



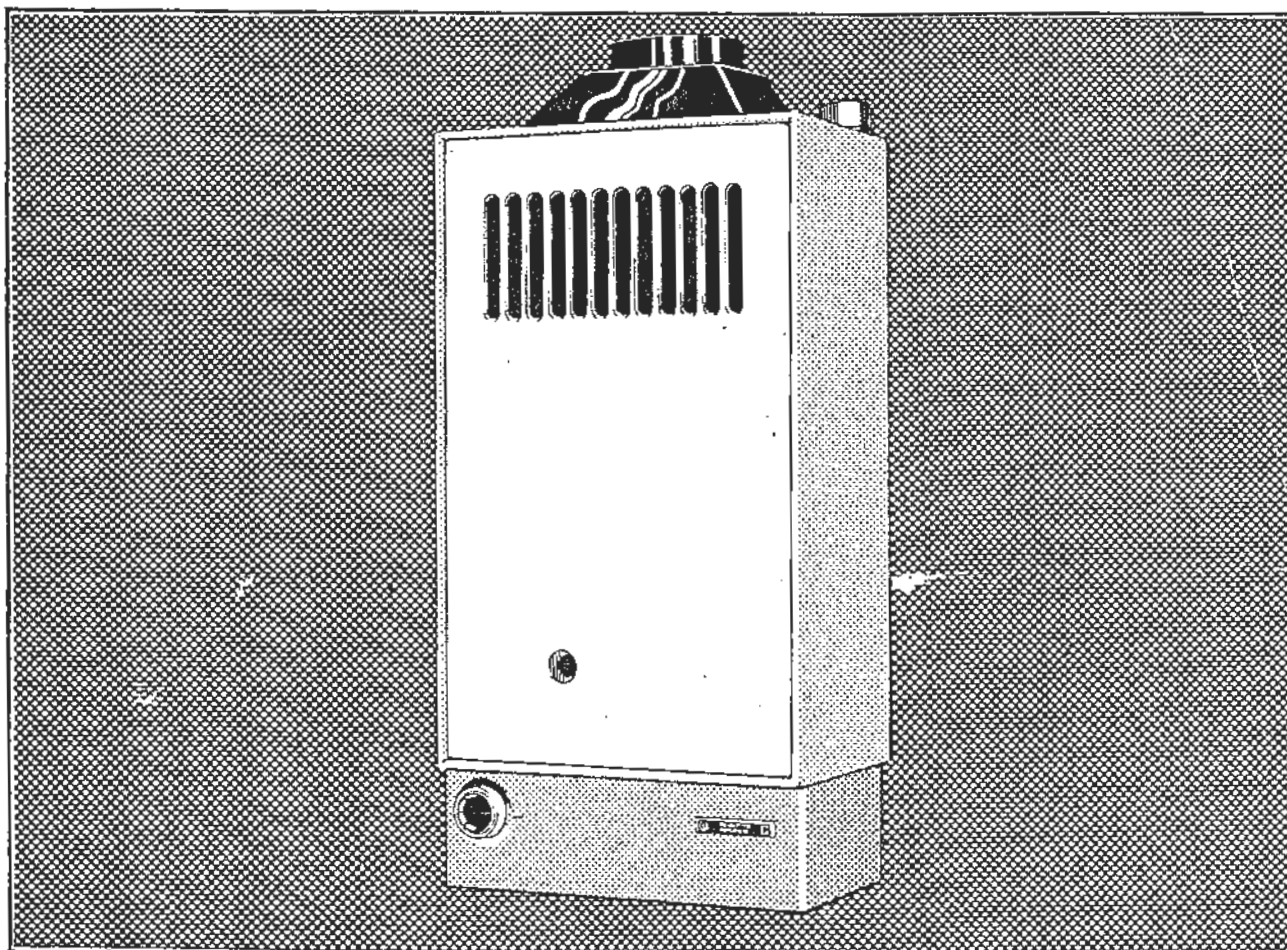
Glow-worm

FUELSAVER

25-30, 30-40, 40-50

Open Flue Boilers

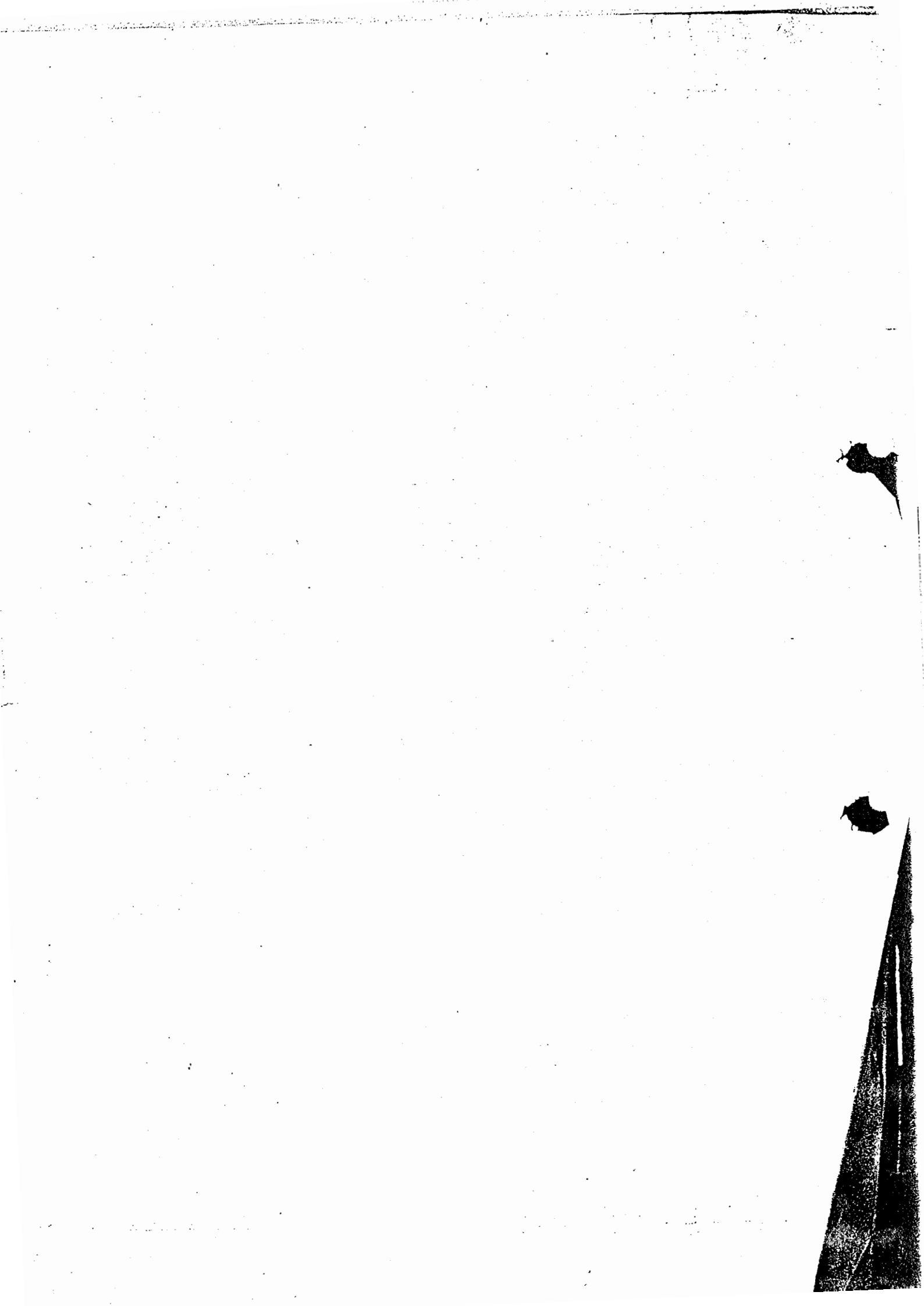
G.C. No. 41.315.80 25-30, 41.315.82 30-40, 41.315.84 40-50



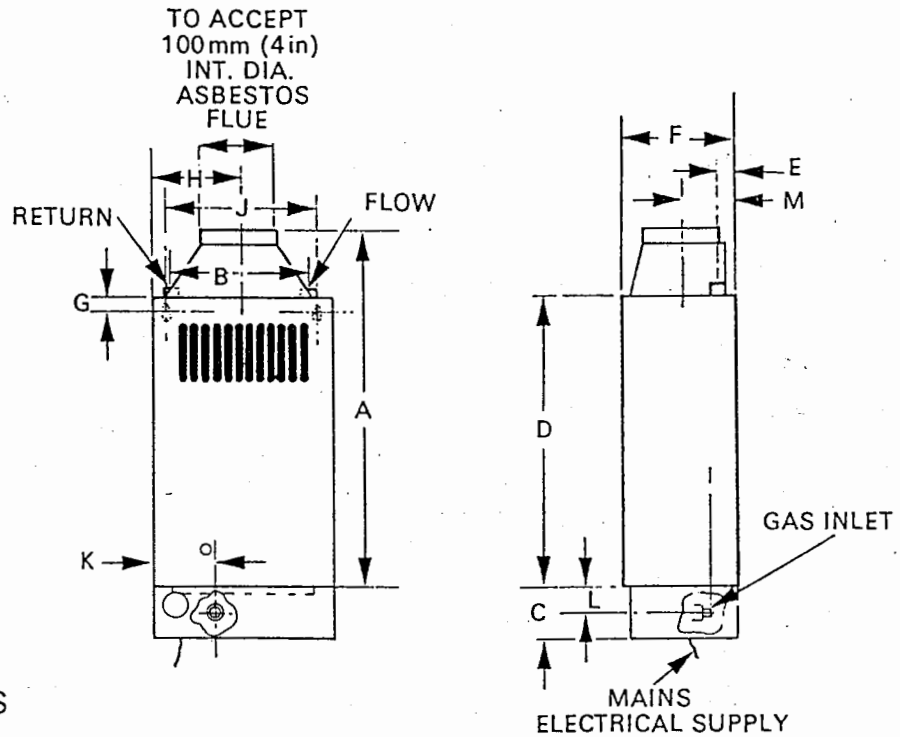
Installation and Servicing Instructions

(To be left at Users Gas Meter)

These boilers are for use on fully pumped systems only, and on natural gas only.



	mm	in
A	615	24 $\frac{3}{16}$
B	275	10 $\frac{13}{16}$
C	100	4
D	534	21
E	31.5	1 $\frac{1}{4}$
F	225	8 $\frac{7}{8}$
G	10	$\frac{3}{8}$
H	165	6 $\frac{1}{2}$
J	290	11 $\frac{7}{16}$
K	140	5 $\frac{1}{2}$
L	53	2 $\frac{1}{8}$
M	83	3 $\frac{1}{4}$



OVERALL DIMENSIONS

Diagram 1

Weight of complete appliance: 18.6 kg (41 lb)

Gas connection: Rc $\frac{1}{2}$

Electrical connection: Terminal strip in control box.

Controls: Ranco P0624 boiler thermostat,
Robertshaw 7000 BER S7AL gas valve.

Injectors: Aeromatic 92-8320, 3.2mm dia. (25-30 & 30-40)
Aeromatic 92-8340, 3.4mm dia. (40-50)

Burner type: Aeromatic 7/5 2000 LR

Ignition: Pilot — piezo generator and electrode
Main — Robertshaw 76360 permanent pilot.

RANGE RATING

THESE APPLIANCES MAY BE RANGE RATED TO SUIT INDIVIDUAL SYSTEMS. THE FOLLOWING TABLES INCLUDE THE MAXIMUM AND MINIMUM OUTPUTS.

The appliance input should be adjusted to suit the system requirements.

FUELSAVER 25-30

Nominal heat input: 9.53/11.31 kW
(32,500/38,600 Btu/h)
heat output: 7.33/ 8.8 kW
(25,000/30,000 Btu/h)

OUTPUT		SETTING PRESSURE	
kW	Btu/h	mbar	in. w.g.
7.33	25,000	4.9	2.0
8.8	30,000	6.8	2.7

FUELSAVER 30-40

Nominal heat input: 11.3/14.9 kW
(38,600/50,800 Btu/h)
heat output: 8.8/11.7 kW
(30,000/40,000 Btu/h)

OUTPUT		SETTING PRESSURE	
kW	Btu/h	mbar	in. w.g.
8.8	30,000	6.8	2.7
10.3	35,000	9.1	3.7
11.7	40,000	11.4	4.6

FUELSAVER 40-50

Nominal heat input: 15.4/19.0 kW
(52,600/65,000 Btu/h)
heat output: 11.7/14.7 kW
(40,000/50,000 Btu/h)

OUTPUT		SETTING PRESSURE	
kW	Btu/h	mbar	in. w.g.
11.7	40,000	9.4	3.8
13.2	45,000	11.5	4.6
14.7	50,000	14.1	5.6

When installing or servicing this appliance, care should be taken when handling the edges of sheet metal parts, to avoid any possibility of injury.

1 GENERAL

This unit is an automatic central heating boiler employing PUMPED CIRCULATION OF HOT WATER up to a temperature of approximately 82°C (180°F) as the medium of heat transmission. It can be used wherever the required output does not exceed 8.8 kW (30,000 Btu/h) for the 25-30, 11.7 kW (40,000 Btu/h) for 30-40, or 14.7 kW (50,000 Btu/h) for 40-50 and is designed for use on open vent or sealed central heating and domestic hot water systems using a DOUBLE FEED (FULLY INDIRECT) CYLINDER.

For details of the system installation a qualified Heating Engineer should be consulted.

It is essential that the unit is installed strictly in accordance with the instructions in this booklet and the attention of the installer is drawn in particular to the following points:

1.1 STATUTORY REQUIREMENTS

The installation of this boiler must be carried out by a qualified installer and must be in accordance with the relevant requirements of the gas safety regulations, local building regulations, I.E.E. regulations, the local gas region, the local authority, the byelaws of the local water undertaking and relevant recommendations of British Standard Codes of Practice CP 331 Part 3: 1974, BS 5376 Part 2: 1976, BS 5440 Part 1: 1978, BS 5440 Part 2: 1976, BS 5449 Part 1: 1977 and BS 5546: 1979.

1.2 BOILER LOCATION

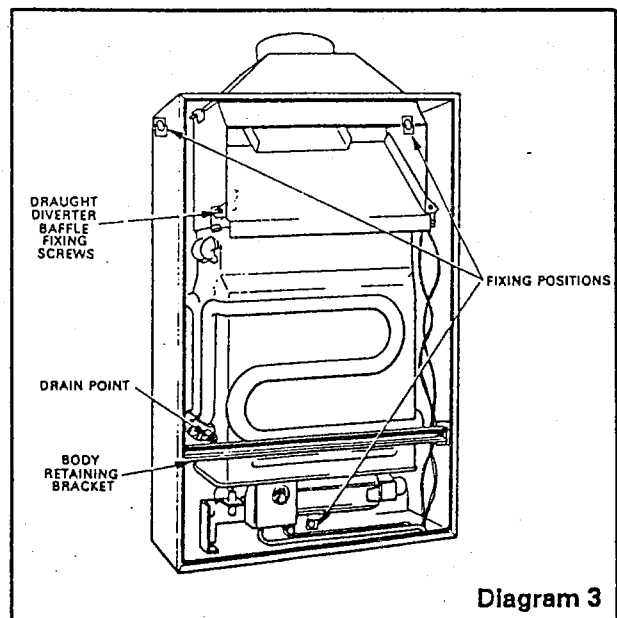
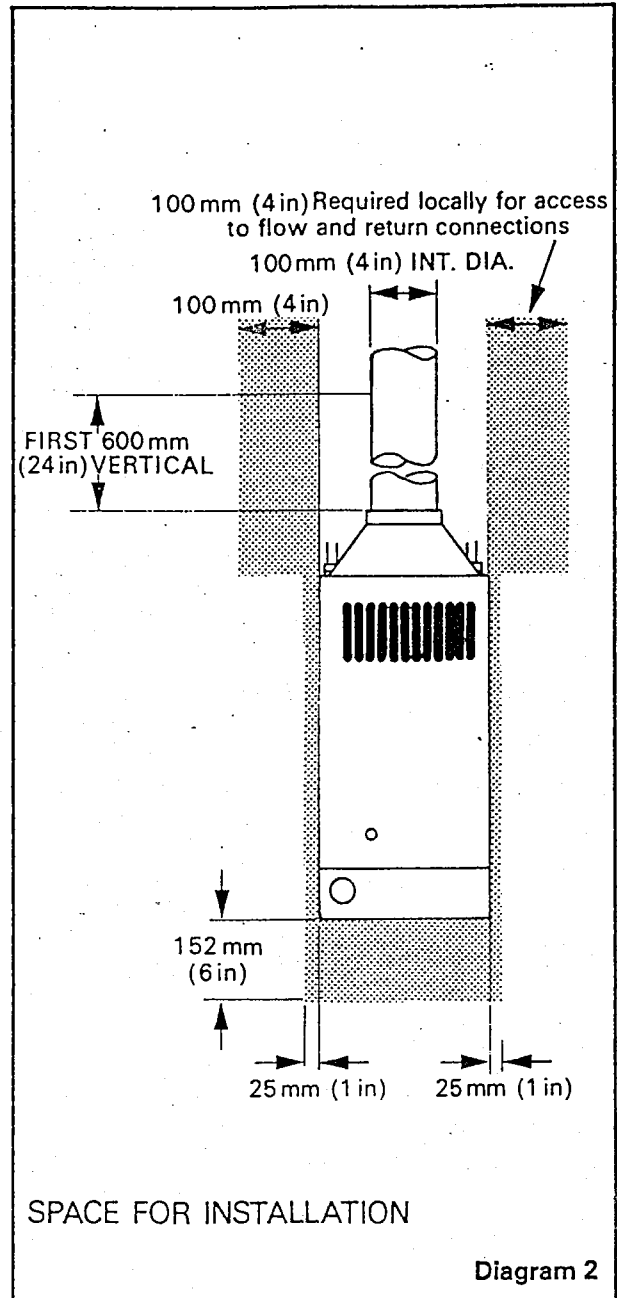
The terminal from an open-flued boiler must not be within 600 mm (2 ft) of an openable window, a ventilator, an inlet to a ventilating system or similar opening.

The boiler position should be such that the following minimum clearances are provided as shown in diagram 2.

Right- and left-hand side of appliance—25 mm (1 in).

Underneath of appliance — 152 mm (6 in).

The boiler should not be installed in a bedroom and must not be installed in a room containing a bath or shower.



2 INSTALLING THE APPLIANCE

2.1 FIXING

- 2.1.1 Determine the position for fixing the appliance, ensuring that the conditions and requirements of 3.1, 3.2 and 3.3 are satisfied.
- 2.1.2 Position the template provided on the wall where the appliance is to be fixed and mark through the positions of the three fixing holes.
- 2.1.3 Drill and plug the fixing holes and then insert woodscrews into the top two fixing positions (No. 10 x 2" long woodscrews are suitable) and tighten to a depth to accept the keyhole slots on the back of the appliance.
- 2.1.4 Remove control cover (see diagram 5) by pulling forwards clear of case and then hang the appliance on the wall using the keyhole slots. The bottom fixing screw (No. 10 x 2" long woodscrew is suitable) can now be inserted and the screw tightened.

2.2 FLUE

Fit flue pipe (see 3.1) and make seal with approved rope and fire cement.

2.3 GAS

- 2.3.1 Gas supply pipe to enter appliance from wall face. Connect supply pipe to gas service cock (see diagram 5). The gas cock is threaded Rc $\frac{1}{2}$.
- 2.3.2 On Natural Gas the house service governor must ensure a constant inlet pressure of 20mbar (8 in. w.g.). The gas installation should be in accordance with CP 331.3. The whole of the gas installation including the meter should be inspected and tested for gas soundness and purged in accordance with the recommendations of CP 331.3.
- 2.3.3 The gas meter must be capable of passing, in addition to all other demands, as follows:—
 - FUELSAVER 25-30
1.07m³/h of 38MJ/m³ gas
(39ft³/h of 1000Btu/ft³ gas)
 - FUELSAVER 30-40
1.41m³/h of 38MJ/m³ gas
(50.8ft³/h of 1000Btu/ft³ gas)
 - FUELSAVER 40-50
1.78m³/h of 38MJ/m³ gas
(64ft³/h of 1000Btu/ft³ gas)

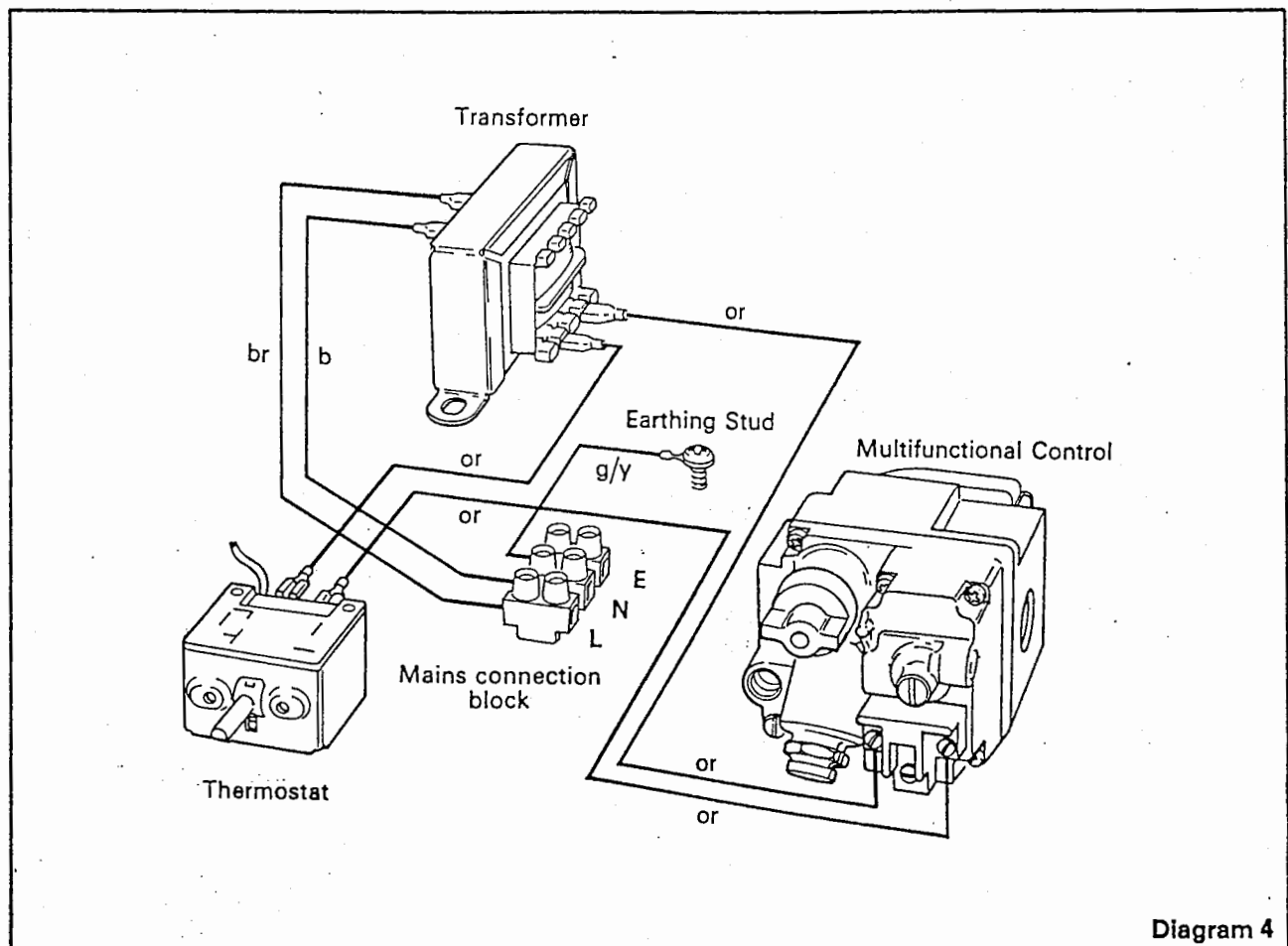


Diagram 4

2.4 WATER

Flow and Return pipes to the appliances must be in 22 mm diameter copper tubing to BS 2871 and connected with the nuts and olives provided.

2.5 ELECTRICITY

2.5.1 Remove the control box by undoing the two fixing screws at the front above the thermostat knob and carefully easing the box forward and clear of its mounting position. The box will still be attached via the thermostat capillary and gas valve connections. Care should be taken, therefore, not to damage these connections. The mains voltage in the United Kingdom is 240V 50Hz. The supply should be fused at 3A. The rating is approximately 6VA. Wiring to the appliance should be in accordance with I.E.E. Regulations. Three-core cable rated to take at least 3A (16/0.2 mm) should be used. A terminal block is provided for the mains connection which is situated inside the control box. The mains supply cable must pass through the grommet provided adjacent to the terminal block and also be clamped using the cable clip provided on the outside of the control box.

2.5.2 Replace control box by carefully re-positioning and tighten two fixing screws with accompanying shakeproof washers above thermostat. Care should be taken not to trap any connections from the box.

2.5.3 The wiring should also comply with any local regulations.

WARNING: This appliance must be earthed.

2.5.4 Preliminary electrical system checks

The following checks should be carried out with a BGC Multimeter or equivalent.

a. Earth Continuity Check

Appliance must be electrically disconnected — meter set on Ω (ohms) x 1 scale and adjust zero if necessary.

(a) Test leads from any appliance earth point to earth pin on plug — resistance should be less than 1Ω (ohm).

If the resistance is greater than 1Ω (ohm) check all earth wires for continuity and all contacts clean and tight.

If resistance of earth is still greater than 1Ω (ohm) then this should be reported to your supervisor.

b. Short Circuit Check

Appliance electrically disconnected, all switches ON (including stats) —

(a) meter set on Ω (ohms) x 1 scale.

Test leads from L to N in appliance terminal strip/block — if meter reads 0 then there is a short circuit.

(b) meter set on Ω (ohms) x 100 scale.

Repeat test with leads from L to E. If meter reads less than ∞ (infinity) there is a fault.

c. Polarity Check

Appliance connected to mains supply and meter set on 300 Vac scale. Test at appliance terminal strip:—

(i) Test leads from L to N — meter reads approx. 240 Vac

(ii) Test leads from L to E ($\underline{\pm}$) — meter reads approx. 240 Vac

(iii) Test leads from N to E ($\underline{\pm}$) — meter reads from 0-15 Vac*

Thus the terminal marked L is the live terminal. If the low* Vac reading is given on terminals other than N to E ($\underline{\pm}$) there is an electrical fault.

Repeat the test at the appliance plug/inlet spur to check the wiring system up to the appliance and rectify any fault. If necessary repeat the test at the supply system socket/spur — if the fault also occurs at this stage then there is a house system fault which requires attention by the Electricity Authority. The customer should be warned not to use the appliance until this examination has been carried out.

d. Resistance to earth check

Appliance must be disconnected from mains supply and meter set on Ω (ohms) x 100 scale. All switches, including stats, ON — Test leads from L to E — if meter reads other than infinity (∞) there is a fault which should be isolated. A detailed continuity check is required to trace the faulty component.

IMPORTANT This series of checks are the first electrical checks to be carried out during a fault finding procedure. On completion of the service/fault finding task which has required the breaking and remaking of electrical connections then the checks — A. Earth Continuity, C. Polarity and D. Resistance to Earth — **must** be repeated.

3 FLUEING AND VENTILATION

3.1 The room containing the boiler must have a permanent ventilator with effective area of at least 2000 mm² (2.8 in²) for the 25-30, 3600 mm² (5.2 in²) for the 30-40, or 5300 mm² (7.8 in²) for the 40-50, which should preferably be on the same wall as the flue outlet and where it is not likely to be obstructed. A 100 mm (4 in) internal diameter asbestos flue pipe should be fitted with the first 600 mm (2 ft) vertical, and there should be a rising characteristic throughout. Right angle bends and horizontal lengths must be avoided where possible. The flue should terminate in a suitable position outside the building with an approved terminal in the vertical position. Flueing should be installed in accordance with recommendations in BS 5440 Part 1.

3.2 CUPBOARD/COMPARTMENT VENTILATION

Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS 5376:2.

Where the appliance is fitted in a cupboard or compartment, the ventilation area must be in accordance with table below.

Position of Opening	Air from Room †	Air direct from Outside
High level	9.0 cm ² per kW input (2 in ² per 5,000 Btu/h input)	4.5 cm ² per kW input (1 in ² per 5,000 Btu/h input)
Low level	18.0 cm ² per kW input (4 in ² per 5,000 Btu/h input)	9.0 cm ² per kW input (2 in ² per 5,000 Btu/h input)

NOTE: Both the high level and low level air vents must communicate with the same room or must both be on the same wall to outside air.

† This is in addition to the ventilation area specified in 3.1.

3.3 EFFECT OF AN EXTRACTOR FAN

If there is any type of extractor fan fitted in the premises in which the boiler is being installed, there is a possibility that if adequate air inlet area from outside is not provided, spillage of the products from the boiler flue could occur when the fan is in operation. Where such installations occur, a spillage test, as detailed in BS 5440:1 must be carried out.

4 WATER SYSTEM

4.1 PUMP

The pump should be fitted in the flow-pipe from the boiler and it is recommended that a pump producing at least 2.5m (8ft) head at a flow rate through the boiler of 686 litre/h (2.5 gal/min) for the 25-30, 916 litre/h (3.4 gal/min) for the 30-40, or 1150 litre/h (4.2 gal/min) for the 40-50, giving a temperature rise of approximately 11°C (20°F) is used. Examples of suitable approved pumps are SMC Commodore, Euramo MXL 130 and the Grundfos UPS 15

4.2 BY-PASS

The flow through the boiler must not be allowed to fall below 491 litre/h (1.8 gal/min) for the 25-30, 655 litre/h (2.4 gal/min) for the 30-40, or 818 litre/h (3.0 gal/min) for the 40-50, while the burner is alight. It is important that if system controls such as thermostatic radiator valves or motorised zoning valves cause the flow through the boiler to fall below this rate, a by-pass must be fitted (see diagram 6). The use of a by-pass will mean that the temperature rise across the boiler will be less than that across the system because part of the water flow is being re-circulated round the boiler. See 7 System Guidance.

4.3 CYLINDER

The hot water cylinder must be a double feed (fully indirect) pattern. Single feed (self-priming) cylinders are not recommended, and must not be used on sealed systems.

4.4 SAFETY VALVE

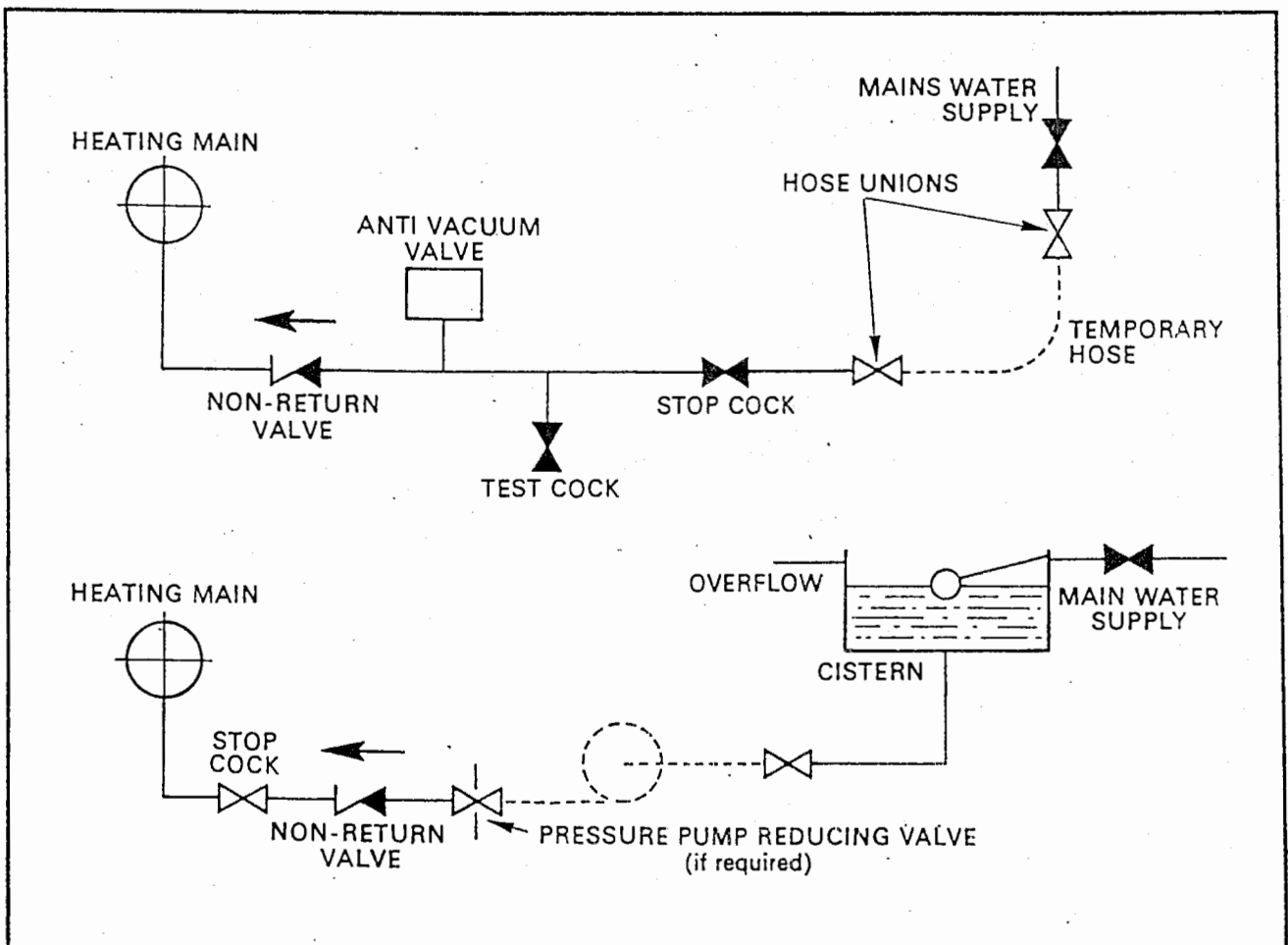
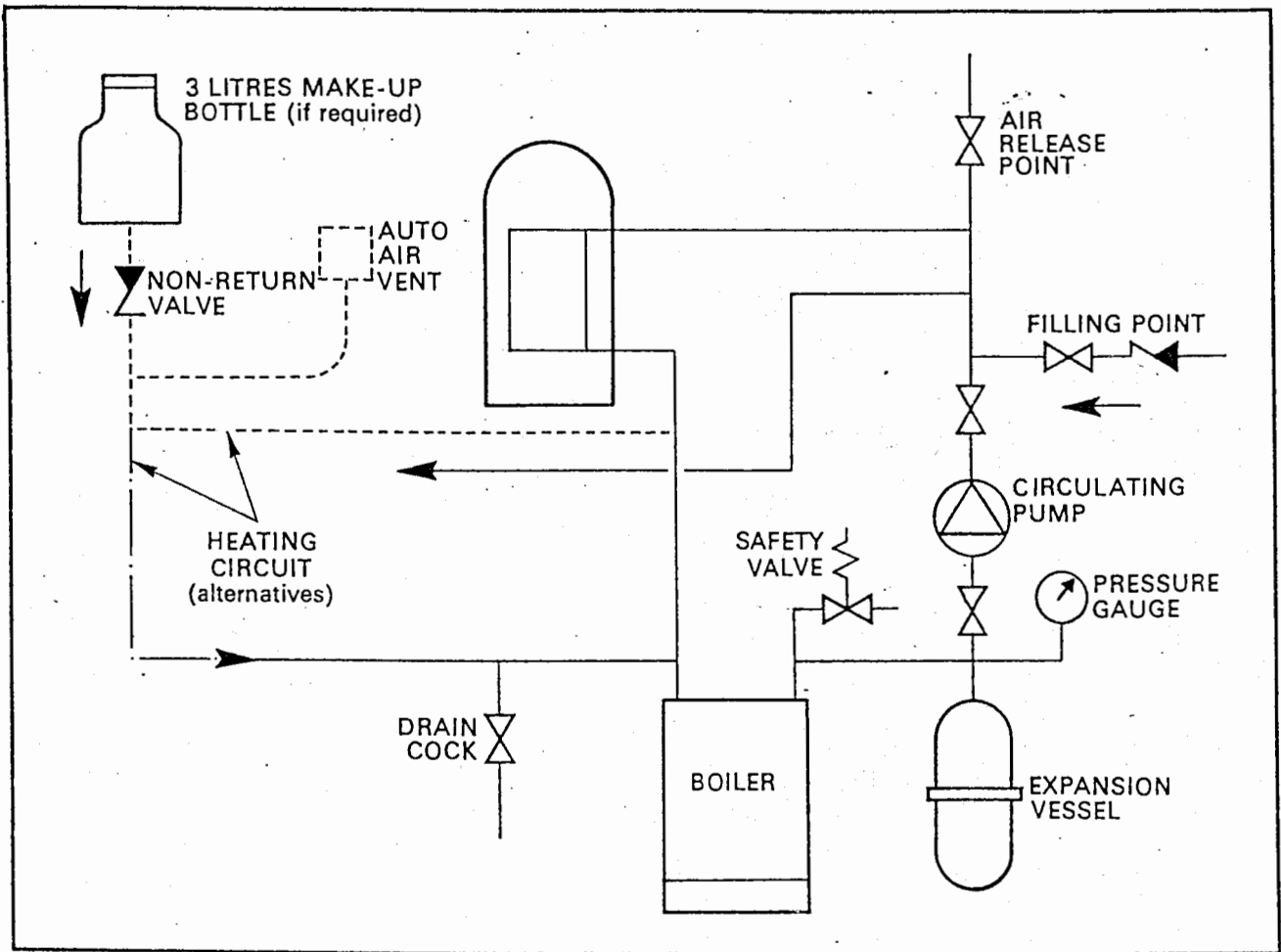
A safety valve set to not more than 3 bar (43.5 lbf/in²) should be fitted to the flow pipe of the boiler where required by the local Gas Region.

4.5 OPEN WATER SYSTEMS

A 22 mm open vent pipe must be fitted in the flow line from the boiler and terminated above the cold feed and expansion cistern, which should not be less than 22 litre (5 gallon) capacity.

The cistern must not be situated more than 27.5 m (90 ft) above the boiler.

A 15 mm minimum cold feed must be fitted in the system. See also System Guidance section. A drain valve must also be fitted at the lowest point in the system; a drain point is sited on the boiler on the left-hand side. This is a small point intended for the draining of the boiler only.



4.6 SEALED WATER SYSTEMS

4.6.1 General

The installation should comply with the appropriate requirements of BS 5376 Part 2 and BS 5449:1.

4.6.2 Safety valve

A spring-loaded safety valve complying with the relevant requirements of BS 759 shall be fitted and shall incorporate the following features:

- (a) A pre-set, non-adjustable lift pressure of 3 bar (43.5 lbf/in²).
- (b) A seating or valve face of suitable resilient material.
- (c) A manual test device.
- (d) Provision for connection to a drain pipe.

The safety valve shall be fitted either directly to the upper portion of the boiler water section or in the flow pipe, as near as is practicable thereto, with no intervening valve or restriction. It should be fitted in an upright position, accessible for testing. The safety valve shall be so positioned or any discharge pipe so arranged that discharge of water or steam from the valve cannot create a hazard to occupants of the premises or cause damage to electrical components and wiring.

4.6.3 Expansion vessel

A diaphragm type expansion vessel shall be connected at a point close to the inlet side of the circulating pump in a manner laid down in the vessel maker's instruction (see illustration of recommended system layout).

The expansion vessel must be chosen to suit the volume of water in the system. The charge pressure shall not be less than the static head at the point of connection.

The ratio of total system volume to expansion vessel volume depends on several factors such as vessel charge pressure, initial system pressure, and maximum boiler temperature. For most systems the ratio will be between 8:1 and 12:1 (see BS 5449:1 for specific information). The volume of water in the appliance alone is 0.87 litre (1.53 pint). Further details may be obtained from the British Gas Publication entitled "Material and Installation Specifications for Domestic Central Heating and Hot Water".

4.6.4 Pressure gauge

A pressure gauge with set pointer and covering at least the range 0 to 4 bar (0 to 60 lbf/in²) shall be permanently fitted to the system in a position visible to the person carrying out the filling operation.

4.6.5 Cylinder

The hot water cylinder shall be either of the indirect coil type or a direct cylinder fitted with an immersion calorifier.

4.6.6 Make-up

Provision shall be made for replacing water lost from the system from a make-up vessel mounted in a position higher than the top 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 circuit. Where access to a make-up vessel would be difficult, provision for make-up can be made by pre-pressurisation of the system.

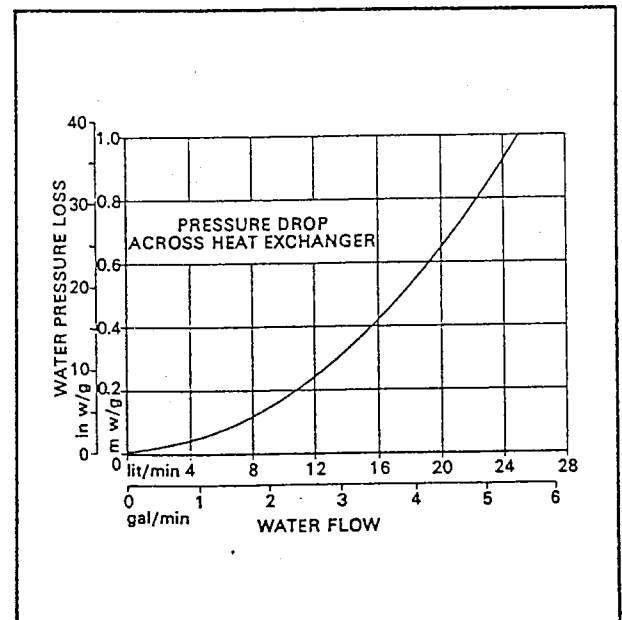
4.6.7 Filling

There shall be no direct connection to the mains water supply or to a storage tank supplying domestic water even through a non-return valve without the approval of the local Water Authority. The system shall be filled with water either from the mains water supply or from a sealed system filler pump with a break tank (see sketch).

The system shall be fitted with a filling point at low level which shall have a stop valve. If direct mains filling is proposed a non-return valve and anti-vacuum valve shall be fitted on the mains side of the stop valve, and both valves shall be of a type approved by a National Water Council.

4.6.8 Commissioning (sealed systems only)

- (a) Flush the whole system with cold water and fill until the pressure gauge registers 1.5 bar (22 lbf/in²). Clear any air locks and examine for leaks. Rectify where necessary.
- (b) Check the operation of the safety valve preferably by allowing the water pressure to rise until the valve lifts. This should be within 0.3 bar (± 4.3 lbf/in²) of the pre-set pressure. Where the above is not possible a manual check should be conducted.
- (c) Release cold water to initial design pressure. Light boiler and heat system to maximum working temperature. Examine for leaks; turn off boiler and drain the system while it is still hot.
- (d) Refill and vent system. Adjust to initial design pressure.



5 EXTERNAL CONTROLS

Any external controls, e.g. clock, room thermostat, cylinder thermostat, must be WIRED SEPARATELY AND ARRANGED TO INTERRUPT THE SUPPLY TO THE BOILER. If a frost thermostat is fitted it must be wired to override the external controls.

6 REGULATION OF THE BOILER

- 6.1 Ensure that the system has been thoroughly flushed and is full of water and that all air is properly vented from the system, including the pump.

Before operating the appliance check that time clocks, room thermostats, domestic cylinder thermostats and other controls that may be used on the system are calling for heat and checked for correct operation.

Check the burner tray is properly located underneath the burner. See diagram 10.

Fit front cover if it has been removed. The top edge should be clipped in position before pressing in the bottom edge, avoiding any case distortion, as this would make the seal ineffective.

- 6.2 TURN BOILER THERMOSTAT TO "OFF" POSITION.

- 6.3 Turn on the main electricity supply to the unit and check that the pump is circulating water through the unit.

- 6.4 Turn on gas cock in main supply pipe. Turn gas control knob to "pilot" setting and press.

- 6.5 Press igniter knob and release. Check that pilot is alight through viewing window in front cover of the unit. When the pilot has lit, keep gas control knob depressed for 20 seconds and then release. If pilot does not remain alight repeat lighting procedure after 3 minutes has elapsed. If the gas valve knob is turned to the "OFF" position at this stage no attempt should be made to force it back to the "Pilot" position until three minutes have elapsed.

If pilot will not remain alight proceed to 9.2.

- 6.6 Turn the gas control knob to "ON" setting, turn thermostat clockwise and the main burner should ignite gradually, taking 3 to 5 secs. to reach full flame and can be seen through viewing window. For checking purposes the table on page 3 shows the pressure at the burner test point (see diagram 5). If it is required to meter the gas rate the correct flow which the meter should pass is given in the section on GAS. This flow should be measured when the appliance is at thermal equilibrium, and with all other gas appliances served by the meter turned off.

If the burner pressure requires adjustment, remove the pressure regulator cover screw, see diagram 5 and adjust the internal grub screw to the required pressure. Turn clockwise to increase pressure. Replace cover screw.

- 6.7 Test for gas soundness around boiler components using sense of smell and leak detection fluid.

- 6.8 Carry out a spillage test as detailed in BS 5440:1.

- 6.9 Check the operation of the flame failure device on the boiler to ensure that the burner shuts down within 60 seconds.

The thermocouple output in millivolts should be checked, with the thermocouple both in and out of circuit. Refer to the graph (diagram 11), the intersection of the two voltages on the graph must lie within area 'B' shown.

If the intersection of the two voltages does not lie within area 'B', proceed as 9.2.2.

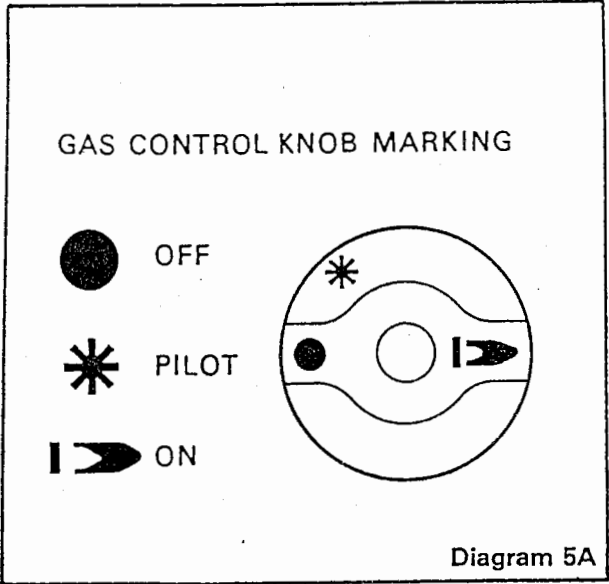
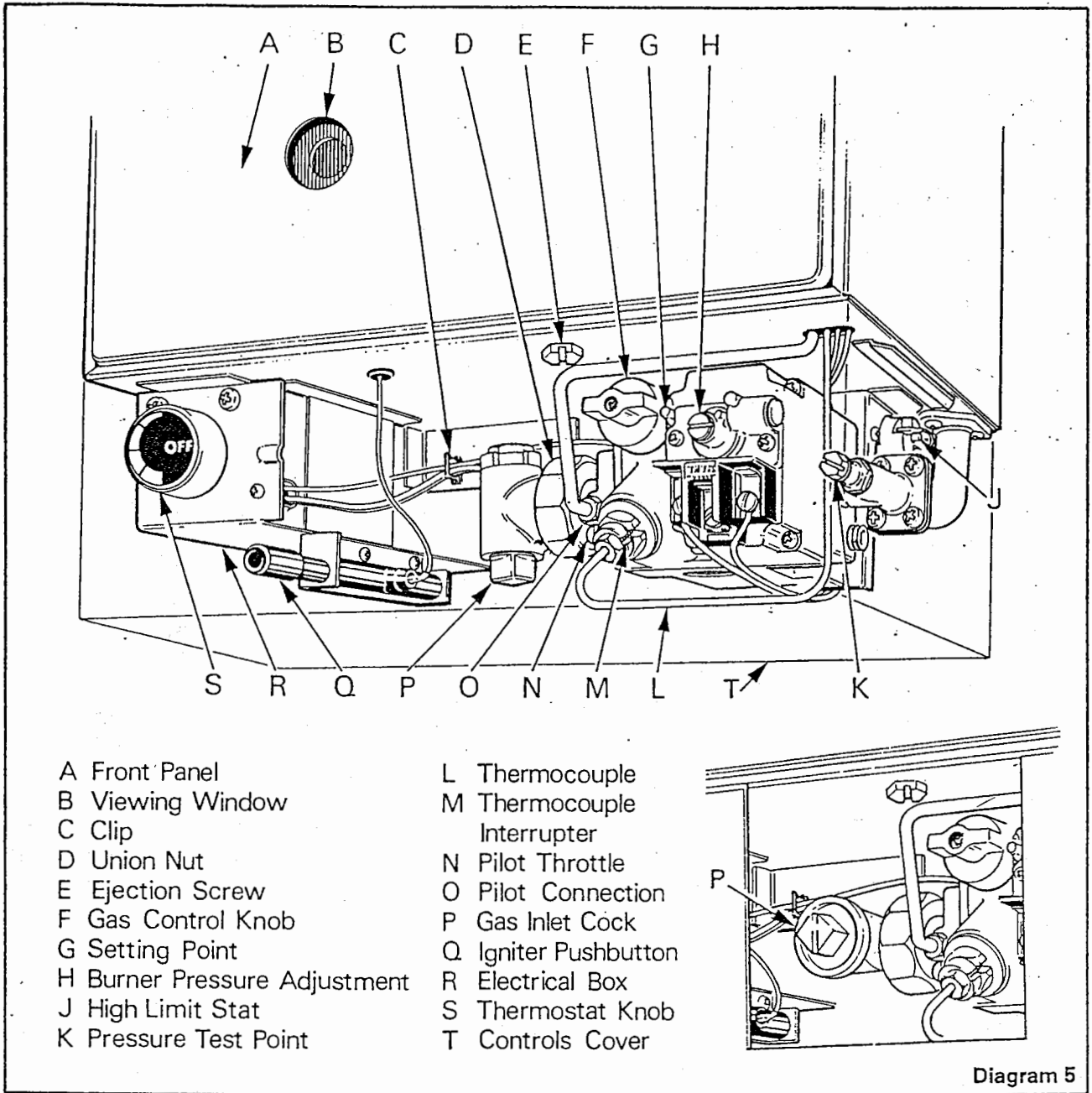
- 6.10 With the system controls allowing normal operation, allow the circuit to warm up, check that all radiators are warm.

- 6.11 Adjust the thermostat to the required setting, adjust systems controls to their required settings and instruct the user in the operation of the unit.

- 6.12 Replace controls cover.

- 6.13 Leave this Instruction Book with user or, at the gas meter.

Ensure that the user has the Users' Operating Instructions.



7 SYSTEM GUIDANCE

7.1 The following information is for the general arrangement of the pipework and is intended for guidance purposes only.

It is, however, important that the relative positions of the pump, cold feed and open vent should be as illustrated in diagram 6. Any external controls *including the pump* must be wired separately and arranged to interrupt the electricity supply to the boiler. All controls should be installed in accordance with the appropriate manufacturers' instructions.

If, by the design of the system, there is a possibility that the water flow rate through the boiler could fall below the minimum requirement of 491 litre/h (1.8 gal/min) for the 25-30, 655 litre/h (2.4 gal/min) for the 30-40, or 818 litre/h (3.0 gal/min) for the 40-50, a by-pass should be incorporated as this will ensure that part of the system water flow is being re-circulated through the boiler.

Insufficient water flow may lead to noise.

A suggested convenient position for the by-pass is shown on the pipework arrangement on the following page.

To adjust the by-pass the boiler should first be fired with the by-pass valve fully closed on full service, i.e. central heating and domestic hot water. The pump should then be set to give the 11°C (20°F) temperature rise across the boiler with the flow temperature of 82°C (180°F) approx. thus providing a flow rate through the boiler of 686 litre/h (2.5 gal/min) for the 25-30, 916 litre/h (3.4 gal/min) for the 30-40, or 1150 litre/h (4.2 gal/min) for the 40-50.

Having achieved this condition the boiler should then be operated on domestic hot water only with the by-pass valve fully closed. If noise is experienced, indicating a reduced flow condition, the valve should be gradually opened to ensure the minimum flow rate is obtained.

When an inhibitor is to be used in the system contact should be made with the inhibitor manufacturers so that they can recommend their most suitable product.

7.2 PLEASE REMEMBER:

YOU MUST ALWAYS USE THE PUMP

YOU MUST ALWAYS INCORPORATE PUMPED PRIMARIES

THE PUMP MUST BE MAN ENOUGH FOR THE JOB

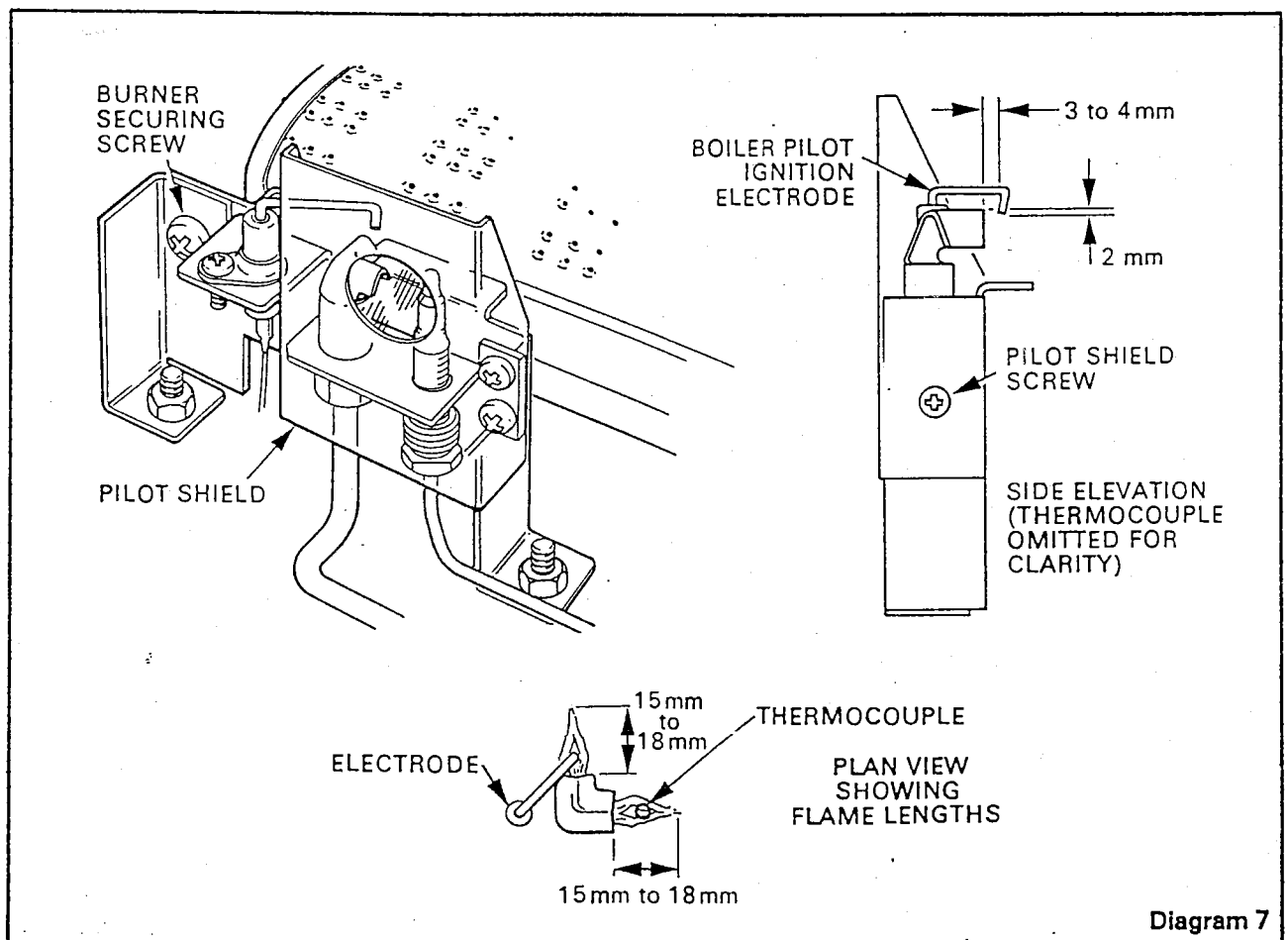
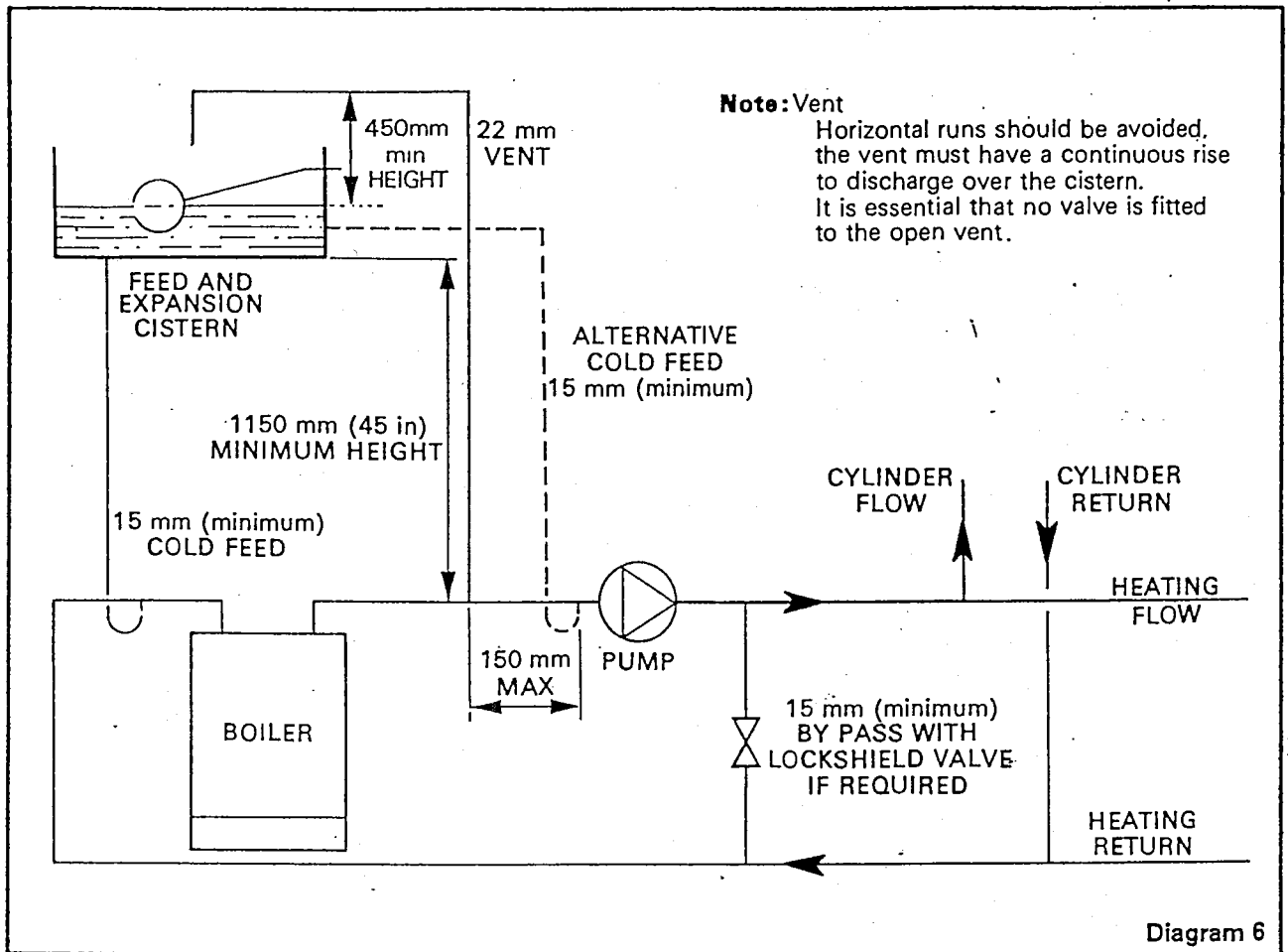
INCORRECT WIRING CAN BE DANGEROUS

STATIC HEAD IS IMPORTANT

BALANCE THE SYSTEM

VENT THE SYSTEM BEFORE FIRING THE BOILER

ALWAYS ALLOW ACCESS FOR SERVICING THE APPLIANCE AND ANY CONTROLS.



8 SERVICING AND REMOVAL OF PARTS

Before carrying out servicing procedures or exchange of parts always DISCONNECT ELECTRICITY SUPPLY AND TURN OFF GAS AT INLET COCK.

Upon completion of a service or exchange of parts, always check for gas soundness.

All items are replaced in reverse order to that described, except where stated otherwise.

8.1 FRONT PANEL

8.1.1 Remove control cover by pulling forwards and clear of appliance.

8.1.2 Turn slotted screw underneath case anti-clockwise to push lower edge of front panel forwards and pull panel clear.

8.1.3 Turn screw clockwise to its fullest extent in readiness for refitting front cover later. (Should block come off screw, replace it with inclined face to top and front.)

8.2 MAIN BURNER

8.2.1 Remove front panel.

8.2.2 Remove the Pozidriv screw at the L.H. side of the pilot bracket. See diagram 7. This releases the main burner.

8.2.3 Move the main burner to the left to clear the injector at the right hand end, then withdraw the main burner, injector end first. Take care not to damage pilot burner, electrode, etc.

8.2.4 With the burner removed, it should be cleaned as follows:

(a) Holding the injector strap at the R.H. end of the burner turn it anti-clockwise through approx. 30° to release the bayonet type fitting of the end plate, see diagram 8.

(b) Withdraw the end plate, with the venturi attached, from the burner body. Take out the filter gauze from inside the burner.

(c) Clean the filter thoroughly by brushing or vacuuming until all accumulated lint and dust has been removed, also clean inside the burner.

(d) Replace the filter in the burner body and re-fit the end plate, making sure that the gasket is in position and that both lugs on the end plate engage into the slots in the burner body before turning the end plate through approx. 30° to secure it in position.

8.3 BURNER INJECTOR

With the main burner removed as above, the injector can be unscrewed.

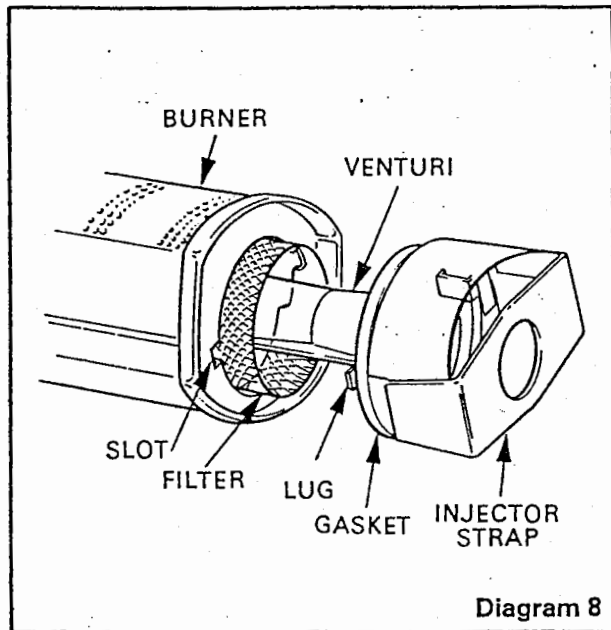


Diagram 8

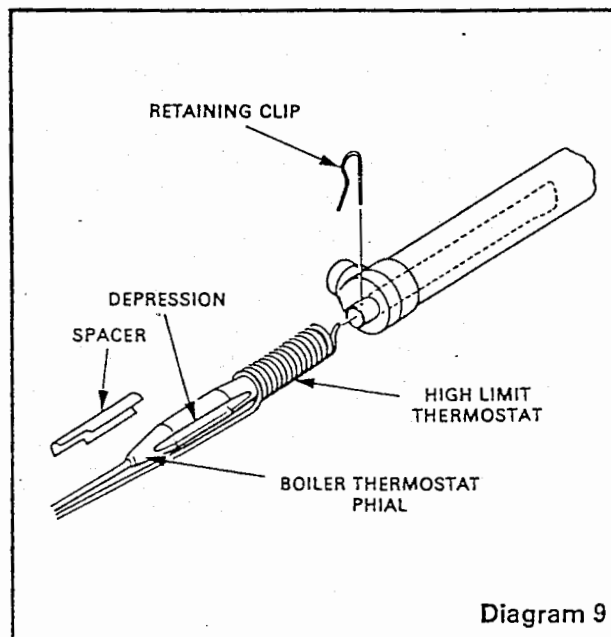


Diagram 9

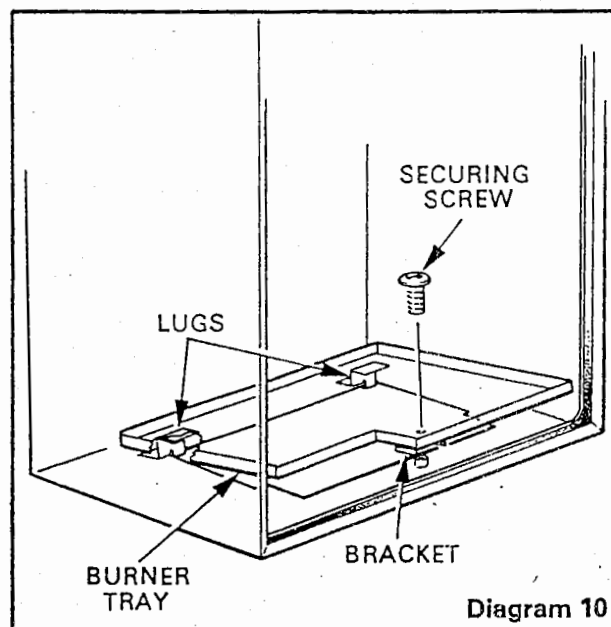


Diagram 10

8.4 PILOT BURNER AND PILOT INJECTOR

- 8.4.1 Remove front panel.
- 8.4.2 Undo the screw at the R.H. side of the pilot shield, and remove pilot shield (see diagram 7).
- 8.4.3 Remove main burner as in 8.2, taking care not to damage the electrode.
- 8.4.4 Pull off ignition lead from electrode.
- 8.4.5 Unscrew the tubing nut at the base of the pilot burner.
- 8.4.6 Undo the two M4 pozidriv screws and hex. nuts securing the pilot burner.
- 8.4.7 Unscrew the thermocouple nut.
- 8.4.8 The pilot can now be lifted away.

NOTE: The pilot injector is loose in the base of the pilot burner and will drop out as the pilot is removed.

- 8.4.9 Take care not to damage the electrode.

8.5 THERMOCOUPLE

- 8.5.1 Follow instructions 8.4.1 to 8.4.8 for pilot burner and pilot injector.
- 8.5.2 Undo thermocouple connection at gas valve and remove thermocouple.
- 8.5.3 When replacing thermocouple check that the interrupter is located in the thermocouple connection at the gas valve. This connection must not be overtightened, a quarter of a turn beyond finger tight is sufficient.

8.6 ELECTRODE

- 8.6.1 Follow instructions 8.4.1 to 8.4.3 for pilot burner and pilot injector.
- 8.6.2 Pull off ignition lead from electrode.
- 8.6.3 Remove screw securing burner tray (see diagram 10) and raise the front of the tray to allow access to the two hex. nuts securing the pilot bracket to the base. Undo the nuts.
- 8.6.4 Raise the whole pilot assembly and ease forward and down so that the electrode clears the edge of the heating body.
- 8.6.5 Remove the Pozidriv screw securing the electrode.
- 8.6.6 When replacing, and before securing the pilot bracket to the base, check that the electrode spark gap is as shown in diagram 7.
- 8.6.7 When re-fitting burner tray screw, only tighten until the bracket locates on casing base, see diagram 10.

8.7 GAS VALVE

- 8.7.1 Remove control cover by pulling forward clear of case.
- 8.7.2 Unscrew thermocouple connection to gas valve.
- 8.7.3 Remove interrupter from thermocouple connection on gas valve.
- 8.7.4 Disconnect orange leads from electrical connections on valve.
- 8.7.5 Undo tubing nut on pilot tube connection.
- 8.7.6 Undo union nut securing gas valve to gas inlet cock.
- 8.7.7 Undo two Pozidriv screws to release bracket at L.H. side of valve.
- 8.7.8 Undo four Pozidriv screws securing manifold at R.H. side of valve, enabling the unit to be removed.
- 8.7.9 When replacing, ensure that the interrupter leads are not trapped.

8.8 PIEZO GENERATOR

- 8.8.1 Remove control cover by pulling forward clear of case.
- 8.8.2 Pull off tag of ignition lead.
- 8.8.3 Undo two Pozidriv screws, nuts and washers securing generator to control box.

8.9 BOILER THERMOSTAT

- 8.9.1 Remove front panel, as in 8.1.
- 8.9.2 Remove retaining clip and spacer from phial pocket at top right-hand side of body. (See diagram 9).
- 8.9.3 Withdraw boiler thermostat phial from pocket.
- 8.9.4 Remove knob from front of electrical box by pulling off.
- 8.9.5 Undo two top screws and shakeproof washers securing electrical box to control mounting bracket to release box. Support box so that leads are not strained.
- 8.9.6 Undo screw clamping capillary inside electrical box.
- 8.9.7 Remove leads from tags on boiler thermostat.
- 8.9.8 Undo two screws and shakeproof washers securing boiler thermostat to front of electrical box and remove thermostat from box.
- 8.9.9 Withdraw phial through hole in case and release capillary from clip 'C', see diagram 5.

NOTE: When replacing boiler and high limit thermostats (see diagram 9) ensure that capillary on high limit thermostat fits snugly against depression in side of thermostat phial. Push both components fully home in phial pocket, fit spacer and secure with retaining clip. Ensure that capillary is clamped securely inside electrical box.

8.10 HIGH LIMIT THERMOSTAT

- 8.10.1 Remove front panel, as in 8.1.
- 8.10.2 Detach leads from tags on high limit thermostat (see diagram 5).
- 8.10.3 Undo two screws to release high limit stat body from mounting bracket.
- 8.10.4 Remove retaining clip and spacer from phial pocket.
- 8.10.5 Withdraw both phials from pocket.
- 8.10.6 When replacing boiler and high limit thermostats (see diagram 9) ensure that capillary on high limit thermostat fits snugly against depression in side of thermostat phial. Push both components fully home in phial pocket, fit spacer and secure with retaining clip.

Should the high limit thermostat operate, this indicates that a fault has developed. The device can be reset by pressing the reset button in the centre.

8.11 TRANSFORMER

- 8.11.1 Remove control cover by pulling forward clear of case.
- 8.11.2 Release orange gas valve lead from the spring clip on control mounting bracket (diagram 5).
- 8.11.3 Unscrew two top screws to release electrical control box from bracket and support the box so that leads are not strained.
- 8.11.4 Undo two screws securing transformer to box and remove.
- 8.11.5 Disconnect live (brown) and neutral (blue) leads from the upper tags on transformer.
- 8.11.6 Remove orange leads from tags on low voltage side of transformer.
- 8.11.7 When re-assembling, ensure live and neutral leads are connected to the upper tags (see diagram 4).

8.12 HEATING BODY

8.12.1 Cleaning

- (a) Remove front panel as in 8.1 and burner as in 8.2.
- (b) Inspect heating body for deposits, using mirror and torch as necessary.
- (c) For cleaning, remove draught diverter baffle by undoing one screw at each side and sliding forward and clear, see diagram 3.
- (d) Brush body deposits clear of heat exchanger, collect and remove from combustion chamber.

8.12.2 Heating body-removal

- (a) Remove front panel as in 8.1.
- (b) Remove burner as in 8.2.
- (c) Undo the screw at the R.H. side of the pilot shield and remove shield (see diagram 7).
- (d) Pull off ignition lead from electrode.
- (e) Unscrew the tubing nut at the base of the pilot burner releasing pilot pipe.
- (f) Undo the screw securing the burner tray (see diagram 10) and raise the front of the tray to allow access to the two hex. nuts securing the pilot bracket. Remove the nuts and lift the bracket, complete with pilot burner, etc. to clear the pilot pipe. (NOTE: the pilot injector is loose in the base of the pilot burner and will drop out at this stage). Withdraw the bracket, etc. with the thermocouple still attached, to the front of the casing, the burner tray can then be removed.
- (g) Remove draught diverter baffle by undoing one screw at each side and sliding forward and clear. (see diagram 3).
- (h) Remove retaining clip and spacer from phial pocket and withdraw both phials from pocket. (see diagram 9).
- (i) Remove injector.
- (j) Drain heating circuit of water (a drain cock is usually found at lowest point of heating system).
- (k) Drain body only through drain point located at lower left-hand side of body, see diagram 3.
- (l) Undo flow and return connections.
- (m) Undo two screws holding body retaining bracket and remove bracket, see diagram 3.
- (n) Undo locknuts on flow and return bulkhead fittings. These are located above the cylindrical spacers.
- (p) The body can now be lowered and removed from the case. The spacers and washers must be retained and re-fitted when the body is replaced. Care must be taken to miss the pilot tube.
- (q) When re-assembling the heating body, fit washers, spacers and locknuts and ensure that the body is fitted and sealed correctly into the draught diverter and that the flue baffle is correctly fitted. Fit the body retaining bracket.
- (r) When replacing the burner tray, engage the lugs at the L.H. rear first, one over and one below the bottom of the casing. Keep the tray as far to the left as possible. Next engage the lugs at the R.H. rear, again one over and one below the casing bottom, (see diagram 10). When re-fitting the burner tray screw, only tighten until the bracket locates on the casing bottom.
- (s) Ensure that pilot injector is re-fitted.

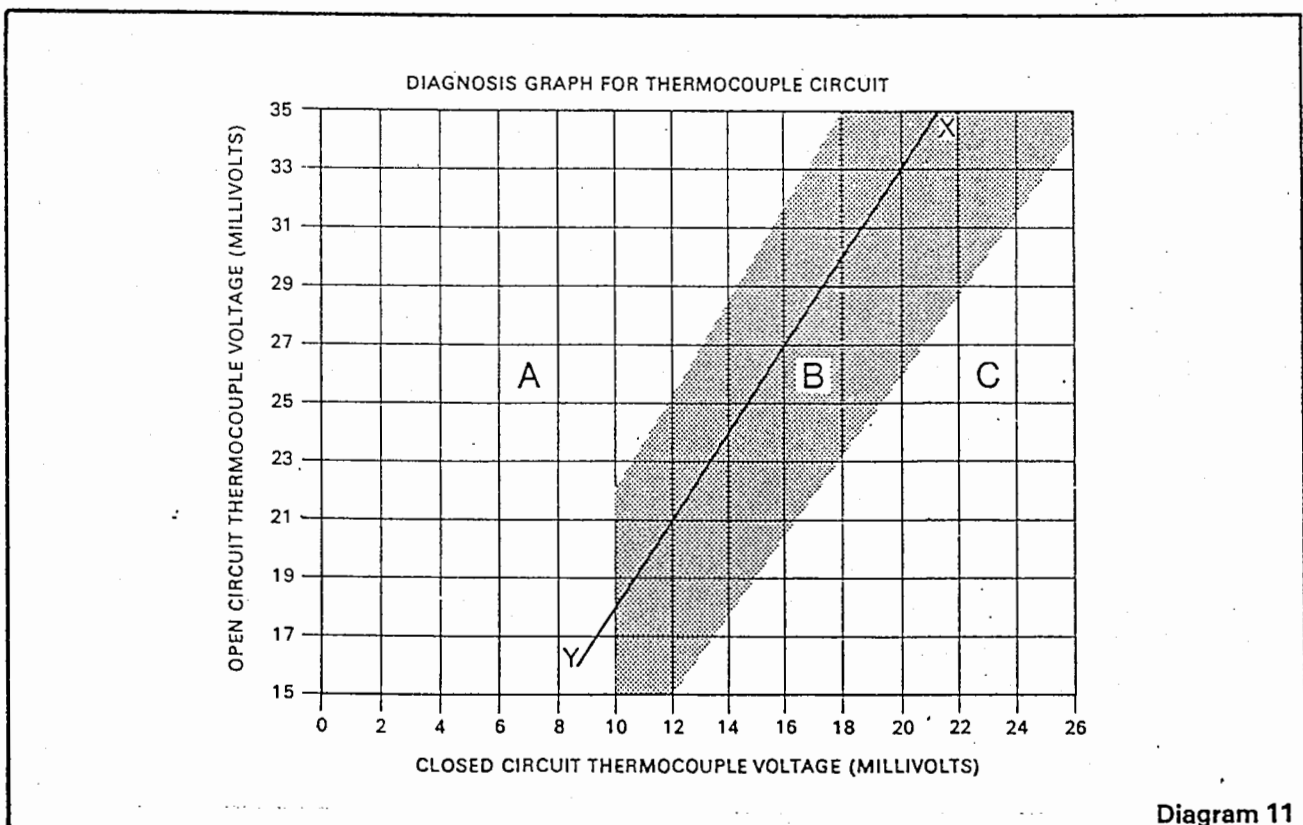
9 FAULT FINDING CHART

9.1 PILOT WILL NOT LIGHT

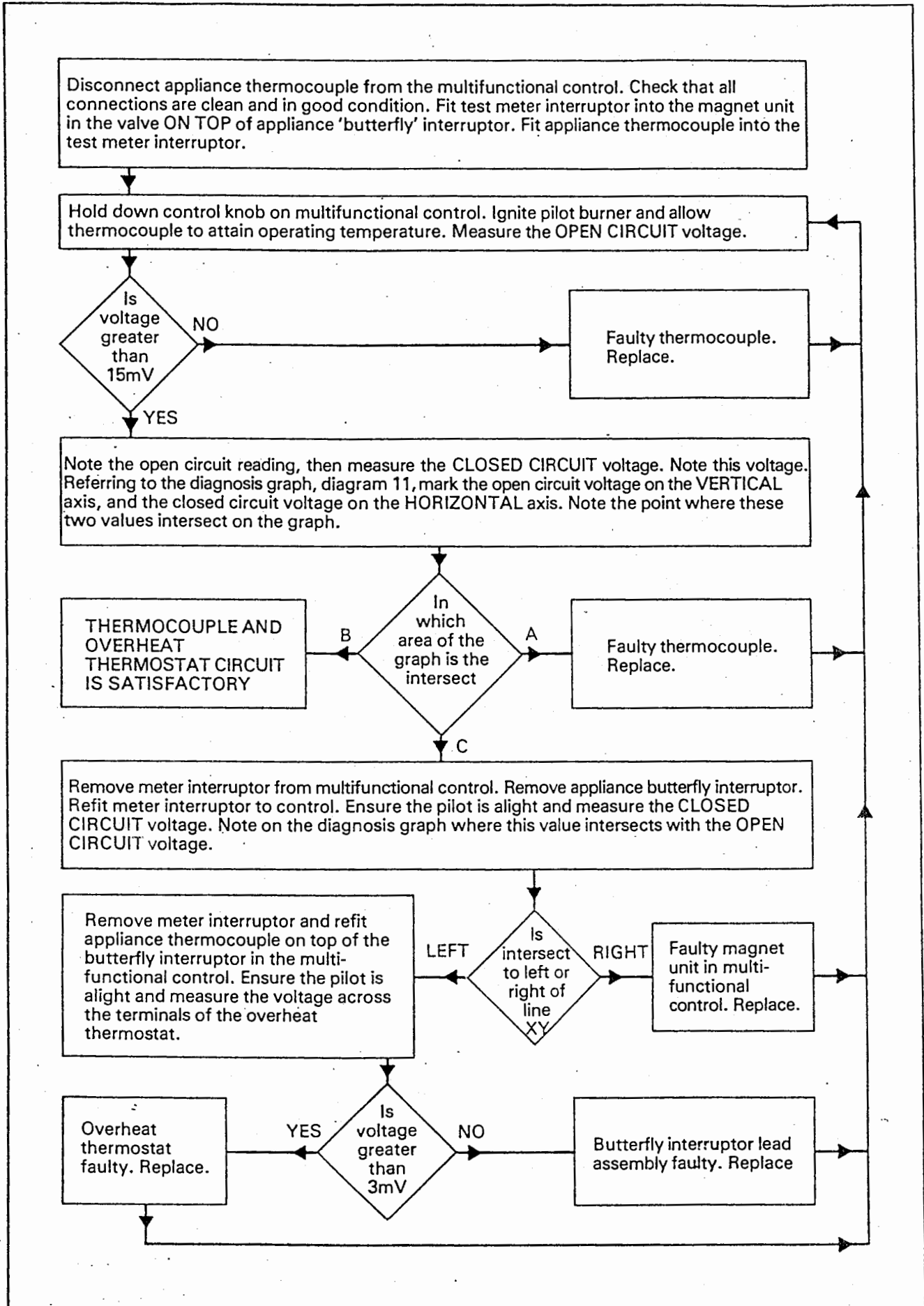
Cause	Remedy
9.1.1 Operating instructions not correctly carried out.	Following lighting instructions correctly.
9.1.2 Gas inlet pressure inadequate.	Check all cocks are open and gas line is unrestricted.
9.1.3 Air in gas line.	Purge out air.
9.1.4 Gas supply to pilot restricted: (Check by applying match to pilot instead of pressing igniter).	
(a) On undoing tubing nut at pilot multi-function control and pressing knob, gas does not flow freely.	Rectify blockage in multi-function control. Ensure pilot throttle is fully open.
(b) On undoing tubing nut at burner and pressing control knob, gas does not flow freely.	Change blocked pilot tube.
(c) As 9.1.4 (b) but gas does flow freely.	Rectify blockage in pilot injector or pilot head.
9.1.5 Pull ignition lead off electrode. Hold end of lead close to burner, operate spark generator.	No spark — change ignition lead, if still no spark, change generator.
9.1.6 Electrode not correctly positioned in relation to pilot head.	Remove and reposition as in 8.6.6.

9.2 PILOT WILL NOT STAY ALIGHT WHEN CONTROL KNOB IS RELEASED

Cause	Remedy
9.2.1 High limit thermostat has tripped.	Reset high limit thermostat by pressing button, situated in centre of thermostat.
9.2.2 Thermocouple outputs not within area 'B' on diagram 11.	Adjust screw on pilot throttle (see diagram 5) until millivoltages are within area 'B' on diagram 11. If this cannot be achieved check pilot injector for damage or blockage, if satisfactory proceed to 9.2.3.



9.2.3 To test the thermocouple and overheat thermostat circuit a meter with a range of 0-30mV is required together with a thermocouple interruptor test unit similar to the B.G.C. (Minitest 6) Multimeter and interruptor.



9.3 BURNER WILL NOT IGNITE

Cause

- 9.3.1 Gas control knob in wrong position.
- 9.3.2 Boiler thermostat not on.

Remedy

Check gas control knob is in "ON" position.
Check boiler thermostat is in an "ON" position.
See also 9.3.3 on page 20.

9.4 THERMOSTAT WILL NOT CUT OUT

Cause

- 9.4.1 Thermostat phial not fitted in pocket.
- 9.4.2 Faulty thermostat.

Remedy

Fit phial in pocket.
Replace thermostat.

9.5 OVERHEAT DEVICE CUTS OUT PREMATURELY

Cause

- 9.5.1 Air in heating body.
- 9.5.2 Water circulation low or non-existent.
- 9.5.3 Overheat device cuts out before boiler cycles on max boiler thermostat setting.
- 9.5.4 Correctly set overheat device cuts prematurely. 1 and 2 satisfactory.

Remedy

Vent system: Alter system layout if necessary.
Pump not functioning correctly. Check pump wired to run while boiler is on. Alter layout if necessary.
Change faulty overheat device.

- 9.5.5 **Note:** If the overheat device has operated it must be reset by pressing the reset button at the centre of the device before the pilot can be re-established. See diagram 5.

9.6 INSUFFICIENT HEAT OUTPUT

Cause

- 9.6.1 Thermostat set too low.
- 9.6.2 Inlet gas pressure inadequate.
- 9.6.3 Governor setting incorrect. (While measuring pressure ensure thermostat is on maximum setting.)

Remedy

Increase setting.
Increase gas pressure.
Check burner pressure against data plate. Reset only if pressure is more than 10% away from stated figure.

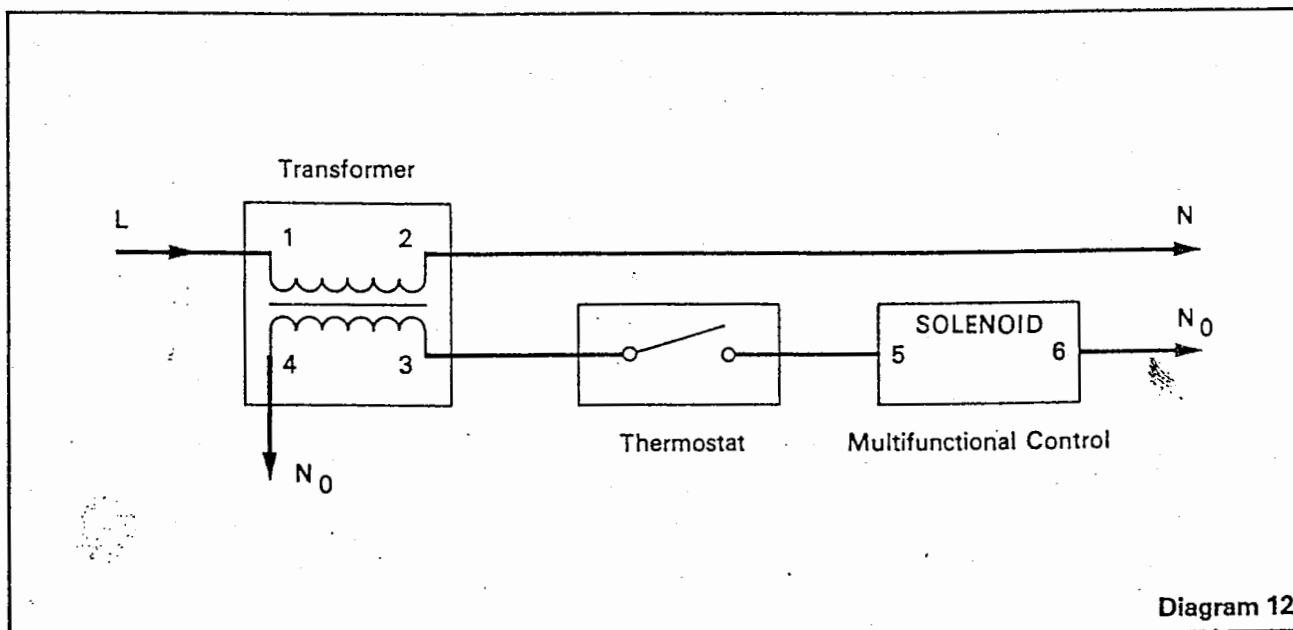
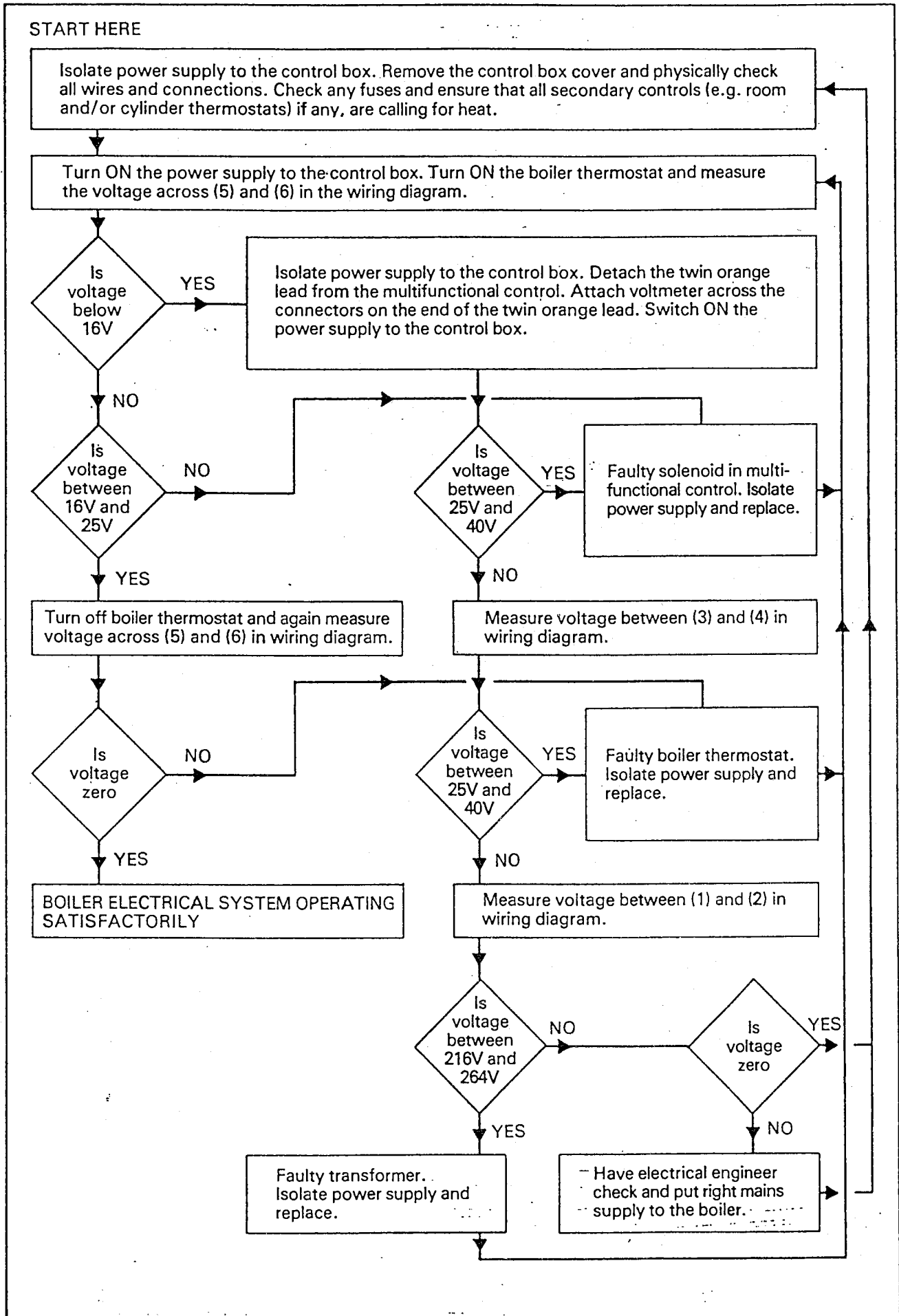


Diagram 12

9.3.3 Electrical fault finding, refer to wiring diagram (diagram 12) when using this chart.



9.7. APPLIANCE NOISY IN OPERATION*

Cause	Remedy
9.7.1 Overgassed.	Check burner pressure against data plate and adjust if necessary, but only if pressure is more than 10% away from stated figures.
9.7.2 Complete lack of water flow.	Check system controls for correct installation or correct type of controls.
9.7.3 Air in system.	Remove air from system. When boiler is first commissioned the air dissolved may take some time to boil out, therefore attempts should be made to remove air periodically 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.
9.7.4 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 which is more noticeable at high temperatures. Normal operation of the boiler over a period should remove most noise.

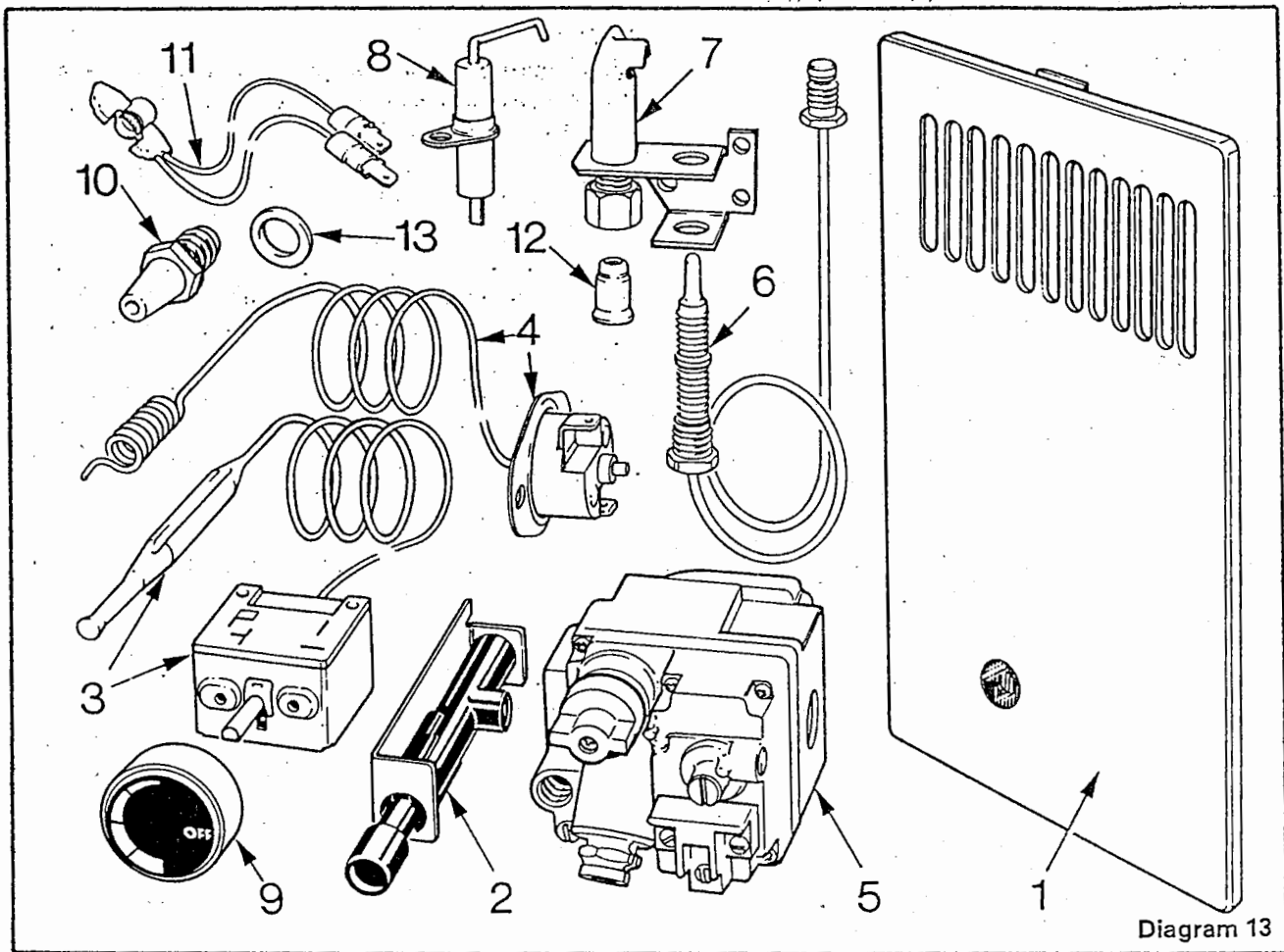


Diagram 13

10 SHORT LIST OF PARTS

The key number in the first column of this list will help you identify each part in diagram 13. When ordering spare parts, quote the part number and description, stating parts required for Fuelsaver 25-30, 30-40 or 40-50 central heating unit. Gas Regions should also include the G.C. Part Number.

Because of our constant endeavour for improvement, details may vary slightly from those given in this booklet.

Key No.	G.C. Part No.	Part No.	Description
1	330 421	412450	Front Cover
2	393 563	412805	Spark generator (Vernitron 66108)
2	387 907	412805	Spark generator (Kigass D5037) } Alt've
3	382 353	403046	Boiler Thermostat (Ranco C26—PO624)
4	382 351	403073	Overheat Thermostat (Ranco LM5—P8037)
5	393 746	412806	Unitrol gas valve (Robertshaw 7000BER S7AL 356.501.774)
6	391 720	412854	Thermocouple (Robertshaw 29.18.0038)
7	391 721	412852	Pilot burner (Robertshaw 5CHL-1)
8	393 762	412853	Electrode (Vernitron 60866)
9	382 354	410935	Thermostat Knob
10	384 680	412819	Boiler injector (25-30 & 30-40 only)
10	384 748	411047	Boiler injector (40-50 only)
11	330 369	412816	Thermocouple interrupter (Robertshaw 21898)
12	391 722	412844	Pilot injector (Robertshaw 76360)
13	330 409	412846	Sealing washer — boiler injector