

# State Light Duty Commercial Turbo Sandblaster Storage Water Heater Model SBT 75-75 NE

## Manual

**INSTALLATION  
MAINTENANCE  
USER INSTRUCTIONS**

This manual contains instructions for the installation, operation and maintenance of your gas-fired water heater. Read the appropriate section carefully before servicing or using the water heater. Then keep it handy for quick future reference by inserting it in the plastic envelope provided on the appliance.

### **▲ WARNING**

This water heater is equipped for one type of gas only. Check the data plate near the gas control valve for the correct gas. **DO NOT USE THIS WATER HEATER WITH ANY GAS OTHER THAN THE ONE LISTED ON THE DATA PLATE.** Failure to use the correct gas can cause problems which can result in **DEATH, SERIOUS BODILY INJURY OR PROPERTY DAMAGE.** If you have any questions or doubts consult your regional gas authority.

**IMPORTANT NOTICE**  
**THIS HEATER MUST BE LEFT UNDER THE CONTROL OF THE GAS CONTROL VALVE AND THERMOSTAT AT ALL TIMES.**

### **FOR YOUR SAFETY IF YOU SMELL GAS:**

1. Turn off Gas and open windows.
2. Don't touch electrical switches.
3. Extinguish any open flames.
4. Immediately call your local Gas Board.

FLAMMABLE VAPOURS MAY BE DRAWN BY AIR CURRENTS FROM OTHER AREAS OF THE STRUCTURE TO THIS APPLIANCE.

### **FOR YOUR SAFETY:**

DO NOT STORE OR USE PETROL, AEROSOL OR OTHER FLAMMABLE VAPOURS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER ATMOSPHERIC GAS APPLIANCE.

"THIS APPLIANCE SHALL BE INSTALLED IN A TECHNICAL ROOM SEPARATE FROM LIVING ROOMS AND PROVIDED WITH APPROPRIATE VENTILATION DIRECTLY TO THE OUTSIDE."

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## General Description

The "Turbo Sandblaster" water heater described in this manual is a floor standing, open flued direct fired storage water heater. The unit is fitted with a multi-functional gas control valve which incorporates a gas governor, a thermo-electric flame supervision device and a user adjustable thermostat. Ignition is by piezo ignitor. Each storage vessel is internally lined with a vitreous enamel coating and is fitted with sacrificial magnesium anode rods to protect against hot water corrosion and a low level drain tap. The tank is insulated with a layer of CFC free foam and is covered by a metal casing finished in a blue stove enamel paint with a light blue trim.

The water heater can be fitted to an unvented, direct on mains system, and in such cases it must be installed by a "competent person", as laid down in Building Regulations – G3.

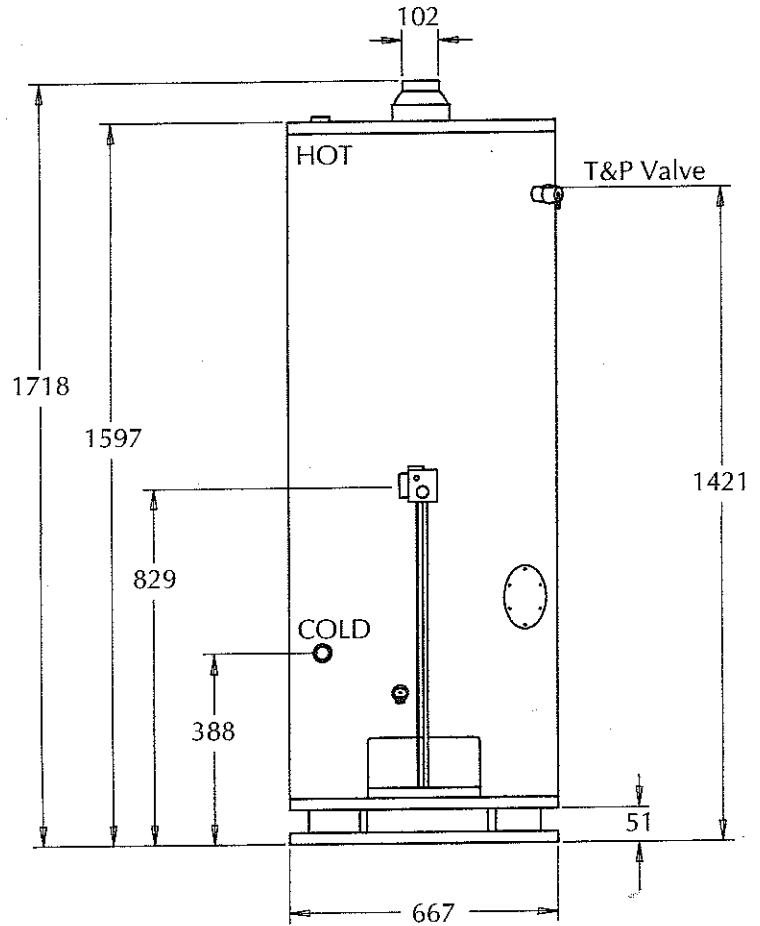
### IMPORTANT NOTICE

**THIS HEATER MUST BE LEFT UNDER THE CONTROL OF THE GAS CONTROL VALVE AND THERMOSTAT AT ALL TIMES.**

# Technical Data

## Technical Data SBT 75-75 NE

Continuous at 44°C temperature rise	341 litre/hr	75 UK gal/hr
Storage capacity	284 litres	62 UK gal
Weight filled	393 kg	865 lb
Time to recover storage with 44°C temperature rise	50 minutes	50 minutes
Input rate	2.06 m³/hr	72.5 ft³/hr
Input gross	21.99 kW	75,100 Btu/hr
Output gross	17.15 kW	58,567 Btu/hr
Maximum working head	10.3 bar	150 psig.
Minimum working head	3 metres	10 ft
Nominal gas inlet pressure (natural gas)	17.5 mbar	7 in wg
Nominal gas inlet pressure (LPG)	27.5 mbar	11 in wg
Maximum gas inlet pressure (natural gas)	35 mbar	14 in wg
Maximum gas inlet pressure (LPG)	35 mbar	14 in wg
Burner setting pressure (natural gas)	10 mbar	4 in wg
Burner setting pressure (LPG)	25 mbar	10 in wg
Injector size (natural gas)	3.8 mm	
Injector size (LPG)	2.45 mm	
Approx. flue gas	30.9 m³/hr	1087.5 ft³/hr
Approx. flue gas temperature	238°C	460°F
Water connections—cold inlet —hot outlet	1½" BSP 1" BSP	1½" BSP 1" BSP
Open Vent	25 mm	1" Minimum
Cold feed pipe	38 mm	1½" Minimum
Gas connection	—	½" BSP
Draught diverter outlet size	102 mm	4"
Shipping weight	111 kg	245 lbs
MINIMUM CLEARANCE All round	152 mm	6"
SERVICE CLEARANCE Front Above	610 mm 1030 mm	24" 40.5"
Safety Valve	19 mm	¾"



All dimensions are in mm

# Installation

## Related Documents

The installation of the storage water heater must be in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations: 1984 and Byelaws of the local water Authority, the Model Water Byelaws and the Building Regulations.

Also, it should be in accordance with any relevant requirements of the Local Authority, the local Gas Region, and the requirements of the following British Standard Codes of Practice:

<i>BS 5540: Part 1</i>	<i>Flues for Gas Appliances up to 60 kw</i>
<i>BS 5440: Part 2</i>	<i>Air Supply For Gas Appliances up to 60 kw</i>
<i>BS 5546</i>	<i>Installation of Gas Hot Water Supplies for Domestic Purposes (2nd Family Gases).</i>
<i>BS 6700</i>	<i>Design, Installation, Testing and Maintenance of services supplying water for Domestic use within buildings and their curtilages</i>
<i>BS 7200</i>	<i>Unvented Hot Water Storage Units and packages</i>

It is the law that all gas appliances are installed and serviced by competent persons in accordance with the above regulations. It is in your own interest and that of safety to ensure that the law is complied with.

## Location

The location of the storage water heater must permit a satisfactory flue and an adequate air supply. The location must also provide the minimum clearances for servicing and air circulation around the water heater. The water heater must not be installed in a bedroom, bed sitting room, or a room containing a bath or shower. They are considered unsuitable for installation in individual dwellings eg houses, flats or hotel rooms. The floor on which the heater is installed must be flat, level, and of sufficient load bearing capacity to support the weight of the filled water heater with allowance for the weight of additional pipework bearing on the appliance.

Minimum clearances all round the heater should be 150 mm.

A clearance of 600 mm should be accessible at the front of the heater for removal of the burner assembly and 1030 mm above the heater for removal of the flue baffles and anode rods.

The location selected should be as close to the flue stack or chimney as practical and as centralized with the piping system as possible. It should be located in an area not subject to freezing temperatures.

The water heater must not be installed on carpeting. Carpeting must be protected by a suitable panel beneath the appliance extending beyond the full width and depth of the appliance by at least 75 mm in any direction.

Any combustible material adjacent to the heater must be so placed or shielded as to ensure that its temperature does not exceed 65°C.

## Combustion and Ventilation Air Supply

Detailed recommendations for combustion and ventilation air supplies are given in BS 5540: Part 2. The following notes are intended to give general guidance:

Vent position	Compartment ventilated:	
	to room or internal space	direct to outside air
	cm <sup>2</sup> per kW of appliance maximum rated input	cm <sup>2</sup> per kW of appliance maximum rated input
High level	9	4.5
Low level	18	9

Air vents should have negligible resistance and must not be sited in any position where they are likely to be easily blocked or flooded or in a position adjacent to an extraction system which is carrying flammable vapour.

Grilles or louvres should be designed so that high velocity air systems are minimized in the boiler house.

If the water heater is installed in hairdressers premise barber shops, dry cleaning establishments or laundry facilities, it is imperative that the combustion and ventilation air must not be contaminated. Sprays or materials emitting volatile vapours can be a source of ignition from the permanent pilot burner in the water heater. Propellants of aerosol sprays and fumes of volatile compounds, in addition to being highly flammable, will also change to corrosive hydrochloric or hydrofluoric acid when exposed to the combustion products of the water heater. The results may be hazardous, cause service problems and produce failure.

## Effects of an Extract Fan

If there is any type of extraction fan fitted in the premises, there is a possibility that if adequate air inlet areas from the outside are not provided, spillage of the products of combustion from the water heater flue could occur when the fan is in operation.

Where such installations occur, a spillage test as detailed in BS 5440: Part 1 must be carried out and any necessary corrective action taken.

# Installation (cont'd)

## Gas Meter

The gas piping to the water heater is connected to a gas meter by the local Gas Region or the local Gas Regional contractor. An existing gas meter and service should be checked preferably by the local Gas Region to ensure that the meter is adequate to deal with the additional rate of gas supply required.

## Gas Piping

Installation of the gas supply pipes should be in accordance with BS 6891. A gas line of sufficient size should be run to the water heater. Make sure the gas supplied is of the same type as listed on the data badge.

CORRECT GAS PIPE DIAMETER (Inches) FOR WATER HEATERS OPERATING ON NATURAL GAS							
Total Input kw (BTU/h)	Distance from Meter, In Metres (Feet)						
	9 (30)	18 (60)	27 (90)	36 (120)	46 (150)	55 (180)	64 (210)
19 (65,000)	½	¾	¾	¾	1	1	1
22 (75,100)	¾	1	1	1	1¼	1¼	1¼
44 (150,000)	¾	1	1	1	1¼	1¼	1¼
59 (200,000)	1	1¼	1¼	1¼	1¼	1¼	1¼

There must be:

- A readily accessible and clearly identified manual isolation valve in the gas supply in accordance with the Gas Safety (Installation and Use) Regulations: 1984.
- A ground joint union between the manual isolation valve and the appliance control valve to permit servicing on the water heater.

To prevent damage, care must be taken not to allow the torque to be applied across the gas control when attaching the gas supply pipe to the control valve inlet.

Before commissioning the heater, the installation pipes must be tested for soundness and purged, see BS 6891. When the gas line is tested, it should be disconnected from the gas control valve on the heater and capped. If the gas control is subjected to pressures in excess of 35 mbar (14 in WG), the damage to the gas valve could result in an extremely hazardous condition. The manufacturer of the water heater will not be liable either direct or contingent for incidental or consequential damages in the event these instructions are not followed.

## Flue System

Detailed recommendations for flues are given in BS 5440: Part 1. The following notes are intended to give general guidance:

- All flue joints must be made "socket up" to retain any condensate within the flue.
- All products of combustion and flue gases must be completely removed to the outside air without spillage from the draught diverter.
- Horizontal runs of pipes and 90° bends/elbows should be avoided.
- The cross sectional area of the flue serving the water heater must not be less than the area of the outlet of the flue connection on the top of the appliance.
- Observe clearances from all combustible materials, i.e. 50 mm except where the flue passes through a non-combustible sleeve where clearance is at least 25 mm.
- Flue pipes and fittings should be constructed from materials, which are asbestos free, robust, durable, corrosion resistant and non-combustible. The flue pipe should be adequately supported to ensure weight is not transferred to the top of the appliance.
- The flue connecting pipe shall not enter the chimney within 250 mm of its base, shall not protrude beyond its inner face and shall enter with an upward sweep. There must be access to examine and maintain the entry point.

A flue pipe constructed from one of the materials used for flue pipes and fittings referred to, should form the initial connection to the chimney. Alternatively, a chimney may be lined with a stainless steel flexible flue liner or any other liner of acceptable material. The number of joints must be kept to a minimum.

Before connecting a water heater to a flue which has been previously used, the flue should be thoroughly swept clean of any soot and loose material. If a register plate, restrictor plate, damper, etc. is fitted in a chimney flue, it must be removed before connecting the water heater to the flue.

The flue should be terminated in accordance with the relevant recommendations given in BS 5440: Part 1, and BS 6644. A suitable terminal must be fitted to the flue outlet. The terminal should have a minimum resistance to the egress of combustion products and have effective protection against the entry of rain, snow, leaves, birds, etc. The point of termination must not be within 600 mm of an openable window, air vent or other ventilation opening, nor in an area of pressure which will cause downdraught.

For further termination guidance, consult BS 5440: Part 1.

# Installation (cont'd)

## Common Flues

Where two or more gas fired appliances are to be connected to a common natural draught flue, the appliances shall be installed in the same room, shall have the same type of burner system and the flue shall be sized so as to ensure complete evacuation of the flue products from the whole installation.

All flues, whether single or combined, must have adequate support.

Where one appliance is likely to be used more regularly or for longer periods than others in a group, it shall be connected at the point nearest to the main flue.

When flues are combined, the area of the combined flue should be equal to the area of the largest flue, plus 50% of all the others joining it.

FLUE SIZES IN CENTIMETERS

FLUE SIZE	SQUARE CENTIMETERS	FLUE SIZE	SQUARE CENTIMETERS
13	133	25	490
15	177	30	707
18	254	35.5	990
20	314	40.5	1288
23	415	45.5	1626

FLUE SIZES IN INCHES

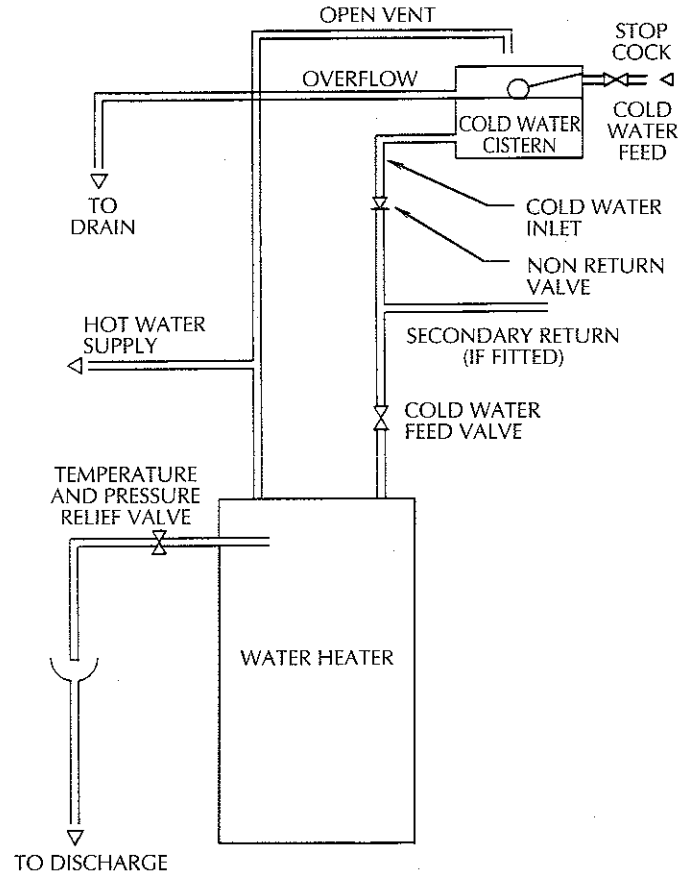
FLUE SIZE	SQUARE INCHES	FLUE SIZE	SQUARE INCHES
5"	20	10"	79
6"	28	12"	113
7"	38	14"	154
8"	50	16"	201
9"	64	18"	254

## Water Connections

Detailed recommendations for the water system are given in BS 5546 and 6700. The following notes are of particular importance:

- The water heater should be fitted to an open vent system or an unvented system.
- In an open system, the cistern should be fitted with a stop valve and its capacity should be in accordance with the local water byelaws and in addition must always be greater than the hourly recovery of the heater. (See Technical Data Sheet for Recovery Rate)
- It is recommended that copper tubing, complying with BS 2871: Part 1 is used for water carrying pipework.
- All pipes must be supported as shown in BS 6700.
- All pipework situated in areas which may be exposed to freezing conditions should be insulated.
- Drainage taps must be located in accessible positions which will permit the draining of the whole system. Draining taps should be at least 1/2" nominal size and be in accordance with BS 2879.

- **The Open Vent** must be connected, normally from the top of the flow pipe of the heater, rising continuously to discharge over the cold feed cistern. Its size must not be less than that specified in the Technical Data Table. It must not be valved and must be insulated along any part where freezing may occur.

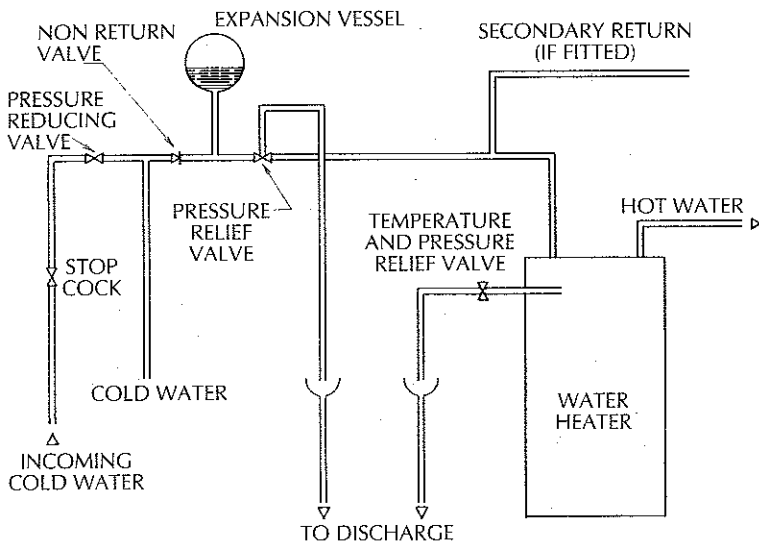


- **The Cold Feed Pipe** should be valved as shown and not be less than the size specified in the Technical Data table.
- Dead legs of hot water pipes to draw off points should be as short as possible and should not exceed the lengths laid down in BS 5546.
- If lengths required are greater than those mentioned, a return circuit must be fitted.

On **Unvented** systems, the equipment must be approved to BS 7206, and must be installed to the manufacturers recommendations. It must also be installed by a "Competent Person", as laid down in the Building Regulations - G3.

# Installation (cont'd)

## Water Connections (cont'd)



## Water Treatment

The use of water softening equipment is strongly recommended in all cases where conditions of high or extreme water hardness exist.

When a water treatment plant (water softener) is used in conjunction with State water heaters, it is recommended that the total hardness be reduced to 50-85 mg/l.

High water temperatures generally cause an increase in corrosion and scale forming activity; waters below 60°C scale and corrode less, thus, it is desirable to keep the water temperature as low as possible.

### IMPORTANT NOTICE

**Warranty on this water heater will not be valid if lime or scale deposits are allowed to accumulate causing failure of the tank due to restricted heat transfer. IN HARD WATER AREAS, CLEANING MUST BE PERFORMED AT LEAST AS OFTEN AS EVERY 90 DAYS. Failure to keep accurate records of dates of each cleaning will constitute lack of proper maintenance and void the warranty.**

## Temperature and Pressure Relief Valve

For protection against excessive pressures and temperatures in this water heater, a combined temperature/pressure relief valve has been installed. This valve conforms to BS 6238: Part 2: *Safety and Control devices for use in hot water systems - specification for combined temperature and pressure relief valves for pressures from 1 bar to 10 bar*. The valve is marked with the maximum set pressure not to exceed the hydrostatic working pressure of the water heater - 10 bar (150 psi).

The discharge pipe must be fitted with a tundish, with the tundish fitted as close to the valve as possible, but must be within 500 mm of the valve.

The discharge pipe from the tundish should be terminated outside of the building, in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal, and:

- be at least one pipe size larger than the nominal outlet size of the valve unless its total equivalent hydrostatic resistance exceeds that of a straight pipe 9 meters long. Bends must be taken into account in calculating the flow resistance.
- have a vertical section of pipe at least 300 mm long below the tundish before any elbows or bends in the pipework.
- be installed with a continuous fall.
- have discharges visible at both the tundish and the final point of discharge, but where this is not practical or possible, there should be clear visibility at one or other of these discharges.

**NOTE:** The discharge will consist of scalding water and possibly steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges.

The relief valve should be manually operated at least once a year. Caution should be taken to ensure that:

- No one is in front of or around the outlet of the valve discharge pipe, and
- That the water manually discharged will not cause any damage to property.

# Commissioning and Testing

## Water Installation

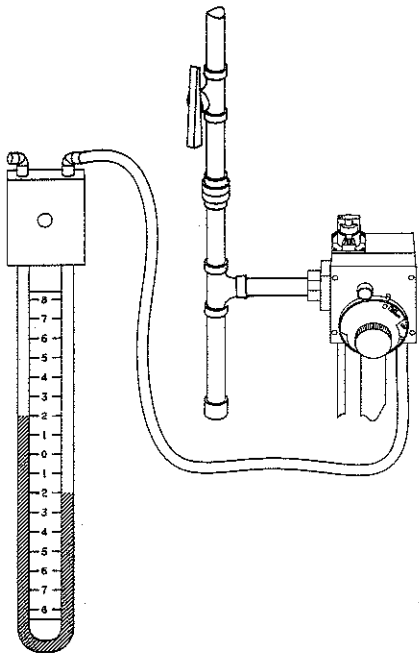
The entire system should be flushed out with cold water with all valves open. Close all hot taps. Ensure the system is filled and clear of any air locks by checking at the hot taps. Check the whole installation for water soundness and for proper operation of the feed cistern, when fitted. Repair any leaks.

## Gas Installation

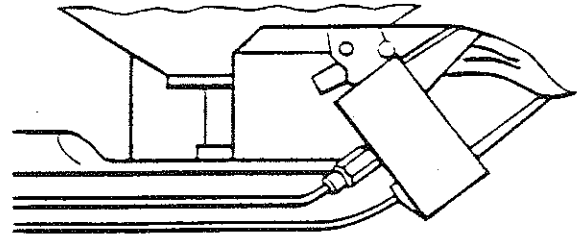
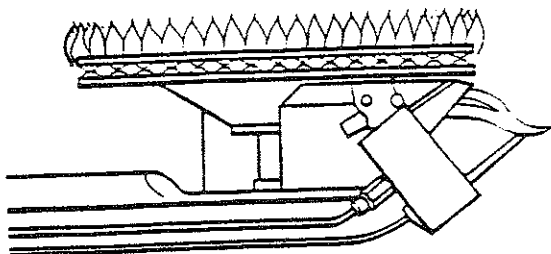
Check the whole of the pipework, including the meter, for gas soundness and purge thoroughly - as per BS 6891. Test for gas soundness round the control and fitting of the water heater with leak detection fluid or other material suitable for the purpose, when the heater is in operation.

After the flame has been established at the main burner, the following points must be checked:

- A. Turn the thermostat to the highest setting and check the burner setting pressure (see Technical Data Table) at the test point provided at the lower right hand corner of the control valve.



- B. Remove the outer and inner doors and check the burner and pilot flame pictures below. The correct flame picture of the pilot flame is blue in colour and 28 mm long. The flame should envelope the thermocouple tip. Replace the inner and outer doors.



- C. Check that there is no spillage of products of combustion from the water heater's draught diverter by carrying out a spillage test as detailed in BS 5540: Part 1. If an extractor fan is fitted, check with the fan OFF and ON, with all windows, doors and any other openable form of ventilation in a closed position. If there is spillage, turn off the water heater and take corrective action.\*
- D. Allow the water system to warm up and check for water soundness and general operation of the system.
- E. Check the operation of the flame failure device to ensure that it closes off the gas to the burner assembly within a maximum period of 50 seconds. Have the main burner alight for several minutes, turn off the gas and start a stop watch immediately. Time the interval prior to the closure of the valve. It is possible to hear a "click" from the valve on closure.
- F. Relight the water heater as instructed.
- G. Adjust the thermostat to the desired setting.
- H. Hand the instructions to the user for retention. Users instruction as an aid. Also, what to do in an emergency (See p.1)
- I. That the heater should be left on continuously and only turned off for emergencies or long periods eg. holidays.
- II. Of the precautions necessary to prevent damage from frost, and scale build up.
- III. Of the importance of regular servicing by a competent person to ensure continued safe and efficient operation.
- IV. Of the heater servicing frequency ie. at least annually, and maintenance frequency of the water softening plant when fitted.

Leave this manual with the user, owner or occupier of the premises in which the appliance is installed, for reference when maintenance and servicing are undertaken. Point out the "User Instructions" at the back of the manual.

\* This is normally by adding permanent ventilation until spillage no longer occurs. It can be estimated by opening a window fully, running the heater and checking for spillage. Using a stiff board, cover the window opening until spillage just occurs, then gradually uncover the window opening until there is no spillage and the spillage indicator shows a satisfactory clearing or "pull" at the draught diverter skirt. The measured opening is then the minimum effective area of permanent ventilation to be added.

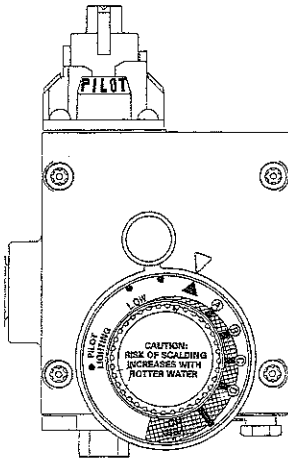


# Commissioning and Testing (cont'd)

## Temperature Regulation

The thermostat of this water heater has been factory set at its lowest position, to reduce the risk of scald injury. It is adjustable and must be reset to the desired temperature setting. The mark (▲) indicative of approximately 50°C is the preferred starting point. Some local byelaws have a requirement for a lower setting. If you need hotter water, follow directions for temperature adjustment, but beware of the warnings in this section.

Turn the water temperature dial clockwise to decrease the temperature, or counter clockwise to increase the temperature.



▲—Is a thermostat setting of approximately 50°C, which will supply hot water at the most economical temperatures. The temperature adjustment knob can be turned lower than 50°C if desired.

A—Is a thermostat setting of approximately 55°C.

B—Is a thermostat setting of approximately 60°C. This is the lowest setting for supply of hot water to dishwashers.

C—Is a thermostat setting of approximately 65°C.

D—Is a thermostat setting of approximately 71°C.

**VERY HOT**—Is a thermostat setting of 82°C. It is recommended that the dial be set lower whenever possible

**NOTE:** Water temperature range of 49°-60°C recommended by most dishwasher manufacturers.

### ▲ WARNING

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

## Maintenance

### Servicing Instructions

To prolong the life of the water heater, it is recommended that the unit is serviced at least once a year. The service should be carried out by a qualified service engineer.

#### Before Commencing the service work:

1. Turn off the gas tap on the gas control valve.
2. Turn off the main gas isolation cock.
3. Turn off the cold water feed supply to the heater.
4. Open a nearby hot water outlet.
5. Attach a hose to the drain valve, and turn on and run to waste.
6. Disconnect the spilt flue clip and remove the draught diverter.

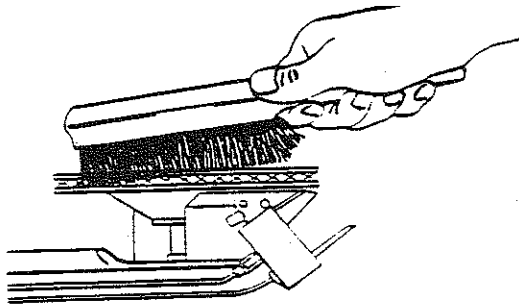
#### To Clean the Main Burner Assembly:

1. Remove the outer and inner doors to the burner chamber.
2. Unscrew the thermocouple from the gas control valve.
3. Unscrew the pilot and main burner supply fitting from the gas control valve.
4. Disconnect the piezo electrode wire from the piezo ignitor button.
5. Carefully withdraw the burner assembly by pulling straight out until clear of the combustion chamber.
6. Brush the burner flame ports with a stiff bristle brush and remove any scale from inside the burner. Care should be taken not to damage the pilot burner and piezo electrode during this operation.

# Maintenance (cont'd)

## To Clean the Main Burner Assembly: (cont'd)

7. Check the condition of the thermocouple tip and pilot burner and renew if necessary.
8. Check the pilot supply pipe for tightness at the pilot burner.
9. Clean any deposits from the pilot burner with a small brush.



10. Examine the condition of the burner and pilot injectors. To do this, disconnect the thermocouple and piezo electrode from the main burner. Remove the screw holding the pilot burner to the main burner. Remove the two screws securing the burner manifold from the burner assembly. Clean the burner injector, if necessary, with a soft cloth and wood splinter. Do not attempt to clean with a drill or metallic reamer. Blow through the pilot injector, and replace if necessary.
11. Re-assemble the manifold to the burner assembly.
12. Re-assemble the pilot burner, together with the thermocouple and piezo electrode.
13. Check the condition and operation of the control knob of the gas valve for damage. Replace the entire valve if found damaged.

## To clean the Flueways:

1. Remove the flue baffle assembly by lifting upwards.
2. Clean the flue baffle and flue tube with a suitable stiff brush and remove any deposits from the top of the tank.
3. Clean out all deposits from the combustion chamber floor plate.
4. Replace the flue baffle.
5. Examine the condition of the flue pipe, terminal and supports, giving attention to ensuring that the flue-way, including any entry point to a chimney, is clear and unobstructed and that the ventilation/combustion air grilles are clear.

## To check the Anode:

1. Remove the magnesium anode rod by unscrewing the hexagonal securing nut from the top of the tank, adjacent to the exit of the flue tube. Using the correct sized spanner or socket, remove the anode.
2. Replace the anode if the diameter is below 9 mm, or if more than 100 mm of the steel core rod is exposed.
3. Using the correct sized spanner or socket, refit the anode using a suitable pipe jointing compound to BS 5292 on the threads.

## To clean the Storage Tank:

**NOTE:** Ensure a new gasket is available before starting, as it is necessary to renew it before refitting the inspection cover.

1. Remove the hexagon head bolts retaining the inspection cover and with a light tap, free the cover from its flange seating.
2. Remove all evidence of the old gasket material from the cover as well as its flange.
3. Remove all deposits from the base of the storage tank, taking care not to damage the Turbo force Ring, or the vitreous enamel lining inside the tank. To remove hard scale, it is the recommendation of the manufacturer that water treatment specialists be called in to circulate an approved chemical de-scalent through the tank, so that hardened deposits can be dissolved and removed. (Important Note: Magnesium anode rods must not come in contact with any chemical de-scalent and should therefore be removed while cleaning the tank).
4. Using a new gasket, replace the inspection cover and securing bolts.

## After the Servicing is completed:

1. Replace the draught diverter and rejoin split flue clip.
2. Insert the burner assembly into the combustion chamber, ensuring that the end of the burner peg locates positively in the burner location slot.
3. Re-assemble burner pipe, pilot tubing and thermocouple to the underside of the gas control valve.
4. Re-connect the piezo electrode wire to the piezo ignitor button.
5. Turn off the drain valve and remove the hose.
6. Turn on the cold water supply to the heater and refill leaving a hot tap open until water is seen to run freely from the tap. Check at other taps for any air locks. Close all hot taps.
7. Turn on the main gas isolation cock.
8. Check water connection for soundness.
9. Check gas pipe work for soundness.
10. Recommission the heater as instructed.
11. Test for gas soundness, with leak detection fluid, any joints or threads broken or disturbed.

# Maintenance (cont'd)

## Unvented Systems:

If the water heater is fitted to unvented system, the following actions are required when the unit is serviced.

1. The pressure in the expansion vessel needs to be checked to make sure that it is at the required pressure of 3.5 bar. If the pressure is lower than this the vessel needs to be pumped back up to the correct pressure.
2. The expansion valve requires to be manually tested.
3. The temperature/pressure relief valve fitted to the water heater needs to be manually tested.
4. The line strainer in the combined pressure reducing valve/line strainer needs to be cleaned.

## Replacement of Parts

### Gas Control Valve:

1. Turn off the cold water feed valve.
2. Open a nearby hot water outlet.
3. Attach a hose to the drain valve, and turn on and run to waste.
4. Turn off the gas tap on the gas control valve.
5. Turn off the main gas isolation cock and disconnect the union.
6. Disconnect the pilot supply pipe at the compression fitting on the gas control valve.
7. Disconnect the thermocouple and move clear of the gas control valve body.
8. Disconnect the burner supply pipe at the gas control valve.
9. Unscrew the gas valve from the storage tank.
10. Unscrew the union cock gland nut and nipple from the old gas valve and re-assemble onto the inlet connection of the replacement valve, using fresh jointing compound on the threads. Jointing compound to BS 5292 should be used.
11. Re-assemble in the reverse order.
12. Turn off the drain valve and remove hose.
13. Turn on the cold feed valve and hot taps and refill the system; ensuring no airlocks.
14. Turn off the hot taps, starting at low level.
15. Recommission the heater.
16. Check for gas soundness on all remade or disturbed joints, with leak detection fluid and seal any leaks found. Recheck for gas soundness following any leaks found.

### Thermocouple Replacement:

1. Proceed as instructed for cleaning the main burner assembly, in the "Servicing Instructions" steps 1 to 5.
2. Disconnect the tubing nut on the thermocouple at the pilot assembly and remove the thermocouple.
3. Replace with a new thermocouple and re-assemble in reverse order.

4. Turn on the main gas cock and relight the burner.
5. Carry out check E.
6. Test for gas soundness, the broken and disturbed joints.

### Burner Replacement:

1. Proceed as instructed for cleaning the main burner assembly in the "Service Instructions"; steps 1 to 5.
2. Remove the screw securing the pilot assembly and remove the assembly.
3. Remove the screws securing the main burner pipe manifold to the burner.
4. Replace the burner and reassemble in reverse order.
5. Turn on the main gas isolation cock and light, and check the burner.
6. Test for gas soundness, the broken and disturbed joints, and seal any leaks.

### Pilot Assembly:

1. Proceed as instructed for the Thermocouple replacement steps 1 and 2.
2. Unscrew the nut securing the pilot pipe to the pilot assembly and remove the pilot pipe, taking care not to lose the pilot injector.
3. Remove the screw securing the pilot assembly to the main burner assembly, and remove pilot assembly.
4. Replace any parts necessary of the pilot assembly and re-assemble in the reverse order.
5. Turn on the main gas isolation cock, and light, and check the burner and pilot.
6. Carry out steps E, F, and G if the thermocouple was replaced.
7. Test for gas soundness joined broken or disturbed.

### Temperature/Pressure Relief Valve:

1. Proceed as instructed for the "Servicing Instructions" steps 1 to 5.
2. Disconnect the discharge pipe from the temperature/pressure relief valve.
3. Unscrew the temperature/pressure relief valve from the tank.
4. Replace as necessary.
5. Re-assemble in reverse order.
6. Turn off the drain valve and disconnect the hose.
7. Turn in the cold water feed valve to the heater and refill, leaving a hot tap open until water is seen to run freely. Check at other hot taps for any air locks. Close all hot taps once the tank is full.
8. Recommission the heater.

# Maintenance (cont'd)

## Piezo Ignitor:

1. Disconnect the wire to piezo electrode from the bottom of the piezo ignitor button.
2. Unscrew nut securing the ignitor to the bracket.
3. Remove the ignitor and replace as required.
4. Re-assemble the ignitor in the reverse order.
5. Test the ignitor to ensure that it works properly.

## Piezo Electrode:

1. Proceed as instructed for cleaning the main burner assembly in the "Service Instructions"; steps 1 to 5.
2. Remove the screws securing the pilot assembly and the piezo electrode from the burner assembly.
3. Replace the electrode as required, and re-assemble in the reverse order.
4. Test the ignitor to ensure that it works properly.
5. Test for gas soundness any joints that have been broken or disturbed.

## General Notes

1. To ensure the safe and efficient operation of your water heater, it should be serviced at least once a year, by arrangement with a qualified service engineer. (See item 8 below).
2. Keep the area around the water heater clean and well clear from dust and lint or other combustible materials.
3. Do not place anything on or near the heater and always ensure there is clear passage for combustion and ventilation air to the heater.
4. Do not block or obstruct any purposely made ventilation grilles or ducts.
5. Do not attempt to operate the heater without an adequate or fully functional water supply.
6. If you think the heater is malfunctioning, turn it OFF and seek expert advice and assistance.
7. If a leak of gas is suspected, turn OFF the gas supply and ventilate the area. Contact the local office of British Gas immediately. Do not touch electrical switches and extinguish any open flame.
8. Failure of the water heater tank may occur if scale is allowed to build up. If a water softener is not used, the water heater may need attention as frequently as every three (3) months in hard water areas.  
Failure due to scale build up will invalidate the warranty.
9. Obtain advice from your local gas region before making any alterations which may affect the air supply and ventilation of the water heater. eg. building alterations, fitting extractor fan. etc.

To clean the outer casing of the water heater, wipe the paint clean with a soft damp cloth and dry with a clean dry cloth.

If the water heater is not giving you the service you need:

1. Check that the pilot burner is alight.
2. Check the setting of the temperature selection knob and adjust if necessary.
3. Do not dismantle any of the gas components, but seek expert advice and assistance by calling your local Gas Region or Service engineer for service.

## Frost Protection

If the water heater is not to be fully operative during freezing conditions, the entire water system should be completely drained to prevent damage to the heater and pipework from the effects of burst pipes.

## Volatile or Explosive Liquids and Corrosive Solutions

Flammable vapours and corrosive fumes may be drawn by air currents from other areas of the structure to this appliance, therefore, these types of products should not be stored anywhere near the water heater, as the pilot flame could cause a hazardous condition or the life of the heater could be reduced through undue corrosion.

# Users Instructions

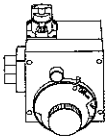
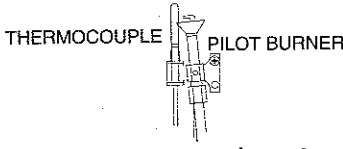
## FOR YOUR SAFETY READ BEFORE LIGHTING

### 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 pilot which must be lighted by hand. 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 knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- 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

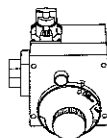
1. STOP! Read the safety information above on this label.
2. Remove outer door.
3. Set the thermostat to lowest setting by turning the water temperature dial clockwise, (↻) to its lowest temperature setting (with arrow on dial) as shown. **DO NOT FORCE.**  

4. Turn gas control knob clockwise (↻) to "OFF" position. Knob cannot be turned from "PILOT" to "OFF" unless knob is depressed slightly. **DO NOT FORCE.**
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
6. Remove (or open) inner door located below the gas control unit.
7. Find pilot-follow metal tube from gas control. The pilot is located on the right hand side of the burner.  


THERMOCOUPLE PILOT BURNER
8. If you don't smell gas, turn knob on gas control counter clockwise (↺) to "PILOT" position.
9. Push in control knob all the way and hold down. Immediately light the pilot with a match. Continue to hold control knob in for about one (1) minute after the pilot is lit. Release knob and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 3 through 8.
  - If knob does not pop up when released, stop and immediately call your service technician or gas supplier.
  - If the pilot will not stay lit after several tries, depress and turn the gas control knob clockwise (↻) to "OFF" and call your service technician or gas supplier.
10. Replace (or close) inner door. Replace outer door if door does not cover gas control on/off knob or temperature adjustment knob.
11. At arms length away, turn gas control knob counter-clockwise (↺) to the full "ON" position. **Warning do not use gas control knob to regulate gas flow.**
12. At arms length away, set the thermostat to desired setting. The mark (▲) indicative of approximate 50°C is preferred starting point. Some local laws may require a lower starting point. If hotter water is desired, see instruction manual and "warning" below.
13. Replace the outer door if not replaced in step 10.

### WARNING

Hotter water increases the risk of scald injury. Before changing temperature setting see instruction manual.

## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting by turning the water temperature dial clockwise (↻) to its lowest temperature setting (with arrow on dial) as shown. **DO NOT FORCE.**  

2. Turn gas control knob clockwise (↻) to "OFF" position. Knob cannot be turned from "PILOT" to "OFF" unless knob is depressed slightly. **DO NOT FORCE.** (Figure 6)
3. Replace outer door (if removed).

# Troubleshooting

## Fault Finding Chart

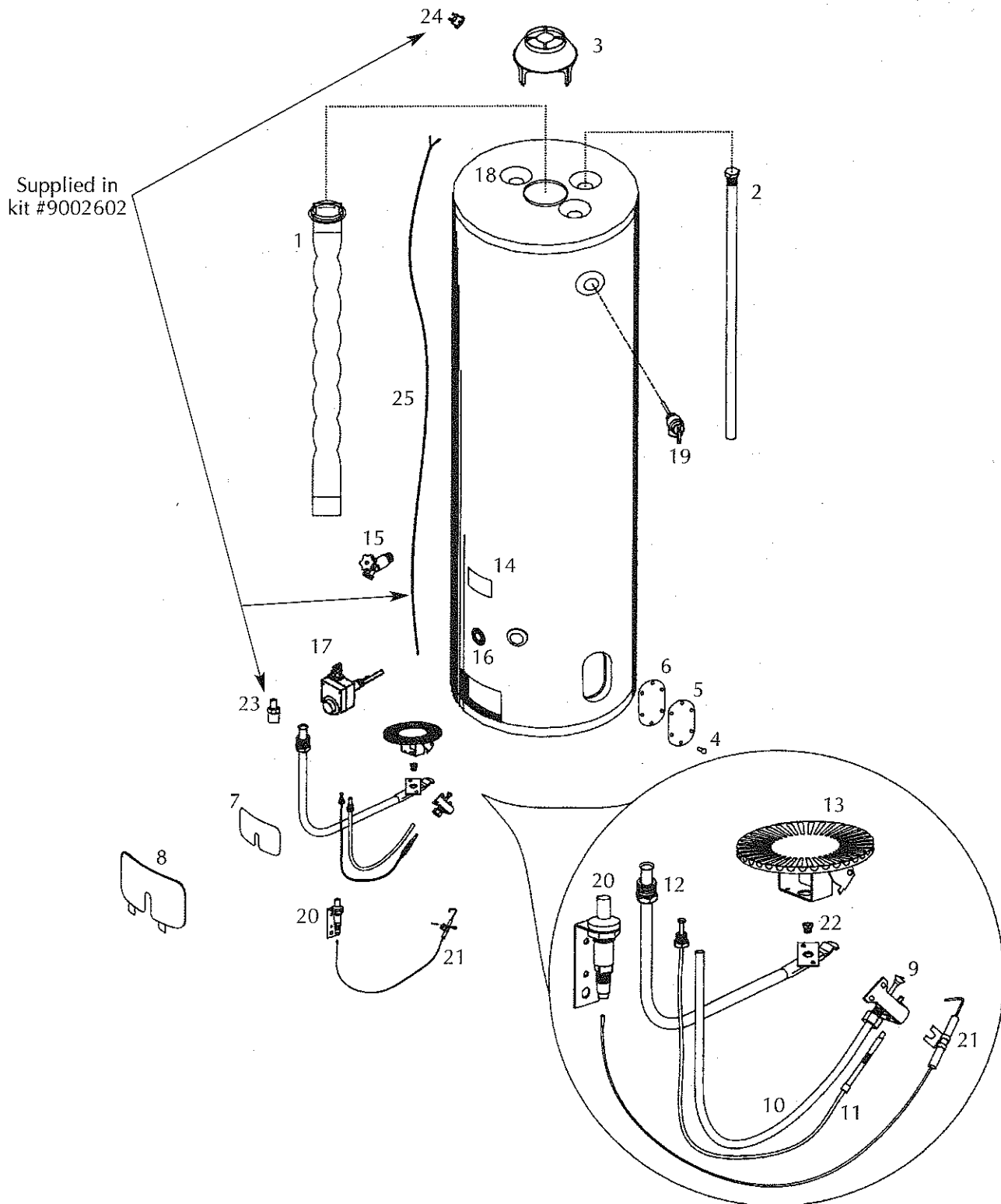
CONDITION	CAUSE	REMEDY
Unable to light pilot	Gas valve tap not correctly positioned	Turn to pilot position Depress knob fully
	Pilot injector clogged	Clean or replace
	Pilot Tube pinched or clogged	Clean, repair or replace
	Air in gas line	Purge air from gas line
Pilot does not remain alight when button is released	Loose thermocouple	Tighten connection at control valve
	Defective thermocouple	Replace
	Defective magnet in control valve	Replace control valve
	Thermocouple too tight	Remove and tighten by hand
	Dirt in pilot injector	Clean injector
	Too much draught	Provide shielding or reduce draught
	E.C.O. open with water at normal temperature	Replace control valve
Main burner will not ignite	Tap on gas control valve not turned to "ON" position	Turn control valve tap to proper position
	Thermostat out of calibration	Replace gas control valve
Pilot goes out	Low gas pressure	Turn off until gas pressure is corrected
	Draught or downblow	Check that the flue system is clear and the terminal unaffected
	Pilot tube leak	Check and tighten or replace if necessary
	Pilot flame too small	Check/clean pilot injector
	Thermocouple defective	Replace/tighten
Flame too large	Burner pressure set too high	Replace gas control valve
	Defective governor	Replace gas control valve

# Troubleshooting (cont'd)

## Fault Finding Chart

CONDITION	CAUSE	REMEDY
<b>Noisy Flame</b>	Noisy pilot	Change pilot assembly if necessary
	Burr in injector	Remove burr or replace injector
	Too much gas	Replace gas control valve
<b>Yellow tipped flame</b>	Clogged burner ports	Clean burner ports
	Clogged flue system	Remove debris and instruct user of danger of this
	Gas pressure too high	Change gas control valve
<b>Not enough hot water</b>	Heater undersized	Advise user of inadequacy
	Water flow rate inadequate	Ball valve stuck. Cold feed valve not fully open
	Low gas pressure	Check gas supply pressure and manifold pressure
<b>Heater Sooting</b>	Insufficient air supply	Check that air openings are to correct size and increase if necessary
	Negative air pressure at water heater area causing downblow due to incorrect terminal location	Resite terminal
	Too much gas	Replace gas control valve and/or burner injector
	Flue blocked	Check flue baffles and flue system and clear
	Inadequate servicing	Advise user of need for regular or more frequent servicing

# Repair Parts



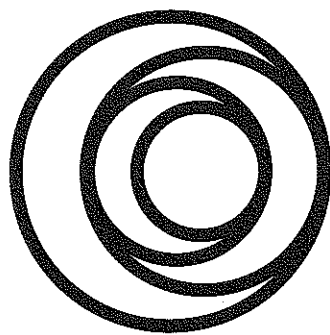


# Repair Parts (cont'd)

KEY NO.	PART DESCRIPTION	PART NUMBER
1	Flue Baffle	9002383
2	Anode	9000734
3	Draught Diverter	9002376
4	Inspection Cover Bolt	9000928
5	Inspection Cover	9000927
6	Inspection Cover Gasket	9000926
7	Inner Door	9000369
8	Outer Door	9000454
9	Pilot (Nat)	9000285
9	Pilot (LPG)	9000287
10	Pilot Tube w/Fittings	9001665
11	Thermocouple	9001675
12	Manifold (Nat)	9001673
12	Manifold (LPG)	9002141
13	Main Burner (Nat. and LPG)	9000298
14	Data Badge	—
15	Drain Valve	9000469
16	Cold Water Inlet Nipple	9002386
17	Gas Control Valve (Nat)	9002173
17	Gas Control Valve (LPG)	9002172
18	Hot Water Outlet Nipple	9002385
19	Temperature/Pressure Relief Valve	9002380
20	Piezo Ignitor	9001940
21	Piezo Electrode	9002105
22	Orifice (Nat)	0230208 Drill #3.8mm
22	Orifice (LPG)	0230246 Drill #2.45mm
23	Adapter	9002357
24	Spill Switch	9001962
25	Wiring Harness—Spill Switch	1390023

# Notes

# Notes



**state**  
WATER HEATERS

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