

# Glow worm

## Installation & Servicing Instructions

To be left with the user

# CE

# Ultimate

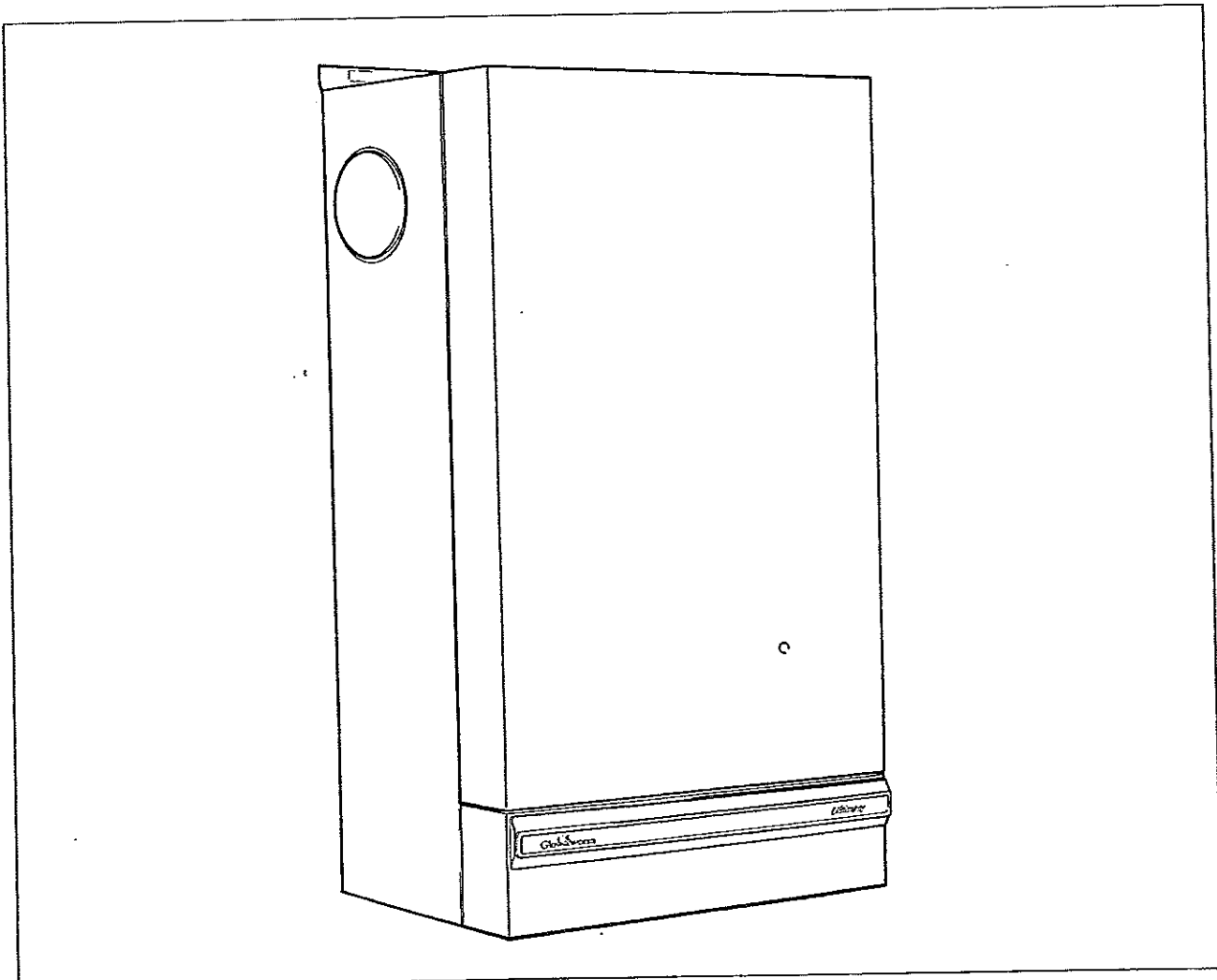


BS 6332  
BS 5258

### 30FF/LP 40FF/LP 50FF/LP 60FF/LP

This is a Cat I<sub>3P</sub> appliance

*Fanned Flue Boiler for Use on  
Propane LPG Only*



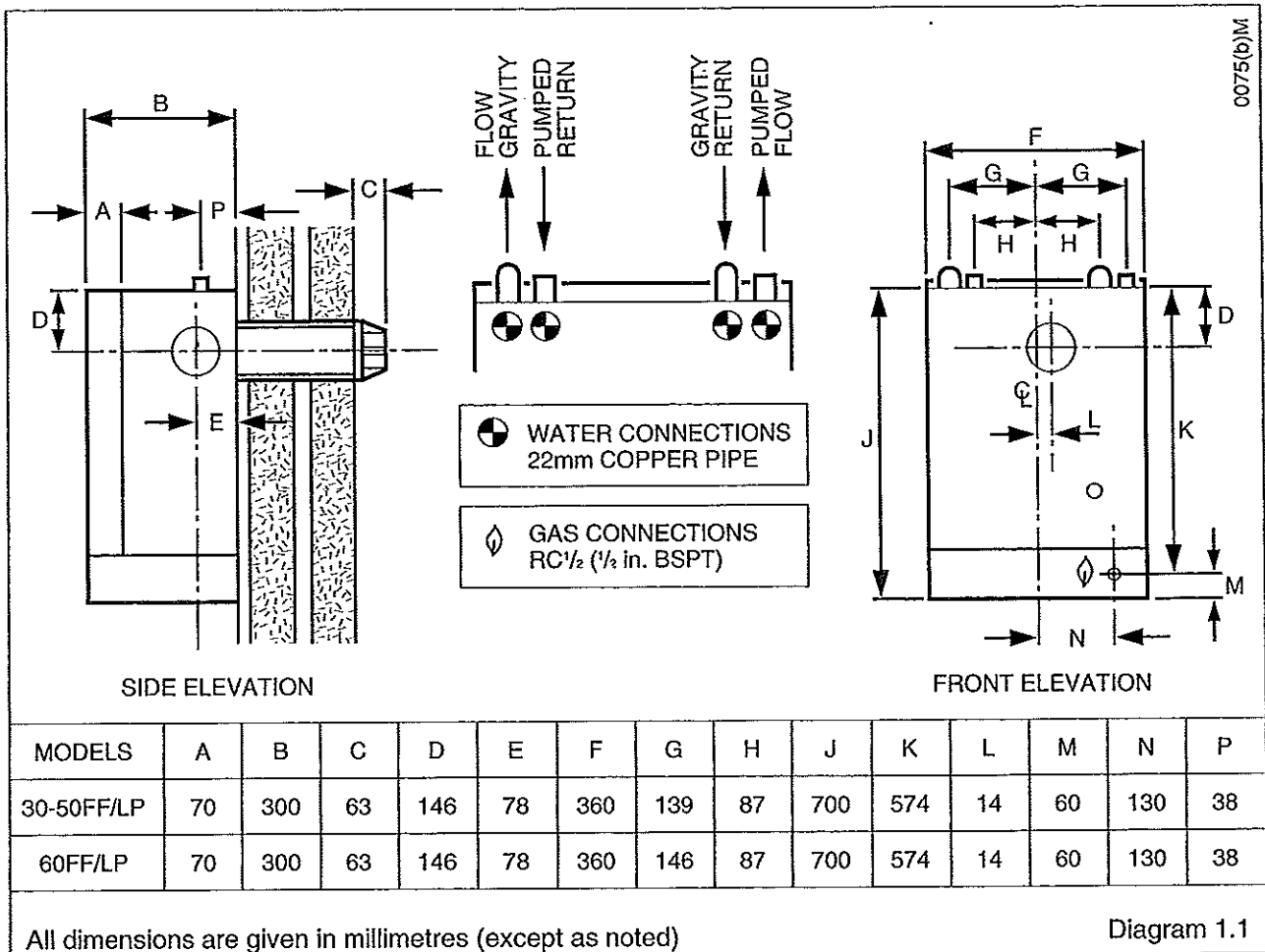
## HEATCALL

Hepworth Heating Ltd., Nottingham Road, Belper, Derbyshire. DE56 1JT

One Contact Total Service



Customer Services: (0773) 828100 Fax: (0773) 828070



The instructions consist of two parts, Installation and Servicing Instructions and Instructions for Use. They are the property of the user and must be handed to them on completion of the installation.

### Important Notice

This boiler is for use on liquid petroleum gas Propane (G31) and cannot be used on any other gas.

This boiler can be used on open vented or sealed water systems.

When used on an open vented system domestic hot water can be provided by gravity or pumped circulation.

Wherever possible, all materials, appliances and components 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.

### Sheet Metal Parts

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

### 1.1 Statutory Requirements

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

The Building Regulations, The Building Standards (Scotland) Regulations (applicable in Scotland), Local Water Company Bye-laws, The Health and Safety at Work Act, Control of Substances Hazardous to Health (COSHH), see page 43, The Electricity at Work Regulations and any local regulations which may apply.

Detailed recommendations are contained in the current issue of the following British Standards and Codes of Practice:

BS4814, BS6798, BS5440 Part 1 and 2, BS5546, BS5449, BS5482 Part 1, BS6700, BS7074 Part 1 and 2, BS7593, BS7671.

LP Gas Association Code of Practice 22.

The Gas Safety (Installation and Use) Regulations, as amended, apply to commercial premises and housing where LPG Propane is supplied from a central storage vessel system.

# 1 General

## 1.2 Data

See Table 1 and diagram 1.1

MODEL	30FF/LP	40FF/LP	50FF/LP	60FF/LP
TOTAL DRY WEIGHT (Including Terminal)	43.4kg (96lb)	43.4kg (96lb)	43.4kg (96lb)	47.5kg (105lb)
LIFT WEIGHT	37.7kg (83lb)	37.7kg (83lb)	37.7kg (83lb)	42.0kg (93lb)
WATER CONTENT	2.35L 0.52gal	2.35L 0.52gal	2.35L 0.52gal	2.95L 0.65gal
GAS CONNECTION	Rc 1/2 in.			
ELECTRICITY RATING	56W		71W	
	Internal fuse F1A			
WATER CONNECTION	4x22mm copper pipes from top of case			
ELECTRICITY SUPPLY	240V~50Hz, fused 3A			
DATA LABEL	Bottom right hand side of case			

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RANGE RATING	Min.	Medium	Max.
NOMINAL HEAT INPUT kW			14.65
Btu/h			50,000
NOMINAL HEAT OUTPUT kW			11.72
Btu/h			40,000
BURNER SETTING PRESSURE m bar			36.6
in. w.g.			14.7
APPROX. GAS RATE m <sup>3</sup> /h			.57
ft <sup>3</sup> /h			20
BURNER INJECTOR MARKING:			205720
BURNER INJECTOR SIZE:			1.85mm
PILOT INJECTOR MARKING:			4209

0078(b)M

RANGE RATING	Min.	Medium	Max.
NOMINAL HEAT INPUT kW			18.32
Btu/h			62,500
NOMINAL HEAT OUTPUT kW			14.65
Btu/h			50,000
BURNER SETTING PRESSURE m bar			36.5
in. w.g.			14.6
APPROX. GAS RATE m <sup>3</sup> /h			.71
ft <sup>3</sup> /h			25
BURNER INJECTOR MARKING:			205719
BURNER INJECTOR SIZE:			2.10mm
PILOT INJECTOR MARKING:			4209

0079(b)M

RANGE RATING	Min.	Medium	Max.
NOMINAL HEAT INPUT kW			10.99
Btu/h			37,500
NOMINAL HEAT OUTPUT kW			8.79
Btu/h			30,000
BURNER SETTING PRESSURE m bar			36.7
in. w.g.			14.7
APPROX. GAS RATE m <sup>3</sup> /h			.42
ft <sup>3</sup> /h			15
BURNER INJECTOR MARKING:			205723
BURNER INJECTOR SIZE:			1.61mm
PILOT INJECTOR MARKING:			4209

0077(b)M

RANGE RATING	Min.	Medium	Max.
NOMINAL HEAT INPUT kW			21.98
Btu/h			75,000
NOMINAL HEAT OUTPUT kW			17.59
Btu/h			60,000
BURNER SETTING PRESSURE m bar			36.5
in. w.g.			14.7
APPROX. GAS RATE m <sup>3</sup> /h			.85
ft <sup>3</sup> /h			30
BURNER INJECTOR MARKING:			205721
BURNER INJECTOR SIZE:			2.25mm
PILOT INJECTOR MARKING:			4209

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## 1.3 B.S.I. Certification

This boiler is certificated to the current issue of British Standard 6332 Part 1, invoking the current issue of BS5258 Part 1 for performance and safety. It is, therefore, important that no alteration is made to this 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, warranty and could also infringe the current issue of the Statutory Requirements.

## 1.4 Gas Supply

The gas installation shall be in accordance with the current issue of BS5482 Part 1.

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.

## 1.5 Propane LPG Storage

Propane LPG cylinders are under pressure and should never be stored or used indoors residentially.

They should be kept out of doors.

Under no circumstances must LPG cylinders be fitted or stored in a basement area. The gas supply should be from standard containers, the regulators of which should be fitted in accordance with the manufacturer's instructions.

The supply must be capable of providing the required gas rate with due regard to other appliances using the same supply.

## 1.6 Electrical Supply

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

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

Connection of the boiler and system controls to the mains supply must be through a common isolator and must be fused 3A, maximum. This method of connection must be by a fused double pole isolating switch, with a minimum contact separation of 3mm on both poles. The switch 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 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, refer to Section 4.1 for contents.

Refer to Section 4.2 to check that the flue terminal assembly supplied is suitable.

## 1.8 Water System

This boiler may be fitted to an open vented or a sealed water system.

## 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.

Draining taps should 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 installation.

This boiler may be installed in any room, except a basement, 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 utilising mains electricity should be placed so that it cannot be touched by a person using the bath or shower. The electrical provisions of the Building Standards (Scotland) apply to such installations in Scotland.

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

The boiler may be fitted to a wall made of combustible material.

## 1.12 Boiler Clearances

Refer to diagram 1.2.

This 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.

At least a minimum clearance of 500mm clearance must be left in front of the boiler for servicing, see diagram 1.2.

## 1.13 Room Ventilation

The boiler is room sealed and does not require the room or space containing it to have permanent air vents.

## 1.14 Boilers in a Compartment

Where the installation of the boiler will be in an unusual position, special requirements are needed, the current issue of BS6798 gives detailed guidance on these requirements.

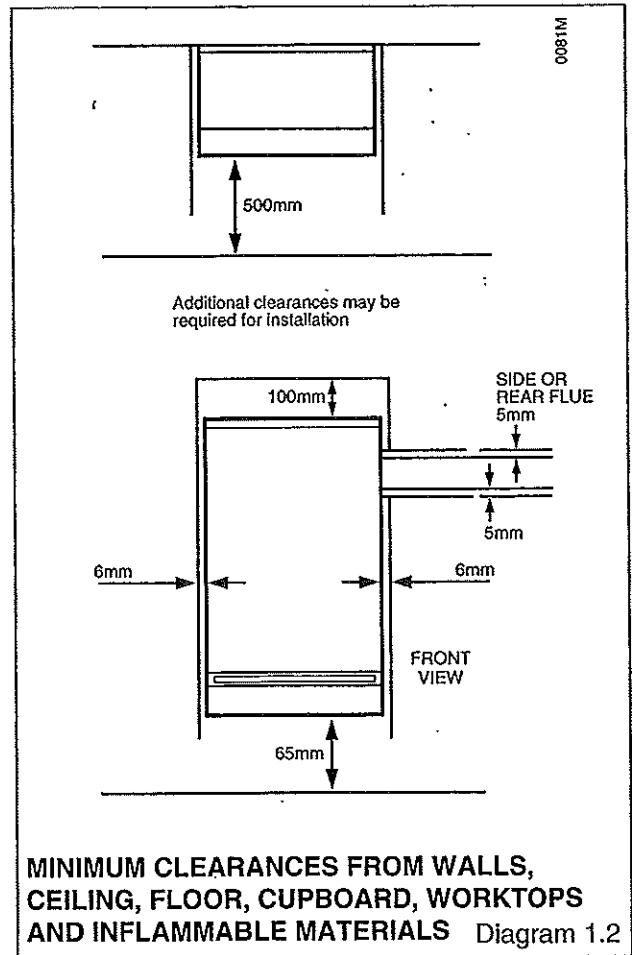
A compartment used to enclose the boiler must be designed and constructed specifically for this purpose. An existing cupboard or compartment modified for the purpose may be used. Details of essential requirements for cupboard or compartment design are given in the current issue of BS6798.

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 3.

## 1.15 Timber Frame Building

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.



VENTILATION REQUIREMENTS		HIGH LEVEL VENT AREA		LOW LEVEL VENT AREA	
		cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>
VENTILATION FROM ROOM OR SPACE	MODEL				
	30FF/LP	99	15	99	15
	40FF/LP	132	20	132	20
	50FF/LP	165	25	165	25
VENTILATION FROM OUTSIDE	30FF/LP	50	7.5	50	7.5
	40FF/LP	66	10	66	10
	50FF/LP	83	12.5	83	12.5
	60FF/LP	99	15	99	15

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## 2 Flue and Ventilation

Note: Detailed recommendations for flues are given in the current issue of BS5440 Part 1.

### 2.1 Terminal Position

The minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram 2.1.

The terminal must be exposed to the external air, the position allowing free passage of air across it at all times.

Car ports or similar extensions of a roof only, or a roof and one wall, require special consideration with respect to any openings, doors, vents or windows under the roof. Care is required to protect the roof if it is made of plastic sheeting. If the car port consists of a roof and two or more walls, seek advice from the local gas company before installing the boiler.

If the terminal is fitted within 600mm below plastic guttering or painted soffit an aluminium shield 1500mm long should be fitted immediately beneath the guttering or eaves. If the terminal is fitted within 450mm below painted eaves or a painted gutter, an aluminium shield 750mm long should be fitted immediately beneath the guttering or eaves.

### 2.2 Terminal Guard

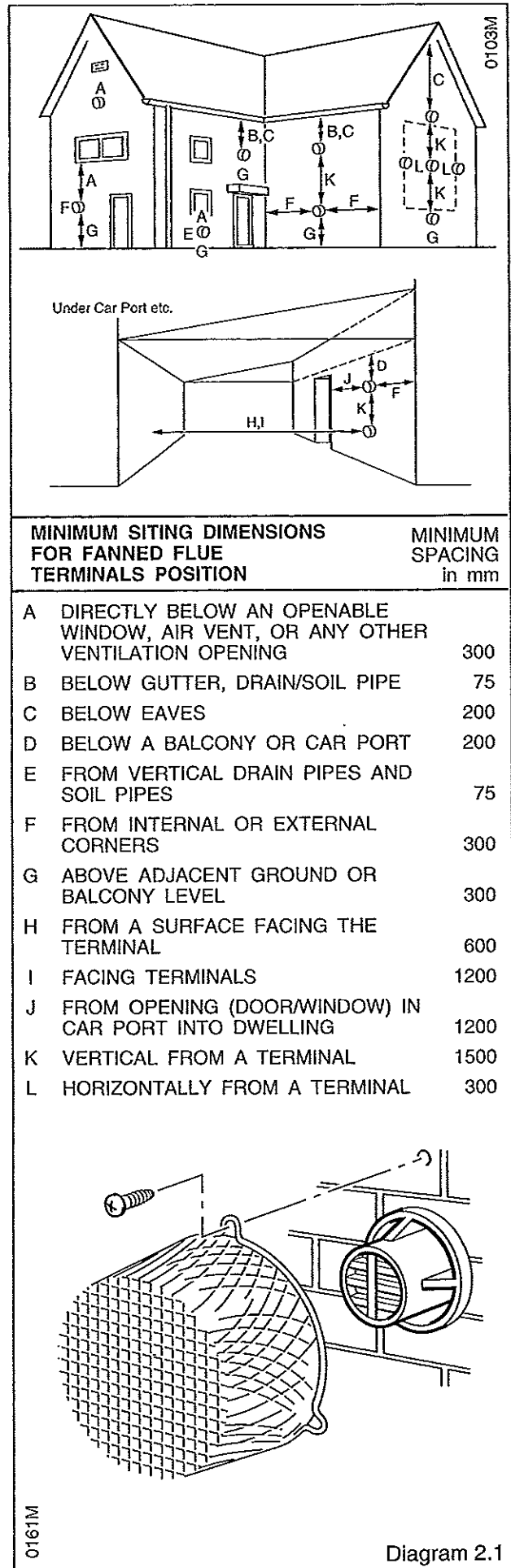
A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

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.

A suitable guard, reference Type "K3", can be obtained from:

Tower Flue Components Ltd.,  
Morley Road,  
Tonbridge,  
Kent.  
TN9 1RA

Telephone, (0732) 351555.



# 3 Water Systems

The installation of the boiler must comply with the requirements of the current issue of BS6798.

## 3.1 Frost Protection

If the position of the boiler is such that it may be vulnerable to freezing it should be protected as specified in the current issue of BS5422. It is recommended that a frost protection thermostat be fitted.

## 3.2 Pump

The pump, with integral valves, should be fitted in the heating flow pipework from the boiler, it should be set to produce a temperature difference of 11°C (20°F), between the flow and return, with the boiler thermostat set at "MAX", which is about 82°C (180°F).

The pressure loss of the boiler can be found from diagram 3.1.

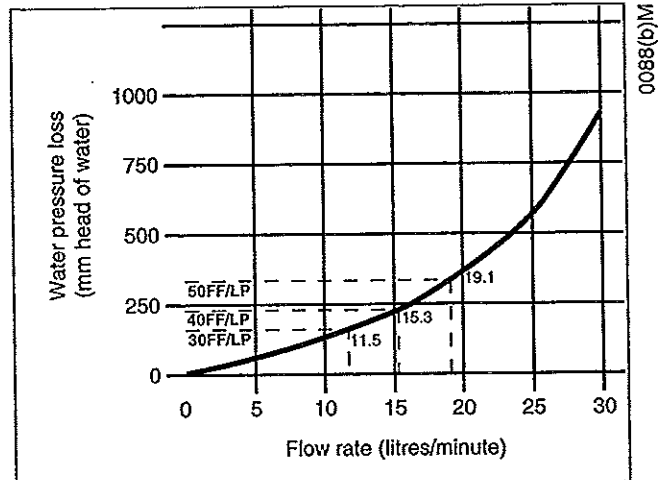
High resistance microbore systems may require a higher duty pump.

## 3.3 Bypass - Fully Pumped and Sealed Water System

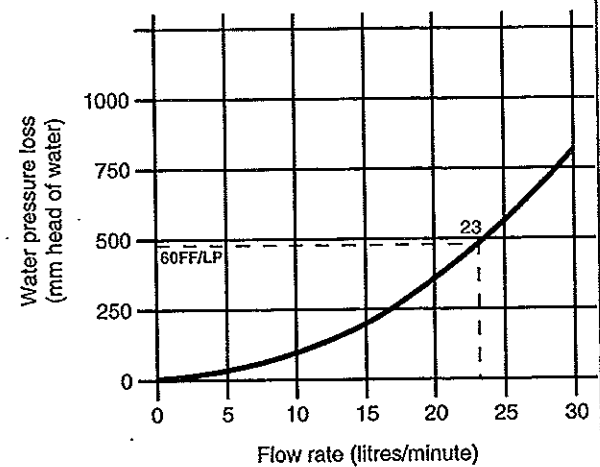
A bypass MUST be fitted to a fully pumped and sealed water system.

Where the water system allows the boiler and pump to operate on bypass only, the bypass connection must be at least 2metres away from the boiler.

The flow through the boiler must not be allowed to fall such that there is a temperature difference greater than 20°C between the flow and return.



The intersection point indicates the Flow rate required to achieve 11°C temperature difference



PRESSURE LOSS OF BOILER

Diagram 3.1

# 3 Water Systems

## 3.4 Water System

For an open vented system the boiler must be supplied from an unrestricted water supply taken from a feed and expansion cistern fitted at a maximum height of 27metres above the boiler.

The cold feed 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.

The unrestricted open vent from the boiler must rise continuously to discharge over the feed and expansion cistern.

## 3.5 Domestic Hot Water System

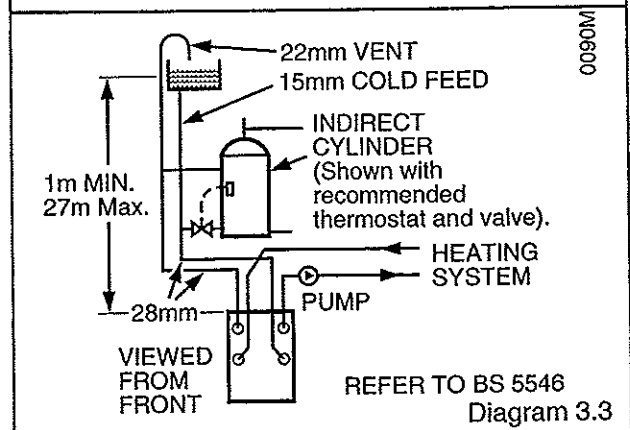
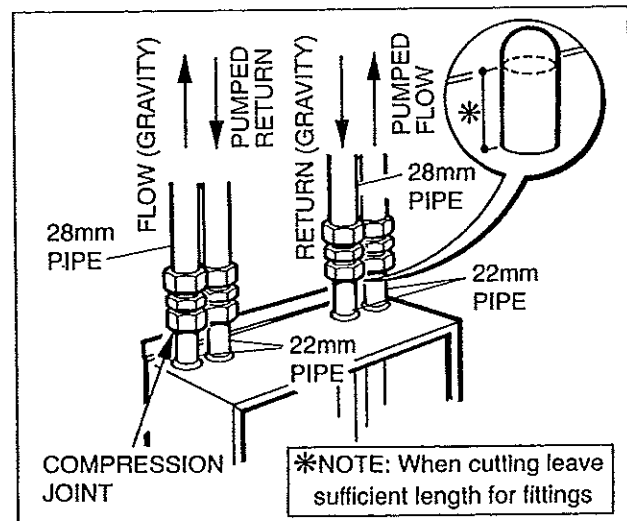
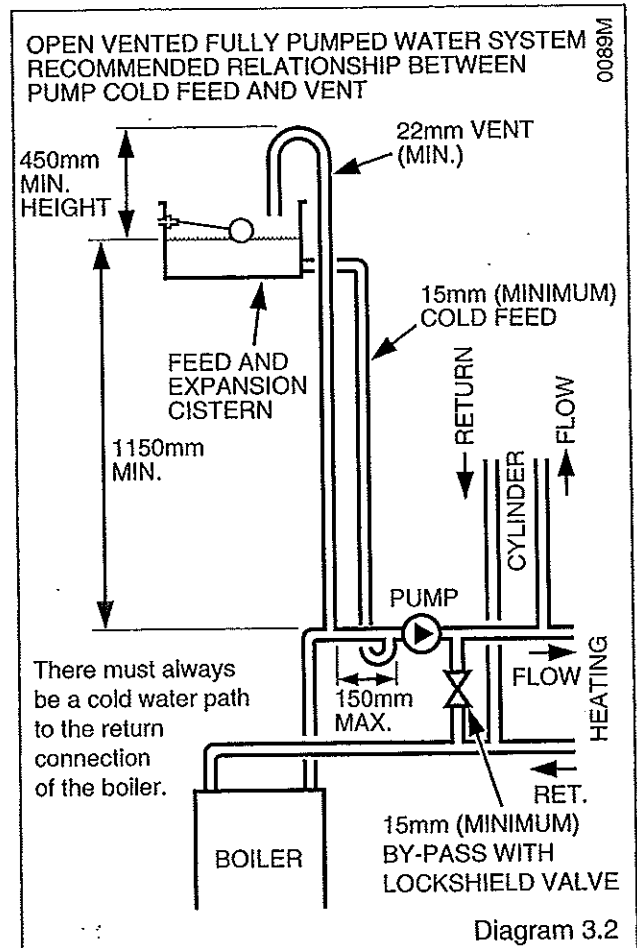
General. The domestic hot water service must be in accordance with the current issue of BS5546, refer also to the current issue of BS6700.

## 3.6 Cylinder

For all systems supplying domestic hot water the cylinder must be indirect. It is recommended that the cylinder be fitted with some form of temperature control.

## 3.7 Gravity Domestic Hot Water with Pumped Heating

Important: If domestic hot water is to be provided by a gravity circulation to the cylinder the blanked off connections must be opened and used, using 22x28mm connections, see diagram 3.3.





## 3.8 Fully Pumped Heating and Domestic Hot Water

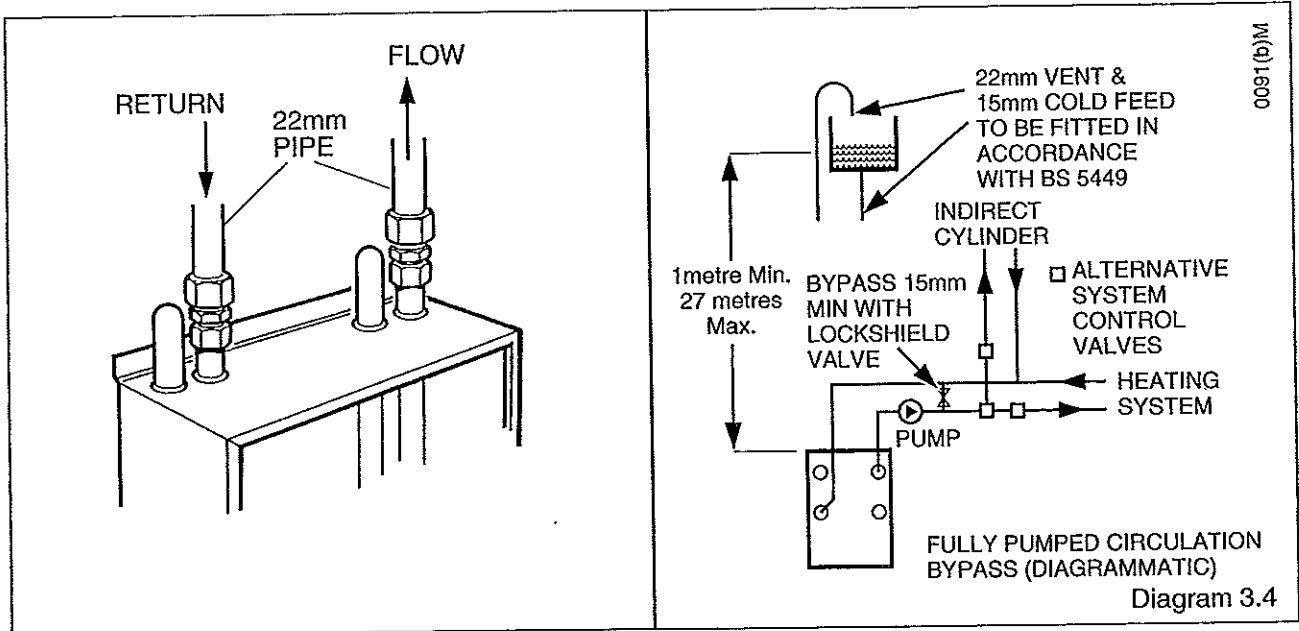
The connections for this type of system **MUST** be as shown in diagram 3.2 and 3.4.

## 3.9 Inhibitor

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

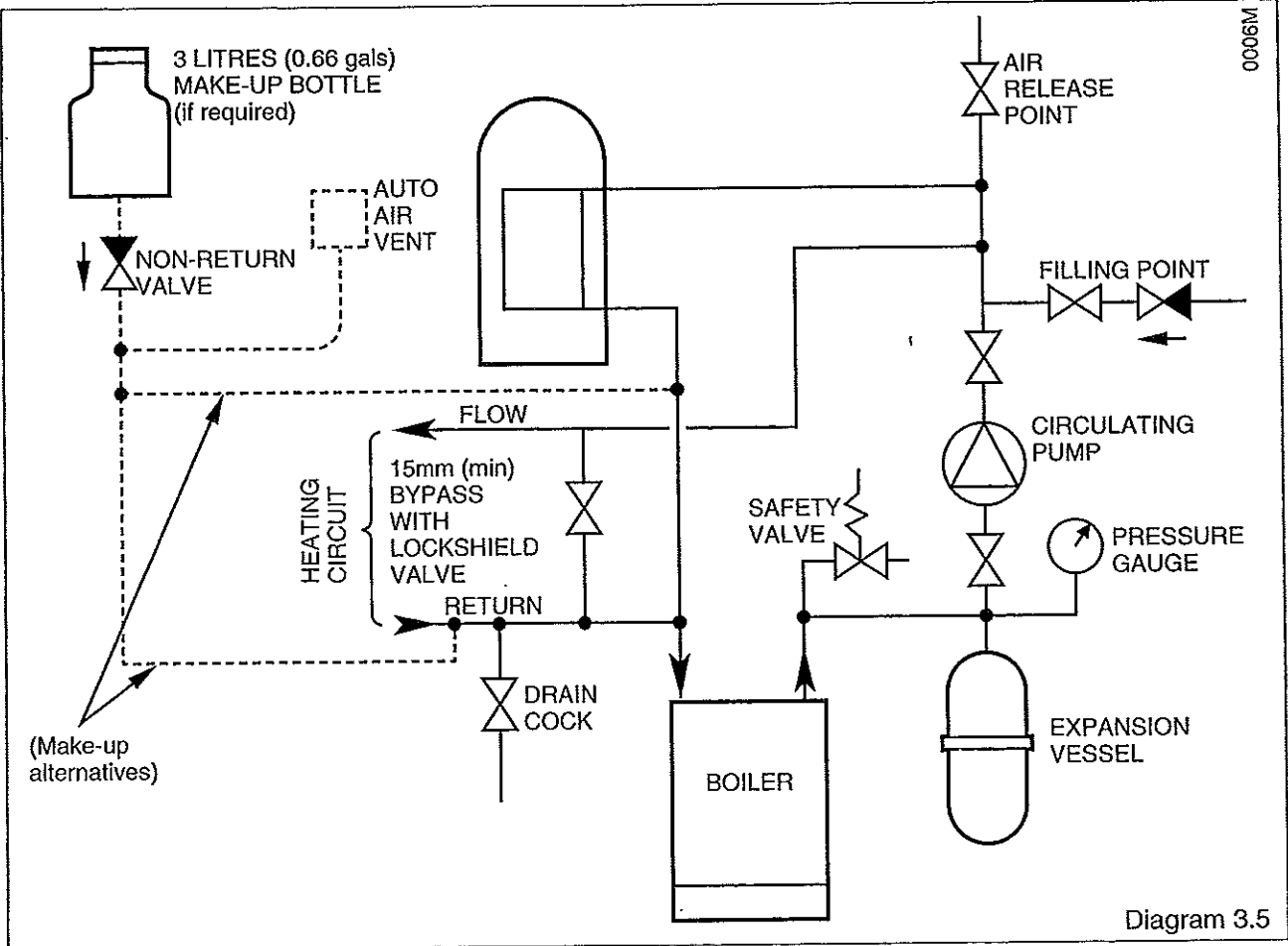
If an inhibitor is to be used, contact a manufacturer or Hepworth Heating Ltd., for their recommendations as to the best product to use.

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



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### 3.10 Sealed Water Systems

The installation should comply with the appropriate requirements of the current issue of BS4814, BS5449, BS6759, BS6798 and BS7074 Part 1 and 2, see diagram 3.5 for a suggested layout.

### 3.11 Safety Valve

A safety valve must be fitted to 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.

### 3.12 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 3.5 unless laid down differently by the manufacturer.

The expansion vessel volume depends upon 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 Water Systems

### 3.13 Pressure Gauge

A pressure gauge with a set pointer and covering at least the range of 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 filling the system.

### 3.14 Domestic Hot Water Cylinder

SINGLE FEED INDIRECT CYLINDERS ARE NOT SUITABLE.

The domestic 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.

### 3.15 Domestic Hot Water System - Unvented

Where a storage system will not have a vent to atmosphere the installation must comply with Building Regulations and local Water Company Bye-laws, see also the current issue of BS6700.

If fitting into an existing system the local authority must also be advised.

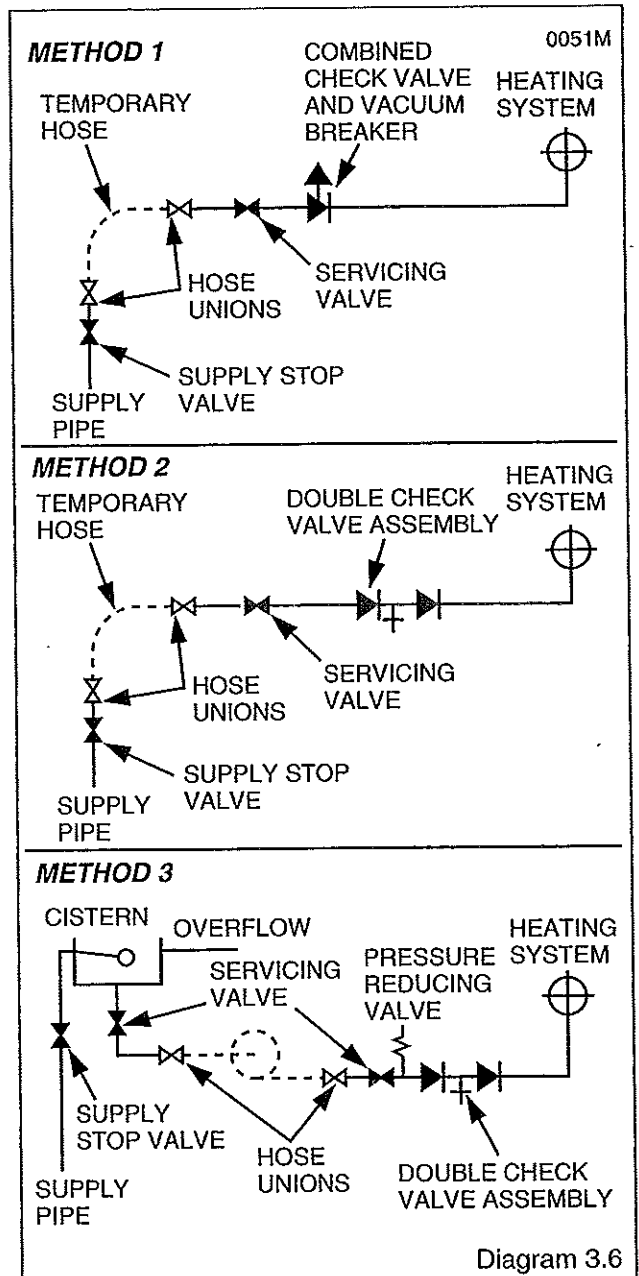
### 3.16 Filling a Sealed Water System

Provision for filling the system at low level must be made. Three methods are shown in diagram 3.6. There must be no permanent connection to the mains water supply, even through a non-return valve.

### 3.17 Water Makeup

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, see diagram 3.5.

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



# 4 Flue and Appliance Preparation

## 4.1 Unpacking

Open the carton, check the items supplied against the boiler pack contents list on the flap and diagram 4.1.

## 4.2 Flue Position and Length

Determine flue application, length and terminal position before starting.

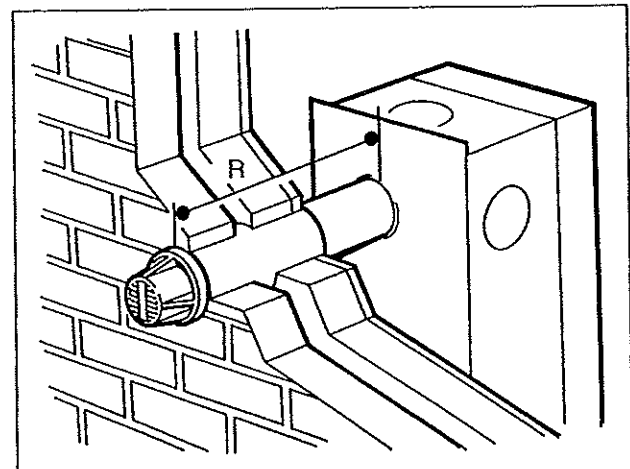
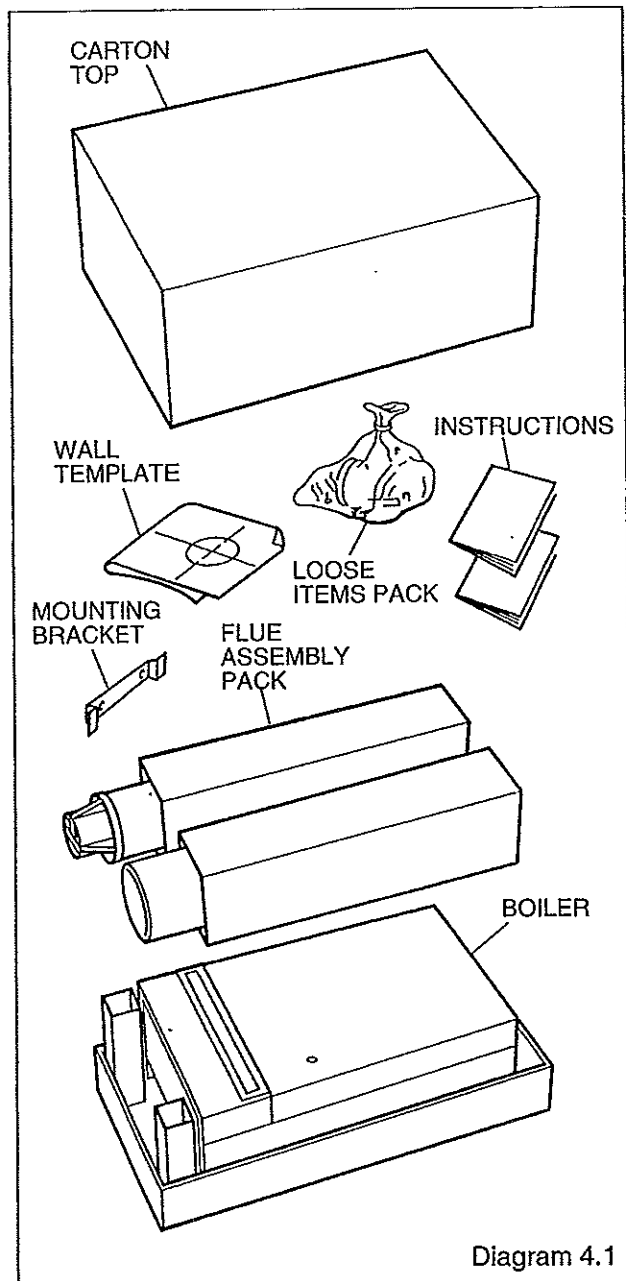
Refer to diagram 4.2 or 4.3.

Note 1. If you are using a Flue Bend or a Vertical Flue Kit, please follow the instructions supplied with that kit.

Note 2. If a longer flue duct is required DO NOT extend the ducting. A special long flue system and terminal MUST be used, Part No. 446382.

Note 3. To make a neat finish to the flue outlet a flue collar kit, part No.443286, with instructions, is available.

Please note, the use of this collar will mean that the flue lengths will need to be altered, full instructions are given in the kit.

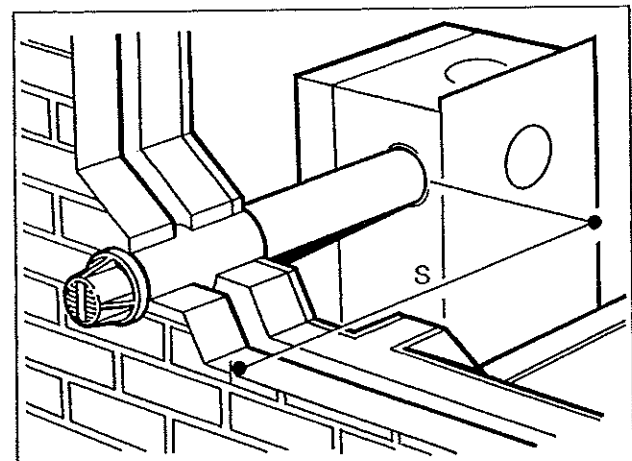


### REAR FLUE LENGTHS

Distance R = Wall thickness

STD.	75mm to 685mm	Supplied with boiler
LONG	685mm to 3003mm	Kit No. 446382

Diagram 4.2



### SIDE FLUE LENGTHS

Distance S = External wall face to boiler case

STD.	81mm to 682mm	Supplied with boiler
LONG	682mm to 3000mm	Kit No. 446382

Diagram 4.3

## 4 Flue and Appliance Preparation

### 4.3 Flue Preparation

All flue assemblies are designed for internal installation, given that there is sufficient clearance opposite to the flue for the installation of the flue.

If there is insufficient clearance the flue can be installed externally from outside.

For a wall thickness up to 300mm provided there is sufficient space available, the flue can be fully installed from the inside.

For a wall thickness of over 300mm the external flue hole will need to be made good from the outside.

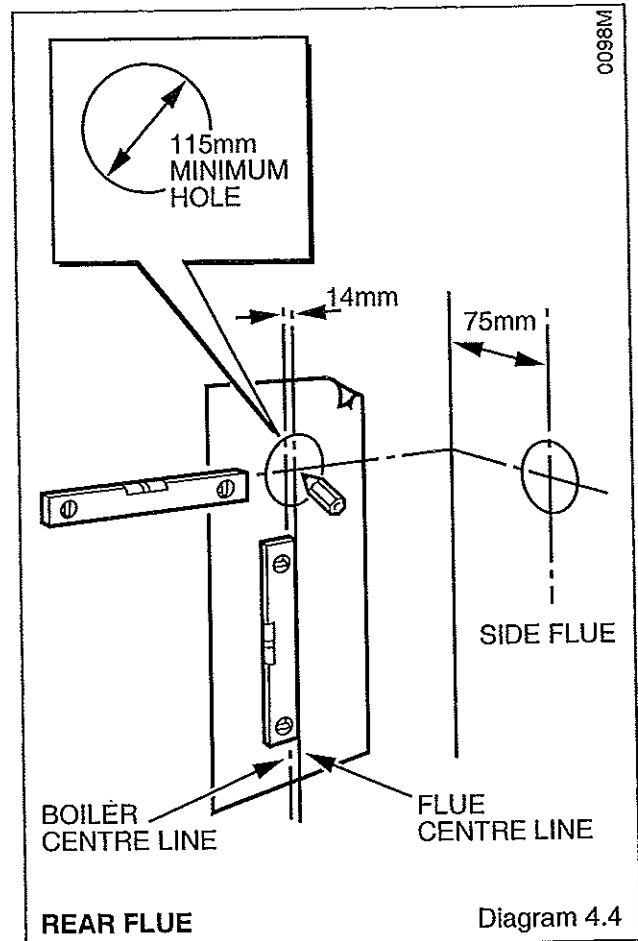
### 4.4 Rear and Side Flue Application

Select the boiler location and flue application, with due regard to the terminal position.

Take the template from the boiler pack and temporarily position it on the wall, making sure that the minimum clearances are maintained, see diagram 1.2.

For a rear flue mark the position of the flue as diagram 4.4.

For a side flue, extend the centre line horizontally left or right to the corner of the adjacent surface where the flue is required to exit to outside. Mark the position of the centre of the flue and boiler, as diagram 4.4.



### 4.5 Flue Hole Cutting

Having marked out the flue centre cut a hole for the flue using, preferably, a 115mm minimum core drill.

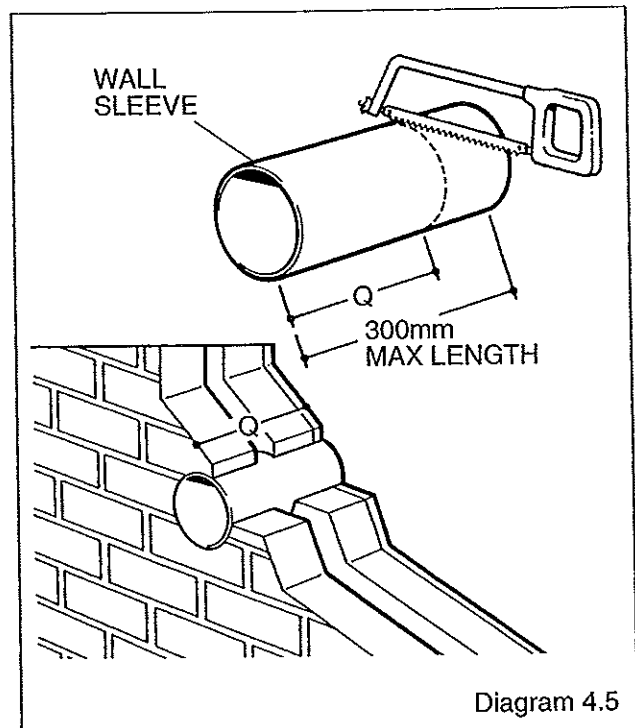
### 4.6 Wall Sleeve

Take the wall sleeve from the boiler pack. If the wall thickness "Q" is less than 300mm cut the wall sleeve to the required length, see diagram 4.5

Fit the wall sleeve.

Make good around the wall sleeve at both internal and external wall faces, through the wall sleeve if internal access only is available.

If the wall thickness "Q" is greater than 300mm the wall sleeve must be fitted flush with the INSIDE wall face. If the inner end of the liner sticks out into the cavity then, if desired, the wall liner can be trimmed back to the depth of the inner skin of brickwork. Make good at the internal wall face but leave the external wall face until the flue has been fitted.



## 4 Flue and Appliance Preparation

Reposition the template, making sure of dimensional alignment with the flue hole.

Mark the boiler fixing points and mounting bracket position, see diagram 4.6.

Drill holes and plug, to suit No.12x2in woodscrews, fit the screws allowing sufficient clearance, about 5mm, to accept the swing brackets, see diagram 4.6.

Secure the mounting bracket to the wall with No.12x2in woodscrews and plugs, see diagram 4.6.

### 4.7 Flue Duct - Standard or Long

Mark the duct to the length required, this length allows for expansion, see diagram 4.7 for rear flue and diagram 4.8 for side flue, then cut square and remove any burrs.

### 4.8 Air Duct/Terminal - Standard or Long

Mark the duct length, see diagram 4.9 for rear flue and diagram 4.10 for side flue, then cut square and remove any burrs.

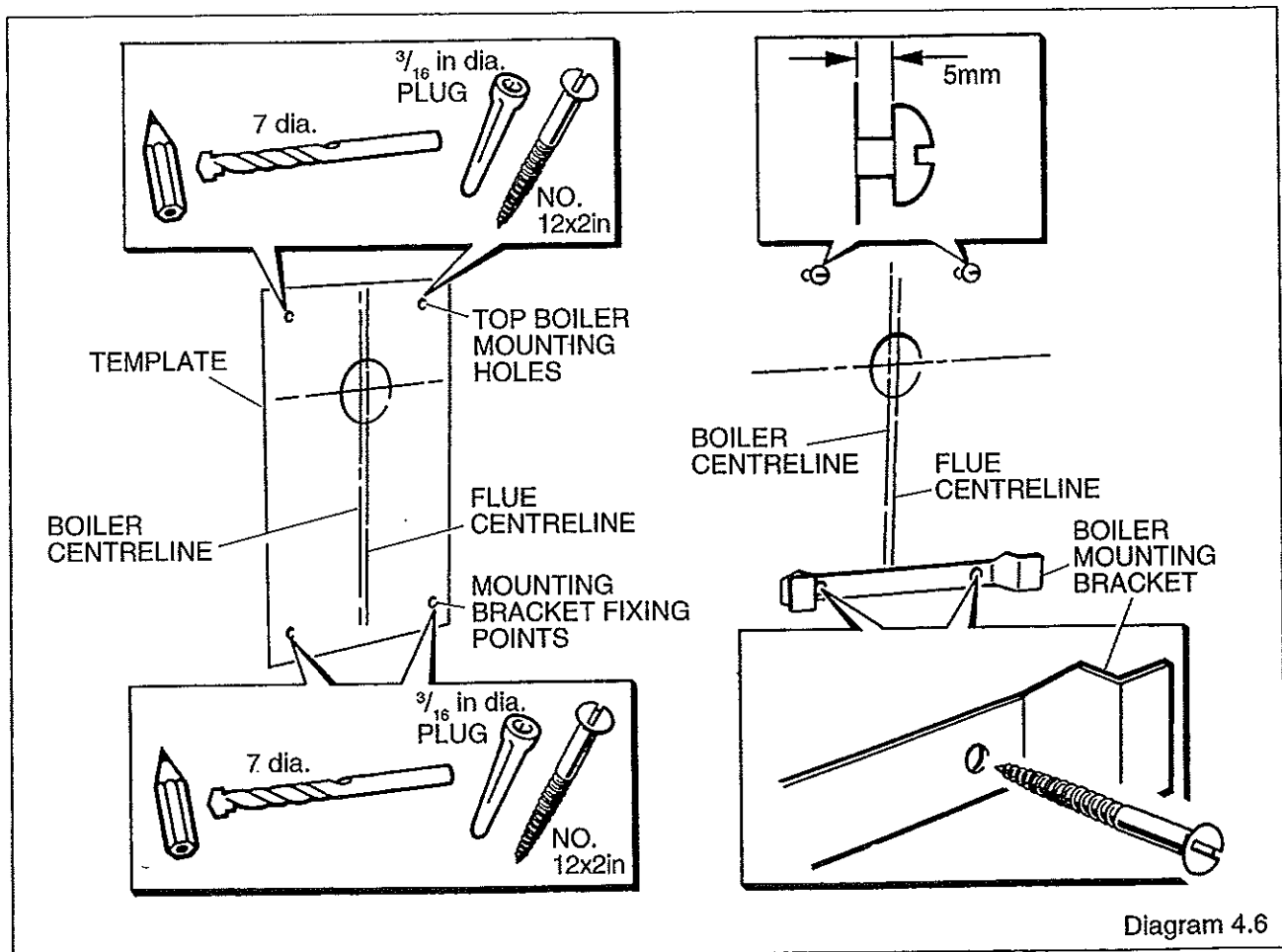
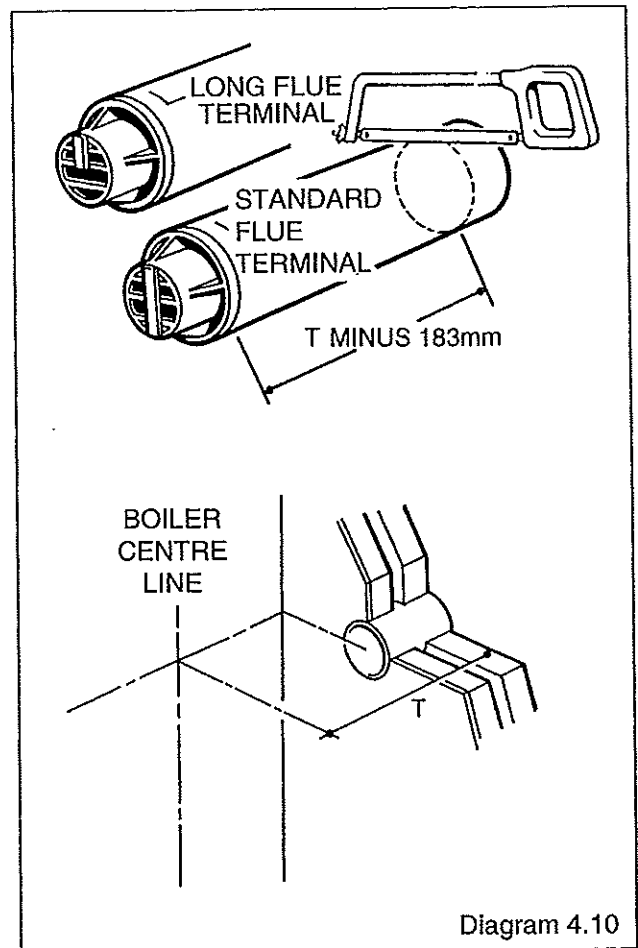
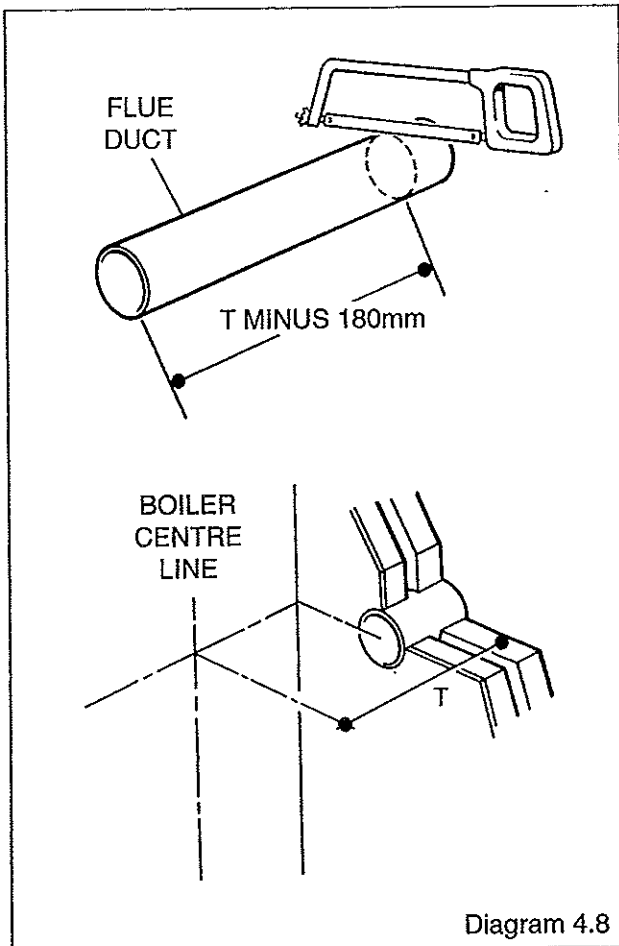
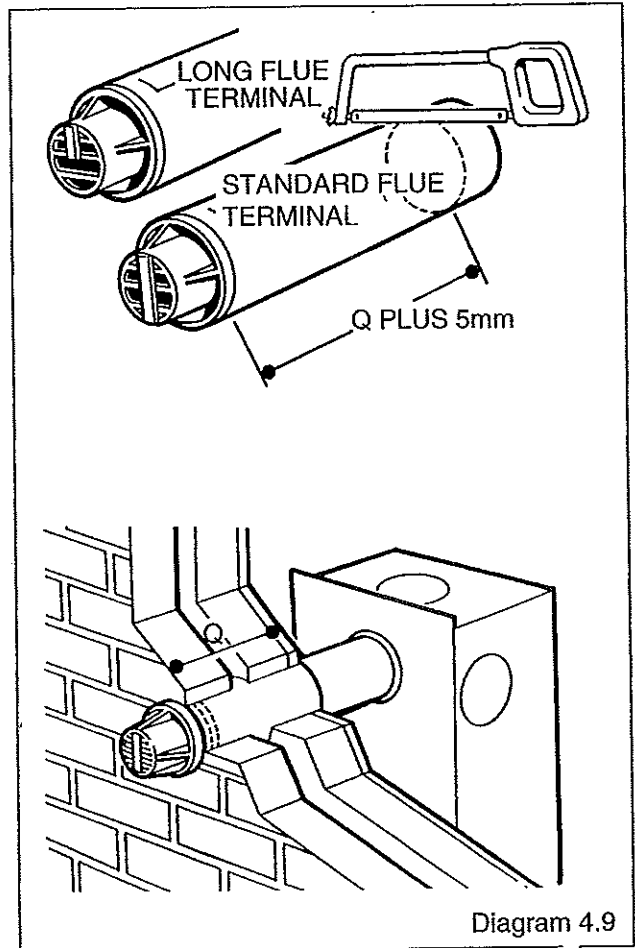
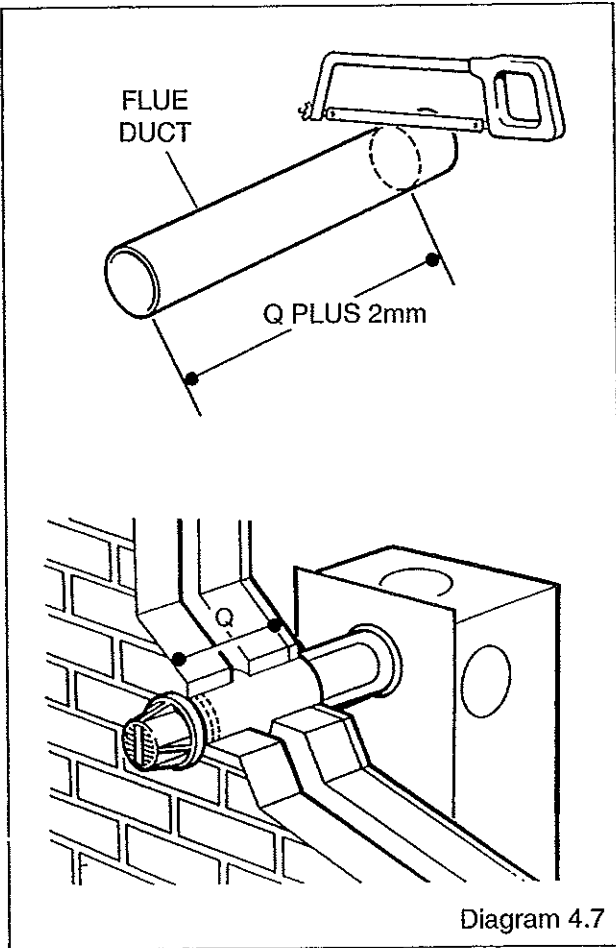


Diagram 4.6

# 4 Flue and Appliance Preparation



## 4 Flue and Appliance Preparation

### 4.9 Air Duct/Terminal and Flue Duct Assembly

Locate the flue duct into the air duct/terminal, see diagram 4.11.

Take the flue manifold from the loose items pack together with the sealant. Place the sealant onto the flue manifold.

Fully locate the flue manifold in to the air duct/terminal and flue duct assembly as shown in diagram 4.11, make sure the correct alignment of the "Top"s.

Drill two 3mm diameter holes through the air duct/terminal to the flue manifold secure with the two self tapping screws supplied in the loose items pack.

It should now not be possible to remove the manifold.

### 4.10 Wall thickness up to 300mm

Fit the self adhesive foam seal provided in the loose items pack around the air duct/terminal at the position shown in diagram 4.12.

### 4.11 Wall thickness over 300mm

Fit the self adhesive foam seal around the air duct/terminal such that, when installed, the seal will be within the wall sleeve, see diagram 4.12.

### 4.12 Flue Assembly - Installation

If the boiler is not to be fitted for some time cover the hole in the wall.

On limited access installations push the flue assembly into and through the wall sleeve and hole such that it is within the wall sleeve and does not stick out into the room, see diagram 4.13. Do not push the flue assembly too far into the hole as it has to be pulled back into the boiler and secured.

Note that the foam seal is a tight fit in the wall sleeve, so either the wall sleeve will need to be rigidly fixed in the wall, that is, the cement has fully set or it can be held from the other side whilst inserting the flue assembly.



# 4 Flue and Appliance Preparation

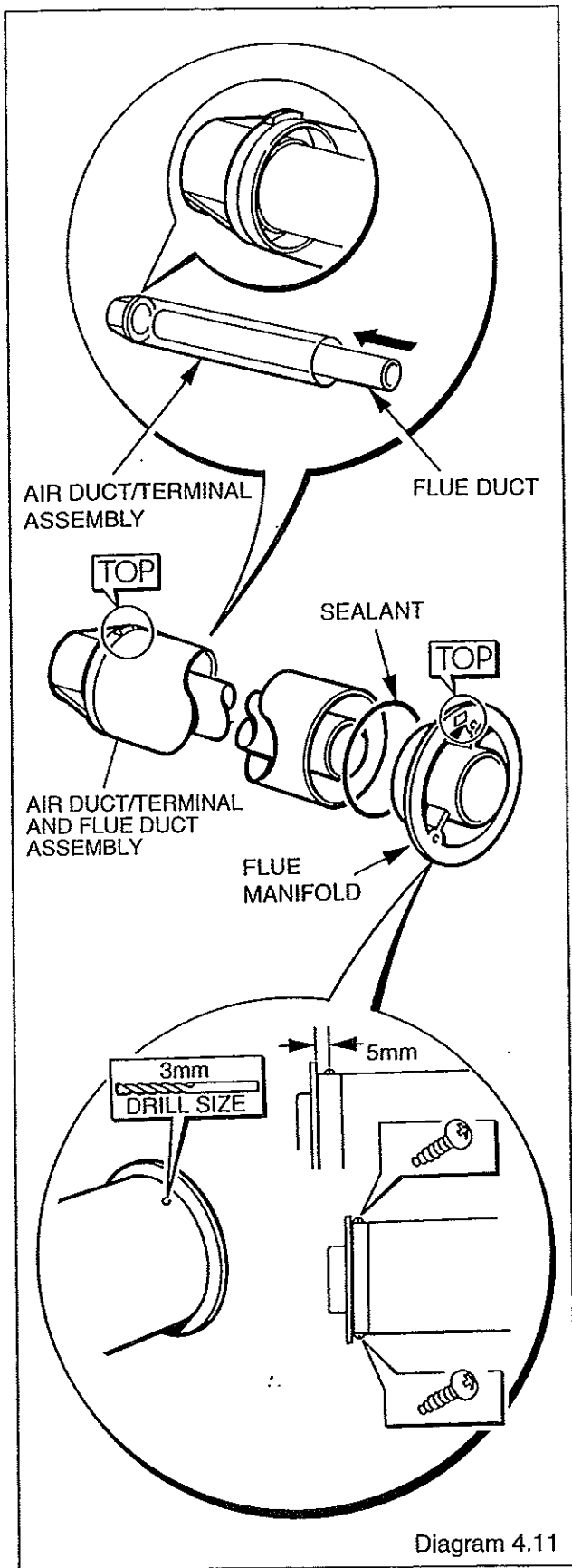


Diagram 4.11

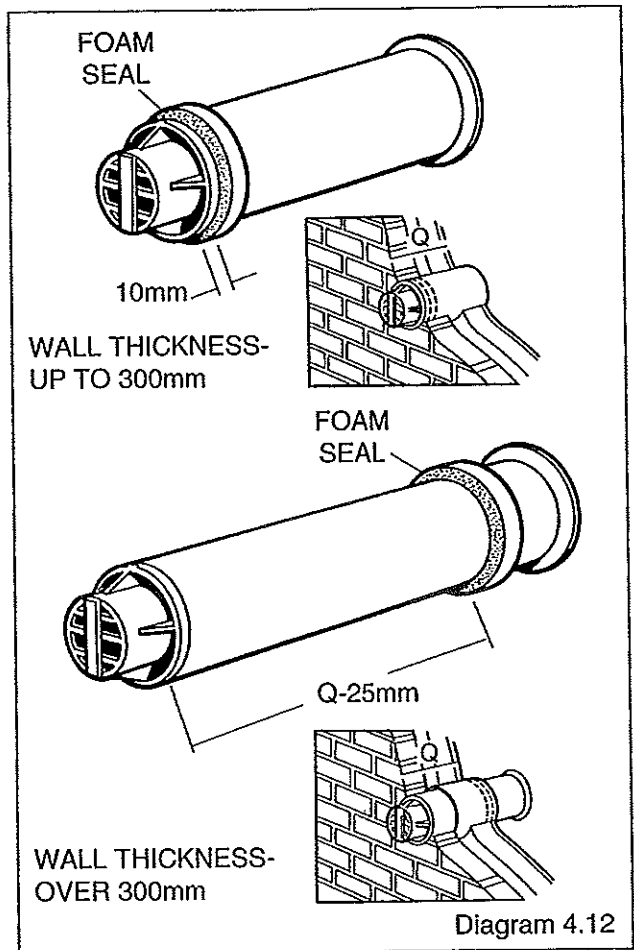


Diagram 4.12

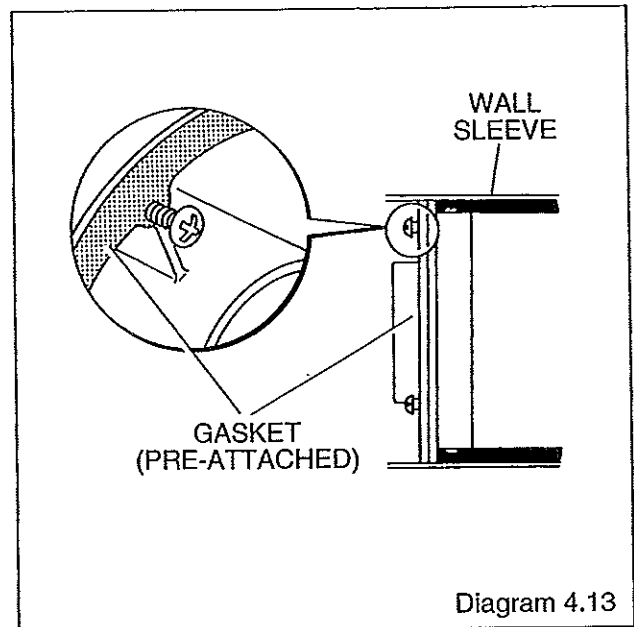


Diagram 4.13

## 5 Boiler Installation

### 5.1 Boiler Preparation

With the boiler still in the bottom tray, slide the controls cover upward and remove it as shown in diagram 5.1.

Remove the front cover by undoing the wing nut, nut and washer, lift the cover off, see diagram 5.1.

60FF/LP, only, remove the packing piece from inside the front cover.

Place front cover on one side until required.

Fit suitable compression fittings to the required tappings on the boiler.

Note. For gravity domestic hot water use 22x28mm connections on the stubs, see diagram 5.2.

### 5.2 Mounting the Boiler

If side or top outlet required fit the blanking plate, see diagram 5.5.

Now make sure that the top, swing brackets are UPRIGHT.

Lift the boiler into position, hooking over the mounting bracket.

Swing the brackets over the two screws at the top. Hold the swing bracket(s) in place whilst tightening the screw(s) on to it, see diagram 5.3.

Remove the blue and red electrical connections from the fan, see diagram 5.4.

Break the air pressure switch tube connections, see diagram 5.4.

Remove the fan assembly by removing the screws at the front, slackening the screws at the rear and sliding it out, see diagram 5.4. Taking care not to damage the gasket.

Secure the flue assembly to the boiler using the previously fitted dogpoint screws noting that these are keyhole fixings, see diagram 5.5.

Make sure of the correct fitting of the flue to the boiler.

For a side outlet cut the fan duct extension to the length required, see diagram 5.6.

Remove any burrs and fit as diagram 5.6.

Fit the fan duct extension to the elbow and assemble to the fan as shown in diagram 5.6.

Do not secure at this point with the screw.

Position the fan assembly and engage the fan duct extension over the flue manifold. Make sure, by pushing the flue duct extension that a secure seal is made.

Mark the final position of the fan duct extension through the screw hole on the elbow, remove the assembly and secure with the screw as diagram 5.6.

Secure the elbow to the fan outlet with the Jubilee clip.

For rear outlet cut and fit the fan duct extension, as diagram 5.6. Secure with the Jubilee clip.

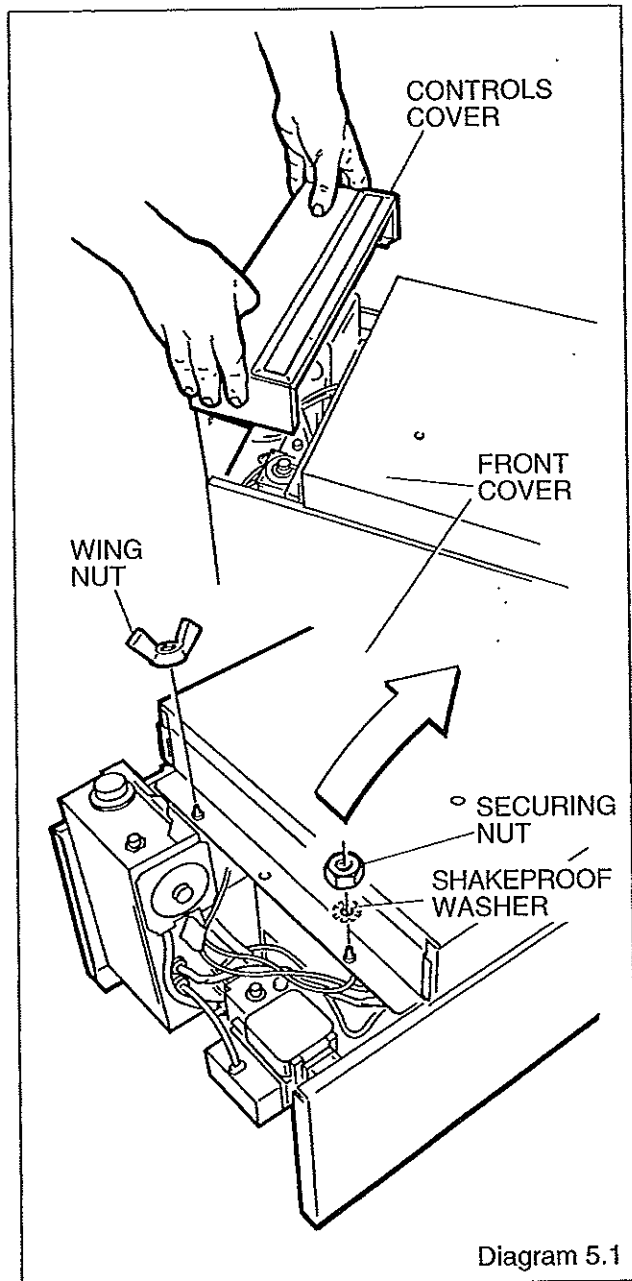


Diagram 5.1

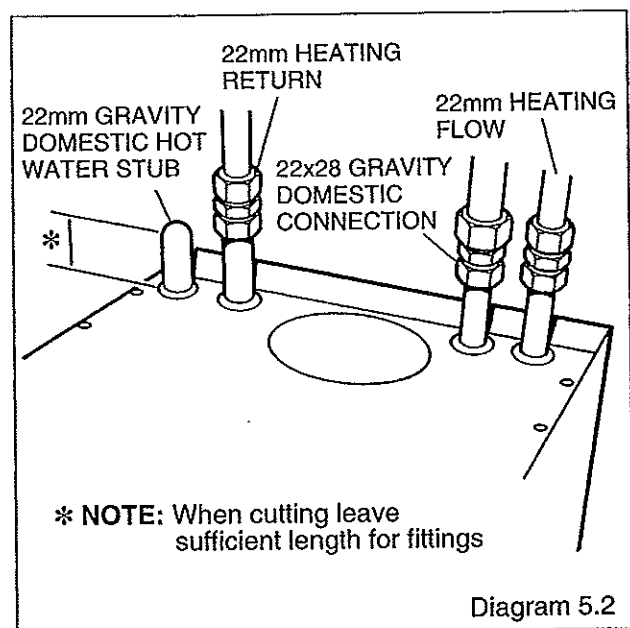


Diagram 5.2

## 5. Boiler Installation

Fit fan assembly by engaging the fan duct extension over the flue manifold spigot, see diagram 5.7.

Secure the fan assembly with the screws previously slackened and removed.

Reconnect the blue and red electrical connections to the fan, the polarity of the connections is not important.

Reconnect the air pressure switch tubes as shown in diagram 5.4.

### 5.3 Water Circulation System

Complete the water connections to the boiler.

Fill, vent and flush the system.

Check for any water leaks and put right.

### 5.4 Safety Valve Discharge

Fit a suitable discharge pipe to the safety valve and route it to outside the building so that any discharge can be seen but will not cause injury to persons, damage to property or any electrical installation.

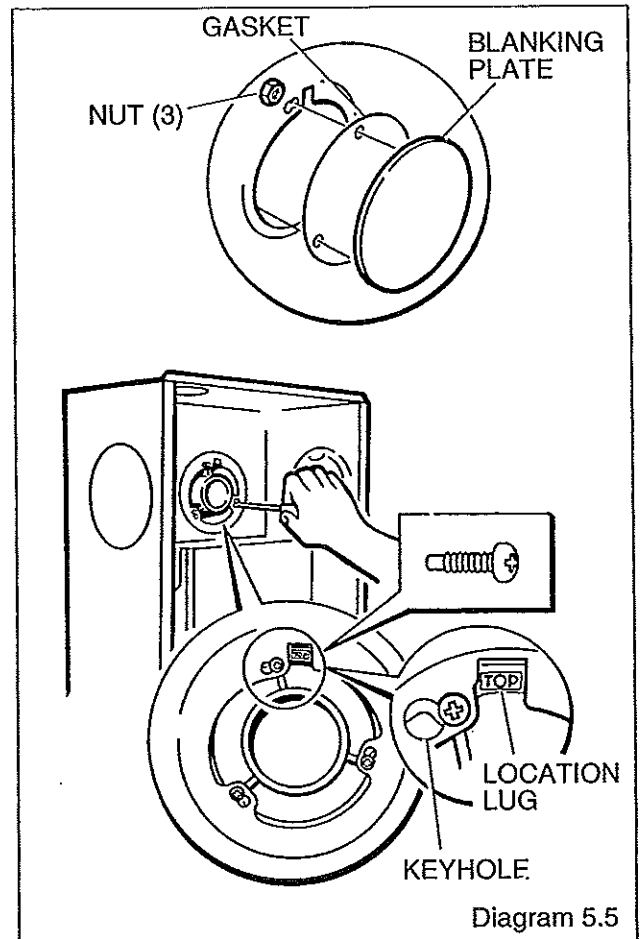
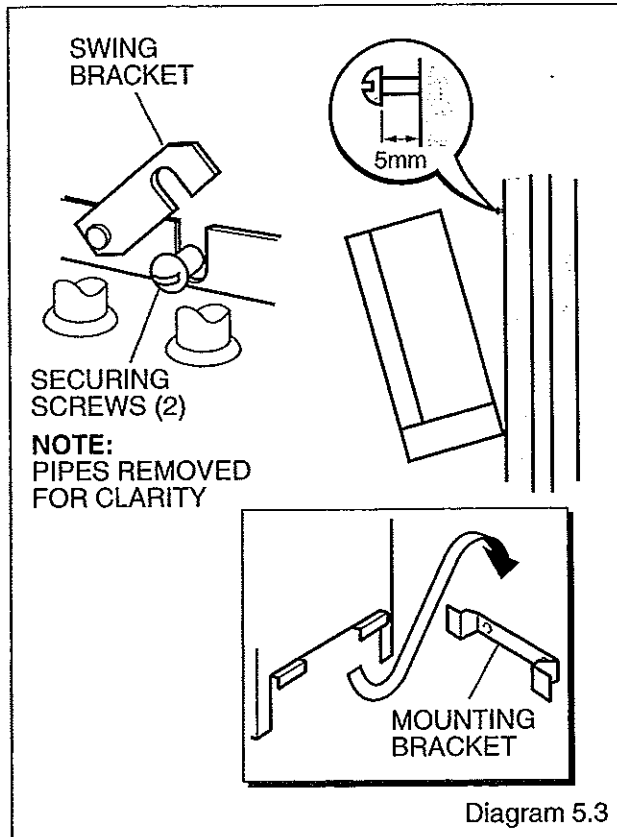
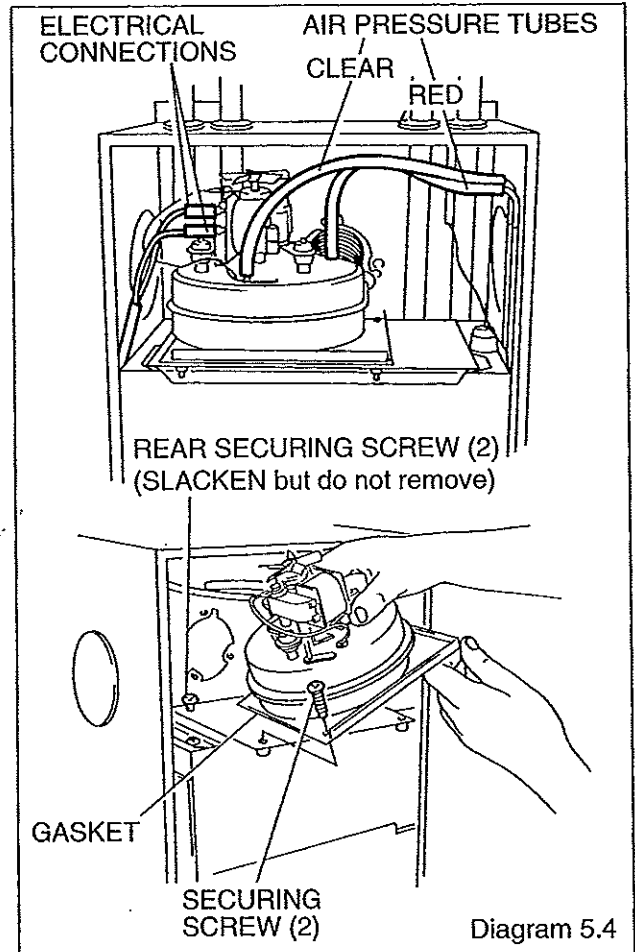
### 5.5 Gas Connection

Make the gas connection to the Rc $\frac{1}{2}$  in gas service cock, see diagram 6.1.

Check for leaks using a suitable leak detection fluid.

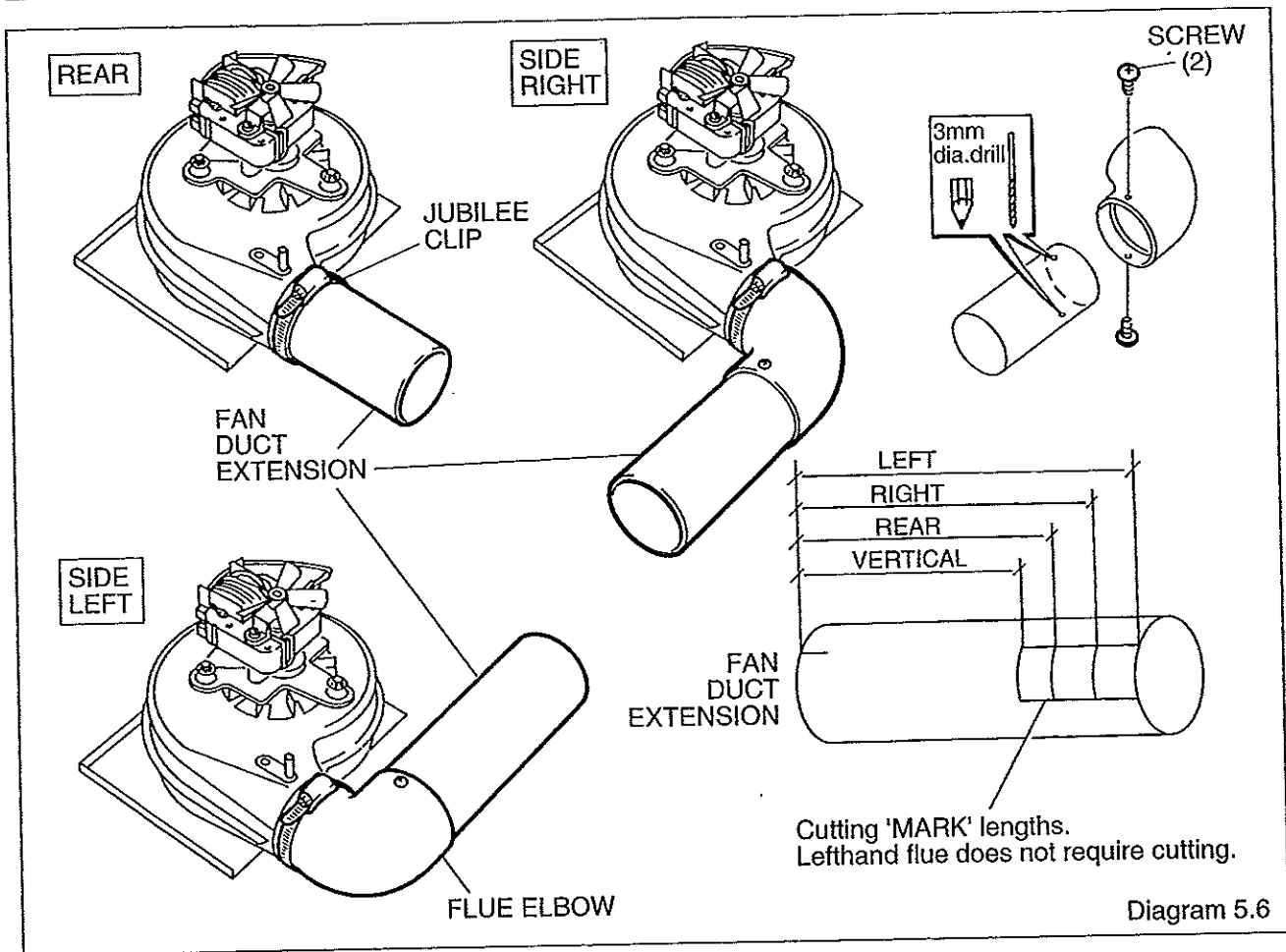
### 5.6 Control Box Removal

Remove the electrical control box securing screws, see diagram 5.8. Slide the box forward and release, hook it onto the lip bracket at the front, see diagram 5.8.



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## 5 Boiler Installation



### 5.7 Electrical Connection

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

Take care not to damage any internal wiring and capillaries.

Take the plastic cable retaining clip, from the loose items pack, peel off the backing paper and position it in a suitable place to secure the incoming cable.

Using heat resistant (85°C) cable of at least 0.75mm<sup>2</sup>(24/0.2mm) to the current issue of BS6500 Table 16 and of a suitable length, thread through the cable clamps, secure into the plastic clips and connect to appropriate terminals, see relevant diagram 5.9 or 5.10.

Standard colours are, brown - live (L), blue - neutral (N) and green/yellow - earth (E) or  $\perp$ .

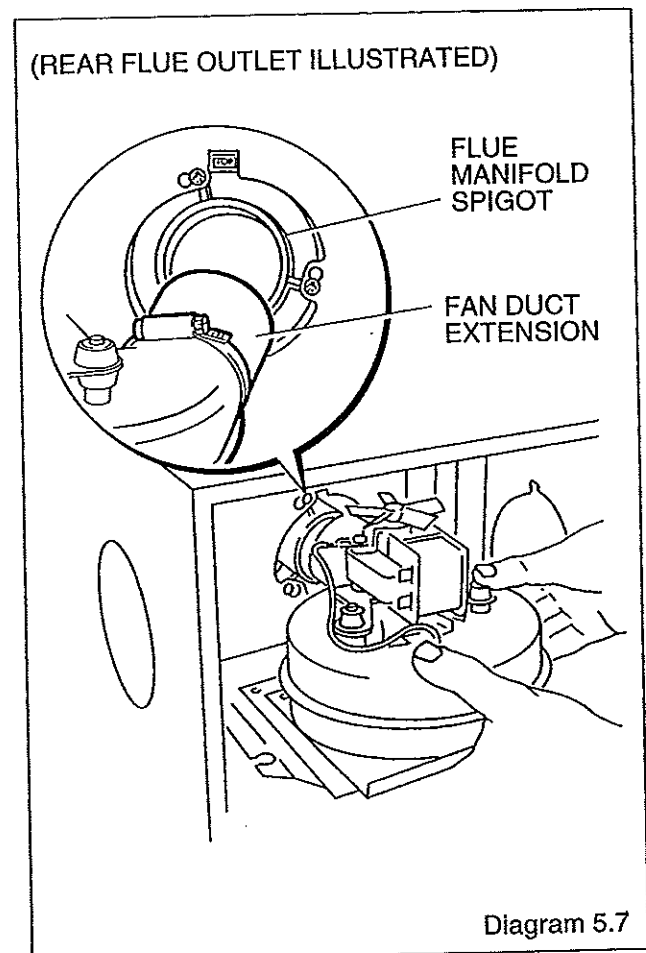
The mains cable outer insulation must not be cut back external to the cable clamp.

Make sure the cable is suitably secured.

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

### 5.8 Gravity Domestic Hot Water Systems

Fit the yellow link cable, supplied in the fittings pack, between terminal K1 and K2, see diagram 5.9.



## 5.9 Pump Connection

**FULLY PUMPED.** The pump must be connected directly to the control box, as shown in diagram 5.10 threading the cable through the cable clamp in the side of the control box.

### PUMPED HEATING AND GRAVITY DOMESTIC HOT WATER

The pump must be wired into the central heating remote controls.

Make sure that the supply cable and all external cables are secured and away from hot surfaces.

## 5.10 External Controls

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

See relevant wiring diagrams, for either a sealed water system, or fully pumped open vented, diagram 5.10 and 9.7.

### PUMPED HEATING AND GRAVITY DOMESTIC HOT WATER

Remove the red link and connect the switched live to SL as shown in diagram 5.9 and 9.6.

Make sure that the supply cable and all external cables are secured and away from hot surfaces.

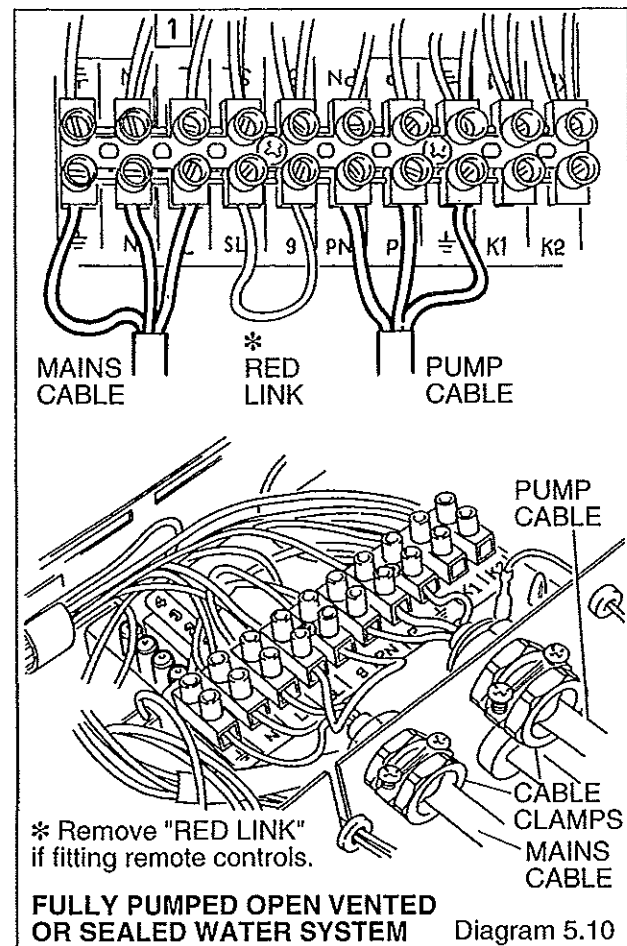
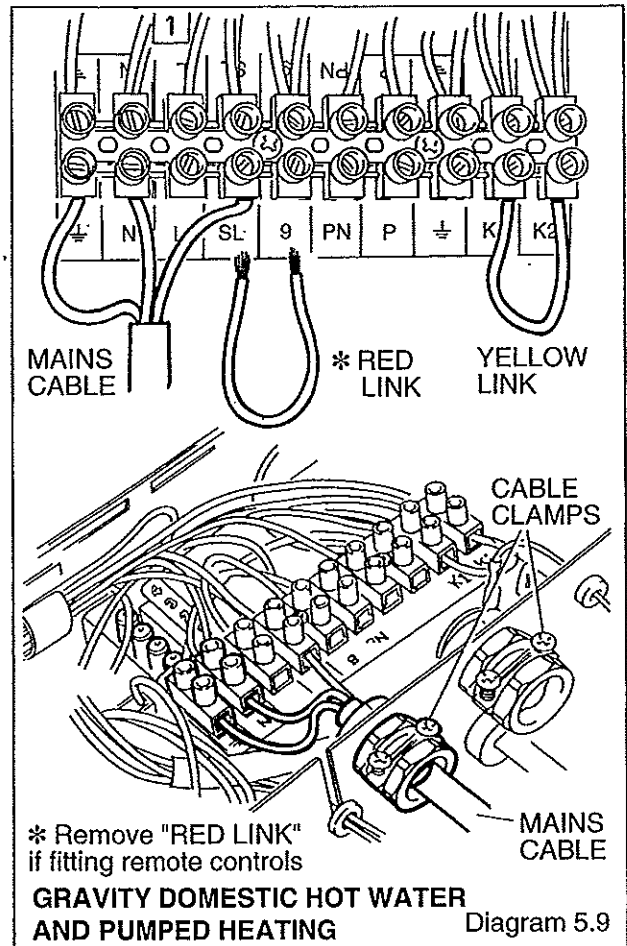
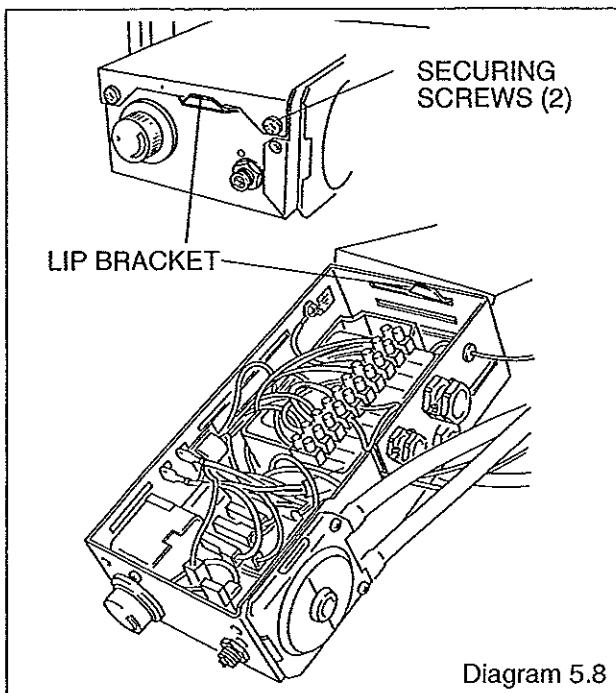
## 5.11 Testing

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.
2. Test earth continuity and short circuit of all cables.
3. Test the polarity of the mains.

The installer is requested to advise and give guidance to the user of the controls scheme used with the boiler.



## 6 Commissioning

### 6.1 All Systems

Commissioning should be carried out by a competent person in accordance with the current issue of BS6798.

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 the air is properly vented from the system and pump.

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

### 6.2 Sealed Water Systems Only

Flush the whole system with cold water without the pump in place. Refit the pump and fill until the pressure gauge registers 2.7bar (40lb/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 +/- 0.3bar (+/- 4.3lb/in<sup>2</sup>) of the 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.

### 6.3 Initial Lighting and Testing

**CAUTION.** This work must be carried out by a competent person, in accordance with the current issue of BS6798.

Make sure that all naked lights and cigarettes are out.

Identify the controls by reference to diagram 6.1.

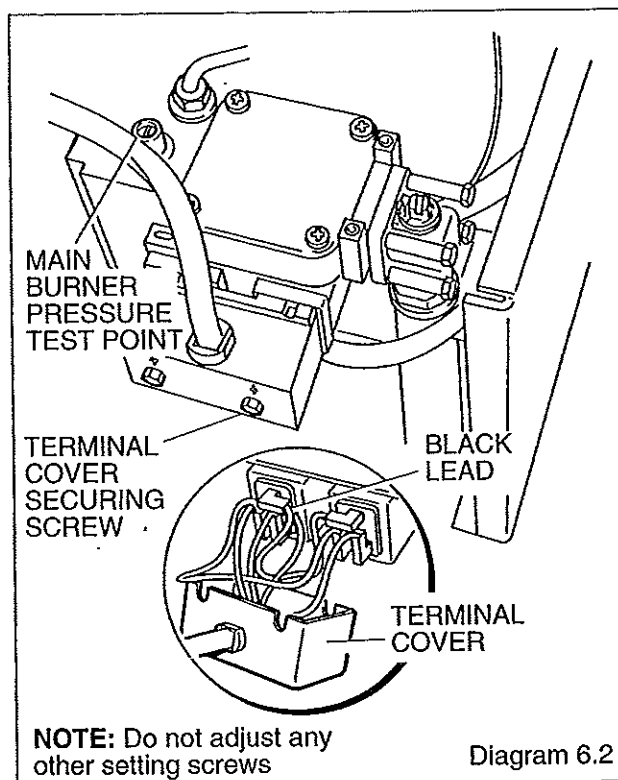
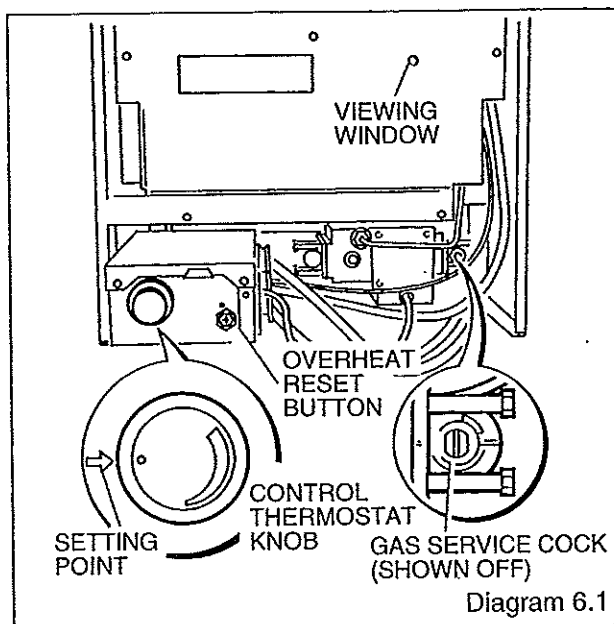
Check that the boiler is isolated from the electrical supply.

Make sure that the control thermostat is turned to "O" the "Off" position.

Turn the gas service cock "On", see diagram 6.1.

Test the pilot supply tube and its connections for gas soundness as follows:

Remove the terminal cover from the multifunctional control, see diagram 6.2. Temporarily disconnect the black lead from the main valve solenoid. Insulate the connector with tape.



**NOTE:** Do not adjust any other setting screws

## 6 Commissioning

Remove the combustion chamber front, see diagram 6.3.

**WARNING.** The multifunctional control and fan operate on mains voltage, terminals will become live.

Switch on/connect the electrical supply to the boiler and heating system. Make sure that any remote controls are calling for heat.

To complete the test it is necessary to operate the boiler without its case, but **UNDER ALL OTHER CIRCUMSTANCES** the case must be correctly fitted and sealed.

Turn the control thermostat knob fully clockwise and the fan will work, sparks will be generated and the pilot flame will light. Test the pilot supply and connections for gas soundness, using a suitable leak detection fluid.

**Note.** Very cold weather may delay the operating sequence.

The pilot rate is preset and no adjustment is provided. The pilot flame length should be as shown in diagram 6.4.

Turn the control thermostat knob to "O" and isolate the boiler from the electrical supply.

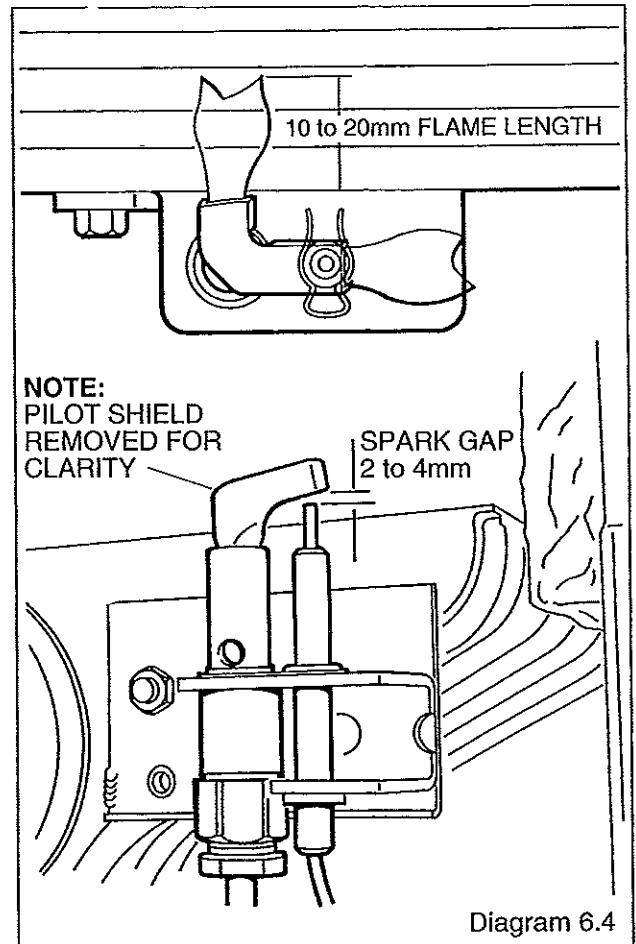
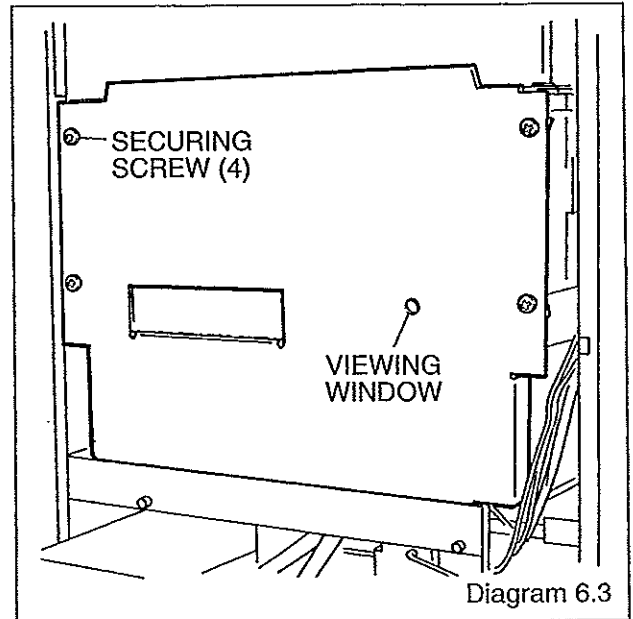
Remove the insulating tape, reconnect the black lead, see diagram 6.2, then refit the terminal cover to the valve.

Fit the combustion chamber front.

Loosen the main burner pressure test point screw and connect a suitable pressure gauge, see diagram 6.2.

Make sure that any remote controls are calling for heat.

Switch on/connect the electrical supply to the boiler and heating system, neon 1 will light, see diagram 9.1.



## 6.4 Testing - Electrical

Turn the boiler thermostat knob fully clockwise to the maximum setting, which is about 82°C (180°F), neon 2 will light.

The lighting sequence is automatic as follows:

The fan operates

The spark ignition operates

The pilot solenoid opens

The pilot burner lights

The ignition spark stops

The main solenoid opens

} neon 3 will light

} neon 4 will light

and after a short period of time the main burner will light, look through viewing window, see diagram 6.3.

Note. Very cold weather may delay the operating sequence.

The main burner will stay alight until switched off, either by the control thermostat or a remote system control.

To make sure that the flame supervision device is working correctly the following should be done.

1. With the main burner alight, turn the gas service cock "Off", see diagram 6.1.

After a short period the main burner and pilot will go out.

2. The correct working of the flame supervision device is shown by neon 4 going out within 10 seconds and the ignition starting up.

Neons 1, 2 and 3 should stay alight.

3. If the above does not happen, refer to fault finding Section 9.1.

4. To carry on turn the gas service cock "On", see diagram 6.1.

When the boiler switches "Off", both the pilot and main burner go out. The automatic lighting sequence will work again when heat is required.

## 6.5 Testing - Gas

With the boiler on proceed as follows:

Test for gas soundness around the boiler gas components using a suitable leak detection fluid, in accordance with the current issue of BS5482 Part 1.

Check the main burner gas pressure at least 10 minutes after the boiler has lit, refer to Data Label.

If necessary adjust the gas supply to obtain the required pressure, do not adjust the multi-functional control.

Turn the control thermostat knob fully anticlockwise to "O" the "Off" position. Remove the pressure gauge from the test point and refit screw, making sure a gas tight seal is made.

When the control thermostat is turned to the "Off" position, by hand, wait at least 30 seconds before turning "On" again.

There may be an initial smell given off from the boiler when new, this is quite normal and it will disappear after a short period of time.

Refit the electrical controls box, see diagram 5.8.

Note: The neon indicator lights on the printed circuit board are an aid to fault finding, for details refer to Section 9.



## 6.6 Testing - Open Vented

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

There should be no undue noise in the system and no pumping over of water or entry of air at the open vent above the feed and expansion cistern.

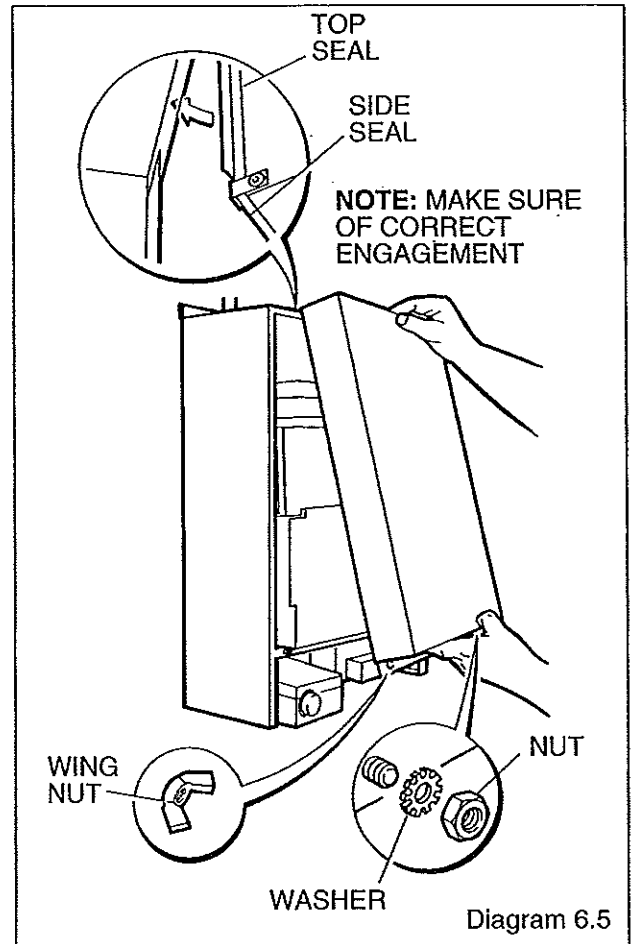
All systems - The boiler should then be turned off and the system drained off as rapidly as possible, whilst still hot.

## 6.7 Adjustment - Fully Pumped Open Vented and Sealed Water 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. Adjust the pump to system design setting then balance the system.

Having achieved a satisfactory condition operate the boiler with the bypass fully closed on minimum load, normally this will be central heating only with one radiator in the main living area operating. The bypass valve should be gradually opened to achieve a temperature difference no greater than 20°C between the flow and return.

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



## 6.8 Sealed Water Systems ONLY

Adjust the system to initial design pressure. The set pointer on the pressure gauge should be set to coincide with the indicating pointer.

## 6.9 Thermostatic Radiator Valves

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

## 6.10 Operational Checks and Completion

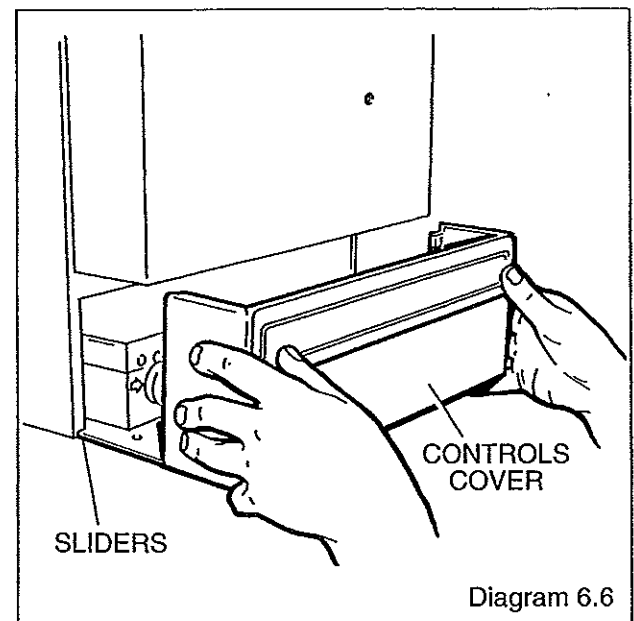
Adjust the control thermostat and any system controls to their required settings.

Do not attempt to adjust the thermostat calibration screw.

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

Fit the front cover by hooking it under at the top and securing with the wing nut, washer and nut previously removed, see diagram 6.5

Fit the controls cover by hooking into the sliders and pushing it back as far as it will go, see diagram 6.6.



## 7 Instructions to the User

Instruct and demonstrate the safe and efficient operation of the boiler, heating system and domestic hot water system.

Advise the user, 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, preferably at the end of the heating season should be enough.

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.

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

## 8 Servicing

Notes: To ensure the continued efficient and safe operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but in general once a year, preferably at the end of the heating season should be enough.

Servicing must be carried out by a competent person.

Before servicing turn off the gas and isolate the electrical supply to the boiler.

After completing a service always test for gas soundness and carry out functional check on controls.

Unless stated otherwise all parts are replaced in the reverse order to removal.

### 8.1 Access

Refer to diagram 6.6 and slide the controls cover forward and off.

Remove the outer case, see diagram 6.5.

Note: As an aid to Servicing the air pressure switch tube connection can be used to obtain a products of combustion reading.

Remove the RED tube from the connection on the air pressure switch and insert the analyser probe into the tube.

Switch on the electrical supply to operate the fan and turn on the gas supply.

On completion of the test switch off the electrical supply and the gas supply and reconnect the red tube to the air pressure switch.

### 8.2 Cleaning Heat Exchanger Flueways

Disconnect the air pressure tubes.

Remove the blue and red electrical connections from the fan.

Remove the fan complete with the fan duct extension take care not to damage the gasket, see diagram 5.4 and 5.7.

Remove the flue hood, noting that there are keyhole slots at the rear, see diagram 8.1.

Remove the combustion chamber cover.

60FF/LP only, remove the flueway baffles, see diagram 8.2.

Remove the burner as Section 8.3.

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

Clean the heat exchanger flueways with a suitable brush.

Remove the paper together with any debris.

If the gasket is damaged, see diagram 8.1, it must be replaced.

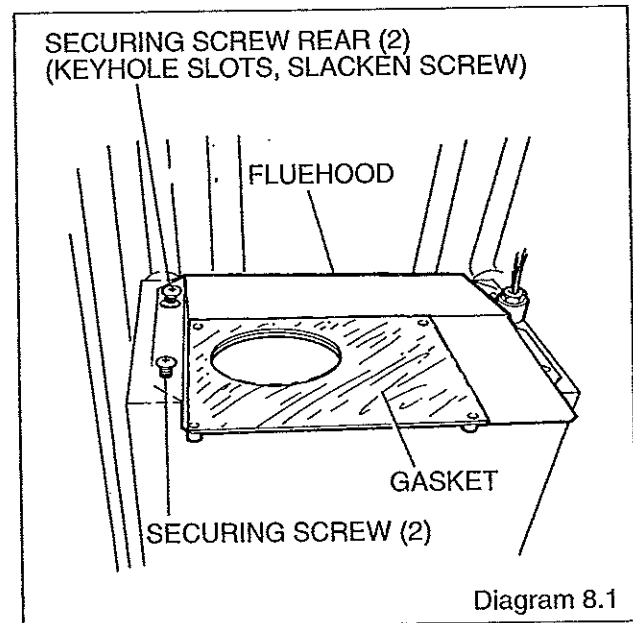


Diagram 8.1

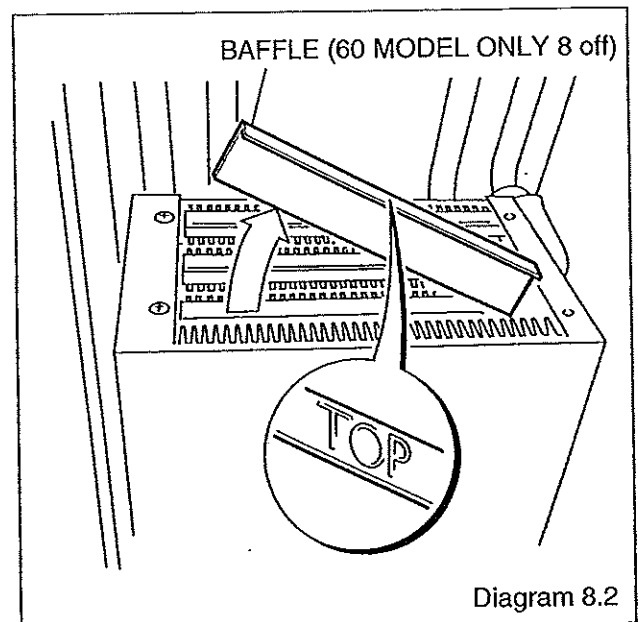


Diagram 8.2

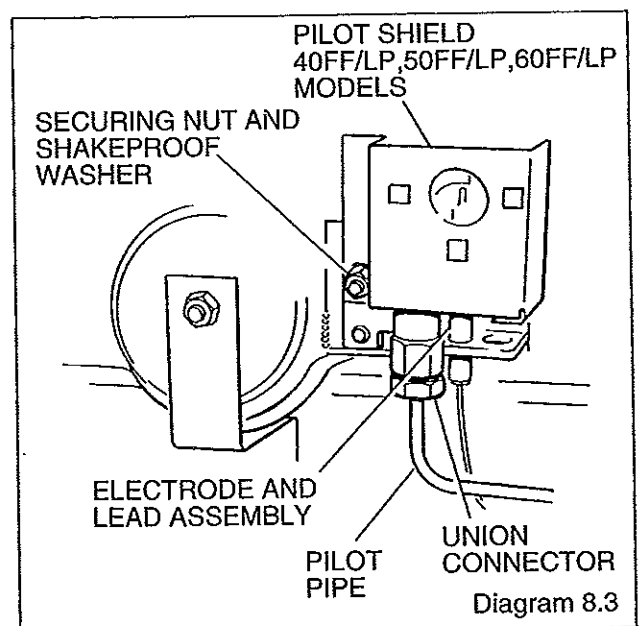


Diagram 8.3

### 8.3 Main Burner

Disconnect the pilot pipe union connector. Remove pilot burner, securing nut and shakeproof washer together with the pilot shield.

Remove the pilot burner assembly taking care not to damage the electrode and lead assembly, see diagram 8.3.

Note. There is no pilot shield fitted to the 30FF/LP.

Remove the wing nut from the burner support bracket, see diagram 8.4.

Remove the main burner from the main injector at the rear. Raise the burner up and forward, easing the pilot pipe down, to clear, take care not to damage the combustion chamber insulation or the pilot burner assembly.

Use a vacuum cleaner or suitable stiff brush to clean the burner thoroughly, making sure that all the burner ports are clear and unobstructed.

Note. On refitting and after cleaning the heat exchanger make sure the main burner is fitted correctly, that is, located on the main injector and horizontal.

### 8.4 Main Injector

With the main burner removed the main injector can be inspected and cleaned as necessary, see diagram 8.5.

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

Use a little suitable sealant on the external thread when refitting to make sure a gas tight seal is made.

### 8.5 Pilot Burner/Electrode and Pilot Injector

Clean the pilot burner and electrode.

To remove the electrode release the spring clip, see diagram 8.6.

When removing and replacing the pilot injector from the pilot burner take care not to damage the electrode, see diagram 8.6, clean the injector by blowing through it.

Check that the spark gap is as shown in diagram 6.4.

### 8.6 Operational Checks

After completing a service and before fitting the case, check condition of the case seal and renew if necessary.

Examine flue hood and terminal to make sure they are clean and clear of obstructions.

Light the boiler and carryout the functional checks as described in Section 6.

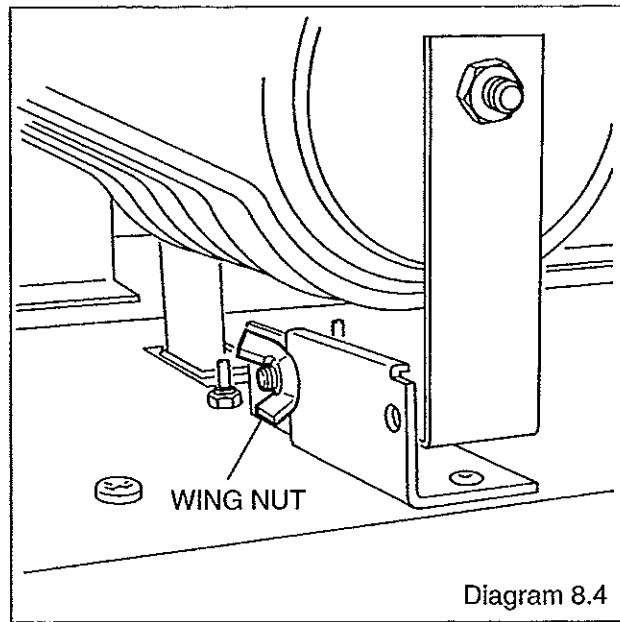


Diagram 8.4

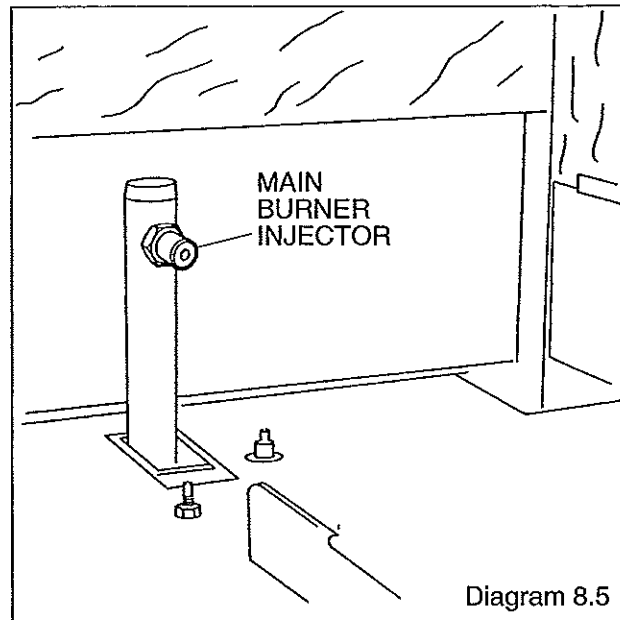


Diagram 8.5

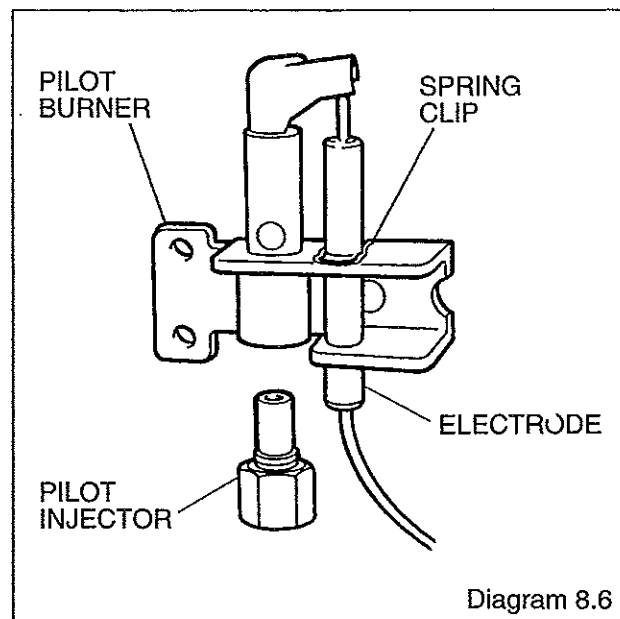


Diagram 8.6

# 9 Fault Finding

## 9.1 Electrical

Important. On completion of the Service/Fault Finding task which has required the breaking and remaking of the electrical connections the earth continuity, polarity, short circuit and resistance to earth checks must be repeated using a suitable multimeter.

Refer to neon indicators "An Aid to Fault Finding" diagram 9.1, Boiler Fault Finding diagram 9.2, Pump Overrun Fault Finding diagram 9.3 the Functional Flow diagram 9.4, Gravity Domestic Hot Water and Fully Pumped Central Heating, diagram 9.5, Fully Pumped Open Vented or Sealed Water System, the Pictorial Wiring diagram 9.6, Gravity Domestic Hot Water and Fully Pumped Central Heating and diagram 9.7 Fully Pumped Open Vented or Sealed Water System.

## 9.2 Electrical Supply Failure

Failure of the electrical supply will cause the burner to go out.

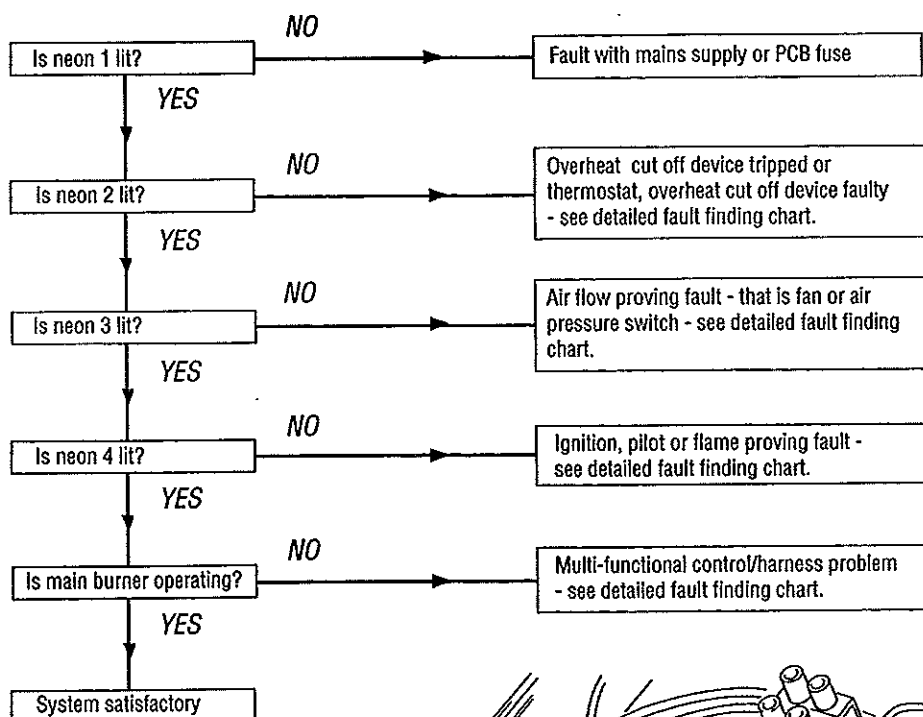
Operation will normally resume on the restoration of the electrical supply. If the burner does not relight after an electrical supply failure the overheat device may need resetting.

Remove the control cover, see diagram 6.6 and push the reset button on the front of the control box, see diagram 6.1.

If the cutoff operates at any other time press the reset button and the burner should relight. If the fault persists refer to fault finding chart.

### Neon Indicators - An Aid to Fault Finding

THE NEON INDICATORS ARE AN AID TO FAULT FINDING ONLY. FAILURE OF ANY OF THE NEON INDICATORS DOES NOT WARRANT THE REPLACEMENT OF AN OTHERWISE SATISFACTORY PRINTED CIRCUIT BOARD (PCB).



NEON INDICATORS

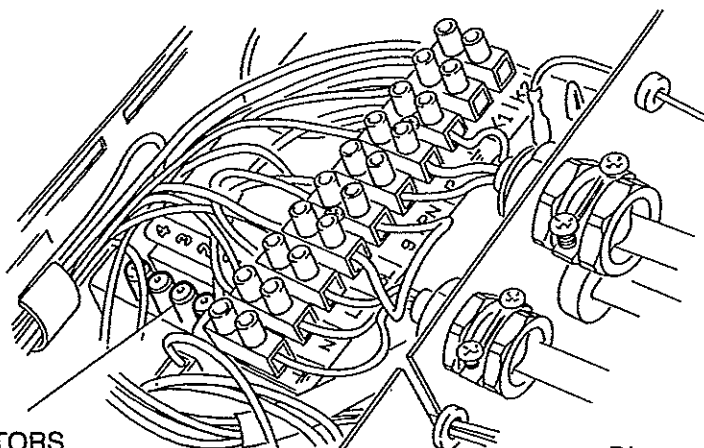


Diagram 9.1

# 9 Fault Finding

Before detailed checking of electrical components ensure that remote controls are calling for heat. Check the gas supply is free of obstructions and purged of air. Check the overheat cutoff has not operated, for fully pumped systems only. Isolate the electrical supply and physically check ALL cables, connections and the printed circuit board fuse. Check the air tubes to the air pressure switch. Switch on the electrical supply and check for correct polarity. Turn the boiler thermostat to its maximum setting. Also check fuses.

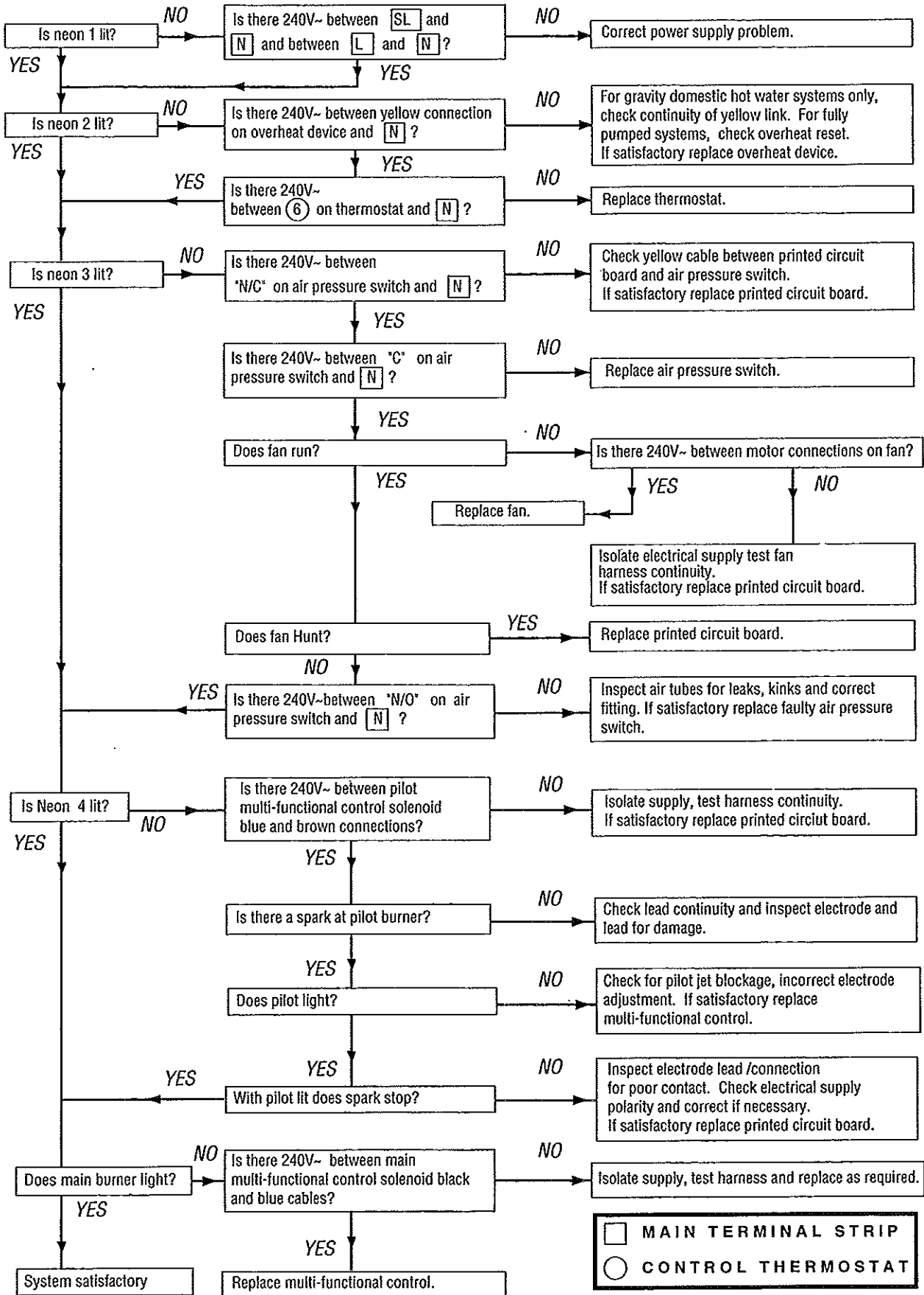


Diagram 9.2

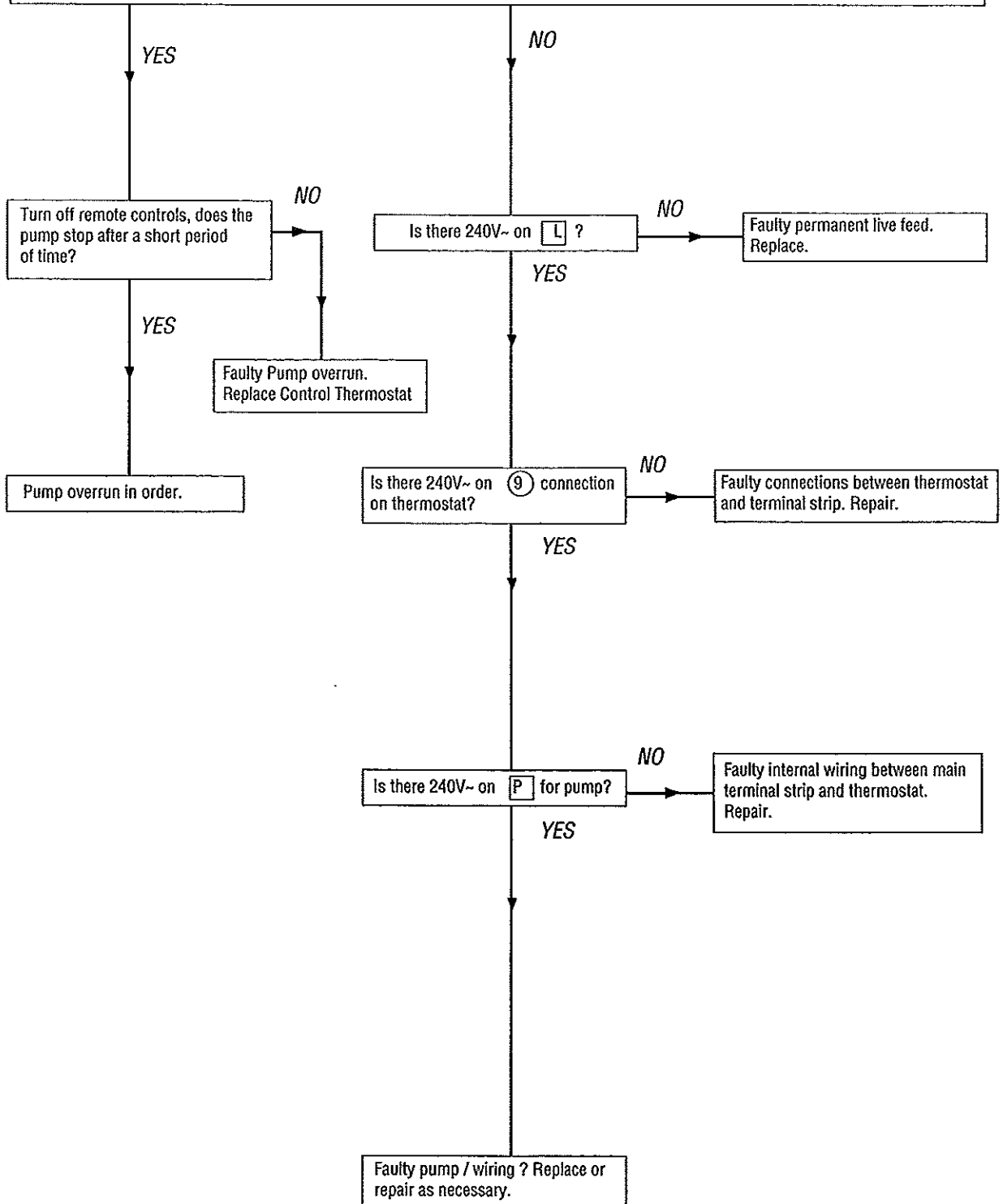
# 9 Fault Finding

## Pump overrun Operation

The Control Thermostat has a pump overrun facility built into it, when the Control Thermostat is set at maximum only, the pump overrun will keep the pump running to allow the boiler to cool down after which it will stop, providing the remote controls are NOT calling for heat.

### Fault Finding

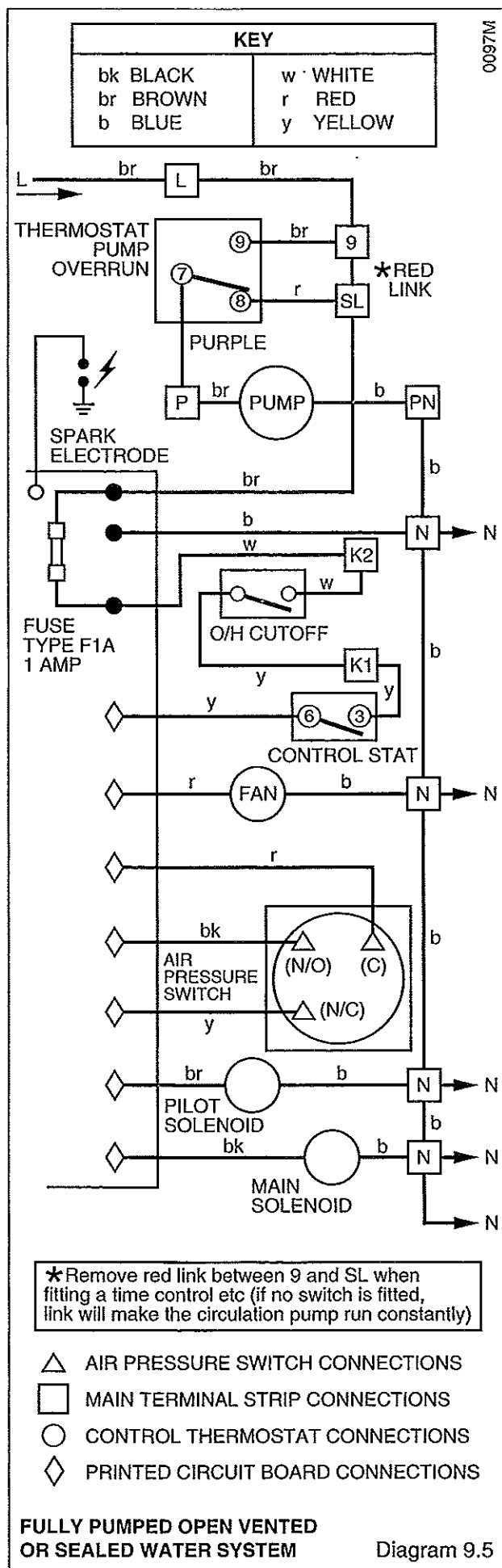
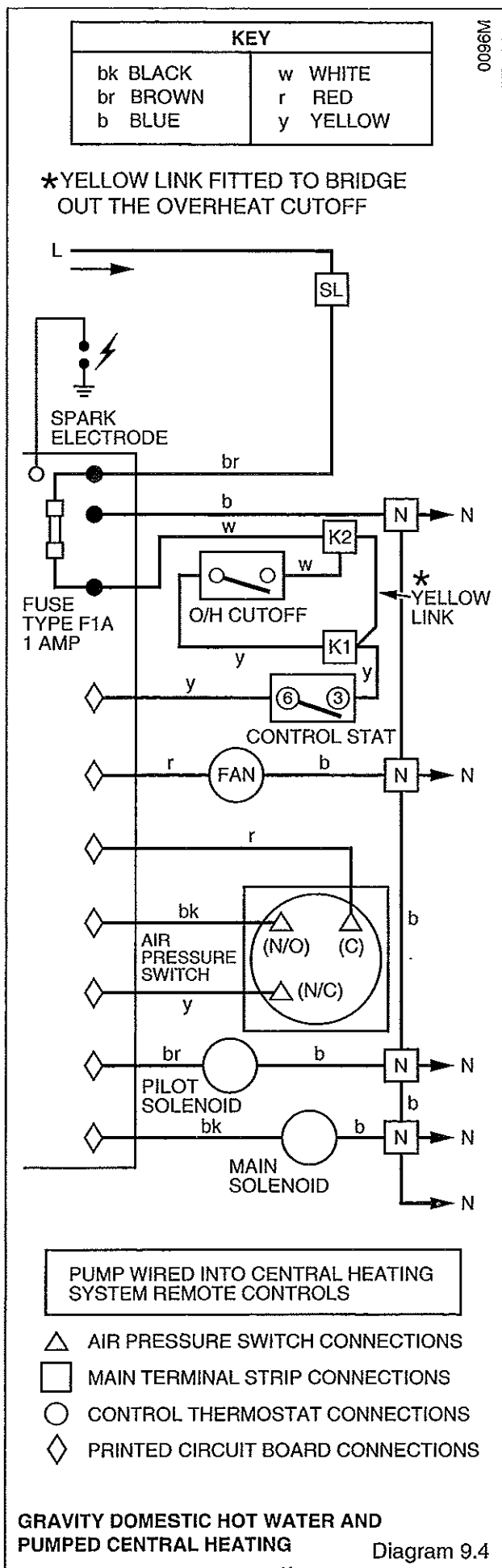
Turn boiler Control Thermostat to maximum, with the remote controls calling for heat, does the pump continue to run after the appliance has shut down on boiler control thermostat?



**FOR FULLY PUMPED OPEN VENTED OR SEALED WATER SYSTEMS ONLY**

Diagram 9.3

# 9 Fault Finding





# 9 Fault Finding

**KEY:**

- b - BLUE
- bk - BLACK
- br - BROWN
- g/y - GREEN/YELLOW
- r - RED
- y - YELLOW
- w - WHITE

**GRAVITY DOMESTIC HOT WATER AND PUMPED CENTRAL HEATING**

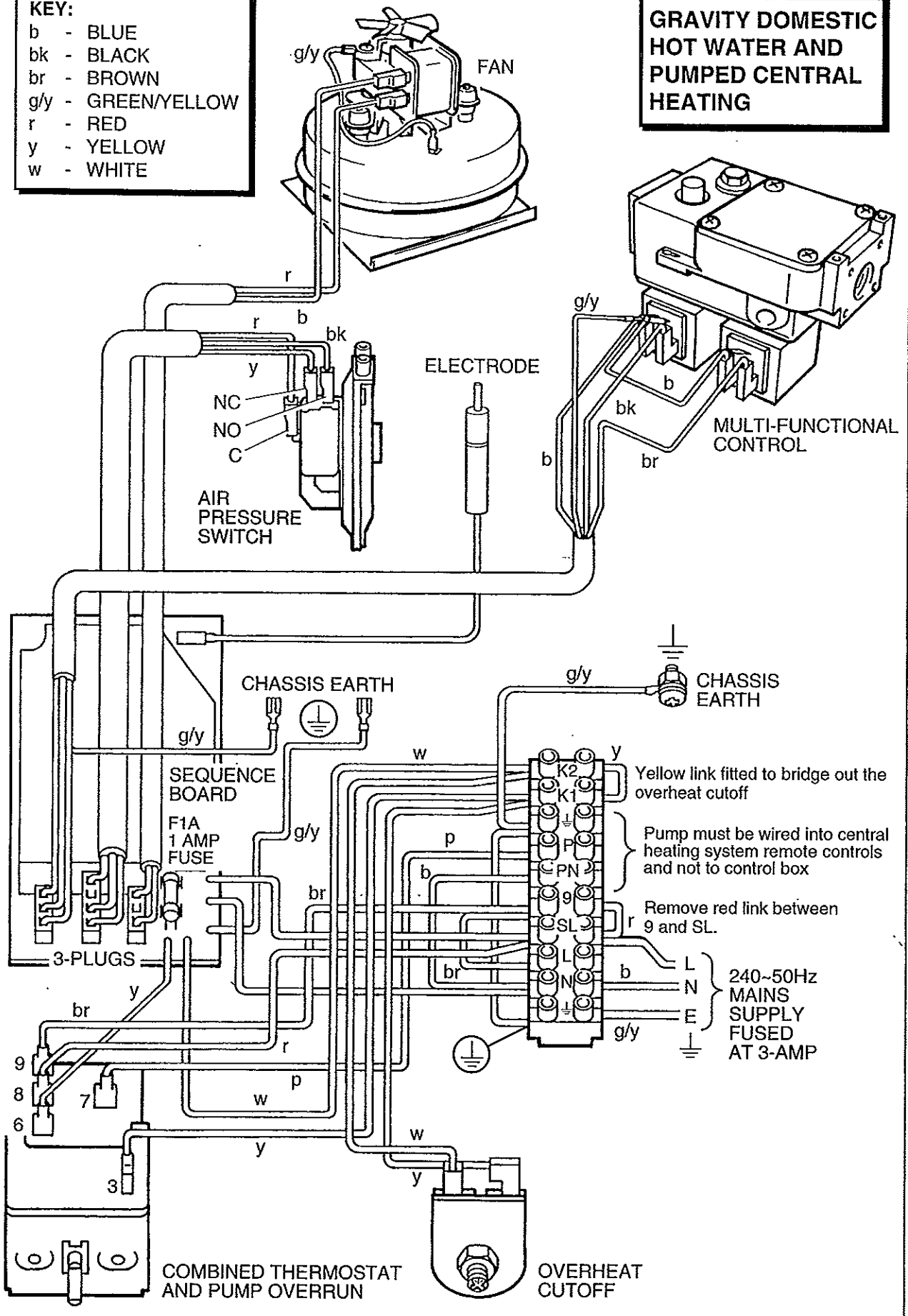


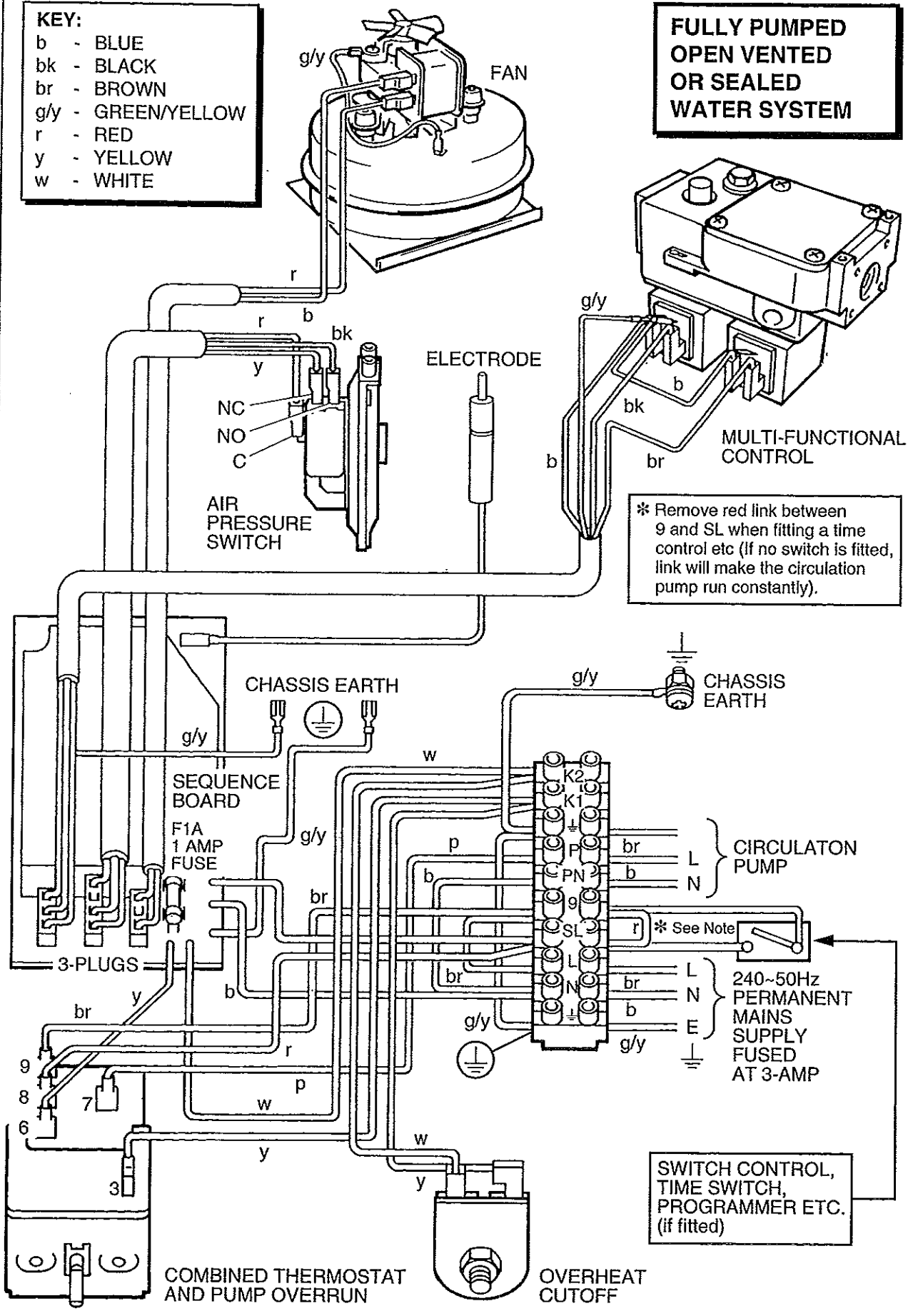
Diagram 9.6

# 9 Fault Finding

**KEY:**

- b - BLUE
- bk - BLACK
- br - BROWN
- g/y - GREEN/YELLOW
- r - RED
- y - YELLOW
- w - WHITE

**FULLY PUMPED  
OPEN VENTED  
OR SEALED  
WATER SYSTEM**



\* Remove red link between 9 and SL when fitting a time control etc (if no switch is fitted, link will make the circulation pump run constantly).

SWITCH CONTROL,  
TIME SWITCH,  
PROGRAMMER ETC.  
(if fitted)

Diagram 9.7

## 10 Replacement of Parts

Note. Replacement of parts must only be carried out by a competent person.

Before replacing any parts isolate the boiler from the electrical supply and turn the gas supply off at the gas service cock, indicator slot to be vertical.

Unless stated otherwise, all parts are replaced in the reverse order to removal.

After replacing any parts always test for gas soundness and if necessary carryout functional check of controls.

### 10.1 Access

Gain Access as Section 8.1.

### 10.2 Control Thermostat/Pump Overrun - diagram 10.1 and 10.2

Remove and support the electrical control box, refer to Section 5.6.

Remove the control knob. Remove the electrical connections from the thermostat body.

Release the thermostat body by unscrewing the two screws and shakeproof washers in the front of the control box.

Remove the split pin and withdraw the thermostat phial from its pocket. Release the capillary from the base and plastic retaining clip then remove it from the split grommet. Release the capillary from its clips. Remove the thermostat complete from the boiler.

Re-assembly note. When fitting the thermostat, make sure that the thermostat phial is covered with heat sink compound and then fully inserted into the phial pocket and that the capillary is within the gland seal, see diagram 10.2. Remake the electrical connections. There must be no kinks or sharp bends in the capillary.

### 10.3 Over Heat Cutoff Device - diagram 10.1 and 10.2

Release the control box as Section.5.6.

Remove the overheat cutoff electrical connections.

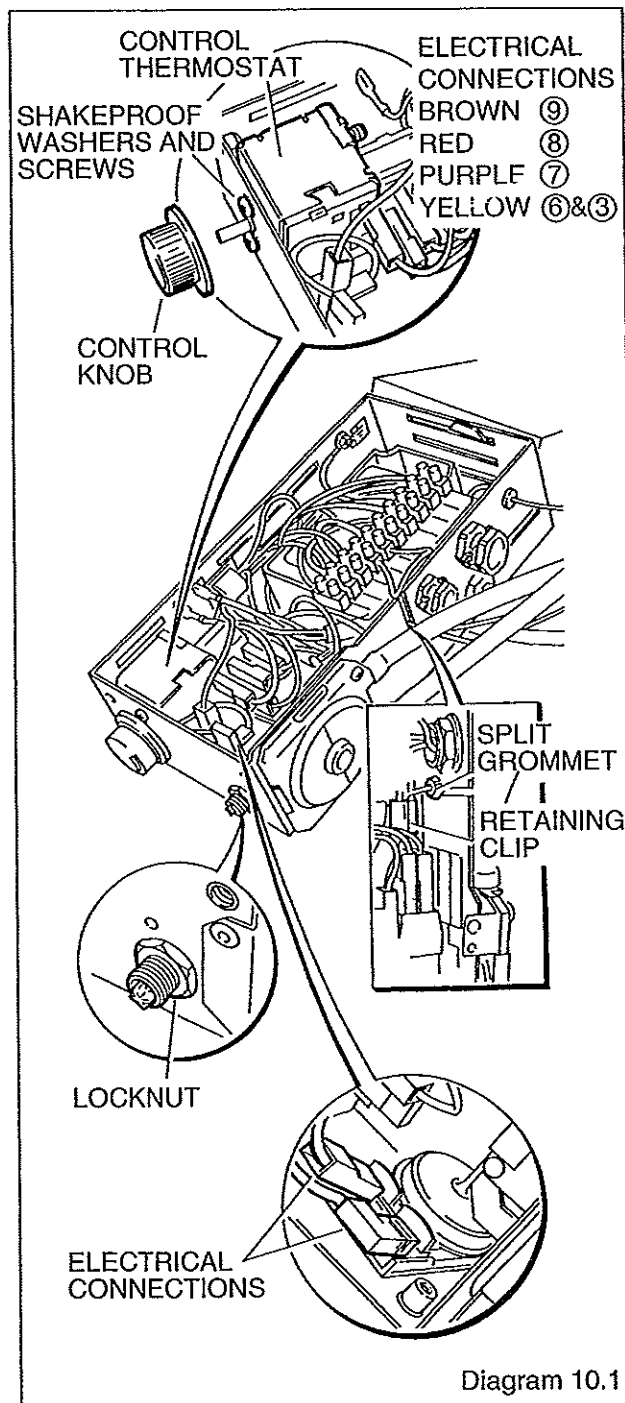
Disconnect the air pressure switch plug from the PCB, see diagram 10.2A.

Remove the locking nut from the overheat cutoff.

Release the capillary from the retaining clips then remove it from the split grommet.

Slacken the bracket and remove the phial from the pipe.

When refitting use the heat sink compound provided and make sure that the phial is correctly fitted into the groove on the pipe.



# 10 Replacement of Parts

## 10.4 Control Board (PCB) diagram 10.2A

Release the control box, refer to Section 5.6.

Disconnect the three electrical plugs and ignition lead.

Release the cables from the plastic retaining clip and disconnect them from the PCB to the main terminal strip, control thermostat and earth connection.

Release the main terminal strip and plastic label.

Carefully pull the board away from its supports.

When refitting refer to wiring diagram 9.6 or 9.7 as appropriate.

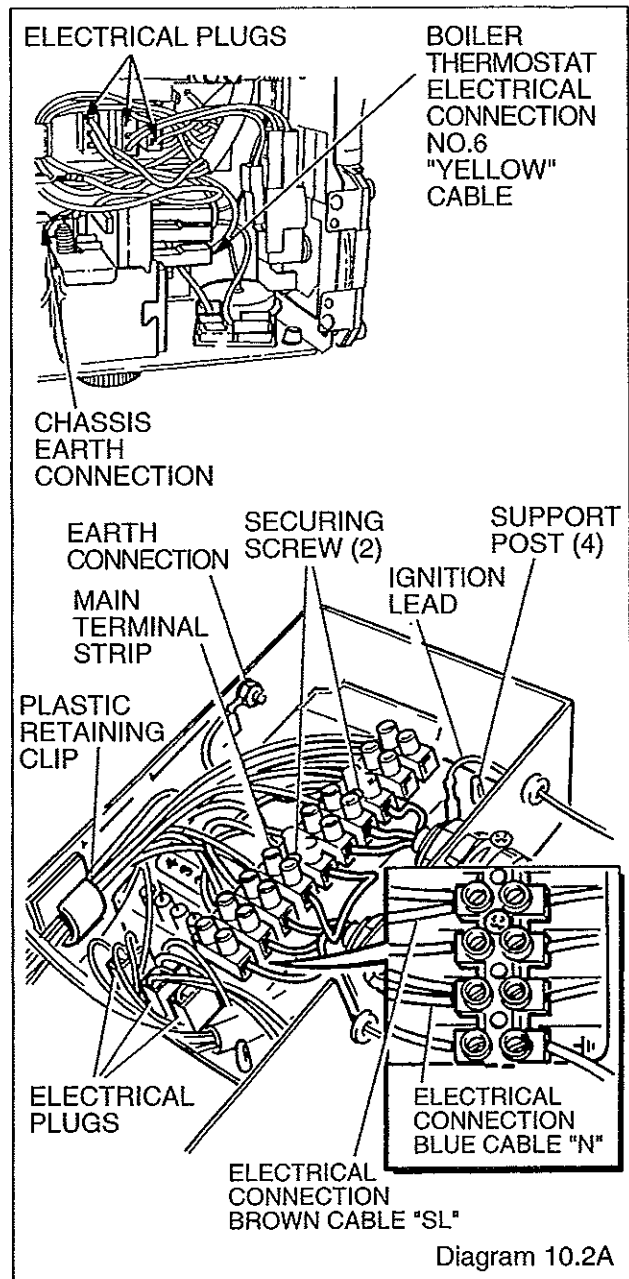
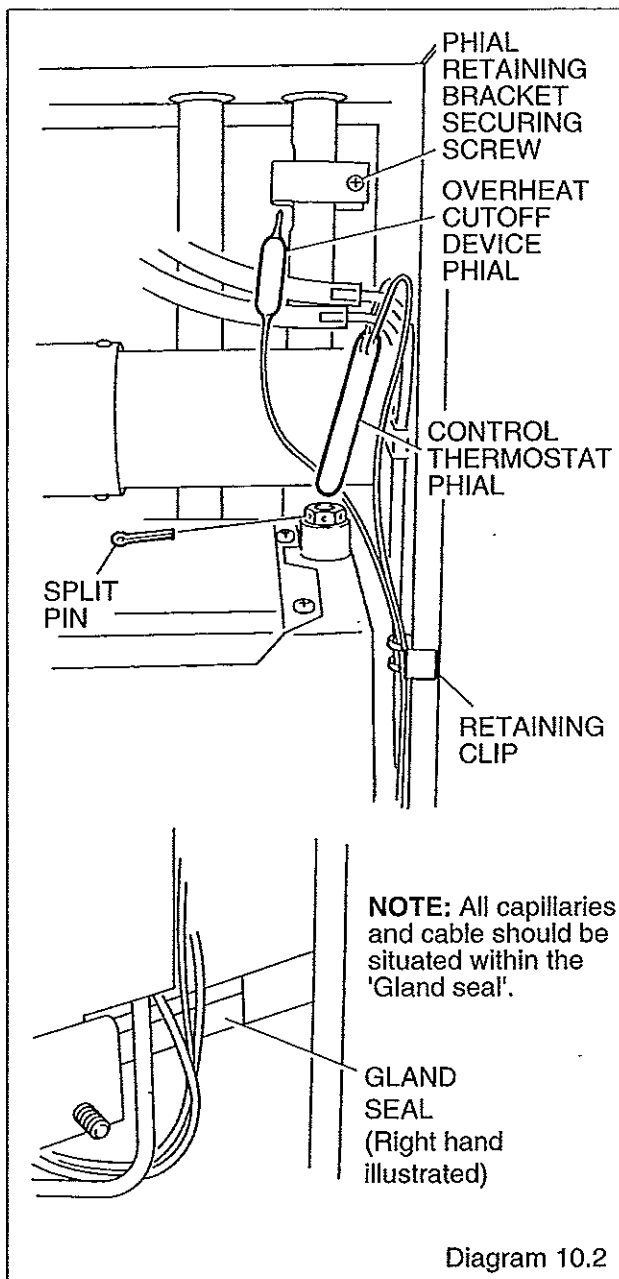
## 10.5 Pilot Burner and Pilot Injector

Proceed as Section 8.3 and 8.5.

## 10.6 Electrode

Proceed as Section 8.3 and 8.5.

Gain access as Section 5.6 to remove lead from control box.



## 10 Replacement of Parts

### 10.7 Multifunctional Control - diagram 10.3

Disconnect the pilot supply by unscrewing the tubing nut at the multifunctional control, take care as there is a restrictor inside the pipe.

Remove the terminal cover from the multifunctional control, secured with two 4BA screws.

Disconnect the electrical connectors.

Support the multifunctional control, remove the four extended screws from the flanged connection at the left and right hand side.

Remove and discard the original "O" rings from the flanged connection and fit the new "O" ring supplied, into recess, before fitting the replacement multifunctional control.

Reassembly note:

To reconnect the electrical leads to the multifunctional control, refer to diagram 9.6 and 9.7.

After assembly test for gas soundness and purge in accordance with the current issue of BS5482 Part 1.

### 10.8 Solenoid - diagram 10.4

With the multifunctional terminal cover removed disconnect the electrical leads, remove the nut and solenoid.

### 10.9 Main Burner

Remove the main burner as Section 8.3.

### 10.10 Main Injector

Remove the main injector as Section 8.4.

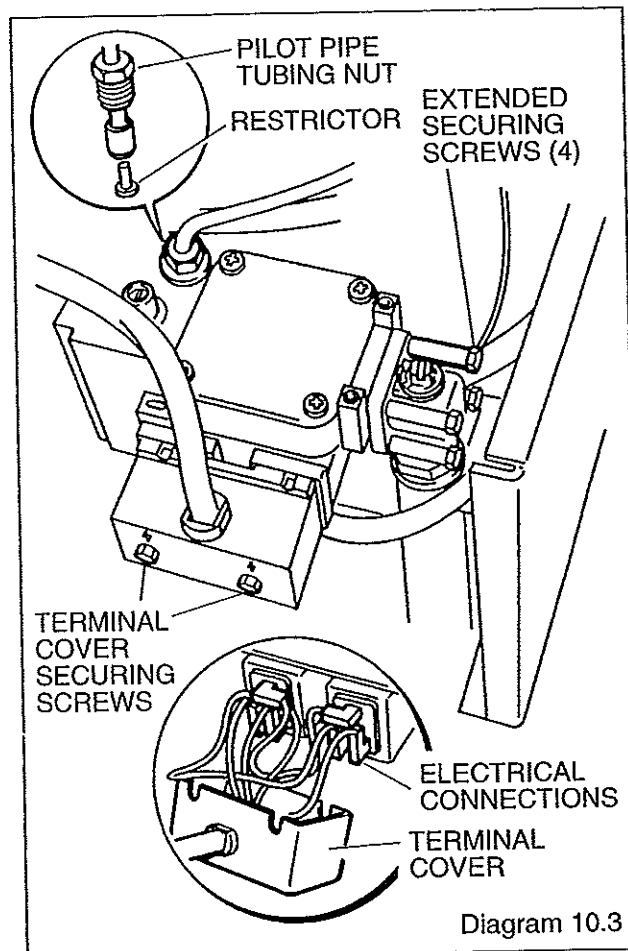


Diagram 10.3

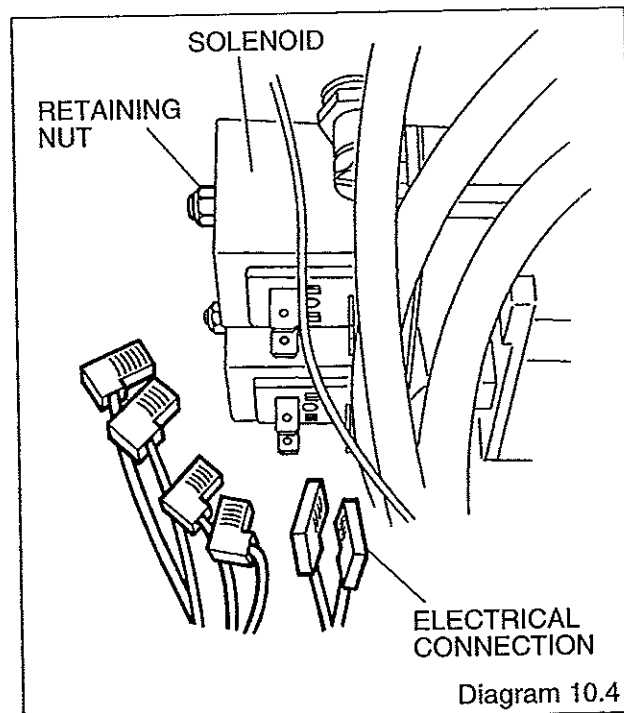


Diagram 10.4

### 10.11 Insulation - diagram 10.5

#### Combustion Chamber Front

Remove the retaining screw then the insulation.

#### Sides

Slide the insulation out.

#### Rear

With the side insulation removed the rear insulation can be removed and replaced.

### 10.12 Viewing Window - diagram 10.6

Remove the push on fixes and then the window.

When replacing take care not to damage the gasket.

### 10.13 Air Pressure Switch - diagram 10.7

Release the control box as Section 5.6.

Remove the air pressure tubes and electrical connections from the PCB, release the screws and remove the switch.

When fitting the replacement make sure that all the plastic tubes and electrical connections are made as shown in diagram 9.6 or 9.7 and 10.7.

### 10.14 Fan - diagram 5.4

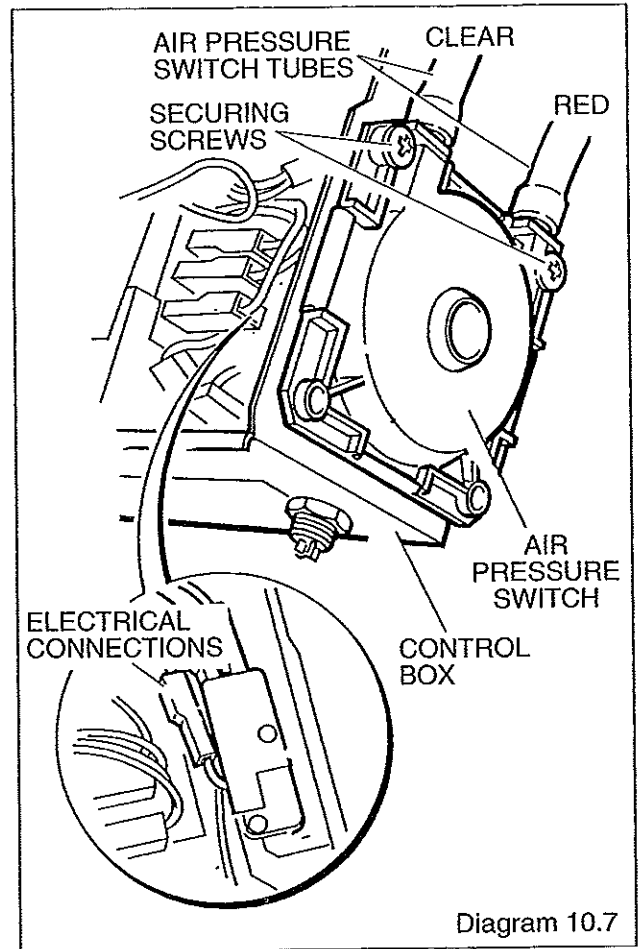
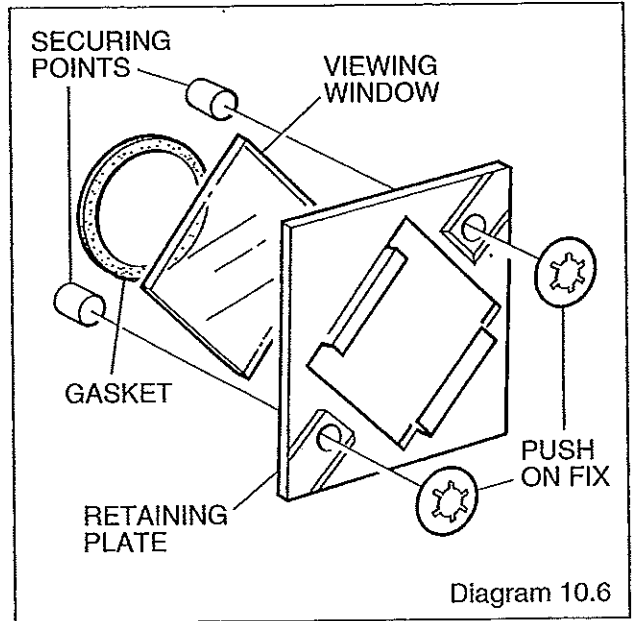
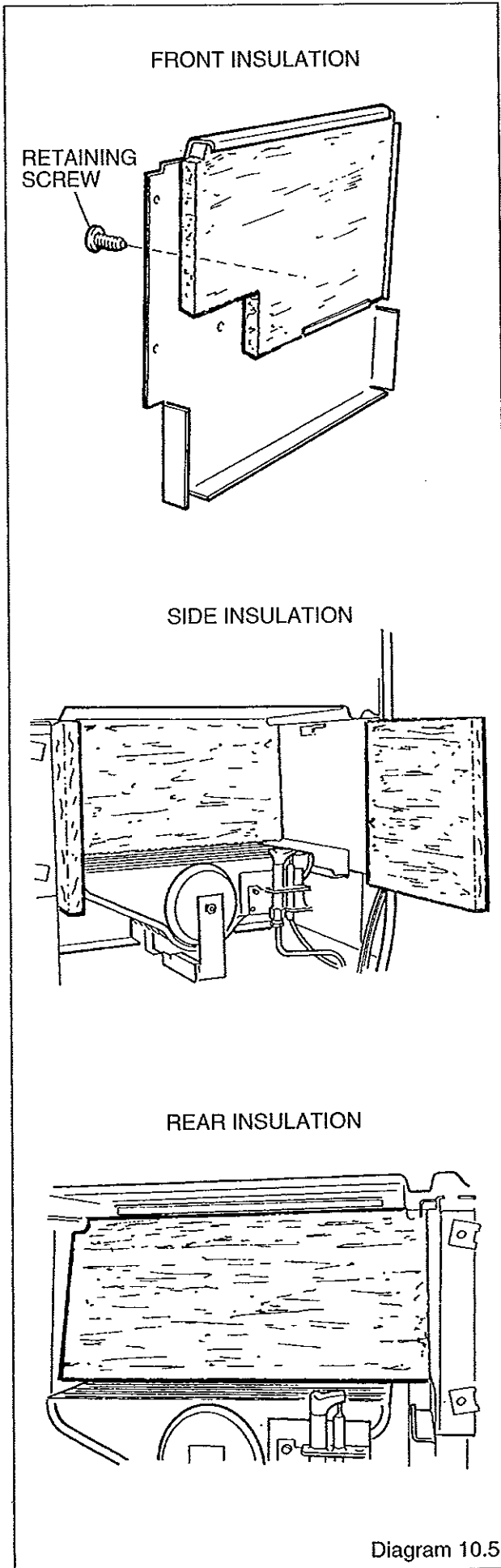
Remove the electrical connections and disconnect the air tubes.

Remove the fan assembly securing screws at the front and slacken those at the rear and withdraw the assembly.

Make sure that the earth connection is remade onto the new fan assembly.

The polarity of the other connections is not important.

# 10 Replacement of Parts



# 11 Spare Parts

## 11.1 Part Identification

The key number on the diagram and the list will help to identify the part.

## 11.2 Ordering

When ordering any spare parts please quote the number and description from the list together with the model name and serial number.

Key No	Part No	Description	
1	800511	Multifunctional control	
2	208040	"O" ring	
3	205723	Injector - 30FF/LP	
3	205720	Injector - 40FF/LP	
3	205719	Injector - 50FF/LP	
3	205721	Injector - 60FF/LP	
4	203431	Pilot burner	
5	411194	Sight glass	
6	446443	Fan assembly - 30FF/LP	
6	446448	Fan assembly - 40FF/LP	
6	446434	Fan assembly - 50FF/LP	
6	446404	Fan assembly - 60FF/LP	
7	202626	Spark electrode and lead	
8	K3580	Clip	
9	202547	Thermostat - control 40FF/LP and 50FF/LP	
9	202552	Thermostat - control 60FF/LP	
10	202201	Air pressure switch	
11	800275	Control knob	
12	202015	Fuse	
13	900817	Control board (PCB)	
14	230347	Thermostat cutoff	



# 11 Spare Parts

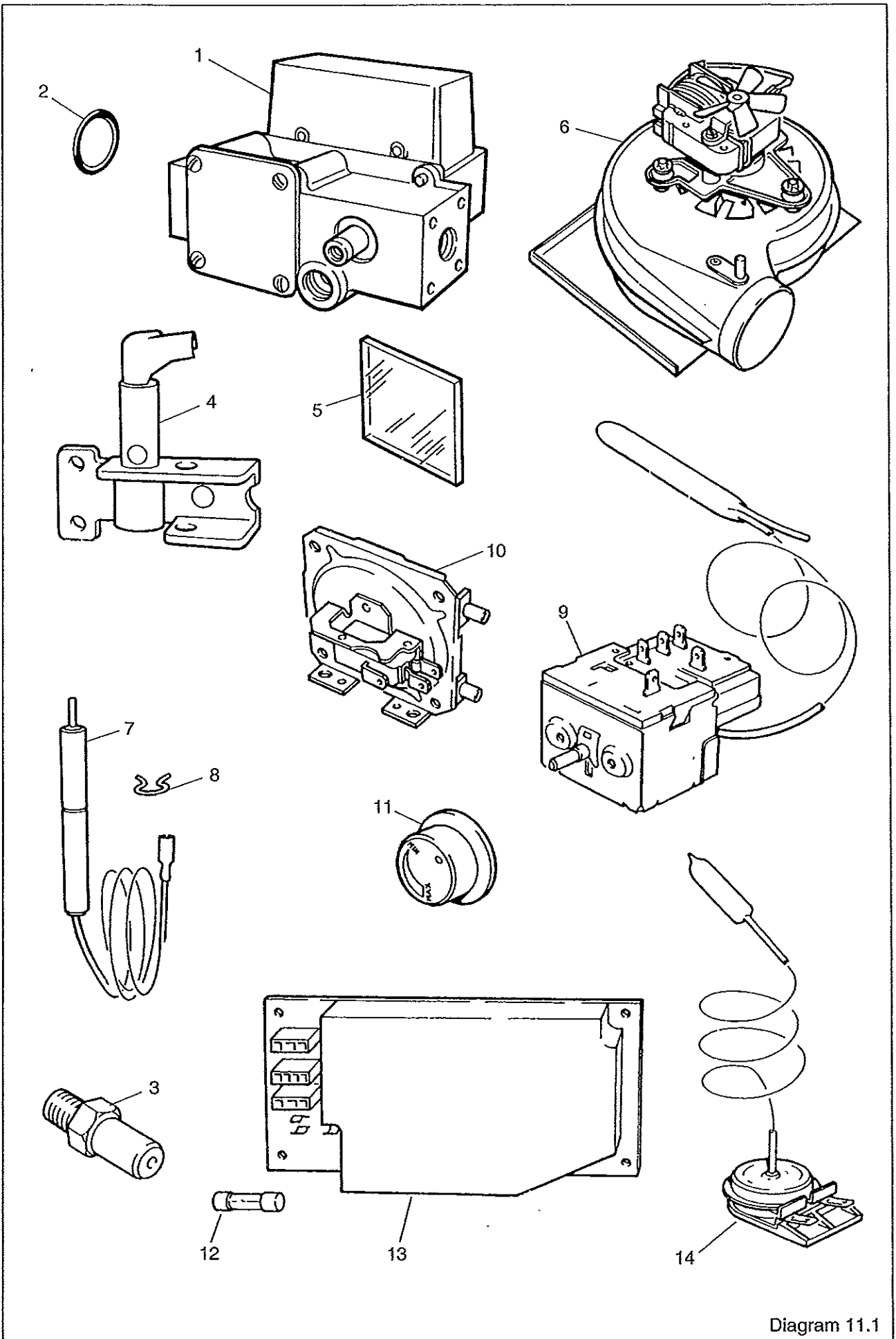


Diagram 11.1



## *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.

### **Ceramic Fibre/Insulation Pads.**

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

If you have a history of skin complaint you may be susceptible to irritation.

High dust levels are usual only if the material is broken.

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

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

### **THERMOSTATS**

These contain very small amounts of "CFC 11" in the 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.

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