

# Installation & Servicing Instructions

To be left with the user

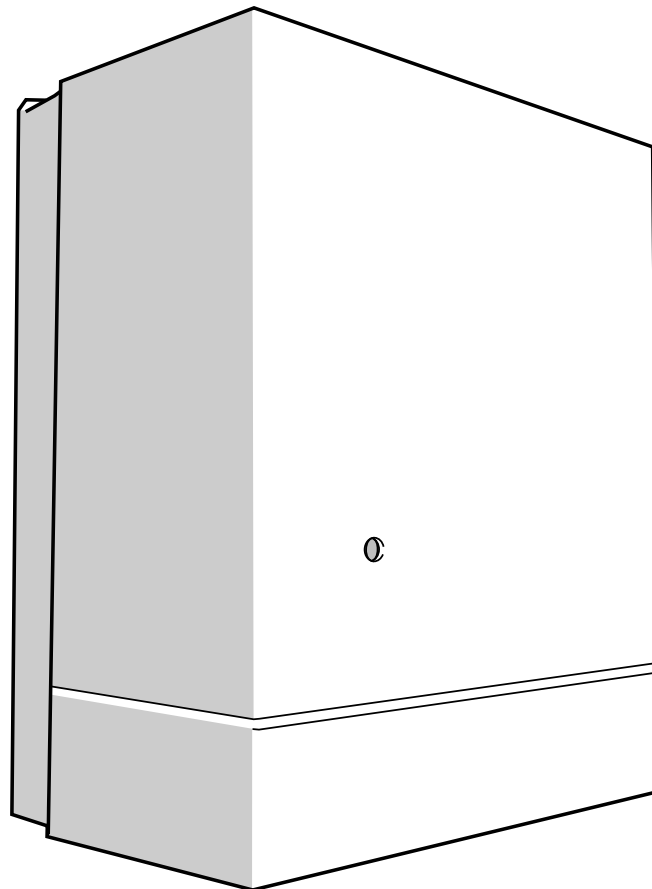
## Economy *plus*

**60B** G.C. No. 41 319 04

**75B** G.C. No. 41 319 62

*Balanced Flue Boilers With Honeywell Control*

2404



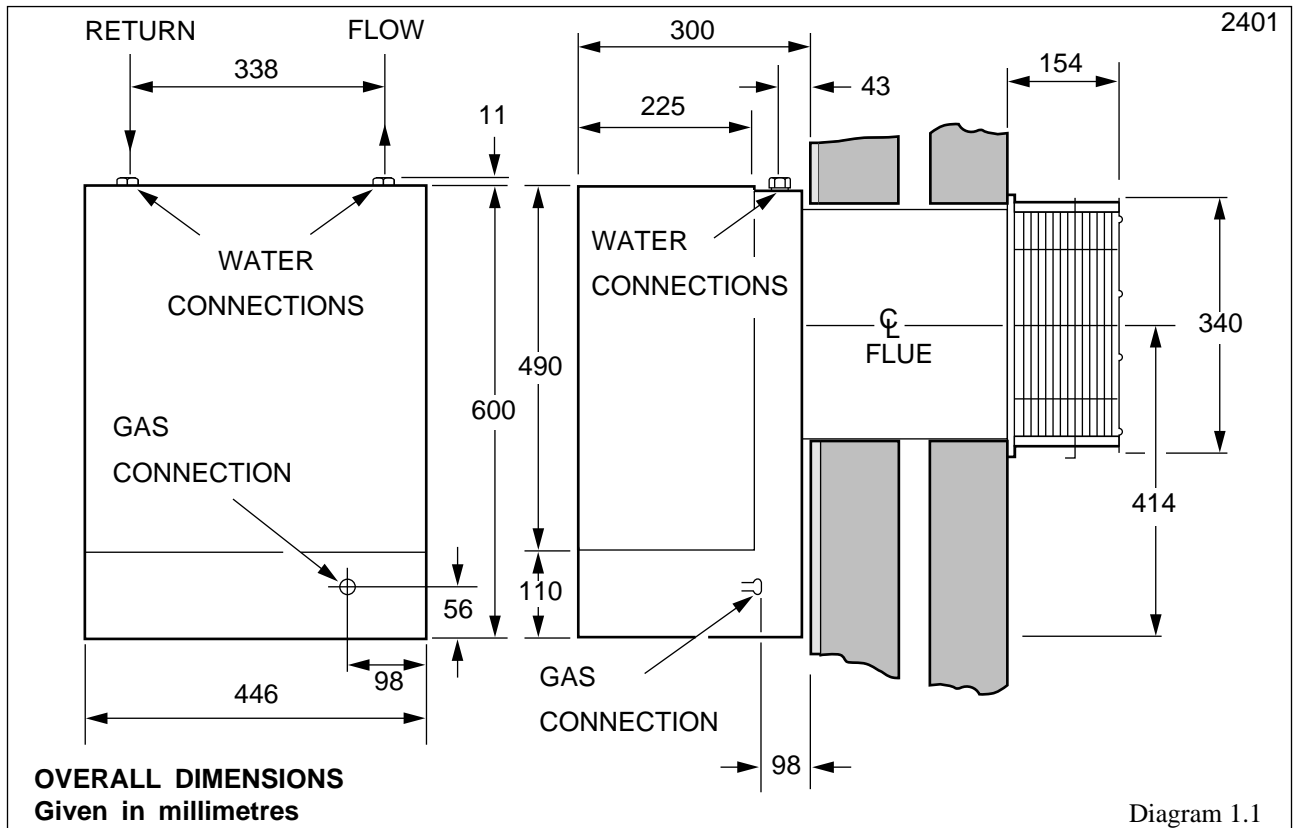
*This is a Cat I<sub>2H</sub> Appliance*



BS6332  
BS5258

**HEATCALL** Customer Services:  
 Tel: (01773) 828100  
 One Contact Total Service Fax: (01773) 828070

**Hepworth Heating Ltd.,**  
 Nottingham Road, Belper, Derbyshire. DE56 1JT  
**General/Sales enquiries :**  
 Tel: (01773) 824141 Fax: (01773) 820569



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

**1 General Notes and Information.**

This boiler is suitable for fully pumped systems only.

**Important Notice**

The boiler is for use on natural gas as distributed in the United Kingdom (G20) and cannot be used on any other gas.

**Sheet Metal Parts**

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

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

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

## 1.1 Statutory Requirements

This boiler must be installed by a competent person in accordance with the requirements of the current issue of:

The Gas Safety (Installation and Use) Regulations, The Building Regulations, The Building Standards (Scotland) Regulations, (applicable in Scotland), Local Water Company Bye-laws, 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:

BS6798, BS5440 Parts 1 and 2, BS6891, BS5546 Part 1, BS5449, BS7074 Part 1 and 2, BS7478, BS7593, BS7671.

## 1.2 Data

<b>Weight</b>	<b>60B</b> - 32kg (71lb) <b>75B</b> - 33.2kg (73.1lb)
<b>Electrical supply -</b>	240V~50Hz fused 3A
<b>Water content</b>	<b>60B</b> - 0.71Litre (0.16gal) <b>75B</b> - 0.75Litre (0.17gal)
<b>Gas connection -</b>	Rc 1/2
<b>Water connection-</b>	28mm copper flow at right
<b>Data label-</b>	Bottom right, inner case.
<b>Injector</b>	<b>60B</b> - Bray 30-1700 <b>75B</b> - Bray 30-2200

## 1.3 Range Rating

This boiler is range rated and may be adjusted to suit individual system requirements.

Table 1 gives the ratings and settings.

## 1.4 B.S.I. Certification

This boiler is certificated to the current issue of BS6332 Part 1, invoking the current issue of BS5258 Part 1 for performance and safety. It is, therefore, 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 of the boiler, the warranty and could also 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.

## 1 General

### 1.5 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 boiler.

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.

### 1.6 Electrical Supply

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

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

Connection of the boiler and system controls to the mains supply must be through a common isolator and must be fused 3A maximum. This method of connection should be, preferably, by a fused double pole isolating switch, provided it has a minimum contact separation of 3mm on both poles. This should be readily accessible and preferably adjacent to the appliance. It should supply the appliance only and be easily identifiable as so doing.

Alternatively an unswitched shuttered socket outlet and 3A fused 3 pin plug both to the current issue of BS1363 may be used provided that they are not used in a room containing a bath or shower.

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

### 1.7 Contents of Packaging

The boiler is delivered in one pack.

The other pack contains the balanced flue terminal assembly and accessories.

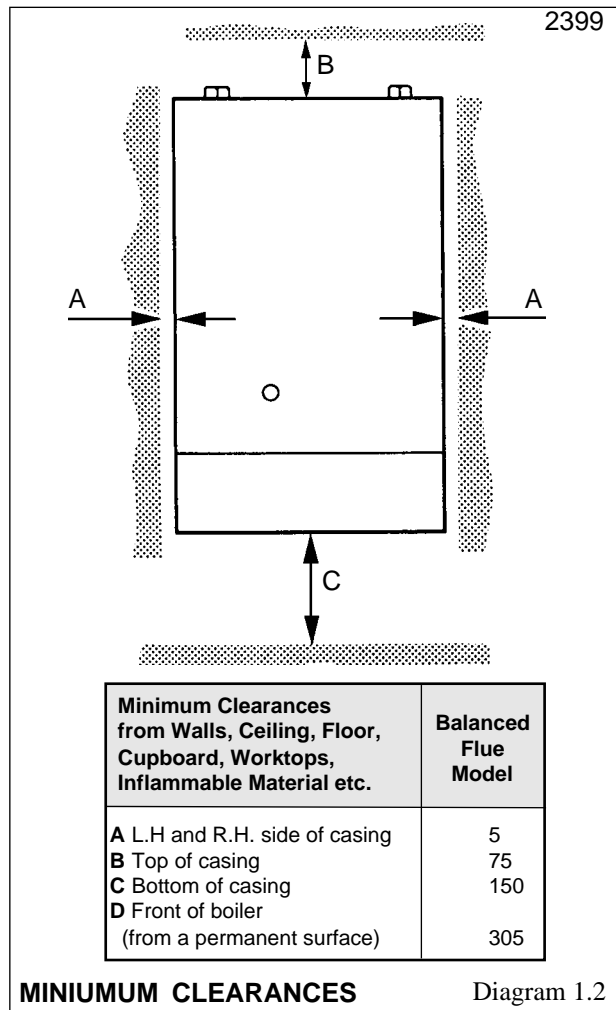
Refer to Section 2.3 to check that the flue terminal assembly supplied is suitable.

### 1.8 Water System

The boiler may be fitted to an open vented or sealed system, refer to Section 3 for details.

ECONOMY PLUS 60B		Table 1		
RANGE RATING		Min.	Med.	Max.
NOMINAL HEAT INPUT	<i>kW</i>	18.47	-	22.00
	<i>Btu/h</i>	63,000	-	75,000
NOMINAL HEAT OUTPUT	<i>kW</i>	14.66	16.12	17.59
	<i>Btu/h</i>	50,000	55,000	60,000
BURNER SETTING PRESSURE	<i>m bar</i>	9.3	11.6	13.4
	<i>in. w.g.</i>	3.7	4.6	5.4

ECONOMY PLUS 75B		Table 1		
RANGE RATING		Min.	Med.	Max.
NOMINAL HEAT INPUT	<i>kW</i>	22.13	-	27.50
	<i>Btu/h</i>	75,500	-	93,800
NOMINAL HEAT OUTPUT	<i>kW</i>	17.60	19.8	22.00
	<i>Btu/h</i>	60,000	67,500	75,000
BURNER SETTING PRESSURE	<i>m bar</i>	9.4	11.8	14.5
	<i>in. w.g.</i>	3.8	4.7	5.8



## 1 General

### 1.9 Draining Tap

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

The boiler is fitted with a drain tap for draining down the heat exchanger.

Draining taps shall be to the current issue of BS2879.

### 1.10 Safety Valve

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

### 1.11 Location

This boiler is not suitable for outdoor location.

The boiler may be installed in any room, although particular attention is drawn to the requirements of the current issue of BS7671 with respect to the installation of a boiler in a room containing a bath or shower.

Any electrical switch or boiler control using mains electricity should be so fitted that it cannot be touched by a person using the bath or shower. The electrical provisions of the Building Standards (Scotland) Regulations are applicable to such installations in Scotland.

The boiler must be mounted on a flat wall which is sufficiently robust to take its weight.

### 1.12 Boiler Location

Refer to diagram 1.2.

The boiler must be positioned so that at least the minimum operational and servicing clearances are provided.

Additional clearances may be required for installation.

If fixtures are positioned next to the boiler they should be made removable for access to pipework.

Sufficient clearance must be left in front of the boiler for servicing.

## 2 Flue and Ventilation

### 2.1 Terminal Position

The minimum acceptable spacings from the terminal to obstructions and ventilation openings are shown in diagram 2.1.

Where the terminal is fitted within 850mm (34in) below plastic guttering or within 450mm (18in) of painted eaves or painted gutters an aluminium shield 750mm (2ft6in) long should be fitted to the underside and immediately beneath the guttering/eaves.

If a terminal guard is required, it must be positioned to provide a minimum of 50mm clearance from any part of the terminal and be central over the terminal.

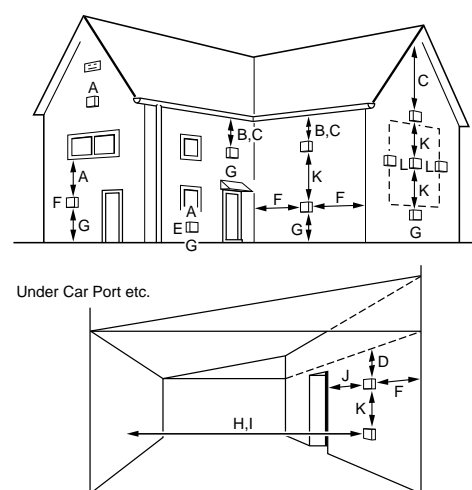
Guards are available from,  
**Tower Flue Components Ltd.,**  
Morley Road,  
Tonbridge,  
Kent, TN9 1RA.

quoting their reference "F"black,

### 2.2 Protecting the Terminal

A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

POSITION	MINIMUM SPACING
<b>A</b> Directly below an openable window, air or any other ventilation opening	300mm
<b>B</b> Below gutter, drain/soil pipe	300mm
<b>C</b> Below eaves	300mm
<b>D</b> Below a balcony or car port	600mm
<b>E</b> From vertical drain pipes and soil pipes	75mm
<b>F</b> From internal or external corners	600mm
<b>G</b> Above adjacent ground or balcony level	300mm
<b>H</b> From a surface facing the terminal	600mm
<b>I</b> Facing terminals	600mm
<b>J</b> From opening (door/window) in car port into dwelling	600mm
<b>K</b> Vertical from a terminal	1500mm



1112

**MINIMUM SITING DIMENSIONS FOR BALANCED FLUE TERMINALS**

Diagram 2.1

## 2 Flue and Ventilation

### 2.3 Wall Thickness

Check the thickness of the wall.

The standard flue set supplied is suitable for wall thickness 238mm to 330mm. For other wall thickness, a short flue kit No.443239 for 76mm to 238mm and a long flue kit No. 443240 for 324 to 580mm are available.

### 2.4 Boilers in a Compartment

Where the installation of the boiler will be in an unusual location, special procedures are necessary, the current issue of BS6798 gives detailed guidance on this aspect.

A compartment used to enclose the boiler must be designed and constructed specifically for this purpose.

An existing cupboard or compartment modified for the purpose may be used.

Details of essential features of cupboard design are given in the current issue of BS6798.

The doorway opening should be of sufficient size to allow for easy removal of the boiler.

Where the boiler is fitted in a cupboard or compartment, permanent high and low level ventilation must be provided. The minimum ventilation areas required are given in Table 2.

AIR VENT AREA TABLE FOR COMPARTMENT INSTALLATIONS		
TABLE 2	AIR VENT AREAS	
POSITION OF AIR VENTS	AIR FROM ROOM OR INTERNAL SPACE	AIR DIRECT FROM OUTSIDE
HIGH VENT	200cm <sup>2</sup>	100cm <sup>2</sup>
LOW VENT	200cm <sup>2</sup>	100cm <sup>2</sup>

### 2.5 Timber Frame Buildings

If the boiler is to be installed in a timber frame building it should be fitted in accordance with the British Gas publication "Guide for Gas Installation in Timber Framed Housing" reference "DM2". If in doubt, seek advice from the local gas undertaking or Hepworth Heating Ltd.

## 3 Water Systems

Notes

### Pump

The pump should be fitted in the flow pipework from the boiler with valves each side, integral if possible, it should produce at least 2.5m (8ft) head, a temperature difference across the boiler of 11°C (20°F). Flow rate through the boiler of 23Litres/min (5.1gal/min).

See diagram 3.1 for pressure loss across the boiler.

High resistance microbore systems may require a higher duty pump.

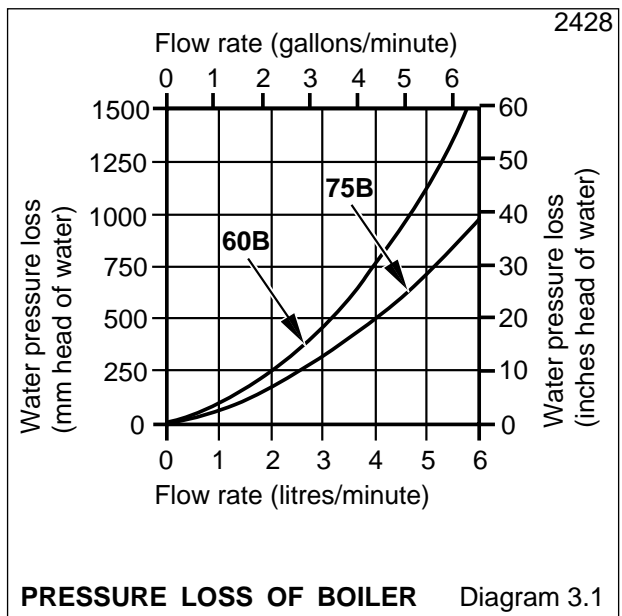
### Bypass

A bypass must be fitted, see diagram 3.2.

The flow rate through the boiler must not be allowed to fall below 18Litres/min (3.9gal/min) whilst the burner is alight.

### 3.1 Water System - Open Vented Systems

For an open, vented, system the boiler must be supplied from an unrestricted water supply taken from a feed and expansion tank, situated at a maximum height of 27.5metres (90ft) above the boiler.



The cold feed supply must be 15mm minimum size.

It is important that the relative positions of the pump, cold feed and open vent are as shown in diagram 3.2.

**3.2 Cylinder**

SINGLE FEED (SELF PRIMING) CYLINDERS ARE NOT RECOMMENDED.

The hot water cylinder must be a double feed, fully indirect, type.

**3.3 Inhibitor**

Attention is drawn to the current issue of BS5449 and BS7593 on the use of inhibitors in central heating systems.

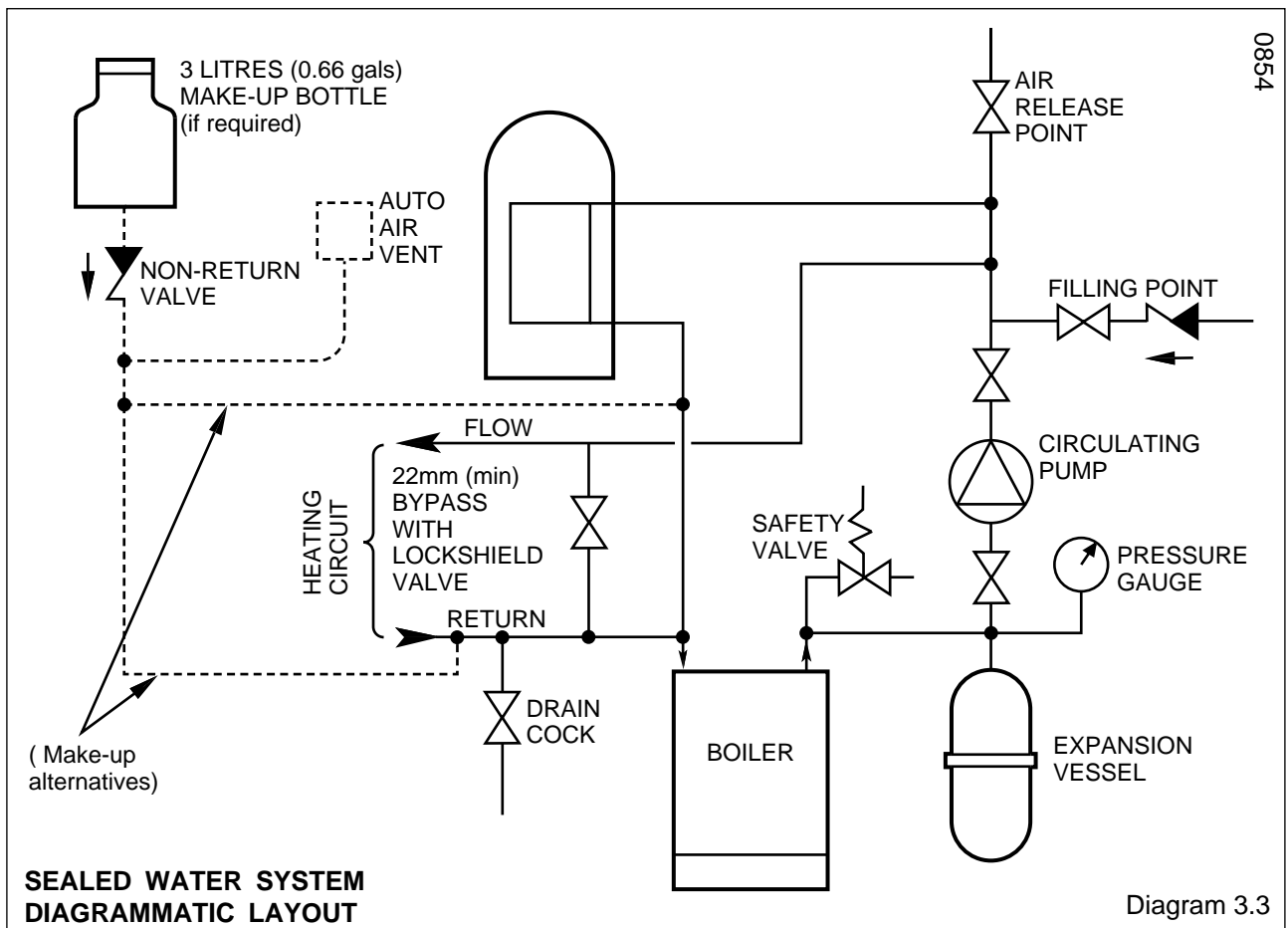
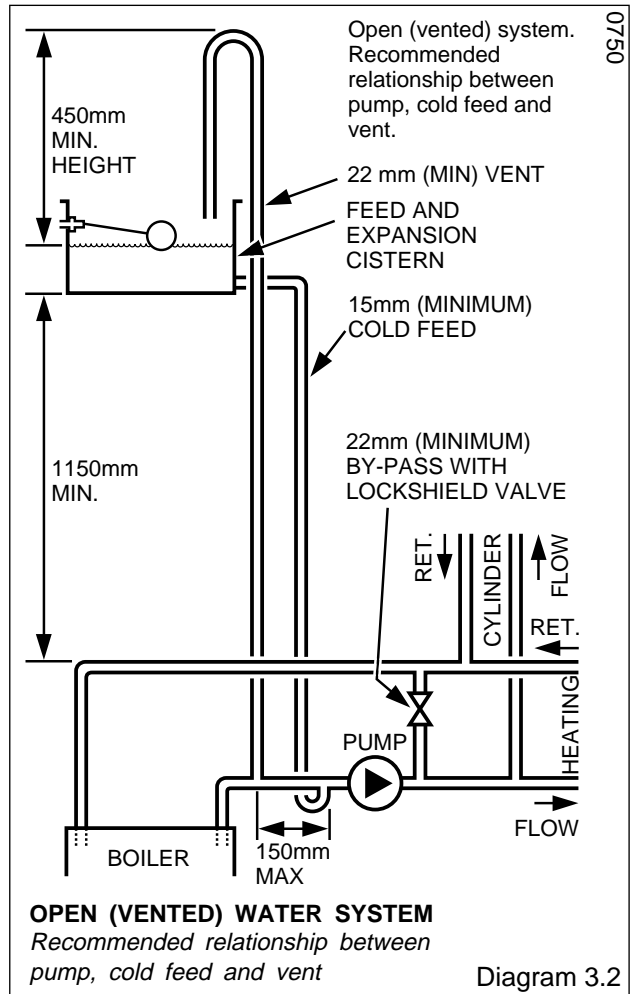
If an inhibitor is to be used, contact a manufacturer for their recommendations for the best product to use.

When fitting the boiler 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.

**Sealed Water Systems**

The installation should comply with the requirements of the current issue of BS4814, BS5449, BS6759, BS6798 and BS7074 Part 1 and 2.

See diagram 3.3. for a suggested layout.



### 3.4 Safety Valve

A safety valve must be fitted in a sealed water system. It shall be preset, nonadjustable with a lift pressure of 3bar, incorporating seating of a resilient material, a test device and a connection for drain. The drain from the safety valve must be routed clear of any electrical fittings and positioned so that any discharge can be seen.

### 3.5 Expansion Vessel

A diaphragm type expansion vessel, conforming to the current issue of BS4814, see also BS7074 Part 1 and 2, must be connected at a point close to the inlet side of the circulating pump, see diagram 3.3 or as laid down by the manufacturer. The expansion vessel volume depends on the total water system volume and the initial system design pressure. For any system an accurate calculation of the vessel size is given in the current issue of BS7074 Part 1.

Example. For an initial system design pressure of 0.7bar, the minimum total vessel volume required is  $0.063 \times \text{Total System volume}$ .

Note. A higher initial design pressure requires a larger volume expansion vessel.

Guidance on vessel sizing is also given in the current issue of BS5449 and BS7074 Part 1.

The charge pressure must not be less than the static head of the system, that is, the height of the highest point of the system above the expansion vessel.

The water content of the boiler is given in Data Table 1.

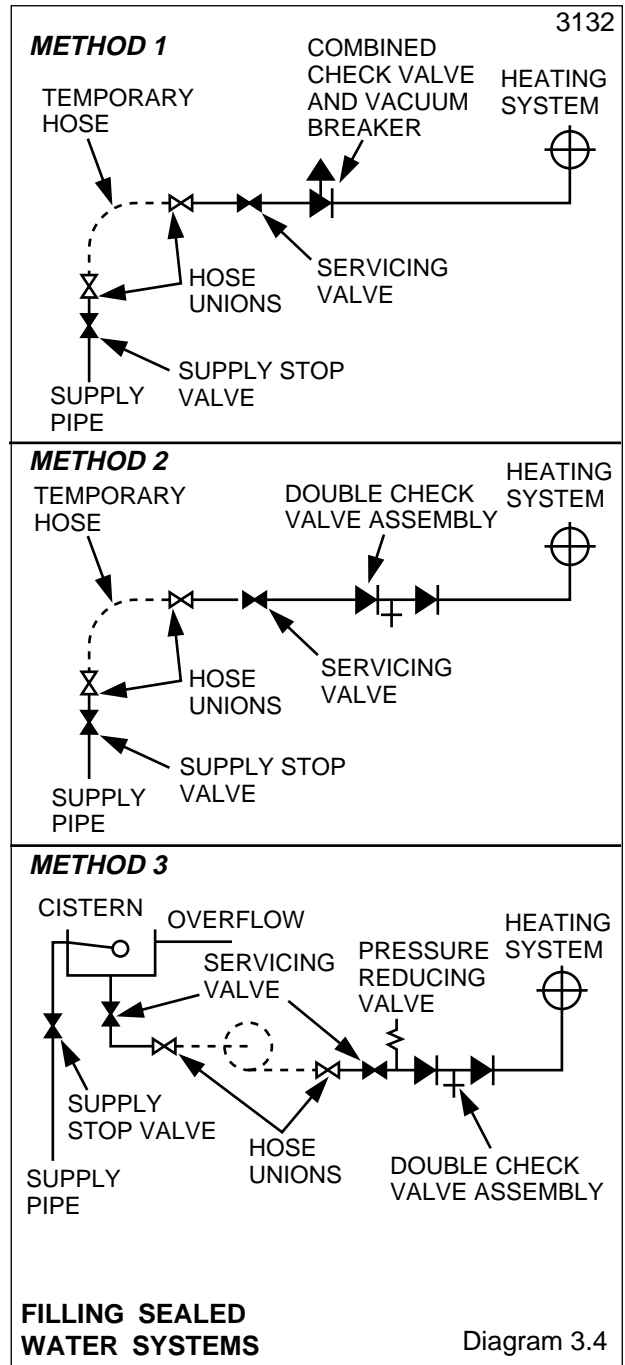
### 3.6 Pressure Gauge

A pressure gauge with a set pointer and covering at least the range 0 to 4bar (0 to 60lb/in<sup>2</sup>) shall be permanently fitted to the system in a position where it can be seen when carrying out the filling operation.

### 3.7 Cylinder

SINGLE FEED INDIRECT CYLINDERS ARE NOT SUITABLE.

The hot water cylinder must be of the indirect coil type. It must be suitable for working at a gauge pressure of 0.35bar above the safety valve setting.



### 3.8 Water Make Up

Provision must be made for replacing water lost from the system. A make up vessel mounted above the highest point of the system and connected through a non-return valve to the system on the return side of either the hot water cylinder or heating system.

Alternatively, provision for make up can be made by using a filling loop.

### 3.9 Filling Sealed Water Systems

Provision for filling the system at low level must be made. Three methods of filling are shown in diagram 3.4. There must be no permanent connection to the mains supply, even through a non-return valve.

### 4.1 Positioning

Place the template, provided, square on the wall in the required position and mark location of the balanced flue hole, see diagram 4.1.

Cut the hole in the wall to accept the wall liner, see diagram 4.1.

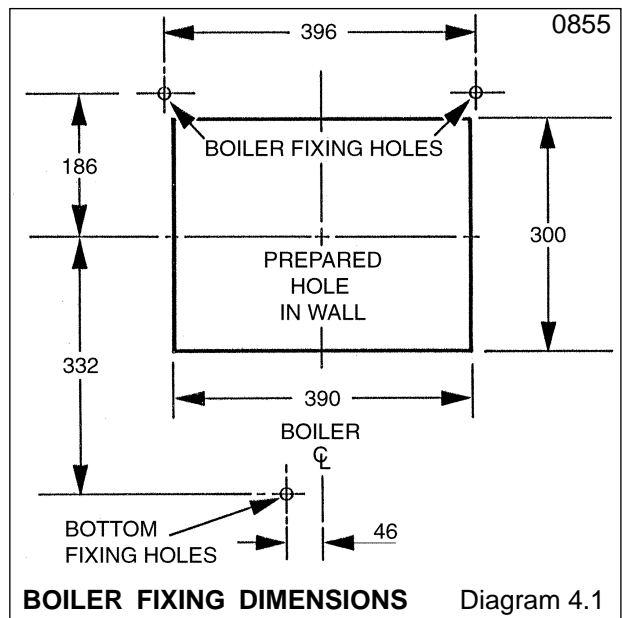
Make good any plasterwork at this stage. When dry, select the liner with the turned flange at one end "C", see diagram 4.2. Push it into the cavity until the flange is flush to the internal wall. Fit the second half of the liner "B" from inside so that it is flush with the outside brickwork. Mark the two liner positions and remove from hole. Align the marks on the liners and tape together with the tape provided.

The extension "B" is not required when the wall thickness is equal to the length of duct.

Reposition the template on the wall in line with the wall opening, or see diagram 4.1.

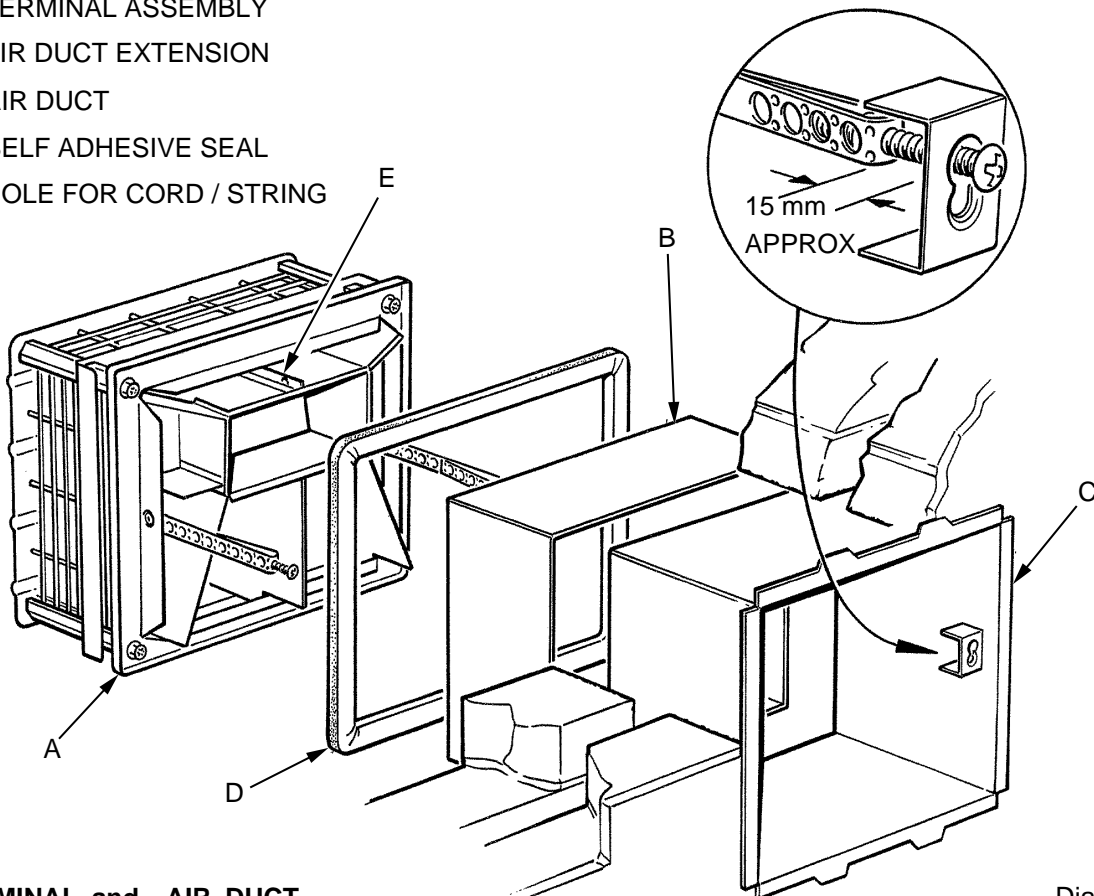
Mark the positions for the three fixing screws.

Drill and plug the fixing holes, suitable for No.10x50mm woodscrews and plugs.



- A - TERMINAL ASSEMBLY
- B - AIR DUCT EXTENSION
- C - AIR DUCT
- D - SELF ADHESIVE SEAL
- E - HOLE FOR CORD / STRING

0858



**TERMINAL and AIR DUCT**

Diagram 4.2

## 5 Installation

### 5.1 External Access Procedure

From inside the room fit the already prepared air duct assembly.

Attach the self adhesive seal "D" to the terminal wall plate, see diagram 4.2.

Place the terminal against the outside wall with the inner flange of the wall plate located inside the air duct assembly. Support the terminal in any suitable way.

Working from the inside, bend the two perforated straps around the hexagon nuts provided at about 15mm from the brackets on the air duct assembly, see diagram 4.2.

Secure the two straps with the screws and nuts, the screw head passing first through the large part of the keyhole in the bracket, then sliding into the smaller recessed portion.

Tighten the screws to tension the straps securing the terminal in position, do not overtighten. Cut off any excess strap length.

### 5.2 Internal Access Procedure

If required the terminal can be installed from inside the premises.

Fit the already prepared air duct assembly into the hole in the wall.

Attach the self adhesive seal "D" to the terminal wall plate "A", see diagram 4.2.

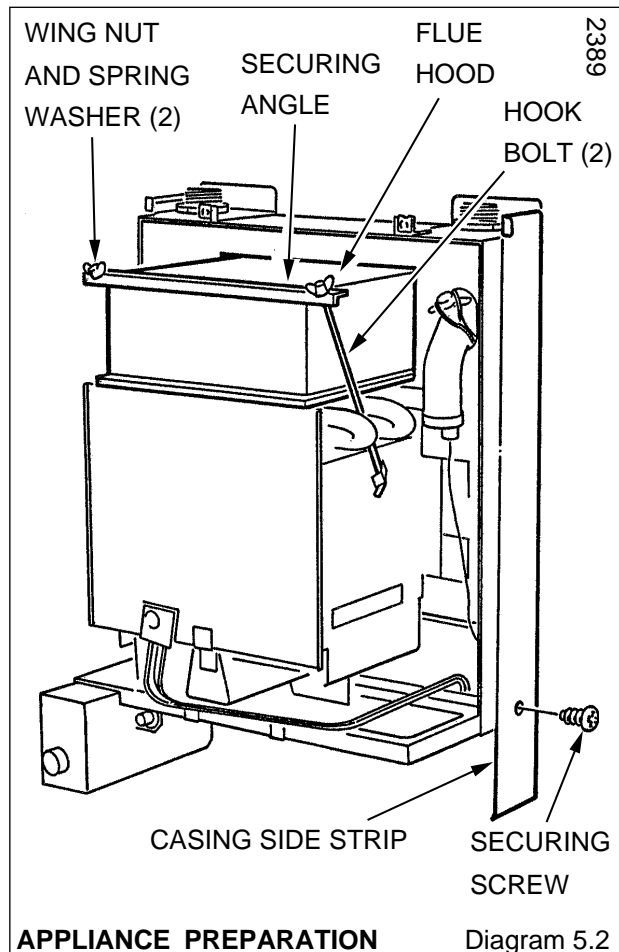
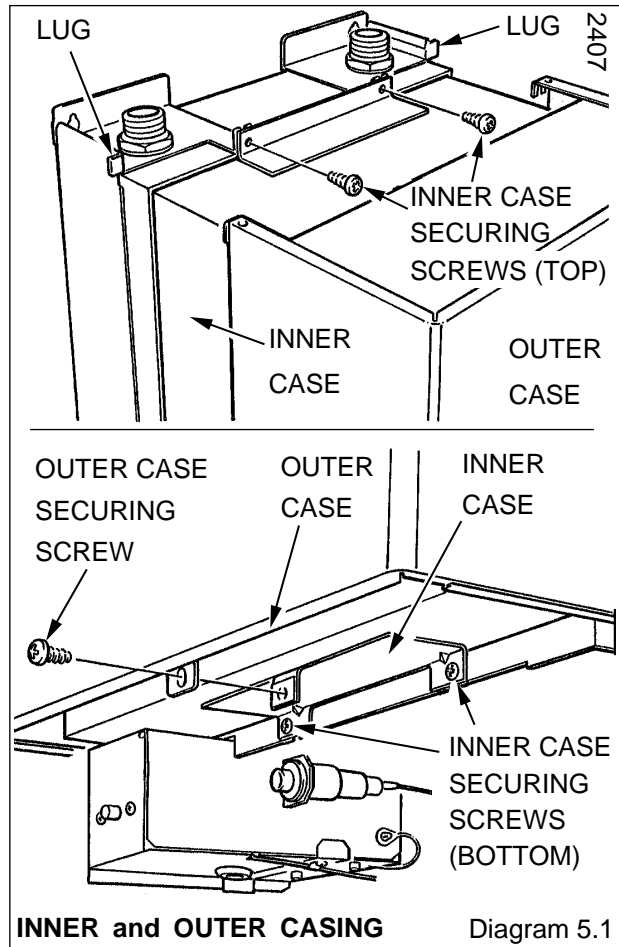
Attach a length of strong cord or similar, to the terminal through the small hole "E" provided in the top centre baffle, see diagram 4.2. Attach a suitable weight to the free end of the cord.

Pass the terminal through the duct assembly, using the straps to manoeuvre the terminal into position. NOTE, the terminal "Top" is indicated and the inside flange of the wall plate is located inside the air duct assembly. The weight will support the terminal in position.

Bend the two perforated straps around the hexagon nuts provided, see diagram 4.2.

Secure the two straps with the screws and nuts, the screws head passing first through the large part of the keyhole in the bracket, then sliding into the smaller recessed portion.

Tighten the screws to tension the straps securing the terminal in position, but do not overtighten. Cut off excess strap length and remove cord.



### 5.3 Appliance Preparation

Remove the controls cover by pulling it forward and off.

Remove the outer case by undoing the screw at the bottom and unhooking at the top.

Remove the inner case by undoing the screws at the top and bottom, see diagram 5.1.

Remove the flue hood by releasing the wing nuts and remove angle, see diagram 5.2. Lift off flue hood.

Remove the two flue duct screws.

Fit the sponge seal "J" around the spigot at the back of the boiler, adhesive face to the back of the case, see diagram 5.3.

Take the side strips from the packaging and hook them over the top edge of the side panel and secure with a screw at the bottom.

### 5.4 Appliance Fixing

Fit the top two screws, allowing them to protrude from the wall face to accept the keyhole slots on the boiler.

Hook the boiler onto the screws, fit the bottom screw and tighten all three.

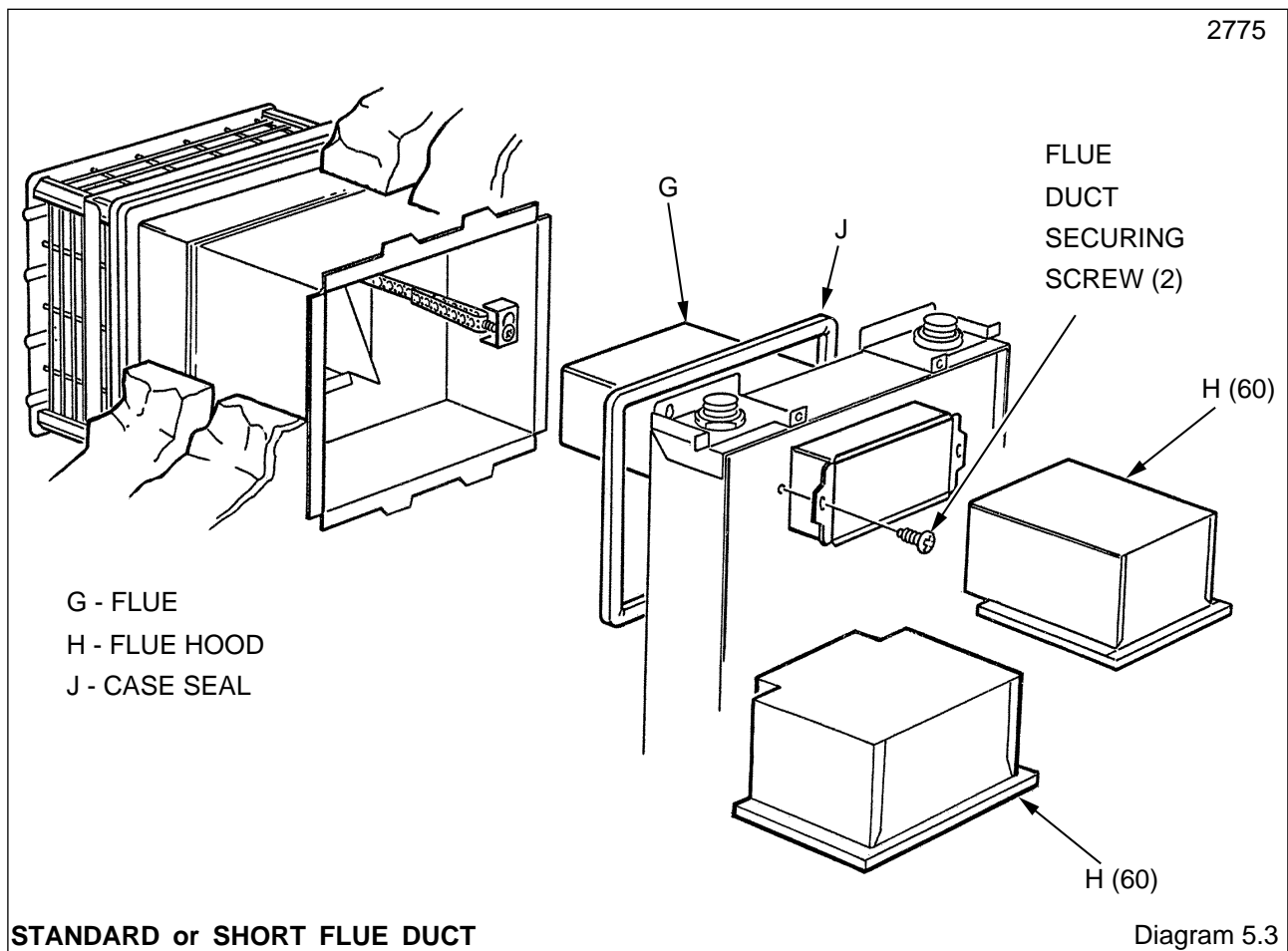
### 5.5 Standard and Short Flue Only

Push the flue duct "G" into the terminal with the unflanged end entering the terminal. Make sure that the lower flange of the duct fits behind the combustion chamber rear panel. For wall less than 150mm thick cut the surplus length from the unflanged end of the flue duct "G", see diagram 5.3.

Fit the two screws through the flue duct flange and sealing plates but do not fully tighten.

Replace the flue hood "H", inserting the rear into the flue duct. Push on the rear of the hood and tighten the duct screws. Refit the securing angle, hook bolts, wing nuts and spring washers firmly but do not overtighten.

Refit the inner case and secure with the screws previously removed.



**5.6 Long Flue Set Only**

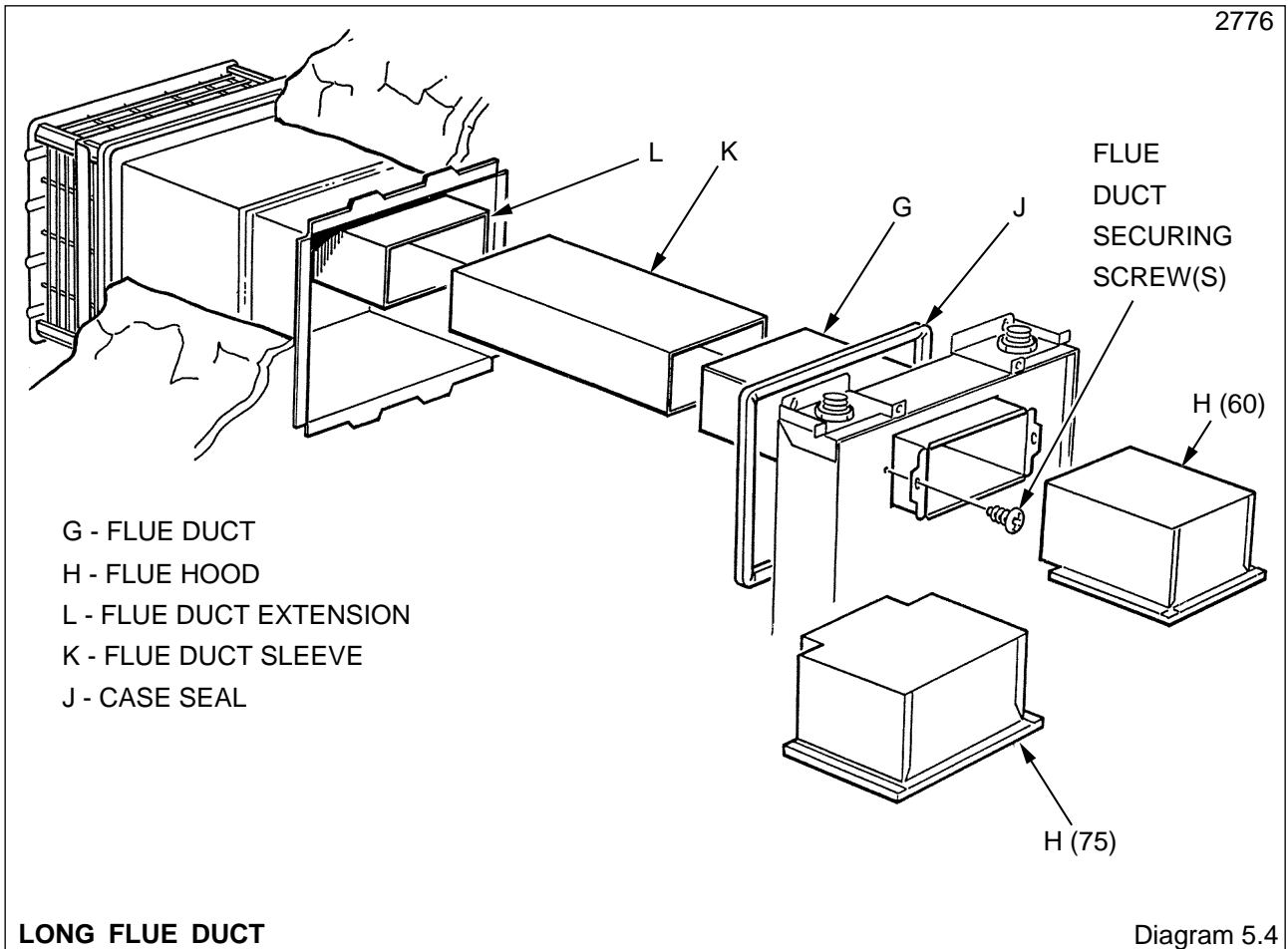
For long flues the flue duct “G”, extension “L” and sleeve “K” need to be assembled together to suit the wall thickness. This assembly is 75mm longer than the air duct assembly already prepared. A minimum overlap of 40mm is required at each joint. Use the tape provided to make permanent the assembly of the three flue parts, see diagram 5.4.

Push the flue duct assembly into the terminal, with the unflanged end entering the terminal. Make sure that the lower flange of the duct fits behind the combustion chamber rear panel.

Fit the two screws through the flue duct flange and sealing plates, do not overtighten.

Replace the flue hood “H”, inserting the rear into the flue duct. Push down on the rear of the hood and tighten the sealing plate screws. Refit the securing angle, tie rods and wing nuts firmly, do not overtighten.

Refit the inner case and secure it with the screws previously removed.



## 6 Gas and Water Connection

Connect the gas supply to the Rc<sup>1</sup>/<sub>2</sub> gas cock.

The whole of the gas installation, including the meter should be inspected, tested for soundness and purged in accordance with the current issue of BS6891.

Connect water to the boiler using the nuts and olives supplied to BS2871 copper tube.

## 7 Electrical Wiring

**WARNING. THE BOILER MUST BE EARTHED AND HAVE A PERMANENT MAINS SUPPLY.**

### 7.1 Electrical Connection

To remove the control box release the two screws at the front, see diagram, lower the box until it is clear then push backward to disengage the hinge at the rear, see diagram 7.1 Take care not to damage the thermostat and capillaries.

Thread the mains lead through the clamp at the rear of the control box cover, and connect to the terminal strip.

The mains cable outer insulation must not be cut back external to the cable clamp.

When making connections, make sure that the earth conductor is made of greater length than the current carrying conductors, so that if the cable is strained the earth conductor would be the last to become disconnected.

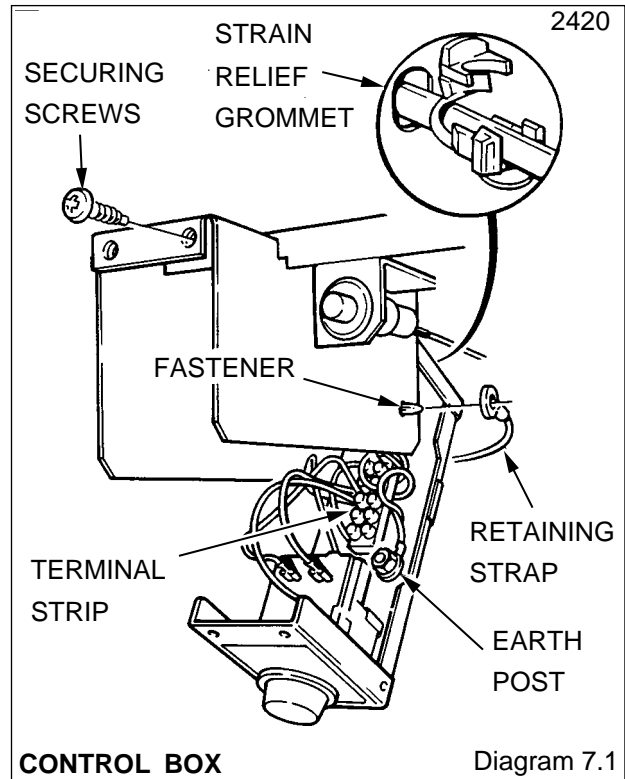
### 7.2 Pump and External Controls Connections

The pump must be wired into the boiler control box as shown in diagram 7.2.

Any external controls must only be wired to interrupt the red link between terminals 9 and SL.

Take the strain relief grommets from the loose items pack. Place around the external controls and pump connection cables respectively. Squeeze the sides of the grommets when pushing them into the obround holes in the rear of the control box, see diagram 7.1.

Make sure that the supply cables and all external cables are secured.

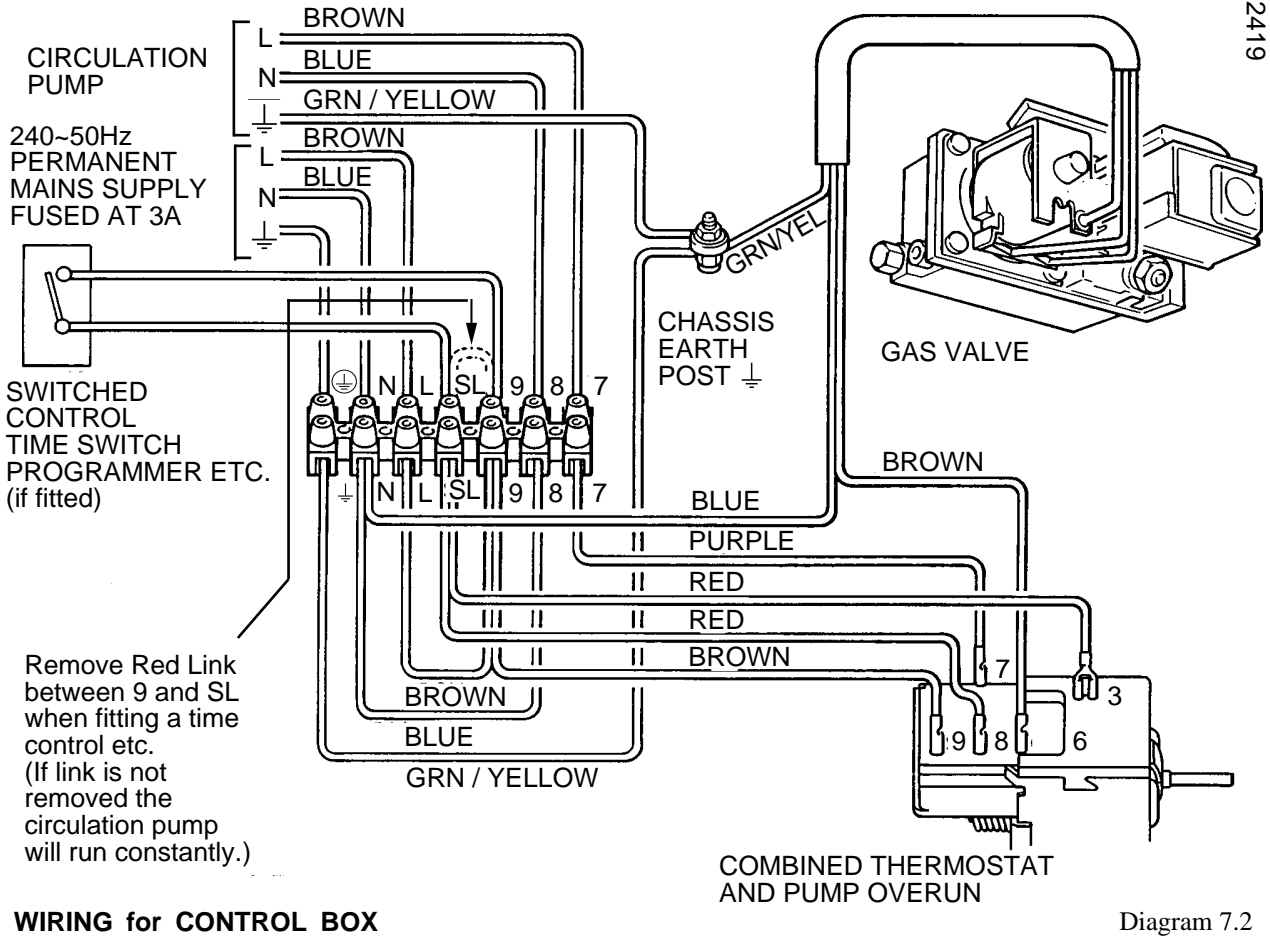


### 7.3 Testing - Electrical

Checks to ensure electrical safety should 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 cables.
2. Test the earth continuity and short circuit of all cables.
3. Test the polarity of the mains.



### 8.1 All Systems

Make sure that the system has been thoroughly flushed out with cold water without the pump in place. Refit the pump, fill the system with water, ensuring that all air is properly vented from the system and pump.

Before operating the boiler check that all external controls are calling for heat.

### 8.2 Sealed Water Systems Only

Flush the whole of the system with cold water without the pump in place. Refit the pump and fill until the pressure gauge registers 1.5bar (21.5lbf/in<sup>2</sup>). Clear any air locks and check for water soundness.

Check the operation of the safety valve, by allowing the water pressure to rise until the valve opens. The valve should open within +/- 0.3 bar (+/-4.3lbf/in<sup>2</sup>) of the 3bar preset pressure. Where this is not possible conduct a manual check and test.

Release cold water to initial system design pressure.

The set pointer on the pressure gauge should be set to coincide with the indicating pointer.

### 8.3 Initial Lighting and Testing

Refit the outer case, see diagram 5.1.

Identify the controls by reference to diagram 8.1.

Turn boiler thermostat to "O" the Off position.

Remove the gas pressure test point screws "K" and fit a suitable pressure gauge.

Turn the electrical supply on and check that the pump is working.

**OPEN ALL WINDOWS AND EXTINGUISH ANY NAKED LIGHTS, PIPES, CIGARETTES etc.**

Turn on the main gas supply and purge in accordance with the current issue of BS6891.

Turn boiler gas service cock "J" to On.

Depress control button "B", keep pressed in and at the same time operate the piezo unit button "C" until the pilot burner lights. After the pilot burner lights keep the button "B" depressed for about 15 seconds. If the pilot fails to stay alight a safety device prevents immediate relighting. Do not attempt to relight until the safety device has reset. Check the length of the pilot flame, it should envelop the thermocouple tip as shown in diagram 10.3. The pilot rate can be adjusted by turning screw "H" having first removed the gas valve cover by releasing the screw. Test pilot supply connection for gas soundness with a suitable leak detection fluid.

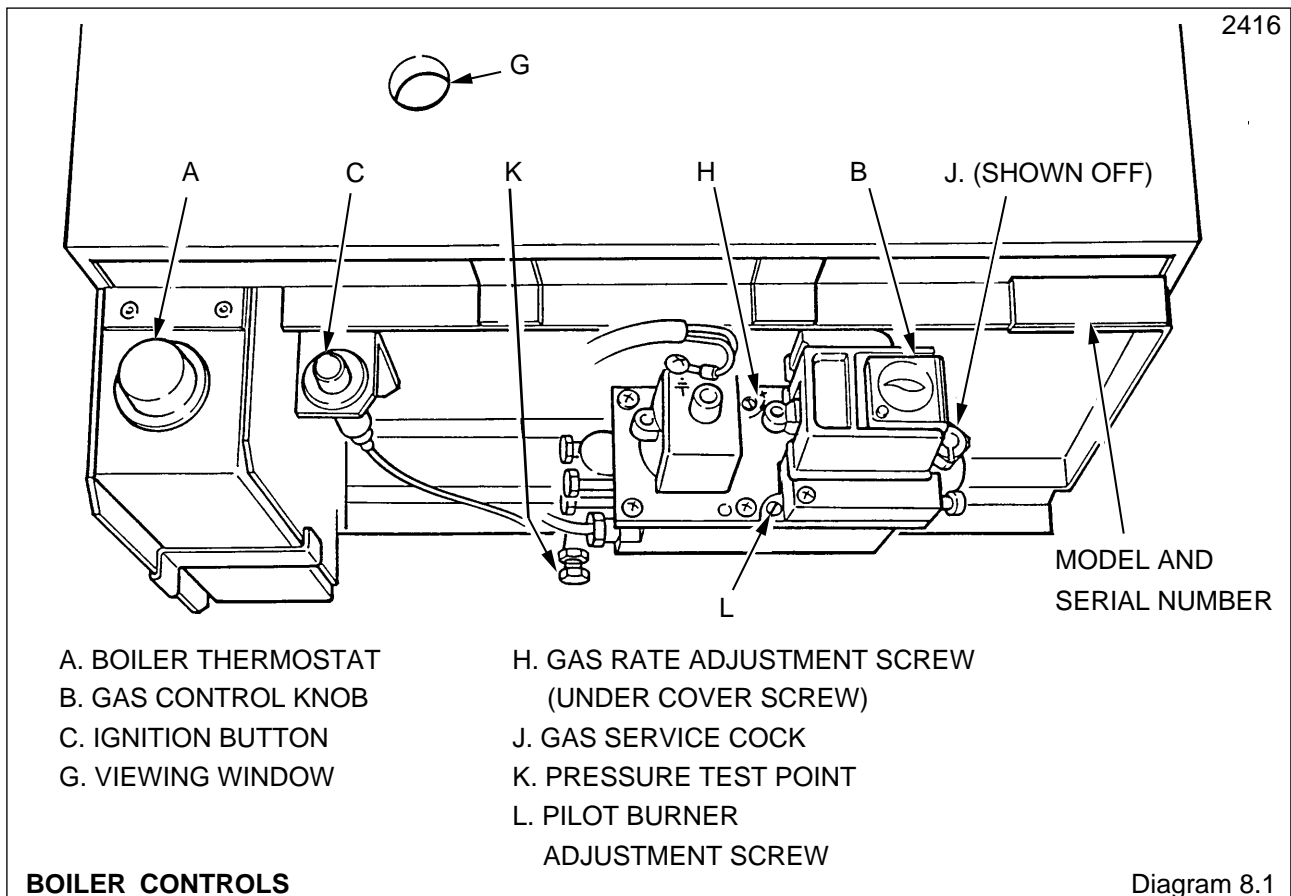


Diagram 8.1

## 8 Commissioning

Fit the outer case, secure with the screws previously removed.

Make sure that the pilot is alight and stable, view through window "G".

Set the boiler thermostat control knob "A" between "1" and "5" and check that the burner lights smoothly. Check the gas connections for gas soundness with a suitable leak detection fluid.

To set the burner pressure operate the boiler for 10 minutes, remove the gas valve cover, if not already removed, adjust the the gas pressure by screw "H" until the required pressure is obtained, see Table 1 for setting pressures.

Align and attach the self adhesive arrow, from the loose items pack, in the appropriate space beneath the "MIN" and "MAX" column on the Data label.

Should any doubt exist about the gas rate this should be checked at the meter, using a stop watch to time at least one cubic foot of gas consumption.

Remove the pressure gauge, refit the test point screw and ensure a gas tight seal is made.

Replace gas valve cover.

### 8.4 Testing

Check the operation of the flame failure device on the boiler, by turning the gas service cock off, to make sure that the gas valve shuts down within 60 seconds, indicated by a "click" from the valve.

### 8.5 Flushing

Allow the system to reach maximum working temperature and examine for water leaks.

The system should then be turned off and drained rapidly whilst hot.

Refill the system, vent all air and check for water soundness.

### 8.6 Adjustment - All Systems

When commissioning the system the boiler should first be fired with the bypass fully closed on full service, that is, central heating and domestic hot water. The system should then be balanced, adjusting the pump and lockshield valve as necessary. Having achieved a satisfactory condition operate the boiler with the bypass valve fully closed on minimum load, normally this will be central heating only with one radiator operating in the main living area. The valve should be gradually opened to achieve a flow rate of 18.0Litre/min (3.9gal/min).

**UNDER NO CIRCUMSTANCES SHOULD THIS VALVE BE LEFT IN THE FULLY CLOSED POSITION.**

Operate the boiler again on full service and check the balancing, making further adjustments as necessary.

If thermostatic radiator valves are fitted care must be taken to ensure an adequate flow rate when the valves close, refer to the current issue of BS7478 for guidance.

Refit the controls cover.

### 8.7 Sealed Water Systems

Sealed water systems should be adjusted to the initial design pressure and the set pointer repositioned.

## 9 Instruct User in Correct Operation of the Boiler

Hand the Instructions for Use to the user for their retention.

Instruct and demonstrate the safe and efficient operation of the boiler.

Advise that to ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced at regular intervals.

The frequency of servicing will depend upon the particular installation and usage, but in general once a year should be enough.

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

Advise the user of the precautions necessary to prevent damage to the system and building in the event of the heating system being out of use during frost and freezing conditions.

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.

Reminder, leave these instructions with the user for use during future service calls.

## 10 Servicing and Replacement of Parts

Servicing and replacement of parts must be carried out by a competent person.

Before commencing a service or replacing parts isolate the gas and electrical supplies.

Unless stated otherwise replacement of parts is in the reverse order to removal.

### 10.1 Heating Body - Service

Remove controls cover by pulling it forward and off.

Remove outer casing by releasing screw at the bottom and unhooking at the top.

Remove the inner case by releasing screws at top and bottom, see diagram 10.1.

To remove the flue hood release the wing nuts and lift off securing angle and flue hood.

Remove the combustion chamber front panel by undoing the wing nut at the bottom front and the four screws securing it to the combustion chamber sides.

Remove the two screws and washers securing the pilot burner and shield to the main burner, see diagram 10.2.

Pull the pilot assembly forward enough to allow the main burner to be freed from the injector. Raise the burner up at the front, withdraw forward. Take care not to damage the insulation and the pilot burner and electrode assemblies.

Place a sheet of paper in the combustion chamber and brush away any deposits.

Remove the paper and debris.

### 10.2 Main Burner

Follow the instructions generally as Section 10.1.

With the main burner removed brush or vacuum any deposits away, ensure that the flame ports are clean.

Do not use a brush with metallic bristles.

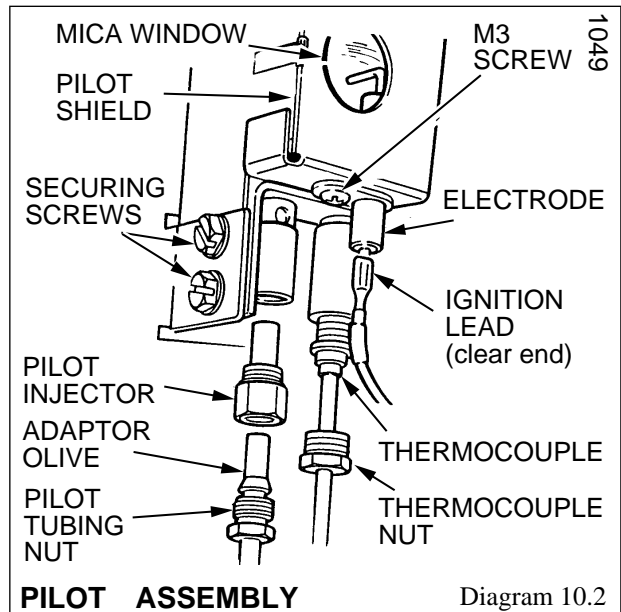
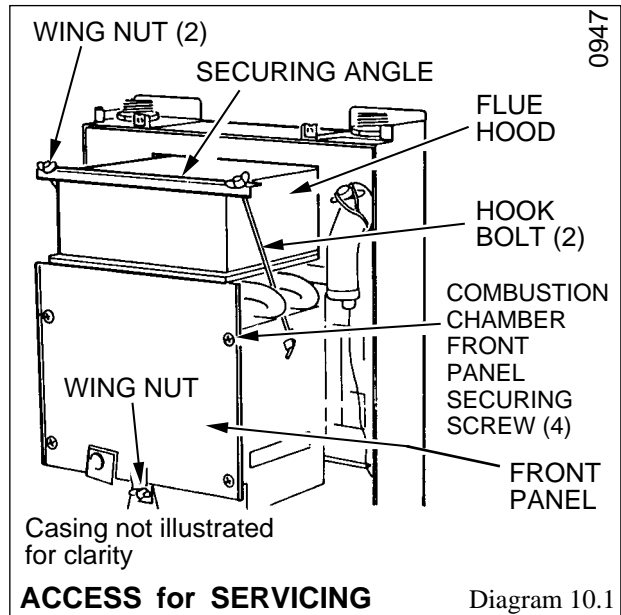
### 10.3 Main Injector

Follow the instructions generally as Section 10.1.

With the main burner removed the injector can be unscrewed and replaced as necessary using a new sealing washer.

If cleaning do not use a wire or sharp instrument on the hole.

When replacing the main burner ensure that it is pushed fully home onto the injector and that the guides are engaged on the injector manifold.



### 10.4 Pilot Burner and Injector

Follow the instructions generally as Section 10.1.

With the main case and controls cover etc., removed as above pull off ignition lead from electrode.

Unscrew the tubing nut at the base of the pilot burner releasing the pilot pipe. Remove the pilot injector by unscrewing it from the pilot burner.

Release the wing nuts securing the flue hood, see diagram 10.1.

Remove combustion chamber front panel as above.

Remove the two screws and washers securing the pilot burner and pilot shield to the main burner, see diagram 10.1.

Remove the pilot shield complete with the electrode.

Unscrew the thermocouple nut.

The pilot burner can now be lifted away.

Take care not to damage the electrode.

When replacing ensure that the spark gap is as shown in diagram 10.3.

### 10.5 Thermocouple

Generally follow the instructions given in Section 10.1.

Release, but do not remove, the two screws securing the front plate and rear gland plates. Pull the front gland plate forward, see diagram 10.4. Disconnect the thermocouple at the gas valve and remove.

Use the old thermocouple as a pattern when fitting the new one. Do not tighten more than a quarter turn beyond finger tight at the gas valve.

Check the electrode spark gap, see diagram 10.3.

### 10.6 Electrode

Generally follow the instructions given in Section 10.1.

Unscrew the electrode from the pilot shield.

When refitting check that the spark gap is as in diagram 10.3.

### 10.7 Over Heat Cutoff

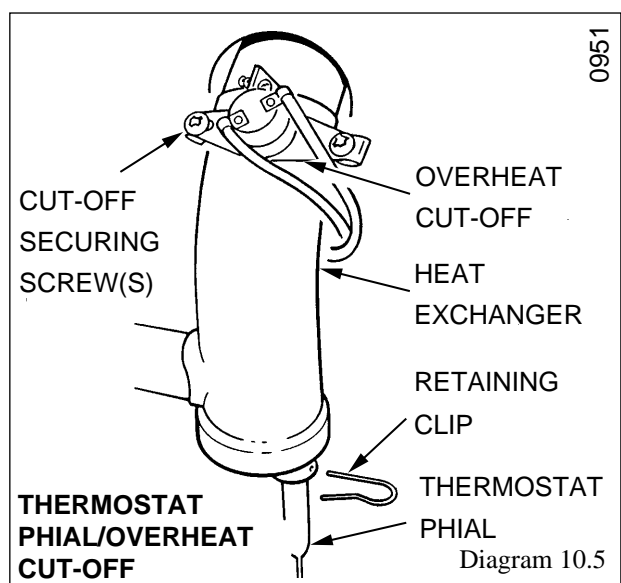
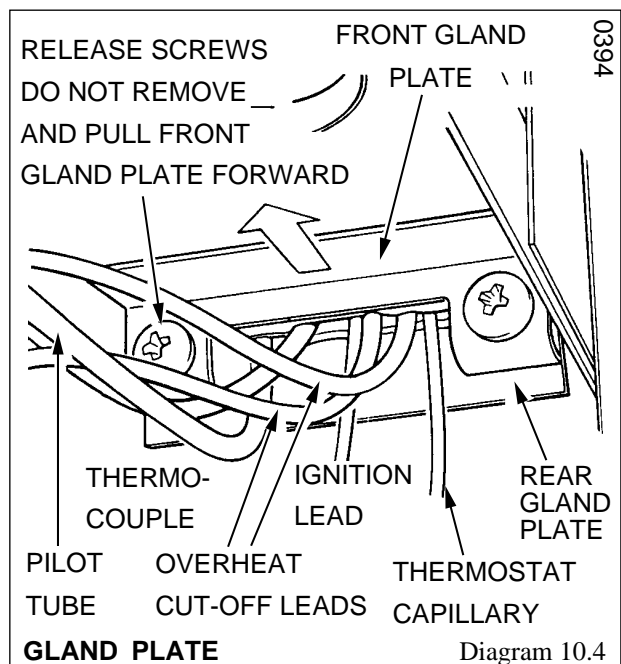
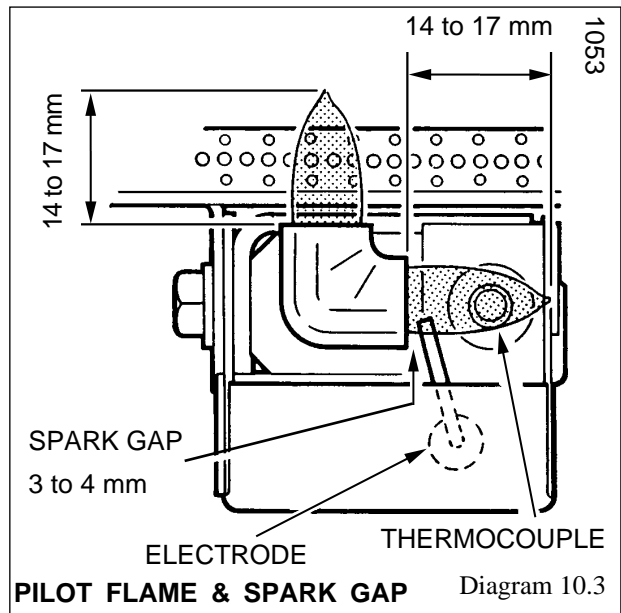
Generally follow the instructions in Section 10.1.

Remove the two screws securing the over heat cutoff clamp, see diagram 10.5.

Release connections at the gas valve, see diagram 10.6.

Release but do not remove the two screws securing the front and rear gland plates, see diagram 10.4 and withdraw the cutoff leads.

When refitting smear a little of the heat sink compound, supplied, between the face of the cutoff and the water pipe, make sure that it is correctly located on the pipe.



### 10.8 Gas Valve

Gain access generally as Section 10.4.

Remove the screw to release the gas valve cover.

Disconnect all leads and pipes at the gas valve.

Undo the four screws each side of the gas valve to release the gas service cock and burner supply tube, take care not to damage the "O" rings.

Fit the new valve and remake all connections.

Do not tighten the thermocouple nut more than a quarter turn beyond finger tight at the gas valve.

It will be necessary to purge the pipework and valve before relighting, refer to Commissioning.

### 10.9 Electrical Control Box

Remove the controls cover and outer casing as Section 10.1.

Remove the retaining clip from the boiler thermostat phial pocket and withdraw the phial, see diagram 10.5.

Release but do not remove the two screws securing the front and rear gland plates. Pull the gland plates forward.

Remove the control box by undoing the two fixing screws at the front and lower the front of the box until it is clear of the cover. Push box toward the rear of the boiler to disengage the hinge and lower, see diagram 7.1.

Withdraw the thermostat capillary through the bottom of the air duct.

Disconnect cables (a) mains, L.N. and E. (b) pump at terminal 8, 7 and earth stud, (c) cables at gas valve, (d) disconnect any remote controls at terminal 9 and SL.

When replacing refer to diagram 7.2 for electrical connections. Smear the thermostat phial with heat sink compound and ensure that it is secured, with the retainer, into the phial pocket.

### 10.10 Piezo Unit

Gain access as Section 10.4.

Disconnect the ignition lead and remove backing nut from the piezo unit.

### 10.11 Ignition Lead

Remove the controls cover and outer casing as Section 10.1.

Release, but do not remove, the two screws securing the front and rear gland plates. Pull the gland plates forward, see diagram 10.4.

Remove the ignition lead, when replacing ensure that the clear end is fitted to the electrode.

### 10.12 Thermostat

Gain access as under Section 10.4.

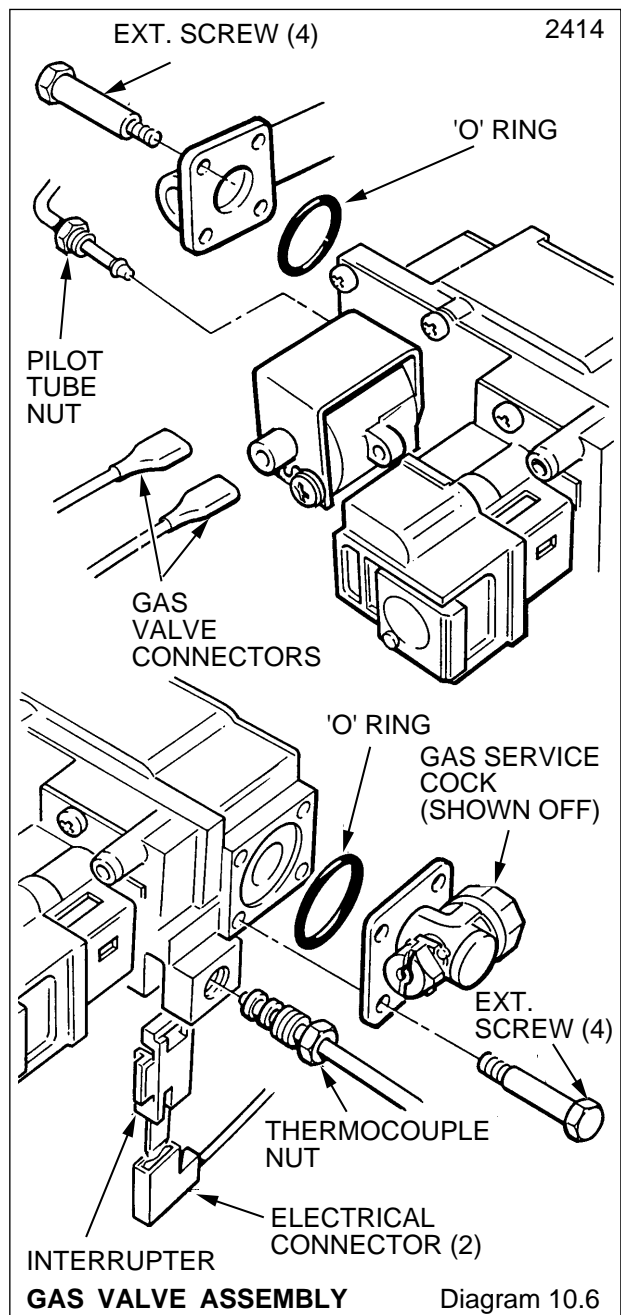
Remove and support control. See Section 10.9.

Remove the control knob and electrical connections from the thermostat.

Release, but do not remove, the two screws securing the front and rear gland plates. Pull the gland plates forward, see diagram 10.4.

Remove the two screws screws securing the thermostat to the control box. The thermostat may now be removed withdrawing the capillary through the bottom of the air duct.

When replacing smear the thermostat phial with the heat sink compound supplied, before fitting and securing in the pocket.



## 11 Fault Finding

### Fault and Cause

### Remedy

#### 11.1 Pilot goes out after a period of remaining alight

- Front cover not fitted correctly \_\_\_\_\_ Fit parts correctly.
- Flue parts not fitted or sealed properly. \_\_\_\_\_ Seal cavity or fit parts flue parts correctly as described in installation instructions.
- Electrical supply failure causing overheat cutoff to operate. — Relight pilot.
- Overheat cutoff operating. \_\_\_\_\_ Refer to 11.3 below
- Pump wired incorrectly. \_\_\_\_\_ Refer to diagram 7.2 and wire accordingly.

#### 11.2 Main burner will not ignite

- External controls not on. \_\_\_\_\_ Check that any external controls are calling for heat.
- Boiler thermostat not on. \_\_\_\_\_ Check that boiler thermostat is on. See also Section 11.9.

#### 11.3 Thermostat will not cut out

- Thermostat phial not fitted in pocket. \_\_\_\_\_ Fit phial in pocket.
- Faulty thermostat \_\_\_\_\_ Replace thermostat.

#### 11.4 Overheat cutoff cuts out prematurely

- Air in heating body. \_\_\_\_\_ Vent system. Alter system layout if necessary.
- Water circulation low or stopped. \_\_\_\_\_
- \_\_\_\_\_ Pump not working correctly. Check pump is wired directly to the boiler. Alter system if necessary.
- Overheat cutoff operates before boiler cycles on maximum boiler thermostat setting. \_\_\_\_\_ Change faulty overheat cutoff.
- The correctly set overheat cutoff operates prematurely. \_\_\_\_\_ Change faulty heating body.
- There is no air in the heating body and the water circulation is satisfactory. \_\_\_\_\_

#### 11.5 Insufficient heat

- Thermostat set too low. \_\_\_\_\_ Increase setting.
- Inlet gas pressure inadequate. \_\_\_\_\_ Increase gas pressure.
- Burner setting incorrect. \_\_\_\_\_ Check burner pressure against  
(ensure thermostat is on data badge.) \_\_\_\_\_ Reset only if more maximum setting than 10% away from required figure.

#### 11.6 Appliance noisy in operation\*

- Overgassed. \_\_\_\_\_ Check burner pressure against data badge and adjust only if more than 10% away from the stated required figure.
- Complete lack of water flow. \_\_\_\_\_ Check system controls for correct installation or correct type of controls.
- Air in system. \_\_\_\_\_ Remove air from system. When system is first commissioned the air dissolved may take some time to boiler out, therefore attempts should be made to vent air during the first weeks of the installation. Check venting of system, as air bubbles can remain suspended in the water if system is not well vented.
- Water flow rate. \_\_\_\_\_ Check that flow rate is correct. Check that pump is correct size and is correctly adjusted. Bypass not fitted or correctly set.

**11.7 Thermocouple and Over Heat Cutoff**

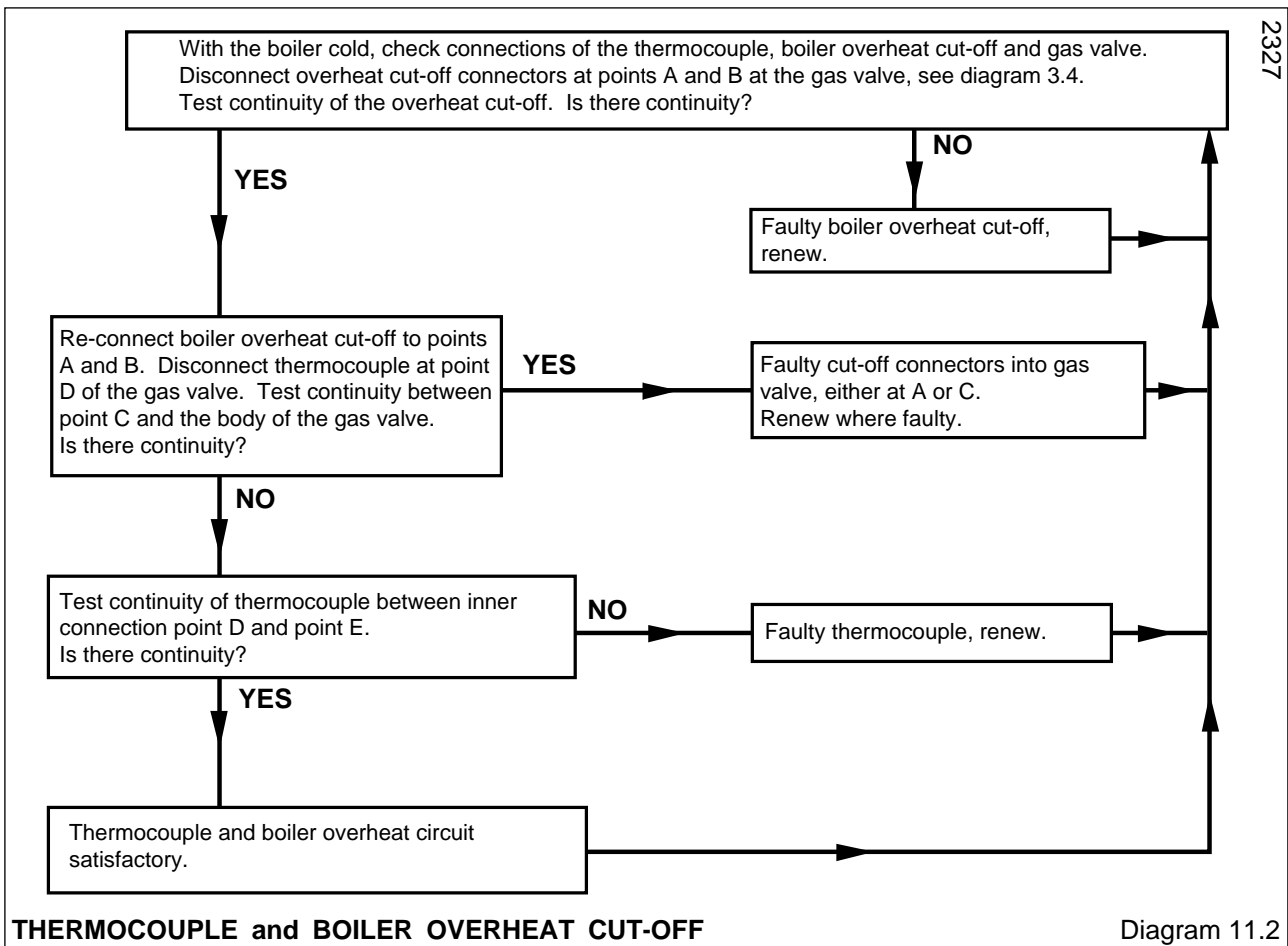
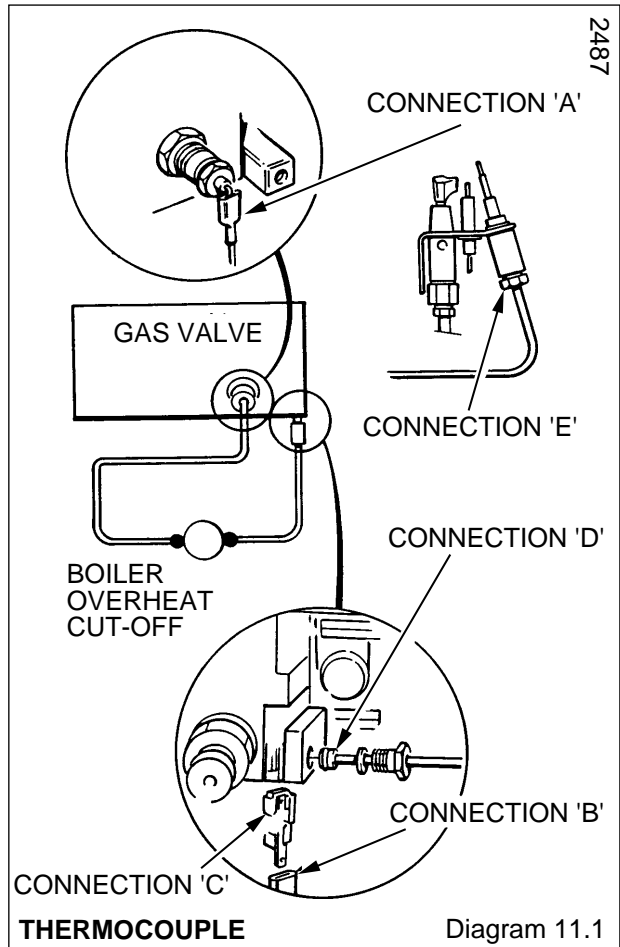
To test the thermocouple, a meter with a range of 0 to 30mV is required.

Symptoms: The pilot burner fails to stay alight.

Test the thermocouple, overheat cutoff and thermocouple connectors, as described in fault finding diagram 11.2 and diagram 11.1.

Check the millivoltage of the thermocouple closed circuit at points "A" and "E" see diagram 11.1.

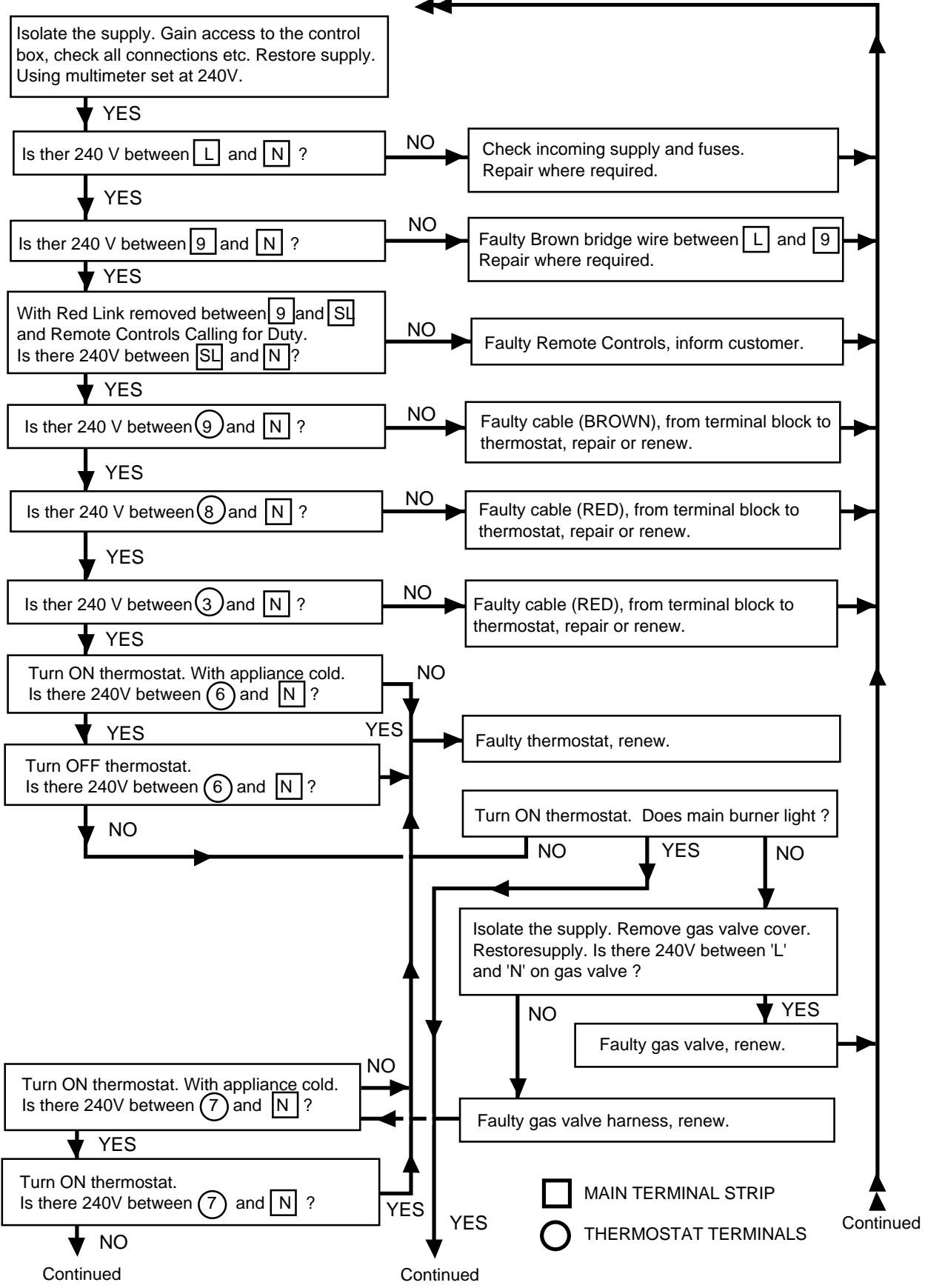
This should be within the range 6 to 13mV. Take the millivoltage drop reading and refer to thermocouple/overheat cutoff fault finding diagram 11.2.



**THERMOCOUPLE and BOILER OVERHEAT CUT-OFF**

**ELECTRICAL**

Ensure that all services are available at the appliance, i.e. Gas, Electricity, Water.  
With Pilot Lit.

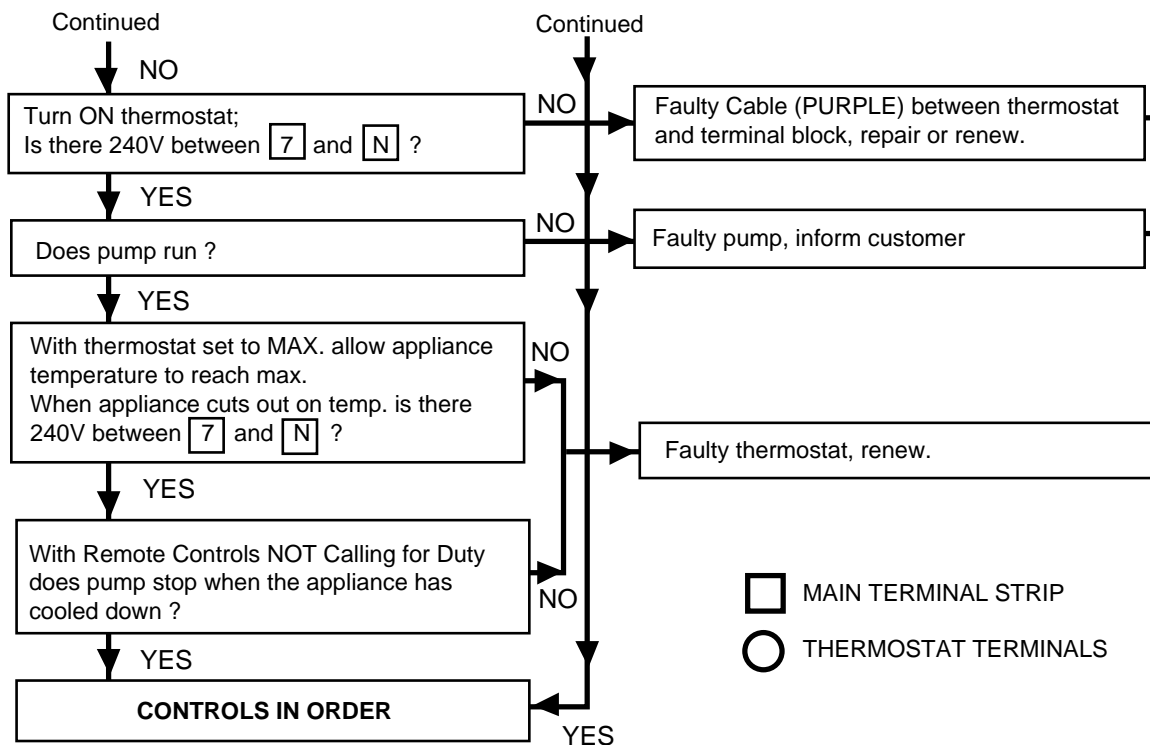


□ MAIN TERMINAL STRIP  
○ THERMOSTAT TERMINALS

Continued

Diagram 11.3

**ELECTRICAL continued**



4403A

Diagram 11.3 continued

**11.8 Electrical**

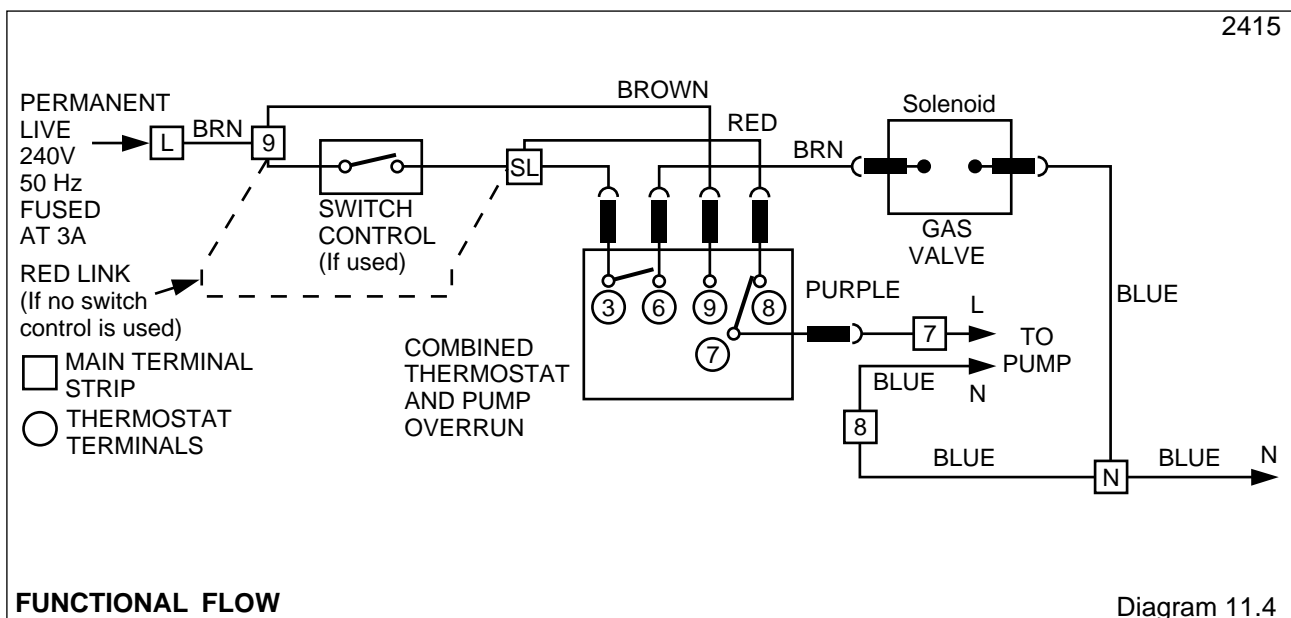
IMPORTANT. On completion of the service/fault finding task which has required the breaking and remaking of electrical connections then the checks, earth continuity, polarity and resistance to earth must be repeated, using suitable multimeter.

To check the boiler thermostat and multifunctional control (gas valve) see diagram 11.3 and functional flow wiring diagram 11.4.

To check thermostat pump over run circuit see diagram 11.3 and functional flow wiring diagram 11.4.

**11.9 Pilot**

Refer to fault finding for pilot, see diagram 11.5.

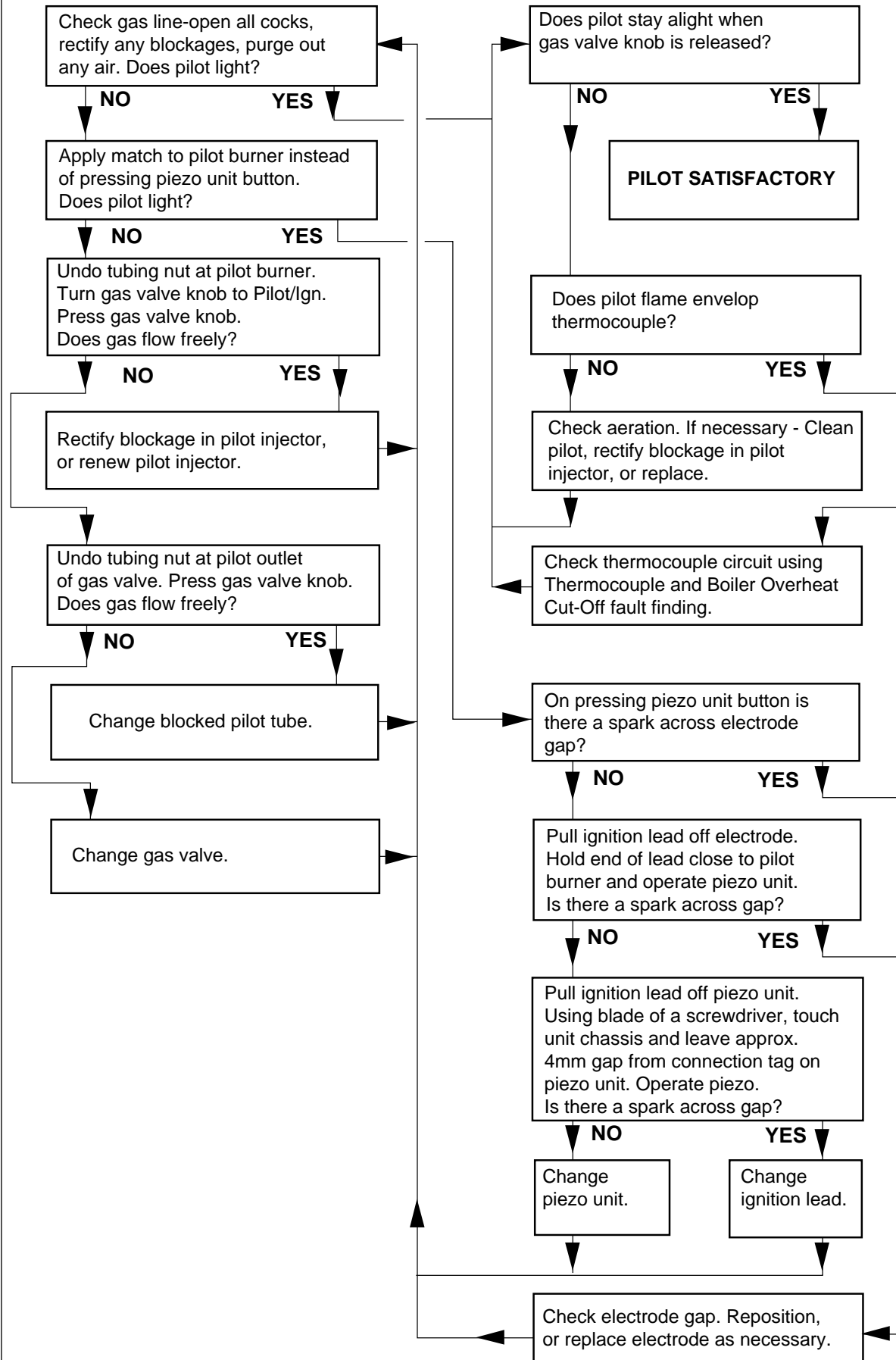


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**FUNCTIONAL FLOW**

Diagram 11.4

**PILOT WILL NOT LIGHT  
START HERE**



## 12 Spare Parts

### 12.1 Ordering

When ordering spare parts, quote the part number, description, serial number and model from the label on the boiler, see diagram 8.1.

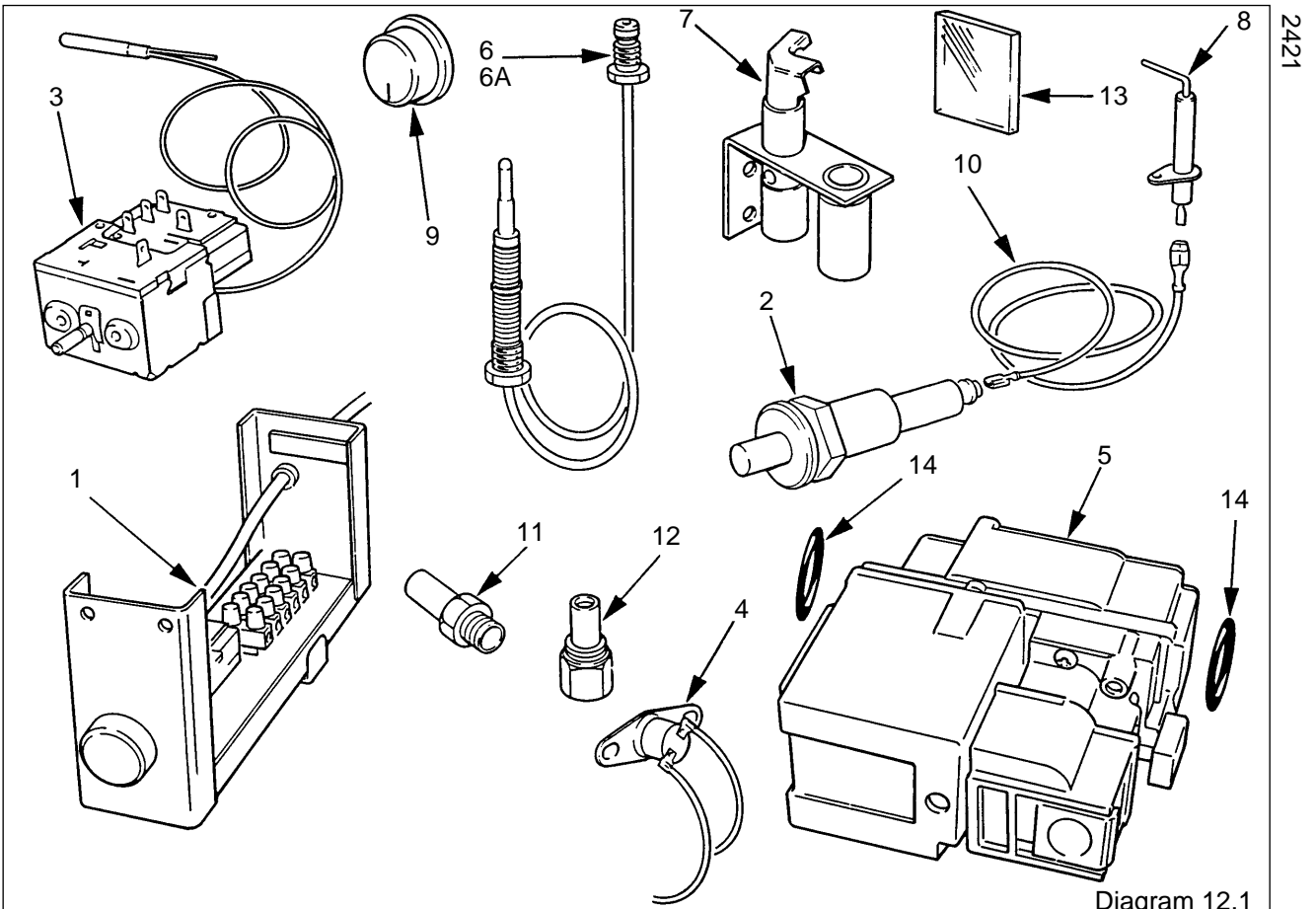


Diagram 12.1

Key No.	Part No.	Description	G.C. No.
1	433504	Electrical control box	313 053
2	900501	Piezo unit	384 146
3	416189	Boiler thermostat assembly	355 501
4	800014	Over heat cutoff assembly	313 064
5	800015	Gas valve assembly - incs 14	313 067
6	900000	Thermocouple	394 162
6		} Alternatives	381 651
7	203415	Pilot burner	394 161
8	202600	Electrode	384 149
9	416144	Thermostat control knob	355 401
10	WW4608	Ignition lead	355 381
11	203028	Injector - Cat 30-1700 - 60B	398 238
11	203089	Injector - Cat 30-2200 - 75B	
12	203509	Pilot injector	394 163
13	411194	Sight glass	355 153
14	208040	"O" ring for gas valve (2 off)	334 674

**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 and Seals**

Ceramic fibre and glass fibre are used in insulation panels, rope and gaskets.

The 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.

**Thermostat**

This contains a very small amount 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.



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