

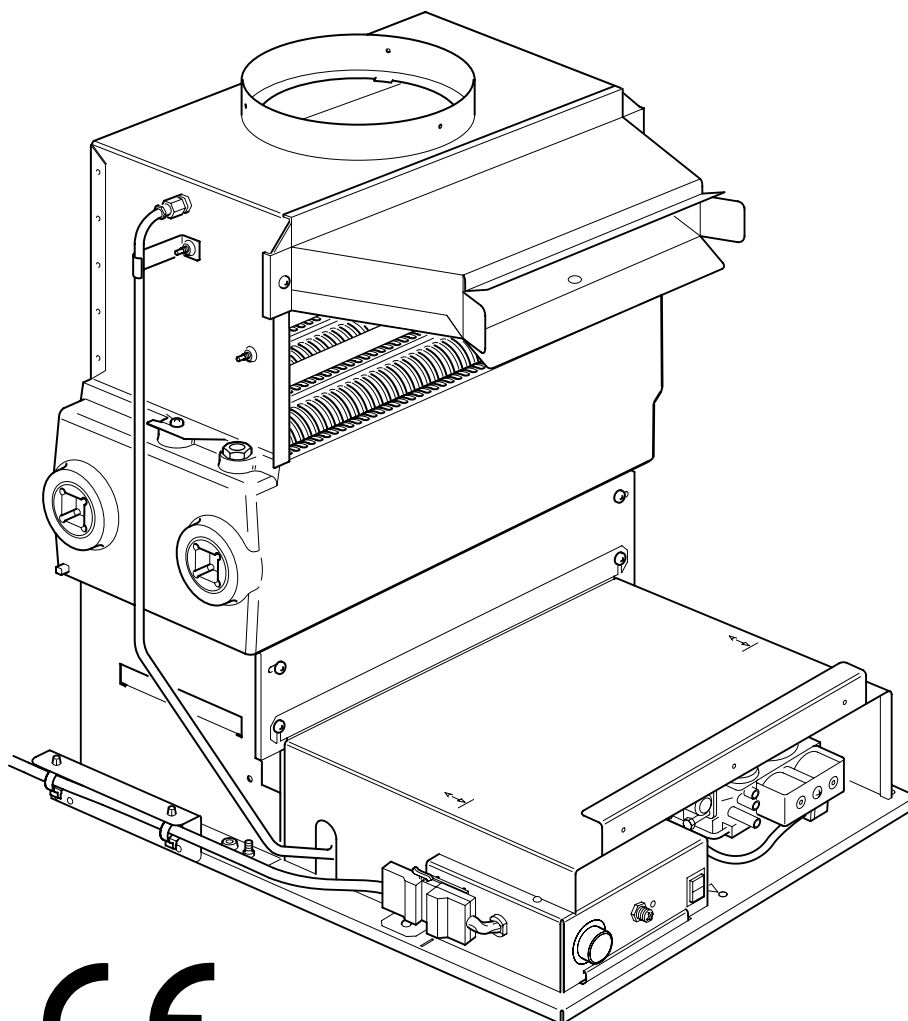
## Installation & Servicing Instructions

To be left with the user

# Glow-worm 56/3e Back Boiler Unit

G.C. No. 44 047 04A

*This Back Boiler Unit Is To Be Used Only With The Glow-worm Mk.3 Fire Front Range*



6836



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

**HEATCALL**

**One Contact Local Service**

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# 1 General

## 1 General

The instructions consist of three parts, Installation and Servicing Instructions for the Back Boiler Unit, Installation and Servicing Instructions for the Fire Front and Instructions for Use, which includes the Guarantee Registration Card. The instructions are an integral part of the appliance and must, to comply with the current issue of the Gas Safety (Installation and Use) Regulations, be handed to the user on completion of the installation.

This boiler is for use only with a specially designed Glow-worm Gas Fire Front, see Table 1.

This boiler is NOT suitable for fitting to a 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 fire front at the same time please read both sets of instructions before starting.

## 1 General Notes and Information

### IMPORTANT NOTICE

The back boiler is fitted with a safety device which will shut it down if there is a lack of oxygen. If the back boiler 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, before the back boiler is used again.

This back boiler is for use only on G20 gas.

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.

## 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 Standards and Codes of Practice, BS6891, BS5449, BS5546, BS6700, BS5871, BS5440 Part 1 and 2, BS6798, BS1251, BS7478, BS7593, BS7671.

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

## 1.2 Data

Gas connection	Rc <sup>1</sup> / <sub>2</sub> (1/2inBSPT)
Water connection	Supplied in fittings pack
Electrical supply	230V~50Hz fused 3A
Weight, about	35kg
Water content	3.11Litres
Injector	3.6mm

Dimensions are given in millimetres (except as noted).

Data Label: Front, centre on base.

The Seasonal Efficiency Domestic Boilers UK (SEDBUK) is 78.6%.

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 shall be in accordance with the current issue of BS6891.

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

On completion test the gas installation using the pressure drop method and suitable leak detection fluid, purge in accordance with the current issue of BS6891.

## 1.4 Electrical Supply

**WARNING.** This back 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 back boiler and system controls to the mains supply should be through a double pole isolating switch, fused 3A having a minimum contact separation of 3mm in both poles.

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

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

## 1.5 Site Requirements

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

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

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

It is recommended that the access hole for pipework into the fireplace or builder's 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 builder's opening.

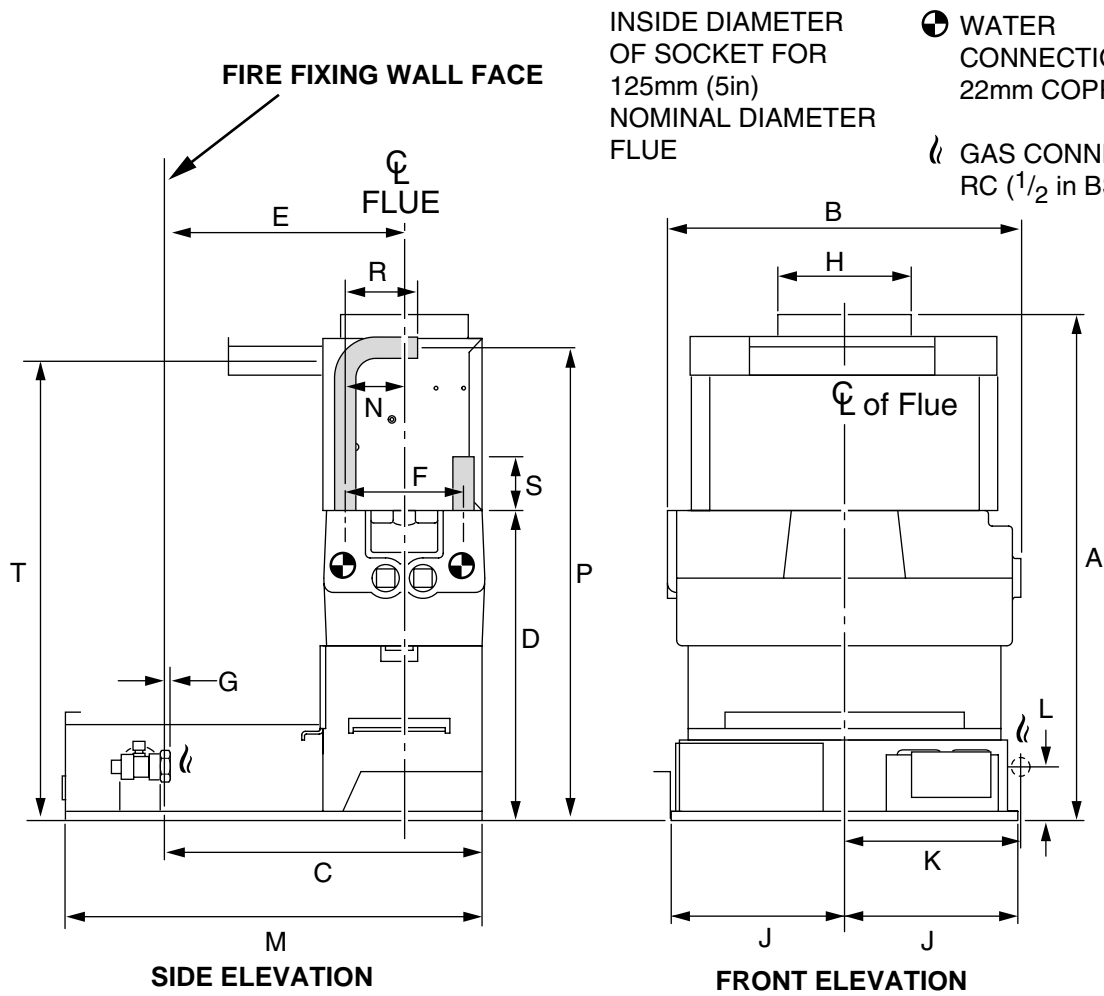
The prepared base for the back boiler must be level.

**NOTE:** For wider openings corner infills may be required when fitting some fire fronts. The infills are for cosmetic reasons only, see diagram 1.3.

Refer to Table 2 for dimensions of fire front fixing wall face which must be true.

# 1 General

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**OVERALL DIMENSIONS**

Diagram 1.1

Dimension	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
56/3e	550	400	338	337	245	130	3	146	177	174	60	457	65	530	80	50	490

**RANGE RATING TABLE**

RANGE RATING	Minimum	Medium	Maximum <i>Brown Ember 3</i> <i>Black Ash 3</i> <i>Saxony 3</i>	Maximum <i>Miami 3</i> <i>Melody 3</i>
HEAT INPUT (NETT)				
<i>kW</i>	10.8	14.5	17.6	18.2
<i>Btu/h</i>	36,950	49,550	59,900	62,150
HEAT OUTPUT				
<i>kW</i>	9.4	12.9	15.8	16.4
<i>Btu/h</i>	32,000	44,000	54,000	56,000
HOT BURNER PRESSURE				
<i>mbar</i>	5.0	9.0	13.7	14.8
<i>in.w.g</i>	2.0	3.6	5.5	5.9
INJECTOR MARKING	3.6 Pt. No. 230208			

# 1 General

## 1.6 Water System - Open Vented

This back 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 (3ft3in) minimum and 27m (90ft) maximum.

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

## 1.7 Sealed Water System

A kit and instructions, part number 459033, 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.

## 1.8 Hot Water Cylinder

The back boiler is suitable for open vented systems using an indirect cylinder (including single feed self priming type). The indirect cylinder must be fitted to the manufacturer's recommendations and the system must conform to the requirements of the current issue of BS5546 and BS6700.

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

## 1.9 Frost Protection

If the position of the back 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 protection thermostat is fitted.

## 1.10 Draining Tap

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

Draining taps shall be to the current issue of BS2879.

## 1.11 Safety Valve

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

## 1.12 Back Boiler Location

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

TABLE 2

FIRE TYPE	Dimensions for minimum flat area (no fixtures)		Dimensions for fixture or surround protection clearance	
	X	Y	X	Y
Miami 3 BBU	642	698	750	836
Melody 3 BBU	642	698	750	836
Black Ash 3 BBU	700	660	840	890
Brown Ember 3 BBU	795	707	905	892
Saxony 3 BBU	700	625	840	860

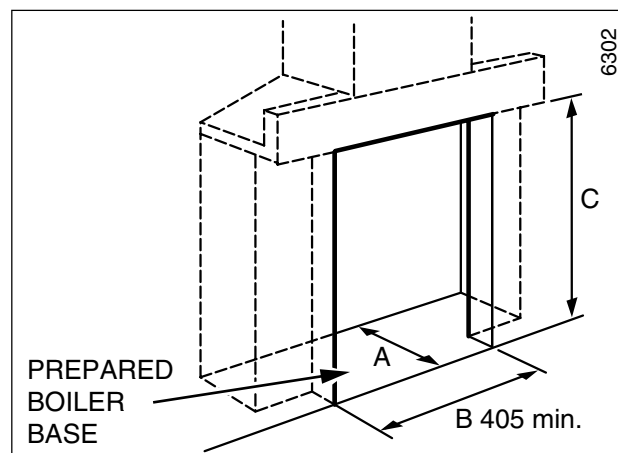
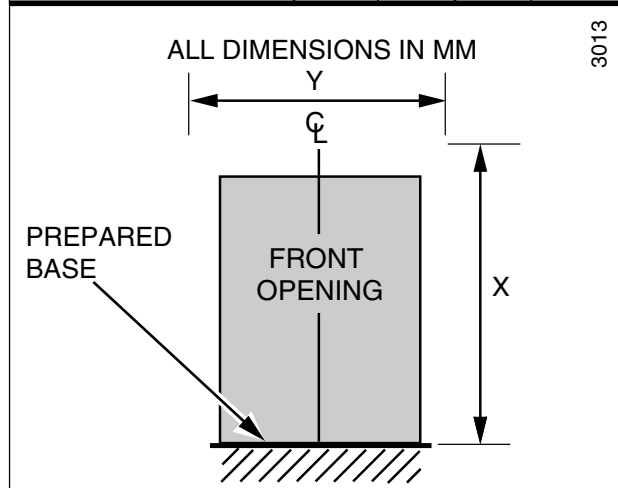
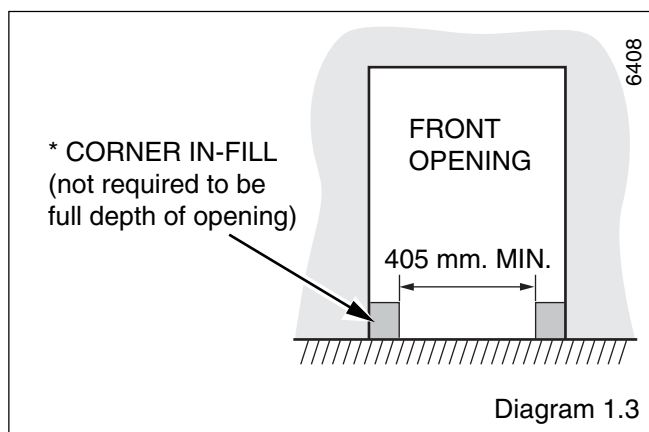


TABLE 1 FIRE TYPE	G.C No.	
	Teak	Mahogany
Miami 3 BBU	37-047-04A	37-047-07A
Melody 3 BBU	37-047-06A	
Black Ash 3 BBU	37-047-08	
Brown Ember 3 BBU	37-047-02A	
Saxony 3 BBU	37-047-09	

	A	B	C
Miami 3 BBU	350	405 to 580	560 to 590
Melody 3 BBU	350	405 to 580	560 to 590
Black Ash 3 BBU	350	406 to 460	560 to 590
*Brown Ember 3 BBU	350	406 to 580	560 to 590
Saxony 3 BBU	350	406 to 460	560 to 590

**FRONT OPENING** Diagram 1.2

# 1 General



## 1.13 BSI Certification

This appliance is certificated to the current issue of BS6332 Part 1 invoking the current issue of BS5258 Part 8 for safety and performance. It is, therefore, important that no alteration is made to it without permission, in writing, from Hepworth Heating Ltd.

Any alteration that is not approved by Hepworth Heating Ltd., could invalidate the BSI Certification of the boiler, warranty and could infringe the current issue of the Statutory Requirements.

## CE Mark

The CE mark on this appliance shows compliance with:

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.

This 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.

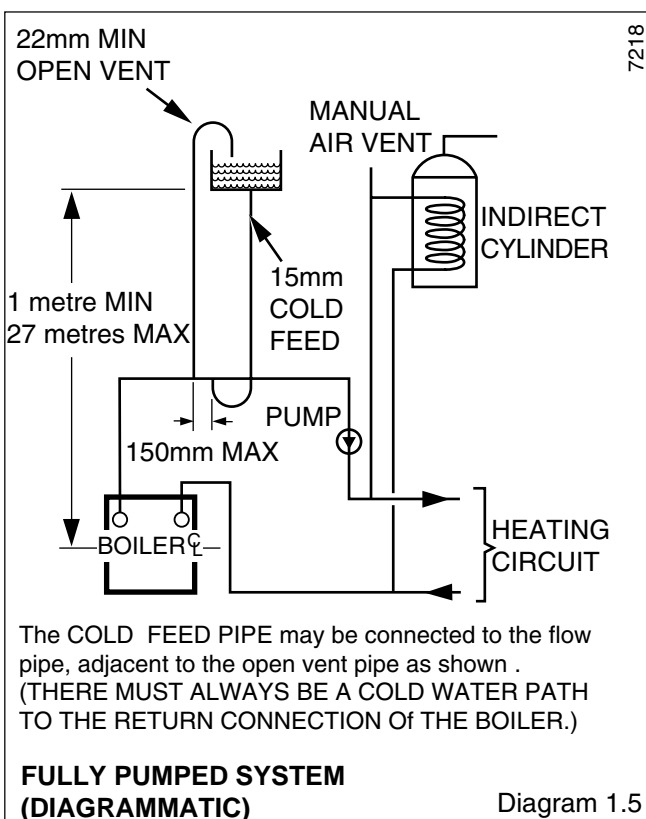
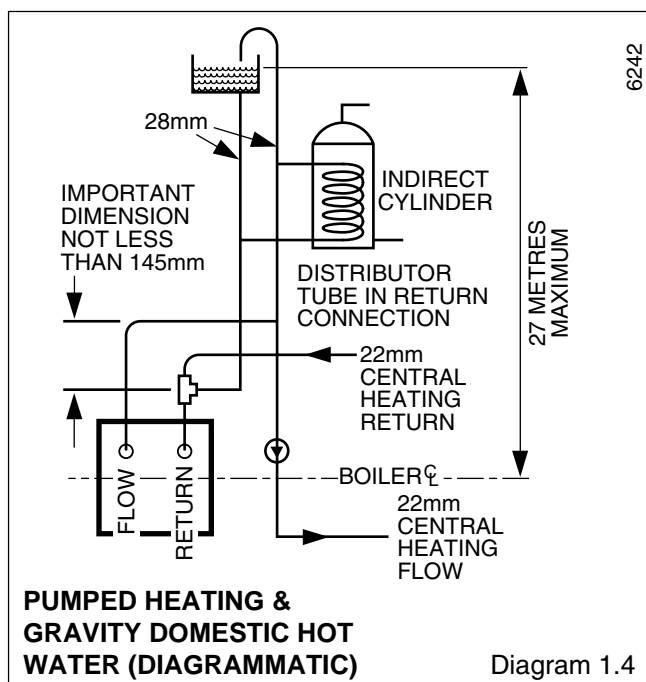
Product/production certified by: Notified body 0086.

## 1.14 Inhibitor

Attention is drawn to the current issue of 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

### 2.1 With Non-combustible Hearth

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

For minimum dimensions of a hearth see diagram 2.1.

### 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 2.2.

### 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

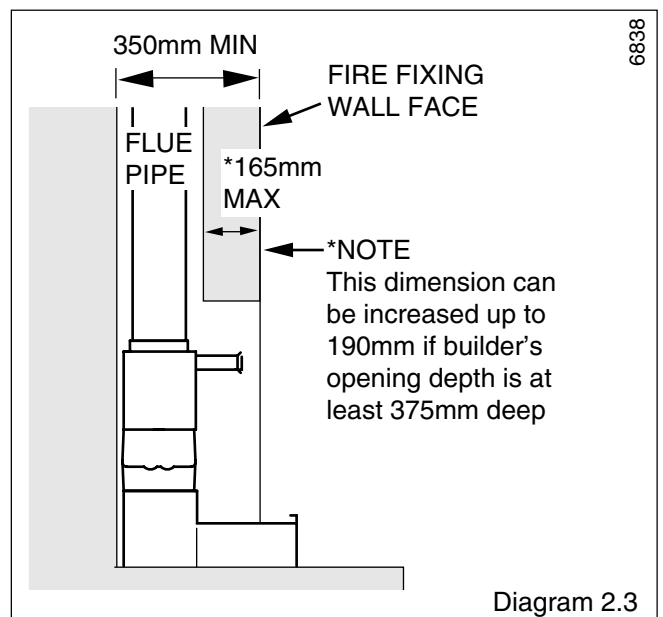
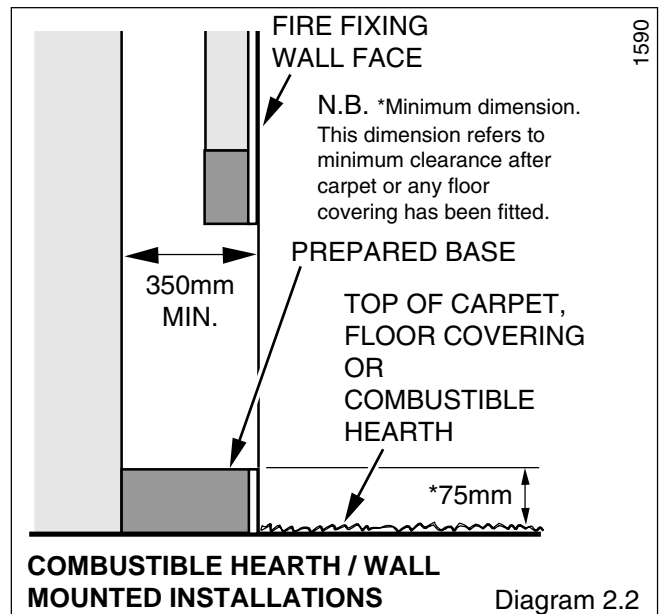
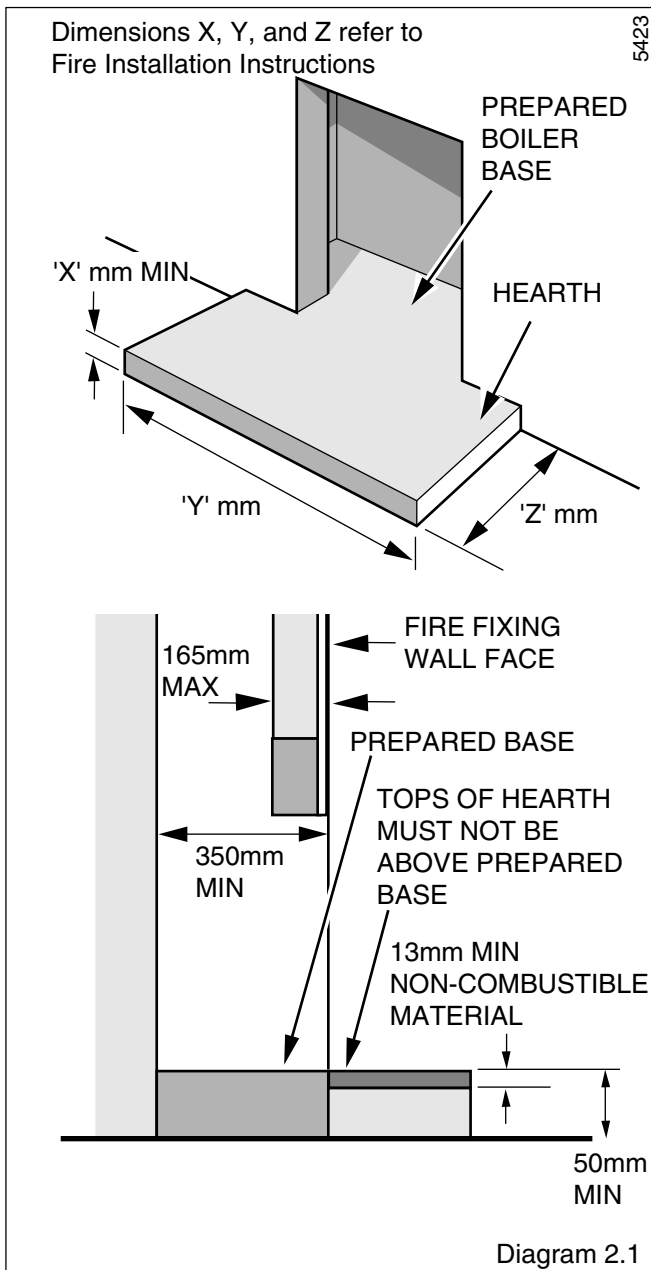
within the opening to allow easy connection of the flue into the back boiler flue socket, see diagram 2.3.

The surround requires a minimum opening for access as shown in diagram 1.2.

### 2.4 Wall Mounted - that is - 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 2.2.

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

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 made with a short vertical piece of flexible liner, see diagram 3.2.

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

The end of the liner at the chimney top must be adequately sealed and clamped, using proprietary fittings suitable for the flue liner used, see diagram 3.1.

The flue should, preferably, end above ridge height but at 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 register plates, dampers and the like. 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 3.2.

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.

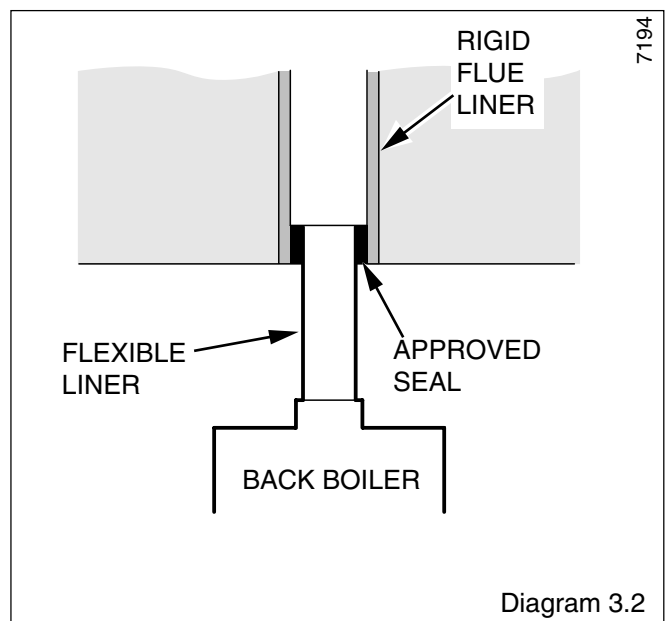
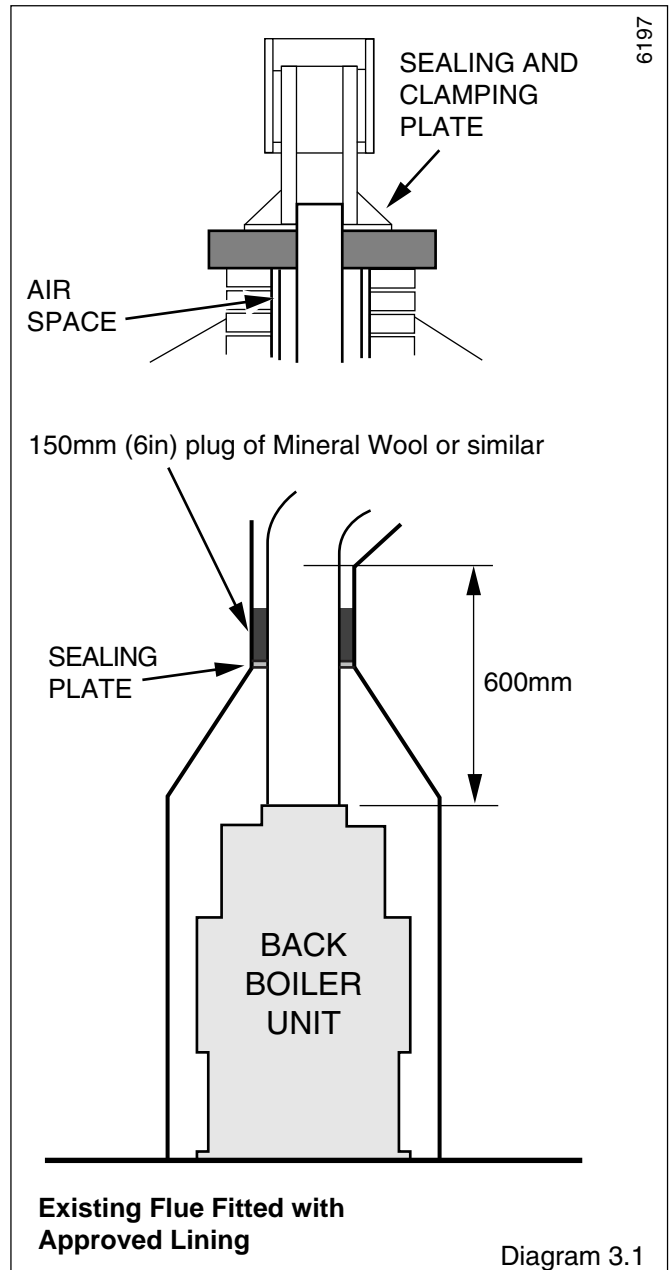
The sealing plate also prevents debris falling and gives the flue better insulation, reducing the possibility of condensation, see diagram 3.1.

Check the flue system efficiency before installing the back boiler.

### 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, preferable flexible metallic be used, fixed and sealed to the back boiler flue socket, made good with approved packing and parged with fire cement, see diagram 3.2.



## 3 Flue and Ventilation

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 Front

It is important that the room in which the back boiler unit is installed has adequate air inlets to ensure correct operation as specified in the current issue of BS5440 Part 2.

Ventilation requirement for this back boiler is:

**87cm<sup>2</sup> (13.5in<sup>2</sup>)**

This ventilation area takes into account the total requirement of the back boiler unit and any of the specially designed gas fire fronts.

The ventilation openings may communicate direct with outside air or with an internal room or space (such as a hall) which itself is provided with a permanent air vent of the same effective area. The permanent air vent should be in a position which minimizes 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.

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

See also Section 6.3 of these instructions.



## 4 Installation

### 4.1 Preparation

Remove draught diverter assembly, flueway baffles and fittings pack from carton.

Check contents of fittings pack against packed list.

Remove back boiler body assembly from carton.

### 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.

The two heat exchanger connections are supplied in the fittings pack and **MUST** be used, see diagram 4.1.

NOTE: Take care when soldering the copper connections not to damage the sealing washers.

### 4.3 Pumped Heating with Gravity Domestic Hot Water

NOTE: The draught diverter assembly and capillaries are shown to aid plumbing, but would not be fitted at this stage.

All pipework must comply with the current issue of BS5546.

The domestic hot water flow and return pipes must be 28mm.

Refer to diagrams 1.3 and 1.4 for a diagrammatic layout.

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, remove the four screws securing the heat exchanger to combustion chamber, see diagram 4.2. Turn heat exchanger, refit the four screws.

It is recommended that pumped heating connections are pre-piped as in diagram 4.4.

Note: The diagram 4.4 shows two methods "A" and "B" of plumbing the flow pipe.

The central heating return must have the injector fitted on both methods "A" and "B", see diagram 4.4 for fitting the injector.

### 4.4 Pumped Heating and Hot Water

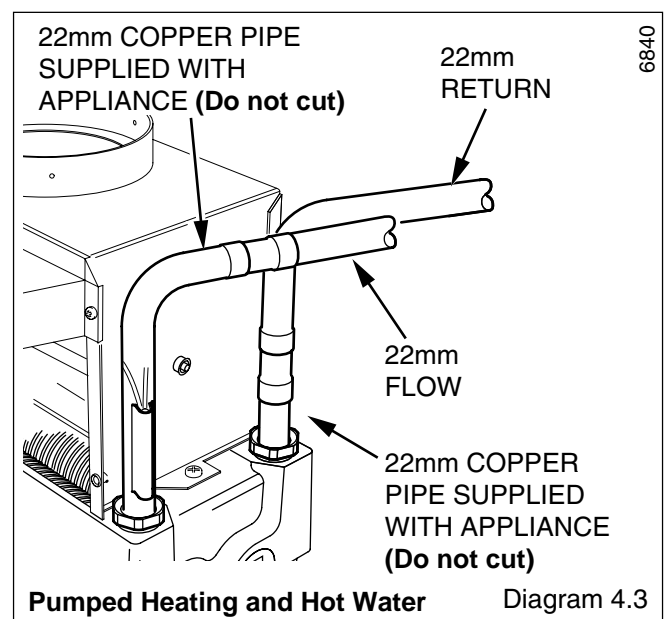
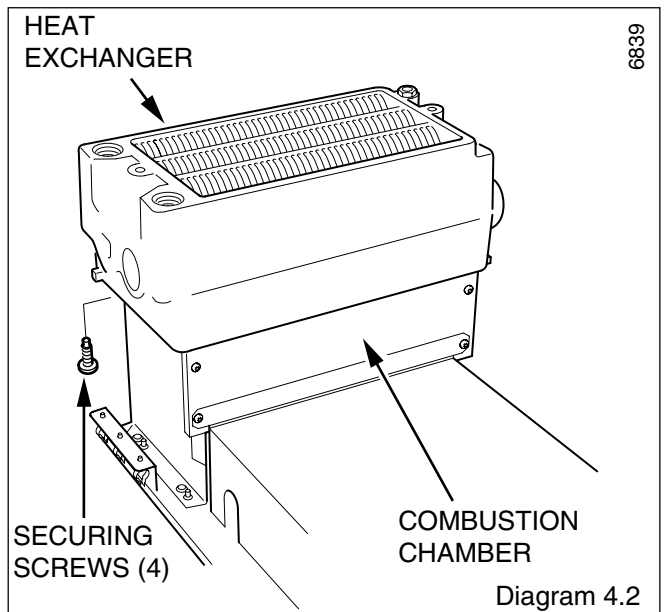
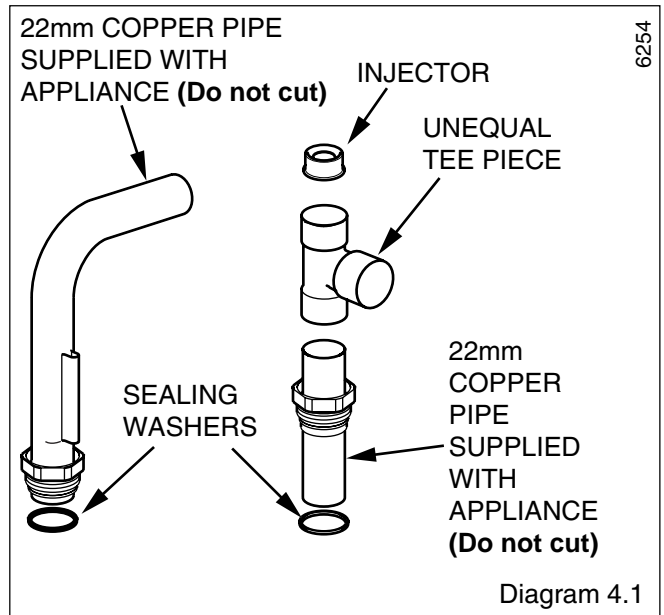
NOTE: The draught diverter assembly and capillaries are shown to aid plumbing, but would not be fitted at this stage.

Refer to diagram 1.5 for a diagrammatic layout.

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 such that the flow pipe exits on the same side as the boiler connections.

It is recommended that the pumped return is pre-piped as in diagram 4.3.

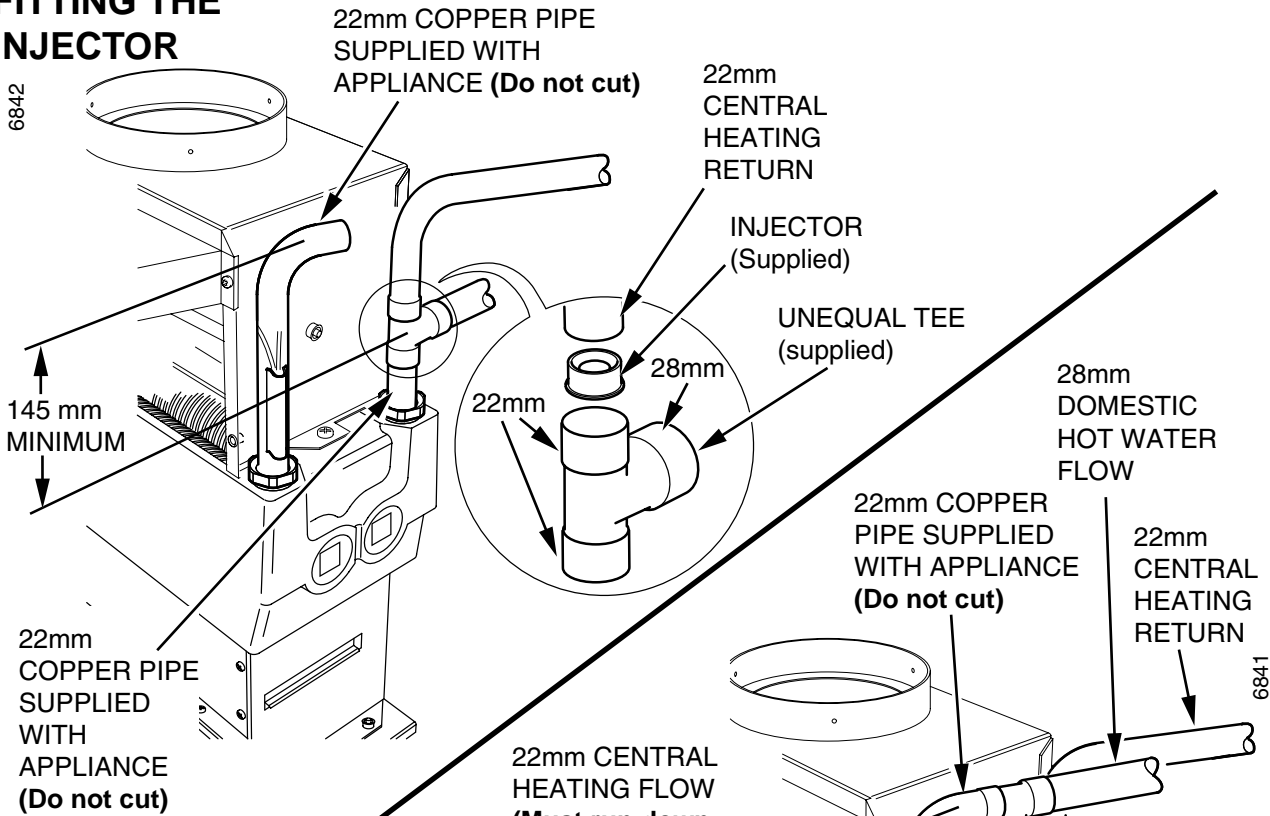
If the heat exchanger connections are opposite hand to that required, turn in the same manner as described in Section 4.3 paragraph 6.



## 4 Installation

### FITTING THE INJECTOR

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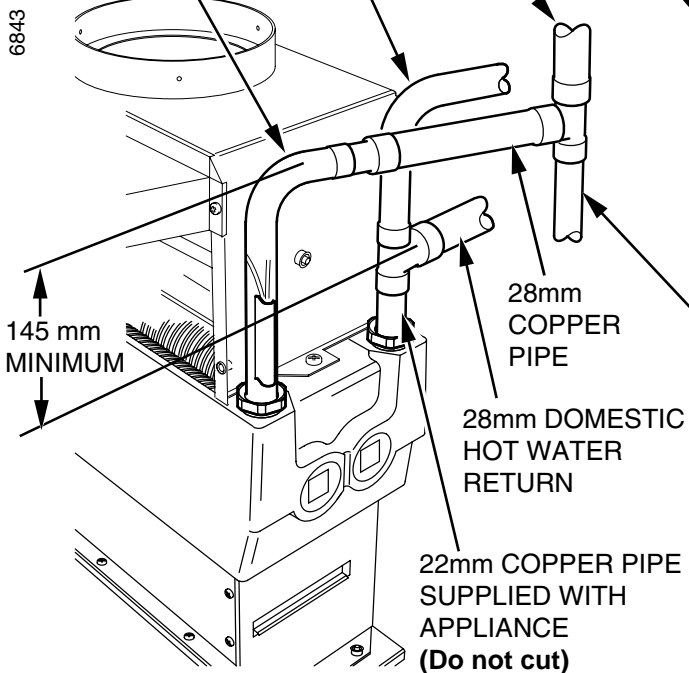
### METHOD A

28mm DOMESTIC HOT WATER FLOW  
(Must rise to allow air to escape from the system)

22mm COPPER PIPE SUPPLIED WITH APPLIANCE  
(Do not cut)

22mm CENTRAL HEATING RETURN

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### METHOD B

22mm CENTRAL HEATING FLOW  
**Note: If the tee piece is fitted away from the boiler, the central heating flow pipe must be increased to 28mm as shown.**

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Diagram 4.4

## 4 Installation

### 4.5 Heat Shield Assembly

If the boiler electrical supply cable has to be routed down the left hand side of the combustion chamber you must fit the heat shield assembly and clips supplied in the fittings pack. Refer to Section 5.1 and diagrams 5.2 and 5.3.

### 4.6 Circulating Pump

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

### 4.7 Gas Supply

Remove the combustion chamber extension by slackening the two securing screws and removing the two base securing screws, see diagram 4.5.

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

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 rates: 58.3ft<sup>3</sup>/h to 88.5ft<sup>3</sup>/h (1.65m<sup>3</sup>/h to 2.51m<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 the pipe behind the combustion chamber before final fixing.

### 4.8 Positioning the Back Boiler

To position the back boiler lift by the heat exchanger casting and place centrally in the builder's opening. The installation centre line is indicated by a cut-out on the front edge of the base, see diagram 4.6.

The back boiler must be positioned so that a line across the opening of the fire fixing wall face coincides with the marks indicated by an 'A' on the appliance, see diagram 4.6.

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 a minimum of two of the five fixing holes available, see diagram 4.7. Remove the back boiler unit. Drill holes using a 5mm masonry drill bit to accept the plugs and fixings provided.

### 4.8 Positioning the Back Boiler - continued

Fit the flueway baffles, ensuring that they are fitted correctly into the flueways, see diagram 4.8.

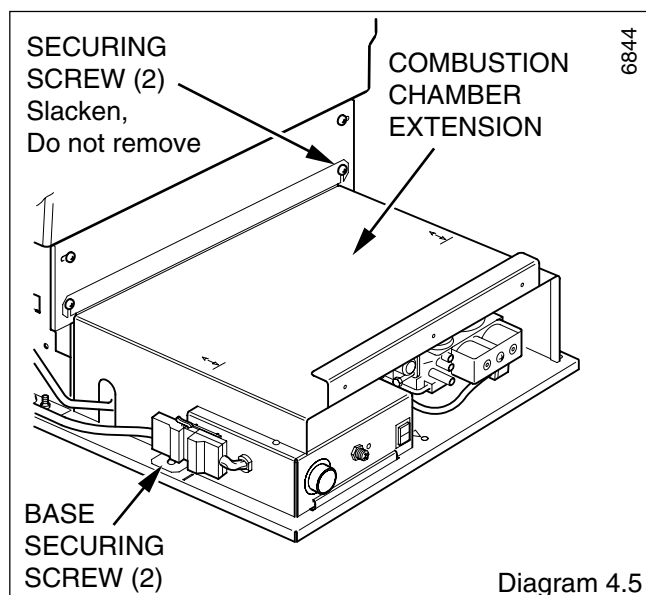
NOTE: The front flueway does not have a baffle.

NOTE: If the heat exchanger has been turned the baffles must still be fitted into the back and middle flueways only.

Fit the spigot duct to the draught diverter assembly with the two securing screws supplied in the fittings pack, see diagram 4.9.

Fit the draught diverter assembly onto the heat exchanger with the two securing screws supplied in the fittings pack, see diagram 4.9.

Fit the lint arrester over the air intake hole, secure with retaining clip. Push fit the sensing tube onto the flue blockage safety device and draught diverter. Secure the sensing tube assembly with the securing screw, see diagram 4.10.



Where a flexible flue liner is being used, fully fit the No8x $\frac{3}{8}$ " self tapping screw provided into the rear of the flue socket as in diagram 4.11.

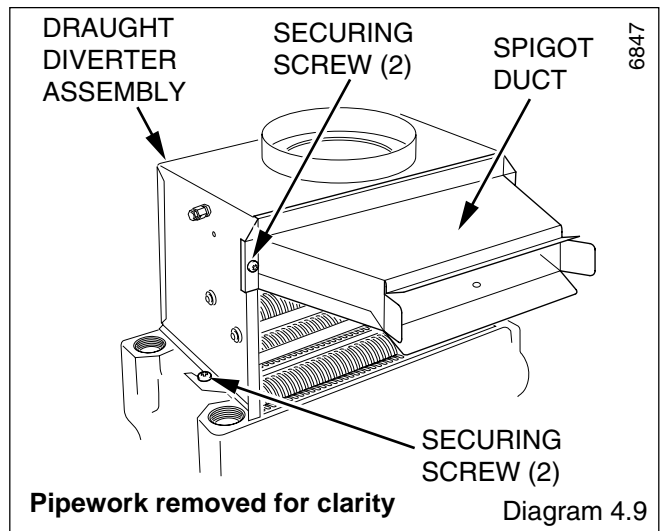
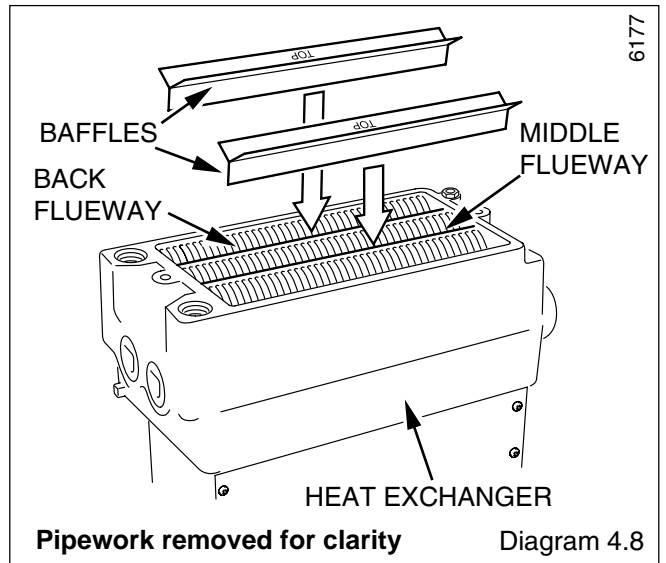
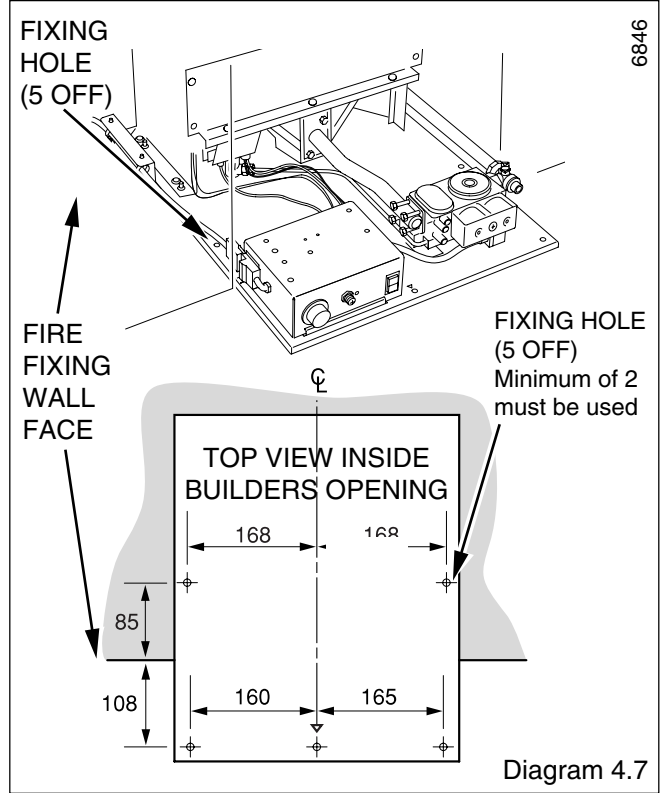
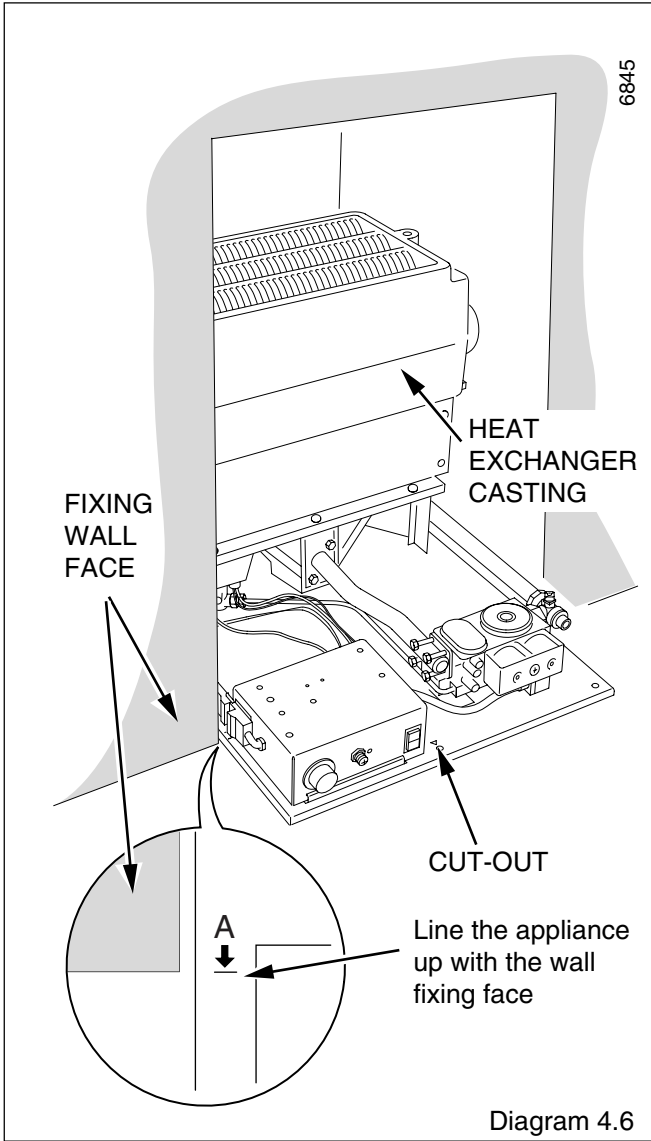
Reposition the back boiler unit into the builder's opening. Connect the system pipework to the back boiler unit, pre-plumbed pipework.

Connect gas supply to gas service cock. Leave gas service cock in the "OFF" position, see diagram 4.12.

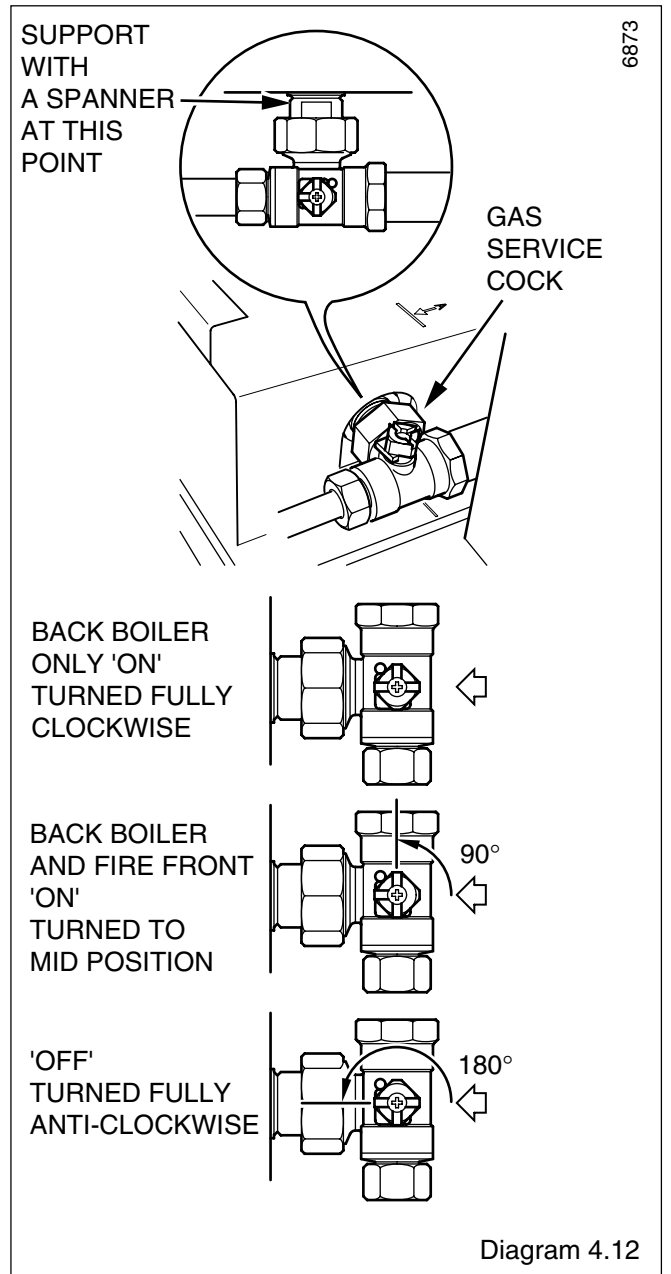
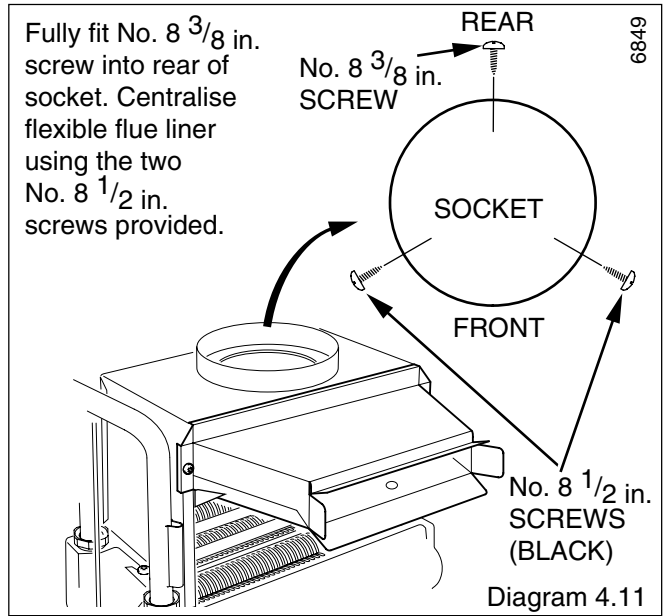
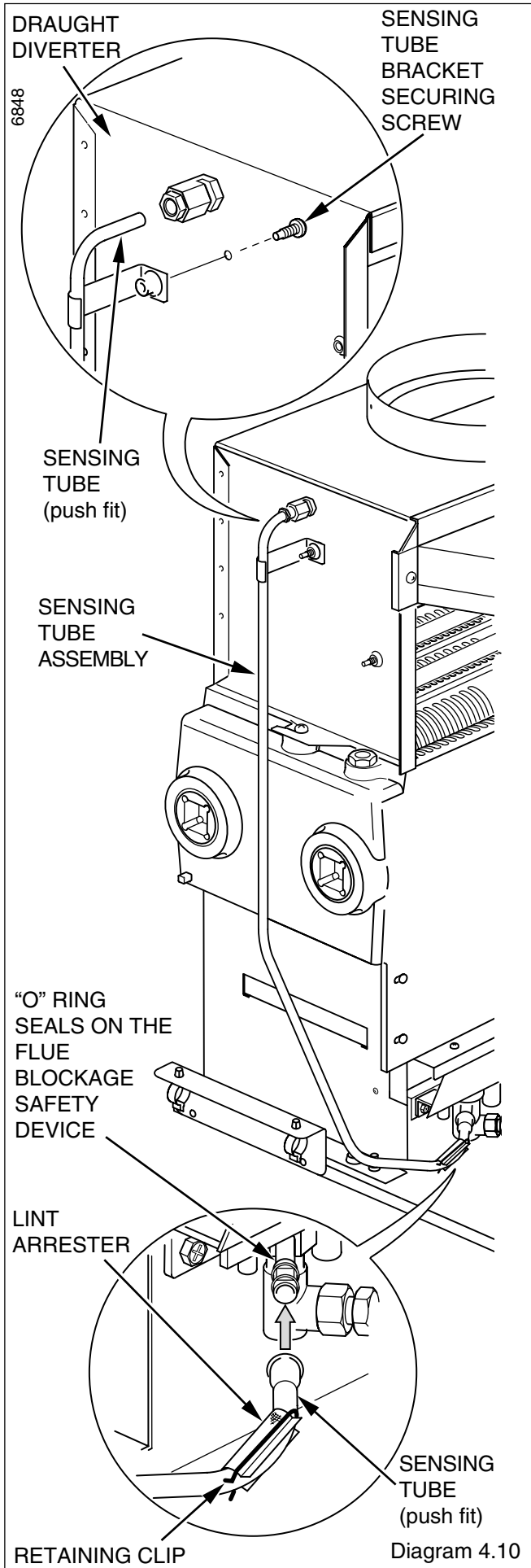
NOTE: When connecting the gas supply use a spanner to support the gas service cock, see diagram 4.12.

If a flexible flue liner is being used, position the liner in to the flue socket. Using two No8x $\frac{1}{2}$ " 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 4.11. Seal with a suitable fire clay cement.

# 4 Installation



## 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 will only require a permanent live if a fire front with lights or ignition is to be fitted.

External controls are connected to the live 'L' terminal in the 5 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.

If the cable has to be routed down the left hand side of the combustion chamber the heat shield assembly supplied in the fittings pack must be used and the cable routed through the clips, see diagram 5.2.

If right hand access is required fit the three clips from the fittings pack to the combustion chamber extension and route the cable down the right hand side of the combustion chamber. Keep the cable well clear of hot surfaces, see diagram 5.3.

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

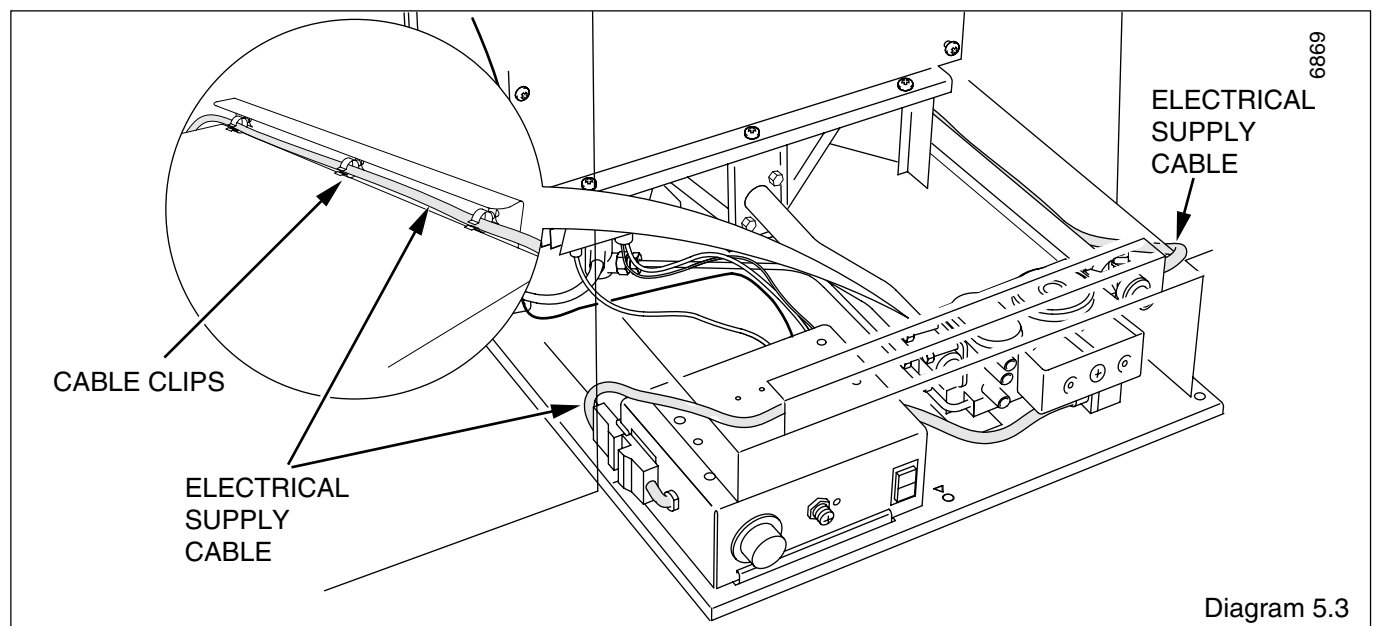
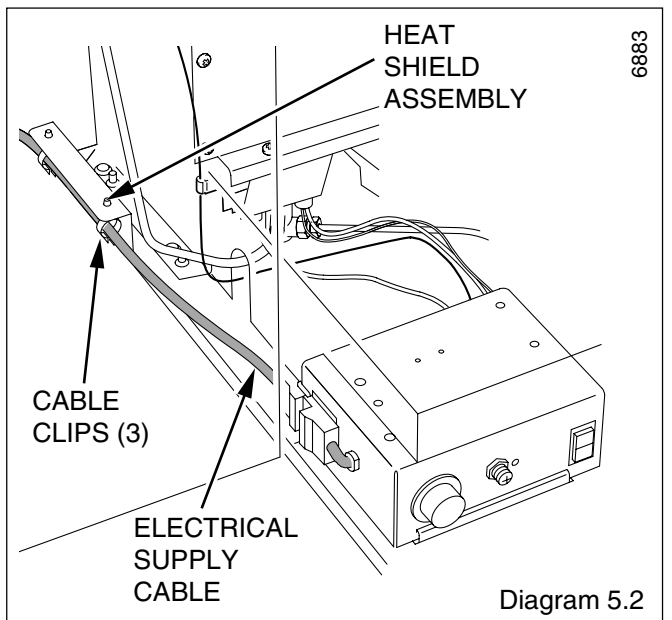
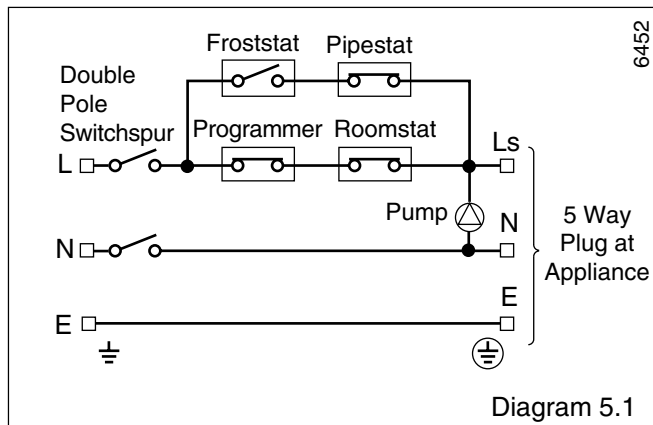
The cable must be kept well clear of hot surfaces.

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

### 5.2 Control Thermostat Phial

Unwind the capillary avoid kinking, make sure that the capillary is positioned so that it passes through the cut out in the side of the control box, see diagram 10.3. Route the capillary well clear of any part of the back boiler which becomes hot. Use the capillary clips, supplied. Secure the capillary and push the phial into the pocket, secure the phial with the retaining pin supplied, see diagram 5.4. Again make sure that the capillary is not touching the casting.

**NOTE:** When fitting the phial into the phial pocket use the heat sink compound supplied in the fittings pack.



## 5 Electrical Wiring

### 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.

NOTE: The ignition sequence is fully automatic and will commence when mains voltage is applied.

### 5.4 Testing - Electrical

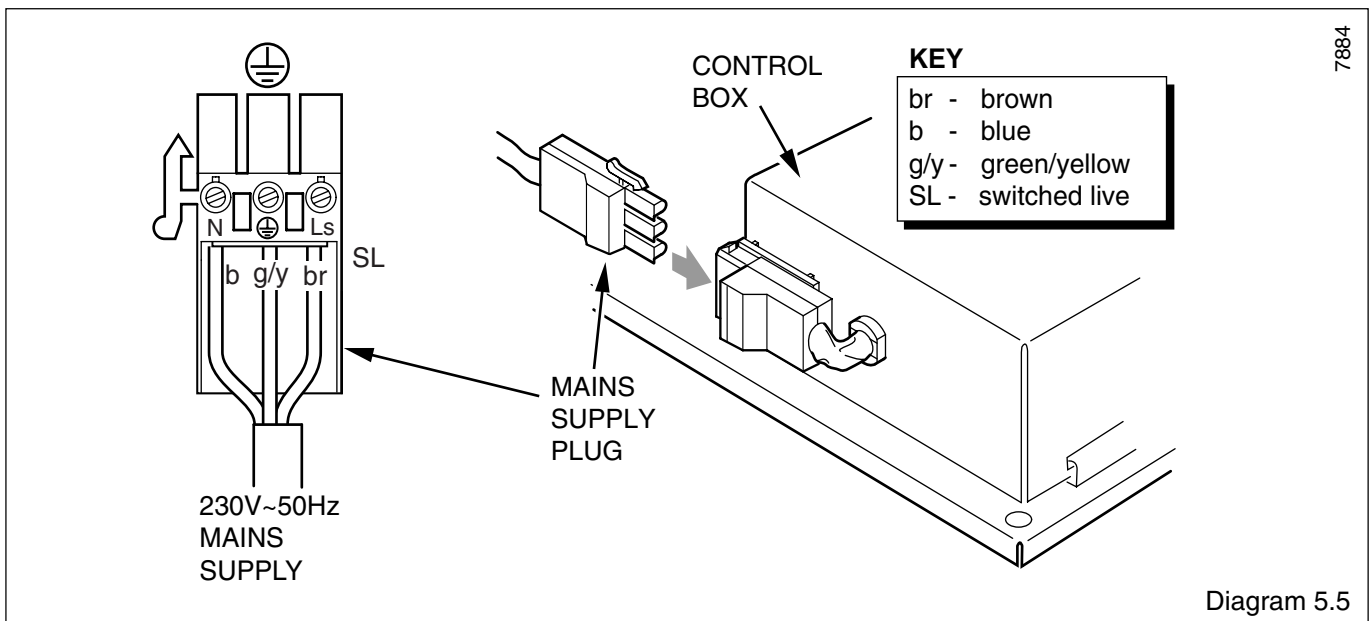
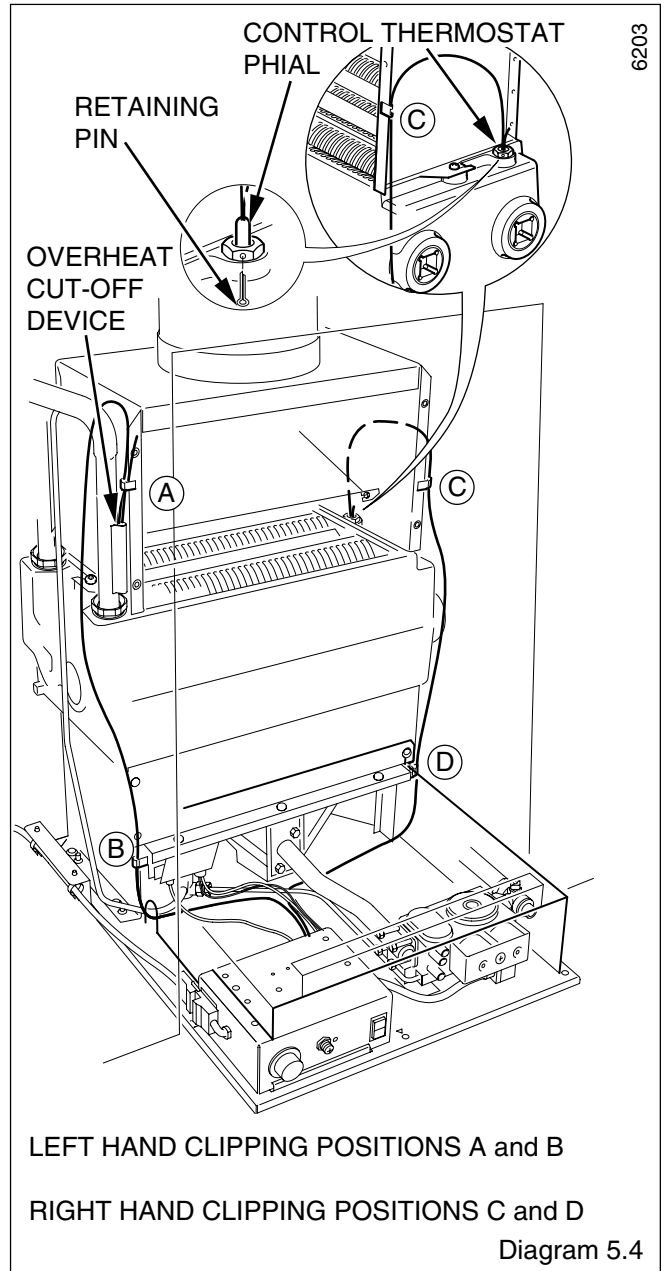
Checks to ensure electrical safety must be carried out by a competent person.

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.

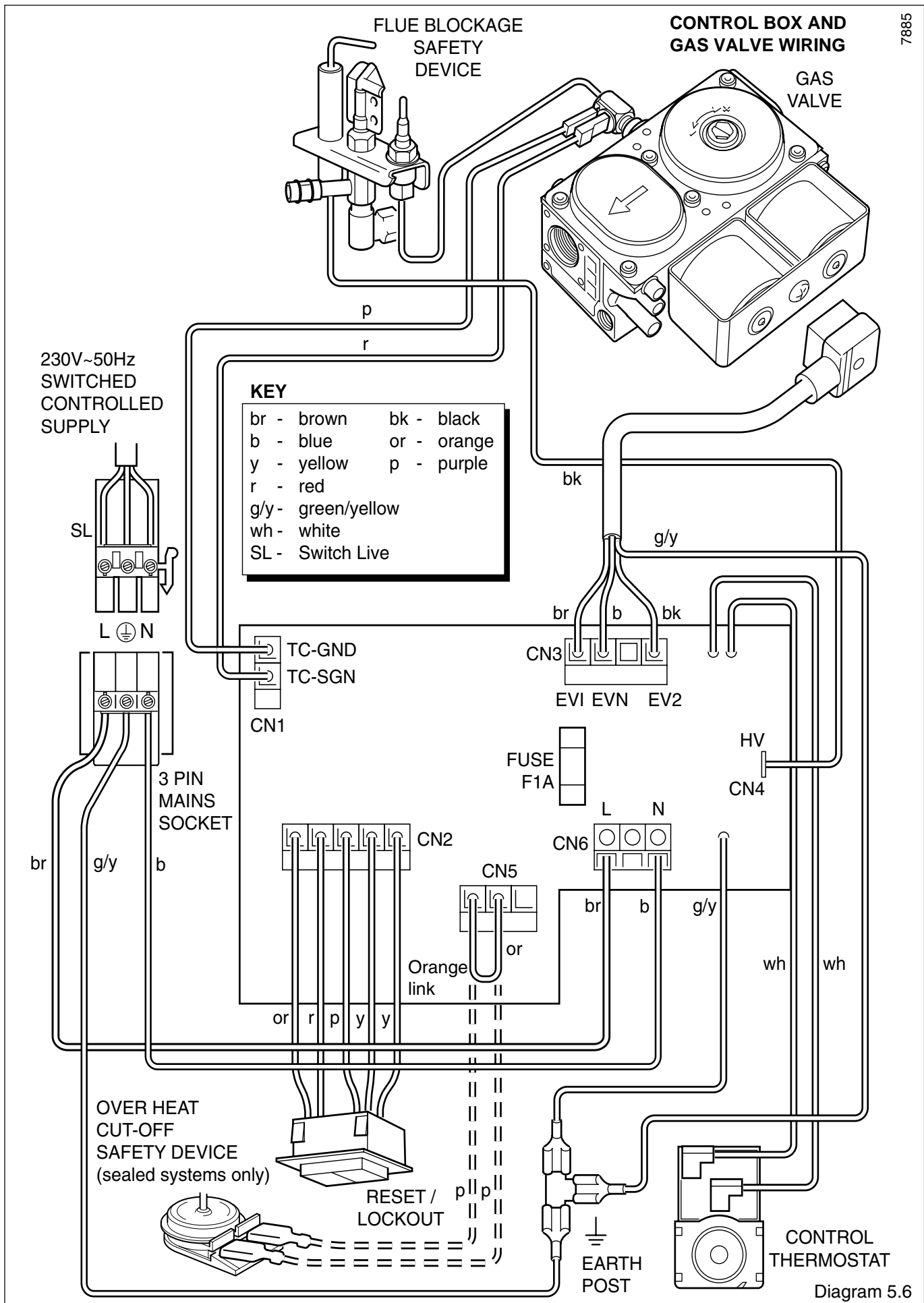
### 5.5 Overheat cut-off device (sealed systems only).

A Kit No. 459033 is available with fitting instructions.



# 5 Electrical Wiring

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## 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, flame on the pilot light will become unstable and lift up off the thermocouple. This will deactivate the mag unit in the gas control valve, 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, thermocouple and pilot assemblies.

**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 part.**

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

Identify the back boiler controls by reference to diagram 6.1.

Note: Overheat cut-off, see diagram 6.1 is applicable only where the back boiler unit is incorporated in a sealed water system.

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 thermostat knob "A" to "0", "Off" position that is, fully anti-clockwise, see diagram 6.1.

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

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

Turn gas service cock "D" to the "On" position making sure that the fire front service cock "D" is in the "Off" position, see diagram 4.12.

### Technical Sequence of Operation

When an external control calls for heat there is approximately a 30 second purge. The control board (PCB) energises the thermoelectric valve and spark unit. With the thermoelectric valve open gas is allowed to pass to the combustion products discharge safety device which will be ignited by the sparks. This ignition attempt will continue until the milli-voltage generated by the thermocouple is sufficient to hold open the pilot valve. At this point the thermoelectric valve and spark unit are de-energised and the green light on the lockout reset button "E" will illuminate, see diagram 6.1. The main gas control valve is energised through the closed contacts of the control thermostats. When the water temperature has reached the set point the control thermostat contacts open, the main gas control valve is closed. The pilot will, however, remain alight since the thermocouple is generating the required milli-voltage.

When the water temperature falls below the set point the control thermostat control will close, thus energising the main gas control valve and allow the main burner to light from the pilot light.

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 the main gas control valve and the thermocouple milli-voltage is reduced to zero.

That is to say whilst ever there is a demand for heat from an external control the pilot will remain alight despite the boiler thermostat cycling on or off.

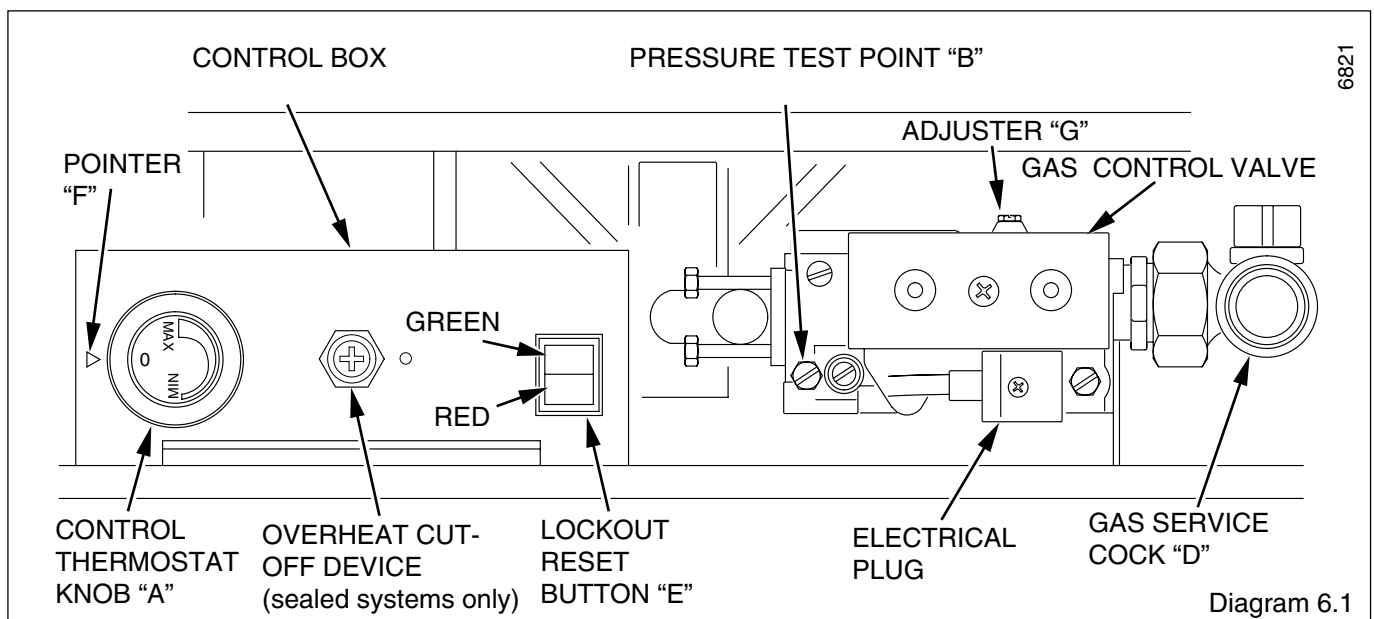
Check the pilot flame is stable and has a length as shown in diagram 6.2.

Note: Should the red light on the lockout reset button "E" come on, it indicates that the pilot light is not operating correctly, or the combustion products discharge safety device has been activated.

Depress the lockout reset button "E", when the fault has been corrected indicated by the green light illuminating, see diagram 6.1.

Turn control thermostat knob "A" clockwise until "MAX" is against the pointer positioned on the control box front cover "F". The main burner will light.

Test for gas soundness using a suitable leak detection fluid.



## 6 Commissioning

The back boiler is supplied preset to a maximum heat output setting of 15.8 kW (54000 Btu/h) but may be adjusted to suit design requirements.

This value 15.8 kW must not be exceeded when using the boiler in combination with a Brown Ember 3, Black Ash 3 or Saxony 3 fire front.

If the boiler is used with a Miami 3 or Melody 3 fire front it is permitted to increase the output to 16.4 kW (56000 Btu/h).

If adjustment is required:

Light the boiler and run for TEN MINUTES.

Turn adjustment screw "G", to suit system design heat input, see diagram 6.1.

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 Saxony, Black Ash, Brown Ember:

1.15m<sup>3</sup>/h (40.5ft<sup>3</sup>/h) to 1.86m<sup>3</sup>/h (65.7ft<sup>3</sup>/h)

For Melody, Miami:

1.15m<sup>3</sup>/h (40.5ft<sup>3</sup>/h) to 1.94m<sup>3</sup>/h (68.5ft<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 "0", "Off" position. Remove pressure gauge and replace test point screw ensure a gas tight seal is made.

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

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

**Refer to sequence of operation below.**

### 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 thermostat knob fully clockwise to the maximum setting.

The lighting sequence is automatic as follows:-

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

### 6.2 Testing the Back Boiler Controls

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

To restart the boiler, turn on the gas supply at the gas service cock and press the lockout reset button "E".

**DO NOT 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.

If removed refit the combustion chamber extension.

### 6.3 Clearance of Products

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

Before fitting the fire, check that the heat exchanger baffles are fitted and seated correctly, see Section 4.8.

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

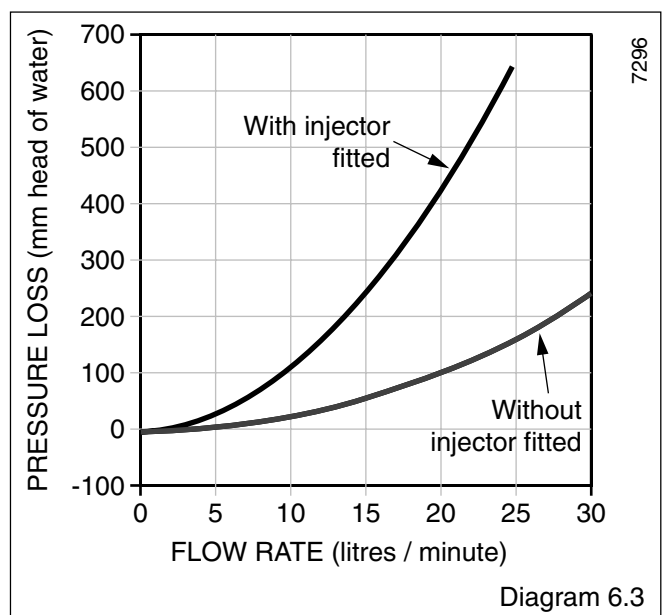
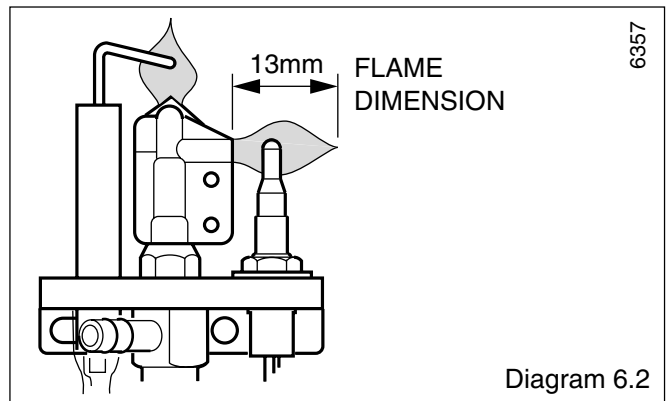
Set all controls to operate the heating system. Adjust circulating pump and balance the system to give a temperature drop across the boiler of 11°C (20°F). At the appropriate flow rate, the resistance of the back boiler can be found by reference to diagram 6.3.

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 "MAX" 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 "Off" and rapidly drain the system whilst still hot, to complete the flushing process.

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



## 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

### 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.
- The Flue Blockage Safety Device **MUST NOT** be adjusted or disconnected. If replacing use only the correct and approved part.

### 8.1 Isolation of Services

Isolate the electrical supply to the back boiler.

With the fire front removed.

Refer to diagram 6.1 to identify the controls.

Turn control thermostat knob "A" anti-clockwise to "0" "Off" position.

Turn appliance gas service cock to "Off", see diagram 4.12.

### 8.2 Sensing Tube Assembly.

Remove the combustion chamber extension, see diagram 4.5. Unclip the mains supply cable if required.

Remove spigot duct, see diagram 8.10.

Remove the sensing tube bracket securing screw, carefully pull the sensing tube assembly away from the sensing tube fitting on the draught diverter assembly and from the combustion products discharge safety device.

Clean or replace the lint arrester, see diagram 8.1.

Remove the sensing tube fitting and the tubing nut to access the internal filter.

Clean or replace the internal filter, check the "O" rings for damage, replace if necessary, see diagram 8.1.

**IMPORTANT NOTE:** When replacing the sensing tube check the "O" rings, internal filter and lint arrester are fitted.

### 8.3 Gas Controls Assembly and Burner.

Remove the control box, hold with both hands squeeze tilt forward and unhook, see diagram 8.3.

Turn the box over.

Disconnect the ignition lead from the control board and remove by threading it through the grommet in the rear of the control box, see diagram 10.6.

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

Disconnect the union at the gas service cock, support with a spanner see diagram 4.12.

Remove the thermostat phial and overheat cut-off device phial if fitted (sealed systems only), from the phial pockets, unclip the capillary tubes, see diagram 5.4.

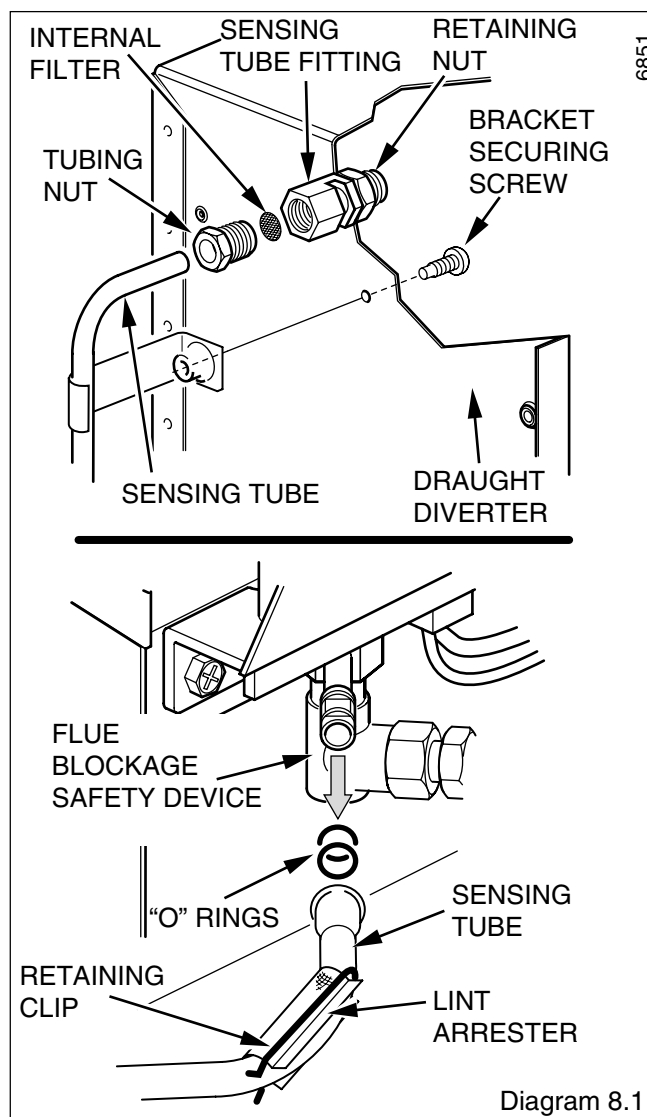


Diagram 8.1

Remove the four combustion chamber securing screws.

Pull the gas control valve forward releasing it from the retaining pin, see diagram 8.4.

Slide the control/burner assembly forwards and up to remove, see diagram 8.2.

## 8 Servicing

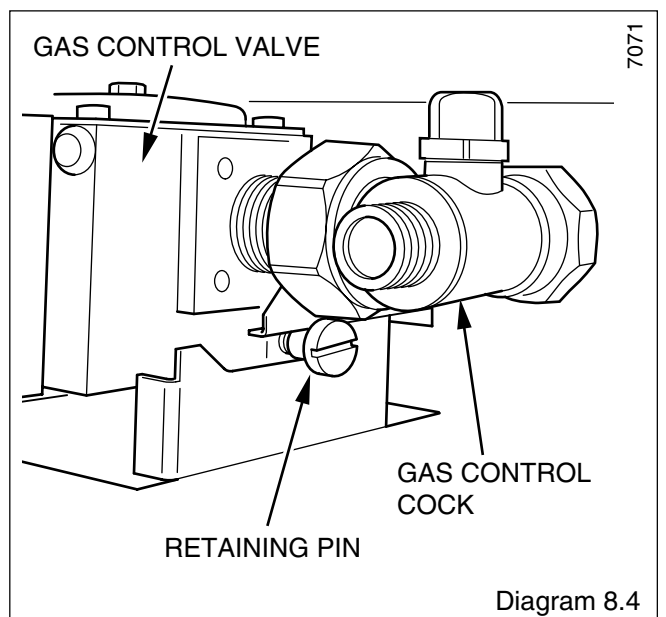
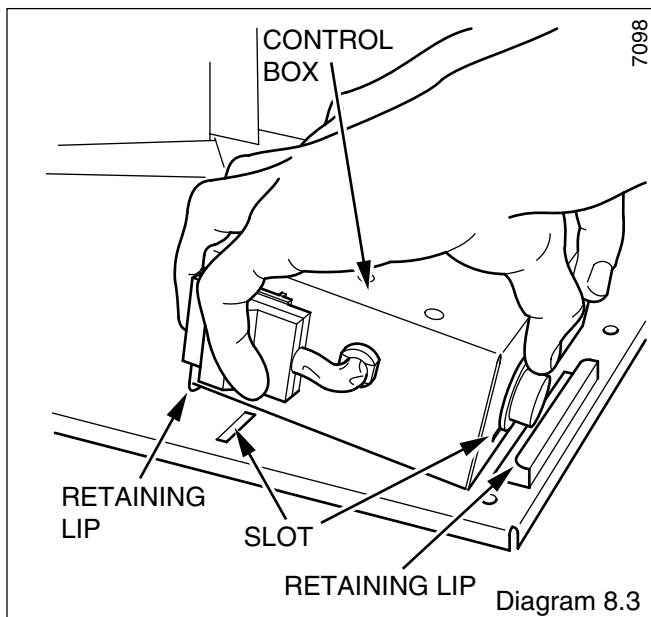
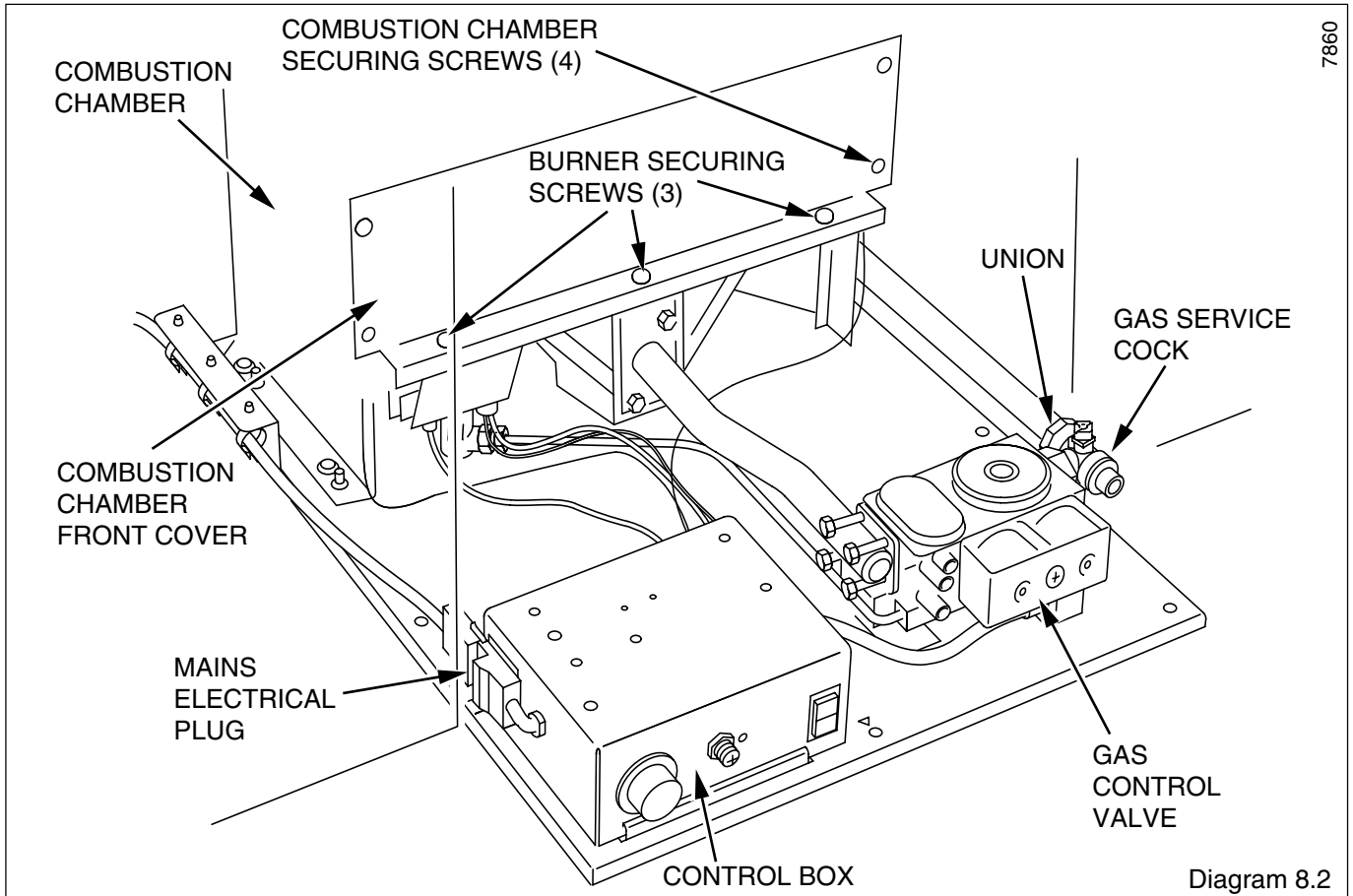
### 8.4 Burner

Disconnect the pilot tube nut and the thermocouple nut from the gas control valve, see diagram 8.5.

Remove the screws which locate the gas manifold to burner, see diagram 8.5.

The 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 Servicing

### 8.5 Lint Arrester

Remove the four securing screws to disengage the two lint arresters, see diagram 8.6.

Clean the lint arresters as required.

### 8.6 Main Burner - Injector

Inspect the main burner injector for damage or blockage, clean or replace as necessary. If replacing ensure the new copper washer is fitted, see diagram 8.7.

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

### 8.7 Flue Blockage Safety Device Assembly

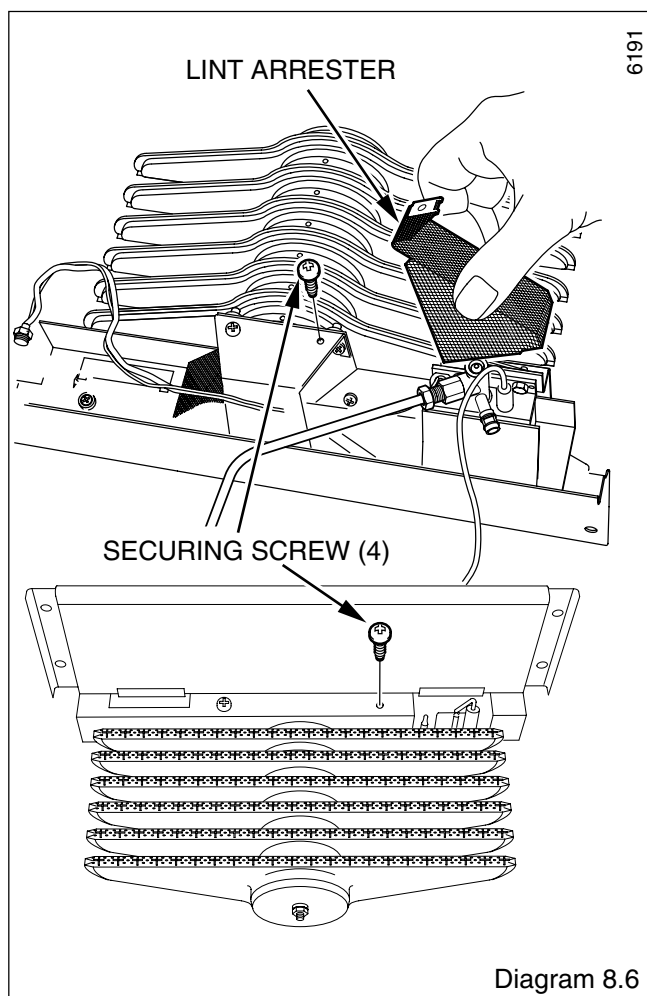
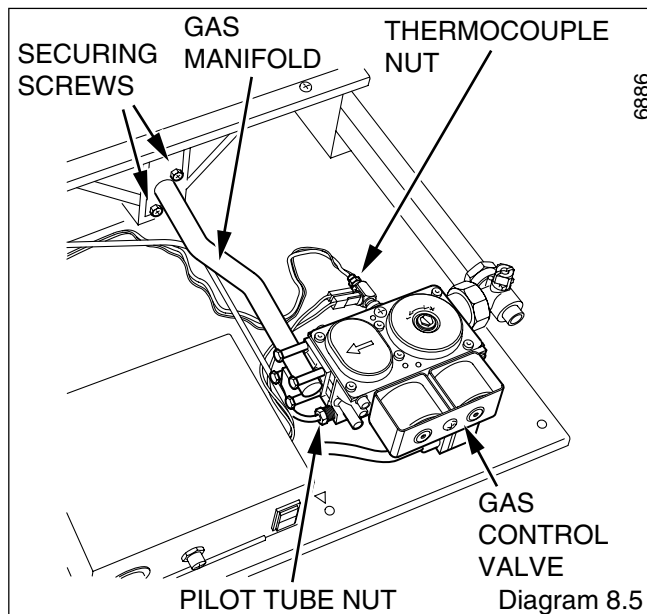
Gain access as relevant part of Section 8.3. Remove any dust and lint, inspect the pilot for damage. Remove the sensing tube adapter, to clean, blow through, do not use a wire or sharp instrument. Inspect the electrode and thermocouple for wear or damage, clean, or replace as necessary the flue blockage safety device, see diagram 8.8.

To remove the safety device, disconnect the pilot tube nut and two securing screws, see diagram 8.9.

Ensure the electrode is in line with the earth post and the spark gap is as shown in diagram 8.8.

Note: When reassembling the burner assembly the following points should be observed:

- a) Make sure that the lint arresters are engaged in the correct position on the burner support bracket.
- b) DO NOT replace the combustion chamber control/burner assembly into the back boiler until the boiler flueways servicing has been carried out.



## 8 Servicing

### 8.8 Ignition Lead

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

### 8.9 Back Boiler Flueways

Remove the spigot duct, see diagram 8.10.

Remove the draught diverter plate by slackening the two side securing screws and removing the rear securing screw, see diagram 8.10.

Lift out the flueway baffles, see diagram 8.11.

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 correctly seated in the back and middle flueways, see diagram 8.11.

NOTE: If the heat exchanger has been turned the baffles must still be fitted into the back and middle flueways.

Refit the draught diverter plate.

Refit the control/burner assembly.

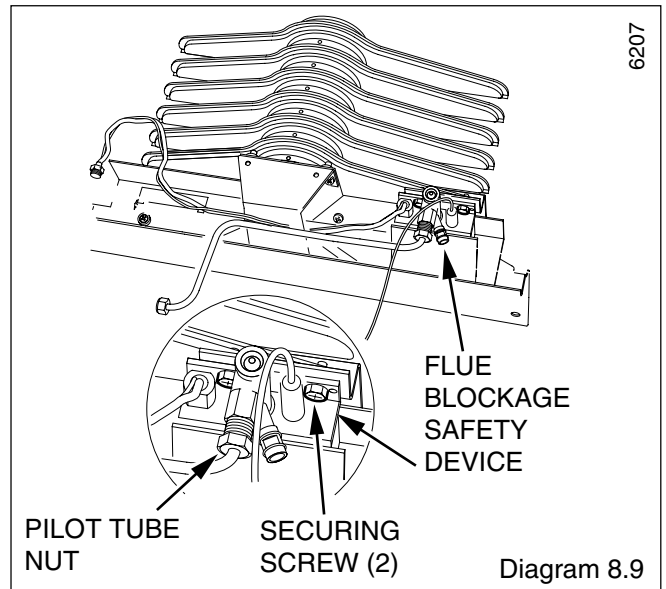


Diagram 8.9

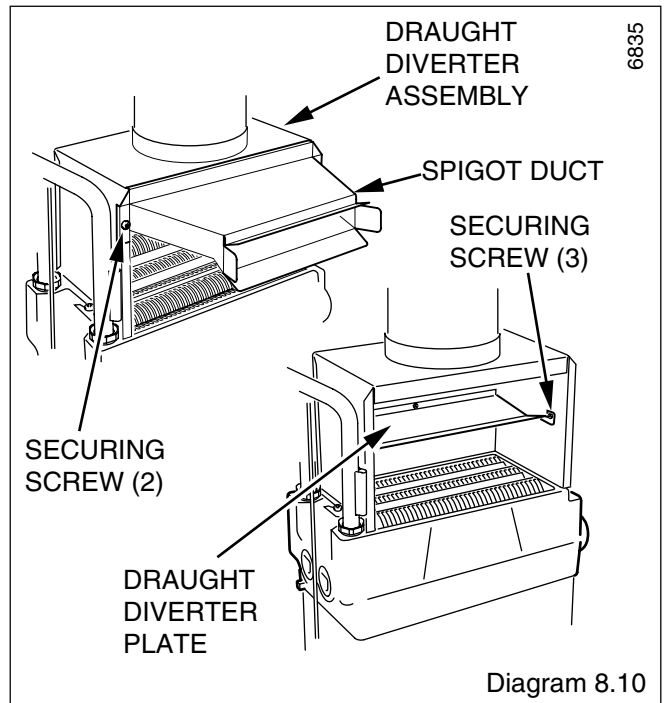


Diagram 8.10

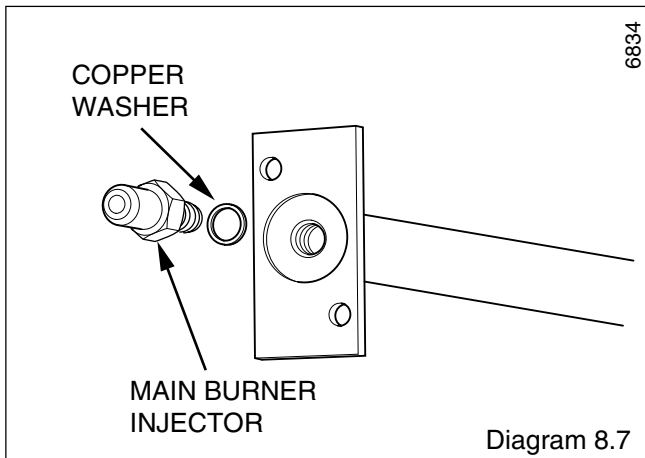


Diagram 8.7

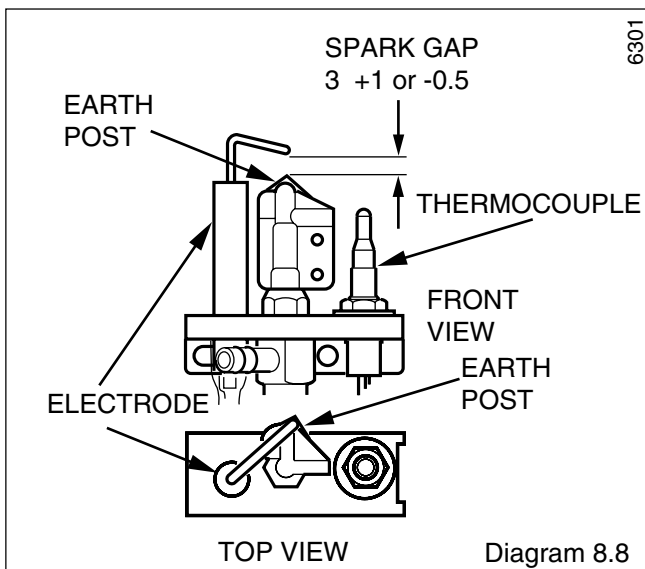


Diagram 8.8

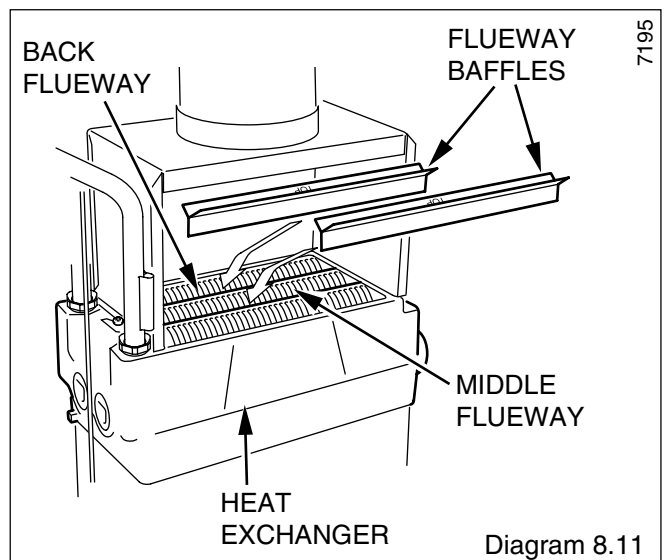


Diagram 8.11

## 9 Fault Finding

### 9.1 Electrical

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

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 Thermocouple

To test the thermocouple, a meter with a range of 0 - 30mV is required together with a thermocouple interrupter test unit.

### 9.3 Electrical Fault Finding Back Boiler

Refer to diagram 9.1.

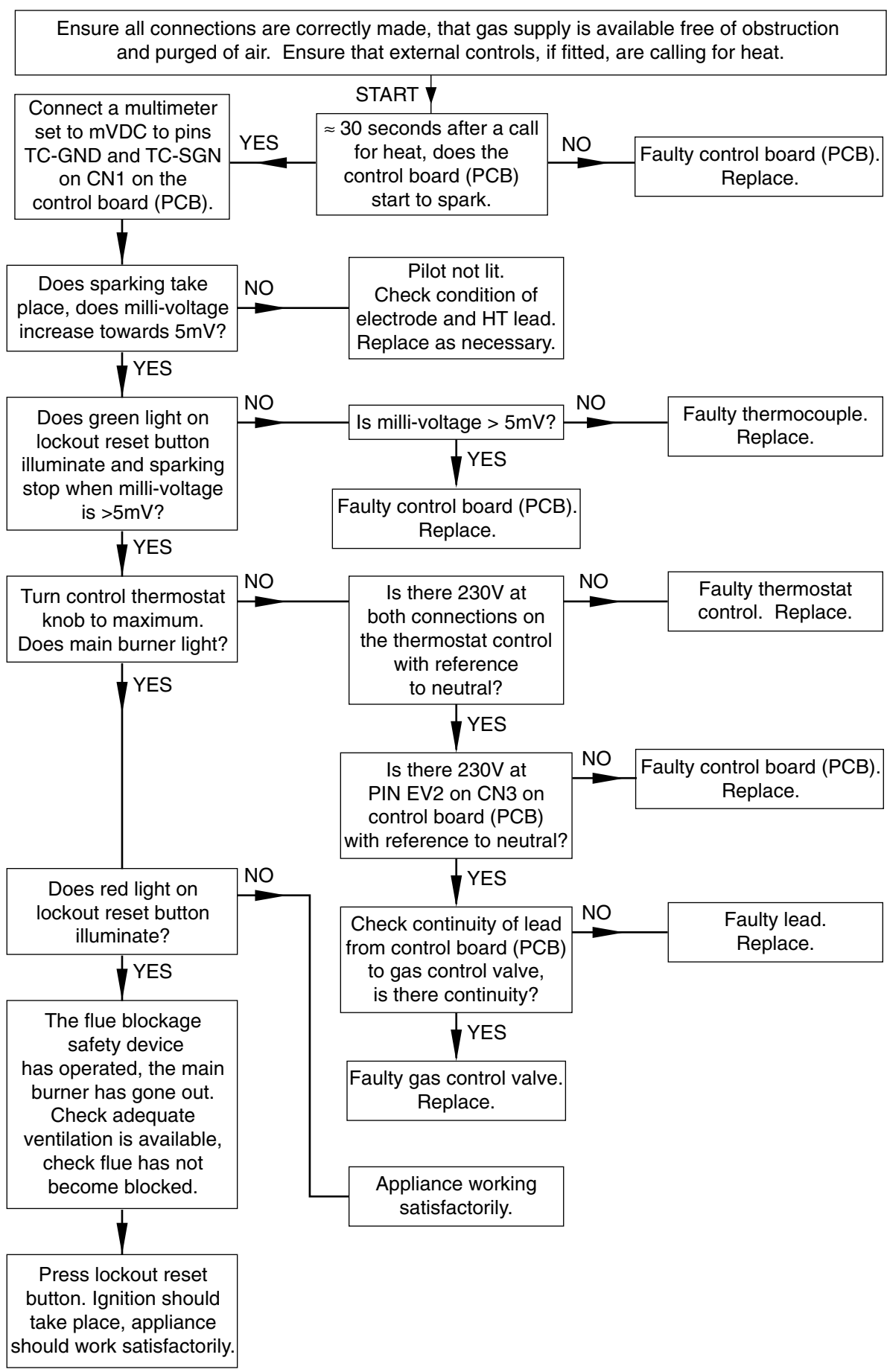
### 9.4 Flue Blockage Safety Device and Ignition Fault Finding

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



## 9 Fault Finding

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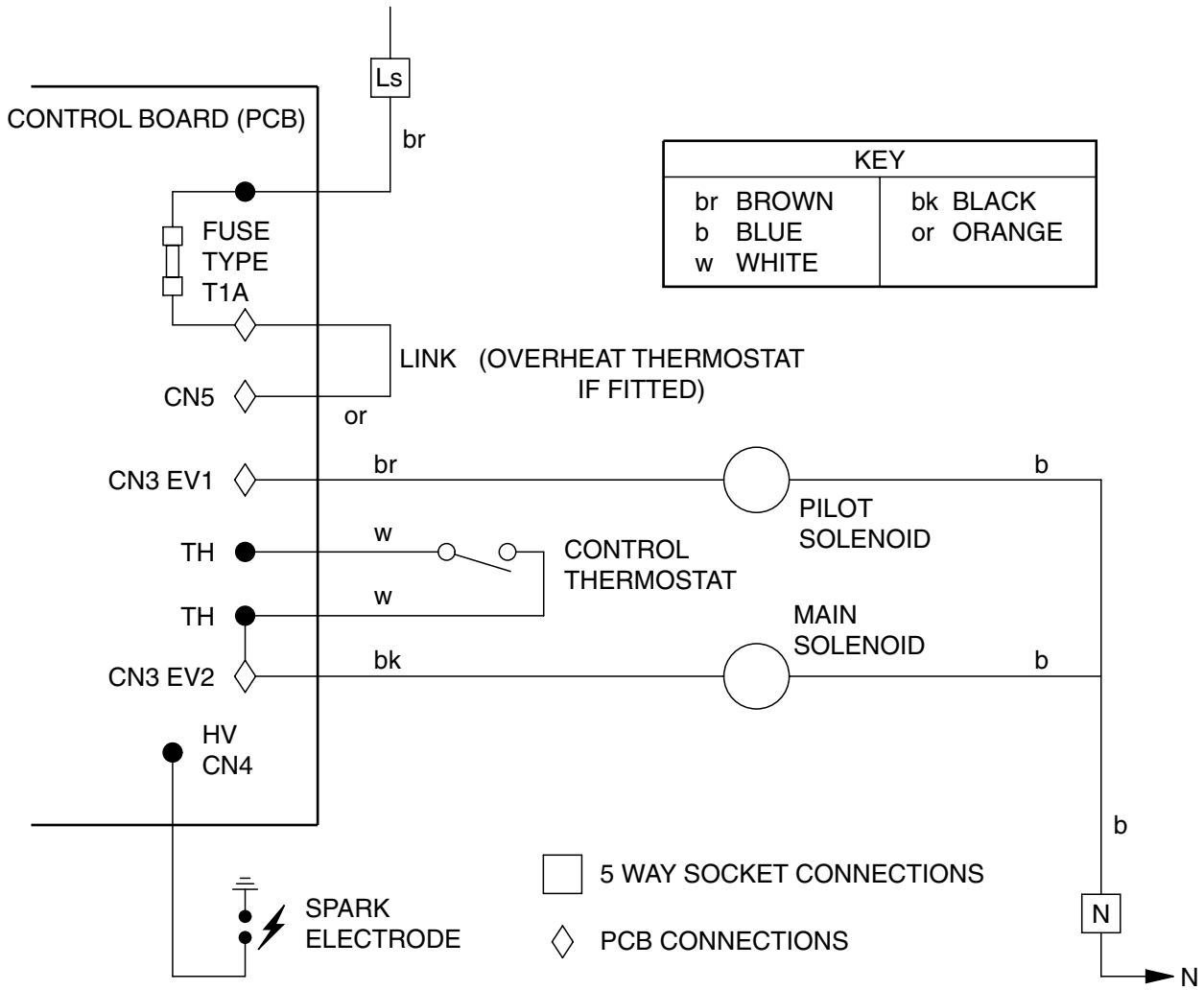


**ELECTRICAL FAULT-FINDING BACK BOILER**

Diagram 9.1

# 9 Fault Finding

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FUNCTIONAL FLOW

Diagram 9.2

## 10 Replacement of Parts

Notes.

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

Turn the thermostat control knob clockwise to "0", "Off" position.

Turn the appliance gas service cock to the "Off" position, see diagram 4.12.

### 10.1 Sensing Tube Assembly.

Refer to Section 8.2.

### 10.2 Flue Blockage Safety Device

Follow the instructions in Section 8.2 and 8.3 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 thermocouple nut.

Disconnect the pilot pipe nut.

Remove the safety device securing screws.

Remove the safety device.

### 10.3 Thermocouple

Proceed as in Section 10.2.

### 10.4 Electrode

Proceed as in Section 10.2.

### 10.5 Ignition Lead

Remove the combustion chamber extension, see diagram 4.5.

Remove the control box refer to the relevant parts of Section 8.3.

Remove the lead from the electrode.

Remove the lead from the control board (PCB).

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

### 10.6 Injector - Main Burner

Follow the instructions in Section 8.4 to remove the burner.

Replace the main injector, Ensure you fit the new copper washer, see diagram 8.7.

### 10.7 Gas Control Valve

Remove the combustion chamber extension, see diagram 4.5.

Refer to diagram 10.2.

Disconnect the union nut at the at the gas service cock, support with a spanner, refer to diagram 4.12.

Disconnect the gas control electrical plug.

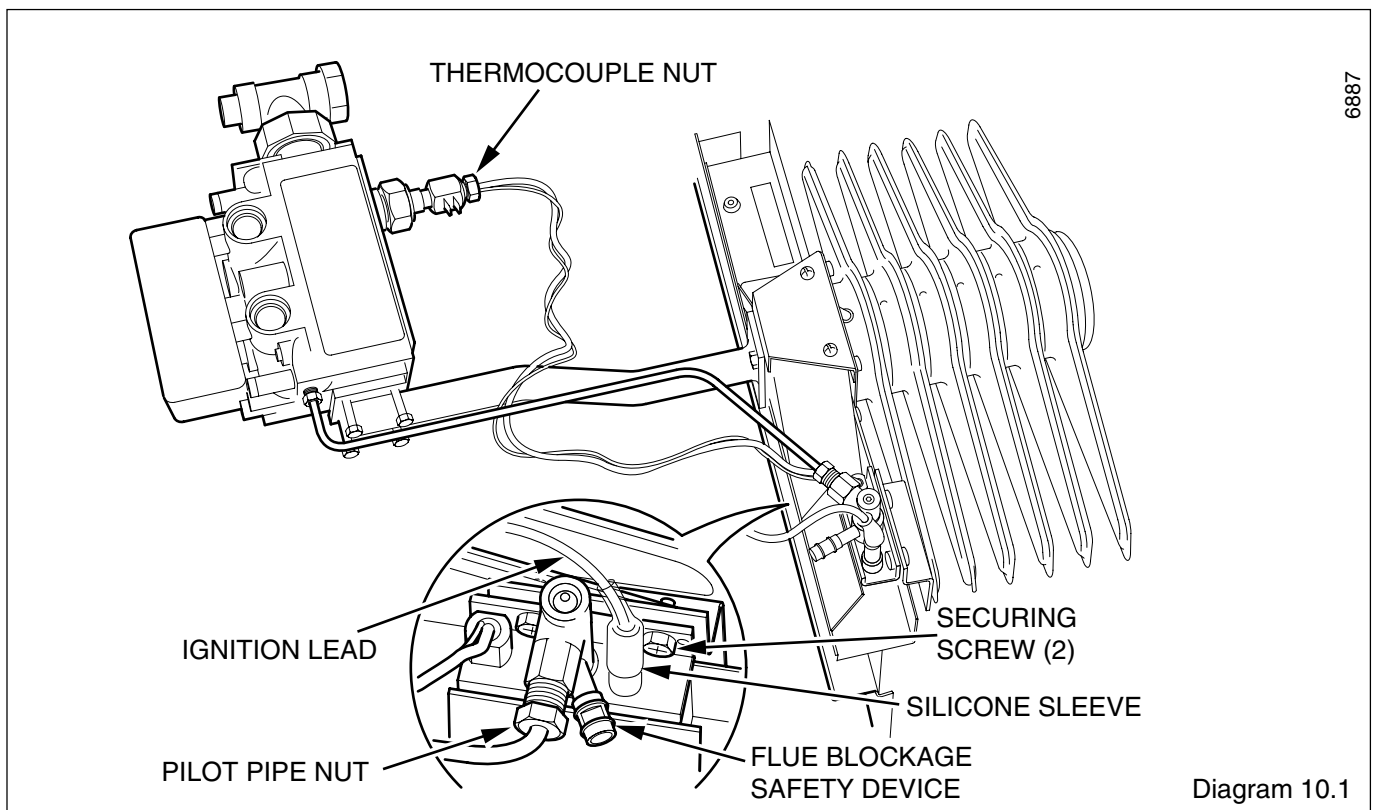
Disconnect the thermocouple nut at the gas control valve and ease out.

Disconnect interrupter electrical connections.

Disconnect the pilot tubing nut at the gas valve.

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

Pull the gas control valve forward releasing it from the retaining pin, see diagram 8.4.



## 10 Replacement of Parts

Remove the interrupter.

Remove the liner and union nut.

Transfer the interrupter to the replacement gas control valve.

Transfer the liner and union nut using a small amount of approved jointing compound on the external threads only to the replacement gas control valve.

Fit the new 'O' ring seal supplied with new gas control valve.

Note. When replacing the thermocouple only tighten the nut a quarter turn beyond finger tight.

Should the solenoids require replacing, refer to Section 10.12.

### 10.8 Burner

Follow the relevant instructions in Section 8.3 and 8.4 to remove the burner.

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

### 10.9 Control Thermostat

Remove the combustion chamber extension, see diagram 4.5.

Remove the control box refer to the relevant parts of Section 8.3.

Remove the control thermostat phial and unclip the capillary tube, see diagram 5.4.

Remove the control knob, see diagram 10.4.

Remove the two electrical connections from the control thermostat, see diagram 10.4.

Remove the two securing screws and remove the control thermostat and capillary, see diagram 10.4.

When refitting, the capillary should pass through the cut-out slot in the control box, see diagram 10.3.

The capillary tube must not touch any part of the back boiler that becomes hot, re-clip the capillary tube and push the phial into the pocket.

NOTE: When fitting the phial use heat sink compound and ensure the phial is fully inserted into the phial pocket.

When refitting refer to diagram 5.4.

### 10.9 Lockout Reset Button

Remove the combustion chamber extension, see diagram 4.5.

Remove the control box refer to the relevant parts of Section 8.3.

Remove the lockout reset button multi pin connector from the control board, release the tabs to remove the lockout reset button, see diagram 10.5.

NOTE: Turn the multi pin connector and carefully ease through the hole in the front of the control box as shown in diagram 10.5.

When refitting refer to the wiring diagram 5.6.

### 10.10 Control Board (PCB)

Remove the combustion chamber extension, see diagram 4.5.

Remove the control box refer to the relevant parts of Section 8.3.

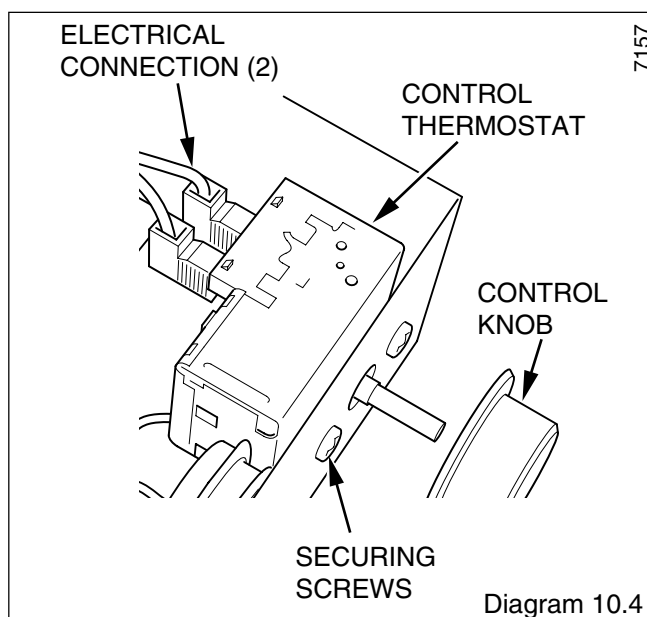
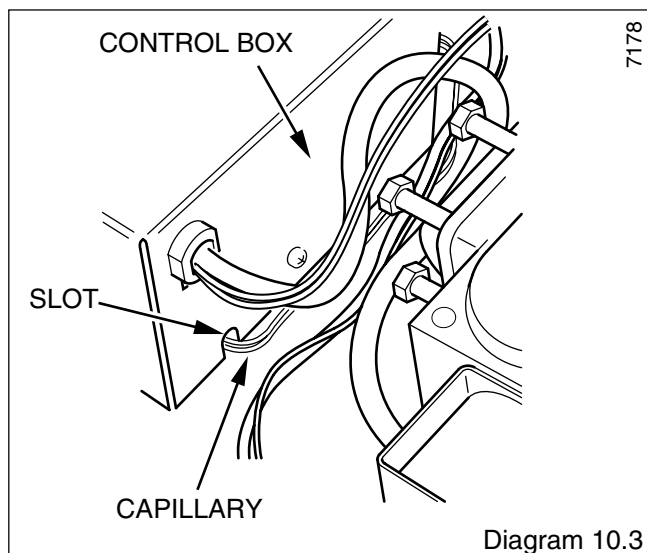
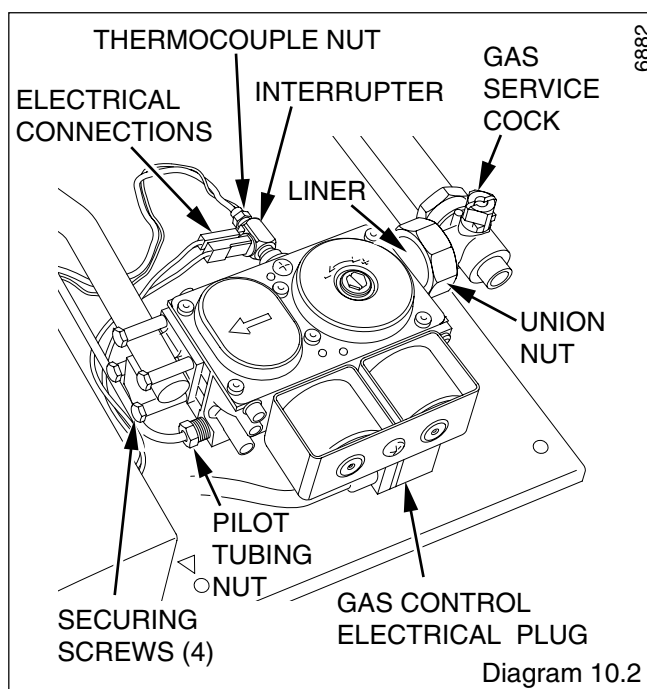
Refer to diagram 10.6.

Disconnect the ignition lead.

Disconnect the electrical connections from the control thermostat.

Disconnect the four multi pin connector .

Disconnect the earth lead.



## 10 Replacement of Parts

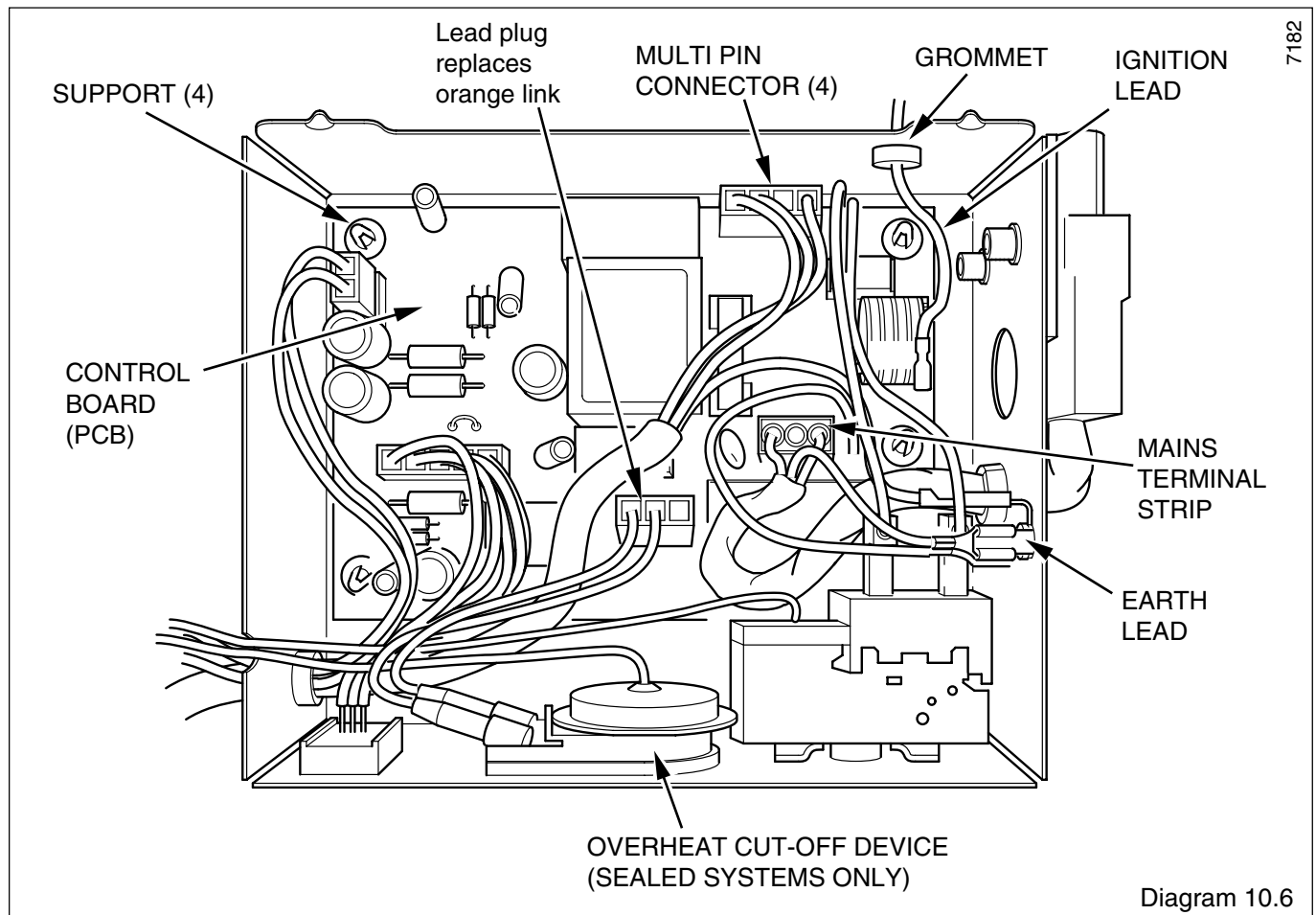
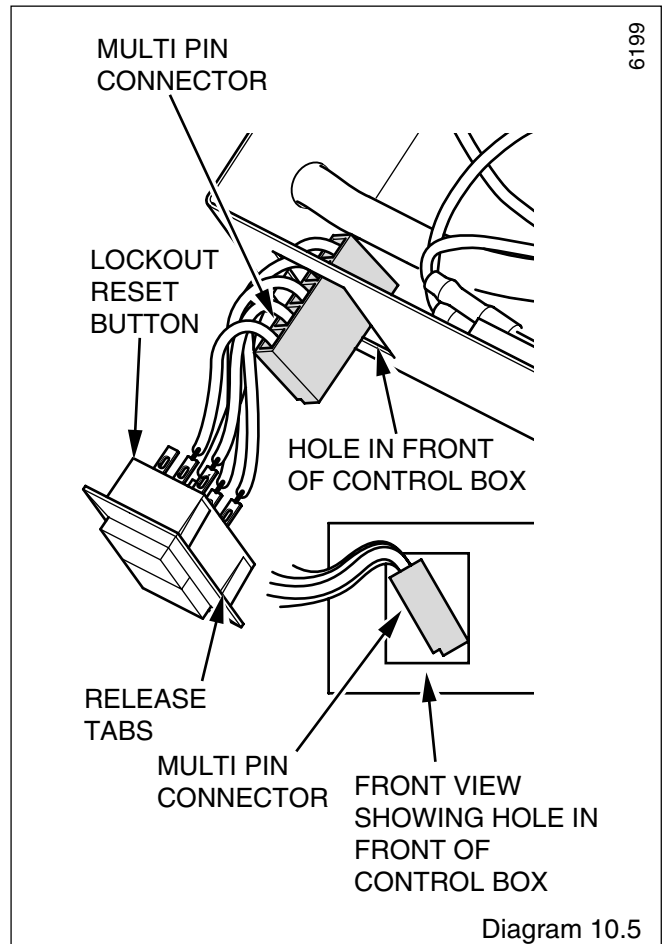
Release the wires from the mains terminal strip.  
Carefully pull the board from its supports.  
When refitting refer to the wiring diagram 5.6.

### 10.11 Over Heat Cut-off Device (Sealed systems only)

Remove the combustion chamber extension, see diagram 4.5.  
Remove the control box refer to the relevant parts of Section 8.3.  
Remove the over heat phial and unclip the capillary tube, see diagram 5.4.  
Remove the locknut, see diagram 10.7.  
Remove the over heat electrical connections, see diagram 10.7.  
Remove the over heat cutoff device and capillary, see diagram 10.7.  
When refitting, the capillary should pass through the cut-out slot in the control box, see diagram 10.3.  
When refitting refer to the wiring diagram 5.6.  
The capillary tube must not touch any part of the back boiler that becomes hot, re-clip the capillary tube and push the phial into the pocket.

### 10.12 Solenoids

Refer to diagram 10.8.  
Remove the gas control plug at the gas control valve.  
Remove the solenoid securing screw.  
Remove the solenoids.



## 10 Replacement of Parts

### 10.13 Interrupter

Remove the combustion chamber extension, see diagram 4.5.

Refer to diagram 10.9

Carefully disconnect the thermocouple nut.

Remove the electrical connections.

Remove the interrupter.

### 10.14 Insulation

Follow the relevant instructions in Section 8.3 to remove the controls assembly and burner.

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

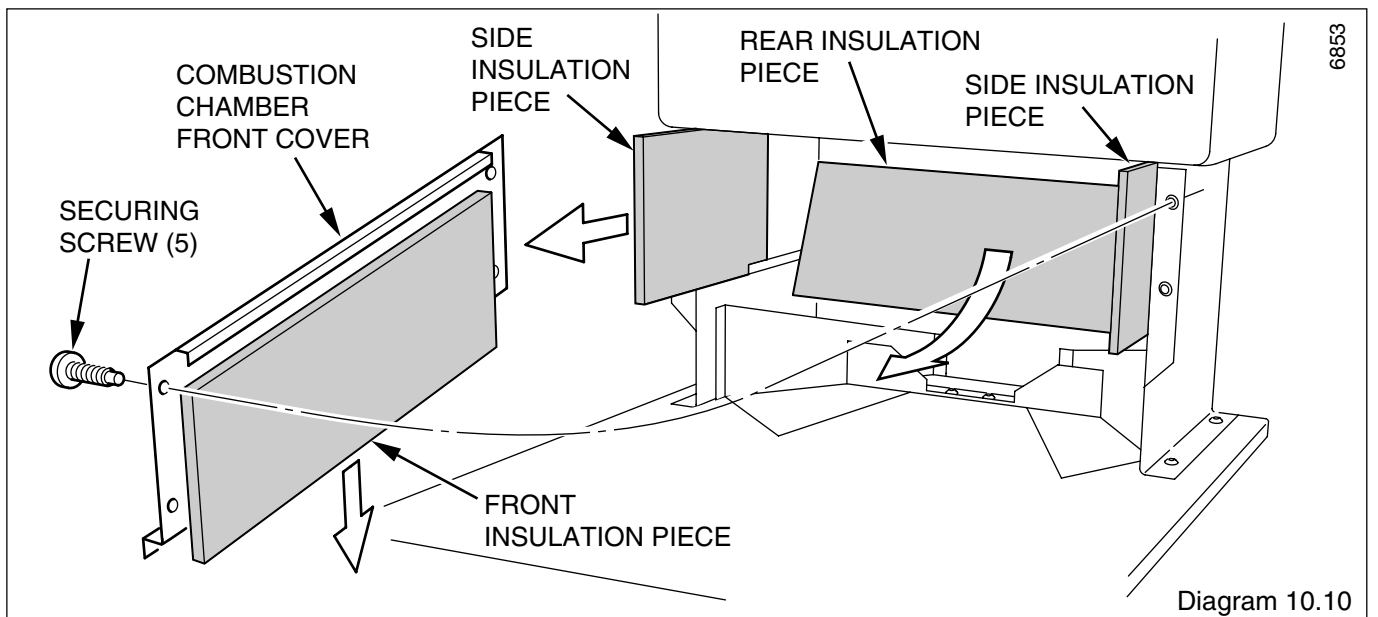
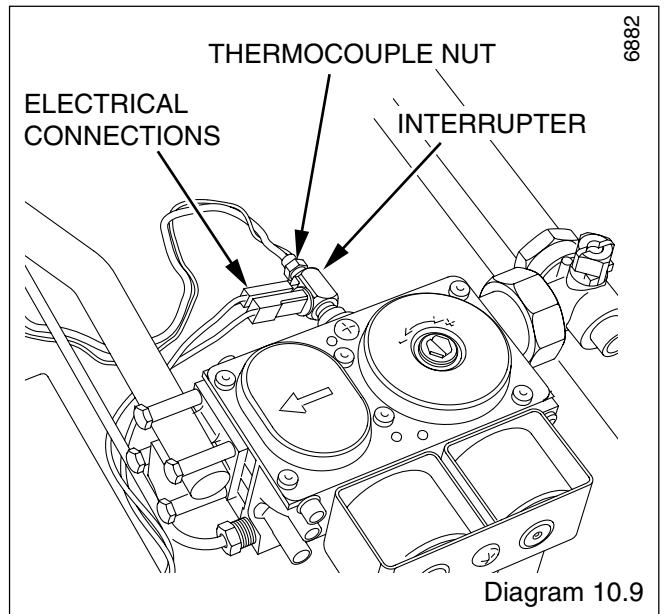
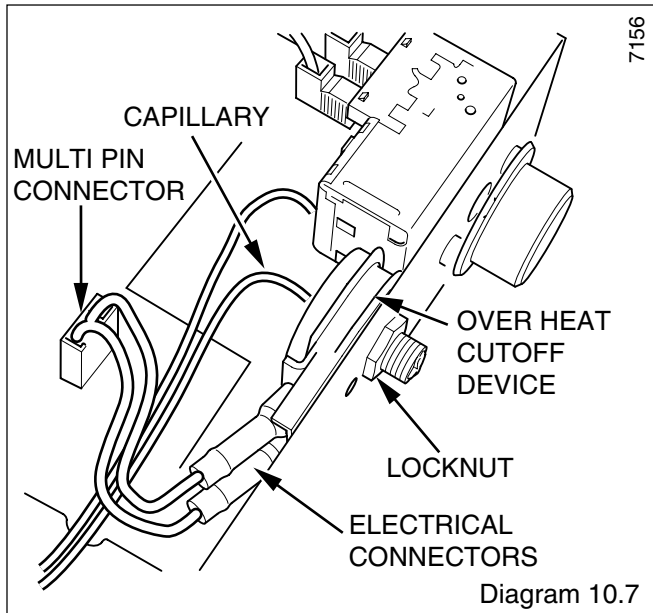
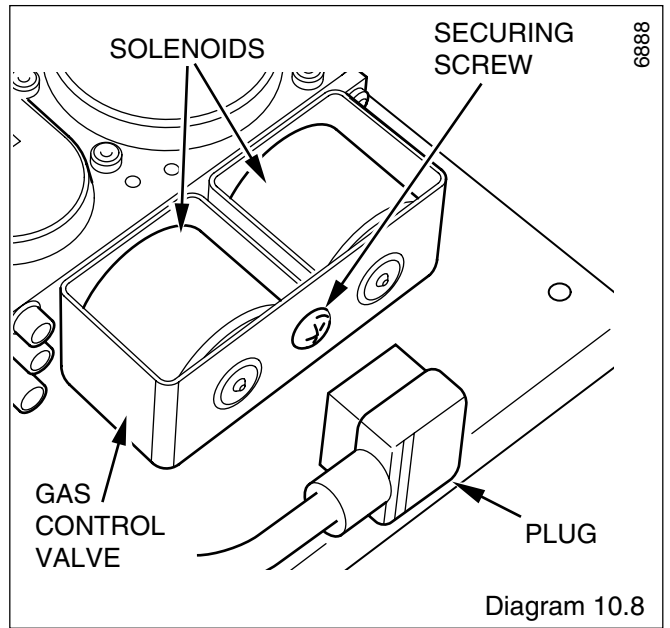
Refer to diagram 10.10.

Remove the front cover insulation,

Slide out the side insulation pieces.

With the side insulation pieces removed, lift out the rear insulation.

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



# 11 Spare Parts

When spare parts are required apply to your local supplier.

Please quote the name of the appliance, Glow-worm 56/3e BBU, with a relevant BBU Fire Front, 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	WY0200	Ignition lead	****
2	800929	Gas control valve	E03 982
3	800204	Injector	313485
4	202015	Fuse (Type T1A)	334 750
5	202273	Control board (PCB)	E03 966
6	451477	Flue blockage safety device - SIT Ref:-9403	191 310
7	202577P	Lock out reset button	E04 330
8	800933	Control thermostat	E03 972
9	800928	Control knob	E03 970
10	800999	Overheat cut off device	E03 997
11	801002	Flue blockage safety device 'O' Rings	E04 001
12	208693	Sensing Tube Internal Filter	E03 987
13	459026	Lint Arrester	****
14	213046	Lint Arrester Retaining Clip	****

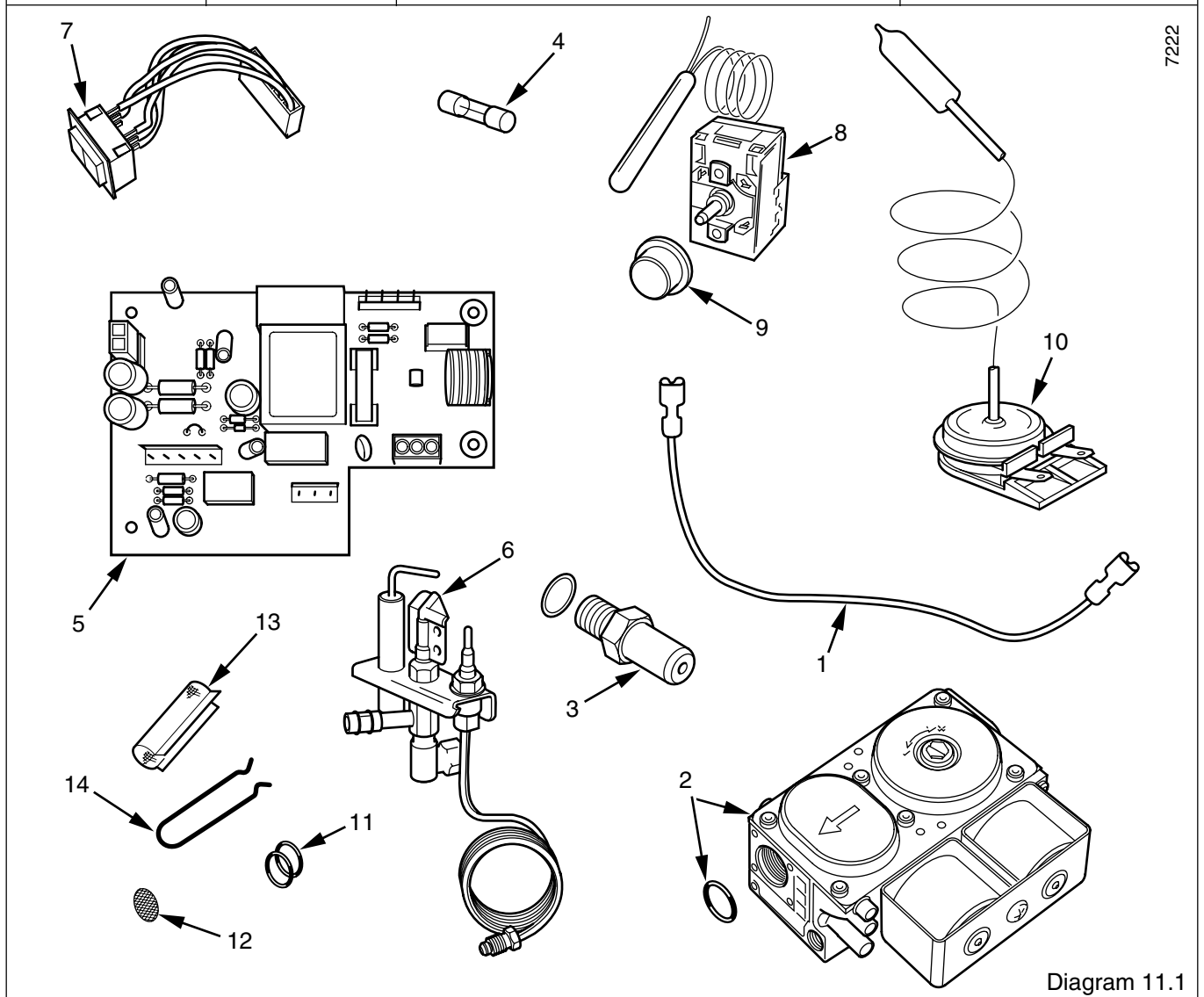


Diagram 11.1

## Control of Substances Hazardous to Health

### **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.

### **RADIANTS, FUELBEDS, ARTIFICIAL FUEL**

After handling wash hands thoroughly.

### **INSULATION PADS/CERAMIC FIBRE, GLASSYARN, MINERAL WOOL**

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.

### **THERMOSTATS**

These contain very small amounts of trichlorofluoromethane in the sealed phial and capillary. If broken, under normal circumstances the fluid does not cause a problem, but it can, in exceptional cases cause freeze burns.

If there is skin burn or irritation to the eyes or skin seek medical attention.

### **THERMOSTATS**

These contain very small amounts of xylene in the sealed phial and capillary. If broken, under normal circumstances the fluid does not cause a problem, but in cases of skin contact, wash with cold water.

If swallowed drink plenty of water and seek medical attention.

### **CUT-OFF DEVICES**

These contain a very small amount of ethylene glycol and methanol in the capillary. If broken, under normal circumstances the fluid does not cause a problem, but in cases of skin or eye contact, wash with cold water.

If swallowed drink plenty of water and seek medical attention.

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