

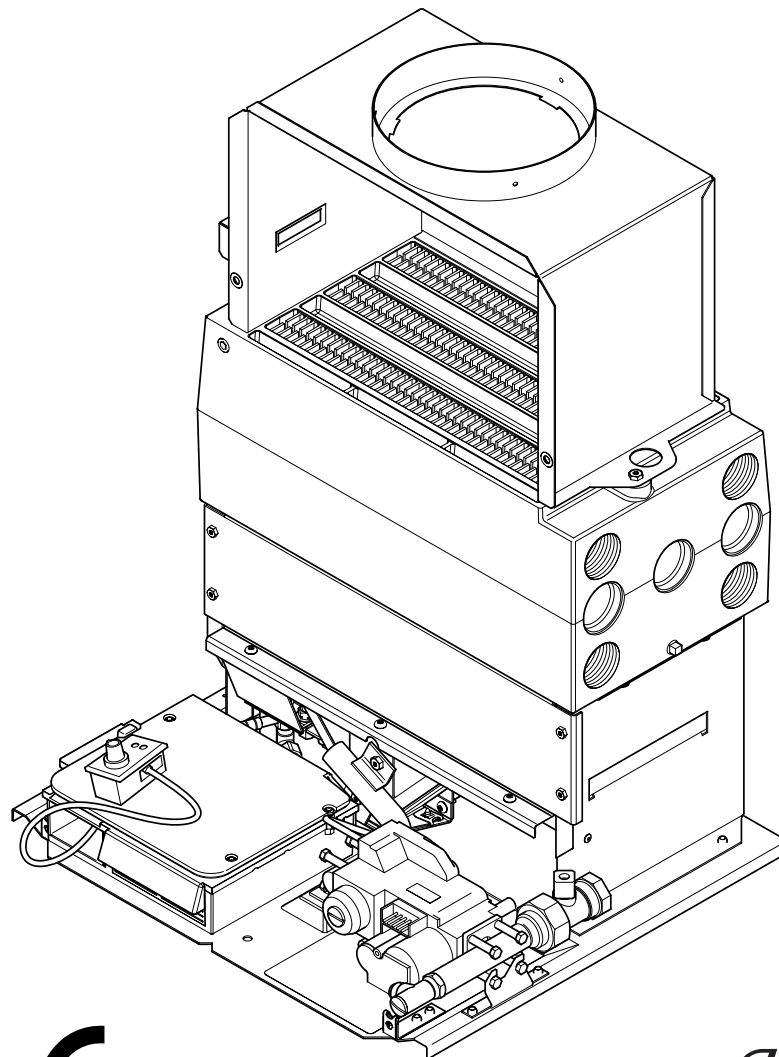
# Installation & Servicing Instructions

To be left with the user

## BBU 45/4

G.C. No. 44 - 047 - 06

*For Use Only With Specially Designed Firefronts*



9701



This is a Cat I<sub>2H</sub> Appliance



The code of practice for the installation,  
commissioning & servicing of gas fires and wall heaters

**HEATCALL**

**One Contact Local Service**

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## Important Information

### TESTING AND CERTIFICATION

It is important that no alteration is made to the boiler without permission, in writing, from Hepworth Heating Ltd.

Any alteration that is not approved by Hepworth Heating Ltd., could invalidate the B.S.I. Certification, the boiler warranty and could also infringe the current issue of the Statutory Requirements, see Section 1.1.

### CE MARK

The boiler meets the requirements of Statutory Instrument, No. 3083 The Boiler (Efficiency) Regulations, and therefore is deemed to meet the requirements of Directive 92/42 EEC on the efficiency requirements for new hot water boilers fired with liquid or gaseous fuels.

Type test for purposes for Regulation 5 certified by: Notified body 0086.

Product/production certified by: Notified by 0086.

1. Directive 90/396/EEC on the approximation of the Laws of the Member States relating to appliances burning gaseous fuels.
2. Directive 73/23/EEC on the harmonization of the Laws of the Member States relating to electrical equipment designed for use within certain voltage limits.
3. Directive 89/336/EEC on the approximation of the Laws of the Member States relating to electromagnetic compatibility.

### INFORMATION FOR THE INSTALLER AND SERVICE ENGINEER.

Under Section 6 of The Health and Safety at Work Act 1974, we are required to provide information on substances hazardous to health.

The adhesives and sealants used in this appliance are cured and give no known hazard in this state.

#### Insulation Pads

These can cause irritation to skin, eyes and the respiratory tract.

If you have a history of skin complaint you may be susceptible to irritation. High dust levels are usual only if the material is broken.

Normal handling should not cause discomfort, but follow normal good hygiene and wash your hands before eating, drinking or going to the lavatory.

If you do suffer irritation to the eyes or severe irritation to the skin seek medical attention.

### SPARE PARTS

REMEMBER, when replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Hepworth Heating Ltd.

### MANUAL HANDLING GUIDANCE

During the appliance installation and the replacement of the heat exchanger it will be necessary to employ caution and assistance whilst lifting as the appliance or component exceeds the recommended weight for a one man lift.

In certain situations it may be required to use a mechanical handling aid.

Take care to avoid trip hazards, slippery or wet surfaces.

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# 1 General

## 1 General Notes and Information

References in these instructions to British Standards, Statutory Regulations and Requirements apply only to the United Kingdom.

For Ireland the rules in force must be used.

These instructions consist of two parts, Installation and Servicing Instructions for the Back Boiler Unit and the Guarantee Registration Card. User, Installation and Servicing Instructions for the specified fire are supplied with the firefront.

The boiler is for use only with a specially designed Glow-worm Gas firefront, see table 1.

This boiler is NOT suitable for fitting to precast flues.

The boiler is delivered in one pack which contains all the parts necessary for the installation.

if installing the back boiler unit and the fire front at the same time please read both sets of instructions before starting.

### IMPORTANT NOTICE

This boiler is for use only on G20 gas.

The back boiler unit is fitted with a flue blockage safety device which will shut it down if there is a lack of oxygen resulting from a build up of combustion products. The flame on the pilot light will become unstable and lift up off the sensing device, this will deactivate the gas valve via the p.c.b., cutting off the gas supply.

If the back boiler unit shuts down frequently for no apparent reason the first things to check are the chimney and air inlets into the room. Any problems found must be put right, by a competent person, and a full operational test carried out before the fire is used again.

The flue blockage safety device incorporates the electrode, pilot assemblies and sampling tube assembly in conjunction with P.C.B.

**The flue blockage safety device MUST NOT be adjusted or disconnected. It must be serviced strictly in accordance with the instructions in this book. Any unauthorised interference could result in the device failing to operate, creating a potentially dangerous situation. If replacing, use only the correct and approved parts.**

Wherever possible, all materials, appliances and components to be used shall comply with the requirements of applicable British Standards.

Where no British Standard exists, materials and equipment should be fit for their purpose and of suitable quality and workmanship.

## Sheet Metal Parts

**WARNING.** When installing or servicing this back boiler care should be taken when handling the edges of sheet metal parts to avoid any possibility of personal injury.

Refer to Manual Handling Operations, 1992 Regulations.

### 1.1 Statutory Requirements

The installation of this back boiler unit must be carried out by a competent person in accordance with the current issue and relevant requirements of:

Manufacturer's instructions, supplied.

The Gas Safety (Installation and Use) Regulations, The Building Regulations, The Building Standards (Scotland) Regulations, applicable in Scotland, Local Gas Undertaking, Bye-laws of the Local Water Company, The Health and Safety at Work Act, Control of Substances Hazardous to Health, The Electricity at Work Regulations and any applicable local regulations.

Detailed recommendations are contained in the current issue of the following British Standard codes of practice,

BS1251, BS5440 Part 1 and 2, BS5449, BS5546, BS5871, BS6798, BS6891, BS7593, BS7671.

Manufacturer's notes must not be taken as overriding statutory obligations.

### 1.2 Data

See diagram 1.1, Range Rating table for firefronts and Table 1.

Gas connection Rc $\frac{1}{2}$  ( $\frac{1}{2}$ inBSPT)

Water connection Rc1

Electrical supply 230V~50Hz fused 3A

Weight, approx. 38kg (83.6lb)

Water content 2.18Litres (0.48gall)

Injector 3.35mm

Dimensions, except as noted, shown on diagrams are in millimetres.

Data Label: On the base of the boiler next to the electrical control box.

The Seasonal Efficiency Domestic Boilers UK (SEDBUK) for LFE and radiant fires is 78.8%, for Inset fires it is 79.5%.

The value is used in the UK Government's Standard Assessment Procedure (SAP) for energy rating of dwellings. The test data from which it has been calculated have been certified by B.S.I.

### 1.3 Gas Supply

The gas installation must be in accordance with the current issue of BS6891.

The supply from the governed gas meter must be of adequate size to provide a steady inlet working pressure of 20mbar (8in wg) at the boiler.

Do not use pipe of a smaller diameter than Rc $\frac{1}{2}$  ( $\frac{1}{2}$ BSP) inlet or 15mm, see diagram 1.1 for position of gas connection.

The gas meter must be capable of passing natural gas at the following rate: 74.2ft<sup>3</sup>/h (2.1m<sup>3</sup>/h).

This rate is in addition to all other natural gas appliances supplied from the same meter.

It is recommended that the gas supply enters the builder's opening on the right hand side.

If the gas supply enters from the left hand side it will be necessary to route and insulate the pipe behind the combustion chamber before final fixing.

On completion test the gas installation for soundness using the pressure drop method and suitable leak detection fluid, purge in accordance with the above standard.

### 1.4 Electrical Supply

**WARNING.** This boiler must be earthed.

All system components shall be of an approved type and shall be connected in accordance with the current issue of BS7671 and any applicable local regulations.

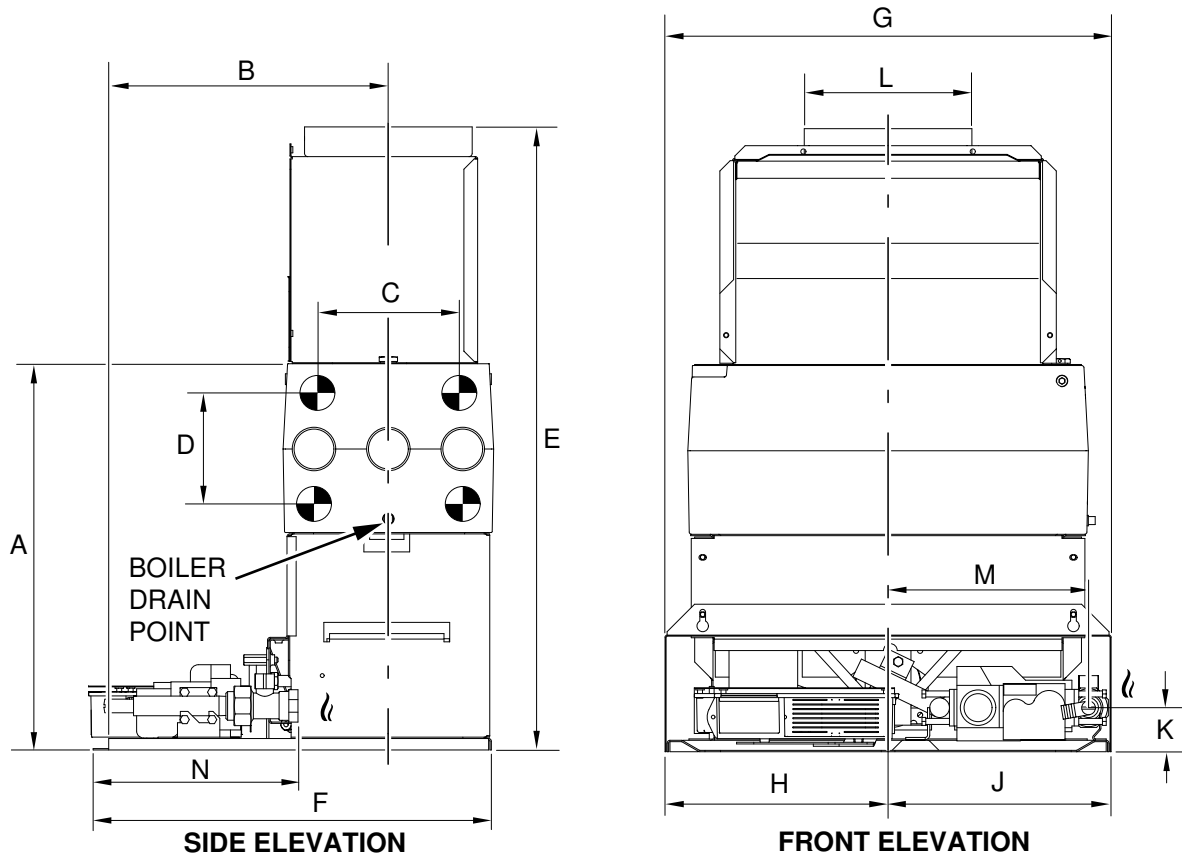
Connection of the boiler and system controls to the mains supply should be through a common isolator, a double pole isolating switch, fused 3A, should be used, having a minimum contact separation of 3mm in both poles.

Alternatively, a fused 3A 3pin plug and unswitched shuttered socket both to the current issue of BS1363 may be used.

Wiring to the boiler must be PVC (85°C) insulated type to the current issue of BS6500 Table 9, not less than 0.75mm<sup>2</sup> (24/0.20mm).

# 1 General

9390



WATER CONNECTIONS  
 RC1

GAS CONNECTION  
 RC (1/2 in BSPT)

DIMENSION	A	B	C	D	E	F	G	H	J	K	L	M	N
BBU 45/4	338	244	124	97	545	348	390	195	195	38	146	175	173

**OVERALL DIMENSIONS**

Diagram 1.1

		Minimum Miami 4 Heartbeat 4 Contour 4 Firelite 4	Medium Miami 4 Heartbeat 4 Contour 4 Firelite 4	Maximum Miami 4 Heartbeat 4 Contour 4 Firelite 4	Minimum Dovedale 4 Chatsworth 4	Medium Dovedale 4 Chatsworth 4	Maximum Dovedale 4 Chatsworth 4
HEAT INPUT (NETT)	kW	9.95	12.22	14.65	9.77	11.21	12.8
	Btu/h	33,950	41,700	50,000	33,340	38,250	43,700
HEAT OUTPUT	kW	8.79	10.99	13.19	8.79	10.26	11.72
	Btu/h	30,000	37,500	45,000	30,000	35,000	40,000
COLD BURNER PRESSURE	mbar	4.5	6.9	9.8	4.4	5.8	7.4
	in.w.g	1.81	2.77	3.94	1.76	2.32	2.97
INJECTOR MARKING	<b>205773</b>						

RANGE RATING TABLE

# 1 General

## 1.5 Site Requirements

Refer to diagram 1.1 for dimensions appropriate to the back boiler.

For all types of installation a standard builder's front opening is required, see diagram 1.2.

### IMPORTANT NOTES :

The depth of the fire opening MUST conform to the dimensions given in diagram 1.2.

Any larger front opening will need to be reduced, with non-combustible material to conform to this requirement.

It is important that the opening is cleared of debris and mortar etc.

The void behind the front opening should be sufficient to allow for the water connections fittings.

It is recommended that the access hole for pipework into the fireplace or builders opening is either at the left hand or right hand side of the chimney breast. if access is required at both sides then it may be necessary to prepare some of the connections before fitting the back boiler into the builders opening.

The prepared base for the back boiler must be level.

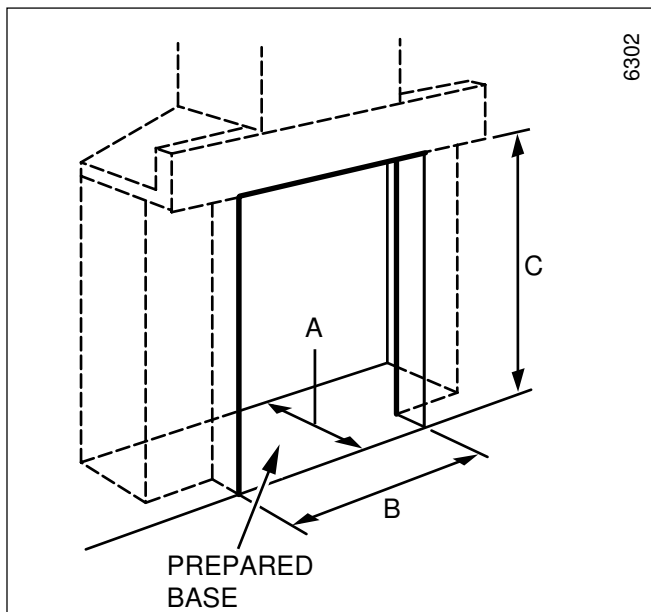
Refer to diagram 1.3 for dimensions of the fire fixing wall face which MUST be true.

## 1.6 Water System - Open Vented

This boiler can be used on an unrestricted open vented system with the water supply taken from a feed and expansion cistern, having a head between 1m (3ft 3in) minimum and 27m (90ft) maximum.

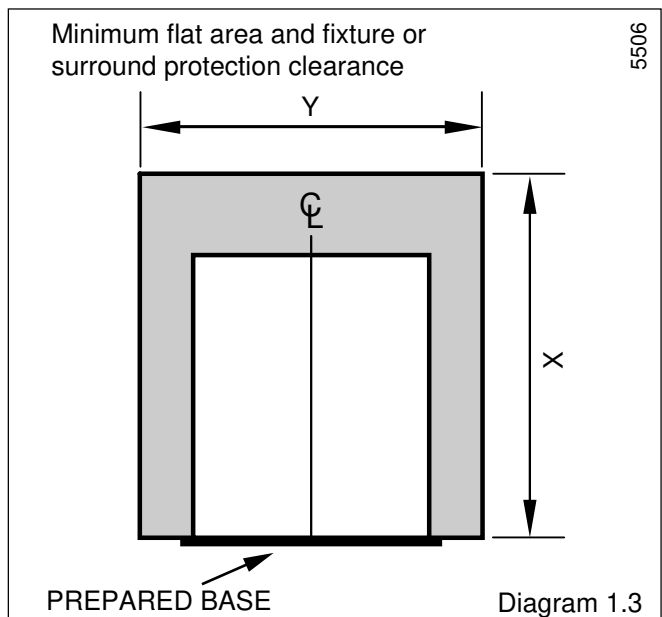
Diagrammatic layouts of systems are shown in diagram 1.4 and 1.5.

Table 1	GC Number
Firelite 4	37-047-13
Contour 4	37-047-14
Miami 4 Teak	37-047-15
Miami 4 Mahogany	37-047-20
Heartbeat 4	37-047-16
BlackBeauty 4	37-047-17
Chatsworth 4	37-047-18
Dovedale 4	37-047-19



	A	B	C
Miami 4	350	406-580	560-590
Firelite 4/ Contour 4	350	406-480	560-590
Heartbeat 4/ BlackBeauty 4	350	406-480	560-590
Chatsworth 4/ Dovedale 4	350	406-460	560-590
<b>BUILDERS FRONT OPENING</b>			

Diagram 1.2



FIRE TYPE (BBU)	DIMENSIONS FOR MINIMUM FLAT AREA (NO FIXTURES)		DIMENSIONS FOR FIXTURE OR SURROUND PROTECTION CLEARANCE	
	X	Y	X	Y
MIAMI 4	625	686	775	986
FIRELITE4	633	620	783	920
CONTOUR 4	638	617	788	917
B/BEAUTY 4	655	657	805	957
HEARTBEAT 4	643	632	793	932
CHATS/DOV 4				
STD. FRAME	630	547	780	690
WIDE FRAME	652	590	800	690

# 1 General

## 1.7 Hot Water Cylinder

The back boiler is suitable for open vented systems using an indirect cylinder. The cylinder must be fitted to the manufacturer's recommendations and the system must conform to the requirements of the current issue of BS5449.

It is recommended that the cylinder be fitted with some form of temperature control.

## 1.8 Frost Protection

If the position of the boiler is such that it may be vulnerable to freezing it should be protected as specified in the current issue of BS5422.

It is also recommended that a frost thermostat is fitted.

## 1.9 Draining Tap

### System

A draining tap must be provided at the lowest point of the system which will allow the entire system, the boiler and hot water cylinder to be drained.

Draining taps shall be to the current issue of BS2879.

### Boiler

A draining point is fitted at the bottom of the side of the heat exchanger where the water connections are located, see diagram 1.1.

When draining is required cover the controls to avoid water damage.

## 1.10 Safety Valve

A safety valve need not be fitted to an open vented system.

## 1.11 Boiler Location

This back boiler unit **MUST NOT** be installed in a private garage or in a room containing a bath or shower or a room used or intended to be used as sleeping accommodation.

## 1.12 Sealed Water System

A kit and instructions, part number 2000463000, is available to enable the back boiler to be used on a sealed water system.

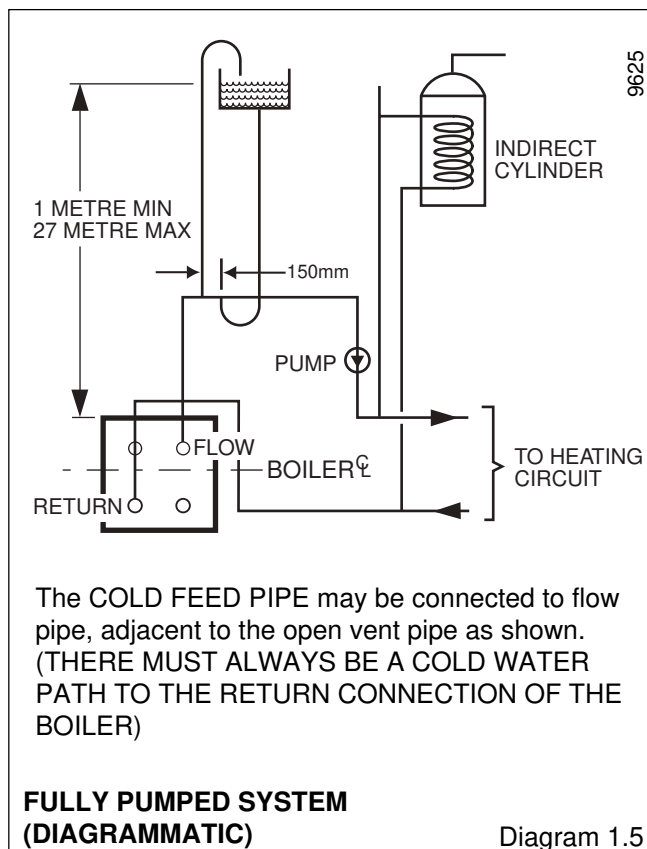
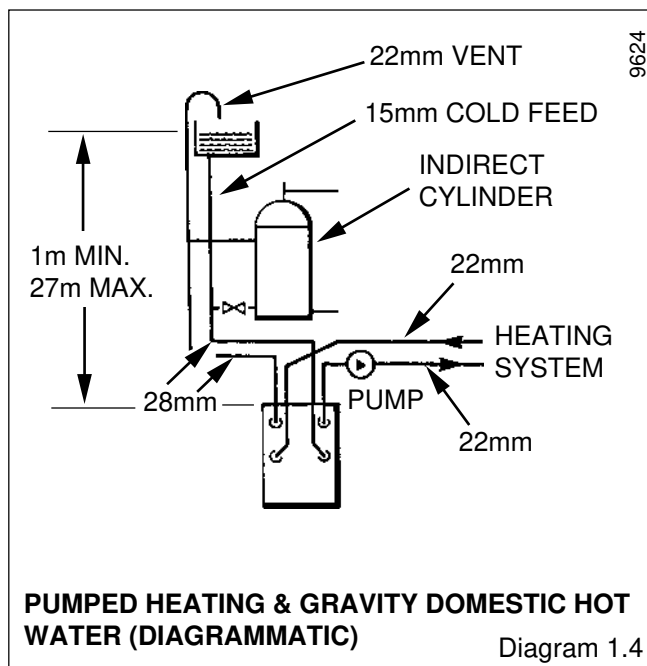
Please give the serial number of the back boiler when ordering the kit.

## 1.13 Inhibitor

Attention is drawn to the current issue BS5499 and BS7593 on the use of inhibitors in central heating systems.

If an inhibitor is to be used, contact a manufacturer for their recommendations as to the best product to use.

If using in an existing system take special care to drain the entire system, including the radiators, then thoroughly cleaning out before fitting the boiler whether or not adding an inhibitor.



## 2 Types of Installation

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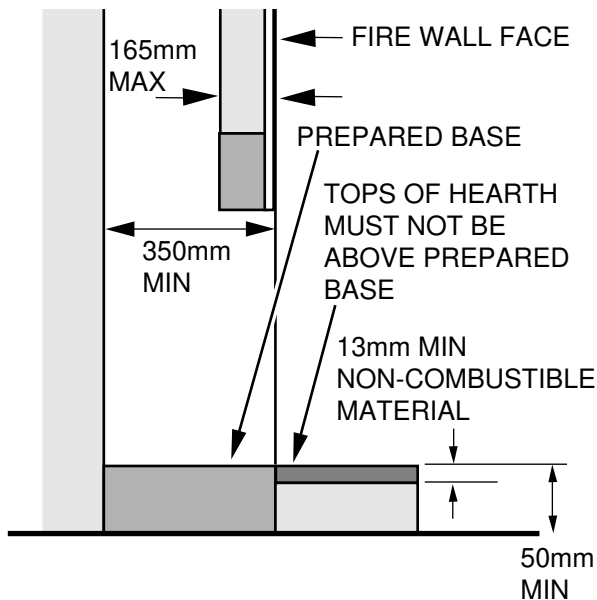
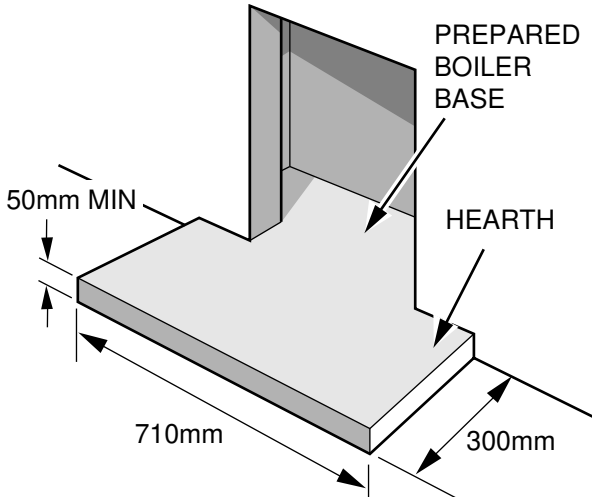


Diagram 2.1

### 2.1 With Non-combustible Hearth

For minimum dimensions of a hearth, see diagram 2.1.

The back boiler must be installed level with the hearth or above it, see diagram 2.1.

Carpet or similar floor covering must not be placed on the hearth.

### 2.2 Combustible Hearth

If the hearth is existing and made of a combustible material the back boiler must be installed to the dimensions in diagram 2.3.

### 2.3 With Surround

The combined thickness of the surround and lintel must be checked, to make sure that the back boiler can be positioned within the opening to allow easy connection of the flue into the back boiler flue socket, see diagram 2.2.

For fireplaces where the wall is not plastered and not covered by BS1251 it is important that such installations comply with the current issue of The Building Regulations.

Any combustible material, for example, blown vinyl wall covering, on the fire front fixing face area must be removed to a height of 625mm and 268.5mm each side of the centre line. These dimensions will allow the standard frame, if fitted, to overlap the remaining wall covering by 5mm.

This area, to the depth removed should then be rendered with a sand/cement mixture.

### 2.4 Without Surround or Hearth

If there is to be any combustible material beneath the fire front, for example, carpet, then the base of the builder's opening must not be less than 75mm above the floor covering as shown in diagram 2.3.

The builder's opening, with lintel must have minimum dimensions as shown in diagrams 1.2 and 2.3.

The information regarding the fire front opening must be followed together with the last three paragraphs of section 2.3.

6196

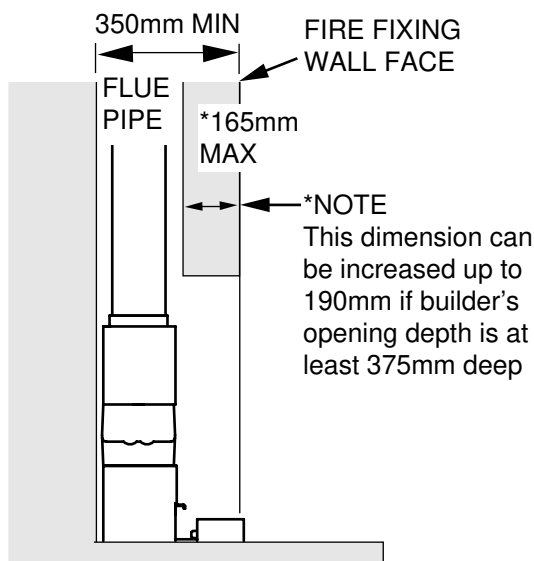
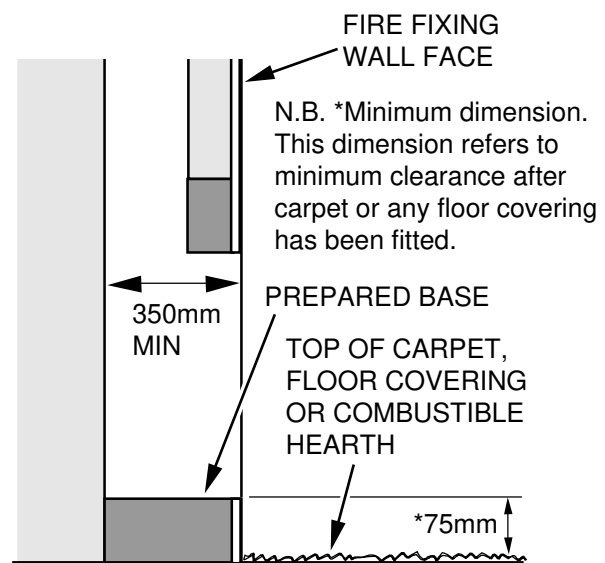


Diagram 2.2

1590



COMBUSTIBLE HEARTH/ WALL MOUNTED INSTALLATIONS

Diagram 2.3

## 3 Flue and Ventilation

### 3.1 General

The general recommendations of the current issue of BS5440 Part 1 should be followed.

In all cases the flue should be lined, preferably with a flexible liner.

It is essential that the flue has an equivalent height of at least 2.5m (8.2ft) measured from the flue connection on the appliance. The first 600mm, at least, above the draught diverter must be vertical.

Where the installation is new it is essential to make sure that the annular space between the boiler flue liner and the chimney is sealed at the base and at the top of the chimney, as shown in diagram 3.2.

The flue socket is designed to take flue pipe to BS567. If flue pipe conforming to a different standard is used a suitable adapter must be fitted and secured to the flue socket. A flexible flue liner may be used, with connection to the back boiler flue socket, see diagram 3.1

The existing flue may not be completely sound. Therefore, to prevent the possibility of leakage to an adjacent flue, additional sealing **MUST** be carried out between the base of the chimney and the flue liner.

The end of the flue liner at the chimney top must be adequately sealed and clamped, using proprietary fittings suitable for the flue liner used, see diagram 3.2.

The flue should, preferably, end above ridge height but at the least above the eaves of a pitched roof. Use a certificated terminal.

If the flue is to pass through or near any combustible material it should be installed in accordance with the current issue of BS5440 Part 1. If in doubt seek advice from the local gas undertaking or Hepworth Heating Ltd.

### 3.2 Existing Chimney

An existing brick chimney must be thoroughly swept and all debris cleared away before lining.

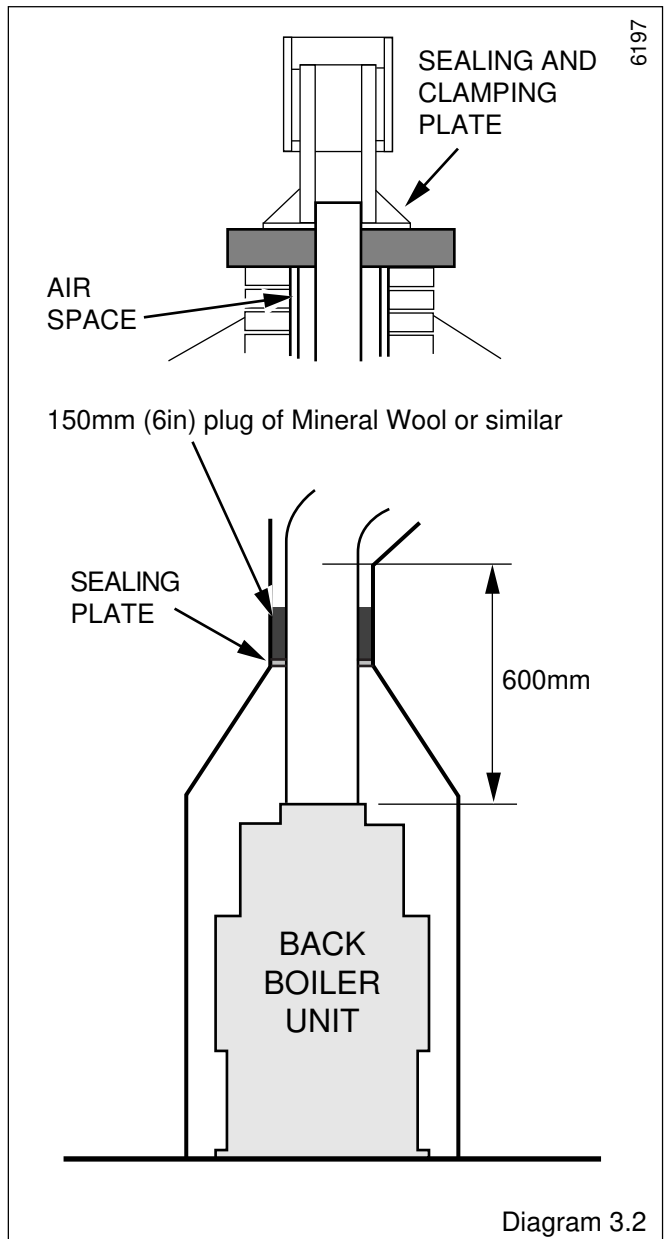
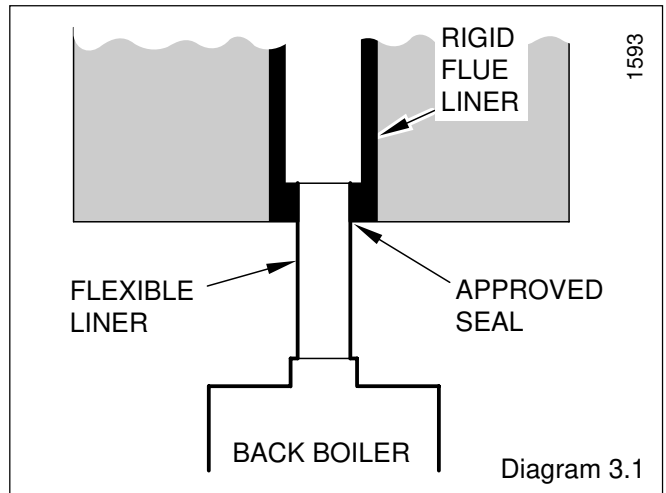
Remove any damper or register plate. Alternatively it may be locked in the open position,

A flexible flue liner is preferred but a rigid liner may be used, with connection to the back boiler flue socket made with a short vertical piece of flexible liner, see diagram 3.1.

Any air supply that enters the builder's opening other than by the front opening, that is underdraught openings and the like must be completely sealed off.

The sealing plate also prevents debris falling and gives the flue better insulation, reducing the possibility of condensation, see diagram 3.2.

Check the flue system efficiency before installing the back boiler.



## 3 Flue and Ventilation

### 3.3 New Chimney

A newly built chimney can be lined with a moisture resistant lining, such as salt glazed pipe, of an appropriate diameter as specified in the Building Regulations

In the case of a salt glazed lined flue, it is recommended that a short vertical length of flue pipe, preferably flexible metallic be used. Fix and seal it to the back boiler flue socket, make good with approved packing and parge with fire cement, see diagram 3.1.

If a flue and false chimney breast are to be constructed all openings for pipework to upper floors etc., must be sealed. The only opening for the back boiler must be at the front, being of the dimensions as shown in diagram 1.2.

If a specially built compartment is constructed for the back boiler, it must conform to the requirements of the current issue of BS5440 Part 1 and BS5871.

The flue should, preferably, end above ridge height but at least above the eaves of a pitched roof. Use a certificated terminal.

### 3.4 Ventilation - Back Boiler and Fire

The room in which the back boiler unit is installed must have adequate air inlets to ensure correct operation as specified in the current issue of BS5440 Part 2.

Ventilation requirement, see vent sizes table.

This ventilation area takes into account the total requirement of the back boiler unit and fire.

The ventilation openings may be direct to the outside air or with an internal room or space (such as a hall) which itself has a permanent air vent of the same effective area. The permanent air vent should be in a position which will cause the least nuisance to occupants, due to draughts.

This vent **MUST NOT** be placed in the builder's opening.

If the appliance is to be installed in a room already containing another fuel burning unit, the air supply required for this other unit **MUST** be added to the figure above.

Any air vent taken through a cavity wall must be ducted.

### 3.5 Extract Fans

If an extract fan is fitted in the premises, there is a possibility that if adequate air inlet openings are not provided spillage of the products of combustion could occur.

When openings are fitted in accordance with the recommendations of the current issue of BS5440 Part 2, extract fans should not cause spillage.

Where such a fan installation is found, a clearance of products test must be conducted as described in the fire front Installation Instructions, Section 4.5.

This test must be carried out with the back boiler fitted with its fire front.

See also Section 6.3 of these instructions.

Note: Refer again to Section 1.6 and diagram 1.2 and make sure that there is sufficient depth for the back boiler unit.

### VENT SIZES TABLE

45/4

Dovedale 4  
Chatsworth 4

64cm<sup>2</sup> / 10in<sup>2</sup>

Miami 4  
Firelite 4  
Contour 4  
B/Beauty 4  
Heartbeat 4

66cm<sup>2</sup> / 10.5in<sup>2</sup>

## 4 Installation

### 4.1 Preparation

Remove draught diverter body, draught diverter and fittings pack from carton.

Check contents of fittings pack against packed list.

Remove back boiler body from carton.

Remove the combustion chamber extension by loosening the two securing screws and lift off, see diagram 4.1.

Put combustion chamber extension to one side until required, see note below.

Take care not to damage the user control during installation, see diagram 4.3.

Remove control/burner assembly from back boiler by removing the four combustion chamber screws and the gas manifold securing screw. Slide the control/burner assembly forwards to remove, see diagram 4.10.

Note: If the back boiler is to be installed with a Chatsworth/Dovedale fire front, discard the draught diverter and combustion chamber extension, use the draught diverter supplied with the fire front, see User, Installation and Servicing instructions supplied with the fire front, see diagram 4.1.

### 4.2 Water Connections

IT IS EXTREMELY IMPORTANT THAT NO SERVICE PIPES ARE ROUTED IN FRONT OF THE BOILER. If the builder's opening was previously used for solid fuel all pipework within should be protected with PVC tape or equal. Pipework passing through walls of the opening should be sleeved and made good.

### 4.3 Pumped Heating with Gravity Domestic Hot Water

All pipework must comply with the current issue of BS5546.

The domestic hot water flow and return pipes must be 28mm. Refer to diagram 1.4 for a diagrammatic layout.

For systems with gravity domestic hot water and pumped heating circuits, pipe crossover maybe required. This type of installation maybe simplified by the use of a Street elbow.

For installation of Street elbow, see diagram 4.2.

Pipes should then be bent accordingly.

If it is necessary to route pipework from both sides of the builder's opening, it is recommended that the heat exchanger is positioned on the combustion chamber so that the gravity circuits exit on the same side as the boiler connections.

If the heat exchanger connections are opposite hand to that required, the heat exchanger can be turned as follows, carefully tilt the back boiler first on its back, then tilt again so that the back boiler is now upside down.

Remove the four screws securing the combustion chamber to heat exchanger, see diagram 4.1, replace the combustion chamber seal, from fittings pack, turn combustion chamber in respect to heat exchanger and refit with the four screws.

Carefully upright the appliance by tilting as above.

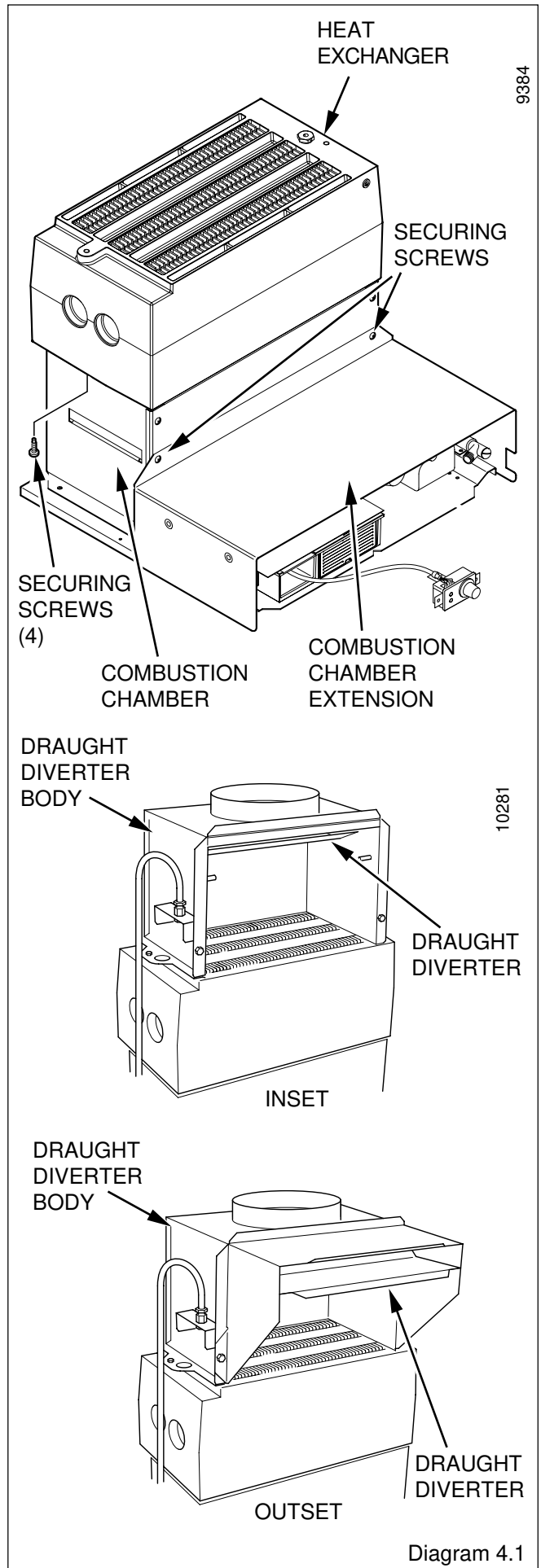


Diagram 4.1

# 4 Installation

## 4.4 Pumped Heating and Hot Water

Refer to diagram 1.5 for a diagrammatic layout.

If the heat exchanger connections are opposite hand to that required, turn in the same manner as described in Section 4.3 paragraph 5.

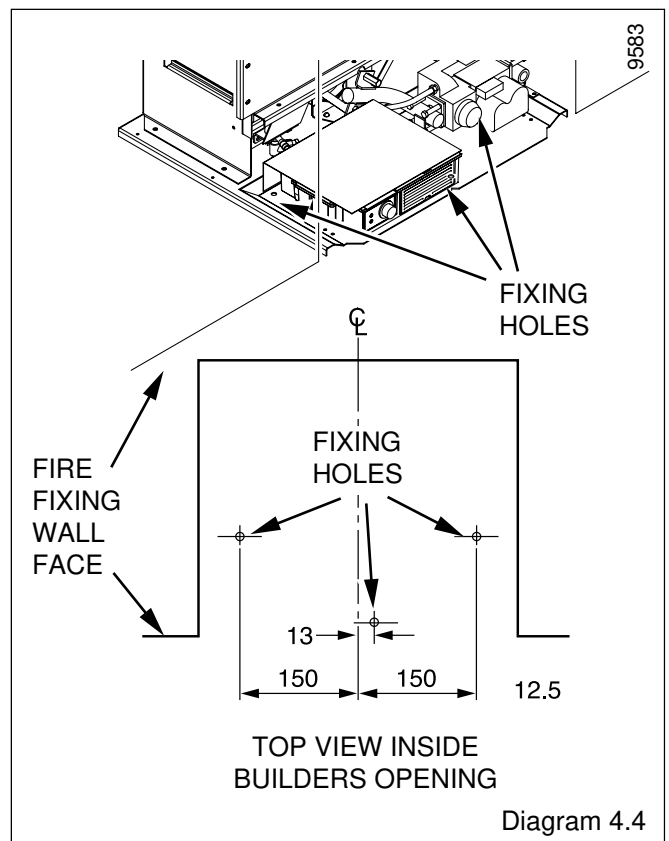
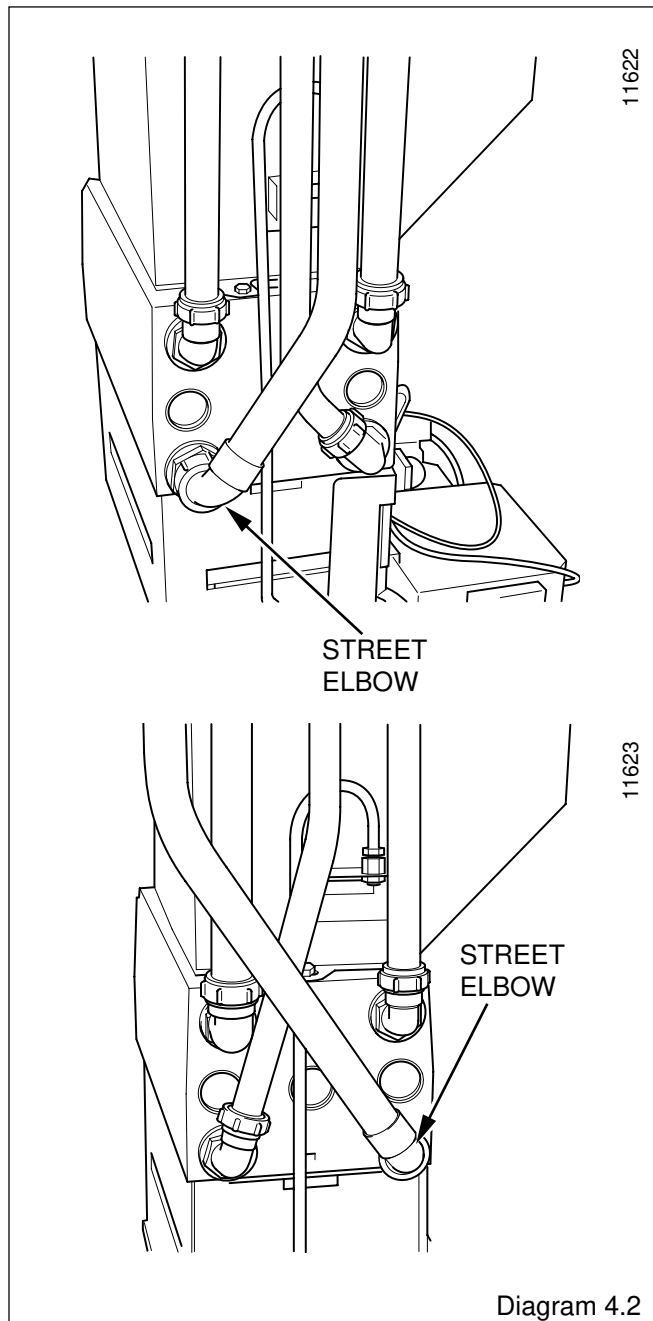
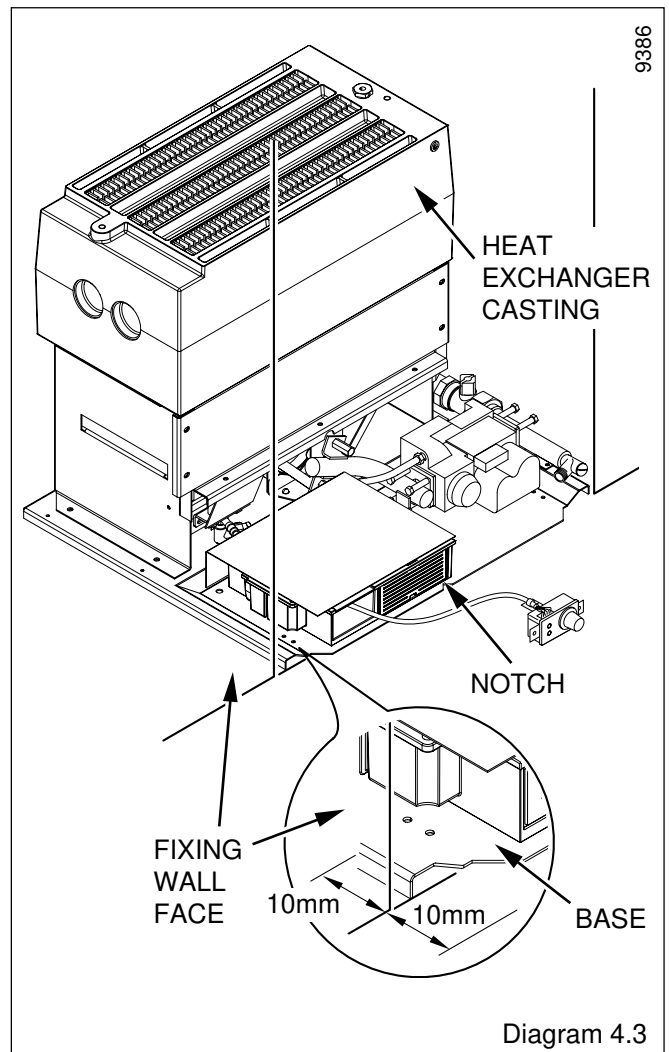
## 4.5 Circulating Pump

Isolating valves, integral if possible, must be fitted each side of the circulating pump.

## 4.6 Chatsworth 4, Dovedale 4 Only

**IMPORTANT:** With the control/burner assembly removed, fit the blanking plate, supplied with the fire front, to the rear of the combustion chamber and secure with a number 6 screw provided, see diagram 4.11.

Please note that the hole for the securing screw in the blanking plate is offset to avoid incorrect fitting.



## 4 Installation

### 4.7 Positioning the Back Boiler

**IMPORTANT.** With regards to the Manual Handling Operations, 1992 Regulations, the following lift operation exceeds the recommended weight for a one man lift.

Carefully lift the back boiler by the heat exchanger casting and place centrally in the builders opening.

The installation centre line is indicated on the base by a notch on the front of the plate and the fire fixing wall face positioning line by the front corner edges of the base, see diagram 4.3.

#### Chatsworth 4 and Dovedale 4 only

The back boiler must be positioned so that a line across the opening of the wall face coincides with the fire fixing wall face positioning line, see diagram 4.3.

Please note: This is the only permitted position for the Chatsworth 4 and Dovedale 4.

Use a straight edge across the wall face to make sure that the back boiler is square to it.

#### Firelite 4, Contour 4, Miami 4, Heartbeat 4 and Black Beauty 4 only

The back boiler may be positioned so that a line across the opening of the wall face coincides with the fire fixing wall face positioning line. Providing the wall is square the positioning line can either be set back or set forward up to 10mm from the wall face, see diagram 4.3.

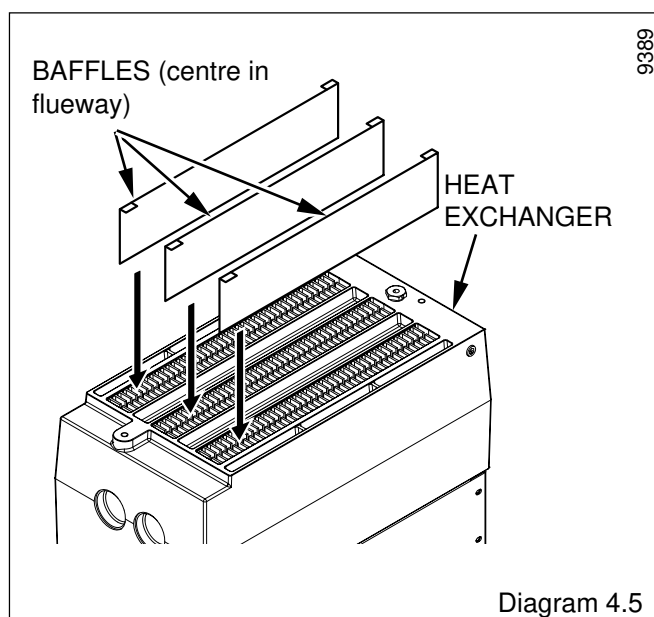
#### continued -

Check that the back boiler is level. If packing is required to adjust the level of the back boiler, use metal shims and pack under the full width of the base.

Mark through the three fixing holes on the floor protection plate, see diagram 4.3. Remove the back boiler unit. Drill three holes using a masonry drill bit to accept appropriate plugs.

### 4.8 Positioning the Back Boiler - continued

Fit the flueway baffles, from fittings pack, into flueways, ensuring that they are positioned centrally in the flueways, see diagram 4.5.



Fit the draught diverter body onto the heat exchanger with the two securing screws supplied in the fittings pack, see diagram 4.6.

Take the flue sensing tube, packed with the boiler, and fit tubing nut into brass fitting, located at side of the draught diverter body, and tighten, making sure the sensing tube is correctly positioned, see diagram 4.7.

Where a flexible flue liner is being used, fully fit the No.8x<sup>3</sup>/<sub>8</sub>in self tapping screw provided into the rear of the flue socket as in diagram 4.8.

Reposition the back boiler unit into the builders opening then secure with fixing screws.

Refit control/burner assembly leaving the combustion top left hand securing screw off, see diagram 4.7.

Push fit the silicone tube which is fitted to the flue blockage safety device, on to the sensing tube, see diagram 4.7.

Fit the sensing tube securing bracket in position, see diagram 4.6, first removing the top left hand combustion chamber screw, see diagram 4.6. Locate the bottom of the bracket by positioning the hole in the base of the bracket so that it engages onto the front left hand nib in the boiler base plate. Secure the top of the bracket to the combustion chamber with the combustion chamber securing screw replaced in its original position, see diagram 4.7.

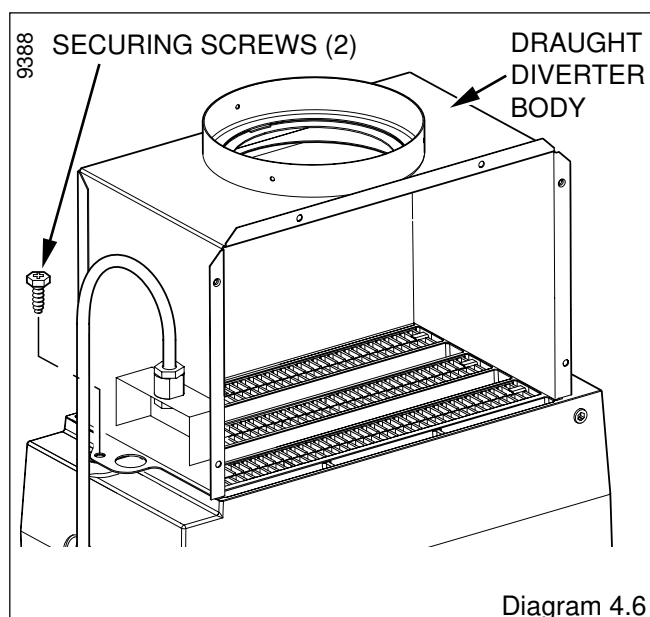
**IMPORTANT: Check that the sensing tube is positioned flat against the combustion chamber side when the sensing tube bracket securing screw is tightened up and that the silicone tube is not trapped against the combustion chamber side. Check also that there are no kinks in the silicone tube.**

NOTE: At this point it may be more convenient to fit the water connections.

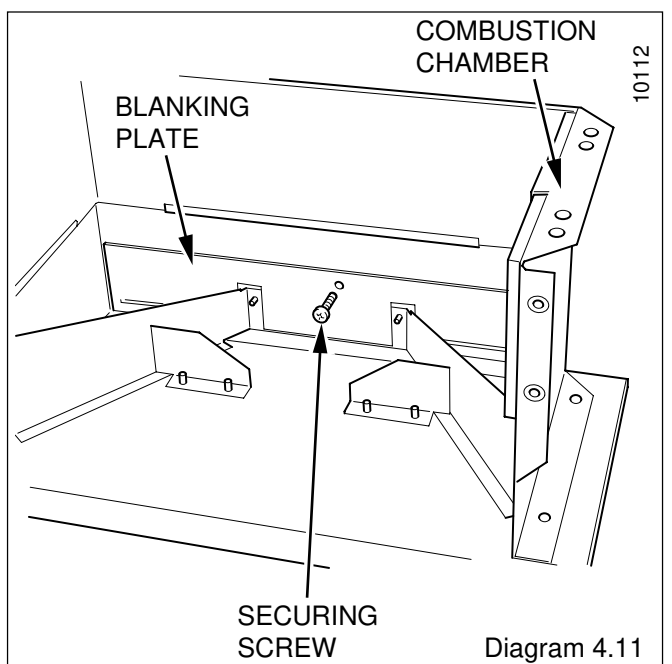
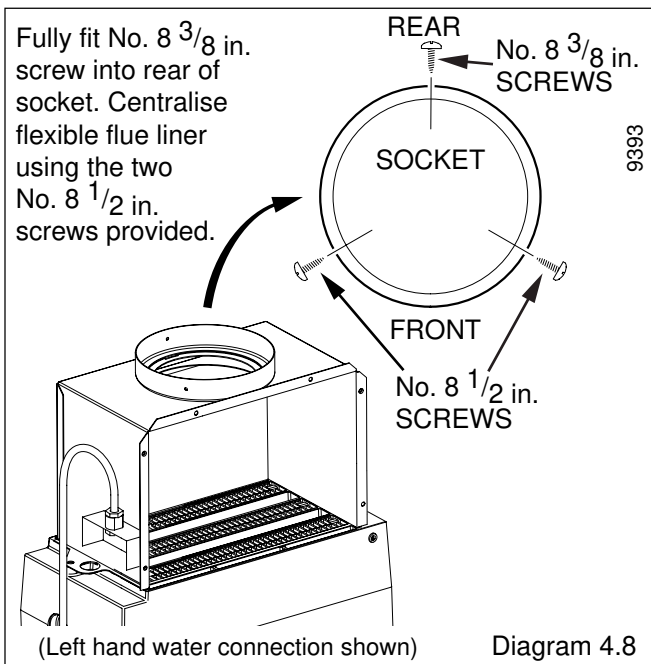
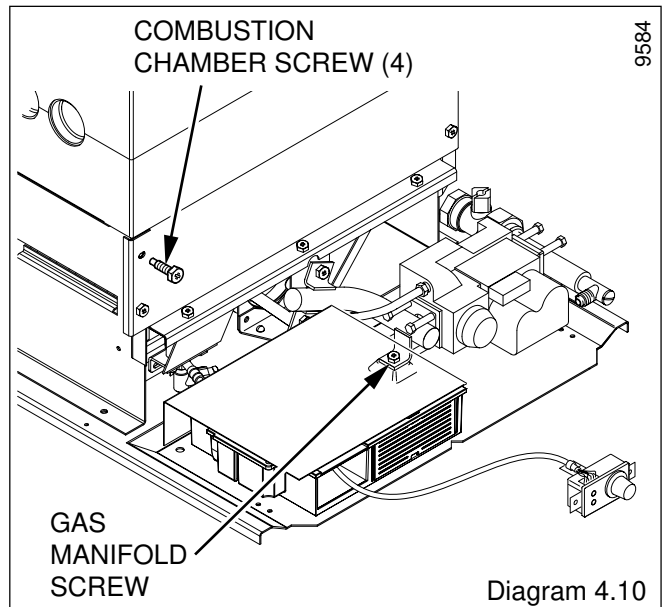
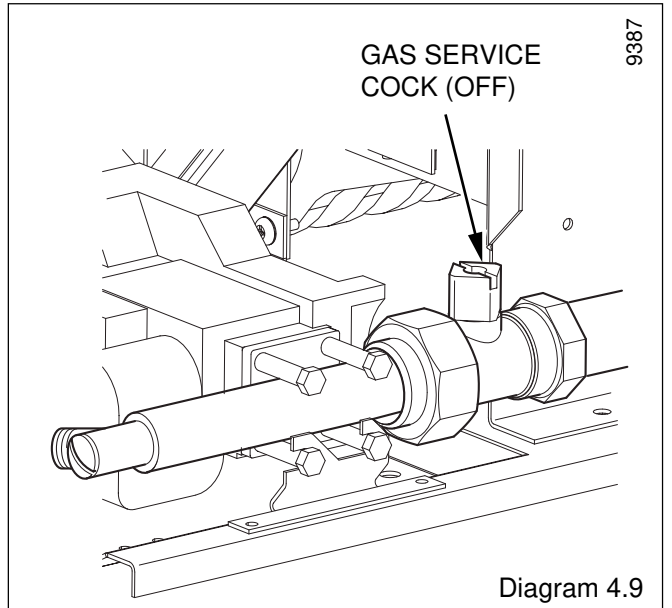
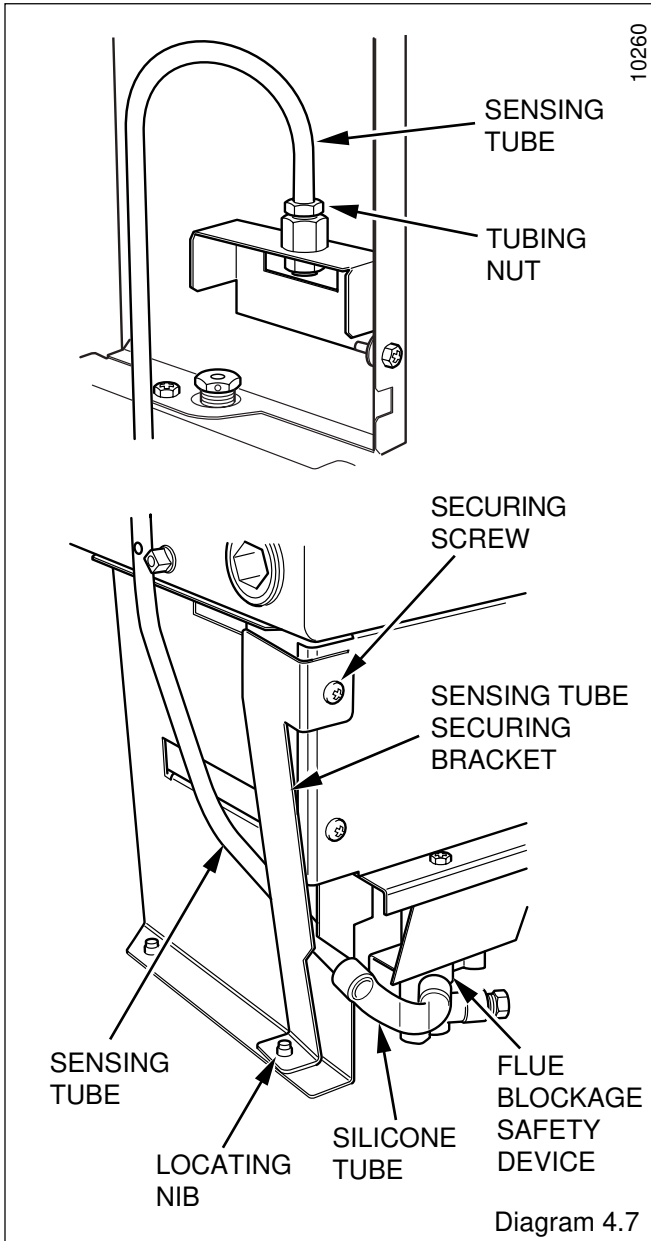
Connect the system pipework to the back boiler unit/pre-plumbed pipework.

If a flexible flue liner is being used, position the liner in to the flue socket. Using two No.8x<sup>1</sup>/<sub>2</sub>in self tapping screws, coloured black, from the fittings pack, screw through the two remaining holes in the flue socket to centralise and secure the flue liner, see diagram 4.8. Seal with a suitable fire clay cement.

Connect gas supply to gas service cock. Leave gas service cock and gas fire supply cock in the "OFF" position, see diagram 4.9 and 6.2.



# 4 Installation



## 5 Electrical Wiring

### 5.1 General

**WARNING.** This boiler must be earthed.

#### ISOLATE THE ELECTRICAL SUPPLY BEFORE DOING ANY WIRING

All of the electrical installation must be correctly earthed and be in accordance with the current issue of BS7671 and be carried out by a competent person.

The boiler electrical supply is 230V~ 50Hz, fused at 3A. A double pole isolating switch, having a minimum contact separation of 3mm in both poles should be used.

The boiler does not require a permanent live. External controls are connected to the live 'L' terminal in the 3 way plug, as an example see diagram 5.1.

Supply cable should be (85°C) PVC insulated type to the current issue of BS6500 Table 16, not less than 0.75mm<sup>2</sup> (24/0.20mm).

**NOTE:** The supply to the boiler and any remote control must be through the same isolating switch or plug and socket.

It is preferable to have the boiler electrical supply cable entering the builder's opening at the left, see diagram 5.2. Keep the cable well clear of hot surfaces.

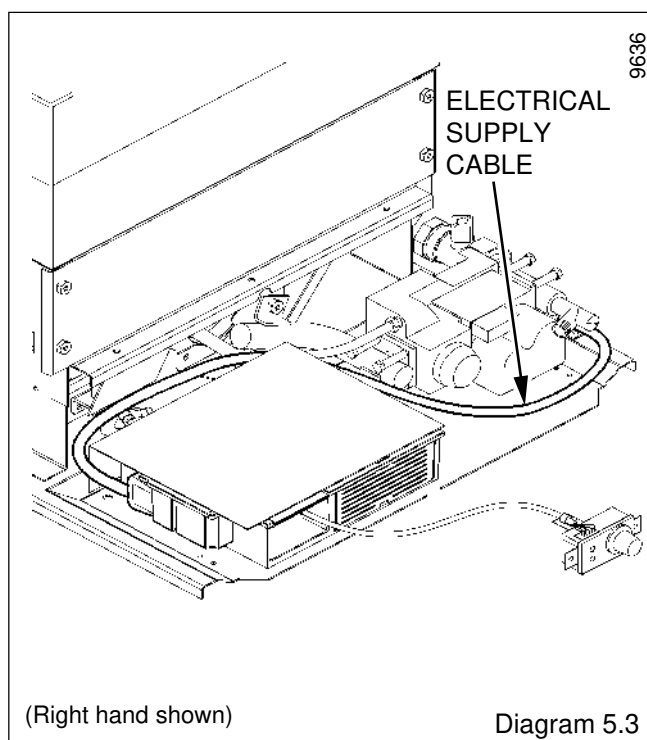
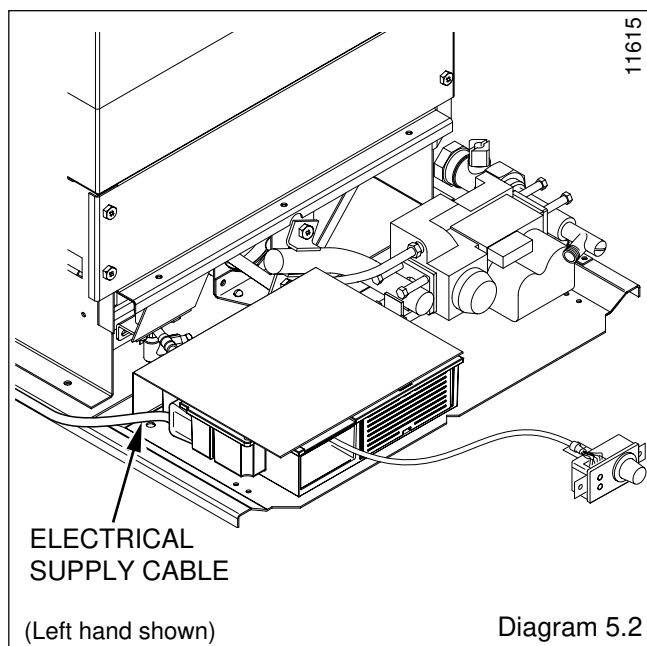
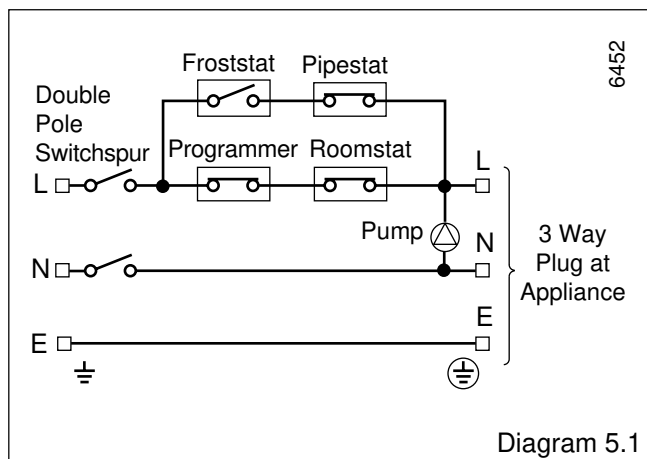
If right hand access is required and the boiler electrical supply cable has to be routed down the right hand side of the combustion chamber keep the cable well clear of hot surfaces. The cable must also be routed in front of the gas control valve, see diagram 5.3.

Note: If the fire front to be fitted to the back boiler unit is, a Firelite 4, Contour 4, Miami 4, Heartbeat 4, or Black Beauty 4, the mains cable, if it is routed from the right, will have to be secured in a retaining clip on the combustion chamber extension. Fitting instructions for the combustion chamber extension are given in the Use, Installation and Servicing instructions of the above fire fronts.

**NOTE: The boiler electrical supply cable must not be routed along the back of the appliance.**

**The cable must be kept well clear of hot surfaces.**

**When fitting the back boiler unit do not trap the cable.**



## 5 Electrical Wiring

### 5.2 Control Thermistor Phial

Route the cable well clear of any part of the back boiler which becomes hot. Push the phial into the pocket and secure with retaining wire from fittings pack, see diagram 5.4. Again make sure that the cable is not touching the casing.

### 5.3 Boiler Control Box

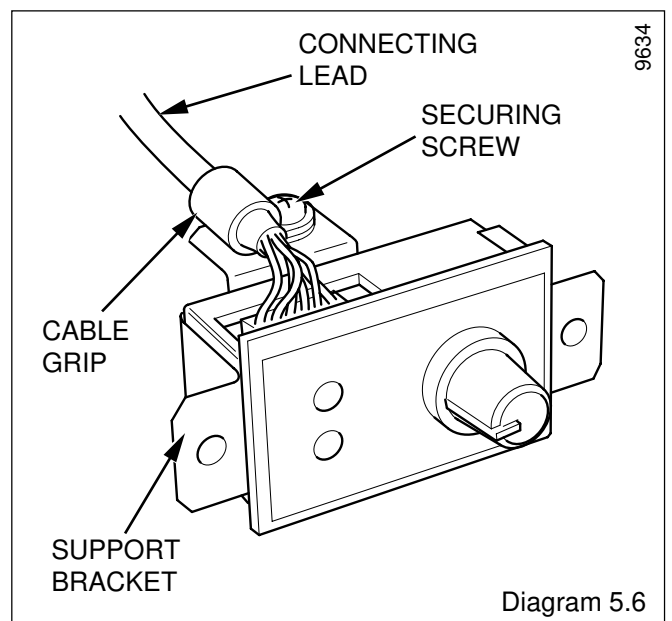
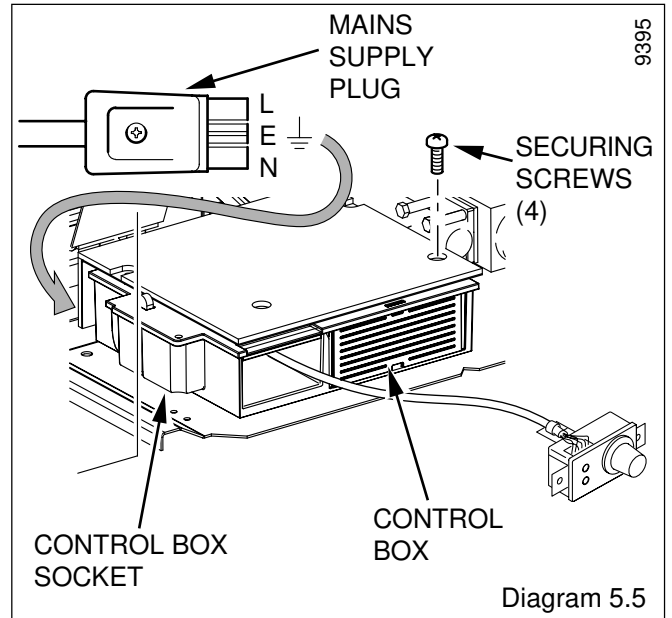
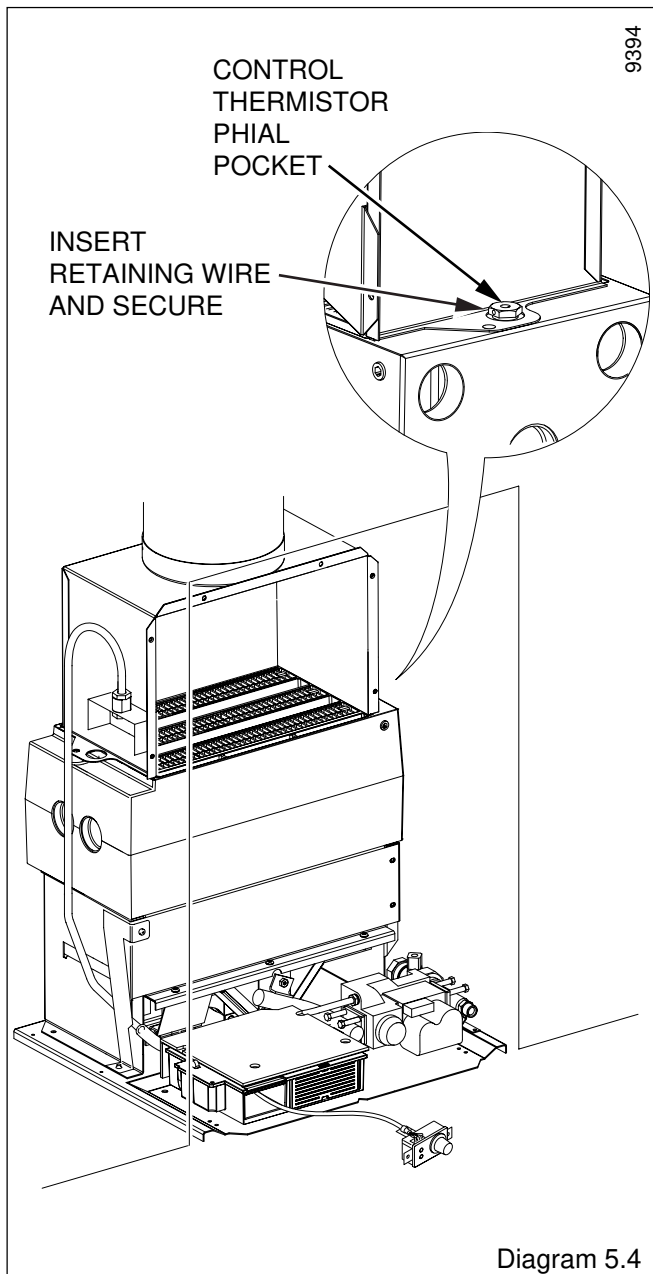
Taking care that the POWER IS OFF, wire the incoming mains cable to the mains plug supplied in the fittings pack. Do not connect the mains supply plug to the control box socket, see diagram 5.5.

### 5.4 Boiler User Control lead fitting, Chatsworth 4 and Dovedale 4 only.

Before the fire front is positioned the boiler user control will need to be fitted to the control box.

Remove the control box lid securing screws, see diagram 5.5.

Remove the control box lid taking care not to damage the insulation.



## 5 Electrical Wiring

Remove the boiler user control and its long connecting lead from the control box, see diagrams 5.8 and 10.4.

Remove the long connecting lead and bracket from boiler user control, first unscrewing cable grip to remove support bracket and then unplug lead. Discard support bracket and long lead, see diagram 5.6.

Plug the short connecting lead (supplied in the fire front fittings pack) into the boiler user control

Slide the boiler user control into position on the control box front, making sure that it fits into the groove in the control box, and connect the lead plug on to P.C.B., see diagrams 5.8 and 10.4.

Refit the control box lid ensuring the boiler user control locates into the slot on the underside of the lid, see diagram 5.7.

Refit the control box securing screws.

### 5.5 Testing - Electrical

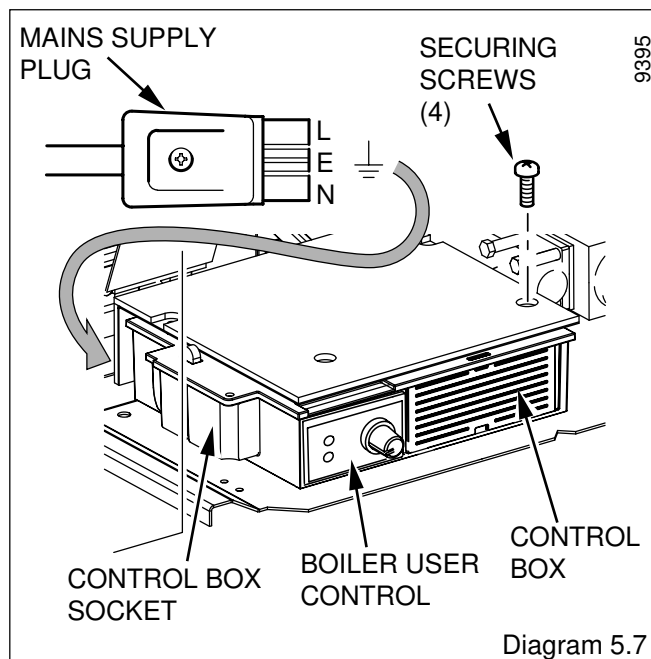
Checks to ensure electrical safety must be carried out by a competent person.

After installation of the system, preliminary electrical system checks as below should be carried out,

1. Test insulation resistance to earth of mains cable.
2. Test the earth continuity and short circuit of all cables.
3. Test the polarity of the mains.
4. With the mains supply off. Plug the mains supply plug into the control box socket, see diagram 5.5.

### 5.6 Overheat Cut-off Device (sealed systems only)

A kit No. 2000463000 is available with Fitting Instructions.



# 5 Electrical Wiring

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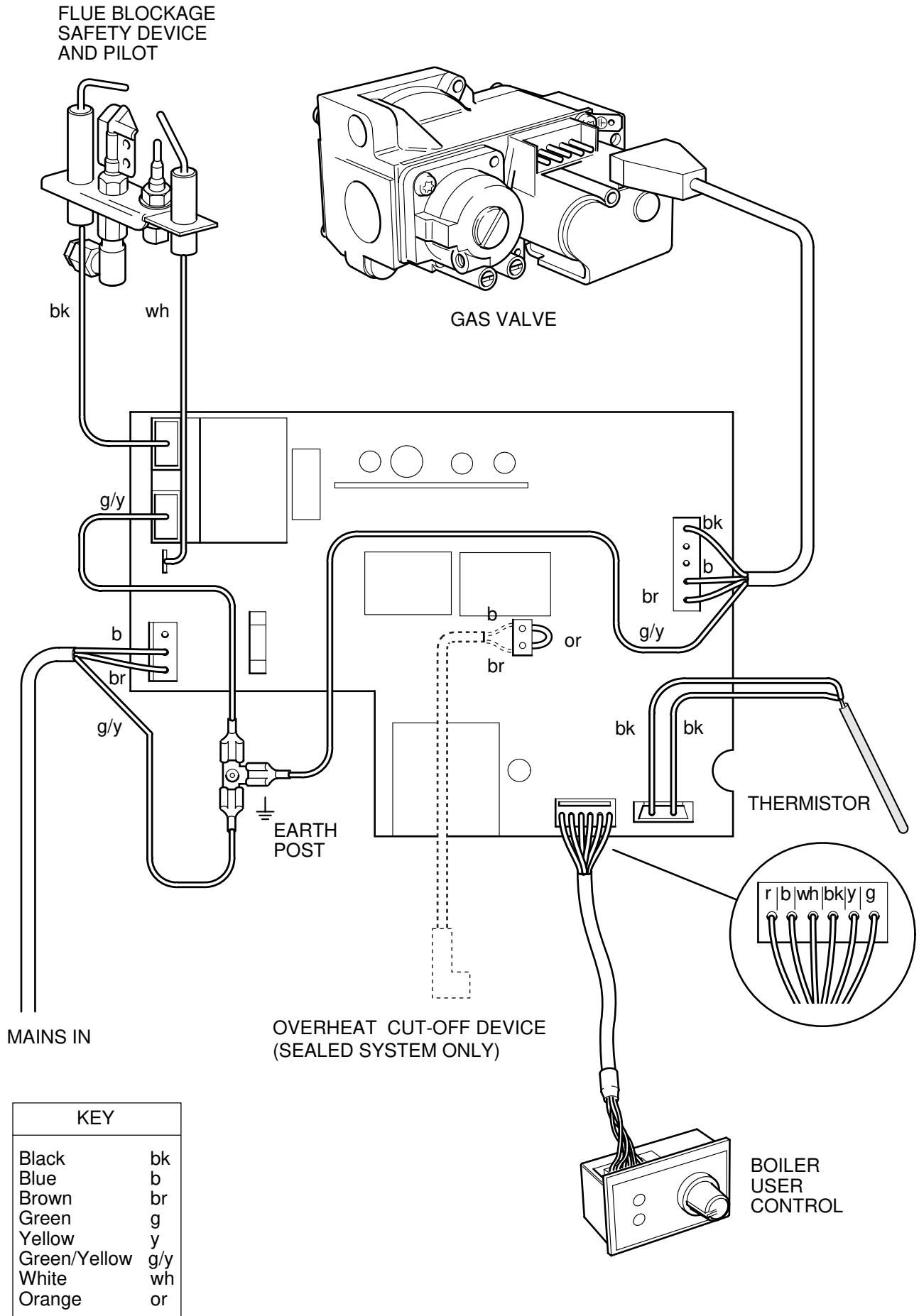


Diagram 5.8

## 6 Commissioning

### 6.1 Commissioning the Back Boiler

Before commissioning the back boiler, the whole of the system should be thoroughly flushed out with cold water with the circulation pump removed. Replace the pump, fill the system and examine for water soundness. Vent air from the system and pump.

The back boiler unit is fitted with a flue blockage safety device, which will shut it down if there is a lack of oxygen. The principle by which this operates is that when there is a depletion of oxygen resulting from a build up of combustion products, the flame on the pilot light will become unstable and lift up off the sensing device, this will deactivate the gas valve via the p.c.b., cutting off the gas supply.

If the back boiler unit shuts down frequently for no apparent reason the first things to be checked are the chimney and air inlets into the room. Any problems found must be put right, by a competent person, and a full operational test carried out before the back boiler unit is used again.

The flue blockage safety device incorporates the electrode and pilot assembly.

**The flue blockage safety device MUST NOT be adjusted or disconnected. It must be serviced strictly in accordance with the instructions in this book. Any unauthorised interference could result in the device failing to operate, creating a potentially dangerous situation. If replacing, use only the correct and approved parts.**

CAUTION: The following work should be carried out by a competent person.

Identify the back boiler controls by reference to diagram 6.1.

Open all windows and put out any naked lights, cigarettes etc.

Test the gas supply for soundness. Purge air in accordance with the current issue of BS6891.

Check that the electrical supply to the back boiler is switched off.

Set the control thermistor knob "A" to "O" position, see diagram 6.1.

**NOTE: Firelite 4, Contour 4, Miami 4, Heartbeat 4 and Black Beauty 4 only.**

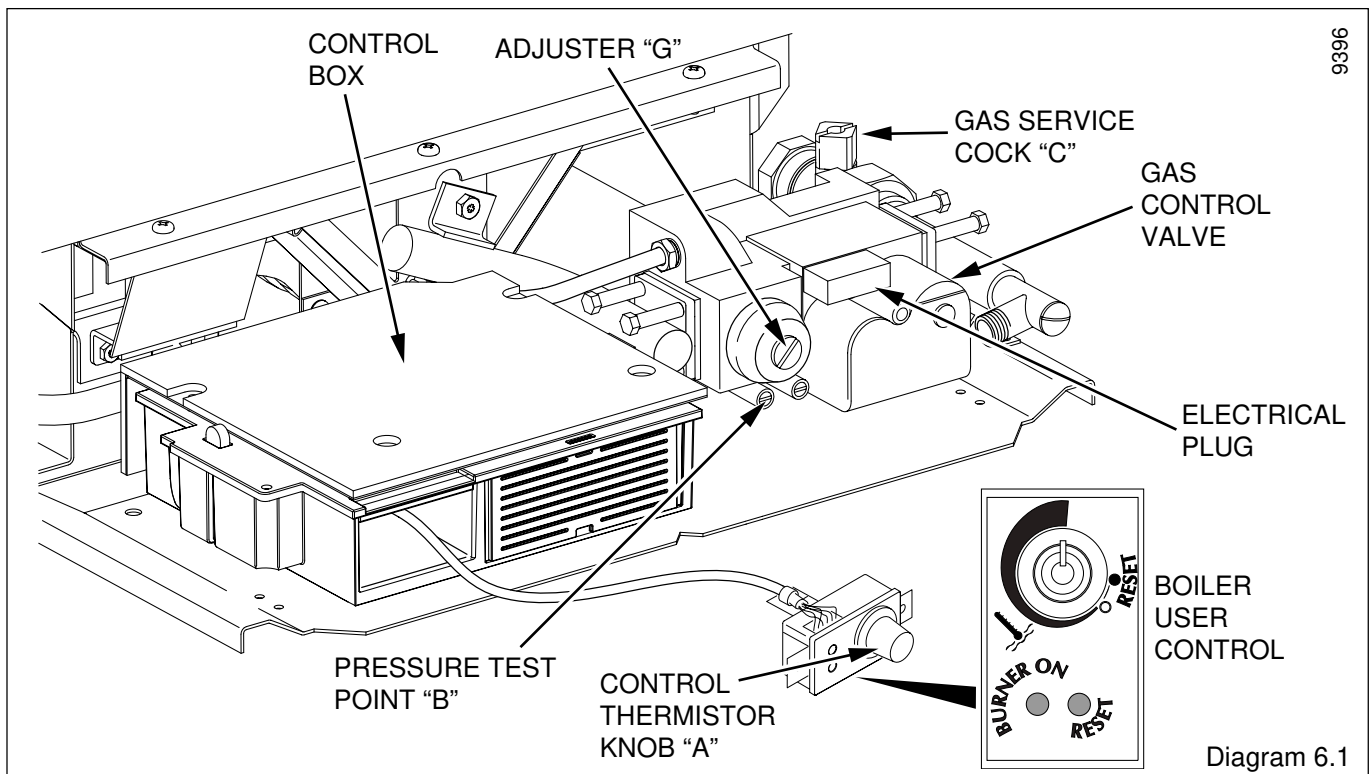
Take care when handling the boiler user control so that the extension lead is not strained.

**continued -**

Make sure the thermistor phial is fitted correctly, see diagram 5.4.

Loosen the back boiler burner pressure test screw "B" and connect a suitable pressure gauge.

Turn gas service cock "C" to the "On" position making sure that the fire front service cock "D" is in the "Off" position, restrictor fully screwed in, see diagram 6.2.



## 6 Commissioning

### Technical Sequence of Operation

When an external control calls for heat there is approximately a 5 second delay. The control board (PCB) energises the 1st gas valve solenoid, the valve will open and the spark unit will operate. With the valve open, gas is allowed to pass to the flue blockage safety device that will be ignited by the sparks. This ignition attempt will continue until the micro-ampage generated at the sense electrode is sufficient to satisfy the board. At this point the spark unit is de-energised and the green light on the boiler user control will light up, see diagram 6.1. The main gas control valve is energised through the control board and main burner lights. When the water temperature has reached the set point the control thermistor instructs the control board to close the gas valve.

**NOTE.** If the electrical supply is switched rapidly off and on without gas present the control will purge for 100 sec. Neither of the indicators will be lit. The appliance will then operate correctly.

When the water temperature has reduced to a set point the control thermistor will instruct the control board to restart ignition.

The boiler will continue to cycle in this manner until the external control stops its demand for heat. At this point external power is removed and the board switches off.

Check the pilot flame is stable and has a length as shown in diagram 6.3.

Note: Should the red light on the back boiler control panel come on, it indicates that the pilot light is not operating correctly, or the flue blockage safety device has been activated, see diagram 6.1.

When the fault has been corrected, turn the control thermistor knob "A" fully anti-clockwise so that the pointer is against the "Reset" position on the back boiler user interface, see diagram 6.1.

Turn the control thermistor knob "A" fully clockwise to maximum on the back boiler user control. After a delay the unit will restart the ignition sequence. This is indicated by the green light on the boiler user interface coming on, see diagram 6.1.

The main burner will light.

Test for gas soundness using a suitable leak detection fluid.

The back boiler is supplied preset to a maximum heat output setting of 11.72 kW (40000 Btu/h) but may be adjusted to suit design requirements.

This value is permitted and must not be increased when using the boiler in combination with a Chatsworth 4 and a Dovedale 4 firefront.

For Firelite 4, Contour 4, Miami 4, Heartbeat 4 or Black Beauty 4 fire front the output may be increased to 13.18 kW (45000 Btu/h).

If adjustment is required, TEN MINUTES after lighting, turn adjustment screw "G" anti-clockwise to suit system design heat input, see diagram 6.1 and 6.2.

Should any doubt exist, the gas rate should be checked at the gas meter.

The rate of the back boiler should be within the range:

For Firelite 4, Contour 4, Miami 4, Heartbeat 4, Black Beauty 4 1.59m<sup>3</sup>/h (56ft<sup>3</sup>/h) to 0.98m<sup>3</sup>/h (34.44ft<sup>3</sup>/h).

For Chatsworth 4, Dovedale 4:

1.39m<sup>3</sup>/h (49ft<sup>3</sup>/h) to 0.96m<sup>3</sup>/h (33.8ft<sup>3</sup>/h)

Note, if the gas rate is checked, make sure that all other gas appliances and pilot lights are turned off.

Turn control thermostat knob "A" anti-clockwise to the "Reset" position. Remove pressure gauge and replace test point screw ensure a gas tight seal is made.

Relight the back boiler by turning control thermostat knob "A" clockwise to maximum.

Use the self-adhesive arrow from the fittings pack and stick it against the relevant heat input figure on the Data Label.

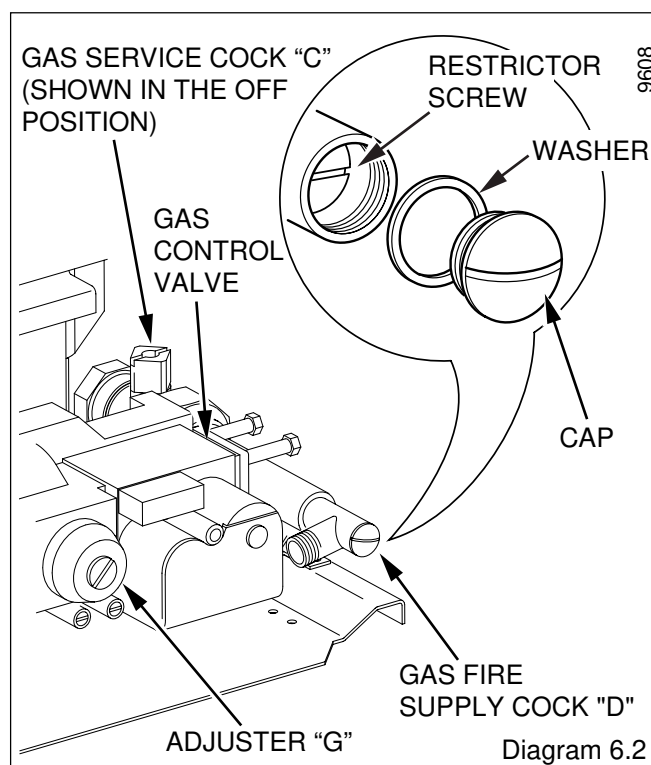
### LIGHTING: SEQUENCE OF OPERATION

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1. Switch on the electrical supply to the boiler and heating systems.
2. Set external controls if fitted, to demand heat.
3. Turn the boiler control thermistor knob fully clockwise to the maximum setting.

The lighting sequence is automatic as follows:-

4. Approximate 30 second delay.
5. Ignition initiated sparking at electrode EV1 energised, (Pilot solenoid) pilot lights.
6. EV2 energised, (Main burner solenoid) main burner lights.



## 6 Commissioning

### 6.2 Testing the Back Boiler Controls

To test the flame failure, turn the boiler on. After about 3 minutes, turn the gas service cock off, the lockout device should now operate. This is indicated by the red light coming on at the back boiler control panel.

To restart the boiler, turn on the gas supply at the gas service cock and turn the control thermostat knob "A" anti-clockwise to the "Reset" position then clockwise to maximum.

**DONOT ATTEMPT TO RELIGHT UNTIL AT LEAST 3 MINUTES HAVE GONE BY.**

Check that the boiler thermostat control and any external controls operate the back boiler correctly.

**NOTE.** If the electrical supply is switched rapidly off and on without gas present the control will purge for 100 sec. Neither of the indicators will be lit. The appliance will then operate correctly.

### 6.3 Clearance of Products

A clearance of products (spillage) test must be carried out after installation of the back boiler and it's fire.

Before fitting the fire, check that the heat exchanger baffles are fitted and seated correctly, see Section 4.9.

Details of the necessary tests to be carried out will be found under "TEST FOR CLEARANCE OF PRODUCTS" in the Fire Front Installation Instruction Booklet.

**Note:** This test must only be carried out after the fire front has been fitted to the back boiler unit.

### 6.4 Commissioning the System

Set all controls to operate the heating system. Adjust circulating pump and balance the system to give a temperature drop across the boiler of 11°C (20°F). At the appropriate flow rate, the resistance of the back boiler can be found by reference to diagram 6.4.

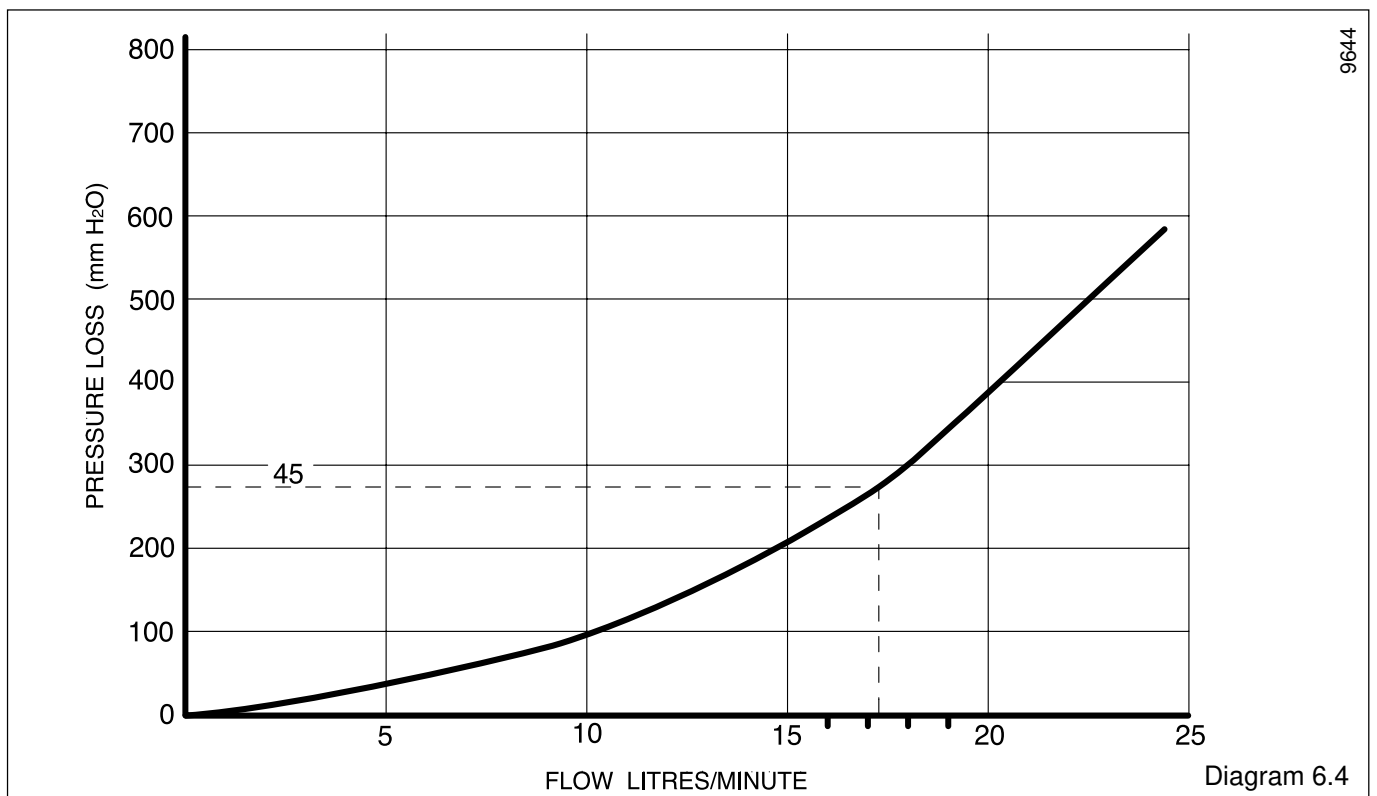
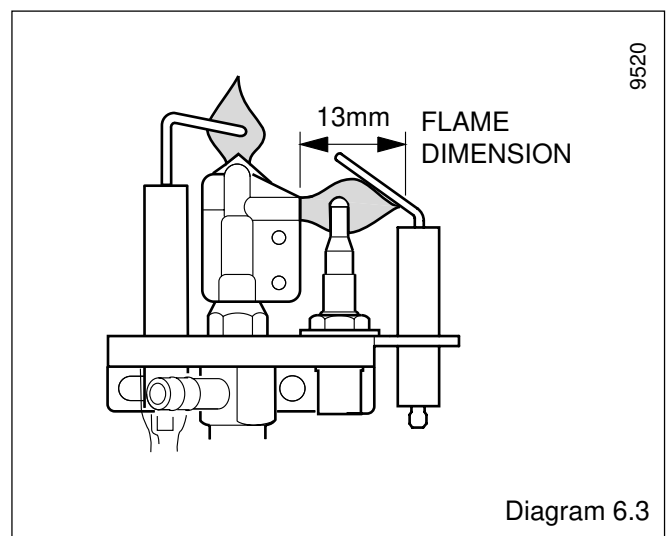
There should be no undue noise in the pipework or heat emitters. There must be NO pumping over of water or entry of air at the open vent pipe above the feed and expansion cistern.

Make sure the back boiler control thermostat knob "A" is turned clockwise to maximum, which is about 82°C (180°F), against the setting point, allow the water to reach maximum working temperature. Examine the system for water soundness.

Turn the control thermostat knob "A" anti-clockwise to "RESET" (OFF) and rapidly drain the system whilst still hot, to complete the flushing process.

Refill the system, vent and check again for water soundness.

Isolate gas at gas service cock 'C' and the electrical supply to the back boiler until the fire front is fitted.



## 7 Fire Installation

Fire Front Installation and Servicing Instructions are packed with the fire.

### 7.1 Completion - After Installation of the Fire Front

Instruct and demonstrate to the user, the efficient and safe operation of the boiler, heating and hot water system and fire front.

Hand the Instructions for Use to the user, making sure that they are understood.

Advise the user that to ensure the continued efficient and safe operation of the appliance it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of the servicing will depend upon the particular installation conditions and usage, but in general once a year should be enough.

Draw attention, if applicable, to the current issue of the Gas Safety (Installation and Use) Regulations, Section 35, which imposes a duty of care on all persons who let out any property containing a gas appliance.

It is the law that any servicing must be carried out by a competent person.

Set any remote controls for the system to settings requested by the user.

Advise that the boiler is fitted with a flue blockage safety device and refer to the Instructions for Use.

Advise the user of the importance to keep any purpose built ventilation system where the appliance is installed, clear of any obstruction that would impede its efficiency.

Reminder, leave these instructions with the user.

Advise the user that the 'Benchmark' logbook should be completed by the installation engineer on completion of commissioning or servicing.

## 8 Servicing

**REMEMBER,** When replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Hepworth Heating Ltd.

### Servicing Notes

- To ensure the continued efficient and safe operation of the appliance it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of the servicing will depend upon the particular installation conditions and usage, but in general once a year should be enough.
- It is the Law that servicing must be carried out by a competent person.
- Remove the fire front
- Refer to the Gas Fire Front Installation and Servicing Instructions for full details of fire front removal.
- After completing any servicing always test for gas soundness with a suitable leak detection fluid and carry out functional check on controls.
- Unless stated otherwise reassembly of all components is in the reverse order to that for removal.

### 8.1 Isolation of Services

With the fire front removed, see fire front instructions.

Refer to diagram 6.1 to identify the controls.

Turn control thermistor knob "A" anti-clockwise to "Reset" position.

Isolate the electrical supply to the back boiler.

Turn appliance gas service cock "C" to the OFF position, see diagram 6.2.

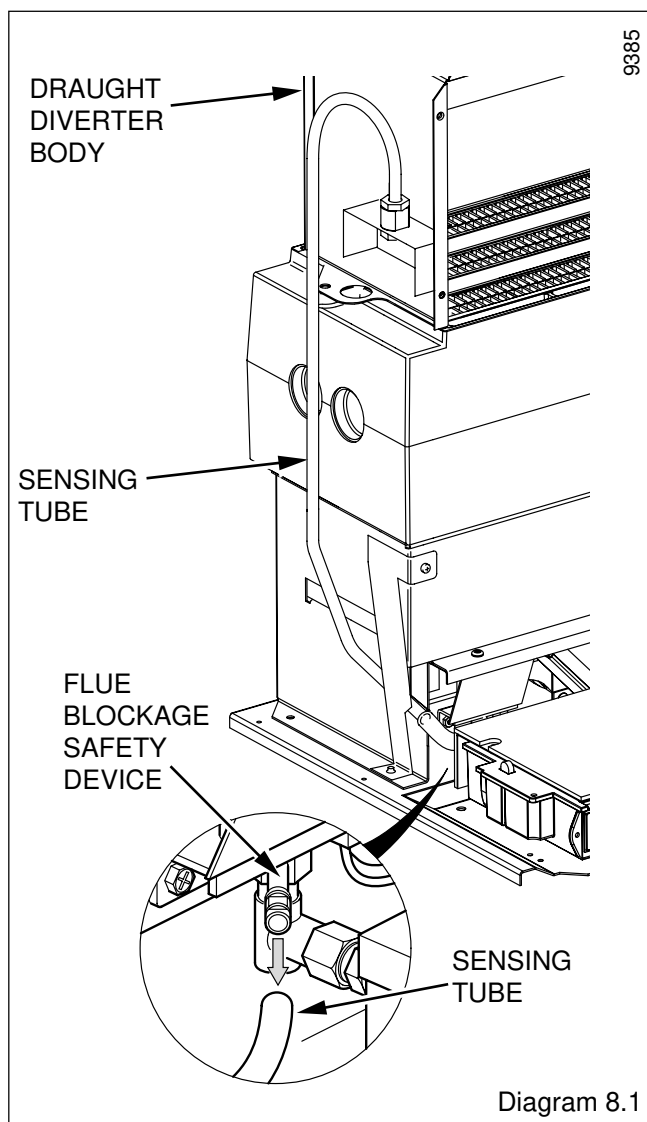
### 8.2 Sensing Tube Assembly

Remove the sensing tube assembly by unscrewing from the draught diverter and carefully pulling it away from the flue blockage safety device, see diagram 8.1.

### 8.3 Overheat Cut-off Safety Device (Sealed systems only)

To enable the controls assembly and burner to be removed from the boiler, pull the plug with the lead off the overheat cut-off safety device, located on the flow pipe near where it exits from the heat exchanger, see diagram 10.5.

**Note:** When replacing the plug ensure that the terminals on the overheat cut-off safety device engage fully in the plug. Check also that the overheat cut-off safety device has not been disturbed and is seated correctly on the flow pipe.



## 8 Servicing

### 8.4 Controls Assembly and Burner.

Disconnect the union at the gas service cock, see diagram 8.2.

Disconnect the mains electrical plug from the control box, see diagram 8.2.

Remove the thermistor phial from the phial pocket taking care not to damage the cable, see diagram 5.4.

Remove the four combustion chamber securing screws.

Remove the gas manifold securing screw and slide the control/burner assembly forwards to remove, see diagram 8.2.

### 8.5 Burner

Disconnect the pilot tube nut from the gas control valve, see diagram 8.3.

Disconnect the ignition lead at the electrode and the sensing lead at the sensor, see diagram 8.6.

Remove the screws which locate the gas manifold to burner, see diagram 8.3.

The control box and gas control valve can now be lifted clear of the burner.

Clean the burner as necessary, do not use a brush with metallic bristles.

### 8.6 Lint Arrester

Remove the four securing screws to disengage the two lint arresters, see diagram 8.4.

Clean the lint arresters as required.

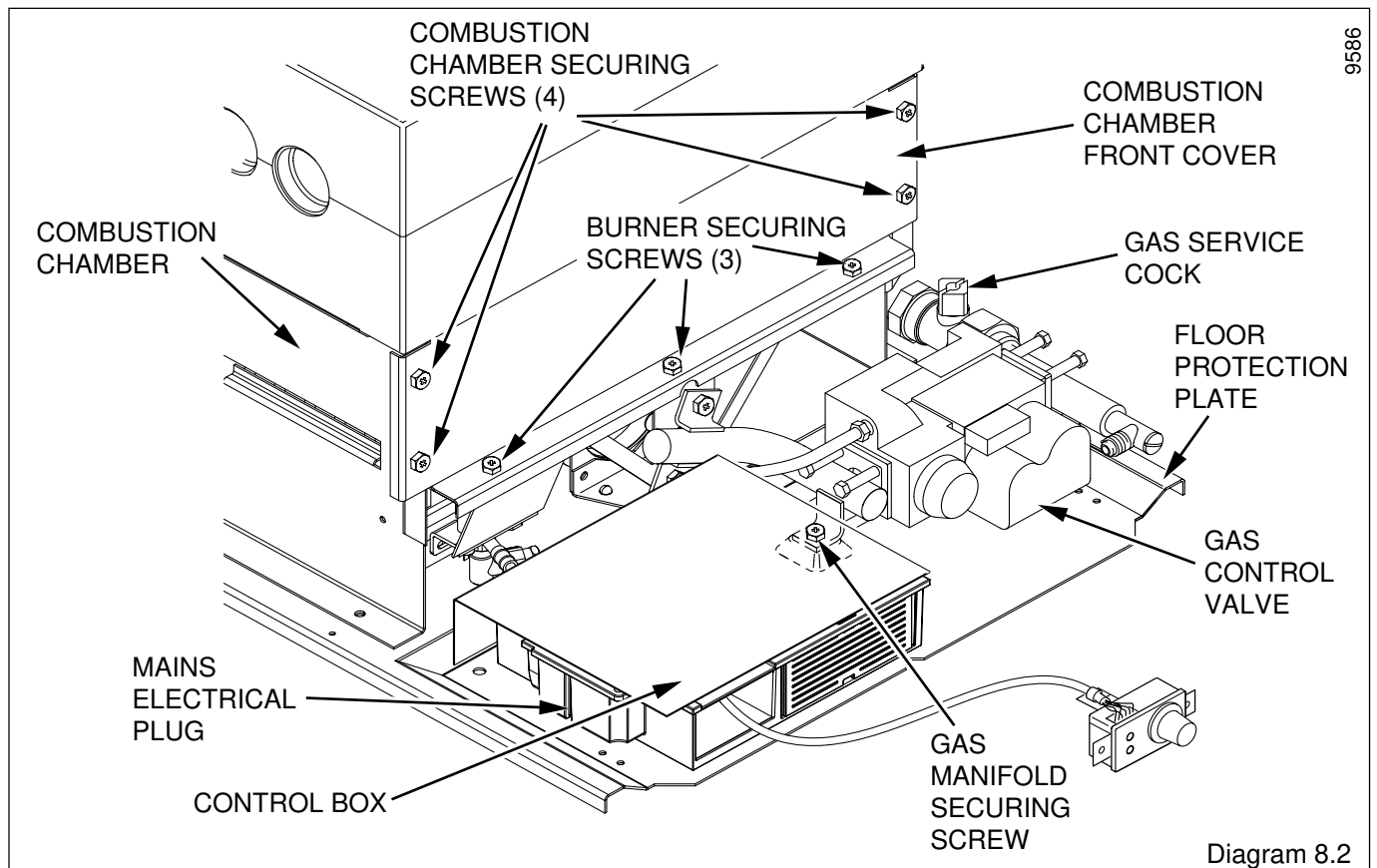


Diagram 8.2

## 8 Servicing

### 8.7 Main Burner - Injector

Inspect the main burner injector for damage or blockage, clean or replace as necessary, see diagram 8.5.

Do not use a wire or sharp instrument to clean the injector hole.

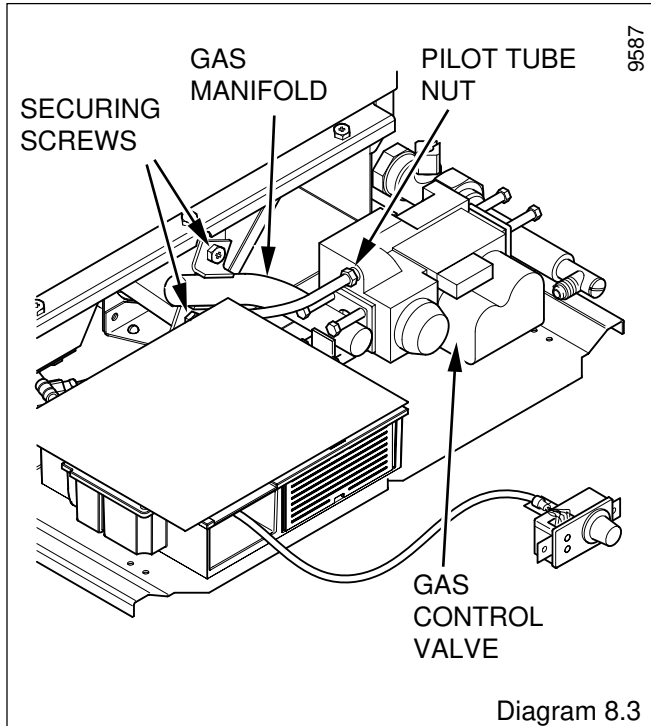


Diagram 8.3

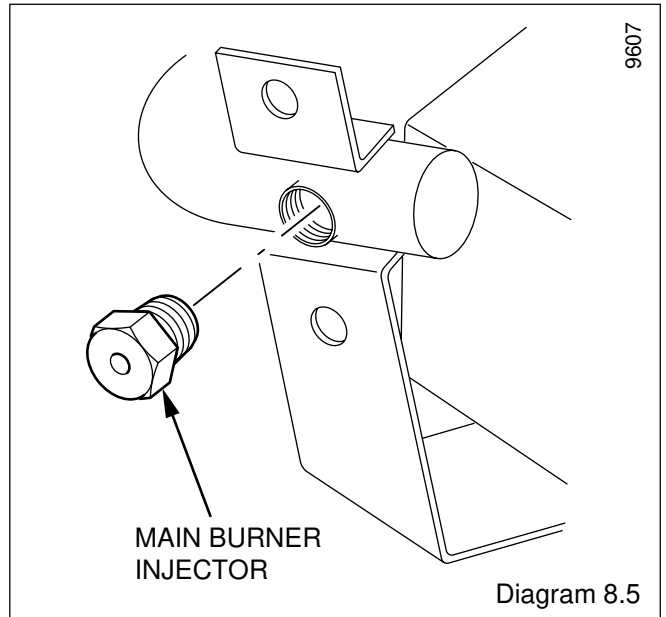


Diagram 8.5

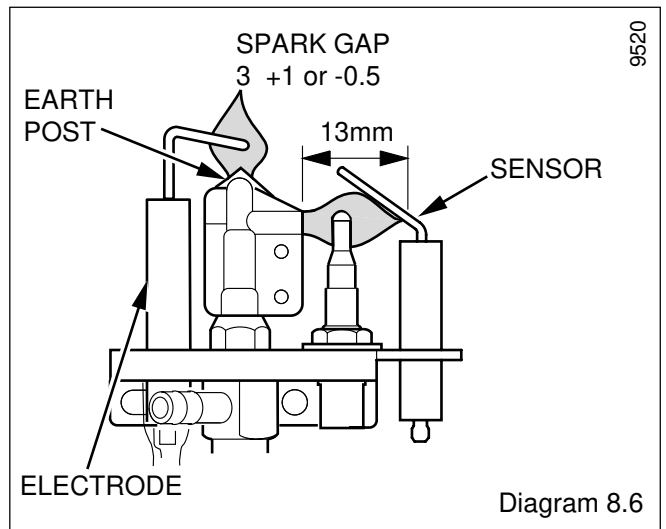


Diagram 8.6

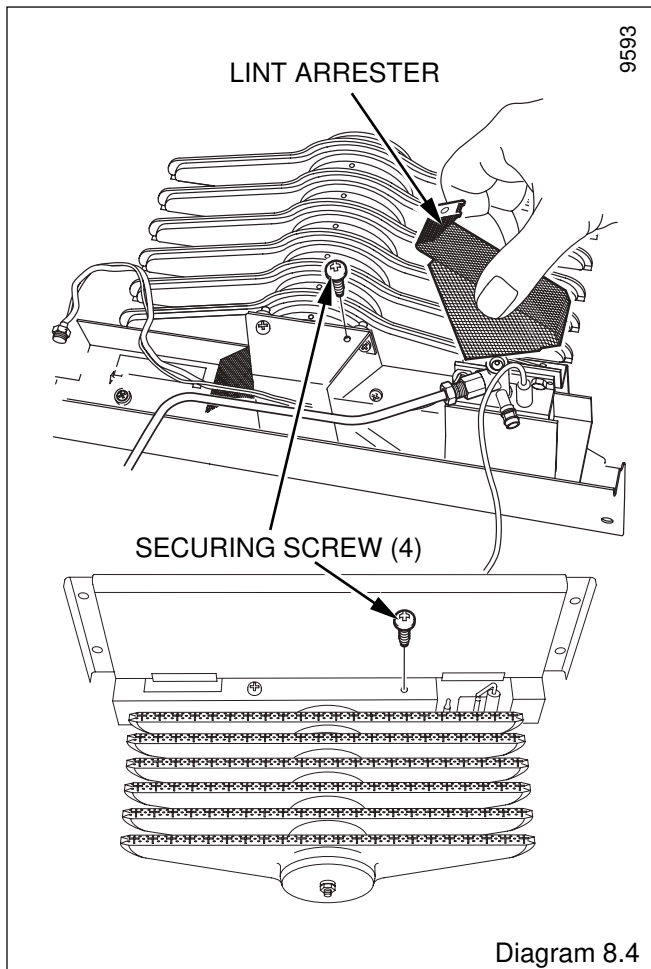


Diagram 8.4

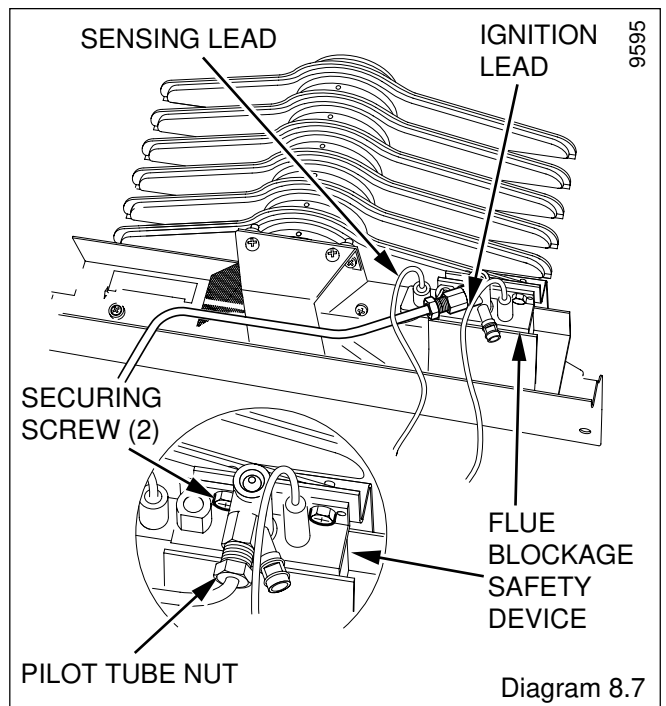


Diagram 8.7

## 8 Servicing

### 8.8 Flue Blockage Safety Device Assembly

Gain access as relevant part of Section 8.4. Remove any dust and lint, inspect the pilot for damage. Remove the sensing tube adapter, to clean, blow through, do not use a wire or sharp instrument. If necessary replace the flue blockage safety device.

Check for the correct spark gap, see diagram 8.6.

To remove the safety device, remove the two securing screws, see diagram 8.7.

### 8.9 Ignition Lead

Inspect the ignition lead for wear or damage, clean or replace as necessary, see diagram 8.7.

### 8.10 Electrode

Ensure the electrode is in line with the earth post and the spark gap is as shown in diagram 8.6.

Inspect the electrode for wear or damage, clean, or replace the flue blockage safety device, see diagram 8.7.

To remove the safety device, disconnect the pilot tube nut and two securing screws, see diagram 8.7.

### 8.11 Sensing Lead

Inspect the sensing lead for wear or damage, clean, or replace as necessary, see diagram 8.7.

### 8.12 Back Boiler Flueways

Lift out the flue baffles, see diagram 8.8.

Place a sheet of paper in the base of the combustion chamber.

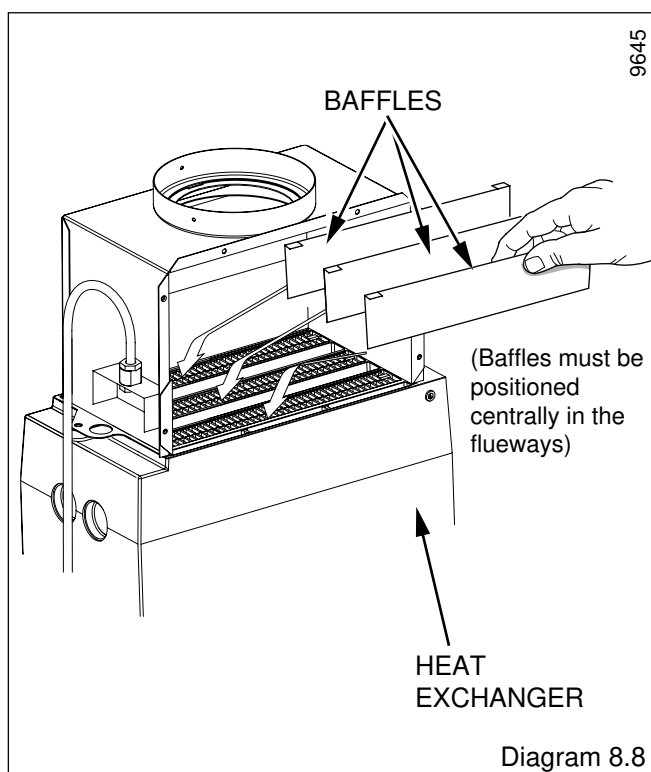
Clean the boiler flueways with a suitable stiff brush.

To make sure that the flueways are clean, view with the aid of a mirror or reflector.

Remove the paper and debris.

When refitting make sure that the baffles are seated and are centred in the flueways see diagram 8.8.

Now refit the control/burner assembly.



# 9 Fault Finding

## 9.1 Electrical

Carry out the preliminary electrical system checks as contained in a multimeter instruction book.

NOTE. If the electrical supply is switched rapidly off and on without gas present the control will purge for 100 sec. Neither of the indicators will be lit. The appliance will then operate correctly.

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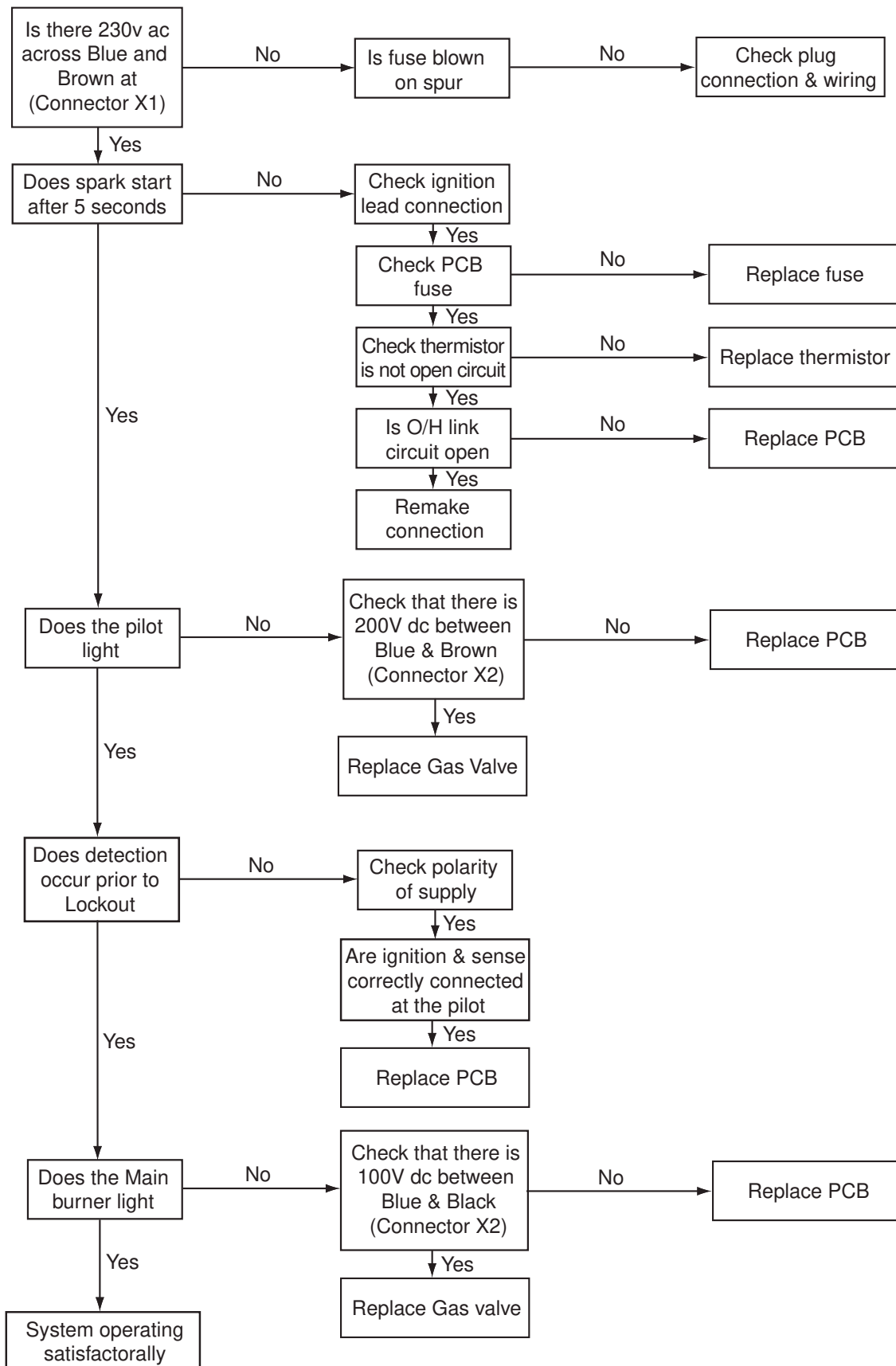


Diagram 9.1

# 9 Fault Finding

Refer to electrical fault finding chart, diagram 9.1 and functional flow wiring diagram 9.2.

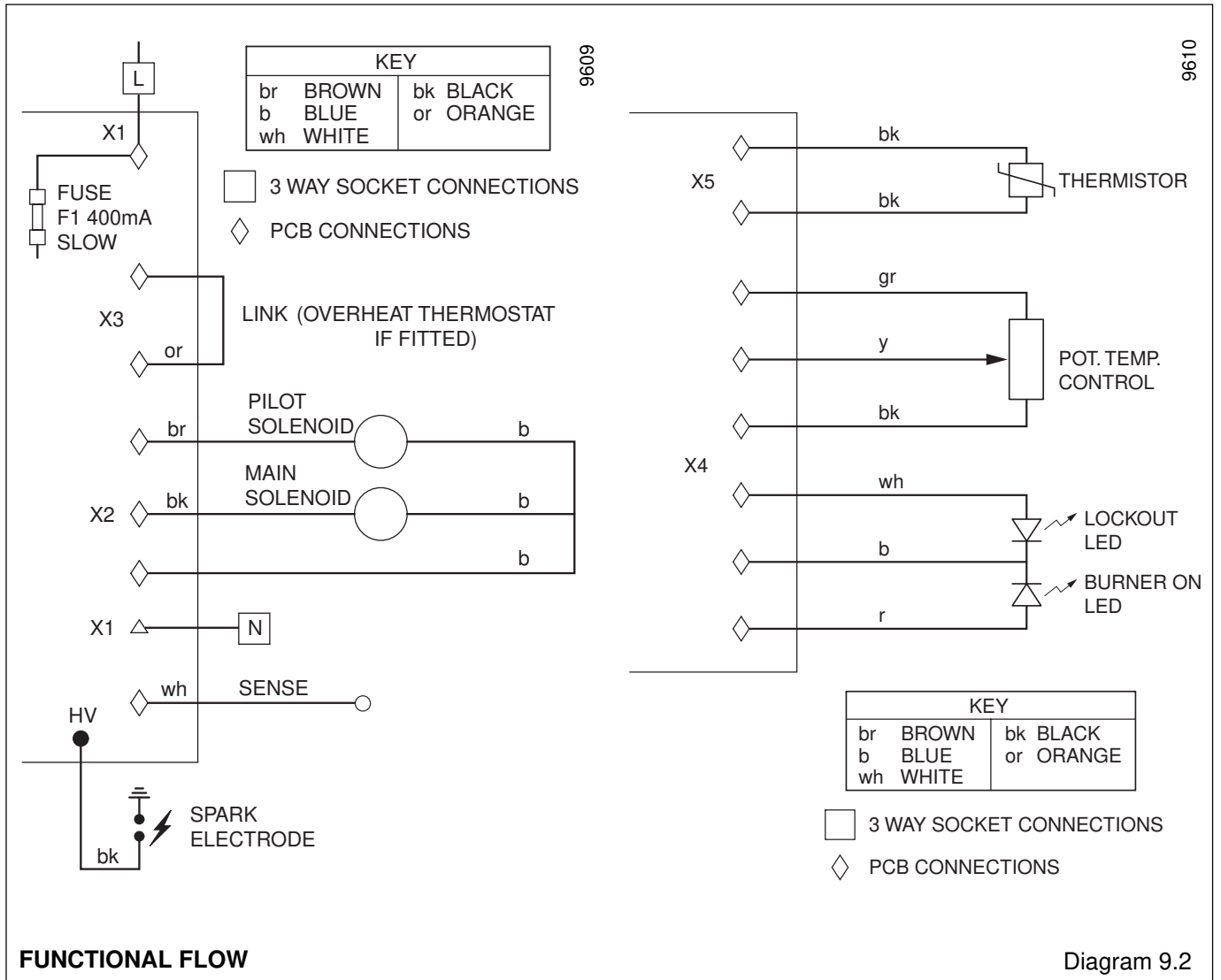
On completion of the fault finding task which has required the breaking and remaking of electrical connections, the checks for earth continuity, short circuit, polarity and resistance to earth must be repeated.

## 9.2 Electrical Fault Finding Back Boiler

Refer to diagram 9.1.

## 9.3 Flue Blockage Safety Device and Ignition Fault Finding

To check the safety device and ignition, refer to fault finding chart, diagram 9.1.



FUNCTIONAL FLOW

Diagram 9.2

## 10 Replacement of Parts

**IMPORTANT.** When replacing the heat exchanger please remember that it exceeds the recommended weight for a one man lift, refer the Manual Handling Operations, 1992 Regulations for further information.

Notes.

- Replacement of parts must be carried out by a competent person.
- Unless stated otherwise all parts are replaced in the reverse order to that of removal.
- After replacing any gas carrying parts always test for gas soundness using a suitable leak detection fluid. Also carryout functional check of controls.
- Refer to the Gas Fire Installation Instructions for details of the removal of the fire front.
- Isolate the electrical supply to the back boiler.
- Refer to diagram 6.1 to identify the back boiler controls.

Turn the control thermistor to "reset" position, see diagram 6.1. Turn the appliance gas service cock anticlockwise to "0", "Off" position, see diagram 6.2.

### 10.1 Sensing Tube Assembly.

Refer to Section 8.2.

### 10.2 Flue Blockage Safety Device

Follow the instructions in Section 8.2 and 8.4 to remove the sensing tube assembly and controls assembly and burner.

Refer to diagram 10.1.

Remove the ignition lead from the electrode.

Disconnect the sensing lead.

Disconnect the pilot pipe nut.

Remove the safety device securing screws.

Remove the safety device.

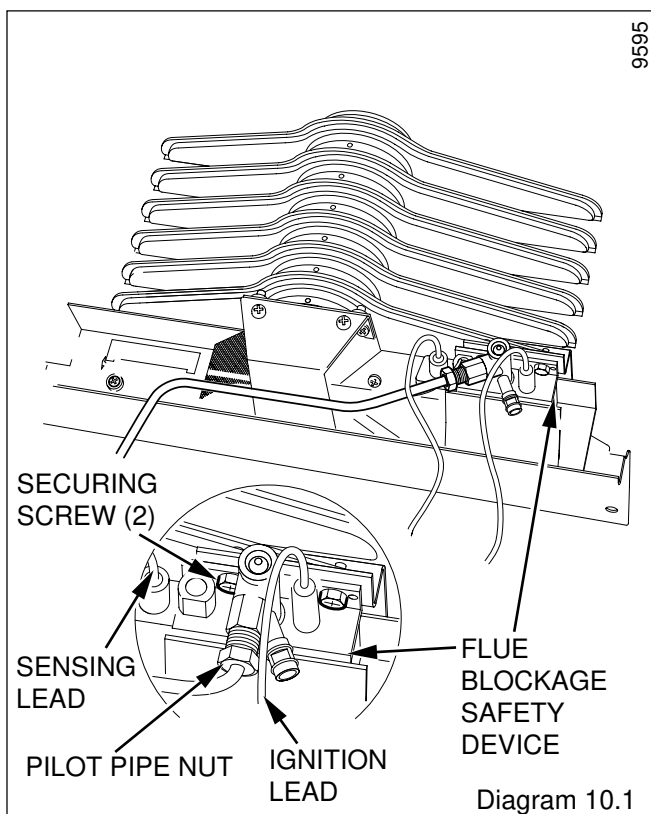


Diagram 10.1

### 10.3 Electrode

Proceed as in Section 10.2.

### 10.4 Ignition Lead and Sensing Lead

Remove the control box lid, see diagram 10.3

Remove the lead from the electrode or sensor, see diagram 10.4.

Remove the lead from the control board (PCB).

When replacing make sure the lead passes through the slot in the rear of the control box and the protective silicone sleeve is replaced.

### 10.5 Injector - Main Burner

Follow the instructions in Section 8.5 to remove the burner.

Replace the main injector, see diagram 8.5.

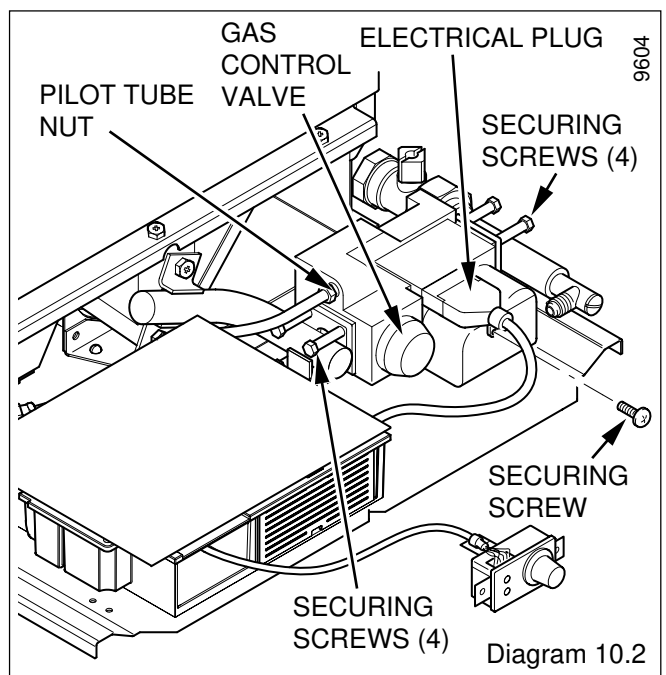


Diagram 10.2

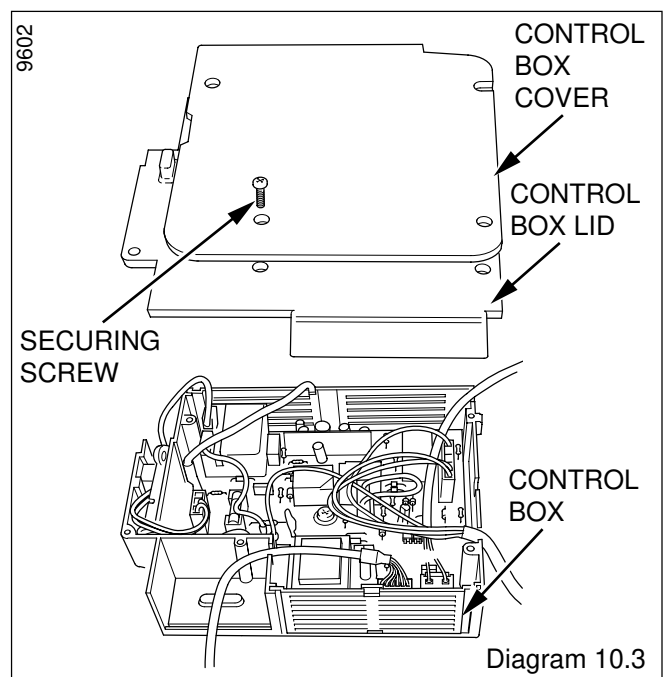


Diagram 10.3

## 10 Replacement of Parts

### 10.6 Gas Valve

Refer to the relevant parts of Section 8.4 to remove the controls assembly.

Refer to diagram 10.2.

Remove securing screw and disconnect electrical plug, see diagram 10.2.

Disconnect the pilot tubing nut at the gas valve.

Undo the securing screws to separate the valve from the supply pipe flange and gas manifold.

Fit the new "O" ring seals supplied with the new gas control valve.

### 10.7 Burner

Follow the relevant instructions in Section 8.4 and 8.5 to remove the burner.

Transfer the flue blockage safety device to the new burner, see diagram 10.1.

### 10.8 Control Thermistor

Remove the control thermistor phial, see diagram 5.4.

Remove the electrical control box lid securing screws and lift the lid off, see diagram 10.3.

Disengage the electrical connection from the P.C.B., see diagram 10.4.

Note: When fitting the new control thermistor, make sure that the thermistor lead is placed through the appropriate slot in the right hand side of the control box.

Refit the electrical connections.

Refit the control box cover.

Make sure the cable does not touch any part of the back boiler.

### 10.9 Control Board (PCB)

Remove the control box cover and control box lid, see diagram 10.3.

Refer to diagram 10.4.

Disconnect the ignition lead.

Disconnect the sensing lead.

Disconnect the four electrical leads

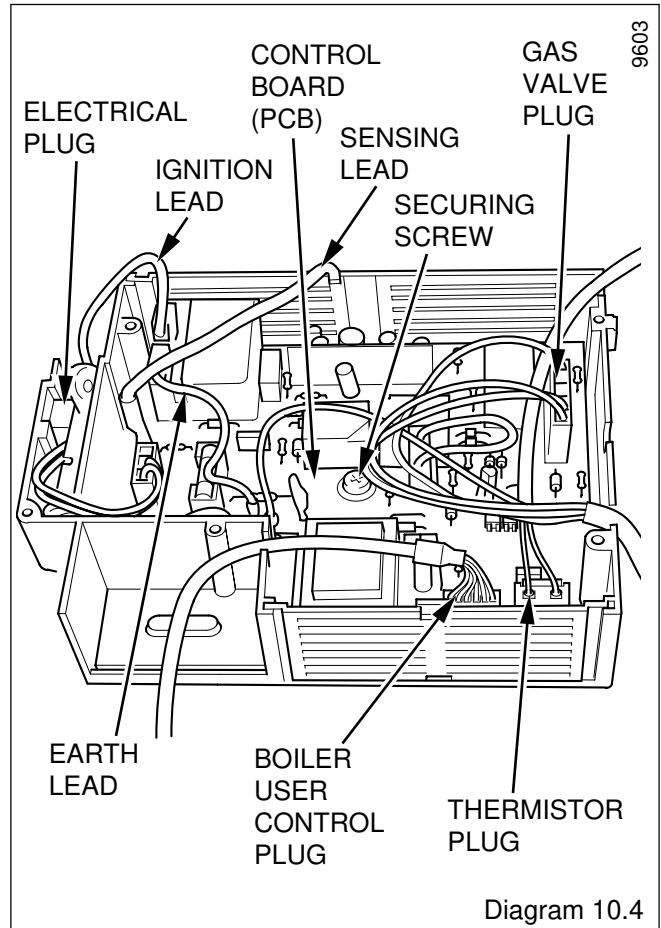
Note: To remove the boiler user control plug and the thermistor plug, prise locking tab before attempting to remove plug.

Disconnect the earth lead.

Remove control board (PCB) securing screw.

Withdraw control board (PCB).

When refitting refer to the wiring diagram 5.8.



## 10 Replacement of Parts

### 10.10 Overheat Cut-off Safety Device (Sealed systems only)

Unclip the overheat cut-off safety device from the flow pipe, it is located near where the flow pipe exits from the heat exchanger.

Withdraw the retaining clip with the overheat cut-off safety device from the lead plug.

Remove overheat cut-off safety device from clip and discard.

Fit new overheat cut-off safety device in clip and re-locate in the lead plug, making sure that the terminals fully engage in the plug.

Secure the new overheat cut-off safety device with the retaining clip to the flow pipe in the same position as where the old one was, see diagram 10.5.

Ensure that it is seated correctly on the flow pipe.

NOTE: Avoid hot areas when routing the overheat cut-off safety device lead.

### 10.11 Insulation

Follow the relevant instructions in section 8 to remove the controls assembly and burner.

#### Combustion Chamber Front

Remove the three burner securing screws to remove the combustion chamber front cover from the controls assembly and burner, see diagram 8.2.

Remove the combustion chamber front, then the front insulation piece, see diagram 10.6.

#### Sides

Slide out the side insulation, see diagram 10.6.

#### Rear

With the side insulation pieces removed, lift out the rear insulation, see diagram 10.6.

Note: Remove any debris that falls when the insulation has been replaced.

When spare parts are required apply to your local supplier.

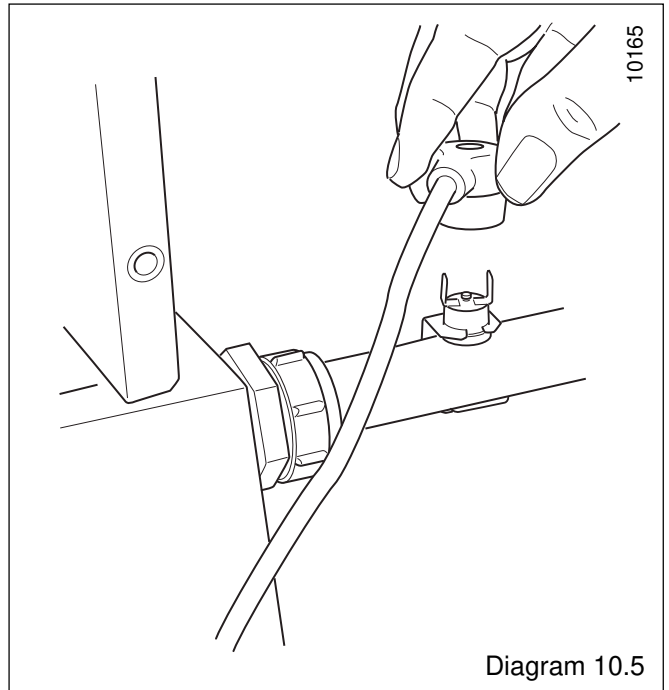


Diagram 10.5

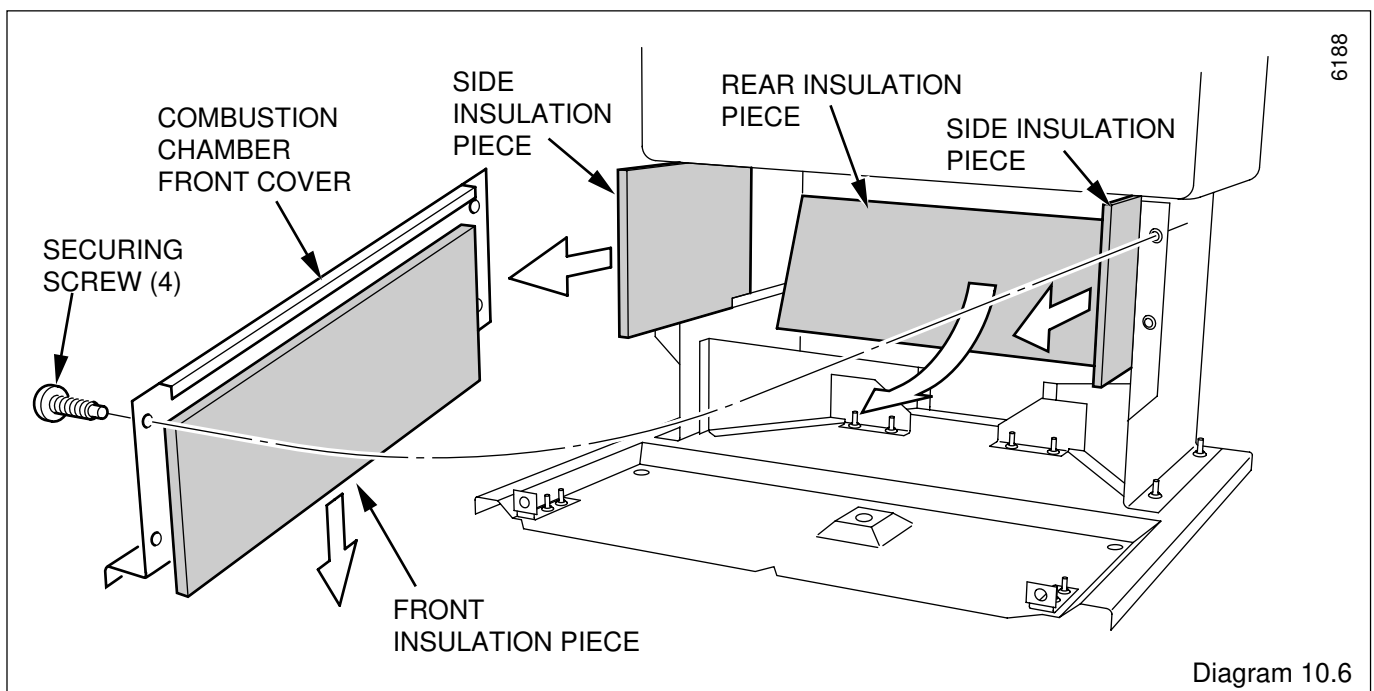
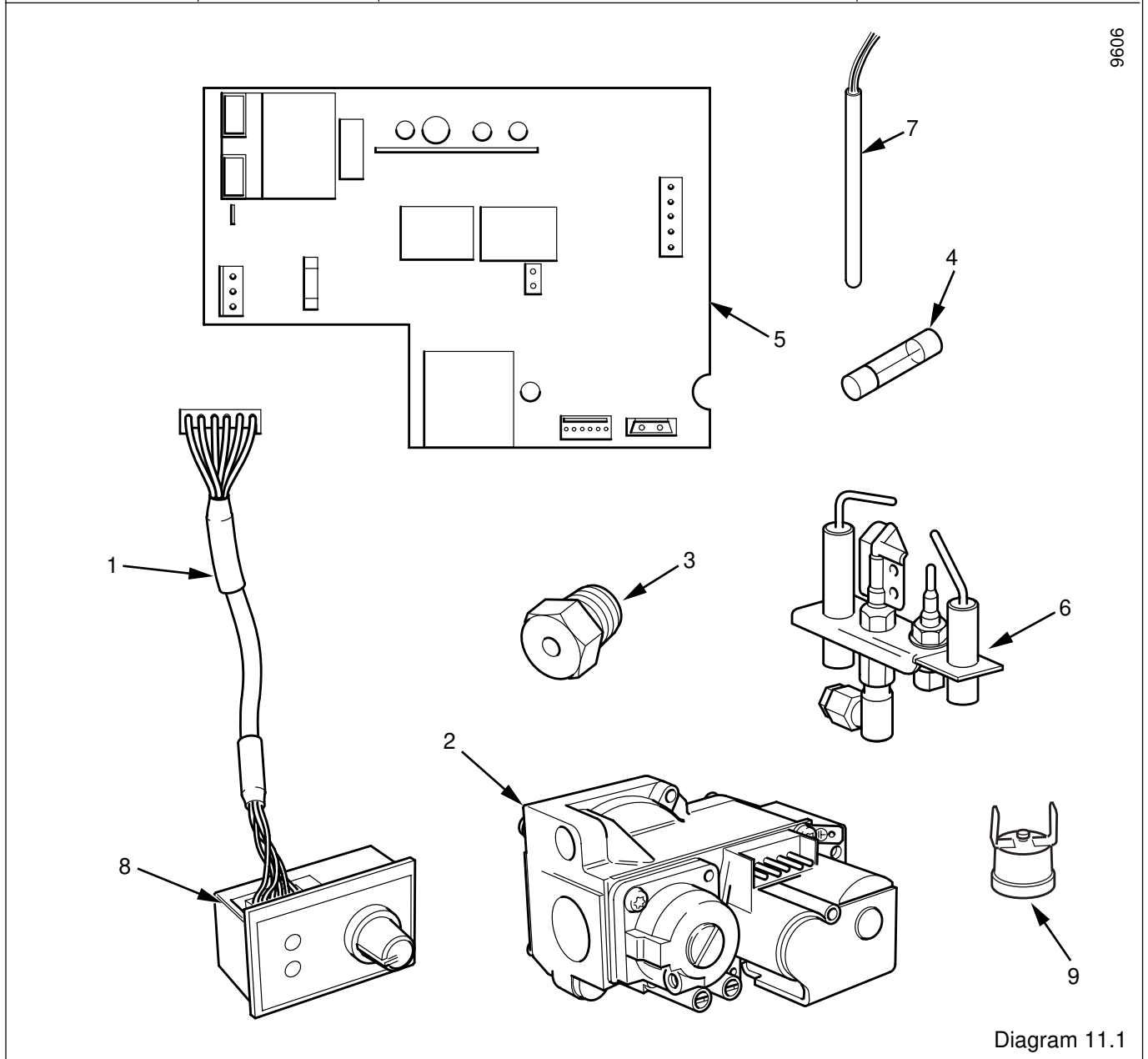


Diagram 10.6

## 11 Spare Parts

Please quote the name of the appliance, also the serial number of the boiler, to be found on the data label on the appliance.  
 If ordering from the local gas undertaking the appropriate appliance GC number should also be quoted together with the GC number of the part.

Key No.	Part No.	Description	GC Part No.
1	2000459492	Boiler user control lead (long)	
2	230536	Gas control valve	
3	205773	Injector	
4	2000459499	Fuse	
5	227126	Control board (PCB)	
6	203445	Flue blockage safety device	
7	2000459497	Control thermistor	
8		Boiler user control	
9	S227038	Overheat Cut-off Safety Device	



*Because of our constant endeavour for improvement, details may vary slightly from those shown in these instructions.*