

206856/10/88

Glow-worm

Installation and Servicing Instructions

To be left adjacent to the gas meter

FUELSAVER 30BR Mk II

G.C. Number 41 313 72

FUELSAVER 40BR Mk II

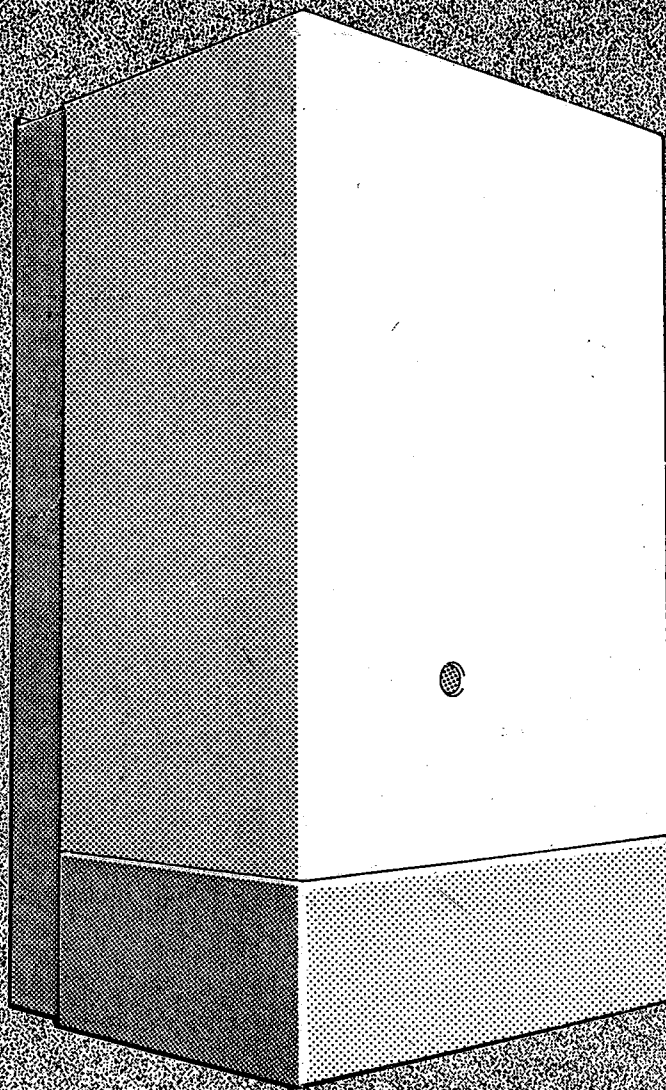
G.C. Number 41 313 73

FUELSAVER 50BR Mk II

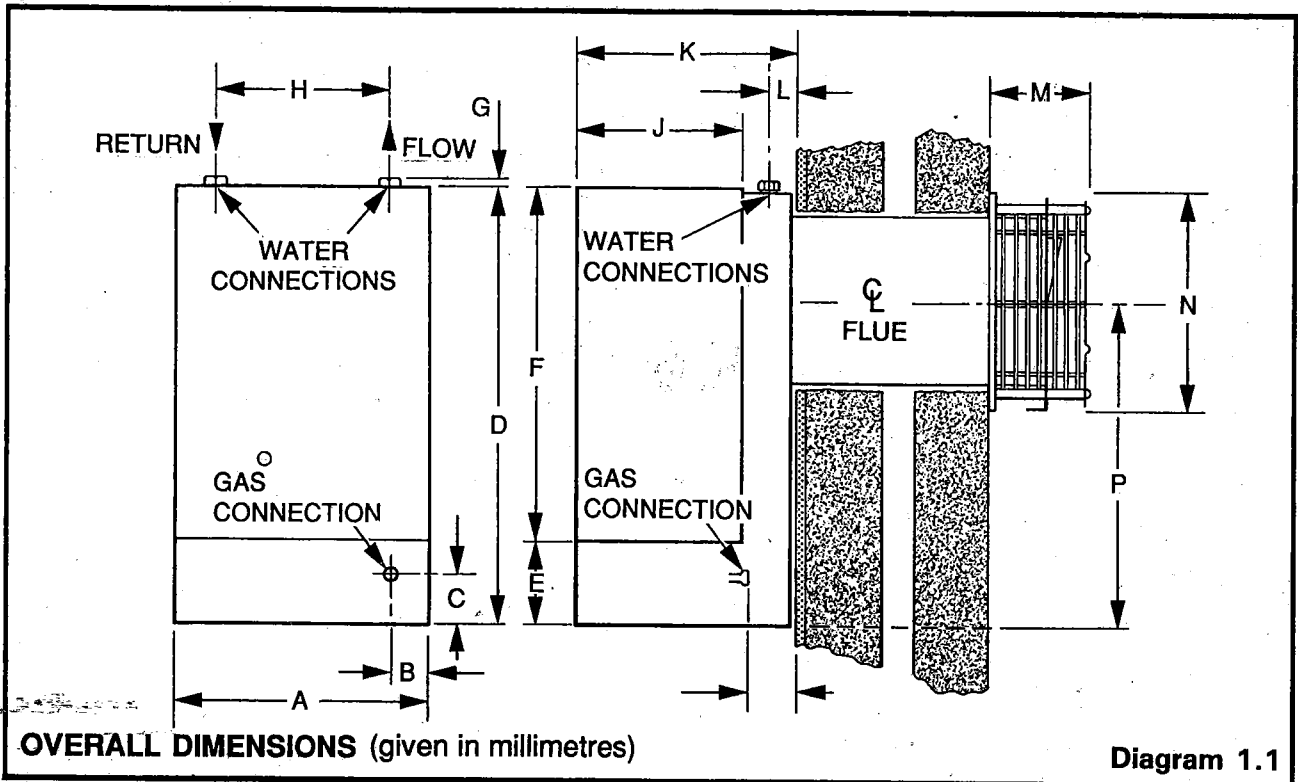
G.C. Number 41 313 74

Balanced Flue Boilers With Honeywell Control

2405



1 GENERAL



MODELS	A	B	C	D	E	F	G	H	J	K	L	M	N	P		
30 BR	278	20	40	600	110	490	11	170	225	300	43	133	320	414		
40BR,50BR	350	36	40	600	110	490	11	242	225	300	43	133	284	434		

1 GENERAL NOTES AND INFORMATION

It is essential that the boiler is installed strictly in accordance with the instructions and information in this booklet.

This boiler is suitable for fully pumped systems only.

IMPORTANT NOTICE

The boiler is for use on natural gas only and cannot be used on any other gas.

SHEET METAL PARTS

When installing or servicing the 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 GAS SAFETY (Installation and Use) REGULATIONS. THE BUILDING REGULATIONS, I.E.E. WIRING REGULATIONS, THE BUILDING STANDARDS (Scotland) REGULATIONS (applicable in Scotland). LOCAL WATER UNDERTAKING BYLAWS.

Detailed recommendations are contained in the current issue of the following British Standard codes of practice: BS6798, BS5440 Parts 1 and 2 BS5546 Part 1, BS5449 Part 1, BS6891

1.2 DATA

Weight - 30BR - 22.6 kg (49.8 lb)
 - 40BR - 27.0 kg (59.5 lb)
 - 50BR - 27.5 kg (60.6 lb)

Water Content - 30BR - 0.45 litre (0.1 gall)
 - 40BR - 0.50 litre (0.11 gall)
 - 50BR - 0.60 litre (0.13 gall)

Gas connection - Rc¹/₂
 Water connection - Rc1
 flow at right
 return at left

Electrical supply - 240V ~ 50Hz fused at 3A
 Data badge -

1.3 RANGE RATING

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

The respective Table 1 gives the ratings and settings.

1.4 B.S.I. CERTIFICATION

The boiler is certificated to British Standard 6332 Part 1 1983, invoking BS5258 Part 1 1986 for performance and safety. It is, therefore, important that no alteration is made to the boiler without permission, in writing, from Glow-worm Ltd.

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

1.5 GAS SUPPLY

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

On completion test the gas installation for soundness and purge in accordance with the above standard.

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 the I.E.E. Wiring Regulations 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 at 3A, maximum. The method of connection should be, preferably, an unswitched shuttered socket outlet and 3 pin (BS1363) plug.

Alternatively, a double pole isolating switch may be used, provided it has a minimum contact separation of 3mm in both poles. The isolator should be clearly marked, showing its purpose. See also Section 1.11.

Cables within the boiler casing must be to BS6500 Table 9 not less than 0.75mm² (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 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, see Section 3 for further details.

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 shall be to BS2879, type 1.

1.10 SAFETY VALVE

Where a safety valve is fitted it should be on the flow pipe, as near to the boiler as possible, there must not be any intervening valve or cock.

The discharge must be clear of any electrical fittings.

Safety valves shall be to BS6759 Part 1.

If applied to a sealed system note the special requirements.

TABLE 1 Glow-worm FUELSAVER 30BR MK II			
	min	medium	max
NOMINAL kW	7.33	—	10.99
HEAT INPUT Btu/h	25,000	—	37,500
NOMINAL kW	5.86	7.33	8.79
HEAT OUTPUT Btu/h	20,000	25,000	30,000
BURNER SETTING m bar	4.7	7.2	10.5
PRESSURE in.w.g.	1.9	2.9	4.2

TABLE 1 Glow-worm FUELSAVER 40BR MK II			
RANGE RATING	Min	Medium	Max
NOMINAL kW	10.99	—	14.65
HEAT INPUT Btu/h	37500	—	50000
NOMINAL kW	8.79	10.26	11.72
HEAT OUTPUT Btu/h	30000	35000	40000
BURNER SETTING m bar	6.1	8.5	11.0
PRESSURE in.w.g.	2.4	3.4	4.4

TABLE 1 Glow-worm FUELSAVER 50 BR MK II			
RANGE RATING	Min	Medium	Max
NOMINAL kW	14.65	—	18.32
HEAT INPUT Btu/h	50000	—	62500
NOMINAL kW	11.72	13.19	14.65
HEAT OUTPUT Btu/h	40000	45000	50000
BURNER SETTING m bar	8.1	10.3	12.6
PRESSURE in.w.g.	3.3	4.1	5.1

1 GENERAL

1.11 LOCATION

This boiler is not suitable for outdoor installation.

The boiler may be installed in any room, although particular attention is drawn to the requirements of the current issue of the I.E.E. Wiring Regulations with respect to the installation of a boiler installed in a room containing a bath or shower. Any electrical switch or boiler control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower. The Electrical Provisions of the Building Standards(Scotland) 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

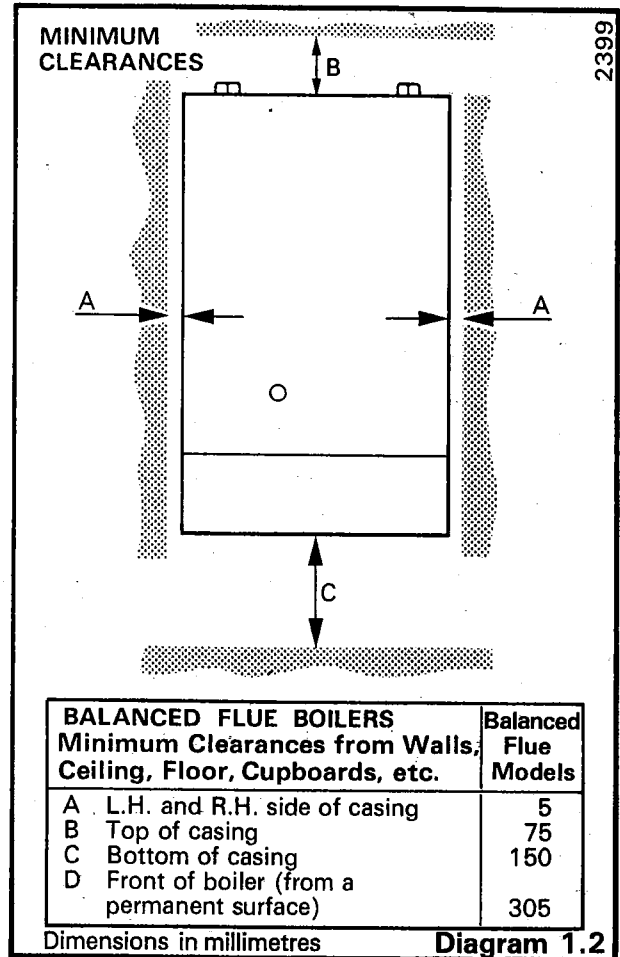
Refer to diagram 1.2.

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.



2.1 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 and aluminium shield 750mm (2ft6in) long should be fitted to the underside and immediately beneath the guttering/eaves.

2.2 TERMINAL PROTECTION

Where the terminal is less than 2m (6ft6in) above the level of any ground, balcony, flat roof etc., to which any person has access and which adjoins the wall in which the terminal is situated the terminal must be protected by a guard of durable material.

Guards are available from: Tower Flue Components Ltd., Tonbridge 351555, quoting reference "A" black, or from Quinnell, Barrett and Quinnell Ltd., 884, Old Kent Road, London SE15, quoting reference type "E".

2.3 WALL THICKNESS

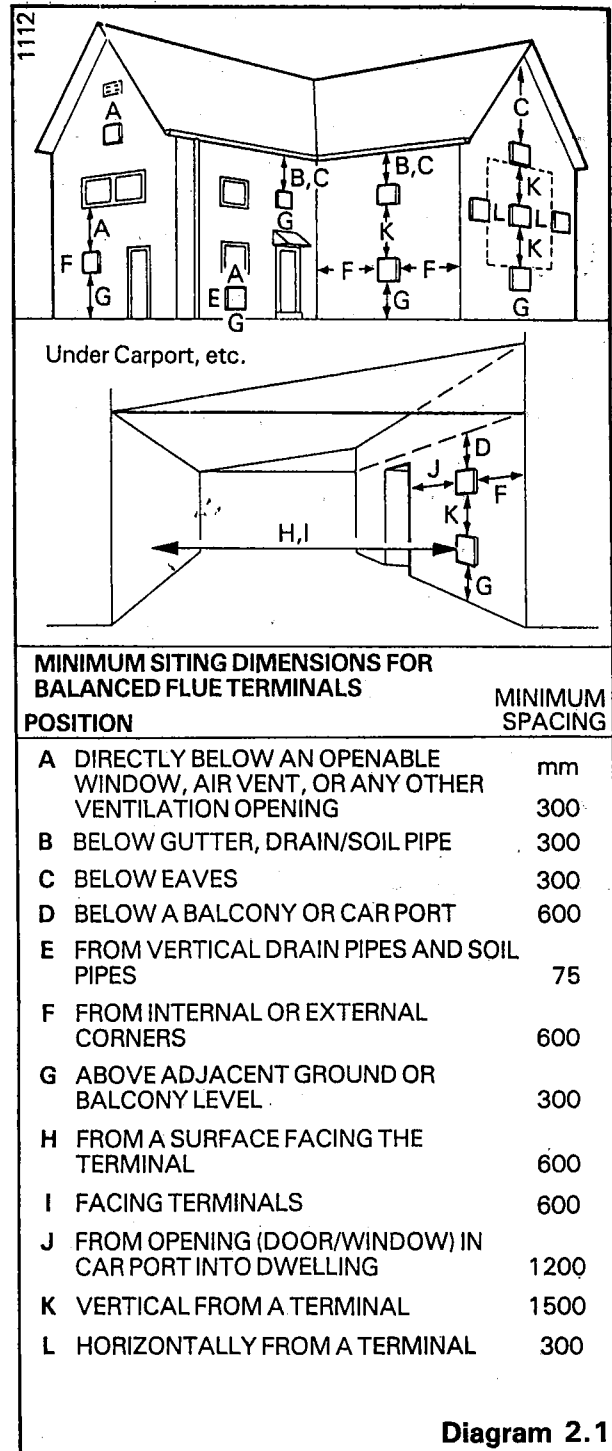
Check the thickness of the wall.

The standard flue set supplied is suitable for wall thickness 238mm to 330mm.

For alternative wall thicknesses, kits are available:

30BR :- 76 to 238mm - kit 416684
324 to 580mm - kit 416677

40BR, 50BR :- 76 to 238mm - kit 406205
324 to 580mm - kit 416193



2 FLUE AND VENTILATION

2.4 BOILERS IN A COMPARTMENT

The compartment, whether modified or specially built, should meet the following requirements:

Have a half hour fire resistance from internal fire. The door must have equal fire resistance.

For good acoustic insulation, should be built of brick or clinker block, plastered on at least one side and supplied with a well fitting door.

Be of sufficient size for access for inspection and servicing. **It must not be used for storage.**

The doorway opening should be 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 the respective Table 2.

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 Glow-worm Ltd.

**TABLE 2
COMPARTMENT AIR VENTS**

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FUELSAVER 30 BR				
VENTILATION REQUIREMENTS	HIGH LEVEL VENT AREA		LOW LEVEL VENT AREA	
FROM ROOM OR SPACE	100 cm ²	(16in ²)	100 cm ²	(16in ²)
FROM OUTSIDE	50 cm ²	(8in ²)	50 cm ²	(8in ²)
FUELSAVER 40 BR				
VENTILATION REQUIREMENTS	HIGH LEVEL VENT AREA		LOW LEVEL VENT AREA	
FROM ROOM OR SPACE	132 cm ²	(20in ²)	132 cm ²	(20in ²)
FROM OUTSIDE	66 cm ²	(10in ²)	66 cm ²	(10in ²)
FUELSAVER 50 BR				
VENTILATION REQUIREMENTS	HIGH LEVEL VENT AREA		LOW LEVEL VENT AREA	
FROM ROOM OR SPACE	165 cm ²	(26in ²)	165 cm ²	(26in ²)
FROM OUTSIDE	83 cm ²	(13in ²)	83 cm ²	(13in ²)

3 WATER SYSTEMS

Notes:

PUMP

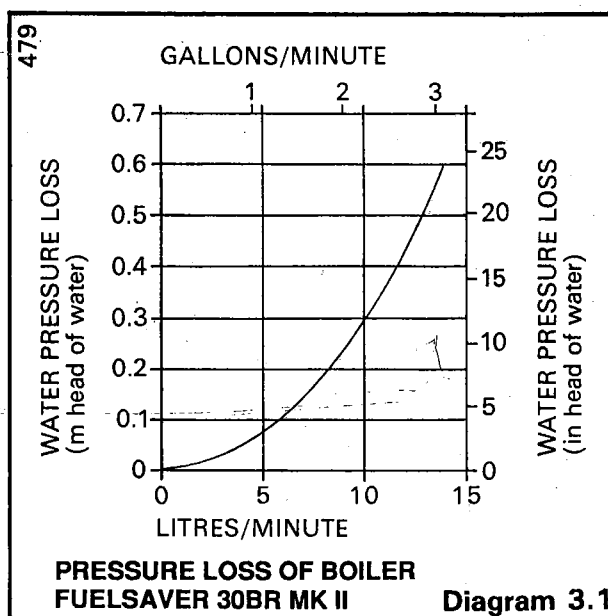
The pump should be fitted in the flow pipework from the boiler it should produce at least 2.5m (8ft) head and a flow, through the boiler, of 11.5litre/min (2.5gall/min) at a temperature difference across the boiler of 11°C (20°F).

See diagram 3.1 (30BR), 3.2 (40BR, 50BR) for pressure loss across the boiler.

High resistance microbore systems may require a higher duty pump.

BYPASS

The flow through the boiler must not be allowed to fall below 30BR 7.8litre/min (1.7gall/min) 40BR 10.5 litre/min (2.3gall/min) 50BR 13.2 litre/min (2.9 gall/min) whilst the burner is alight. A bypass must be fitted, see diagram 3.4.



OPEN (VENTED) SYSTEMS

3.1 WATER SYSTEM

For an open(vented) system the boiler must be supplied from an unrestricted water supply taken from a feed and expansion tank (minimum 22litre(5gall) capacity situated at a maximum height of 27.5metre (90 ft) 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 3.3.

3.2 CYLINDER

The hot water cylinder must be a double feed (fully indirect) type. Single feed (self priming) cylinders are not recommended.

3.3 INHIBITOR

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

Where installing a Fuelsaver boiler in an existing system take special care to drain the entire system including radiators, then thoroughly flush out before installing the boiler and adding the inhibitor.

SEALED WATER SYSTEMS

The installation should comply with the appropriate requirements of BS5449 Part 1 and BS6798, see diagram 3.4 for layout.

All valves and fittings must be suitable for use on sealed systems.

3.4 SAFETY VALVE

A safety valve must be fitted in a sealed system.

The safety valve must conform to BS6759 Part 1 and be fitted to the requirements of BS6798.

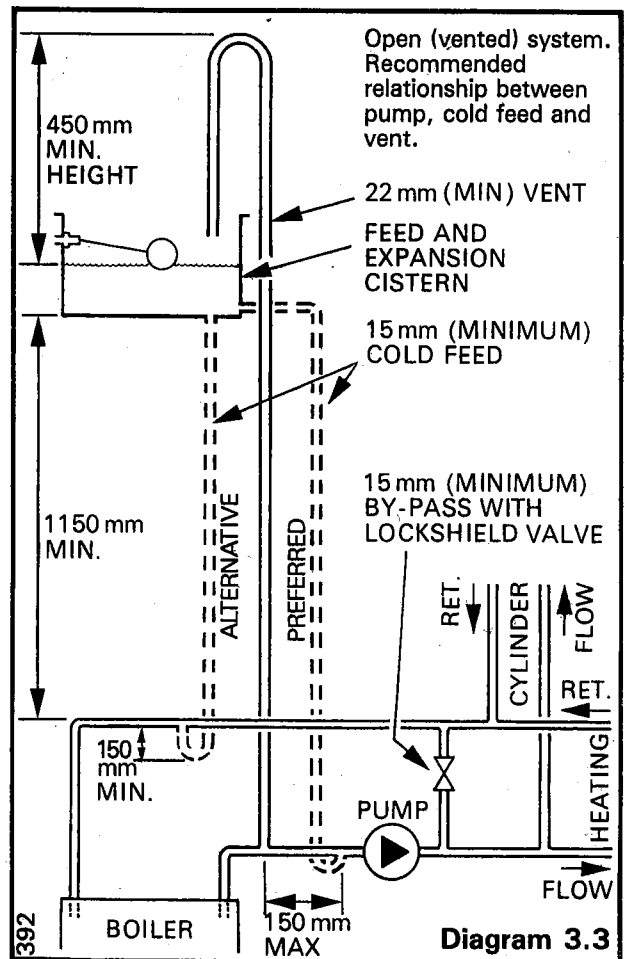
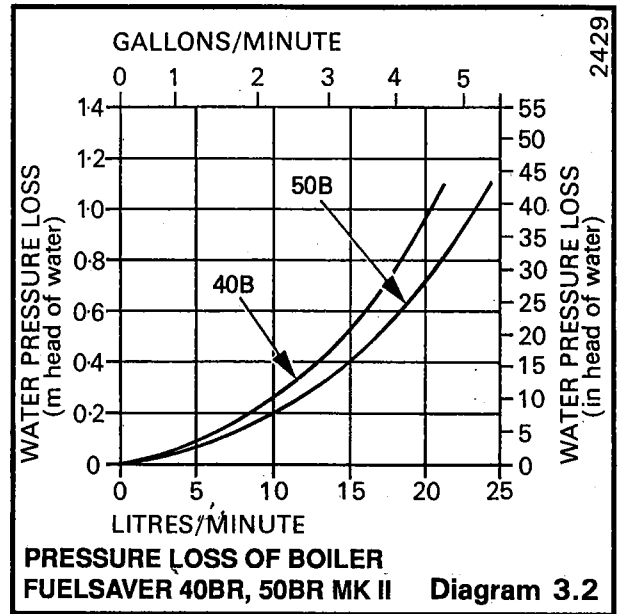
3.5 EXPANSION VESSEL

A diaphragm type expansion vessel, conforming to BS4814 must be connected at a point close to the inlet side of the circulating pump, see diagram 3.4 or as laid down by the manufacturer.

The expansion vessel must suit the volume of water in the system, see BS5449 Part 1 clause 25 for details. The charge pressure must not be less than static head i.e. the height of the highest point of the system ABOVE the expansion vessel.

The expansion vessel should have sufficient capacity to accept the volume change when the water is heated from 10°C to 110°C. Refer to BS5449 Part 1 for specific details.

The water capacity is given in Section 1.



3 WATER SYSTEMS

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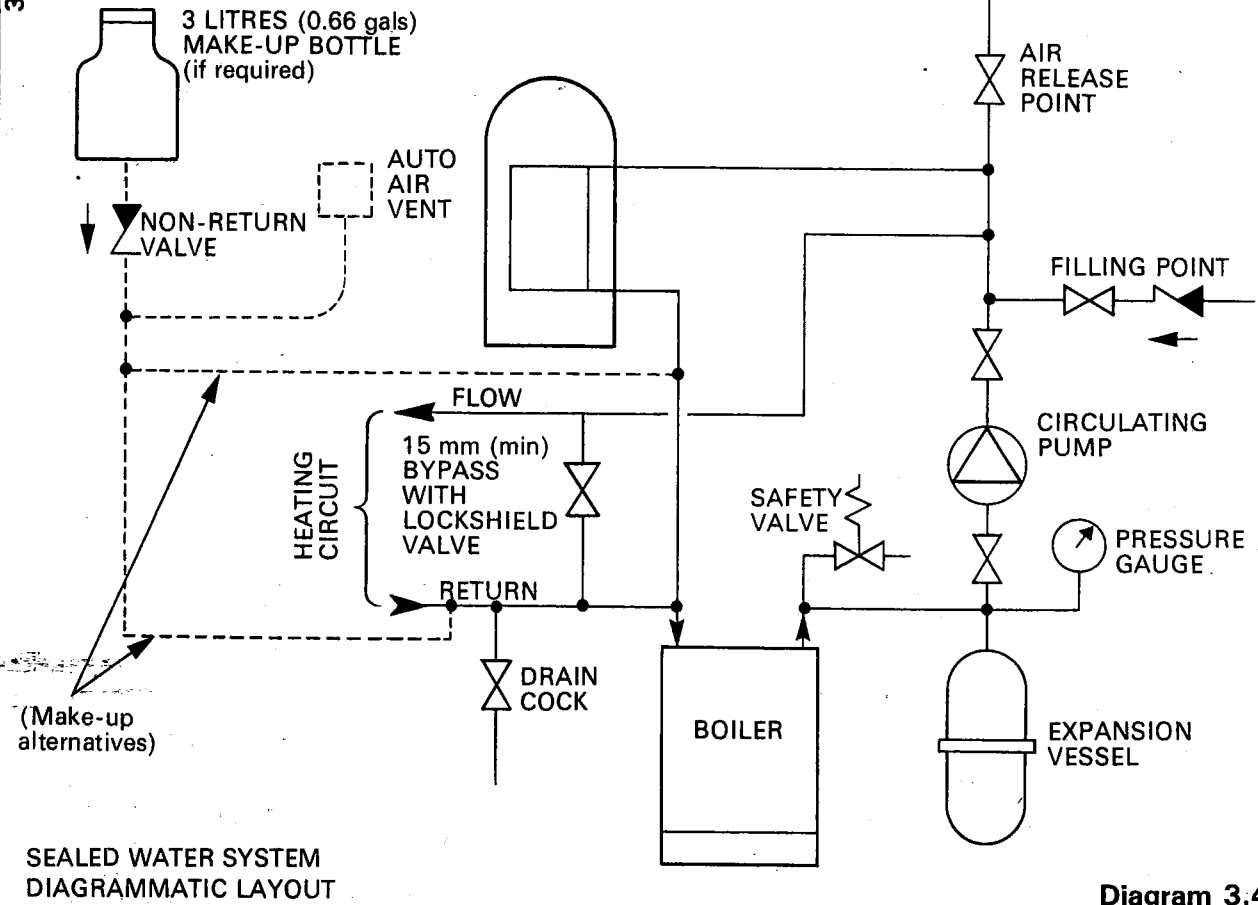


Diagram 3.4

3.6 PRESSURE GAUGE

A pressure gauge with set pointer and covering at least the range 0 to 4bar (0 to 60lb/in²) shall be permanently fitted to the system in a position where it can be seen when carrying out the filling operation.

3.7 CYLINDER

The hot water cylinder must either be of the indirect coil type or a direct cylinder fitted with an immersion calorifier. They must be suitable for working at a gauge pressure of 0.35bar above the safety valve setting.

SINGLE FEED INDIRECT CYLINDERS ARE NOT SUITABLE.

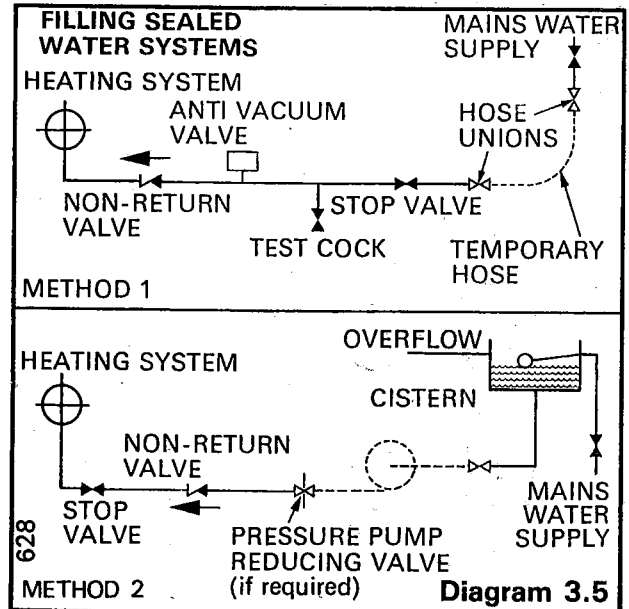
3.8 WATER MAKE-UP

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.

Where access to a make up vessel would be difficult make-up can be provided by pressurising the system, as below.

3.9 MAINS CONNECTION

There must be no connection to the mains water supply or to a water storage cistern supplying domestic water, even through a non-return valve, without the approval of the local water undertaking.



3.10 FILLING

The system must be fitted with a filling point at low level.

Two methods of filling are shown in diagram 3.5.

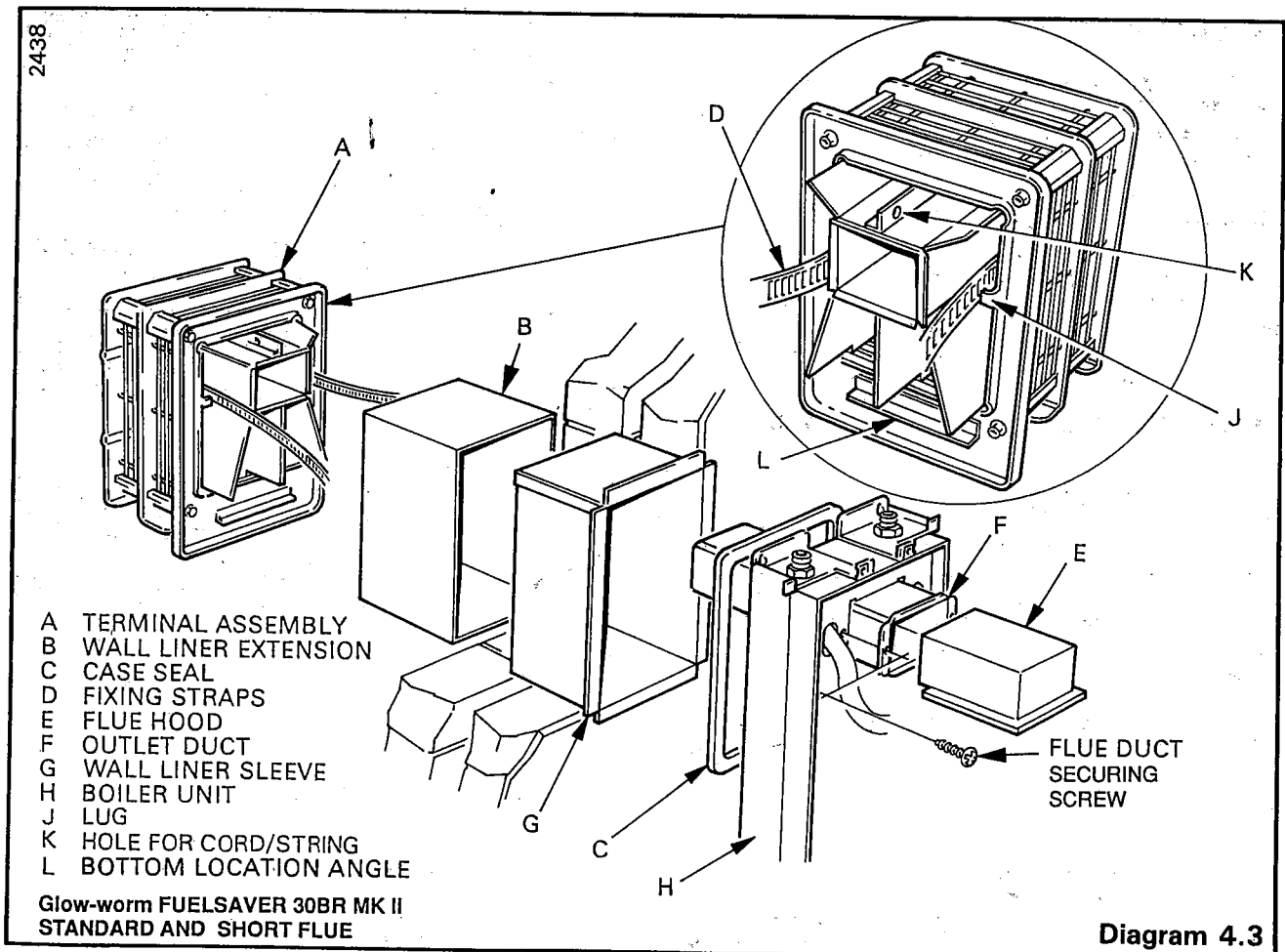
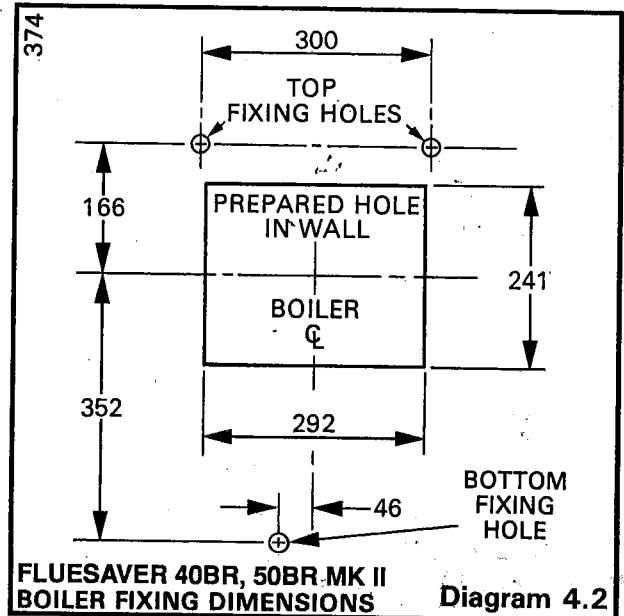
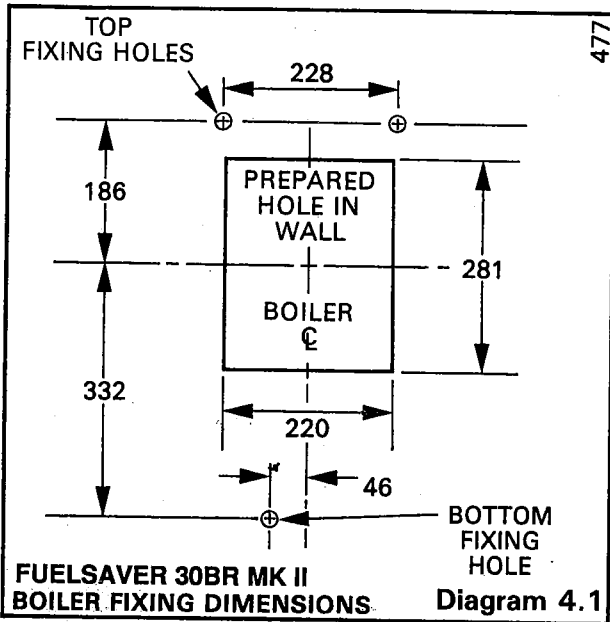
Method 1 may only be used if approved by the local water undertaking.

4.1 POSITIONING

Place the template, provided, on the wall in the required position and mark location of the balanced flue hole, see diagram 2.1.

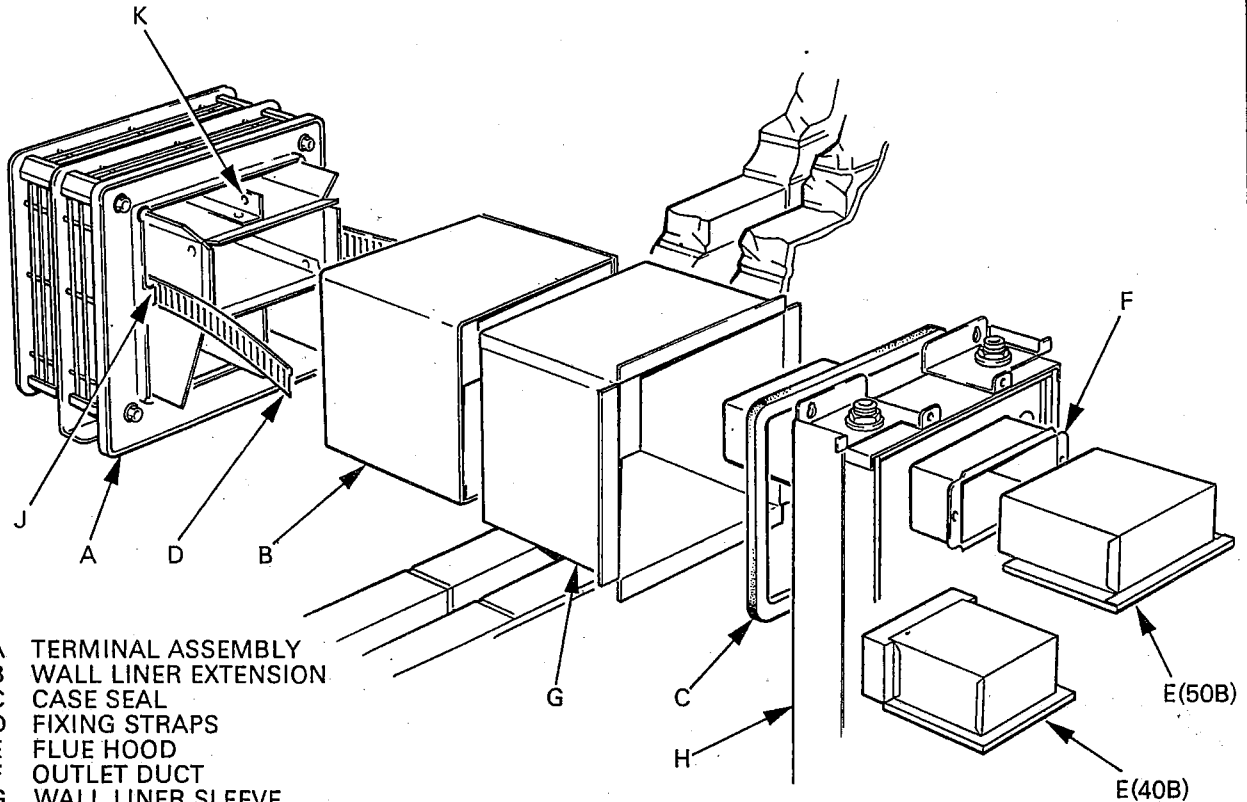
Cut the hole in the wall to accept the wall liner, see diagram 4.1 (30BR), 4.2 (40BR, 50BR).

Make good any plasterwork at this stage. When dry, select the liner "G", see diagram 4.3 (30BR), 4.4 (40BR, 50BR). Push into the hole until the flange is flush with the internal wall. Fit the liner "B" from inside so that it is flush with the outside brickwork. Mark the two liner positions and remove. Align the marks on the liners and tape them together with the tape provided.



4 FLUE AND APPLIANCE PREPARATION

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- A TERMINAL ASSEMBLY
- B WALL LINER EXTENSION
- C CASE SEAL
- D FIXING STRAPS
- E FLUE HOOD
- F OUTLET DUCT
- G WALL LINER SLEEVE
- H BOILER UNIT
- J LUG
- K HOLE FOR CORD/STRING

STANDARD AND SHORT FLUE
Glow-worm FUELSAVER 40BR, 50BR MK II

Diagram 4.4

The wall liner "B" is not required for wall thickness less than length of duct "G" on the short flue set. For lesser wall thickness than duct "G" cut the plain end to required length.

Reposition the template on the wall in line with the wall opening, or see diagram 4.1 (30BR), 4.2 (40BR, 50BR).

Mark positions for the three fixing screws.

Drill and plug the fixing holes, suitable for No10x50mm wood screws and plugs.

4.2 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 4.5.

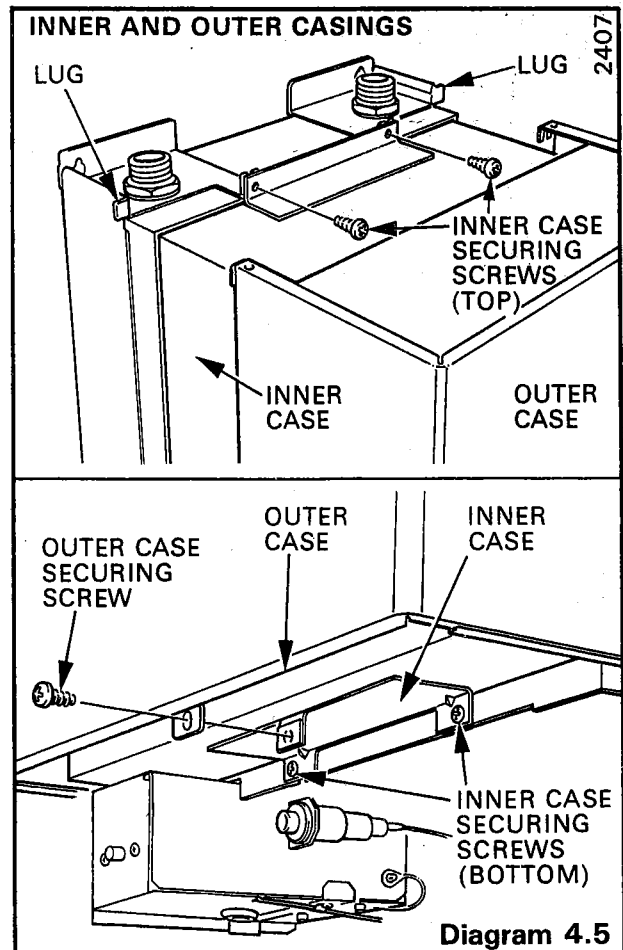
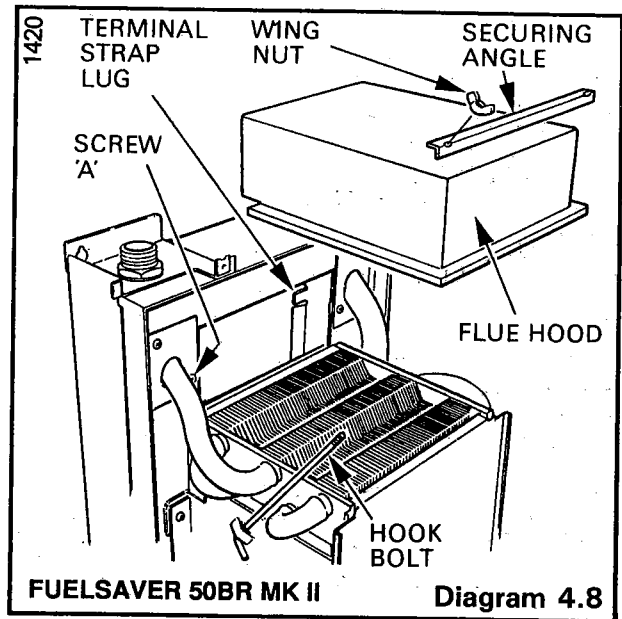
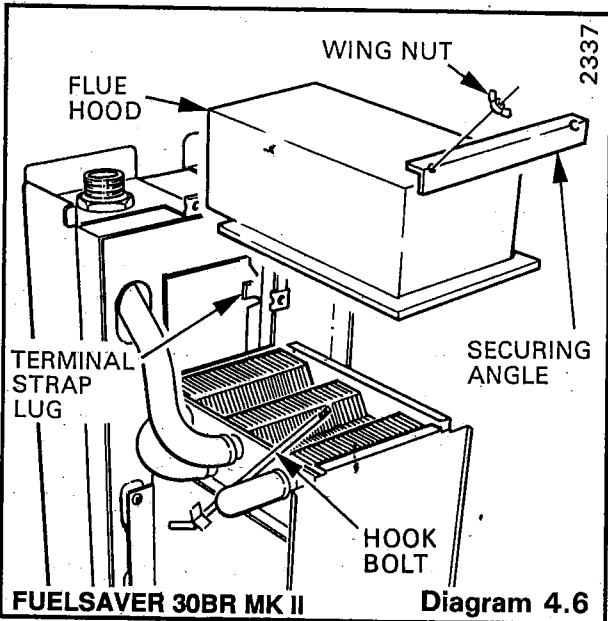
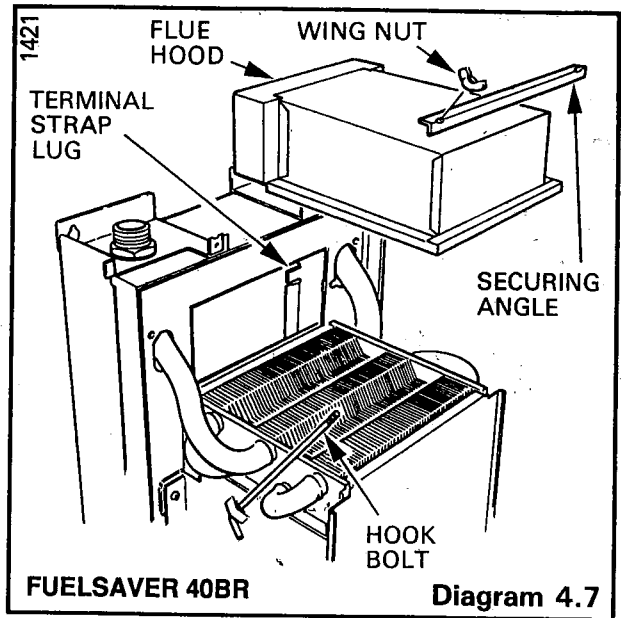


Diagram 4.5

Remove the flue hood by releasing the wingnuts and remove angle, see diagram 4.6 (30BR), 4.7 (40BR), 4.8 (50BR). Lift off flue hood. Remove the two flue duct screws.

Fit sponge seal "C" around the spigot at the back of the boiler, adhesive face to the back of the case "H", see diagram 4.3 (30BR), 4.4 (40BR), 50BR).

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



5. INSTALLATION

5.1 EXTERNAL ACCESS PROCEDURE

Fit the slotted straps "D" to the terminal "A" by placing over the lugs and then bending the lugs to secure, see diagram 4.3 (30BR), 4.4 (40BR, 50BR).

From the inside fit the wall liner assembly "B" and "G" into the hole.

Fit the top two fixing screws, allow them to stand proud to accept the keyhole fixing slots on the boiler.

Mount the boiler and tighten the top screws and fit bottom screw.

Locate and support the terminal note, TOP is marked, see diagram 4.3 (30BR), 4.4 (40BR, 50BR).

An alternative method of support is to attach a length of cord or string etc., to the terminal through the small hole in the top centre of the baffle, see diagram 4.3 (30BR), 4.4 (40BR, 50BR). Attach a suitable weight to the free end of the cord etc. Pass the weight and cord through the hole in the wall.

Working from the inside, attach the straps to the lugs on the boiler, see diagram 4.6 (30BR), 4.7 (40BR), 4.8 (50BR), bend the lugs and cut off excess strap length.

Push the flue duct "F" into the terminal with the unflanged end against the terminal. Ensure that the lower flange duct "F" fits behind the combustion chamber rear panel. For walls less than 230mm thick cut to required length at the plain end of the duct.

Refit the two screws through the duct flange, but do not over tighten.

Replace flue hood, securing angle, tie rods and wing nuts.

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

5.2 INTERNAL ACCESS PROCEDURE

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

Fit the slotted straps "D" to the terminal "A" by placing over the lugs and then bending the lugs to secure, see diagram 4.3 (30BR), 4.4 (40BR, 50BR).

Fit the top two fixing screws, allow them to stand proud to accept the keyhole fixing slots on the boiler.

Attach a length of cord to the terminal through the small hole provided in the top centre of the baffle.

Fit the liner assembly "B" and "G" into the hole through the wall.

Pass the terminal through the wall liner assembly, using the cord with a suitable weight attached to hold the terminal in position. NOTE, the terminal TOP is indicated and the flange on the wall plate is to be located inside the wall liner assembly.

Hook the appliance onto the screws passing the string and weight through the air duct in the back of the appliance.

Tighten the two upper screws and fit the bottom screw.

Attach the two slotted straps from the terminal to the two lugs on the appliance, see diagram bend lugs to secure. Cut off excess strap length and remove cord.

Push the flue duct "F" into the terminal with the unflanged end against the terminal. Ensure that the lower flange duct "F" fits behind the combustion chamber rear panel. For walls less than 230mm thick cut to required length at the plain end of the duct.

Refit the two screws through the duct flange, but do not overtighten.

Sealing plates are not fitted to the 30BR and 40BR models.

Replace flue hood, securing angle, tie rods and wing nuts.

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

5.3 INSTALLING THE LONG FLUE SET

Refer to diagram(s) 5.1 (30BR), 5.2 (40BR, 50BR).

The flue duct "F", flue duct extension "K" and flue duct sleeve "J" need to be assembled together to suit wall thickness.

This assembly is 75mm longer than the wall liner assembly "B" and "G" already prepared, with a minimum overlap of 40mm at each joint. Use the tape provided to make a permanent assembly of these parts.

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

Refit the two screws through the duct flange, but do not over tighten.

Replace the flue hood, securing angle, tie rods and wing nuts, do not overtighten.

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

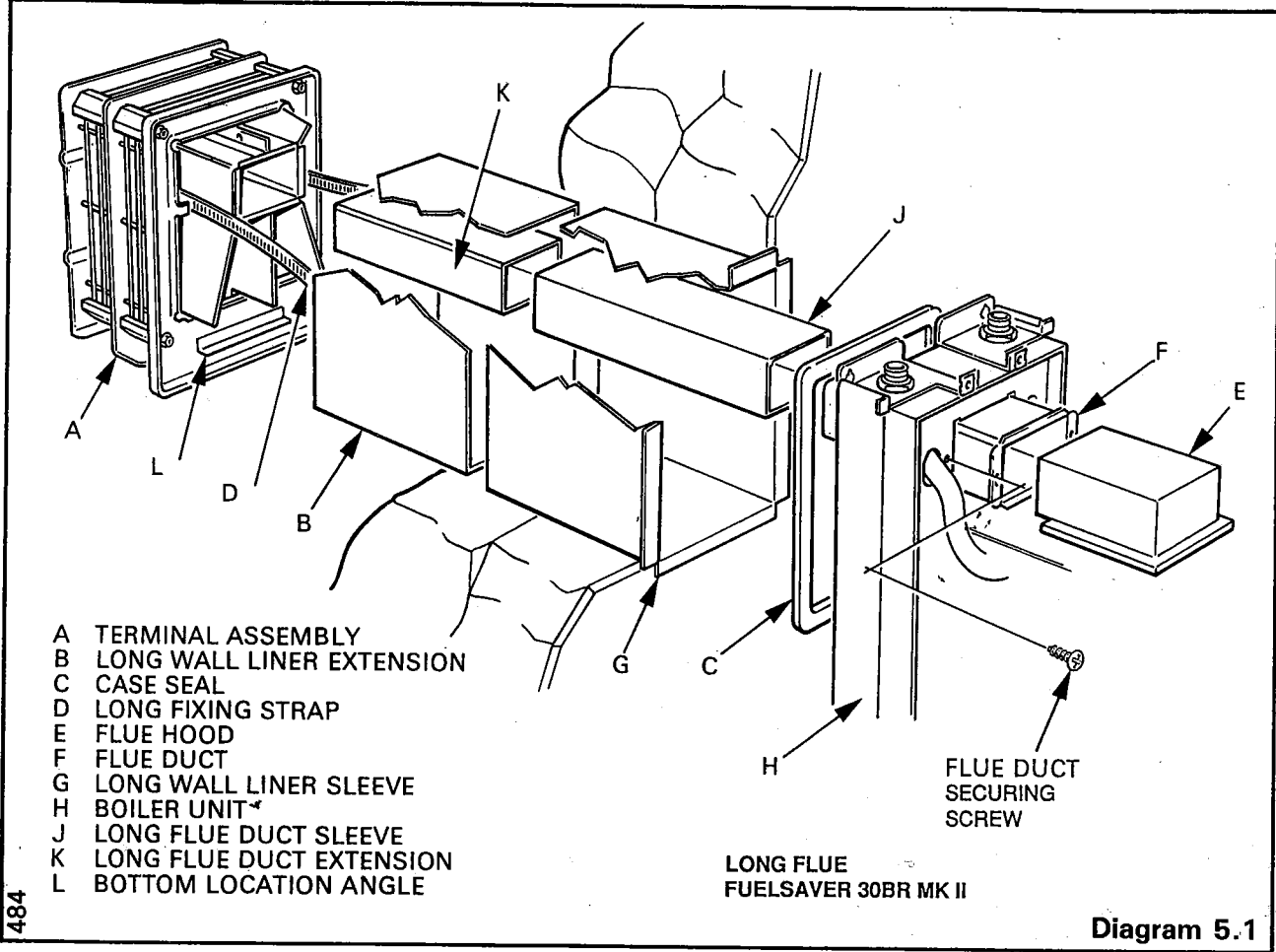


Diagram 5.1

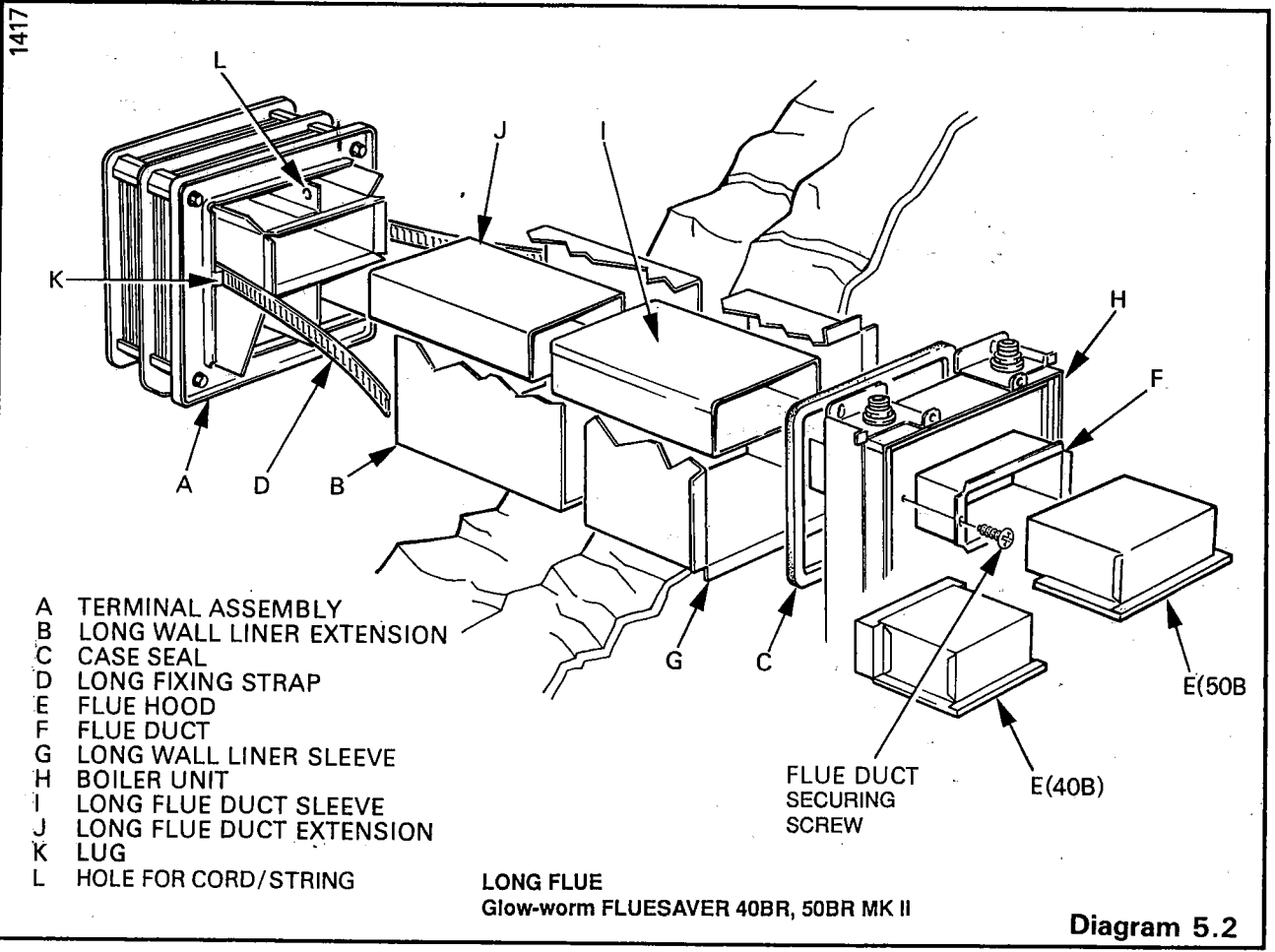


Diagram 5.2

6 GAS AND WATER CONNECTON

Connect the gas supply to the Rc¹/₂ gas cock.

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

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

7 ELECTRICAL WIRING

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 7.1, 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 centre bottom grommet in the rear of the controls cover, through the clamp and connect to the terminal strip, see diagrams 7.1 and 7.2.

When making connections, ensure that the earth conductor is made longer than the others so that it is the last to become disconnected.

7.2 PUMP CONNECTION

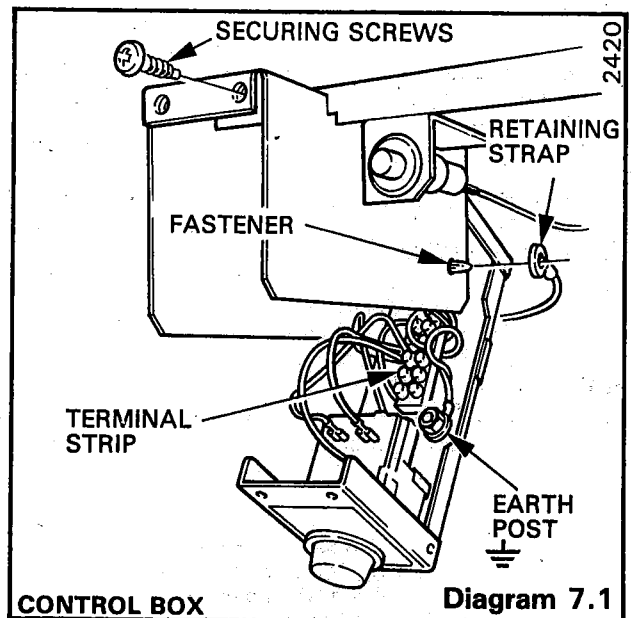
The pump must be wired into the boiler control box as shown in diagram 7.2.

Any external controls must only be wired to interrupt the Red link between terminals 9 and S.L.

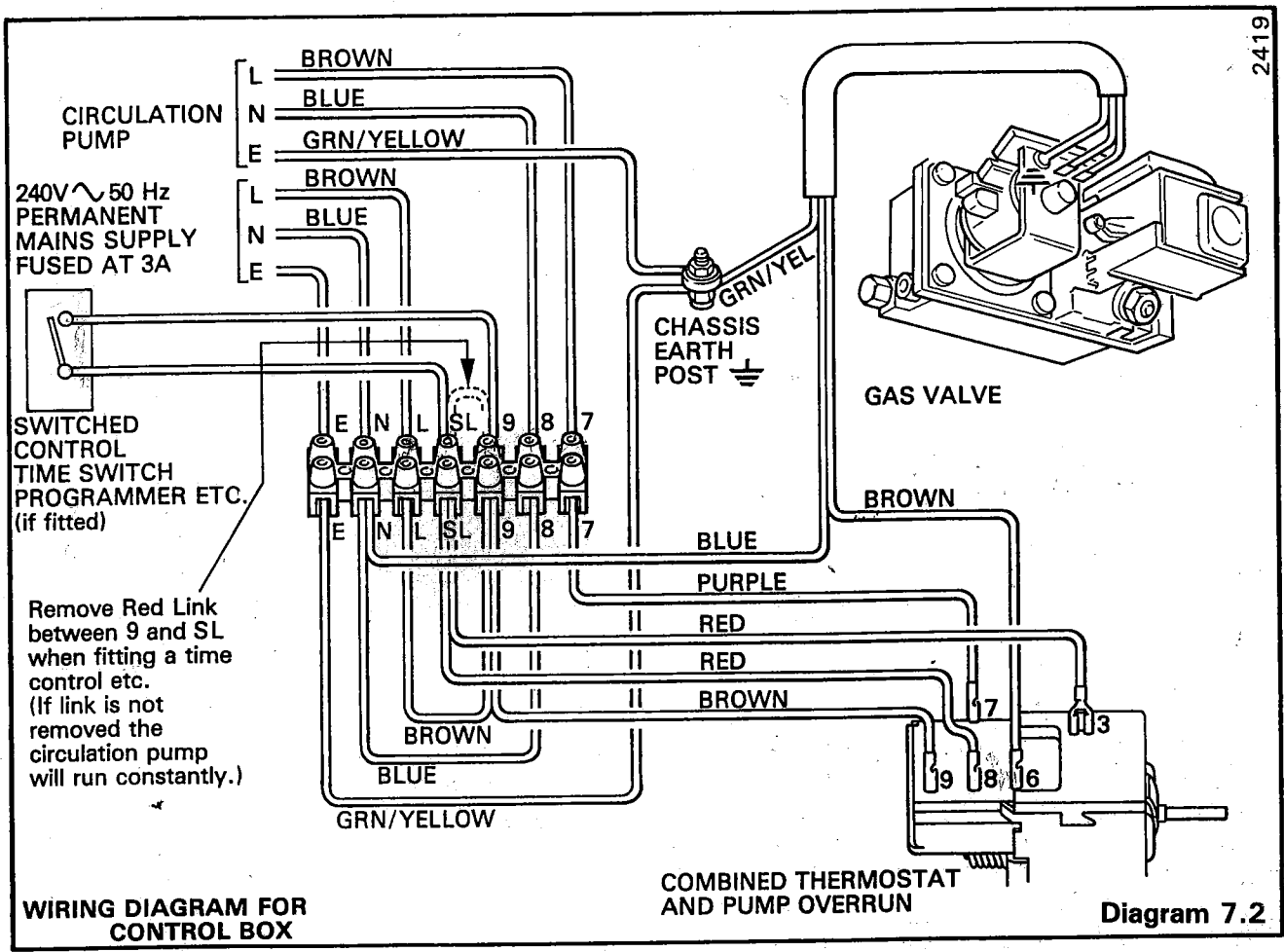
7.3 TESTING

In the event of an electrical fault after installation preliminary system checks must be carried out, i.e., earth continuity, polarity and resistance to earth.

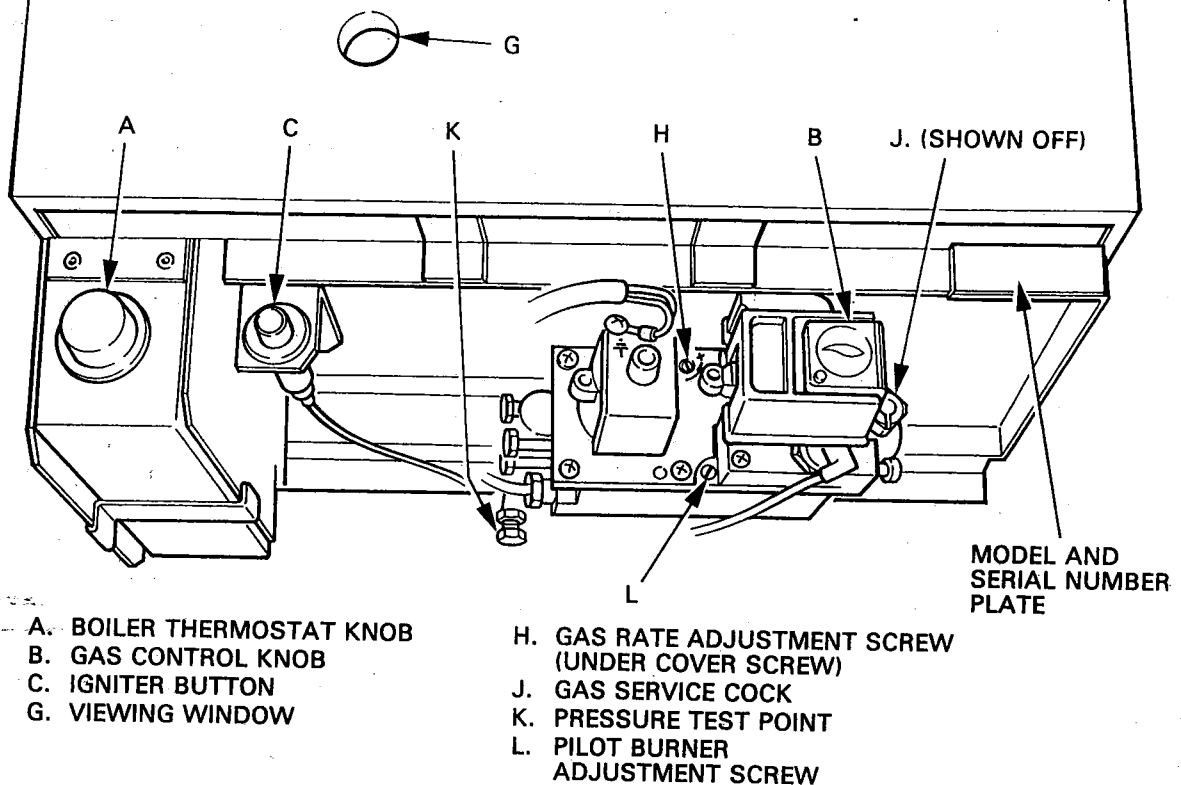
7.4 The installer is requested to advise and give guidance to the user of the controls scheme used with the boiler.



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BOILER COMPONENTS

Diagram 8.1

8.1 ALL SYSTEMS

Ensure 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 duty.

8.2 SEALED SYSTEMS ONLY

Flush the whole system with cold water without the pump in place. Refit the pump and fill until the pressure gauge registers 1.5bar (21.5lbf/in²). 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 (± 4.3 lbf/in²) of the preset pressure. Where this is not possible conduct a manual check and test.

Release cold water to initial system design pressure.

Any 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 4.5.

Identify the control by reference to diagram 8.1.

Turn boiler thermostat to "O" the off position.

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

Turn the electrical supply on and check that the pump is circulating water through the unit.

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

Turn on the main gas supply and purge in accordance with 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 approximately 15 seconds. If the pilot burner fails to light or 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 'L' having first removed the gas valve cover, see diagram 8.1. Test pilot supply connections for gas soundness with a suitable leak detection fluid.

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 knob "A" between "MIN" and "MAX" and check that the burner lights smoothly. Check the gas connections etc., 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 gas pressure via screw "H" until the required pressure is obtained, see relevant 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 and refit the screw, 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 to ensure that the gas valve shuts down within 60 seconds.

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 and vent all air as before.

8.6 ADJUSTMENT - ALL SYSTEMS

When commissioning the system the boiler should first be fired with the bypass valve fully closed on full service i.e., 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 in the main living area operating. The valve should be gradually opened to achieve a flow rate of 7.8 litre/minute (1.7gall/min), 30BR. 15.3 litre/min (3.4 gall/min), 40BR and 19.2 litre/min (4.2 gall/min), 50BR.

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.

Refit controls cover.

8.7 SEALED SYSTEMS

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

INSTRUCT USER IN CORRECT OPERATION OF THE BOILER 9

Hand the User Instruction to the user for their retention.

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

Advise that for continued safe and efficient operation of the boiler servicing should take place at least once a year, preferably at the end of the heating season.

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 service engineer.

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

Replacement of parts is in the reverse order to removal unless stated otherwise.

10.1 HEATING BODY - SERVICE

Remove controls cover by pulling it forward and off.

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

Remove inner case by releasing screws at top and bottom, see diagram 4.5.

To remove flue hood release wing nuts and lift off securing angle and flue hood, see diagram 10.1.

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, see diagram 10.1.

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, with draw 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 paper.

10.2 MAIN BURNER - SERVICE

Generally follow instruction given in 10.1.

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

DO NOT USE A BRUSH WITH METALLIC BRISTLES.

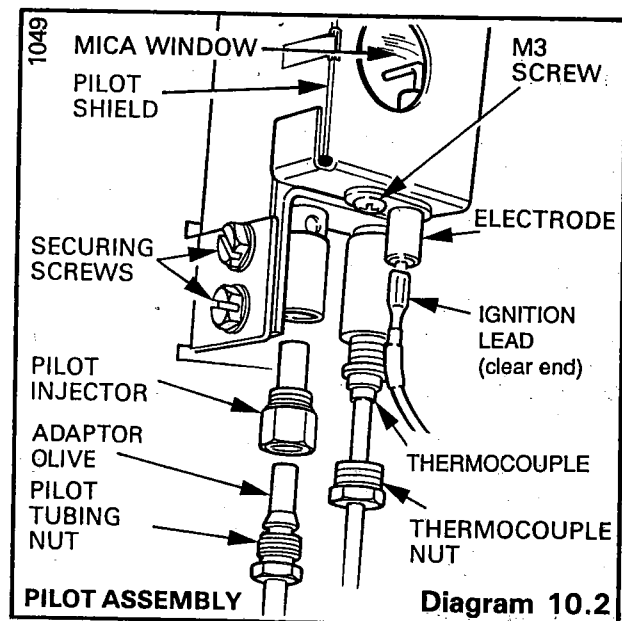
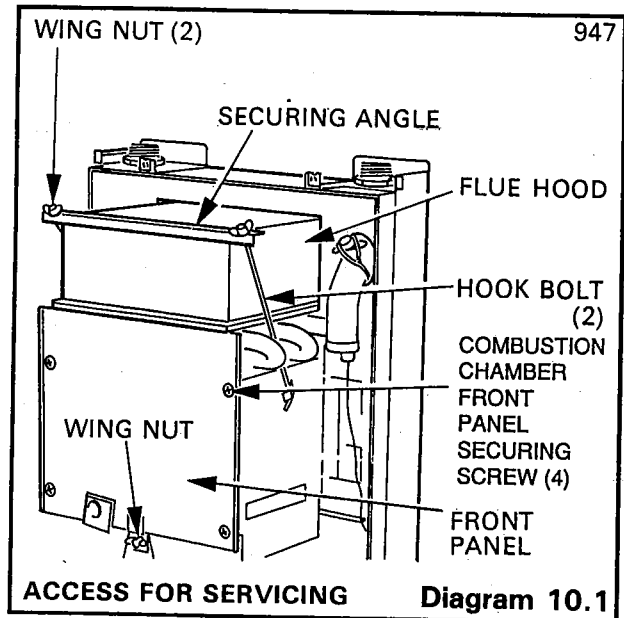
10.3 MAIN INJECTOR

Generally follow instruction given in 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 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

Generally follow instruction given in 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 from the pilot burner, see diagram 10.1.

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 10.2.

Remove pilot shield complete with electrode

Unscrew 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 instructions given in 10.1.

Release, but do not remove, the two screws securing the front 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 electrode spark gap, see diagram 10.3.

10.6 ELECTRODE

Generally follow the information under Section 10.4.

Unscrew electrode from pilot shield.

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

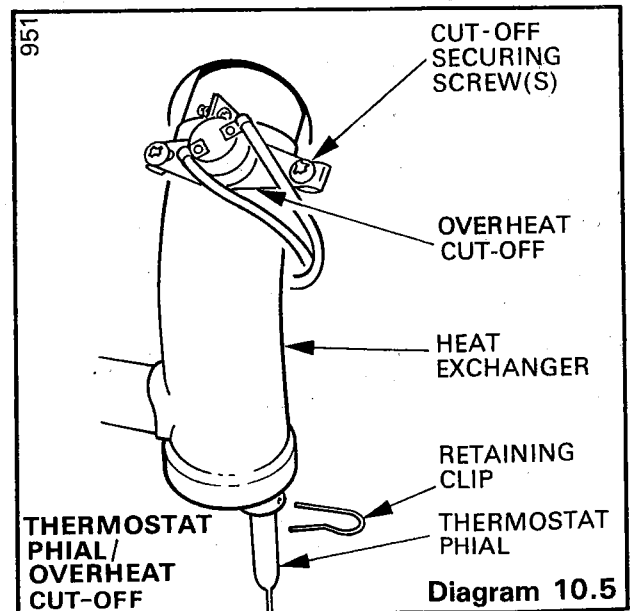
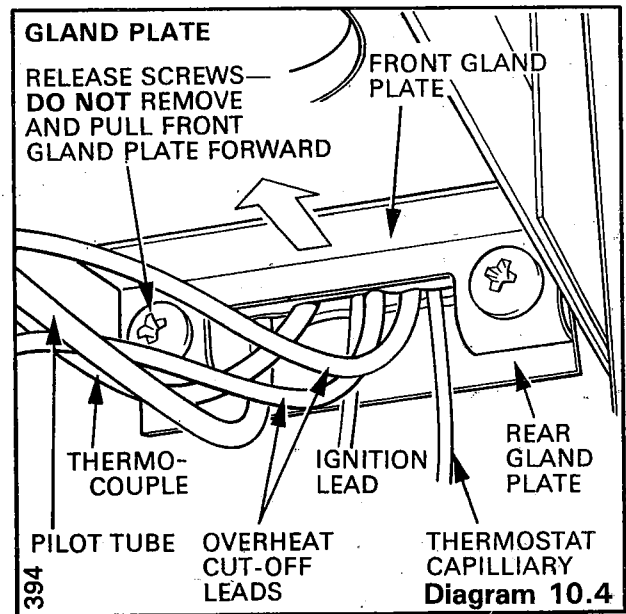
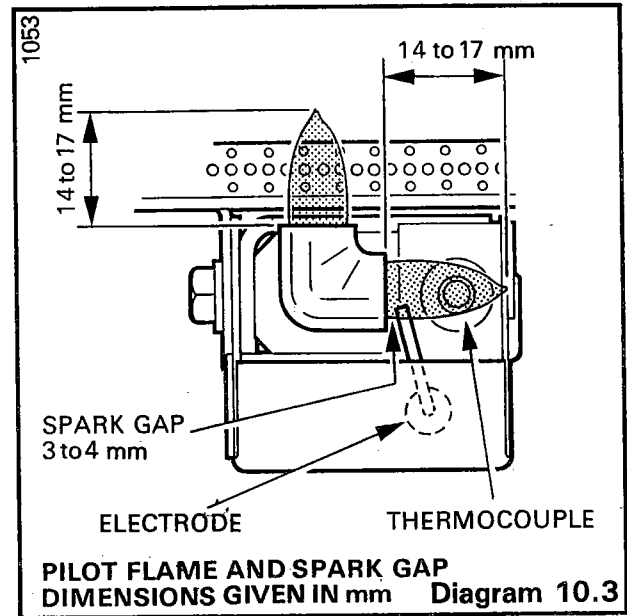
10.7 OVER HEAT CUT-OFF

Generally follow the information under Section 10.4. Remove the two screws securing the over heat cut-off to the clamp, see diagram 10.5.

Release connections at 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 cut-off leads.

When refitting smear a little of the heat sink compound, supplied, between the face of the cut-off and the water pipe, ensure that it correctly located on the pipe.



10 SERVICING AND REPLACEMENT OF PARTS

10.8 GAS VALVE (see diagram 10.6)

Gain access as under Section 10.4 above.

Remove screw to release gas valve cover.

Disconnect all leads and pipes at valve.

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

Re-assembly note, when refitting the gas valve take care not to damage the "O" rings.

Remake all connections.

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

It will be necessary to purge the pipework and valve before re-lighting - refer to Commissioning.

10.9 ELECTRICAL CONTROL BOX

Remove controls cover and outer casing as above. See 10.1.

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

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 S.L.

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

10.10 PIEZO UNIT

Gain access as in Section 10.4, above.

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

10.11 IGNITION LEAD

Remove controls cover and outer casing as above.

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

10.12 THERMOSTAT

Gain access as under Section 10.4 above.

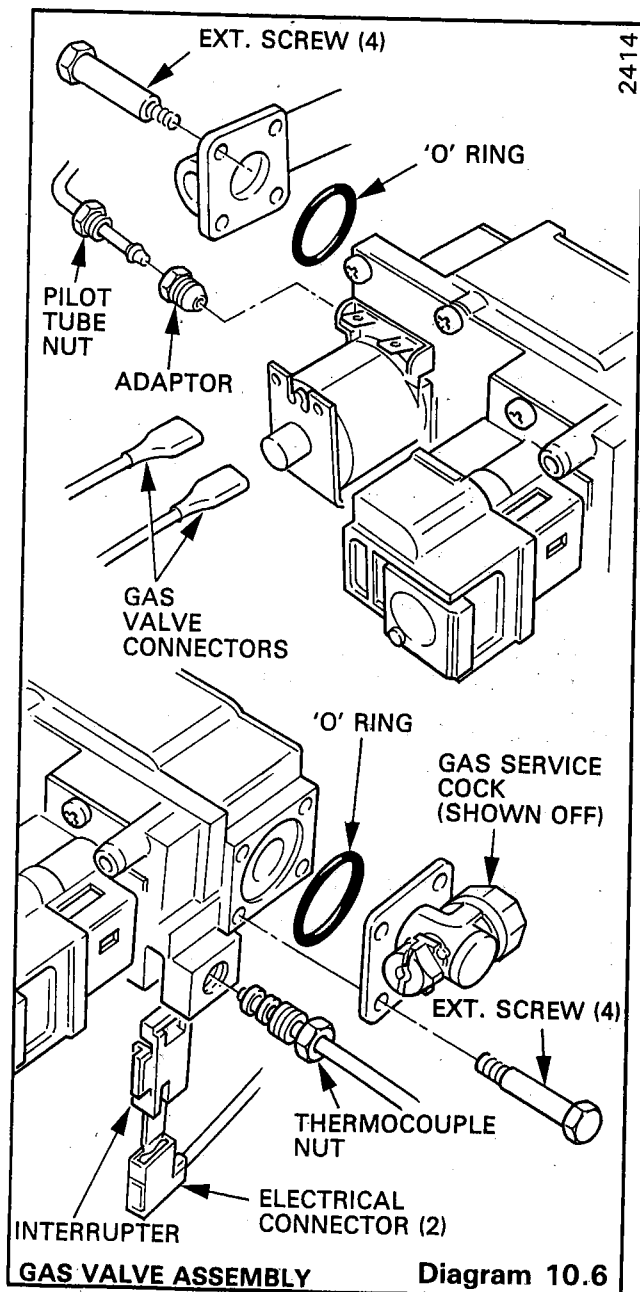
Remove and support the control box. See 10.9.

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

Pull off the connectors from the thermostat terminals. Remove the two 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 replacing in the pocket.

Ensure that it is secured by the retainer.



FAULT AND CAUSE

REMEDY

11.1 PILOT GOES OUT AFTER A PERIOD OF REMAINING ALIGHT

Front cover not correctly fitted.

Fit parts correctly.

Flue parts not fitted or sealed properly.

Seal cavity or fit flue parts correctly as described in installation instructions.

Electrical supply failure causing overheat cut-off to operate.

Relight pilot.

Overheat cut-off operating.

Refer to 11.3.

Pump incorrectly wired.

Connect pump in accordance with diagram 7.2.

11.2 MAIN BURNER WILL NOT IGNITE

External, remote controls not "ON".

Check that any remote external controls are calling for duty.

Boiler thermostat not on.

Check boiler thermostat is in an "ON" Position. See also 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 CUT-OFF CUTS OUT PREMATURELY

Air in heating body.

Vent system. Alter system layout if necessary.

Water circulation low or stopped.

Pump not functioning correctly. Check pump is wired directly to boiler. Alter system if necessary.

Overheat cut-off operates before boiler cycles on maximum boiler thermostat setting.

Change faulty overheat cut-off.

The correctly set overheat cut-off operates prematurely. There is no air in the heating body and the water circulation is satisfactory.

Change faulty heating body.

11.5 INSUFFICIENT HEAT

Thermostat set too low.

Increase setting.

Inlet gas pressure inadequate.

Increase gas pressure.

Governor setting incorrect. (ensure thermostat is on maximum setting)

Check burner pressure against data badge. Reset only if more 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 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 boil 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. By-pass not fitted or correctly set.

*There remains on most boilers a residual noise more noticeable at high temperatures. Normal operation of the boiler over a period should remove most noise.

11 FAULT FINDING

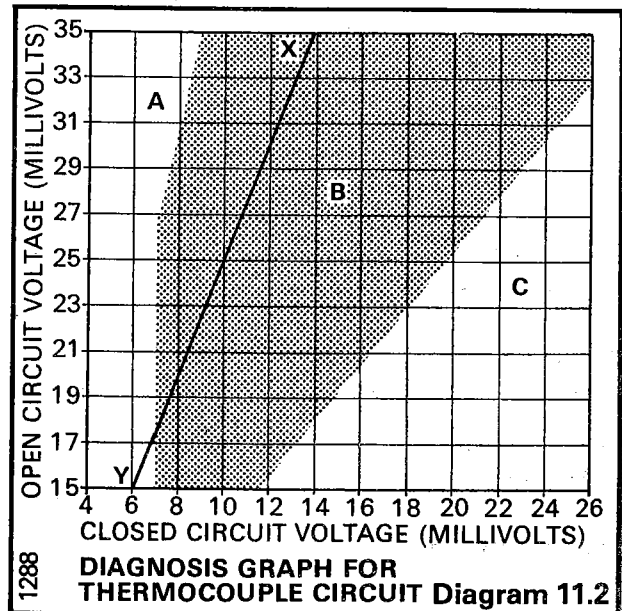
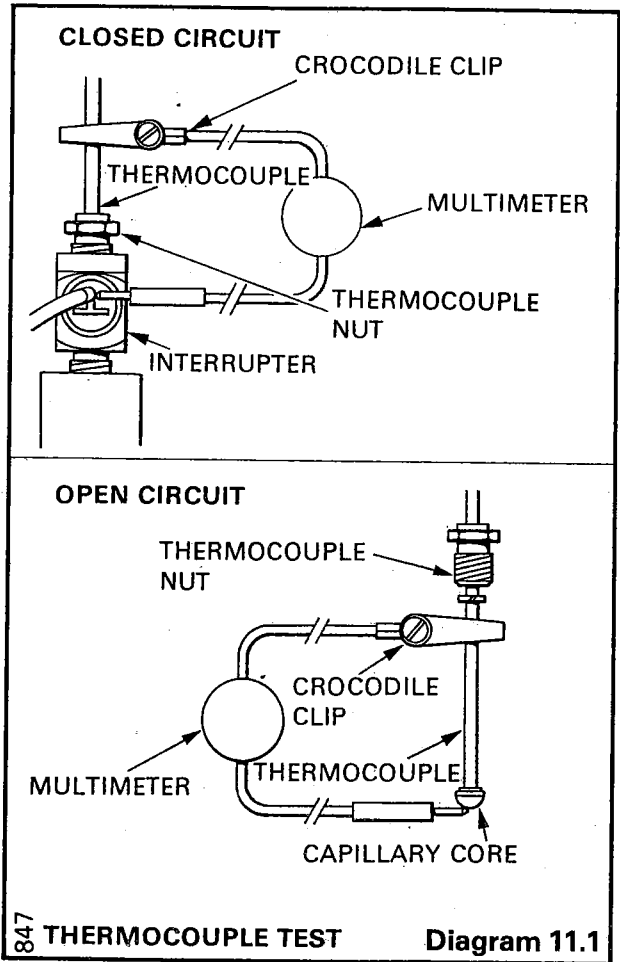
11.7 THERMOCOUPLE

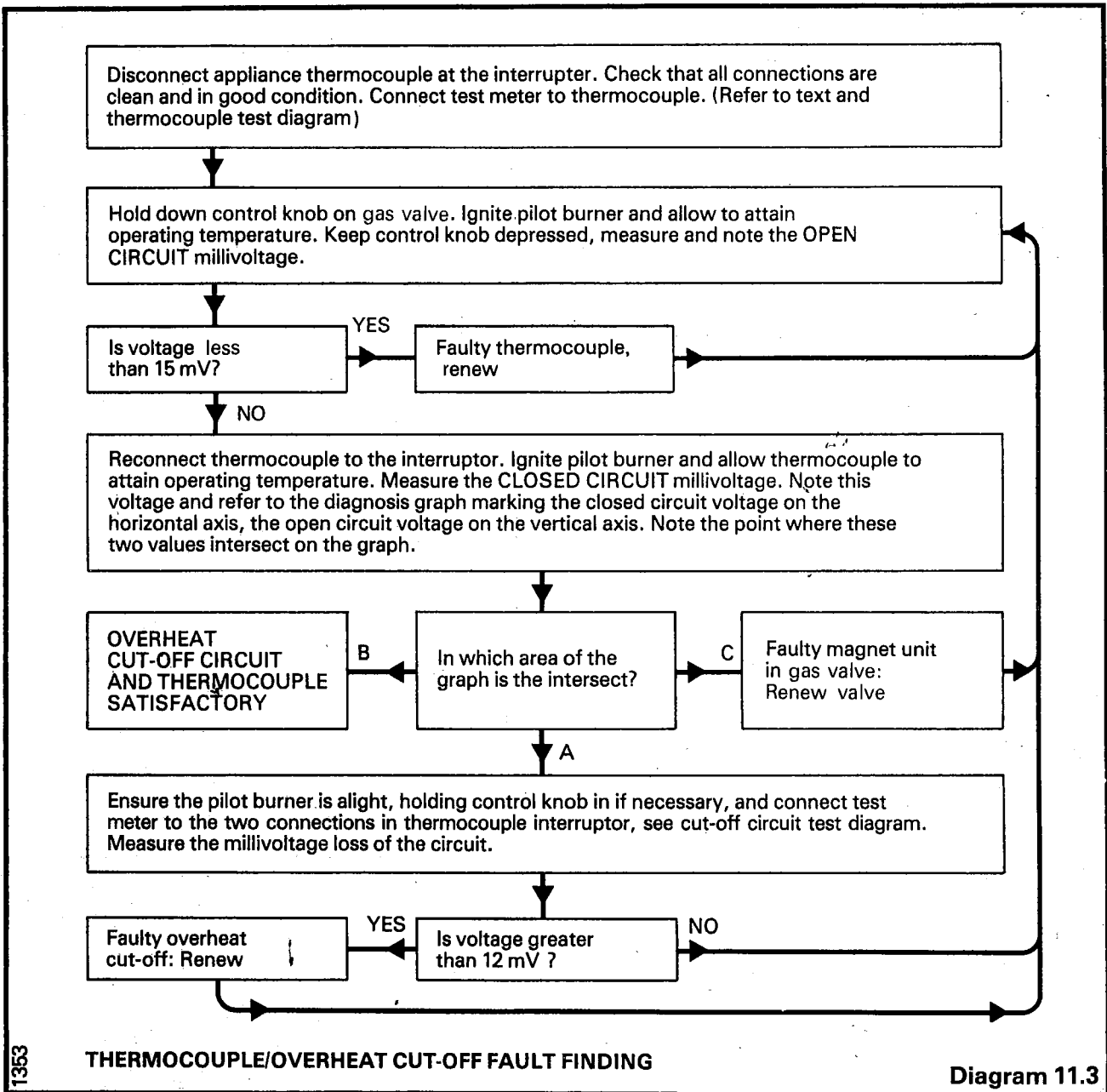
To test the thermocouple, a meter with a range of 0 to 30 mV is required, similar to the B.G.C. (Minitest 6) Multimeter.

Close Circuit - With the pilot lit connect one crocodile clip to the thermocouple capillary as close as possible to the thermocouple nut which is fastened into the interrupter, see diagram 11.1. Connect the other lead to the connector held in the interrupter nearest to the gas valve, then take millivoltage reading.

Open Circuit - Disconnect the thermocouple nut from the interrupter. Connect crocodile clip to thermocouple capillary and connect the other lead to the capillary core. Hold in gas control knob and light pilot, keeping the control knob held until thermocouple millivoltage has settled, to take reading.

Refer to thermocouple diagnosis graph, diagram 11.2, when using the chart, diagram 11.3.

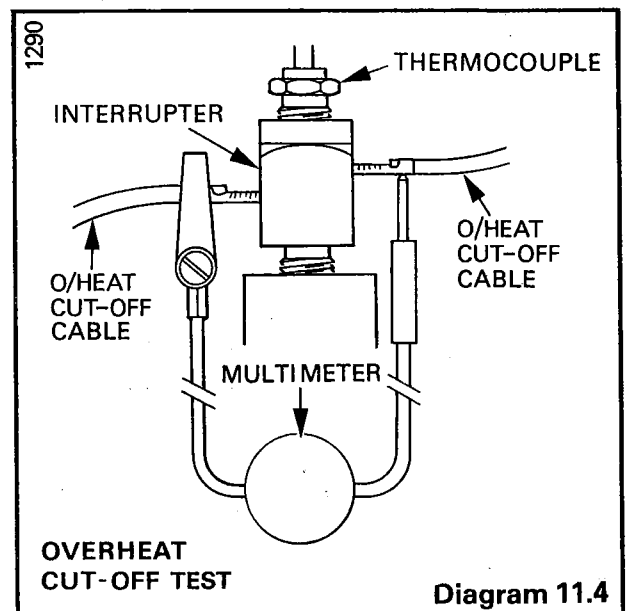




11.8 OVERHEAT CUT-OFF

With the pilot burner lit, by holding in the gas control knob if necessary, connect multimeter to the two terminals either side of the thermocouple interrupter, see diagram 11.4.

Take the millivoltage drop reading and refer to thermocouple/overheat cut-off fault finding diagram 11.3.



11 FAULT FINDING

ELECTRICAL FAULT FINDING

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

START

Isolate the supply. Gain access to the control box, check all connections etc. Restore supply. Using multimeter set at 240V.

Is there 240V between **L** and **N** ?

NO

Check incoming supply and fuses. Repair where required.

YES

Is there 240V between **9** and **N** ?

NO

Faulty Brown bridge wire between **L** and **9** Repair or renew.

YES

With Red Link removed between **9** and **SL** and Remote Controls Calling for Duty is there 240V between **SL** and **N** ?

NO

Faulty Remote Controls, inform customer.

YES

Is there 240V between **9** and **N** ?

NO

Faulty cable (BROWN) from terminal block to thermostat, repair or renew.

YES

Is there 240V between **8** and **N** ?

NO

Faulty cable (RED) from terminal block to thermostat, repair or renew.

YES

Is there 240V between **3** and **N** ?

NO

Faulty cable (RED) from terminal block to thermostat, repair or renew.

YES

Turn on thermostat. With appliance cold is there 240V between **6** and **N** ?

NO

Faulty thermostat, renew.

YES

Turn OFF thermostat. Is there 240V between **6** and **N** ?

NO

YES

Turn ON thermostat. Does main burner light?

NO

Isolate supply. Remove gas valve cover. Restore supply. Is there 240V between 'L' and 'N' on gas valve?

YES

Faulty gas valve, renew.

NO

Faulty gas valve harness, renew.

Turn ON thermostat. With appliance cold is there 240V between **7** and **N** ?

NO

YES

Turn OFF thermostat. Is there 240V between **7** and **N** ?

NO

YES

Continued

Continued

Continued

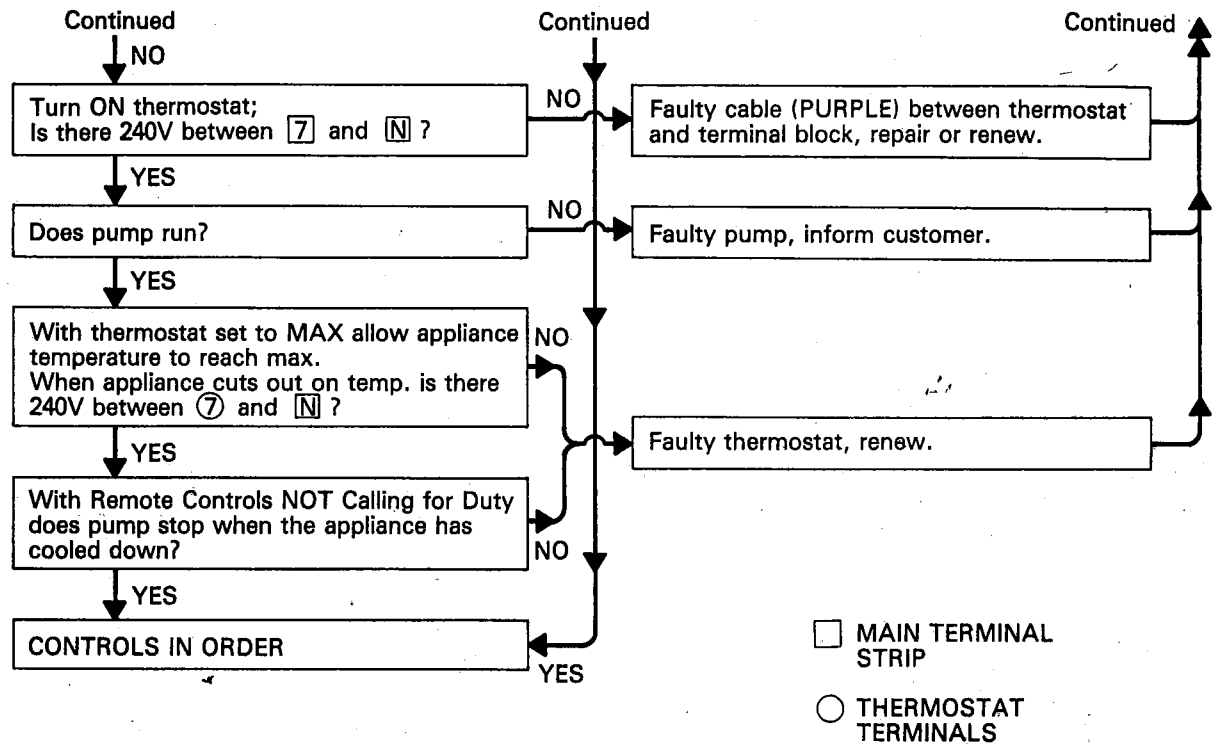
□ MAIN TERMINAL STRIP

○ THERMOSTAT TERMINALS

Diagram 11.5

2435

ELECTRICAL FAULT FINDING CONTINUED



2435

Diagram 11.5 Continued

11.9 ELECTRICAL

IMPORTANT:- The preliminary electrical system checks contained in the British Gas Multimeter instructions book or equal are the first checks to be carried out during a fault finding procedure. On completion of the service/fault-finding task which has required the breaking and re-making of electrical connections then the checks 'A' Earth continuity, 'C' Polarity and 'D' Resistance to Earth must be repeated.

To check boiler thermostat, transformer and multi-functional control, see diagram 11.5 and functional flow wiring diagram 11.6.

To check thermostat pump overrun circuit see diagram 11.5 and functional flow wiring diagram 11.6.

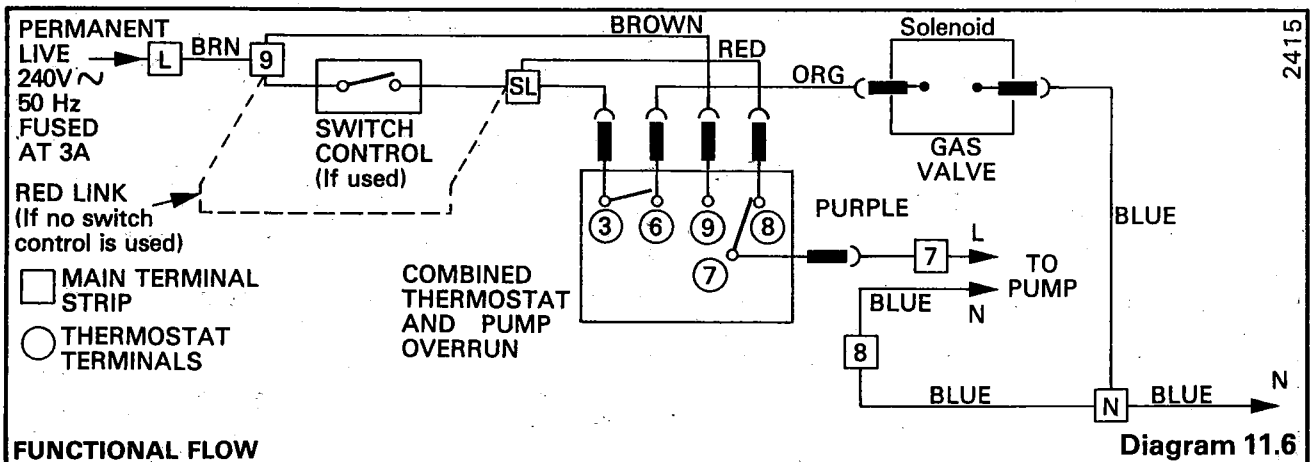
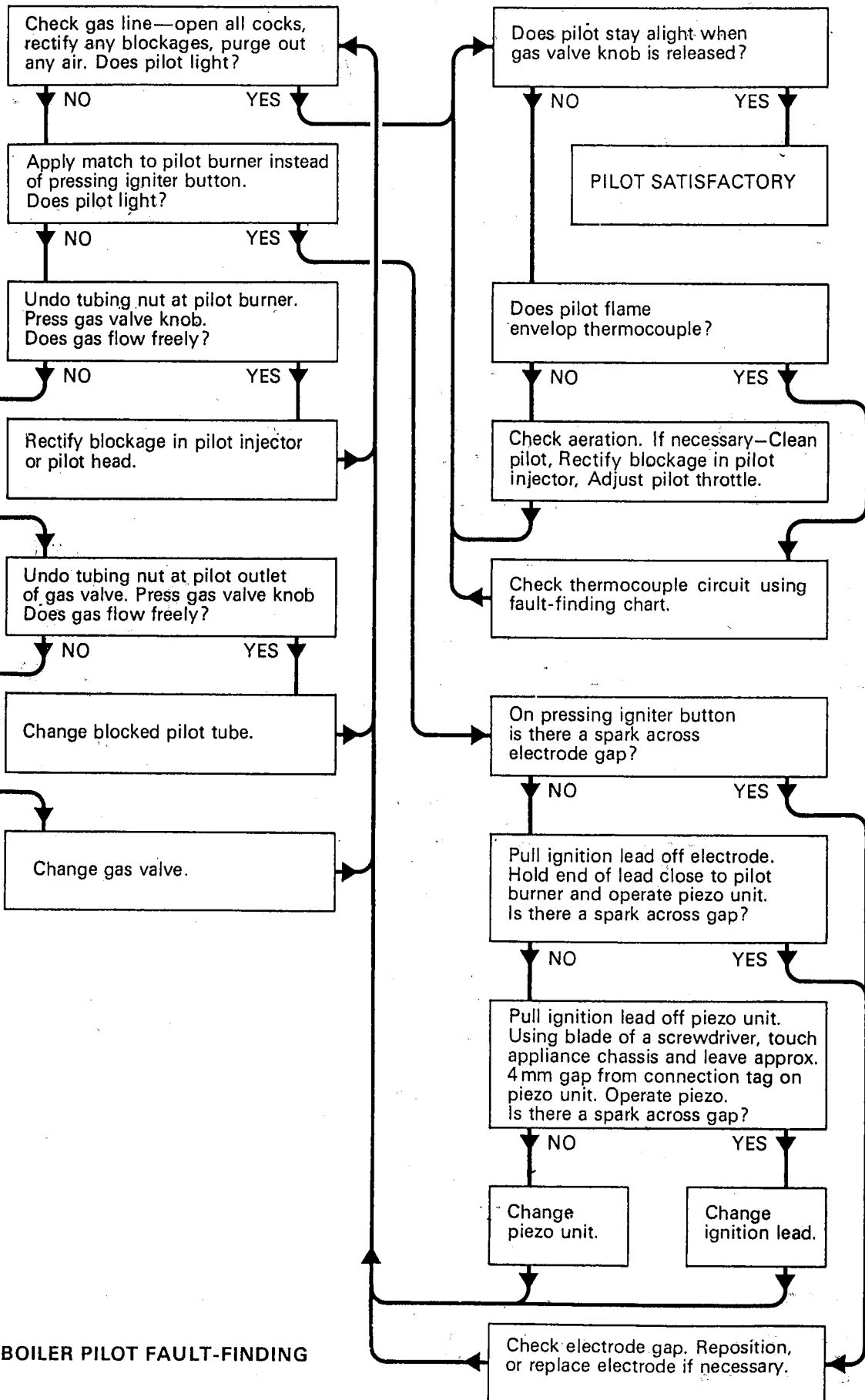


Diagram 11.6

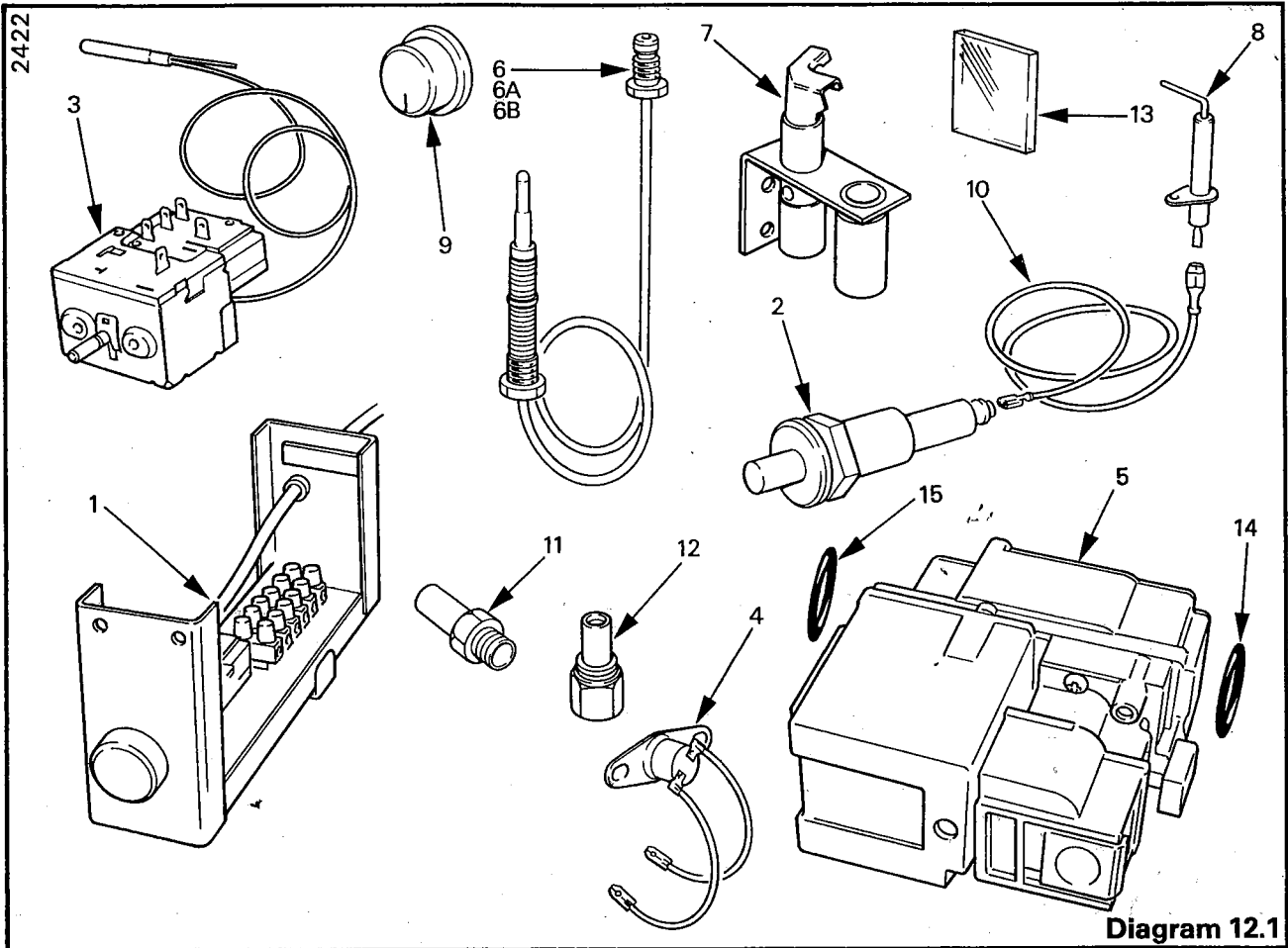
11 FAULT FINDING

PILOT WILL NOT LIGHT
START HERE



BOILER PILOT FAULT-FINDING

Diagram 11.7



Key No.	Glow-worm Part No.	Description	G.C. Part No.
1	433504	Electrical control box	
2	202700/702	Piezo unit	
3	416189	Boiler Thermostat assembly	384 145
4	800014	Overheat cut-off assembly	
5	800015	Gas valve assembly - Honeywell (incl. 14)	
6	202400/ 412/413	Thermocouple	
7	203415	Pilot burner - Johnson (incl. 12)	394 161
8	202600	Electrode	384 149
9	416144	Thermostat knob	355 401
10	WW4606	Ignition lead	
11	203011	Boiler injector, marked 2.8	398 247
12	203509	Pilot injector - Johnson	-
13	411194	Sight glass	355 153
14	208040	'O' Ring - gas valve/2 off	

12.1 ORDERING

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

900 000

394 162

Glow-worm Ltd
Nottingham Road, Belper, Derby DE5 1JT
Telephone Belper (0773) 824141
Telex 37586

719

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