

Water Heater / Combi Boiler

Design Installation and User Guide



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October 2001

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BRIEF HEATER SPECIFICATION

The range of water heaters consists of one atmospheric gas model, two heaters with either forced draught burners (oil or gas firing) or fully pre-mixed gas. Pre-mixed versions have the advantage of room sealed operation, see page 12. The heaters with gas burners are suitable for firing natural gas (G20) from an inlet pressure to the appliance of 17.5 mbar and have a conventional flue and the atmospheric gas model has an integral draught diverter. For oil firing the heaters are suitable for 35 Second Class D heating oil and 28 second Kerosene, For other fuels contact The Beeston Technical Department for Information.

The heater is 80 % efficient heat into water on the gross calorific value (88 % on the nett calorific value) and is suitable for direct generation of domestic hot water on open vented, with sufficient head, or direct mains systems and can also be used as a combi unit supplying central heating pressurised sealed systems only.

Table 1

MODEL	MAXIMUM CONTINUOUS OUTPUT	
	L / Hr at 54 C	L / Hr at 60 C
WHA 630	634	651
WHF 1250	1250	1088
WHF 1750	1750	1588
WHG 1250	1250	1088
WHG 1750	1750	1588

The heaters consist of an 18/12 (304) stainless steel corrugated inner tank that is totally surrounded by an outer jacket that contains the primary water. Due to this unique design heat transfer takes place over the whole surface of the inner secondary tank and so eliminates hot spots and the build up of scale. As the secondary inner tank is corrugated it also flexes and even in the hardest water areas scale breaks up and is simply flushed through.

The atmospheric heater is supplied with pelzo igniter and thermoelectric controls and the pressure jet burner models have full automatic ignition and burner lockout and high limit thermostat trip are available as 240 V signals. All versions have a thermometer and pressure gauge, control and high limit thermostats and are supplied with a drain cock on the primary side. All versions have an illuminated on/off switch.

The heaters are insulated with 30 mm of high density C.F.C free polyurethane insulation and the whole encased in an enamelled steel jacket.

The heaters come complete with an expansion vessel and safety valves and quick fill loop on the primary side. A Grundfoss primary circulating pump is included to further aid heat transfer. All electrical connections to burners are by plug and socket.

Direct mains connection kits, pump overrun timers and volt free contacts are available as optional extras.

For Direct Mains connection for domestic water it is the Law that Planning Approval is obtained from the Local Building Control Officer.

These units when fitted with gas burning equipment are CE Marked to the following documents :-
 Gas Appliance Directive
 Low Voltage Directive
 Electro Magnetic Compatibility Directive

SHIPPING CONTENTS

All heaters are shrink wrapped onto one pallet.

DESIGN CONSIDERATIONS GENERAL

The installation of the boiler must be in accordance with the following regulations :-

National Building Regulations

Local Building Regulations

The Building Standards (Scotland) (Consolidation) Regulations

I.E.E Regulations 16 th Edition

Local Water Byelaws

Local Gas Service Area Recommendations

Local Authority Recommendations

BS5440 Pt 1 1978 Flues

C.I.B.S.E I.H.V.E Guide Part A, B and C.

BS5440 Pt 2 1976 Air Supply.....

BS6644 1991 Specification for the installation of gas fired hot water boilers of rated input between 60 kW and 2 MW.

CP342 Pt 2 1974 Code of practice for centralised hot water supply - buildings other than individual dwellings.

British Gas Publications :-

IM/2 Purging procedures.....

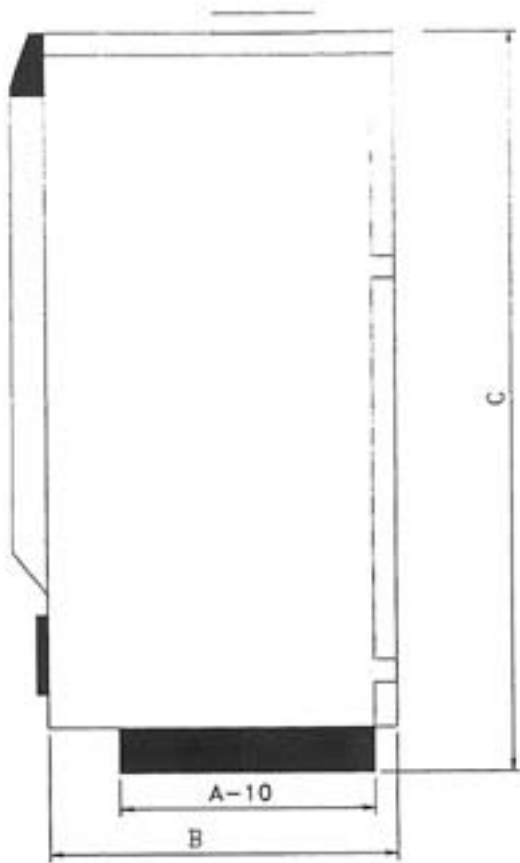
IM/5 Soundness testing

IM/16 Installation of gas pipe work and boosters

Health and Safety Executive Guidance Note PM5 - Automatically controlled steam and hot water boilers.

BEESTON HEATING DIRECT FIRED WATER HEATER WH RANGE

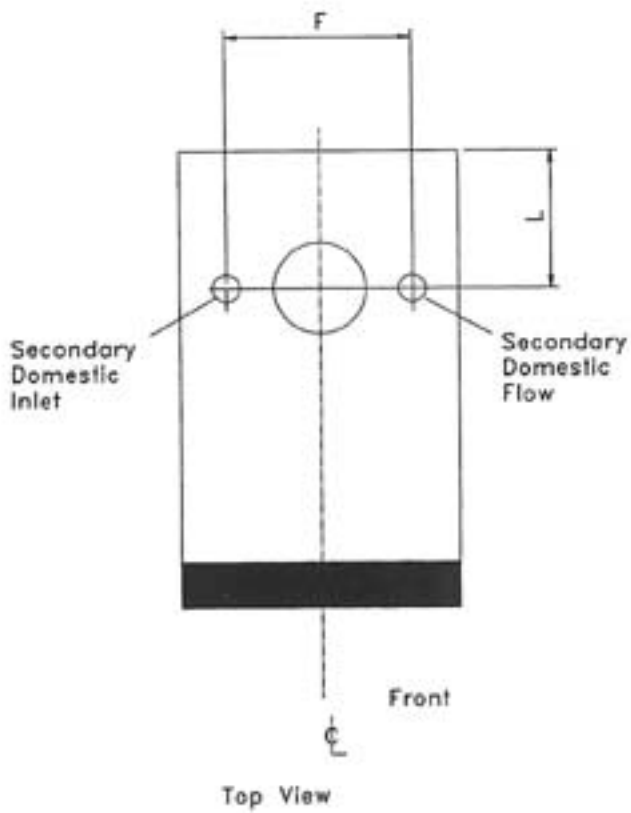
Fig 1 General Dimensions



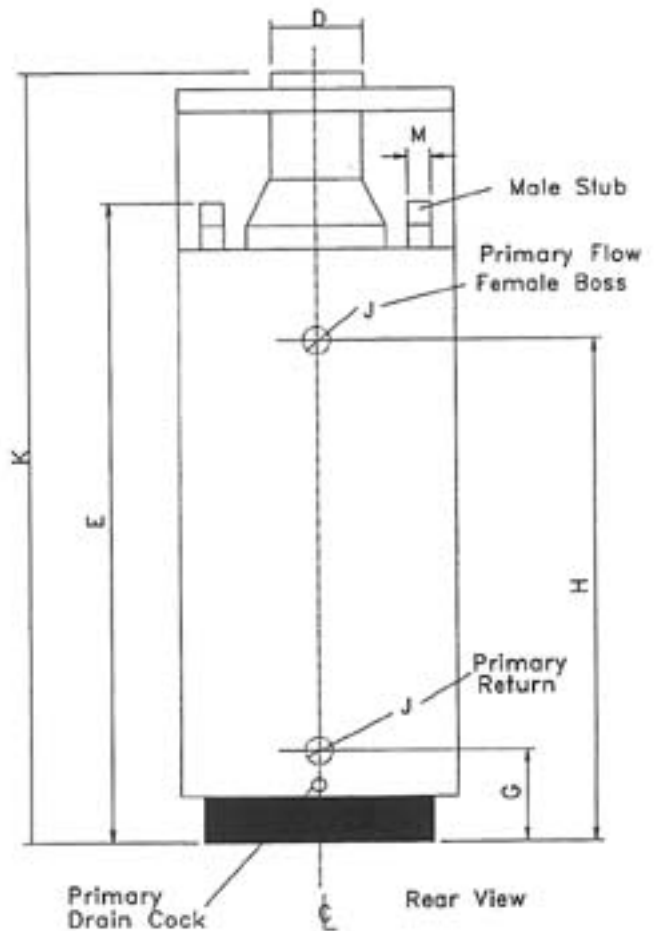
Right Hand Side View



Front View



Top View



Rear View

Table 1 Technical Data

Model	Heater Output kW	Max Continuous Water Output l/h		Burner Input kW	Fuel Rate		Primary Flue Gas Volume l / s @ S.T.P	Ventilation to BS6644			
		@ 54 C	@ 60 C		Gas cu.m / h	Oil kg / h		Low sq.cm	High sq.cm	Mechanical Inlet l/s	Extract l/s
WHA630	37.5	634	558	46.5	4.34	-	19	540	270	45	18
WH1250	63	1250	1098	78.2	7.29	7.42	35	630	315	72	48
WH1750	92	1750	1544	114.2	10.65	10.93	49	776	388	101	68

Model	Secondary Hydraulic Resistance Pa					Recovery time From 10 C Inlet In Minutes To:-		Flue Draught Required 0.5 m Above Flue Socket - Pa.	Weight Empty Kg	Secondary Storage litre	
	Continuous Output @ 54 C		Continuous Output @ 60 C		Peak Output For 10 minutes @ 450 l / 10 min	54 C	60 C				
	l/h	Pa	l/h	Pa	Pa						
WHA630	634	160	558	130	279	1700	25	30	5	190	85
WH1250	1250	600	1098	500	369	2700	13	15	10	220	85
WH1750	1750	790	1544	350	668	2300	14	18	15	320	191

Table 2 Burner Details

Model	Burner Type	Start Current A	Run Current A	Motor Power W	Fuse Rating A	Fuel Nozzle Size	Fuel Pressure	Fuel Conn' in. BSP
WHA630	Atmospheric	-	0.06	-	3	Hole diameter 5.1 mm	12.3 mbar	1/2
WHF1250	R40G10 Oil	2.5	1	180	5	Danfoss 1.5 / 60 / S	175PSI	1/4
WHF1750	R40G10 Oil	2.5	1	180	5	Danfoss 2.00 / 60 / S	190PSI	1/4
WHG1250	R40GS10 Gas	3	0.9	140	5	Multi hole head	4.1 mbar	3/4
WHG1750	R40GS10 Gas	3	0.9	140	5	Multi hole head	5.7 mbar	3/4
WHG1250	Blockgaz BG60	3	0.9	32	5	Pre-Mixed	7.0 mbar	3/4
WHG1750	Blockgaz BG100	3	0.9	37	5	Pre-Mixed	8.2 mbar	3/4

Table 3 Dimensions

MODEL	A	B	C	D *	E	F	G	H	J	K	L	M
WHA630	540	657	1690	155	1513	390	281	1179	1 1/4"	1705	270	3/4"
WH1250	540	538	1695	148	1583	390	281	1379	1 1/2"	1710	271	3/4"
WH1750	680	680	2093	198	2034	390	281	1609	1 1/2"	2090	340	1"

* The flue dimension " D " is the external diameter and for the WHA630 will act as a socket and accept 150 mm nominal size flue pipe and for the other models acts as a spigot to accept 150 mm and 200 mm nominal size flue pipe over it. The flue should be designed in accordance with Table 4 Flue Systems.

Table 4 Flue Systems

Flue Height	Minimum Flue Dia (mm) for gas and oil models :-		
	WHA630	WH 1250	WH1750
5 metre	153	280	330
10 metre	153	240	280
15 metre	153	210	250
Draught Stabiliser diam	n/a	180	200

For special flue requirements it is advisable to contact The Beeston Technical Dept for advice and sizing.

LOCATION

The heater should be situated on a level concrete non-combustible plinth typically of minimum height 50 mm and capable of supporting the weight of the full boiler in accordance with the Standards called up under Design Considerations. The minimum clearances are:-

Sides 100 mm
Rear 150 mm
Front 500 mm
Top 700 mm

and should be observed for assembly and maintenance and combustible material should not be located near the heater.

If a pair of heaters are installed then the minimum clearance between them does not need to be doubled as a single clearance is satisfactory.

WATER CIRCULATION SYSTEMS

The heater is suitable for direct domestic hot water supply off the secondary side and also for central heating off the primary side at pressures between 1 and 3 bar.

The secondary flow and return connections must be made as given in fig. 1 only and the flow is on the right hand side looking from the front. Domestic secondary returns should be teed into the cold feed. Biral Bronze secondary recirculation pumps are available from Beeston Heating, please contact the Beeston Heating Technical Department for sizing etc..

If the primary connections are used to provide central heating the minimum water flow through the heater is equivalent to a 25 K temperature rise across the heater at full output.

For satisfactory operation when using the boiler to provide central heating the pressure including any effect from the circulating pumps must not be less than 1 bar.

The quick fill loop and the safety valve from the original primary sealed system can be retained but the expansion vessel prefitted will generally be too small for a sealed system and should be replaced with a larger capacity vessel.

A conventional open system may be fitted to the primary system but a safety valve must always be fitted to the heater and the minimum primary pressure must be 1 bar.

The control thermostat has an adjustable range 0 to 90 C and would normally be set to 80 C or above. A locking clip is available to order to lock this thermostat at the required temperature.

Before installation of the heater for central heating the system should be cleaned and flushed and a reputable specialist consulted for the correct water treatment of the system and best practice observed. If site conditions dictate the provision of sludge traps and strainers should be considered.

Suitable water treatments are :-

Sentinel X100 manufactured by Grace Dearborn Ltd.
Copal manufactured by Femox Ltd.

The standard heater does not contain Aluminium.

GAS SUPPLY

The installation must be in accordance with the regulations given under Design Considerations General.

The local gas supply authority should always be contacted at the design stage to ensure that an adequate supply is available.

An existing service pipe must not be used without prior consultation with the local gas supply authority and the supply must be made through a suitable meter.

The heaters require a minimum inlet gas pressure at the boiler gas inlet of 17.5 mbar (7.0 in.wg).

FLUE

The installation must be in accordance with the regulations given under Design Considerations General.

The nominal size should not be less than that of the heaters flue connection socket and the flue must be self supporting as the draught diverter is non load bearing.

The flue height must be at least equivalent to a vertical height above the boiler of 2 m and due allowance being made for any horizontal runs and bends. There should be a vertical section of at least 0.6 m before the first bend.

The flue gas volumes given in table 1 for the primary flue are only approximate and will depend on the site conditions.

A flue should be designed to give a draught of 5,10 or 15 Pa about 0.5 m above the heaters flue socket as given in Table 1.

A quick release flue connection about 0.6 m above the unit is required to service the flue ways from above.

The flue must be in accordance with Table 4 page 5.

VENTILATION

The installation must be in accordance with the regulations given under Design Considerations General.

For natural ventilation grilles with the minimum free areas as given in table 1 which are based on BS6644 for a single heater should be provided at high and low level. These figures are for gas firing but are suitable for oil fired units as well.

For exposed boiler houses grilles should be provided on two or more external walls and care should be taken in siting boilers so that they are not affected by adverse draughts or situated next to powerful fans or other such equipment.

For underground boiler houses or those where communication with the outside is not possible then mechanical ventilation may be used. Volumes of air for mechanical ventilation are given in table 5 for a single boiler and are based on BS6644.

For mechanically ventilated boiler houses it is possible to have mechanical inlet air at low level and natural extract air at high level and all volumes and grilles should be designed on the values given in table 5.

It is not allowed to have natural inlet air and mechanical extract.

In all cases of mechanical ventilation the fans should be interlocked so that the boiler will not run unless the fans are running.

ELECTRICAL CONNECTION

1 The main electrical supply should be taken from a fused isolator having a minimum contact separation between the poles of 3 mm and taken through the 20 mm electrical conduit to the 6 way plug on the back of the control panel (remove jacket top panel to access 6 way plug and socket, top panel is ball stud fixing).

2 All wire should be suitable for a service temperature of 70 C and a load of 10 Amp and have a minimum cross sectional area of 1.0 mm².

All electrical installations should be in accordance with I.E.E Regulations.

WARNING

THIS APPLIANCE MUST BE EARTHED

ELECTRICAL SAFETY CHECKS

Carry out the following electrical safety checks using a multimeter. (Do not use a PAT Tester on the pressurejet models as you could damage the electronics and they give false readings).

EARTH CONTINUITY CHECK

1 Appliance must be electrically disconnected from the mains.

2 Set the meter to Ohms X 1 scale and zero if necessary.

3 Measure resistance between the earth connection point in the boiler control panel and the earth contact point in the supply junction box or the earth pin on the 3 way plug if this is being used.

4 If the resistance is greater than 0.1 Ohm check all earth wires and connections for continuity and that they are clean and tight and rectify as necessary.

SHORT CIRCUIT CHECK

1 Appliance must be electrically disconnected from the mains and all appliance switches set to " ON " including the thermostats.

2 Set the meter to the Ohms scale X 1 and measure the resistance between the Live (1) and neutral (2) terminals in the boiler control panel. If the meter reads zero then there is a direct short circuit and a fault that should be rectified.

3 Set the meter to the Ohms X 100 scale and measure the resistance between the Live terminal (1) and the earth block in the boiler control panel.

If the meter reads less than infinity then there is a fault that requires rectifying.

POLARITY CHECK

Connect the appliance to the mains supply and set the meter to AC volts by 300 V scale.

1 Measure the voltage between the Live (1) and Neutral (2) terminals and check that the voltage measures approximately 240 V.

2 Measure the voltage between the Live (1) and earth block and check that the voltage measures approximately 240 V. When doing this if earth fault detection equipment is installed in the distribution board you may well trip it on some types of multimeter.

3 Measure the voltage between earth and Neutral (2) and check that the voltage measures less than 15 V.

RESISTANCE TO EARTH CHECK

The appliance must be disconnected from the mains supply and all switches including the thermostats set to "ON".

1 Set the meter to the Ohms X100 scale.

2 Measure the resistance between the Live (1) and the earth block . The reading should be infinity and if there is any other reading then there is a fault which should be isolated and rectified.

FLUE CONNECTION

The flue sockets are sized to accept single skin flue pipe of the nominal size or Selkirk boiler flue socket to twin wall adaptors with a small gap of a few millimetres for caulking with silicone sealant.

The height of the flue must be equivalent to a vertical height of at least 1 metre above the flue outlet, with due allowance being made for any bends, horizontal runs or flue terminals etc.

A vertical rise of at least 600 mm is recommended between the flue socket and the underside of a header or the first bend. A quick release piece must be included to allow maintenance from above.

The overall flue system when being designed should allow for a negative pressure in the flue about 0.5 m above the boiler flue socket of 5,10 or 15 Pa when hot as given in Table 1 and generally to table 4 page 5.

The boiler flue socket is non load bearing and the flue system should be supported independently.

FITTING PRESSURE JET BURNERS

1 Fit the burner to the burner mounting plate using the gasket and screws supplied with the burner.

2 The tip of the burner draught tube should just project through the inner tank and into the combustion chamber proper.

3 On oil fired burners the correct oil nozzle as given in Table 2 and supplied with the burner should first be fitted along with the flexible oil hose.

4 On gas fired burners the gas train should be fitted in accordance with the burner manufacturers instructions using a suitable gas jointing compound if necessary and the soundness of the installation checked.

A union and service gas cock should be fitted by the installer to allow removal of the burner for servicing.

5 The lead with a 7 way plug should be connected to the burner 7 way socket which is pre wired. The lead should be routed out of the bottom right hand corner, NOT out of the burner mounting plate as this area gets very hot.

GAS CONNECTION

A suitable size of gas supply pipe should be run between the boiler and the gas meter which in any case will not be smaller than the gas connection size to the boiler. A union and gas isolating cock should be provided between the boiler and the incoming supply so that it is possible to isolate the gas supply and remove the complete boiler burner assembly if ever required. The inlet connection should be made to the front bottom right hand of the boiler and the incoming supply pipe should be independently supported so that it does not put strain on the burner assembly. For correct operation of the boiler an inlet gas pressure to the boiler or boilers of 17.5 mbar (7.0 in.wg) should be available when all boilers are running. All dirt, swarf etc should be removed from the gas supply lines before final installation is made. The gas installation should be tested in accordance with the purging and testing procedures as described in BS6644.

MAKING OIL CONNECTION

1 The oil supply should be made to the oil pump inlet as shown in the burner manual using the flexible pipe provided. A single pipe oil supply from the tank is normally sufficient providing there is a small positive head in the oil supply pipe. For other installations a two pipe oil supply system should be provided as given in the burner manual.

2 The installer should provide a suitable oil filter and oil isolating valve.

MAKING DOMESTIC HOT WATER CONNECTIONS

1 Make the secondary domestic hot water connections to the 3/4" or 1" connections on top of the unit using materials and jointing compound suitable for drinking water.

2 Ensure that it is still possible to remove the flue connection and the top panel to clean the flueways.

3 For multiple heater installation schemes it is possible to connect the secondaries in series or in parallel depending on whether temperature or volume are the critical factor when volume flows that far exceed the normal design conditions are experienced.

In all cases a secondary recirculation system should be incorporated.

4 If the secondary pressure is greater than 6 bar a pressure reducing valve should be provided and set to 4.5 bar and a safety valve which should be set to 8 bar.

DIRECT MAINS CONNECTION

1 The unit is suitable for Direct Mains Connection but this should only be done after consulting the Local Water Authority and it is the Law that Planning Permission is obtained from the Local Building Control Officer before installing a direct mains system.

2 Fig 8 and 9 show the installation of a Direct Mains Kit that is available as an optional extra. The pressure valves should be set up as per the instructions packed with them and all fittings eg tees and elbows should be supplied by the installer and suitable for drinking water.

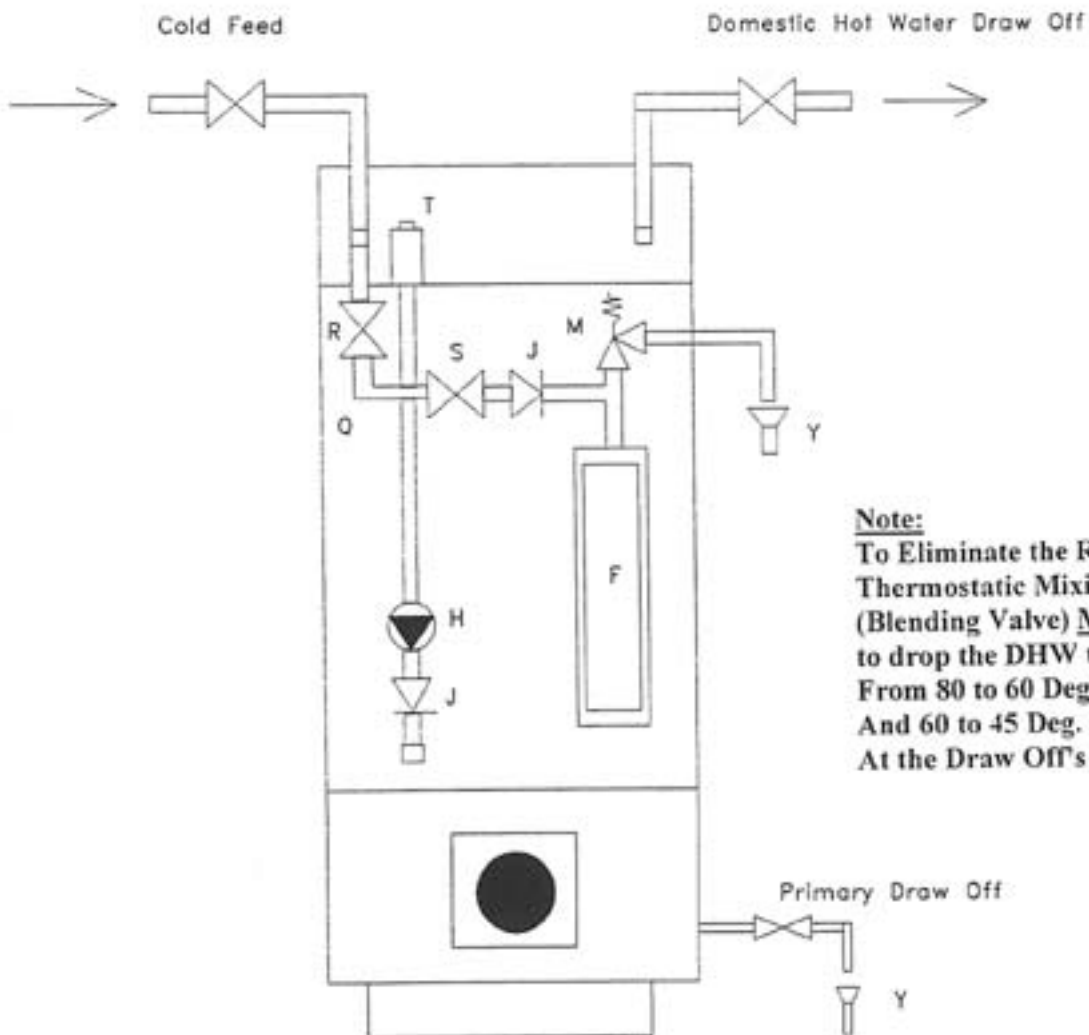
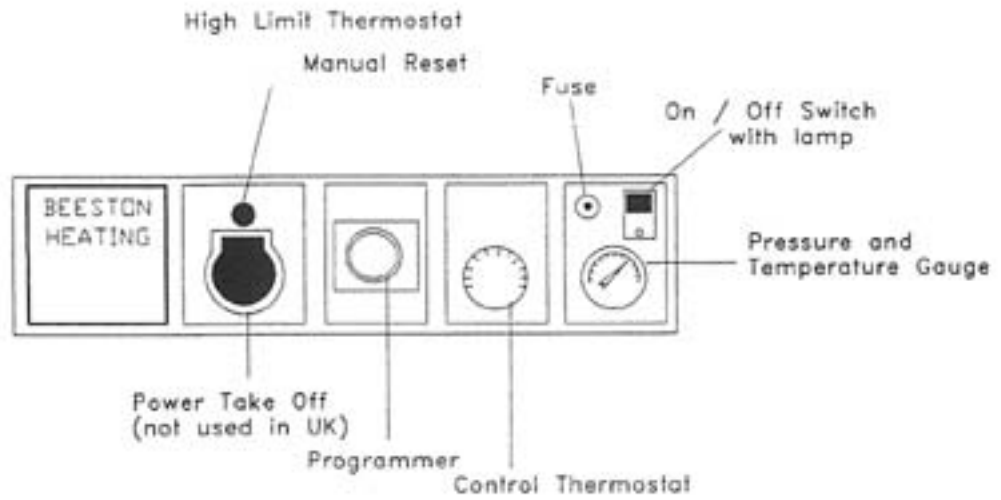
FILLING THE PRIMARY VESSEL

- 1 Fit the drain cock to the primary vessel.
- 2 Plug off the two primary connections on the rear of the primary vessel if they are not going to be used to provide heat to another unfired vessel or a central heating circuit.
- 3 Fill and vent the domestic hot water circuit by opening the taps and running the circulating pump if one is fitted.
- 4 Pressure the primary circuit as follows :-
 - a) Open valves R and S watching the pressure gauge E.
 - b) When the pressure reaches 1.0 bar close valve R and purge of air using the air vent T.
 - c) When complete close the air vent T and repressurise using valve R until the pressure reaches 1.0 bar again.
 - d) Check the operation of the safety valve by twisting the cap to operate manually.
 - e) Finally repressurise and check that the pressure is 1.0 bar and close valves R and S.
 - f) Totally disconnect the flexible quick fill pipe Q.

CONNECTING PRIMARY HEATING CIRCUITS

- 1 The primary circuit pressurisation equipment as supplied prefitted to the unit is suitable only for the volume of the primary vessel at 1.0 bar cold fill.
- 2 For larger volume circuits at higher pressures all of the equipment on the primary vessel should be replaced with equipment suitable for the new temperature and pressures.
- 3 Alternatively a suitable conventional open system may be used provided the minimum pressure is 1.0 bar and the maximum pressure is 3.0 bar.
- 4 In all cases the primary vessel circulating pump should be left in position as it is essential for the correct heat transfer into the secondary vessel.
5. The standard pressure relief valve fitted to the primary vessel is preset to 3.0 bar. The maximum hot operating pressure of the primary vessel is 3.0 bar and it is pressure tested at works to 4.5 bar.
If it were to be used at 3.0 bar then an alternative safety valve would need to be fitted and set to 3.5 bar.

Fig 3 Controls And Primary Loop



Note:
 To Eliminate the Risk of Scalding
 Thermostatic Mixing Valve
 (Blending Valve) Must be Fitted
 to drop the DHW temp.
 From 80 to 60 Deg. C
 And 60 to 45 Deg. C
 At the Draw Off's

- F Expansion Vessel
- H Primary Pump
- J Non Return Valve
- M Safety Valve Primary Circuit
- Q Flexible Quick Fill Pipe
- R Isolating Valve
- S Isolating Valve
- T Air Vent
- Y Tundish

Fig 3 Pilot Burner And Electrode Setting On WHA630 Atmospheric Burner
(Earlier models had a different pilot arrangement)

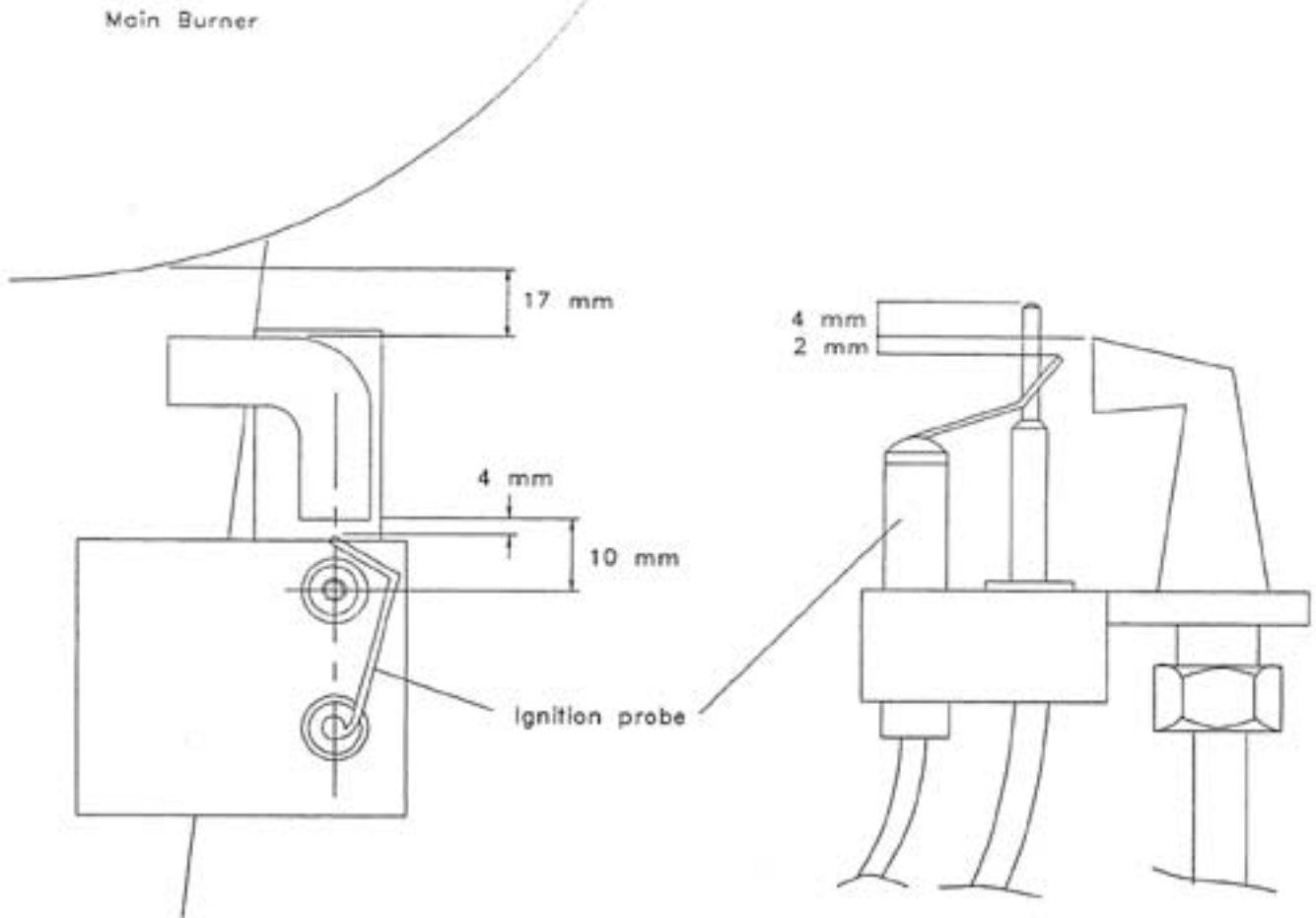
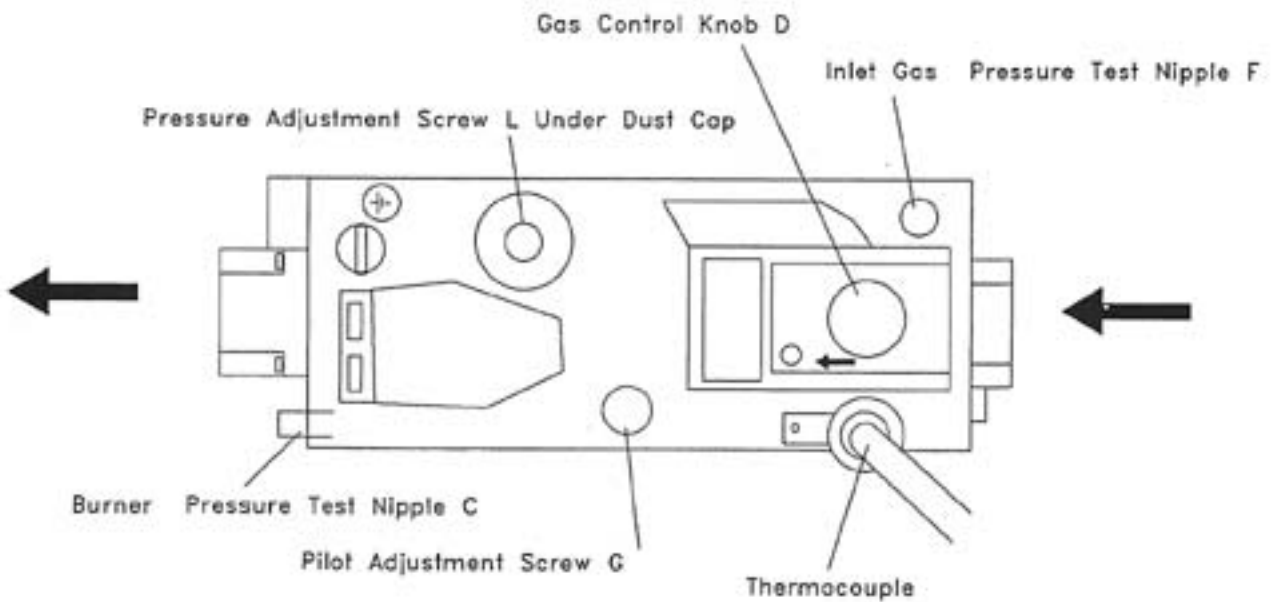


Fig 4 WHA630 Gas Control Valve
(Earlier models had a different valve)



COMMISSIONING WHA630

Electrical: Before commencing ensure that the electrical supply is turned off and that all electrical connections are correctly made and that the appliance is earthed.

Gas Supply: Before commencing check that the gas supply is purged of air and that the gas connections are sound and that the boiler gas cock is off. Ensure that the gas supply is turned on at the meter.

Water: Before commencing ensure that primary system has been filled and that the primary pressure is 1.0 bar and that the quick fill flexible pipe has been removed. If the primary system is also being used for central heating check that the system is filled, that pumps are operating and that the system pressure is at least 1.0 bar and that any isolating or any other valves on the system are open. Check that the secondary side is full of water by running off water from the taps and checking that any inlet valves are open.

Pressure: The primary vessel is fitted with a pressure switch factory set to 0.8 bar and the heater will not run unless the unit has been correctly precharged to 1.0 bar.

1 Ensure that the on/off switch on the heater control panel is turned off and that the gas supply is turned ON at the meter and at the heaters own gas cock.

2 Loosen the screw in the burner test nipple C located on the outlet of the gas valve and fit a manometer to measure the gas pressure.

3 Open the pilot viewing port so that the pilot can be seen. Fully depress the green gas control button D on top of the main gas valve and at the same time press the button on the peizo igniter two or three times. The pilot should light and the knob should be held fully depressed for a further 20 seconds. Release the knob and check that the pilot remains alight. If the pilot flame has gone out release the knob and wait three minutes before trying to relight the pilot.

If the pilot is burning and you want to put it out then press the green control button to the left as shown by the arrow and the pilot will then go out.

Note: On initial light up or after prolonged shut downs the pilot may require several attempts to light it due to air in the gas supply pipe.

4 With the pilot flame established check that the flame covers the top 10 to 12 mm (1/2") of the thermocouple tip. If necessary adjust the pilot flame by turning the pilot adjustment screw G (see Fig 5) clockwise to reduce the flame and anticlockwise to increase it.

5 Close the pilot viewing port. Set the control thermostat to 68 C and turn on the electricity, on/off switch time clocks etc and the main burner should light. The main gas valve is fitted with a slow opening solenoid and it will take several seconds to fully open.

6 After 10 minutes of running check the main burner pressure to the value given in Table 2 and adjust if necessary (See Fig 5) by turning the adjuster L clockwise to decrease the pressure and anticlockwise to increase it.

7 Check the inlet gas pressure at test point F is typically 17.5 m.bar (7.0 in.wg) and remove the pressure gauge and tighten all test point sealing screws.

8 Switch OFF the electricity and check that the main burners are extinguished. Turn off the pilot and check it goes out by pushing the green gas control knob down and to the left.

9 Test for gas soundness around joints as described in BS6644 and British Gas Publication IM 5. These documents give the correct procedure which is to pressurise the gas pipe work system and look for a loss of pressure with a suitable manometer.

Soap solution or ultrasonic leak detectors are not suitable to prove that pipe work is sound, only to find the point of the leak when a pressure test shows there is one.

10 Check that there is no spillage of flue products from the draught diverter. A suitable test is detailed in BS5440 Pt 1.

This test procedure uses a cold polished steel plate with which spillage is detected by the condensation of the fumes on the cold surface. In practice smoke matches or smoke bombs are used to check that all of the smoke is pulled into the boiler or up the flue and that there is no spillage back out again.

11 Set the control thermostat to the required setting which would normally be 63 C to achieve a domestic hotwater flow of 54 C or 68 C to achieve a domestic hot water flow of 60 C.

LEGIONELLA:

The complete domestic hot water system and the secondary recirculation system should always be commissioned so that the temperature of the stored water is at or above 60 C.

Note:

To Eliminate the Risk of Scalding
Thermostatic Mixing Valve
(Blending Valve) Must be Fitted
to drop the DHW temp.
From 80 to 60 Deg. C
And 60 to 45 Deg. C
At the Draw Off's

PROGRAMMER

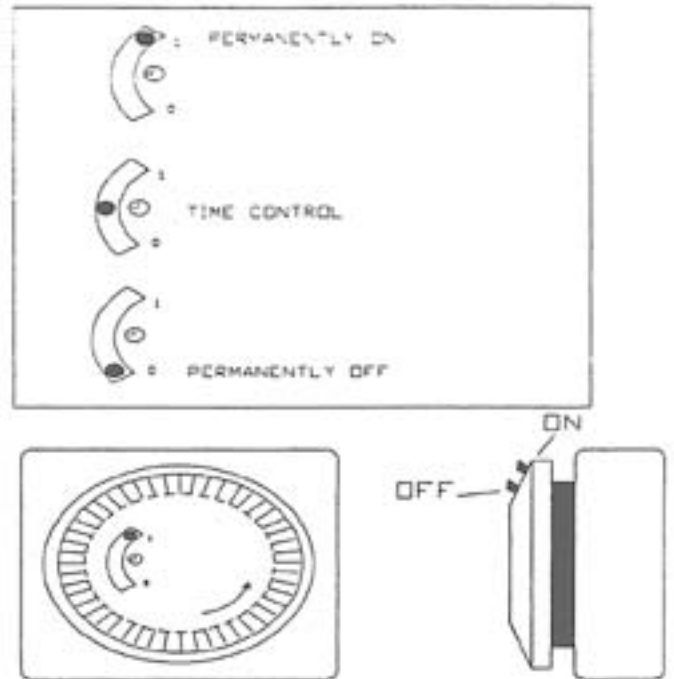
This unit is fitted with a built in timer / programmer that is located on the control panel.

The operation of this programmer is very simple and can give several heating periods per day, it is also fitted with an over-ride control or the unit can be set permanently on if requirements for hot water are so.

COMMISSIONING

1. Set the correct time of day by rotating the clock in the direction of the arrow on the unit that has been supplied.
2. Adjust the heating cycles thus :-
 Tappets pushed in - domestic hot water OFF
 Tappets pushed out - domestic hot water ON
3. Over-ride, the unit has a built in over-ride facility

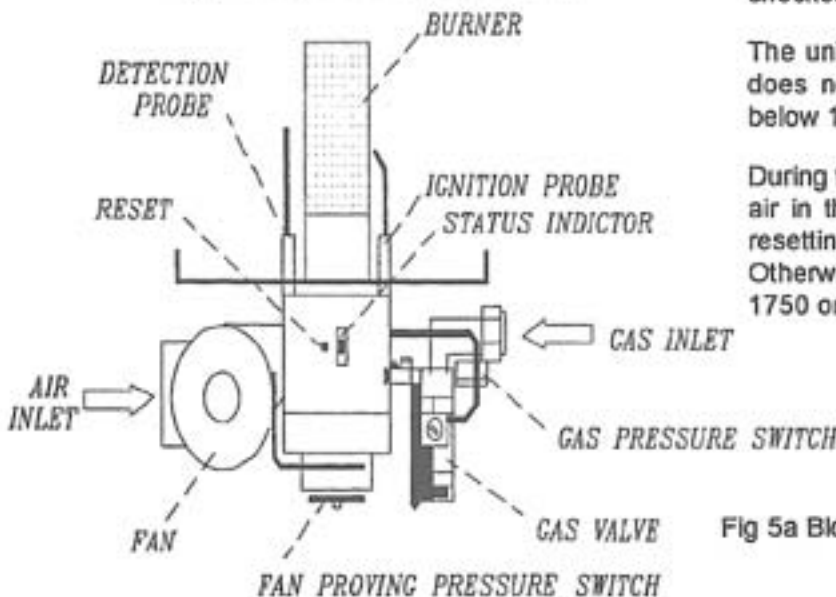
Fig 5 Programmer



BLOGAZ PREMIX BURNER, BG60 & BG100 (WHG1250 & 1750)

This burner is of pre-mix gas air ratio operation. By the reduction of secondary air almost to zero the NOx production of this burner is very low compared to a standard burner.

The unit is also suitable for room sealed operation via a suitable air duct of 100mm outside diameter being fitted into the air inlet, this inlet has pre fitted an EPDM rubber seal for this purpose. maximum length of this duct length would be 2.5 metres with a reduction of 0.5 metres for every 45 deg or 90 deg bend used.



The unit is factory pre set for the application (BG60 for the WHG1250 & BG100 for the WHG1750) and will require the minimum of setting up. Although pre set a full commissioning, combustion and soundness check is always required to ensure the correct and safe operation of the burner.

Typical Co2 values expected in flue gas analysis are around 8.5 to 9% with a trace of Co of up to 50ppm. The burner pressures given on page 9 table 2 are only a guide and the gas rate to the appliance should be checked to correspond with the values given in table 1.

The unit is fitted with a gas inlet pressure switch that does not allow the unit to fire under gas pressures below 15 mbar.

During first commissioning the unit may lock out due to air in the gas line and it may be necessary to keep resetting the burner several times until the air is purged. Otherwise commissioning procedures for the 1250 and 1750 on page 13 should be observed.

Fig 5a Blocgaz Pre-Mix Burner

COMMISSIONING 1250 AND 1750

Electrical: Before commencing ensure that the electrical supply is turned off and that all electrical connections are correctly made and that the appliance is earthed.

Gas Supply: Before commencing check that the gas supply is purged of air and that the gas connections are sound and that the boiler gas cock is off. Ensure that the gas supply is turned on at the meter.

Oil Supply: Before commissioning check that oil is available and that the oil supply has been made through an isolating valve and a suitable filter.

Water: Before commencing ensure that primary system has been filled and that the primary pressure is 1.0 bar and that the quick fill flexible pipe has been removed. If the primary system is also being used for central heating check that the system is filled, that pumps are operating and that the system pressure is at least 1.0 bar and that any isolating or any other valves on the system are open. Check that the secondary side is full of water by running off water from the taps and checking that any inlet valves are open.

Pressure: The primary vessel is fitted with a pressure switch factory set to 0.8 bar and the heater will not run unless the unit has been correctly precharged to 1.0 bar.

- 1 Check that the on/off switch on the heater control panel is off and that the gas or oil service cocks are turned on.
- 2 Check that the correct oil nozzle is fitted as given in Table 2 and fit an oil pressure gauge to the oil pump or a manometer to the burner head for gas burners.
- 3 Commission the oil or gas burner as described in Burner Manufacturers Manual and set the pressures to those given in Table 2.
- 4 Switch OFF the electricity and check that the burner closes down.
- 5 Test for gas soundness around joints as described in BS6644 and British Gas Publication IM 5. These documents give the correct procedure which is to pressurise the gas pipework system and look for a loss of pressure with a suitable manometer.
Soap solution or ultrasonic leak detectors are not suitable to prove that pipe work is sound, only to find the point of the leak when a pressure test shows there is one.
- 6 Set the control thermostat to the required setting which for constant temp/flow rate would normally be:-

Model	DHW Flow 60 C	DHW Flow 54 C
WH1250	86 C	83 C
WH1750	79 C	76 C

LEGIONELLA:

The complete domestic hot water system and the secondary recirculation system should always be commissioned so that the temperature of the stored water is at or above 60 C.

SERVICING WHA630

To ensure continued safe and reliable operation of the heater it should be serviced at regular intervals which will depend on the application and the amount of use that it gets but in any case will be at least once a year.

It is Law that only qualified people can carry out such servicing work eg British Gas or C.O.R.G.I registered companies.

IMPORTANT: Before starting to service the heater turn OFF the electricity supply at the isolator and check that all other incoming feeds eg from time clocks are OFF and also turn OFF the gas at the service gas cock provided by others.

Remove the front door panel.

TO WITHDRAW BURNER ASSEMBLY

- 1 Turn OFF the gas cock on the heater and release the gas union which is part of the gas cock.
- 2 Release the electrical connections from the boiler control panel to the burner assembly by disconnecting the plug and socket. Also pull off the two E.C.O reroute wires from their connections to the thermocouple on the multifunctional gas valve.
- 3 Remove the two screws holding the complete burner front plate to the heater and it is now possible to remove the complete burner assembly by pulling it forward taking care not to knock the pilot burner.

TO CLEAN MAIN AND PILOT BURNERS

- 1 Remove the burner assembly as described above.
- 2 Clean the burner bar by brushing down with a stiff bristle brush and check that the ports are clear, not damaged and that there are no cracks
- 3 Check that the main injectors are clear with a match stick but do not try to clean them with metal tools.
- 4 To clean the pilot burner on all models release the pilot pipe from the pilot burner fitting and from the main valve. Remove the pipe and check that the injector is clear and not damaged. Clean the pilot burner itself with a soft lint free rag. In practice it is not recommended that this is done unless a problem like a poor pilot flame has been found because the olives on the pilot pipe may not seal a second time and the injector itself tends to bind into the body of the pilot burner and you may damage it to get it out.

Examine the thermocouple and if it shows any signs of deterioration or if you believe it may not last another year then replace it.

6 Examine the ignition probe for signs of deterioration particularly of the lead. Check the spark gap is correct (see Fig 4).

TO CLEAN THE HEATER

1 Remove the section of flue directly above the heater that should of been installed with a quick release piece and remove the top panel. Next remove the draught diverter and remove the flue way baffles. also remove the flame baffle situated in the combustion chamber just above the burner.

2 Clean the heater from the top with a suitable brush.

3 Sweep away the debris from under the heater.

REASSEMBLY

1 Reassembly is the reverse paying particular attention to :-

to :-

1 All flue way baffles are in position and the flue correctly reinstalled and gas tight.

2 The combustion chamber baffle is refitted.

3 The pilot injector is correctly fitted and the pilot pipe connections are sound.

4 The main burner is correctly positioned on the injector.

5 The burner assembly is pushed fully home and the two retaining screws are tightened up.

6 The thermocouple connection is tight and sound and that all electrical connections are remade.

7 Test for gas soundness around joints as described in BS6644.

SERVICING WH1250 AND 1750

1 These models are cleaned as per the WH630 but there is no baffle inside the combustion chamber.

2 The burner should be removed and serviced in accordance with the Burner Manufacturers Installation Manual.

3 A gas soundness test should always be carried out after every service and the burner recommissioned.

COMPONENT REPLACEMENT

It is Law that only qualified people can carry out such servicing work eg British Gas or C.O.R.G.I registered companies.

IMPORTANT: Before starting to service the heater turn OFF the electricity supply at the isolator and check that all other incoming feeds eg from time clocks are OFF and also turn OFF the gas at the service gas cock provided by others.

WHA630 BURNER AND GAS CONTROLS

1 Peizo unit- pull off the lead and unscrew the locknut and slide the body away and replace with a new unit.

For the following remove the burner assembly as described under Servicing.

2 Pilot burner and injector- remove the thermocouple locking nut and then the thermocouple.

Undo the pilot pipe cap nut, remove and replace the injector or the complete unit, replace the thermocouple and check alignment.

3 Spark electrode- remove the fixing nut and replace. On reassembly check alignment of the electrode.

4 Thermocouple- unscrew the thermocouple locking nut at the pilot burner and remove. Remove the plastic cover over the gas valve by releasing the screw and lifting away. Unscrew the thermocouple from the gas valve and replace as the reverse of the above checking the alignment of the thermocouple.

5 Main burner injector- unscrew from the manifold and replace using a suitable gas jointing compound.

6 Main burner- remove the pilot assembly, thermocouple and electrode. Release the two screws through the burner plate and lift away the complete burner. Transfer the insulation and protection plate from the old burner to the new one and reassemble. Check the correct alignment of the pilot thermocouple and electrode.

7 Gas valve- Remove the pilot pipe at its fitting. Unscrew the thermocouple and then the thermocouple reroute connector from the gas valve. Disconnect the inlet and outlet flanges. Remove the screws holding the valve fixing bracket. Remove the valve and replace using new seals on the flanges. Reassemble as the reverse of the above and test for gas soundness and recommission the burner.

TANK COMPONENTS

1 Circulating pump- remove the electrical cover from the body of the pump and release the electrical connections noting which goes where. Drain the primary tank. Release the pump from its unions and replace as the reverse of the above paying particular attention to remaking the earth connection correctly and refilling the primary tank as described under commissioning.

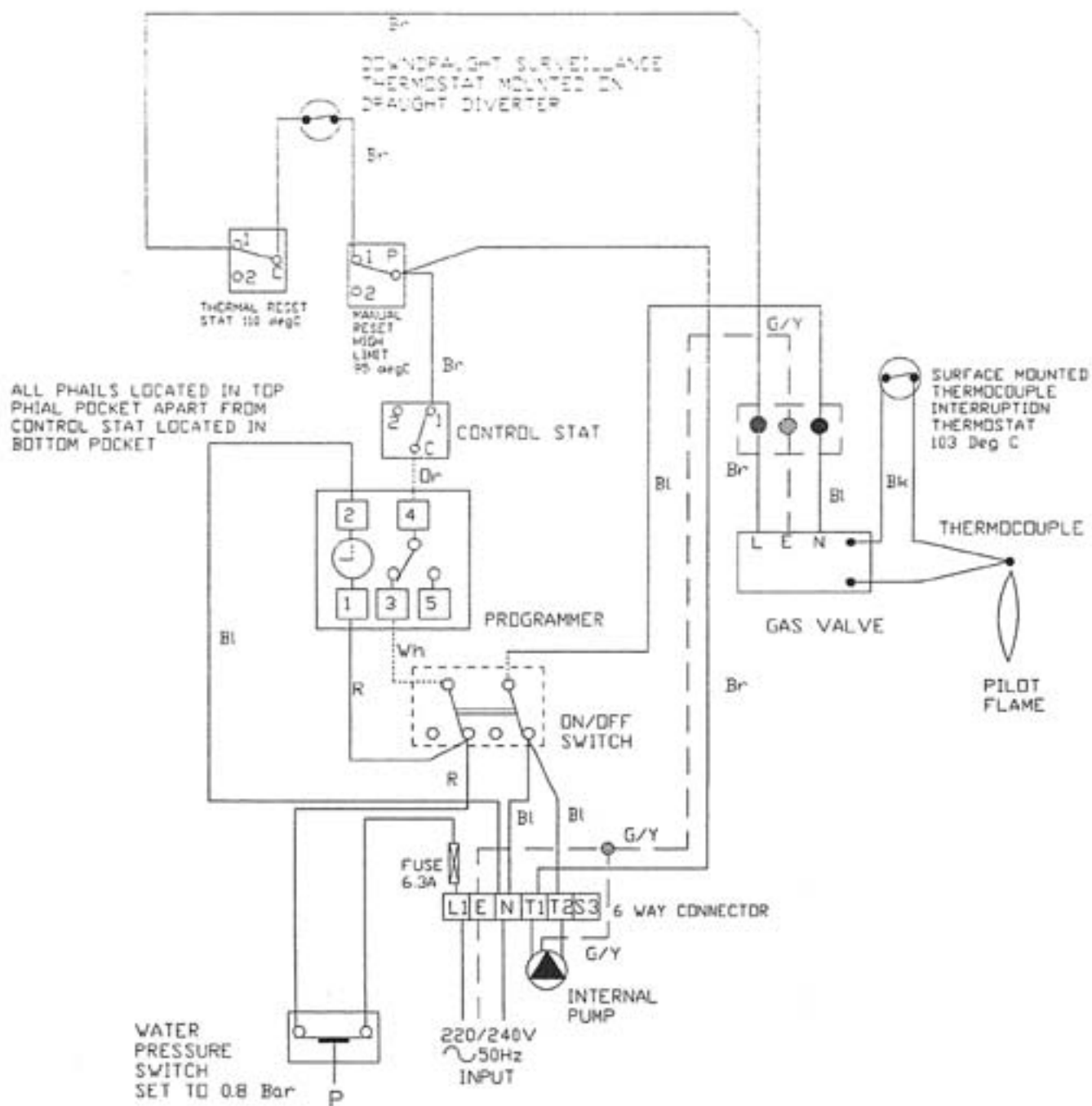
2 Expansion vessel- Drain the primary tank. Release the vessel from its unions and replace as the reverse of the above and refilling the primary tank as described under commissioning. The new vessel should have a precharge of 1.0 bar.

3 Safety valve- Drain the primary tank. Release the valve from its unions and replace as the reverse of the above using a suitable jointing compound and refilling the primary tank as described under commissioning.

4 Primary vessel pressure switch - Drain the primary tank. Release the two electrical connections and remove the pressure switch from its 1/2" B.S.P boss at the top front of the tank.

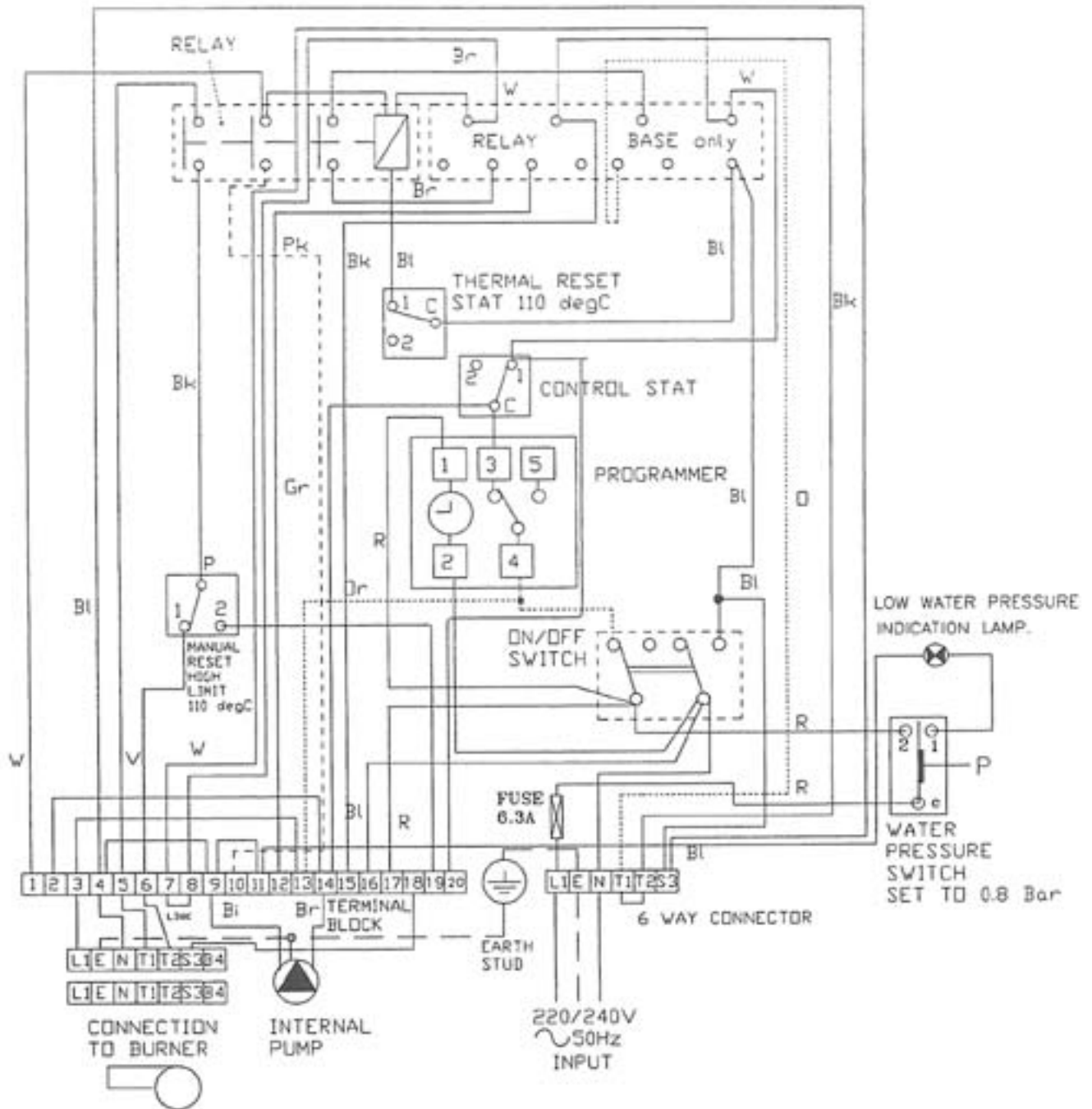
Replace as the reverse of the above using a jointing compound on the switch threads.

Fig 6 WHA630 Wiring Diagram



HIGH LIMIT LOCK OUT SIGNAL CAN BE TAKEN FROM TERMINAL 2 ON THE MANUAL RESET STAT. AN EXTERNAL TIMER ETC. CAN BE USED BY SETTING THE BUILT IN TIMER TO PERMANENTLY OFF, SEE PAGE 12 FIG 5, AND WIRE THE EXTERNAL CONTROL VIA A VOLT FREE CONTACT ACROSS THE TIMER TERMINALS 3 AND 5.

Fig 7 WH1250 And 1750 Wiring Diagram



BURNER LOCK-OUT SIGNAL (230VAC) MAY BE TAKEN FROM TERMINAL 18 INSIDE THE BOILER CONTROL PANEL.

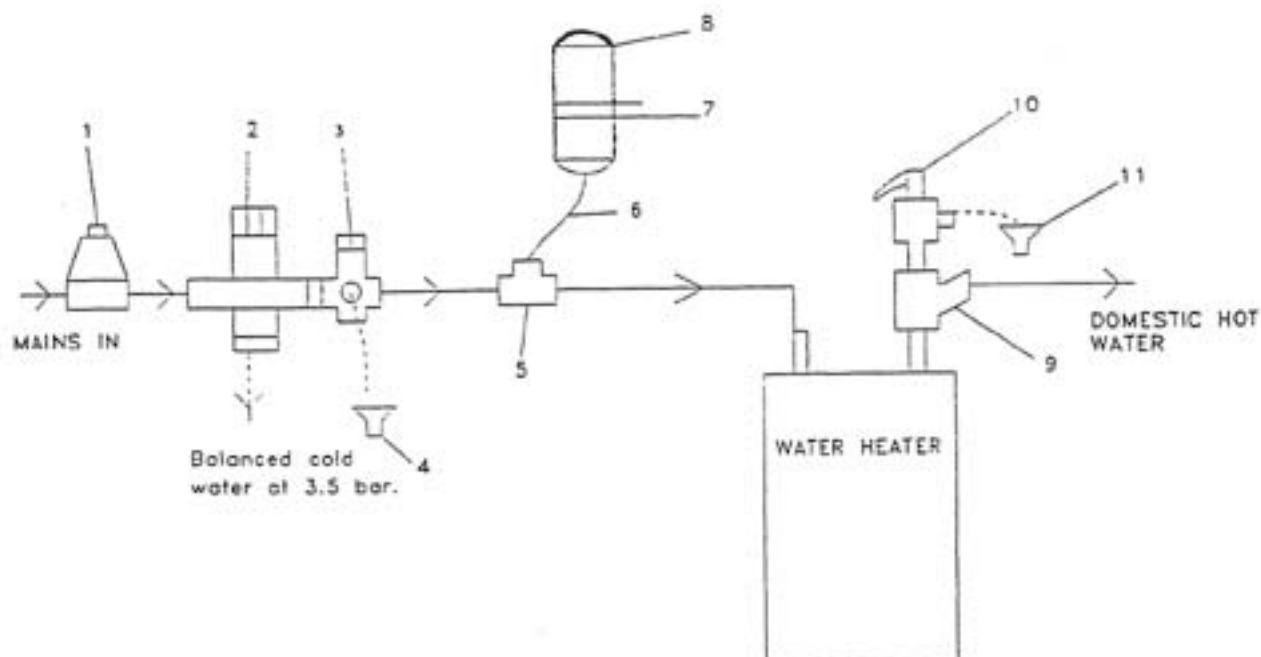
RUNNING SIGNAL CAN BE TAKEN FROM TERMINAL 20 INSIDE THE BOILER CONTROL PANEL.

AN EXTERNAL TIME CLOCK CAN BE USED BY FITTING A VOLT FREE CONTACT BETWEEN TERMINALS 7 AND 8, AFTER REMOVING THE LINK.

HIGH LIMIT LOCK OUT SIGNAL CAN BE TAKEN FROM TERMINAL 19 IN THE BOILER CONTROL PANEL.

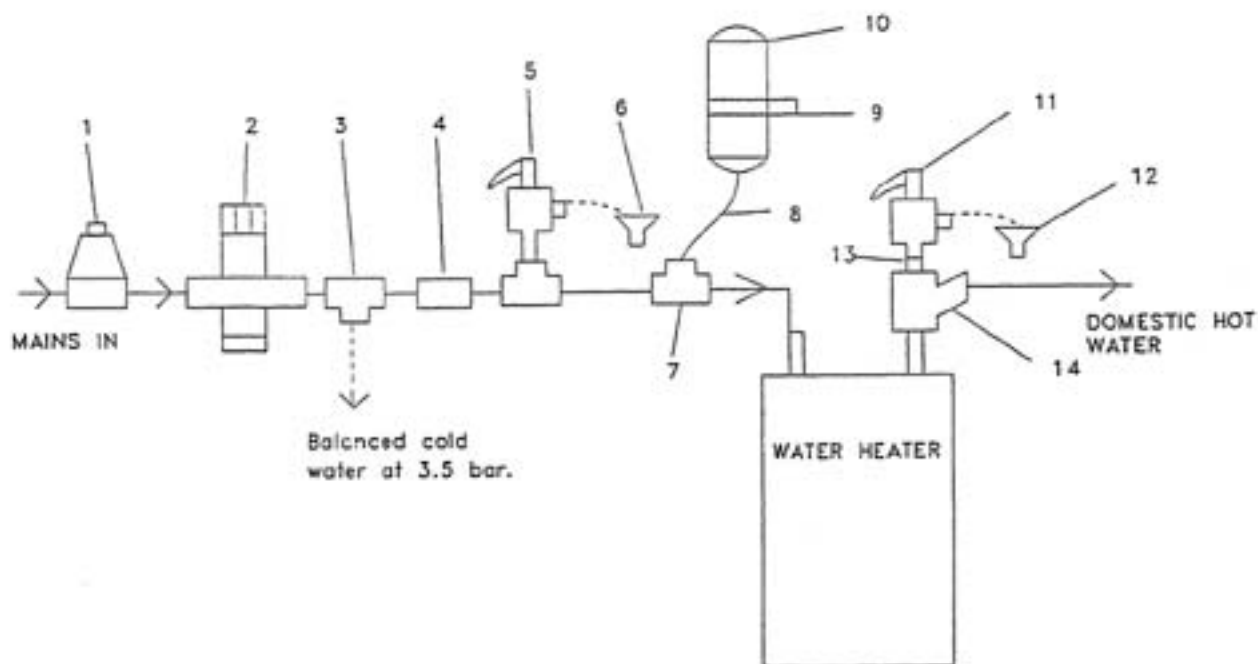
ALL THERMOSTAT PHIALS LOCATED IN POCKETS ON TOP OF TANK UNIT, THERMOMETER LOCATED IN BASE TANK POCKET.

Fig 8 WHA630 and WH1250 Direct Mains Connection



Note:
 To Eliminate the Risk of Scalding
 Thermostatic Mixing Valve
 (Blending Valve) Must be Fitted
 to drop the DHW temp.
 From 80 to 60 Deg. C
 And 60 to 45 Deg. C
 At the Draw Off's

Fig 9 WH1750 Direct Mains Connection



Generally an inlet pressure above 1 bar is required for the pressure reducing valve to accurately control the pressure.

WHA630 And WH1250 Direct Mains Connection Kit

Item No	Description	Inlet Size	Outlet Size	Supplied By	Beeston Part No.
1	Lock shield valve	22 mm	22 mm	Others	n/a
2	Pressure reducing valve (3.5 bar) with integral strainer and 15 mm cold feed balanced connection	22 mm	3/4" F	Beeston	PRED510 008
3	Expansion (6 bar) and check valve	3/4" M	22 mm	Beeston	CORE214 001
4	Brass tundish	1" F	22 mm	Beeston	TUND218 003
5	Bronze 3/4" equal tee	3/4" F	3/4" F	Others	n/a
6	1000 mm expansion vessel flexible hose	3/4" M	3/4" F	Beeston	HOSE202 006
7	Wall mounting bracket for 18 l vessel	-	-	Beeston	BRKT240 023
8	18 litre expansion vessel charged at 3.5 bar	-	-	Beeston	XVES600 031
9	Bronze 3/4" pitcher tee	3/4" F	3/4" F	Others	n/a
10	Temperature and pressure relief valve (7 bar 90 C) 9" probe	3/4" M	3/4" F	Beeston	PTEM275 300
11	Brass tundish	1" F	22 mm	Beeston	TUND218 003

WH1750 Direct Mains Kit

Item No	Description	Inlet Size	Outlet Size	Supplied By	Beeston Part No.
1	Lock shield valve	1" F	1" F	Others	n/a
2	Pressure reducing valve (3.5 bar) with integral strainer	1" F	1" F	Beeston	PRED300 007
3	Bronze equal tee for balanced cold water feed	1" F	1" F	Others	n/a
4	Check valve	1" F	1" F	Beeston	FLOW222 005
5	Expansion (6 bar) valve	3/4" M	3/4" F	Beeston	PREL500 109
6	Brass tundish	1" F	1" M	Beeston	TUND218 005
7	Bronze tee 1" x 3/4"	1" F	1" F	Others	n/a
8	1000 mm expansion vessel flexible hose	3/4" M	3/4" F	Beeston	HOSE202 006
9	Wall mounting band for 25 l vessel	-	-	Beeston	BRKT240 024
10	25 litre expansion vessel charged at 3.5 bar	-	-	Beeston	XVES600 041
11	Temperature and pressure relief valve (7 bar 90 C) 9" probe	3/4" M	3/4" F	Beeston	PTEM275 300
12	Brass tundish	1" F	1" M	Beeston	TUND218 005
13	Bronze 3/4" F x 1" M reducing bush	1" M	3/4" F	Others	n/a
14	1" equal pitcher tee	1" F	1" F	Others	n/a

WATER HEATER WHA630 USERS GUIDE

It is the Law that this appliance is installed and serviced only by a competent person eg a C.O.R.G.I registered installer or British Gas.

THIS APPLIANCE MUST BE EARTHED.

TO LIGHT THE HEATER

1. Make sure that the gas supply is turned on at the gas meter and that the service and isolating gas cock on the heater underneath the jacket are turned on.

2. Remove the front bottom door panel and open the pilot viewing port. Fully depress the green gas control knob on the main gas valve down and at the same time press the button on the peizo igniter fitted next to the gas valve two or three times. The pilot should light and the knob should be held fully depressed for a further 20 seconds. Release the knob and check that the pilot remains alight. If the pilot flame has gone out press the green gas control knob down and to the the left and wait **THREE MINUTES** before trying to relight the pilot.

Note: On initial light up or after prolonged shut downs the pilot may require several attempts to light it due to air in the gas supply pipe.

3. Close the pilot viewing port. Switch on the electricity supply, time clocks etc and the on / off switch on the heater control panel. The green lamp in the on / off switch should light .

4. Turn the Control Thermostat on the control panel to 68 C which will give a domestic hot water flow of 60 C.

5. The main burner should now light and the front door panel should be replaced.

HEATER FAILS TO LIGHT

1. If one of the two High Limit Thermostats has tripped then the pilot will go out as soon as you take your finger off the gas control knob. Only one of these requires resetting and it can be reset by removing the black plastic dust cap on the front of the control panel and pressing the small button beneath it. If you still cannot light the heater contact your installer.

2. The pressure in the primary tank is below the minimum of 0.8 bar. Check the pressure gauge reading on the heater control panel and if it is less than 0.8 bar then contact your installer.

TO SHUT DOWN HEATER

1. Switch off the electricity supply and the on/off switch on the control panel.

2. If switching off for an extended period eg holidays put out the pilot by pushing the green gas control knob on the gas valve situated underneath the front jacket panel down and to the left and turn off the service and isolating gas cock on the heater situated underneath the jacket.

CARE OF THE HEATER

1. Do not shut down the heater if freezing conditions are expected unless a frost protection thermostat has been incorporated in the boiler house control system.

2. Do not obstruct the air vents, grilles or other air openings in the boiler room and ensure a clear path of combustion and ventilation air to the heater.

3. Do not store objects on or near the heater or the flue. Do not use propellant sprays or chemicals particularly chlorine based chemicals in the vicinity of the heater.

4. The heater should be serviced once a year by a C.O.R.G.I registered engineer.

5. If at any time a gas leak is suspected DO NOT use a naked flame to locate the leak or turn on or off any electrical switches.

Turn off the gas supply to the heater at the Gas Meter and contact the Local Gas Region Office immediately.

The number is in the phone book under GAS, write the number here....

LEGIONELLA: The complete domestic hot water system and the secondary recirculation system should always be operated so that the temperature of the stored water is at or above 60 C.

WATER HEATER 1250 AND 1750 USERS GUIDE

It is the Law that this appliance is installed and serviced only by a competent person eg a C.O.R.G.I registered installer or British Gas.

THIS APPLIANCE MUST BE EARTHED.

TO LIGHT THE HEATER

1. Turn OFF the on/off switch on the heater control panel.
2. Remove the front bottom door panel and check that the gas cock or the oil isolating valve is on.
3. Switch on the electricity supply, time clocks etc and the on / off switch on the heater control panel. The green lamp in the on / off switch should light .
4. Turn the Control Thermostat on the control panel to 88, 86, or 79 C for the models WH1080, WH1250 or WH1750 respectively to give a domestic hot water flow temperature of 60 C.
5. The burner should now light and the front door panel should be replaced.

HEATER FAILS TO LIGHT

1. If one of the two High Limit Thermostats has tripped then the burner will not attempt to start. The thermostats can be reset by removing the black plastic dust cap on the front of the control panel or beneath it (after removing the front panel first)and pressing the small button beneath it.
2. If the burner itself has detected an internal fault it will Lock Out and will not attempt to light. This Lock Out can be reset by pressing the reset button on the burner control pack which may be glowing red.
3. The pressure in the primary tank is below the minimum of 0.8 bar. Check the pressure gauge reading on the heater control panel and if it is less than 0.8 bar then the heater will not run.

If you still cannot light the heater contact your installer.

TO SHUT DOWN HEATER

1. Switch off the electricity supply and the on/off switch on the control panel.
2. If switching off for an extended period eg holidays turn off the gas or oil supplies at the service and isolating gas or oil cock on the heater situated underneath the jacket.

CARE OF THE HEATER

1. Do not shut down the heater if freezing conditions are expected unless a frost protection thermostat has been incorporated in the boiler house control system.
2. Do not obstruct the air vents, grilles or other air openings in the boiler room and ensure a clear path of combustion and ventilation air to the heater.
3. Do not store objects on or near the heater or the flue. Do not use propellant sprays or chemicals particularly chlorine based chemicals in the vicinity of the heater.
4. The heater should be serviced once a year by a C.O.R.G.I registered engineer.
5. If at any time a gas leak is suspected DO NOT use a naked flame to locate the leak or turn on or off any electrical switches.
Turn off the gas supply to the heater at the Gas Meter and contact the Local Gas Region Office immediately.
The number is in the phone book under GAS, write the number here....

LEGIONELLA: The complete domestic hot water system and the secondary recirculation system should always be operated so that the temperature of the stored water is at or above 60 C.

FAULT FINDING WHA630 HEATER**PILOT WILL NOT LIGHT**

- 1 No ignition spark, check connections and look for spark at ignition electrode.
- 2 No gas, check gas cocks are ON.
- 3 Air in gas line, purge gas supply.
- 4 Faulty multifunctional gas valve.

PILOT WILL NOT REMAIN ALIGHT

- 1 Thermal reset high limit thermostat still seeing high temperature.
- 2 Faulty connections from thermocouple reroute wires to the surface mounted high limit thermostat.
- 3 Thermocouple loose in the fitting of the reroute connector situated underneath the main gas valve.
- 4 Faulty thermocouple.
- 5 Faulty high limit thermostat.
- 6 Faulty multifunctional gas valve.

MAIN BURNER WILL NOT LIGHT

- 1 No electrical supply to the heater. The green neon in the on/off switch should be lit.
- 2 The control thermostat is set too low.
- 3 Primary tank pressure below 0.8 bar. Check pressure gauge on control panel.
- 4 Some external control eg time clocks etc are holding the heater off.
- 5 Faulty control thermostat or connections.
- 6 Faulty multifunctional gas valve.

MAIN BURNER WILL NOT CLOSE DOWN AFTER THE REQUIRED FLOW TEMPERATURE HAS BEEN REACHED

- 1 Faulty control thermostat.
- 2 Faulty multifunctional gas valve.

MAIN BURNER WILL NOT CLOSE DOWN AFTER THE ELECTRICAL POWER HAS BEEN TURNED OFF

- 1 Faulty multifunctional gas valve.

NOISY PUMP

- 1 Primary vessel not full or air locked. Bleed air, refill and check cold fill pressure of 1.0 bar.
- 2 Safety valve discharged.
- 3 Faulty pump.

PRESSURE GAUGE NOT REGISTERING

- 1 Primary vessel not fully charged.
- 2 Faulty gauge.

UNIT SOOTING UP - SMELL OF FUMES

- 1 Lack of ventilation or dust in the boiler house.
- 2 Burner incorrectly commissioned or faulty.
- 3 Blocked flue or flueways.
- 4 Condensation in combustion chamber due to excessive demand.

FAULT FINDING WH1250 AND 1750**BURNER WILL NOT RUN**

- 1 No electrical supply.
- 2 Faulty burner.
- 3 Control thermostat set too low.
- 4 Primary tank pressure below 0.8 bar. Check pressure gauge on control panel.
- 5 One of the high limit thermostats has tripped out.
- 6 Burner has detected internal fault and locked out.

BURNER FAN RUNS BUT WILL NOT LIGHT

- 1 No fuel, check gas and oil cocks are ON.
- 2 Air in fuel supply.
- 3 Faulty burner.

NOISY PUMP**PRESSURE GAUGE NOT REGISTERING****UNIT SOOTING UP - SMELL OF FUMES**

See WHA630 fault finding.

SPARE PARTS LIST

ALL MODELS	Part No
Control thermostat 0-90 C	442045
High limit thermostat 90-110 C	442052
Thermal reset stat	764001
Pressure/Temperature gauge	441008
On/off switch	428116
Pump Grundfoss UPS 25-40	1237
Expansion vessel 8 litre cold 1 bar hot 4 bar and for 105 C	3012
Primary vessel pressure switch set at 0.8 bar.	439129
Safety valve 3 bar	1239

FOR WHA630	Part No
Surface mounted thermostat 103 C	442015
Pilot burner complete with injector	439013
Thermocouple Honeywell 36"	439097
Ignition probe	428060
Ignition lead	1244
Thermocouple interrupter leads	1245
Gas valve Honeywell V4014-1 1/2" and V4347C -4005-1 governor /solenoid.	439047
Peizo igniter	428073
Main burner	439209

FOR WH1250 AND 1750	Part No
Refer to burner manufacturers manual	-



Our Promise

Customers will find that:

- They get value for money
- They can communicate with us easily
- We are reliable and do what we say we will do
- Our products are reliable and do what we claim for them
- We deliver the right product on time, every time
- We aim to have zero defects in our products, services, systems, information and advice
- It is easy to be our customer

Quality for Beeston means that we aim to meet and exceed our customers' expectations of both product and service all the time, every time and in every way - at a competitive price.

Beeston Heating maintain a policy of continuous research and development, and reserve the right to alter specifications when necessary.

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