED BY A QUALIFIED SERVICE PERSON:

Vent System: Should be checked annually. Clean and repair as needed.

Water Valve (Part # 8707002497): The water valve on this heater should be serviced periodically. Lubricate component #19 on page 18 with a small amount of silicon, faucet or lithium grease every two years to keep its o rings fresh and pushrod sliding smoothly. Every 3-5 years replace components #19 and #21 on page 18. The frequency will depend on the mineral content of the water and conditions of use or whenever signs of corrosion appear at the gas and water valve joint. Periodically check that the water inlet filter (#25 on page 18) is clean as well.

Pilot Flame: The pilot flame should burn with a clean sharp blue flame and should resemble the diagram in Fig 7. If the flame is yellow, or if the pilot knob has to remain depressed for a long time in order to keep the pilot lighted, the pilot burner and or the pilot burner orifice may need to be cleaned, the orifice may need to be replaced, and or the air screen or pilot gas filter may need cleaning. The pilot flame should envelop approximately 10 mm (3/8") of the tip of the thermocouple. If it is too small, the pilot burner must be cleaned. The position of the Piezo igniter electrode should be approximately 3 mm (1/8") from the pilot.

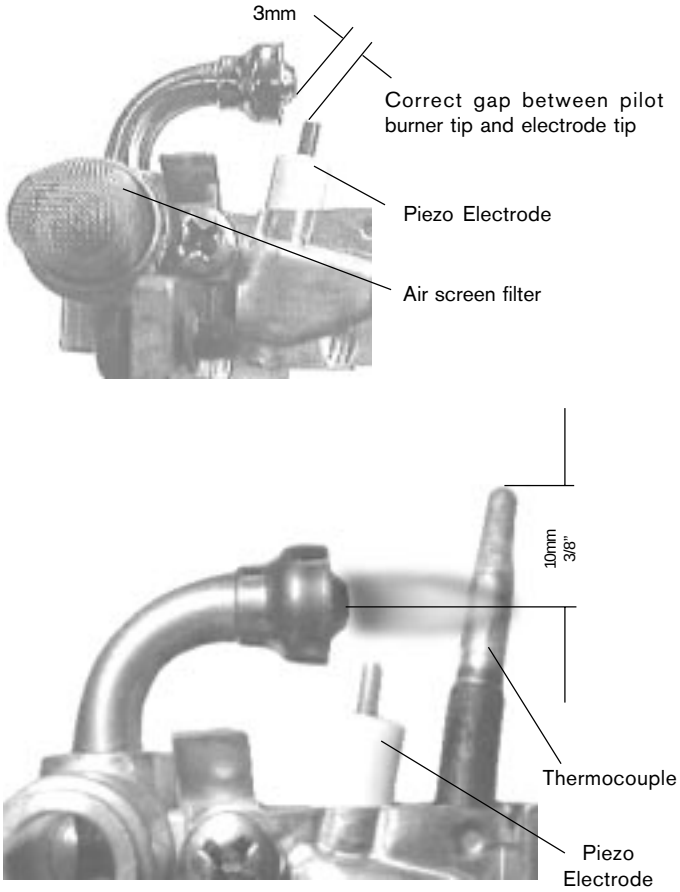


Fig. 7 - Characteristic Pilot Flame

To clean the pilot burner and/ or the pilot orifice : Turn off the gas at the unit. Remove the cover of the heater. To do so, remove the incandescent particle tray, pull off the temperature adjustment knob and unscrew and remove the knob collar. Unscrew the central screw located at the bottom of the front cover. Pull main cover out toward you and lift up and out. Pull the air screen off, wash it and blow any lint off (See Fig 8). The pilot orifices should also be cleaned or replaced. **Do not enlarge the orifice.** Do not use any wire or sharp object to clean orifices. Natural gas orifices are large enough that you can usually clean them by blowing through them. LP orifices, on the other hand, are too small to clean and should be replaced. See #3 in Trouble Shooting Section. To access the pilot orifice, remove 2 screws holding pilot assembly in place. Then loosen compression fittings to expose pilot orifice.

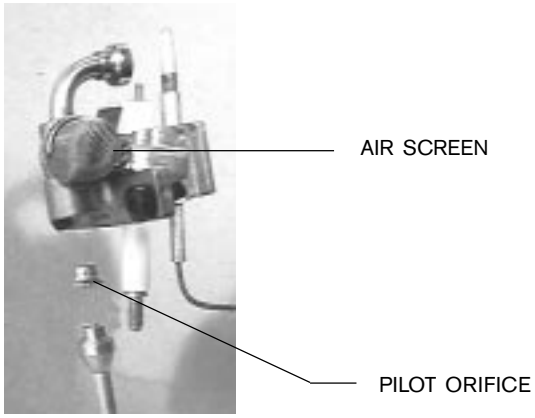


Fig. 8 - Pilot burner with air screen/ pilot orifice

Main Burner Flames: The main burner flames should be blue, with a more intense blue cone in the center core. Yellow flames could be a sign of wrong size gas orifices or dirty burners, or a blockage on the heat exchangers fins. If some burners have yellow flames while others have good flames, it is likely that dust, lint or spider webs have partially clogged the burner venturis. To clean the burners contact a gas service person.

Mineral Scale Build-up: The AquaStars heater, when operated at lower temperature settings, do not accumulate mineral build-up. If however, the heater is used at the higher temperature settings and the water has a high mineral content, periodic descaling may be necessary. The heating coils should be flushed with a descaling solution. Consult your service person.

TROUBLE SHOOTING (see maintenance table on back)

Introduction

The AquaStar 38 burners are ignited by a water flow valve. Numerous water related problems can cause this water valve to malfunction such as: Insufficient water flow volume to activate the burners at its minimum flow requirement; Dirt in the water flow valve causing it to malfunction; Sediment build-up in faucet aerators, or shower heads; Uneven pressures between cold and hot. (with single lever faucets) Plumbing cross overs. These water flow related problems can cause the heater to deliver less than its full output, or to fail to ignite or to shut down completely.

Problems are stated in upper case, bold face. Most common causes for the problems follow in order of likelihood. The suggested solutions require that the cover be taken off. To this, remove incandescent particle tray, pull off the temperature adjustment knob and unscrew and remove the plastic collar and unscrew the central screw located at the bottom of the front cover. Pull main cover out toward you and lift up and out.

PILOT DOES NOT LIGHT

1. No gas to the Aquastar

A. Gas cock on gas line may not be open.

B. Gas valve button has not been moved to "PILOT POSITION". Slide button to right to single flame position (⬮).

2. In-line Aquastar gas regulator jammed (usually on LP gas)

Replace or unlock the regulator. **Note:** The regulator furnished with the heater is designed for low gas pressure. Excessive pressure will lock it up (propane only). Locking usually happens if the gas pressure between the gas tank (propane) and the water heater's gas regulator has not been reduced. See page 2 for recommended correct gas pressure and check with gas service person.
To unlock a regulator, consult your gas supplier.

3. Pilot orifice clogged and/or air screen dirty

Clogging of the pilot burner can be caused by dust and any suspended matter contained in the ambient air. Although the filters can lengthen the cleaning intervals, they can never completely prevent such clogging. In consequence the gas jet issuing from the pilot orifice is reduced and or the air mixture is reduced. The pilot flame is weak and thus can no longer heat the thermocouple sufficiently. For cleaning purposes, the air filter screen is pulled off, washed and blown out. The pilot orifice has likewise to be cleaned or exchanged. See page 12.

4. Air in the Gas Line

Note: Normally this is a problem only at the time of initial installation, after the pipes have been worked on, or after a propane tank has been allowed to empty, or after the heater has been shut down for a long time.
Bleed all the air trapped in the gas line. Because of the very small pilot orifice (especially on LP gas models), bleeding out all the air could take several minutes. Slide the gas valve button (○) to pilot position (⬮) and depress this button until all the air has escaped, and the gas has arrived. During this process, press on the piezo ignition button separately until the pilot flame has ignited.

PILOT LIGHTS BUT FLAME GOES OUT WHEN BUTTON IS RELEASED

1. **Pilot push button was not pushed in far enough or was not held in long enough**

Slide the gas valve button (○) to pilot position ( ) and depress this button. Hold it pushed in for at least 15 seconds to give time for the pilot flame to properly heat the tip of the thermocouple.

2. **Pilot flame improperly aimed or is too weak so it is not properly heating the tip of the thermocouple.**

The Pilot flame should be a sharp blue flame and aimed at the tip of the thermocouple so that it envelops 10 mm (3/8 “) of the thermocouple tip. Pilot flame has to be properly aimed at the thermocouple. See Fig 7.

3. **Poor thermocouple connection at the electromagnet**

Note: Electromagnet is part #8707201012 located on the right side of the gas valve behind the piezo pushbutton assembly. Check the tightness of the thermocouple connection nut at the electromagnet: The Electro-magnet connection is a large aluminum 17mm hex head nut. The thermocouple end is a 5 mm brass nut which screws into the 17 mm nut. Tighten the thermocouple nut snugly but not too tight.

4. **Poor circuit connections at the ECO. (Energy Cut-Off overheat protection)**

Oxidation or looseness of the ECO terminal connections can result in millivolt current loss through the thermocouple safety circuit. Clean terminals with very fine sand paper or an eraser and reconnect ECO leads.

5. **Faulty ECO (part #8707206040**)

If cleaning the terminals attached to the ECO did not fix the problem, connect a jumper wire between the two wires and try to relight the pilot. If the pilot flame now remains on, replace the ECO. If the flame still goes out when the button is released, the ECO is not defective. Go to next step.

6. **Faulty thermocouple (part #8747202083) or electromagnet) Unless these 2 parts are at least 8 to 10 years old, it is very unlikely that they are faulty. Before testing, reconfirm that #2 is absolutely correct, and that all connections are clean and tight.**

To test the thermocouple, disconnect the thermocouple lead to the ECO. Insert a multi-meter probe into the thermocouple lead and attach or hold the other lead to the metal gas valve (DC common). Light the pilot flame and hold button, meter reading should be 24 mVDC or more. If the reading is 24 mVDC or more the thermocouple is good. To test the electromagnet, re-connect the thermocouple lead to the ECO, light pilot and hold button while taking a reading between the ECO leads and the metal gas valve (DC common). The reading should drop to 19 mVDC or less. If it does not, replace the electromagnet.

BURNERS DO NOT IGNITE WHEN HOT WATER IS TURNED ON

1. **Pilot is not on.**

Light the pilot. See lighting instructions.

2. **Pilot lighting push button not turned to proper position**

Be sure that once the pilot flame is on, that the gas valve button (○) is slid all the way to the right to the ON position ( ).

3. **Cold incoming water connection made to wrong side of heater**

Make sure cold water inlet connection is on the right side of heater when you are facing heater.

4. **Water flow rate at hot water tap is too low.**

With the control knob set fully clockwise the Aquastar model 38B requires ½ gallon per minute flow to activate the burners. This is a flow which would fill a quart jar in 30 seconds.

5. **Cold water inlet filter on heater is dirty.**

Remove the filter and clean. This screen filter is located at the inlet side of the brass water valve (fig. 10, #25). Check and clean faucet aerators too.

6. **Crossover in household plumbing**

The AquaStar burner activates when there is sufficient water pressure drop in the AquaStar water valve assembly – ie. when a hot water faucet is opened. If there is a crossover in the plumbing, the necessary pressure drop in the AquaStar will be insufficient, or totally eliminated. A plumbing crossover can be caused by a bad washer at a single lever faucet or incorrect plumbing or a mixing valve in the line, etc. which permits hot and cold water to mix in the plumbing. The crossover will create a back pressure in the system preventing the pressure drop in the Aquastar (i.e. cold water is entering the water heater from both sides and the burners will not come on). To confirm there is no crossover in the plumbing, shut off the cold water supply to the AquaStar. Open your hot water taps. There should not be any water flowing. If there is water flowing, there is a crossover in the plumbing. This is a plumbing problem, not an Aquastar problem. Please contact your plumber.

7. **Water valve parts may be dirty or components damaged.**

Water valve and component parts must be totally free of dirt. First check that the venturi is free of dirt particles. In hard water areas, mineral deposits can eventually (3 to 5 years in hard water areas) corrode the water valve parts to a point where they will need replacing. *Any sign of moisture or corrosion at the joint of the water valve and the gas valve is a sign that the water valve assembly components need to be replaced immediately*. (Contact service person to clean water valve or replace if corrosion is present).

PILOT LIGHT GOES OUT DURING OR IMMEDIATELY AFTER HOT WATER HAS BEEN USED

1. Gas pressure too low
Very low gas pressure may be caused by low delivered gas pressure, a jammed gas regulator or undersized gas lines. If the gas lines are undersized, there may still be the specified static gas line pressure. However when the water valve opens,and gas enters the burners, the pressure could drop sharply, causing the pilot flame to go out. Have a gas technician confirm the gas pressure both static and at maximum Btu output. Specifications for your heater are on page 2.

2. Pilot may be dirty or weak
See Page 12 for instructions on pilot maintenance.

3. Burners are not shutting down immediately when hot water is turned off
Note: If burners don't shut down immediately when the hot water is turned off, the heater will overheat and the ECO will shut-off the gas. Rebuild the water valve assembly repair kit from BBTNA (part#8 703 406 204).

4. Water is too hot causing overheat sensor to shut heater down
Reduce burners by sliding gas control to single flame position or set control knob to a lower setting.

WATER IS TOO HOT

1. Burners are too strong
Note: If the inlet water is quite warm, slide gas valve control to single flame symbol ( ) and the heater will function on a minimum burner output.

2. Temperature selection is too hot
Turn the temperature adjustment knob to the left.

WATER IS NOT HOT ENOUGH

1. Temperature adjustment knob is set too low.
Change the setting. Turn the temperature adjustment knob clockwise (to the right).

2. Water flow through the heater is higher than the capacity of the AquaStar to heat it
Reduce the flow demand at the faucet. See flow rates at specific temperature rises on page 2.

3. Btu input is too low due to insufficient gas pressure
It is extremely important for a tankless instantaneous water heater to have the right size gas line to obtain the correct gas pressure
See specifications on page 2. Unlike storage tank water heaters, the burners of a tankless water heater must be very powerful to heat water instantaneously since they do this only at the time hot water is actually being used. It is therefore imperative that the gas pressure requirement be met exactly. Insufficient gas pressure will directly affect the water temperature at the time of usage. See pages 2 and 10 respectively for correct gas pressure settings and where gas pressures are taken.

4. Btu input is too low due to insufficient gas supply
Make sure your main gas line is fully opened. If using LP gas, be sure that the size of the propane tank is adequate to supply the required gas pressure.

5. Cold water is mixing with the hot water between the AquaStar and the outlet
Compare water temperature at outlet of the AquaStar (hold the AquaStar's outlet pipe with your hand) and at the tap. If these two are very different, check for mixing valve or plumbing crossover (see "BURNERS DO NOT IGNITE WHEN HOT WATER IS TURNED ON" paragraph # 6). Where automatic "anti-scald" valves are required by code, lower the temperature setting on the AquaStar as much as possible and balance the pressure between cold and hot water after the AquaStar.

6. Parts in water valve are dirty or damaged, which will prevent the gas valve from being fully opened.
Water valve maintenance needs to be performed, see #7 under BURNERS DO NOT IGNITE WHEN HOT WATER IS TURNED ON

HOT WATER TEMPERATURE FLUCTUATES

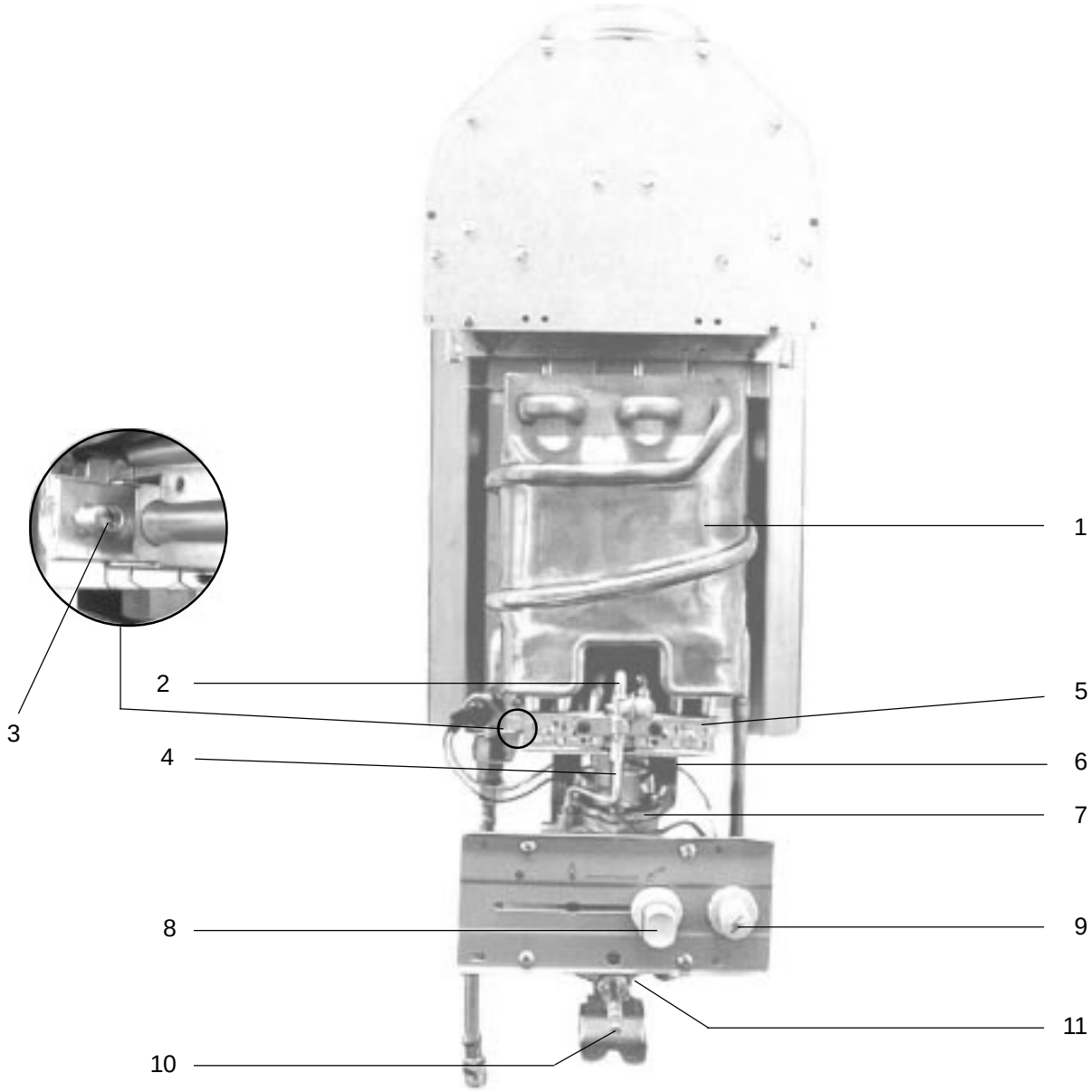
1. Unbalanced pressure in waterlines
The added restriction caused by the Aquastar in the hot water system can result in uneven pressures between the cold and the hot. In such cases when mixing cold water at the tap, the lower hot water pressure may be overpowered by a much higher cold water pressure, which may cause the Aquastar burners to shut down. Make sure faucet aerators or shower heads are free of minerals. ***Do not add any flow restrictor to the shower head.***

2. Cold water is mixing with the hot water between the AquaStar and the outlet
See # 6 under "Burners do Not Ignite When Hot Water is Turned On".

3. Inlet water pressure is erratic due to inadequate supply water pressure or saturated pressure tank on well system
For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07-3.45 bar). Confirm that the pressure tank is not water logged.

4. Insufficient gas pressure
Check gas pressure requirements (page 2) and consult gas service person.

Fig. 9 - Diagram of AquaStar 38 B



1. Heat exchanger
2. Pilot assembly
3. Burner manifold gas pressure test nipple
4. Pilot gas tubing
5. Main gas burner
6. Inlet gas pressure test nipple
7. Gas valve
8. Gas control slide
9. Piezo igniter
10. Temperature adjustment knob
11. Water valve

Fig. 10 - INTERIOR COMPONENTS DIAGRAM AND PARTS LIST

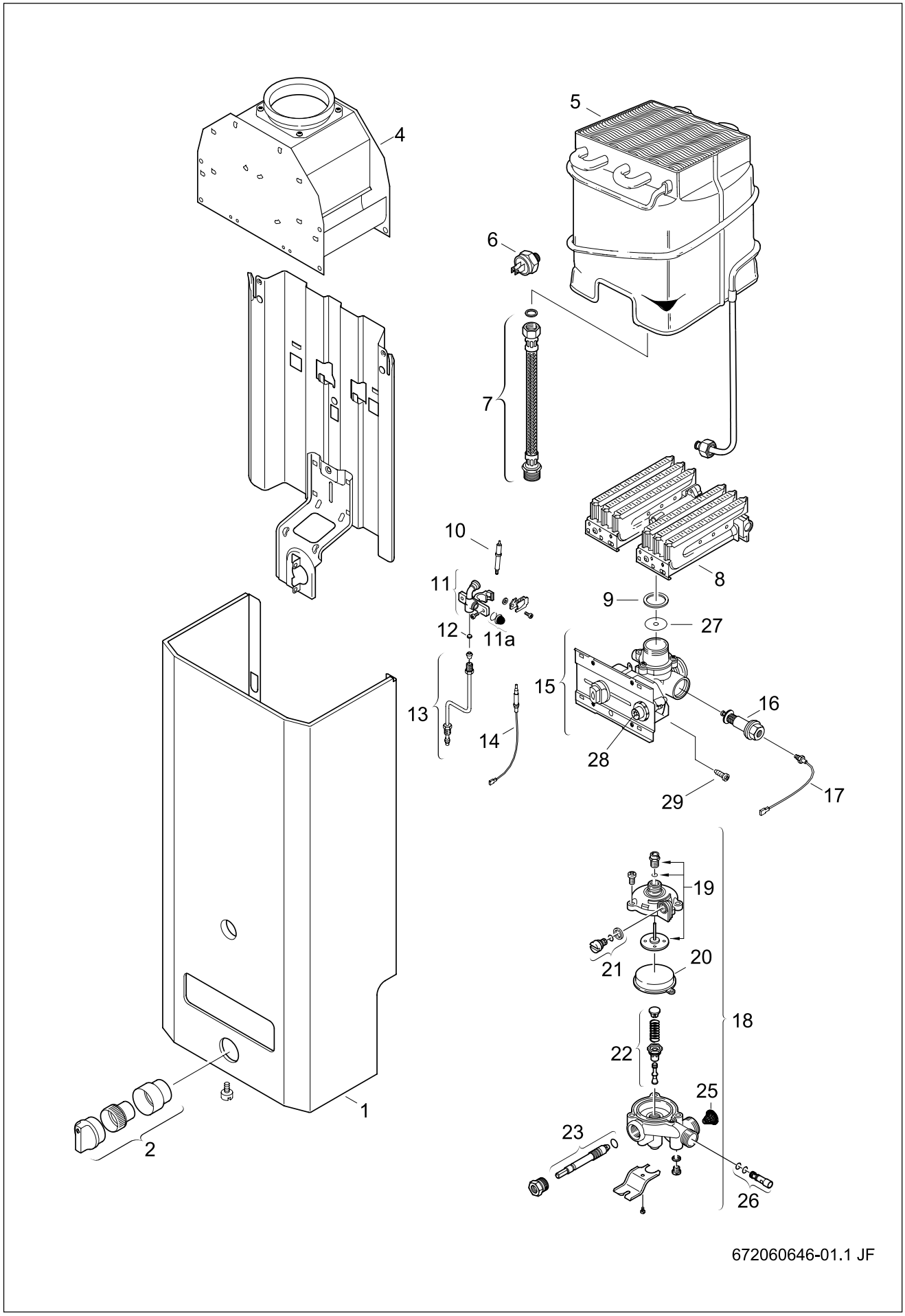
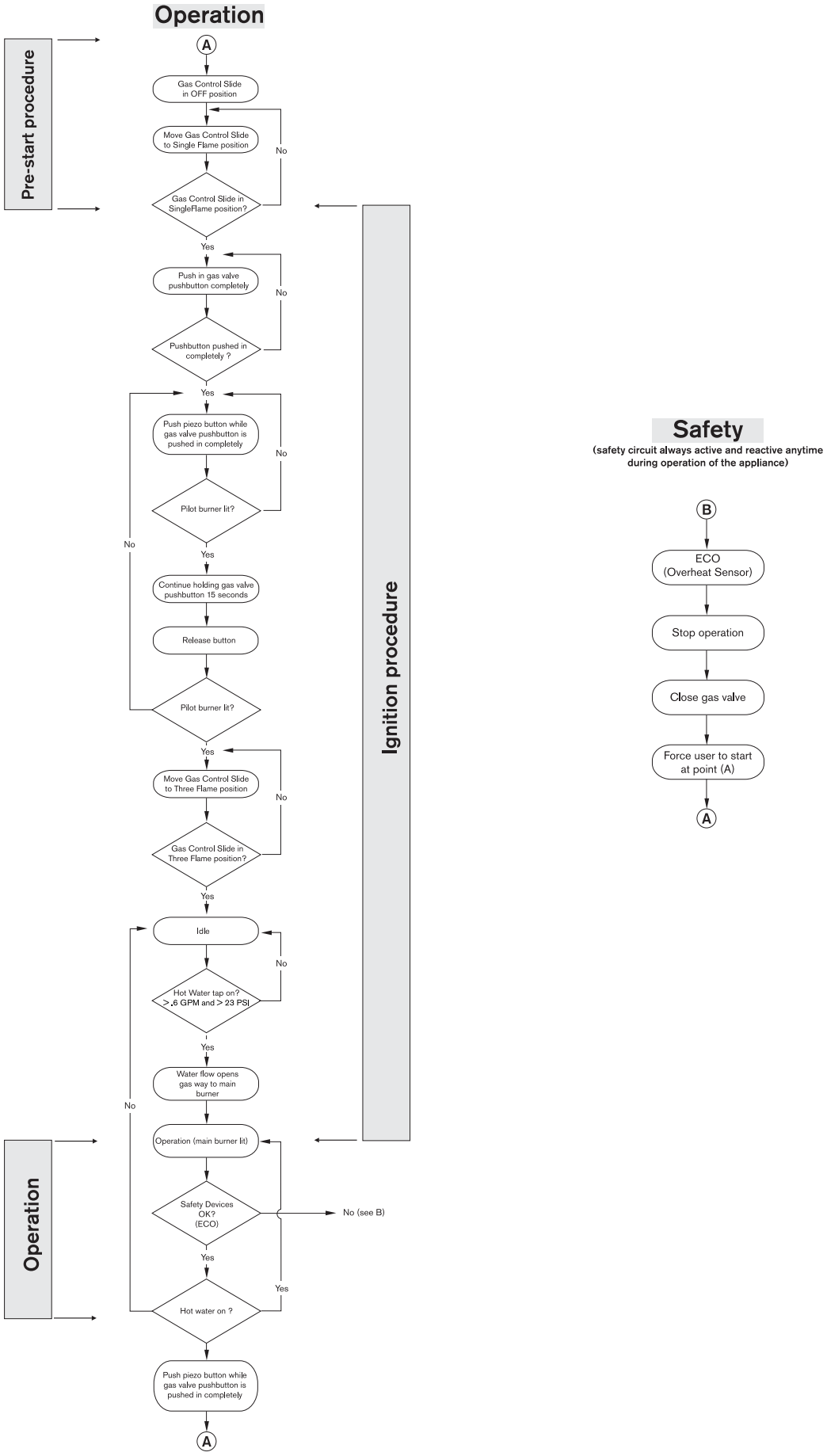


Fig. 10

INTERIOR COMPONENTS DIAGRAM AND PARTS LIST 38B

1	Cover	8 705 421 021	
2	Temperature adjustment knob	8 702 000 182	
4	Draft divertor	8 705 505 361	
5	Heat exchanger	8 705 406 149	
6	Overheat sensor (ECO)	8 707 206 040	
7	Hot water pipe	8 700 703 038	
8	Main burner assembly	8 708 120 301	LPG
	Main burner assembly	8 708 120 011	NG
9	Burner assembly washer	8 700 103 008	
10	Piezo electrode	8 708 107 002	
11	Pilot burner assembly	8 718 105 051	
11a	Pilot air screen	8 700 507 055	
12	Pilot orifice	8 708 200 005	NG
	"	8 748 200 173	LPG
13	Pilot Tube	8 710 707 166	
14	Thermocouple	8 747 202 083	
15	Gas valve	8 707 011 456	LPG
	Gas valve	8 707 011 466	NG
16	Electromagnet	8 707 201 012	
17	Thermocable	8 747 202 209	
18	Water valve assembly	8 707 002 497	
19	Pushrod	8 703 406 204	
20	Water valve diaphragm	8 700 503 050	
21	Slow ignition valve	8 708 503 063	
22	Water valve water governor	8 707 402 018	
23	Water valve selector screw	8 708 500 166	
25	Water inlet filter	8 700 507 001	
26	Water valve venturi	8 708 205 210	
27	Throttle Disc	8 700 100 169	NG
28	Piezo igniter	8 708 108 040	
29	Screw	8 703 401 051	

Fig. 11 - Flow chart of Aquastar 38 B



LIMITED WARRANTY

Aquastar

General
Aquastar water heaters are warranted by the Manufacturer (BOSCH) through **BBT** North America. **BBT** North America (BBTNA) 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 BBTNA 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 twelve (12) years after the original installation and operation BBTNA 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 two (2) years after original installation and operation, BBTNA will furnish a replacement part free of charge.

Shipping costs
In addition to supplying the replacement part(s), BBTNA 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.

How to Make a Claim
Any claim for warranty parts should be made to your local dealer, distributor or to BBTNA. If BBTNA, please contact the Technical Support Department:

Controlled Energy Corp.
340 Mad River Park
Waitsfield, VT 05673
Phone: 800-642-3111
www.controlledenergy.com/tech

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

MAINTENANCE TABLE see pages 12 & 13			
	EVERY YEAR	EVERY 2 YEARS	EVERY 3-5 YEARS
LUBRICATE WATER VALVE		†	
REBUILD WATER VALVE			†
INSPECT WATER FILTER SCREEN	†		
INSPECT PILOT ASSEMBLY	†		
INSPECT VENT ASSEMBLY	†		
INSPECT MAIN BURNER	†		

Replacement Parts available from:

BBT NORTH AMERICA
Bosch Group

Bosch Water Heating
340 Mad River Park
Waitsfield, VT 05673
Phone 800-642-3111
Fax (802) 496-6924
www.boschhotwater.com
techsupport@boschhotwater.com

Bosch Heating
System Co. Foschan Guangdong
C. T. 528315 P.R. China