206741/10/86

# Glow-worm

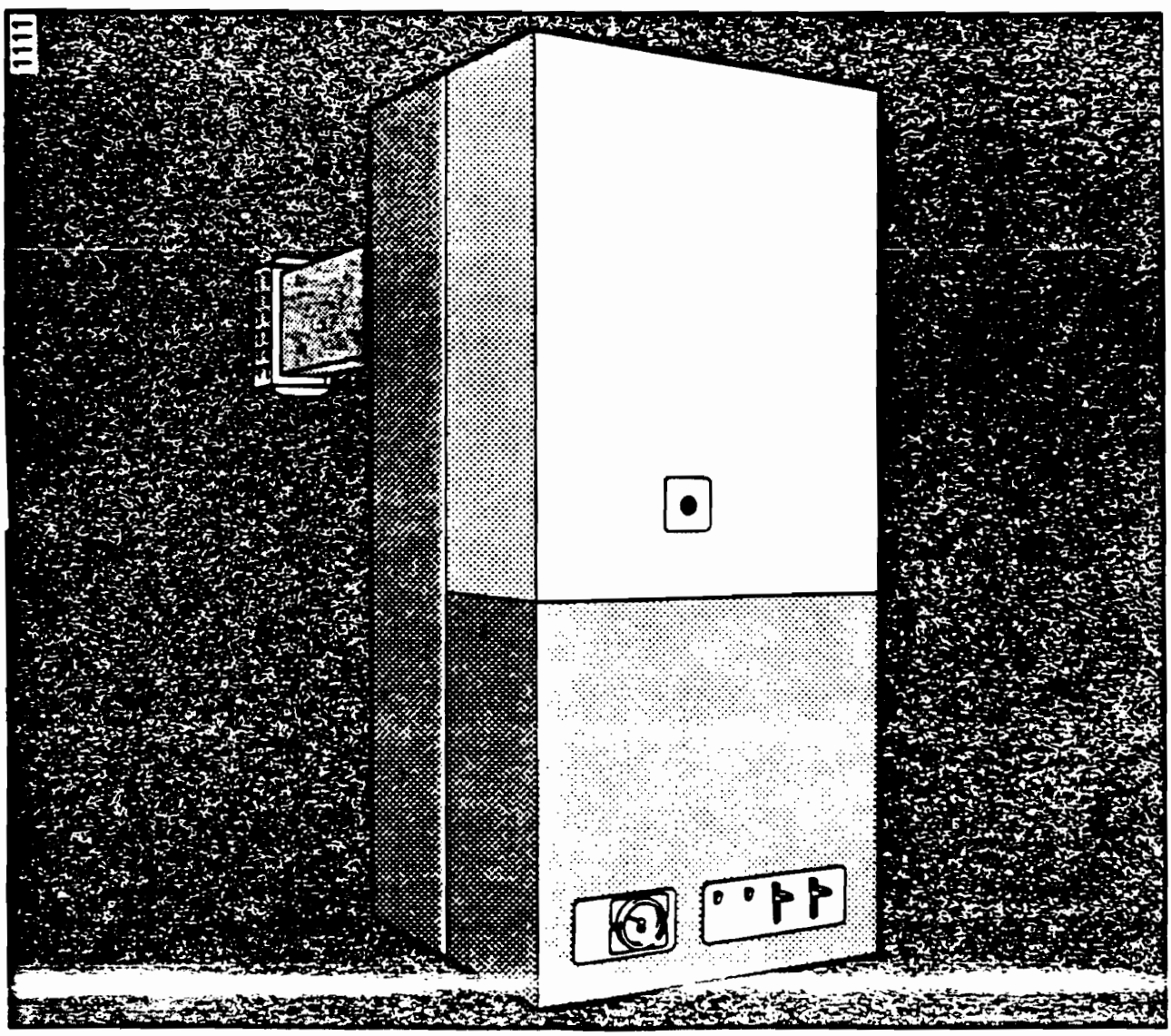
## Servicing Instructions

To be left adjacent to the gas meter

# FUELSAVER COMBINATION FANNED FLUE

## Boiler and Water Heater

**G.C. Number 47 313 02**



Servicing and/or the replacement of parts must always be carried out by a competent person. Any parts removed for servicing, or spare part replacements should be fitted in the reverse order of removal, unless stated otherwise. After completing any servicing or replacement of gas carrying components always test for gas soundness and carry out functional checks of controls.
Discard all used sealing washers and 'O' rings when exchanging components. Replace with new seals.
The data plate can be found on top of the air duct base, i.e. underneath the burner.

## 1.1 ISOLATION OF UNIT

1.1.1 BEFORE COMMENCING ANY SERVICING OR REPLACEMENT OF PARTS ISOLATE THE ELECTRICITY SUPPLY AT THE EXTERNAL ISOLATOR.

1.1.2 BEFORE COMMENCING ANY SERVICING OR DISCONNECTING ANY GAS CARRYING PARTS TURN OFF THE GAS AT THE SERVICE COCK, see diagram 1.1.

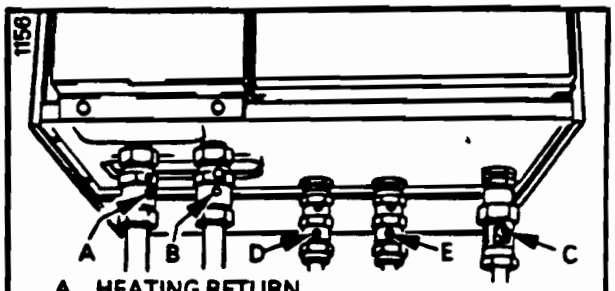
1.1.3 BEFORE DISCONNECTING ANY WATER CONTAINING PART, TURN OFF THE APPROPRIATE ISOLATING VALVES, see diagram 1.1. (Release the water pressure before draining the unit, refer to section 1.3).

## 1.2 CASING REMOVAL

1.2.1 Remove the lower casing by pulling forward off the unit, see diagram 1.2.

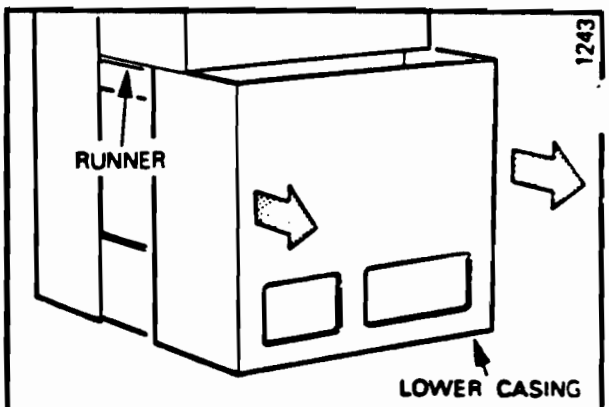
1.2.2 Unscrew the upper and lower securing screws, see diagram 1.3, and remove top casing by pulling forward.

1.2.3 Before replacing the top casing check that the casing seal has not been damaged. A damaged seal must be replaced, refer to section 3.2 Casing/back panel seal.

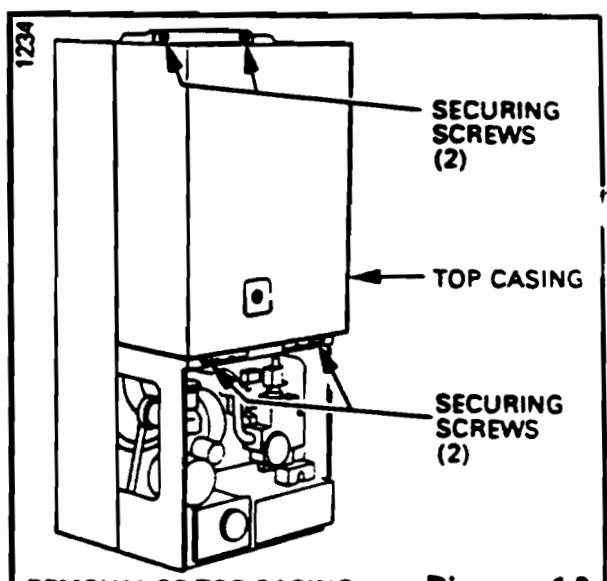



A. HEATING RETURN
B. HEATING FLOW
C. GAS SERVICE COCK
D. DOMESTIC HOT WATER OUTLET
E. COLD WATER INLET

UNIT ISOLATING VALVES **Diagram 1.1**




LOWER CASING REMOVAL **Diagram 1.2**




REMOVAL OF TOP CASING **Diagram 1.3**

## 1.1 INTRODUCTION

1.1.1 The Glow-worm Fuelsaver Combination Fanned Flue unit is a wall mounted, fanned flue room sealed, central heating boiler and domestic hot water heater.

1.1.2 The unit comprises of a heat exchanger, gas and electric controls, safety devices, pump, expansion vessel, and a heat transfer tank for domestic hot water.

## 1.2 HEATING SYSTEM

1.2.1 The unit is only suitable for use on a sealed/pressurised heating system to work at a cold fill pressure of 0.4 to 0.6 bar, (5.9 to 8.9 lbf/sq.in.). The pressure safety valve on the unit is pre-set at 3 bar, (43.5 lb/sq.in.).

1.2.2 IN HARD OR AGGRESSIVE WATER AREAS IT IS RECOMMENDED THAT FERNOX CP3 BE USED.

## 1.3 DOMESTIC HOT WATER SYSTEM

1.3.1 The domestic hot water circuit has a maximum working pressure of 10 bar, (145 lbf/sq.in.). If the mains water pressure exceeds this a pressure reducing governor must be fitted in the mains cold water supply.

1.3.2 The minimum cold water pressure required is 0.5 bar, (9 lbf/sq.in.), (20 ft. head).

## 1.4 PROCEDURE

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 in sections 1.6 to 1.12.

## 1.5 SAFETY

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

## 1.6 STATUTORY REQUIREMENTS

1.6.1 THE INSTALLATION OF THIS UNIT MUST BE CARRIED OUT BY A COMPETENT PERSON AND MUST BE IN ACCORDANCE WITH THE RELEVANT REQUIREMENTS OF THE CURRENT GAS SAFETY (INSTALLATION AND USE) REGULATIONS, I.E.E. WIRING REGULATIONS AND BY-LAWS OF THE LOCAL WATER UNDERTAKING.

1.6.2 DETAILED RECOMMENDATIONS ARE CONTAINED IN THE CURRENT ISSUE OF THE FOLLOWING BRITISH STANDARDS, AND CODES OF PRACTICE:-
CP 331 Part 3; BS5376 Part 2; BS5440 Part 1 & Part 2; BS5449 Part 1; BS5546.

## 1.7 GAS SUPPLY

1.7.1 The gas meter must be capable of passing, in addition to all other demands, 2.9 m3h (103 ft3h.) of Natural gas.

1.7.2 The meter governor must ensure a constant outlet pressure of 20 mbar (8in. wg.). The gas installation should be in accordance with CP331 Part 3. The whole of the gas installation, including the meter, must be testec for soundness and purged in accordance with the recommendations of CP 331: Part 3.

## 1.8 BRITISH GAS APPROVAL

1.8.1 This unit is approved by British Gas for safety and performance. It is therefore important that no alteration is made to this unit unless recommended by T. I. Glow-worm Ltd in writing.

1.8.2 Any direct connection of an "add-on" device not approved by T.I. Glow-worm Ltd. could invalidate British Gas approval, unit warranty and could also infringe the Gas Safety (Installation & Use) Regulations.

## 1.9 ELECTRICAL

1.9.1 All electrical wiring must be carried out by a qualified electrician. All external components shall be of the approved type and shall be wired in accordance with the current edition of the I.E.E. wiring regulations and any local regulations which apply.

1.9.2 The unit must be earthed and connection of the unit and any system controls to the mains supply should be through an unswitched, shuttered outlet socket and fused 3 pin plug. Alternatively, a fused double pole isolating switch may be used, having a minimum double pole contact seperation of 3mm, serving only the unit and systems control.

1.9.3 Heat resistant cables at least 0.75mm$^2$ (24/0.20mm$^2$), to BS6500 Table 9, must be used for all wiring to the control drawer. Refer to Electrical information in DATA section page 2.

1.10 UNIT LOCATION

1.10.1 THIS UNIT IS NOT SUITABLE FOR OUTSIDE INSTALLATION.

1.10.2 Minimum clearances for the safe operation and servicing of the unit are as shown in diagram 1.2. An additional clearance will be required on either side of the unit for installation purposes. This is dependant upon site conditions and is left to the discretion of the installer. Sufficient clearance must be left in front of the unit to remove the outer case and service the unit.

1.10.3 The unit may be installed in any room, although particular attention is drawn to the requirements of the current I.E.E. wiring regulations and, in Scotland, the electrical provision of the building regulations applicable in Scotland with respect to the installation of the unit in a room containing a bath or shower. Where a room-sealed unit is installed in a room containing a bath or shower, any electrical switch or unit control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

1.10.4 A compartment used to enclose the unit must be designed and constructed specifically for this purpose. An existing cupboard or compartment modified for the purpose may be used.

1.10.5 Details of essential features of cupboard compartment design, including airing cupboard installations are given in BS5376: 2 : 1976.

1.10.6 The unit must be mounted on a vertical wall capable of supporting its weight refer to 'DATA' section. The unit may be fitted on a combustible wall and insulation between the wall and the unit is not necessary unless required by the local authority.

1.11 TIMBER FRAMED BUILDINGS

If the unit is to be installed in a timber framed building, it should be fitted in accordance with British Gas Publication "Guide for Gas Installation in Timber Framed Housing" Ref DM2. If in doubt advice must be sought from the local region of British Gas or T.I. Glow-worm Ltd.

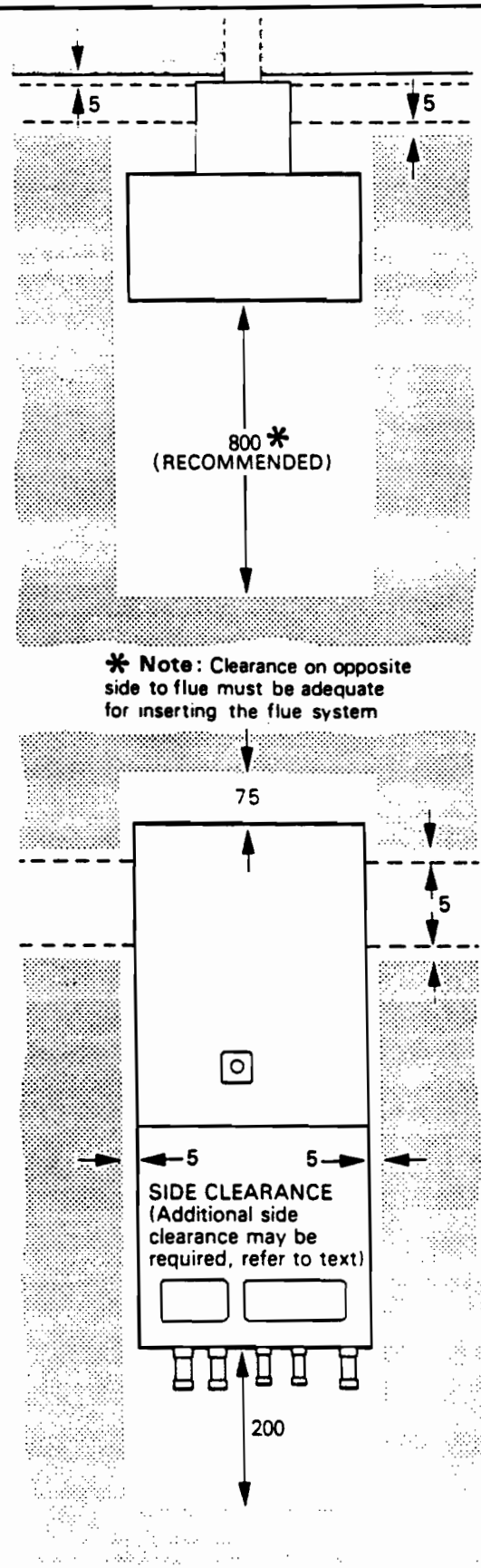



Diagram 1.2

## 1.3 SYSTEM PRESSURE

1.3.1 All water containing parts on the central heating circuit within the boiler are under pressure. This pressure must be released by operating the safety valve (pressure relief valve) before any parts on this circuit are removed.

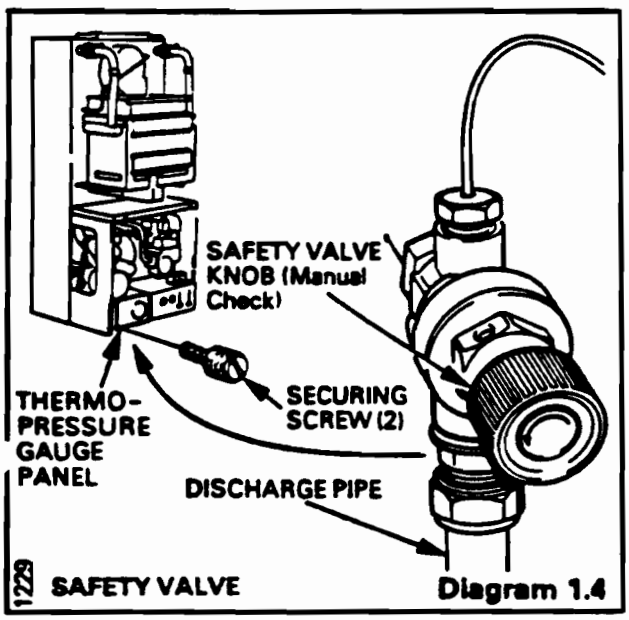
1.3.2 To gain access to safety valve knob, remove the two screws and carefully pull forward the thermo pressure gauge panel, see diagram 1.4. Invert the thermo pressure gauge and resecure it using one of the screws, to prevent any strain on the capillaries.

1.3.3 Turn the safety knob in the direction of the arrow to release the pressure.

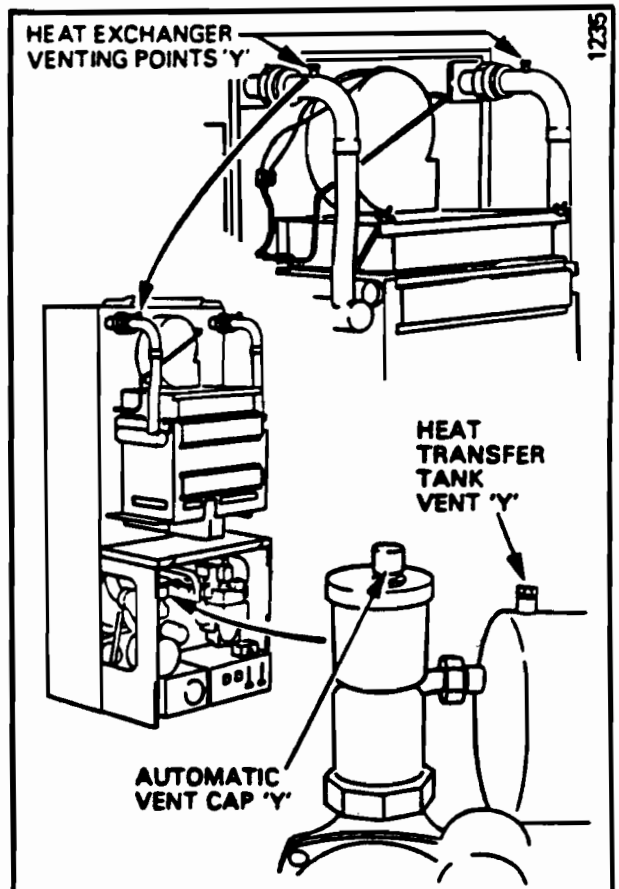
1.3.4 All water containing parts on the domestic hot water circuit are under mains pressure. Before any parts are removed on this circuit, within the unit, it must be isolated and drained using unit drain points, see diagram 1.6.

1.3.5 After replacing any water containing part, refill or make up water loss, vent all air and pressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

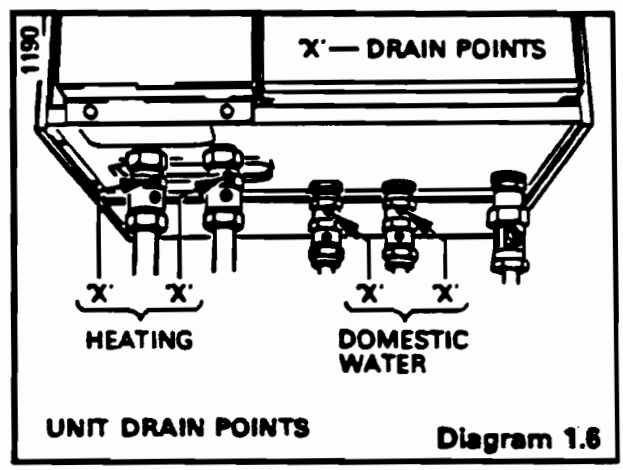
1.3.6 Check that there are no water leaks and the safety valve seats without leaking.




SAFETY VALVE — Diagram 1.4

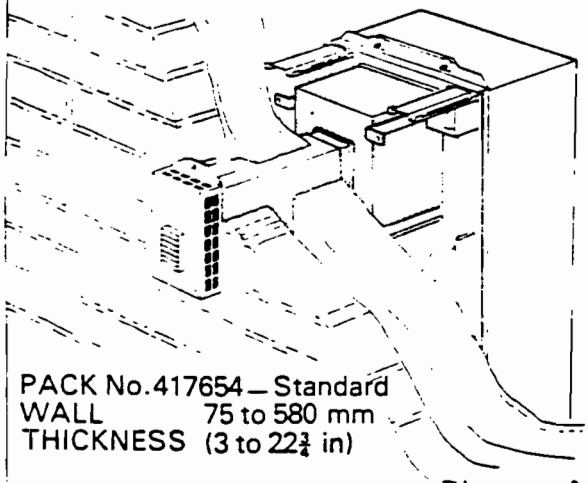



VENTING POINTS 'Y' — Diagram 1.5




UNIT DRAIN POINTS — Diagram 1.6

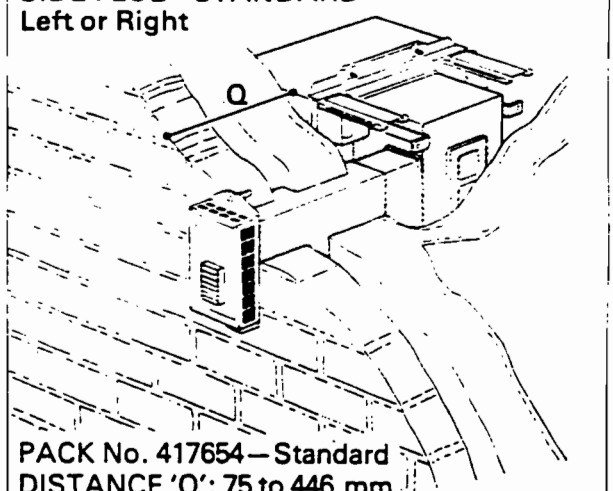
Type A
REAR FLUE—STANDARD



PACK No.417654—Standard
WALL THICKNESS 75 to 580 mm (3 to 22¾ in)

Diagram A1

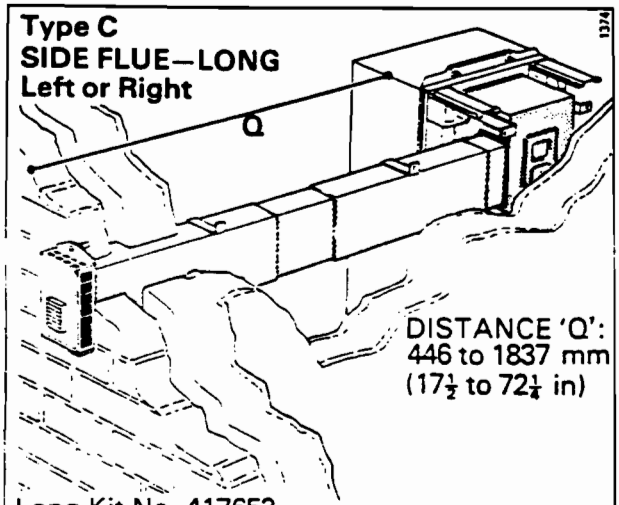
Type B
SIDE FLUE—STANDARD
Left or Right




PACK No. 417654—Standard
DISTANCE 'Q': 75 to 446 mm (3 to 17½ in)

Diagram B1

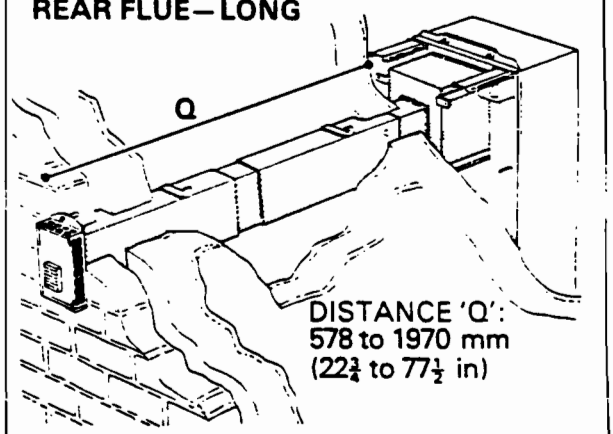
Type C
SIDE FLUE—LONG
Left or Right




Long Kit No. 417653
(For use with Standard Pack No. 417654)

Diagram C1

Type D
REAR FLUE—LONG




Long Kit No. 417653
(For use with Standard Pack No. 417654)

Diagram D1

## 2.1 FLUE/AIR DUCT

2.1.1 Detailed recommendations for flues are given in BS5440 : Part 1. The following notes are intended to give general guidance.

2.1.2 The unit must be installed so that the terminal is exposed to external air. It is important that the position of the terminal allows the free passage of air across it at all times.

2.1.3 Various types of flue terminal are available to suit various installation requirements, see diagram A1, B1, C1 and D1.

NOTE: The long flue kit 417653 will have to be ordered extra, to be used with the standard flue pack (417654), by quoting kit number.

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

2.1.5 Car port or similar extensions of a roof only, or roof and one wall, require special consideration with respect to openings, doors and vents or windows under the roof. Care is required to protect the roof if made from plastic sheeting. Seek further advice if the car port comprises a roof and two or more walls, from the local Gas region of British Gas.

2.1.6 If the terminal is fitted within 850mm (34in) of a plastic or painted gutter or 450mm (18in) of painted eaves an aluminium shield of at least 750mm (30in) long should be fitted to the underside of the gutter or painted surface.

2.1.7 The air inlet/products outlet duct and the terminal of the unit must not be closer than 25mm (1in) to combustible material. Detailed recommendations on protection of combustible material are given in BS5440 : 1 : 1978, sub clause 20.1.

## 2.2 PROTECTING THE TERMINAL

**2.2.1 Where the terminal is less than 2 metres 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.**

2.2.2 Guards are available from Tower Flue Components Ltd., telephone Tonbridge 351555, quoting reference type 'H', or from Quinnell, Barret and Quinell Ltd., 884 Old Kent Road, London S.E. 15, quoting reference type C52.

## 2.3 ROOM VENTILATION

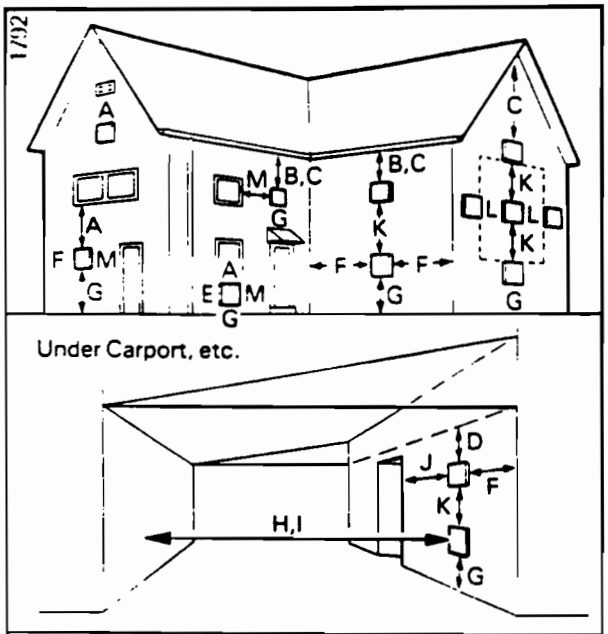
Where the unit is fitted in a room, or internal space, the unit does not require the room or internal space containing it to have a permanent air vent.

## 2.4 CUPBOARD/COMPARTMENT VENTILATION

2.4.1 Where the unit is fitted in a cupboard or compartment, the ventilation area must be in accordance with the dimensions given in the AIR VENT AREA TABLE.

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

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**MINIMUM SITING DIMENSIONS FOR FANNED FLUE TERMINALS**

| POSITION | | MINIMUM SPACING |
|---|---|---|
| | | mm |
| A | DIRECTLY BELOW AN OPENABLE WINDOW, AIR VENT, OR ANY OTHER VENTILATION OPENING | 300 |
| B | BELOW GUTTER, DRAIN/SOIL PIPE | 75 |
| C | BELOW EAVES | 200 |
| D | BELOW A BALCONY OR CAR PORT | 200 |
| E | FROM VERTICAL DRAIN PIPES AND SOIL PIPES | 75 |
| F | FROM INTERNAL OR EXTERNAL CORNERS | 300 |
| G | ABOVE ADJACENT GROUND OR BALCONY LEVEL | 300 |
| H | FROM A SURFACE FACING THE TERMINAL | 600 |
| I | FACING TERMINALS | 1200 |
| J | FROM OPENING (DOOR/WINDOW) IN CAR PORT INTO DWELLING | 1200 |
| K | VERTICAL FROM A TERMINAL | 1500 |
| L | HORIZONTALLY FROM A TERMINAL | 300 |
| M | ADJACENT TO OPENING | 150 |

**Diagram 2.1**

1226

**AIR VENT AREA TABLE FOR COMPARTMENT INSTALLATIONS**

| | AIR VENT AREAS | |
|---|---|---|
| POSITION OF AIR VENTS | AIR FROM ROOM OR INTERNAL SPACE | AIR DIRECT FROM OUTSIDE |
| HIGH VENT | 270 $cm^2$ (42 $in^2$) | 135 $cm^2$ (21 $in^2$) |
| LOW VENT | 270 $cm^2$ (42 $in^2$) | 135 $cm^2$ (21 $in^2$) |

## 7.2 FILLING CENTRAL HEATING CIRCUIT

7.2.1 Open the C.H. service cocks, slots in line with pipe work (see diagram 5.1). Fill the system with cold water and clear all air from the system and unit, taking care not to spill any water onto the electrics. Switch ON the main electricity supply to the unit, at the external isolator. Set switch 'F' to ON (see diagram 7.3). Switch the external isolator ON/OFF a number of times to operate the internal pump, thus assisting filling and venting. Vent points 'Y' are provided on the unit, (see diagram 7.2).

7.2.2 Operate the automatic air vent by slackening the cap. This must not be retightened.

IMPORTANT NOTE: To prevent water being spilled on any electrical connections, when venting the heat transfer tank, a suitable rubber or plastic tube MUST be connected to the nipple before venting.

7.2.3 Vent the air from the primary side of the heat transfer tank, by releasing the vent nipple in the vent 'Y', see diagram 7.2.

7.2.4 Re-tighten the vent nipple and remove tube from the vent point.

7.2.5 Pressurise the system until the gauge 'K', diagram 7.3, registers 1.5 bar (21.5 lbf/sq.in.), and check for water soundness at all joints.

7.2.6 Check the operation of the safety valve, preferably by allowing the pressure to rise until the safety valve lifts. This should be between 2.7 - 3.3 bar (39 - 48 lbf sq.in.), where this is not possible a manual check should be conducted, see 5.3.2 for access.

7.2.7 Release the system pressure to the initial design pressure of 0.5 bar. The safety valve must re-seat and not pass any water.

7.2.8 The cold filling set pointer on the pressure gauge 'K' should be set to coincide with the gauge pointer indicating initial design pressure.

## 7.3 INITIAL LIGHTING

7.3.1 CAUTION: The following procedure should be carried out by a qualified gas service engineer.

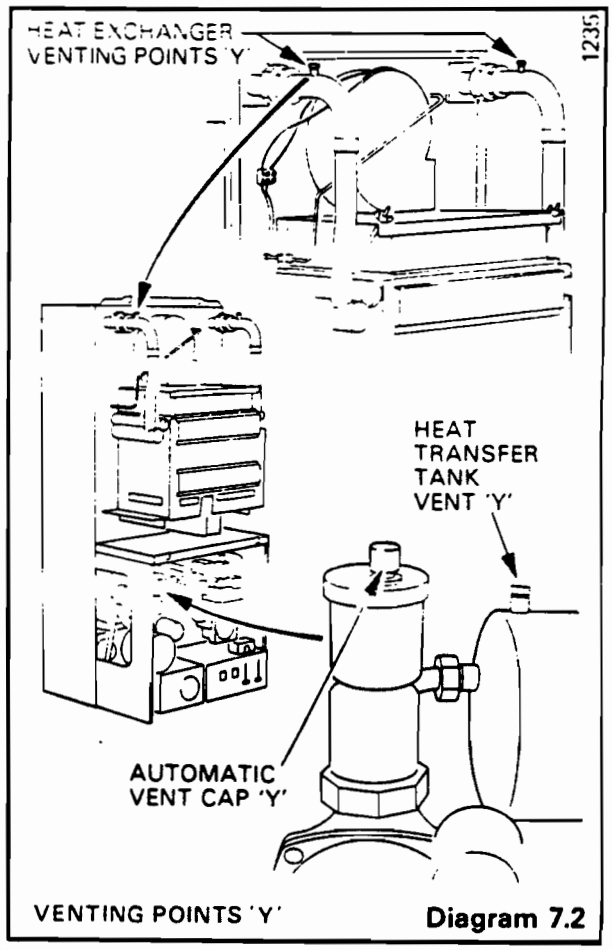
7.3.2 Check that the main electricity supply to the unit is switched OFF and that the unit switch 'F' is in the OFF position.

7.3.3 Identify controls by reference to diagram 7.3.

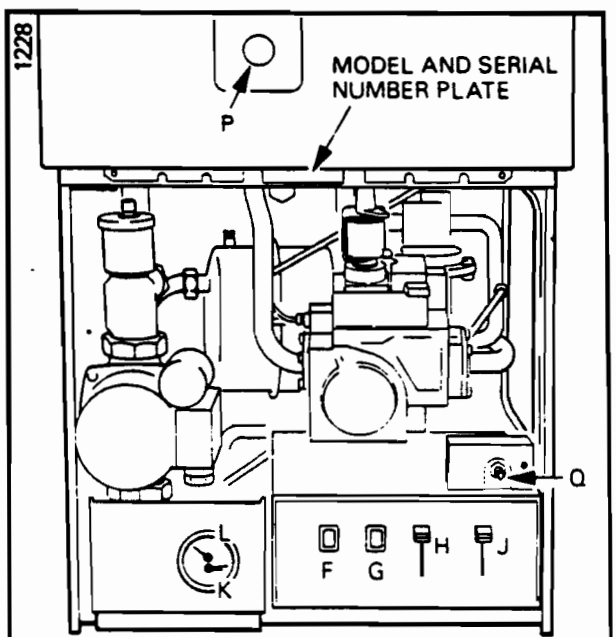
7.3.4 OPEN ALL WINDOWS AND EXTINGUISH ALL NAKED LIGHTS, PIPES OR CIGARETTES E.T.C. IN THE ROOM.

7.3.5 Turn on the gas supply at the gas service cock, slot in line with the pipework (see diagram 5.1) and purge air from the supply pipe in accordance with C.P.331 : Part 3.

7.3.6 Check that the time clock and room thermostat, (if fitted) are operating correctly and are calling for duty.




VENTING POINTS 'Y' **Diagram 7.2**




F. UNIT ON/OFF SWITCH
G. H.W./C.H. SELECTION SWITCH
H. H.W. TEMPERATURE SELECTOR
J. C.H. TEMPERATURE SELECTOR
K. C.H. SYSTEM PRESSURE GAUGE (with cold filling set pointer)
L. BOILER WATER TEMPERATURE GAUGE
P. VIEWING WINDOW
Q. CUT-OFF RESET BUTTON

UNIT CONTROLS Diagram 7.3

7.3.7 Test for gas soundness around the pilot connection as follows: Remove the top cover of the gas valve by unscrewing the hexagon headed screw and pull the cover upwards. Pull off the white cable (at the snap-on connector) on the gas valve solenoid and insulate the female connector with insulating tape. Switch ON the electricity supply to the unit at the external isolator.

WARNING: THE GAS VALVE AND FAN OPERATE ON MAINS VOLTAGE, TERMINALS WILL BECOME 'LIVE'.

Set the slider controls 'H' and 'J' to MAXIMUM position. Set switch 'F' to 'ON' and switch 'G' to 'HW' (see diagram 7.3). Ensure the over heat thermostat is functional by pushing the reset button 'O' (see diagram 7.3). Open a hot water draw off tap and the fan should start, sparks should be generated and the pilot should light. NOTES: At this stage air may be present in the gas pipes and this operation may need to be repeated. If the above sequence occurs but the pilot does not light automatically, light the pilot manually with a match. If sparks are not generated temporarily attach a suitable piece of flexible tubing over the open end of the air pressure tube and position the open end of the tubing adjacent to the fan outlet. (see diagram 7.5A). Sparks should then be generated and the pilot should ignite automatically. (If not light manually with a match). Check around pilot supply for gas soundness, using a suitable leak detection fluid.

NOTE: The pilot rate is factory pre-set. Refer to diagram 7.5 for approximate pilot flame size. If adjustment is found necessary, reset the Pilot Adjustment Screw, see diagram 7.4.

7.3.8 Set slider controls 'H' and 'J' to MINIMUM position, set switch 'F' to 'OFF' and isolate the unit from the electricity supply at the external isolator.

7.3.9 Replace the white cable and replace the cover and hexagon headed screw, and remove the rubber tubing if fitted.

7.3.10 Refit the top casing and secure it with the screws previously removed, see diagram 4.2 ensuring that a good seal is made.

7.3.11 Loosen the sealing screw in the outlet pressure test point, and connect a suitable pressure test gauge (see diagram 7.4).

7.3.12 Switch ON the main electricity supply to the unit, at the external isolator.

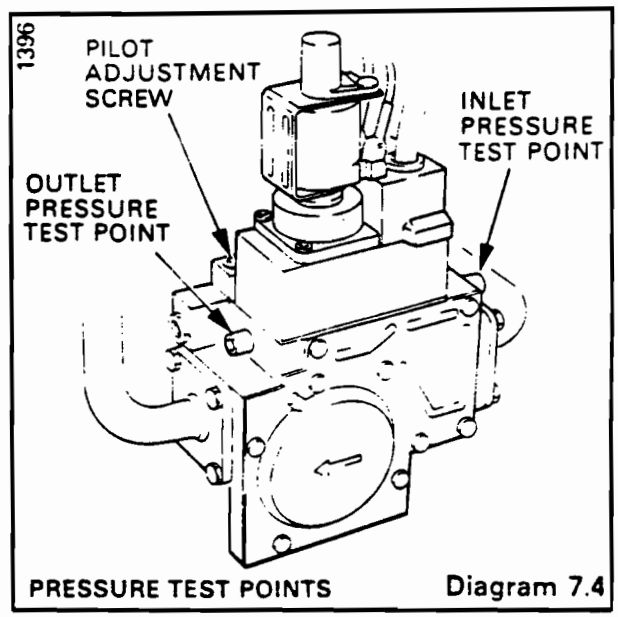
7.3.13 Set the slider controls 'H' and 'J' to the top, maximum position, see diagram 7.3.

7.3.14 Set switch 'G' to 'HW'.

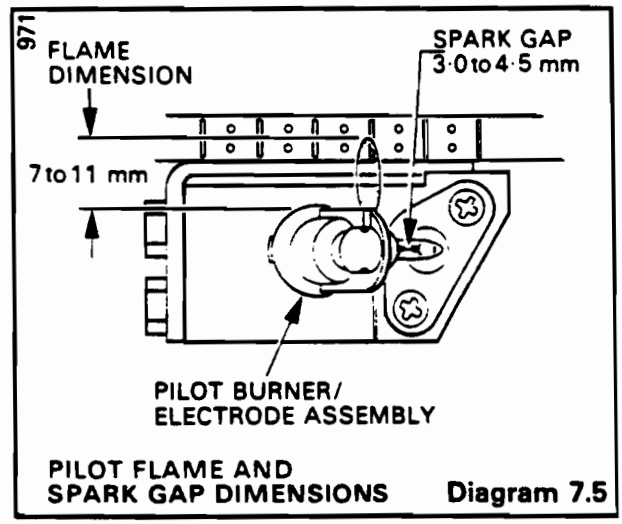
7.3.15 Set switch 'F' to ON.

7.3.16 Fully open a hot water draw off tap and check that the following automatic sequence takes place:-

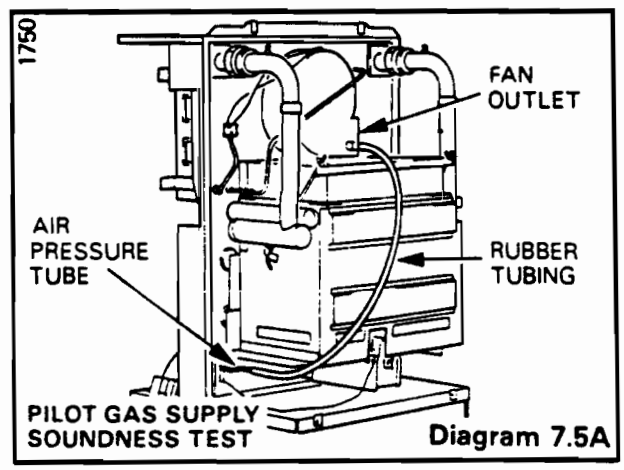
a. The pump and then the fan will operate, after a short delay period.
b. The spark igniter will operate.
c. The pilot burner will ignite (view this through pilot window 'P' in the top casing).
d. The ignition spark will switch off.




PRESSURE TEST POINTS Diagram 7.4




PILOT FLAME AND SPARK GAP DIMENSIONS Diagram 7.5




PILOT GAS SUPPLY SOUNDNESS TEST Diagram 7.5A

e. The main burner will operate, at its higher setting, until the hot water reaches the correct temperature.

7.3.17 Set switch 'G' to 'HW+CH'. Check that any remote heating controls are 'ON' or at 'HIGH' settings. The automatic operation sequence will occur as in 7.3.19, a. to d. but the main burner will operate at its lower setting, until the 'CH' temperature selector 'J' or any remote heating control switches the burner OFF.

7.3.18 Close the hot water draw off tap and the main and pilot burners will extinguish.

NOTE: The unit may give off a 'burning smell' for a short period after initial light up.

## 7.4 TESTING AND ADJUSTING

7.4.1 Set switch 'F' to 'OFF' and 'G' to 'CH+HW'.

7.4.2 Using an insulated screwdriver, temporarily disconnect one of the low voltage leads to the thermistor (see diagram 3.8 SERVICING INSTRUCTIONS). This will ensure that no modulation takes place during the adjustment procedure. Set switch 'F' to 'ON'. The main burner should ignite gradually, taking approximately 10 seconds to reach full flame.

7.4.3 Should the burner fail to light, refer to 'Fault Finding' section in the servicing instructions.

7.4.4 When the burner lights, check that there is adequate air for combustion, by the correct appearance of the flames, i.e. no yellow tips.

7.4.5 Check the burner pressure when hot, ten minutes after lighting, referring to the setting for central heating in the rating/pressure table..

NOTE 1: The burner pressures are pre-set. If the burner pressure/gas rates are incorrect, initially ensure that the gas supply pipework is correctly sized, (refer to section 5.7 'GAS CONNECTIONS'), and check that an inlet working pressure of 20 mbar (8 in w.g.) is available, (i.e. with the appliance in operation). If burner adjustment is necessary to obtain correct settings proceed as 7.4.6:-

NOTE 2: Should any doubt exist about the gas rates, check them at the gas meter, ten minutes after lighting up. The gas rates should be as follows:-

Central Heating : 2.2 m3/h (77 ft3/h).
Domestic Hot Water : 2.9 m3/h (103 ft3/h).

The gas rates calculate above must be regarded as only approximate for guide purposes.

7.4.6 Isolate the electricity supply to the unit.

7.4.7 Unfasten the two screws that secure the electrical drawer, see diagram 9.1.

7.4.8 Slide the electrical controls drawer forward to its stops and hinge down, taking care with cables and capillaries connected to the drawer.

WARNING: Adjustment of the gas pressures can only be made with the mains electrical supply on and the appliance operating.

7.4.9 Switch ON the main electricity supply to the unit at the external isolator.

7.4.10 Adjust the central heating potentiometer using an insulated screwdriver, see diagram 7.6 and rating/pressure table for setting. Rotate gently to adjust the gas pressure to the burner, turning clockwise to increase. Operate switch 'F' to turn the unit 'ON' and 'OFF' several times and check that pressure is maintained, making minor adjustments if necessary.

**RATING/PRESSURE TABLE– FUELSAVER COMBINATION FANNED FLUE** 1227

| | | CENTRAL HEATING | DOMESTIC HOT WATER |
|---|---|---|---|
| NOMINAL HEAT INPUT | kW | 23.0 | 29.9 |
| | Btu/h | 78500 | 102000 |
| NOMINAL HEAT OUTPUT | kW | 17.6 | 23 4 |
| | Btu/h | 60000 | 80000 |
| HOT BURNER PRESSURE | mbar | 8.7 | 14.1 |
| | in. w.g. | 3.5 | 5.6 |
| APPROX GAS RATE | $m^3/hr$ | 2.2 | 2.9 |
| | $ft^3/hr$ | 78.5 | 102 |
| INJECTOR MARKING | | 4.5 | 4.5 |

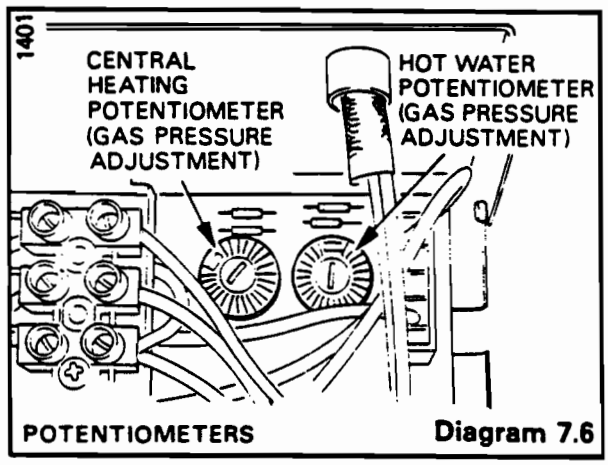


Diagram 7.6

7.4.11 Set switch 'G' to HW and fully turn ON a hot water draw off tap to fully light the unit.

7.4.12 Adjust the hot water potentiometer, using an insulated screwdriver, see diagram 7.6 and the pressure/rating table for setting pressure. Rotate gently to adjust the gas pressure to the burner, turning clockwise to increase. Operate switch 'F' to turn the unit 'ON' and 'OFF' several times and check that the pressure is maintained, making minor adjustments if necessary.

7.4.13 Turn OFF the hot water draw off tap, and set switch 'G' to 'HW+CH'. Check pressure and readjust as necessary.

7.4.14 Check for correct operation of minimum modulation rate by temporarily disconnecting one of the push on leads to the gas valve modulator, see diagram 3.7 in Servicing Instructions. The burner pressure should drop to between 1.5-2.5 mbar.

NOTE: this minimum rate is factory preset and cannot be adjusted. If incorrect, the gas valve must be replaced. Refer to section 3.7 in Servicing Instructions.

7.4.15 Switch 'F' to 'OFF' and electrically isolate the unit, slide the electrical drawer back and secure with the two screws, taking care not to trap any cables.

7.4.16 Remove the pressure gauge and retighten pressure test point sealing screws ensuring a gas tight seal is made.

7.4.17 Replace the lead to the thermistor and the snap-on connector to the gas valve modulator, previously disconnected.

7.4.18 Turn ON electricity supply to the unit at the external isolator, set switch 'F' to ON. Turn a hot water draw off tap fully ON. Reduce the flow through the hot water draw off tap to approximately 1 gall./min. or 1 pint/7secs.. Ensure that the burner pressure reduces. This ensures that the unit operates under control of the thermostat system.

## 7.5 SYSTEM COMMISSIONING

7.5.1 Operate the unit again on central heating i.e. switch 'F' to 'ON' and switch 'G' to 'CH+HW' with all radiator valves fully open.

7.5.2 Fully open lockshield valve 'B' (see diagram 3.2) and adjust the flow rate using lockshield valve 'A' to achieve a temperature differential of 17 degrees (31 deg. F) across the unit flow and return, at full central heating rate, (this is equivalent to a flow rate of 3.2 gall./min.).

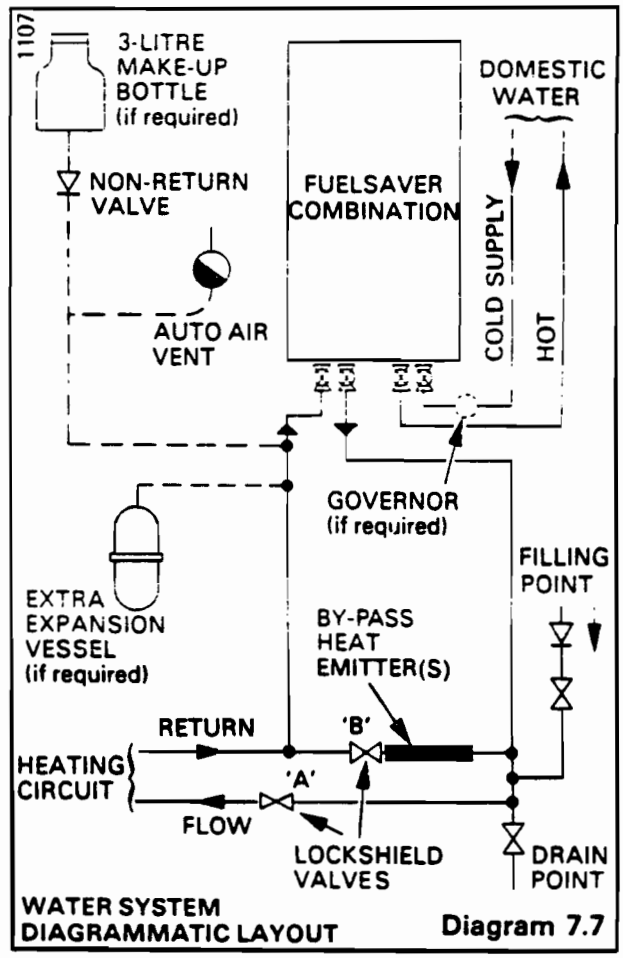
NOTE: The temperature reading must be taken as close to the unit as possible.

7.5.3 Balance the system radiators, to give a 17 deg. C (31 deg. F) temperature differential across each one.

7.5.4 Adjust lockshield valve 'B' to give a temperature differential of 17 deg. C (31 deg. F) across the by-pass heat emitter, see diagram 7.7.

7.5.5 Recheck the temperature differential across the unit flow and return, and re-adjust lockshield valve 'A' if necessary to achieve a 17 deg. C (31 deg. F) temperature differential.

7.5.6 Allow the system to reach a maximum working temperature, turn off and rapidly drain the system whilst hot.




7.5.7 Refill the system, vent and pressurise as previously described.

## 7.6 COMPLETION

7.6.1 Refit the lower casing by locating its top edges on the runners of the top casing and sliding on see diagram 4.1.

NOTE: During the first weeks of the installation periodic attempts should be made to vent air from the system radiators as air may take some time to be released.

## 7.7 INSTRUCT THE USER

7.7.1 Instruct and demonstrate the efficient and safe operation of the unit and sliding temperature selectors 'H' and 'J' (see diagram 7.3) and also advise on operation of any remote heating and hot water system controls, including details on the use and maintenance of any domestic water softener.

7.7.2 Adjust the units temperature controls and system controls to their required settings. Leave the unit controls set to the requirements of the customer.

7.7.3 Advise the user of the precautions necessary to prevent damage to the system, unit and building in the event of the heating system being inoperative during frost or freezing conditions.

7.7.4 Advise the user or purchaser that for continued efficient and safe operation of the unit it is important that adequate servicing is carried out at intervals recommended by the local Gas Region.

NOTE: Hand the User Instructions to the user for retention, making user they are understood. Leave the Installation and Servicing instructions adjacent to the gas meter.

## 2.1 ISOLATION AND ACCESS

2.1.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

2.1.2 Remove all casings refer to section 1.2.

## 2.2 UNIT SERVICING

2.2.1 Unscrew the wing nuts holding the securing angle, remove the angle and hook bolts, see diagram 2.1.

2.2.2 Remove the two screws securing the flue hood to the back panel and remove the flue hood.

2.2.3 Remove the four screws and wing nut securing the combustion chamber front panel, see diagram 2.2. Take care not to damage the insulation on the inside of the panel when removing.

2.2.4 Disconnect the ignition lead at the base of the electrode, see diagram 2.3.

2.2.5 Remove the pilot burner assembly by unscrewing the pilot tubing nut, see diagram 2.3.

2.2.6 Free the pilot burner assembly from the burner assembly by removing the two pilot burner securing screws, and lift clear, see diagram 2.3.

2.2.7 Inspect the pilot injector for damage or blockage, renew or clean as necessary. Do not use any wire or sharp instruments to clean.

2.2.8 Inspect the condition of the ignition electrode, renewing or cleaning as necessary.

2.2.9 Remove main burner assembly by easing the pilot tube down sufficiently to allow the main burner to be disengaged from the injector. Raise the burner up through the combustion chamber to remove, taking care not to damage the combustion chamber insulation.

2.2.10 Remove any deposits from the main burner, e.g. using a suitable brush or vacuum cleaner. Note; brushes with metallic bristles must not be used.

2.2.11 Cover the main burner injector and the open end of the pilot supply pipe to prevent any deposits entering them, and place a sheet of paper underneath the heat exchanger. Brush the deposits from the heat exchanger collecting them on the paper sheet.

2.2.12 Check the main burner injector for blockage or damage and clean or renew as necessary, ensuring that the sealing washer is in position.

**REASSEMBLY NOTES:**

1. When replacing main burner ensure that it is pushed fully back onto the burner injector, and that the burner guides locate correctly, see diagram 2.4.

2. When replacing the flue hood ensure that it is seated correctly onto the heat exchanger, and onto the top edge of the combustion chamber front panel.

3. Refit securing angle, hook bolts, and wing nuts, and tighten. Ensure that the two tabs on the combustion chamber sides are correctly located in the slots in the heat exchanger sides.

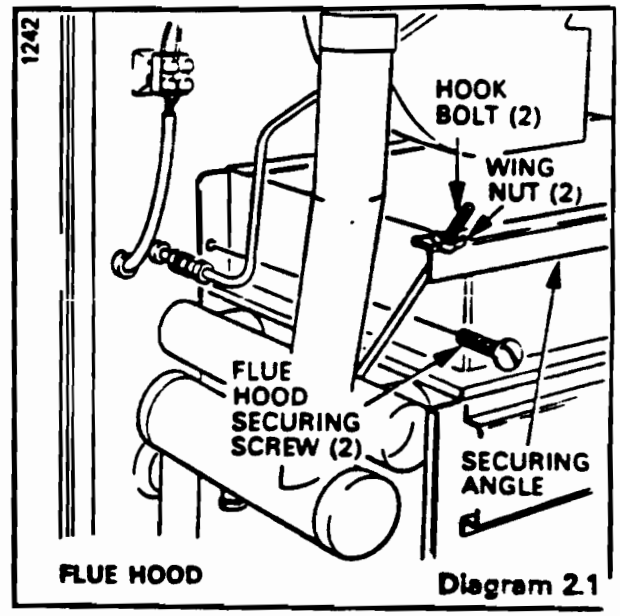


Diagram 2.1

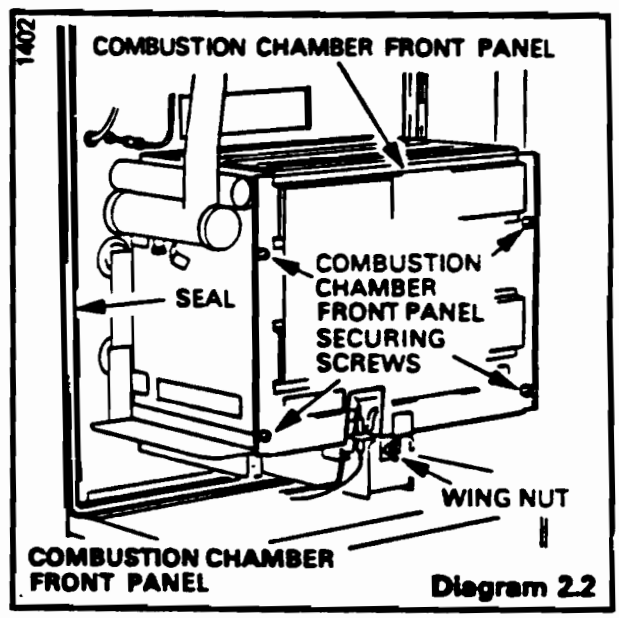


Diagram 2.2

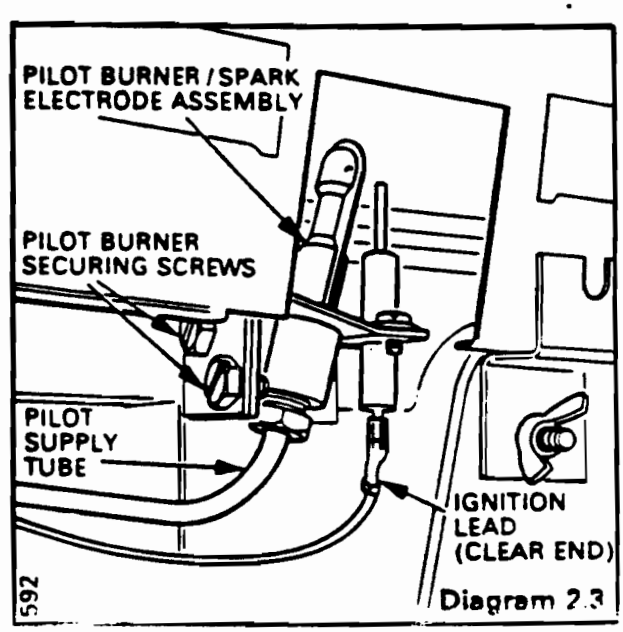


Diagram 2.3

4. Refit the two securing screws, and fully tighten, see diagram 2.1.

2.2.13 Check the condition of the combustion chamber insulation, renew if necessary.

2.2.14 Check the seal on the rear of the flue hood, renew if necessary.

2.2.15 Check that the spark gap is correct, see diagram 2.5.

2.2.16 Check around the unit for water soundness.

2.2.17 As a manual check, turn safety valve knob in the direction of the arrow until it clicks. Check that water discharges and that the valve seats without leaking.

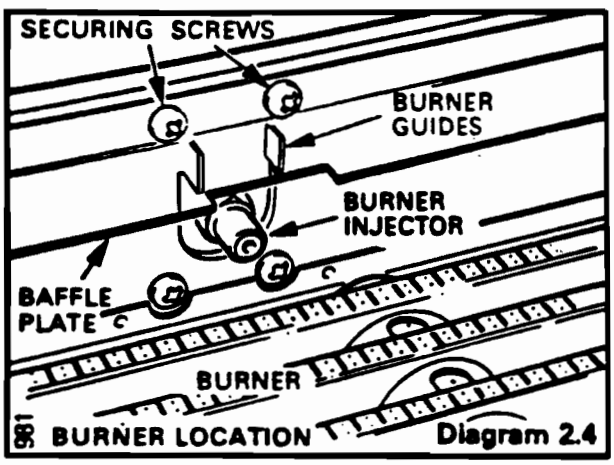


Diagram 2.4

2.2.18 Complete the reassembly and relight the unit to check the pilot flame length, see diagram 2.5.

2.2.19 Test the unit for operation, checking burner pressures and gas rates. Refer to 'Commissioning and Testing' in the Installation Instructions.

2.2.20 Test for gas soundness around gas carrying components and joints.

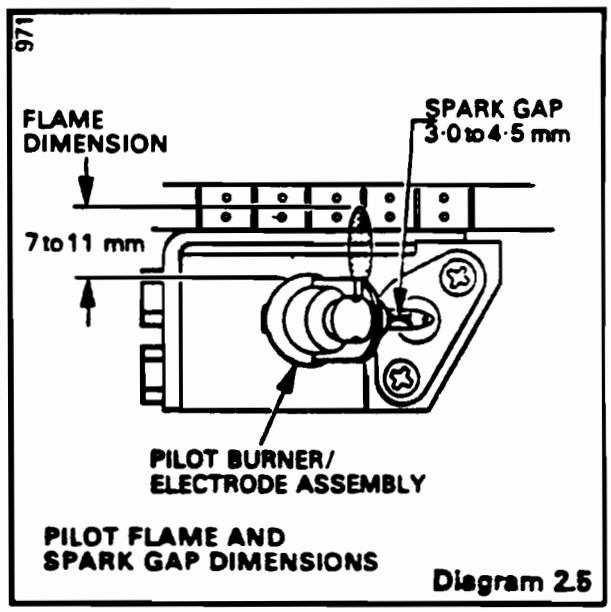


Diagram 2.5

## REPLACEMENT OF PARTS 3

### 3.1 MAIN BURNER/BURNER INJECTOR

3.1.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.1.2 Remove all casings refer to section 1.2.

3.1.3 Proceed as 2.2.1 to 2.2.5 "UNIT SERVICING".

3.1.4 Remove pilot burner assembly by unscrewing the pilot tubing nut and lift clear, see diagram 2.3.

3.1.5 Ease the pilot tube down sufficiently to allow the main burner to be disengaged from the injector. Raise burner up through the combustion chamber and remove. Take care not to damage the combustion chamber insulation.

3.1.6 To change the burner injector, unscrew the injector, and renew the sealing washer to ensure a gas tight seal, see diagram 2.4.

REASSEMBLY NOTE: Ensure that the main burner is pushed fully backward onto the injector and that the burner guides locate correctly, see diagram 2.4.

### 3.2 UPPER CASING/BACK PANEL SEAL/GLASS-VIEWING WINDOW

3.2.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.2.2 Remove all casings refer to section 1.2.

3.2.3 If exchanging the seal, pull the old one from its groove, on the unit front panel, and glue the new one in position using the adhesive provided, see diagram 2.2.

3.2.4 If exchanging the glass viewing window, remove the nuts securing the glass retaining plate and carefully remove the plate, glass and seal.

3.2.5 Renew the seal when refitting the glass viewing window.

### 3.3 PILOT BURNER/ELECTRODE ASSEMBLY

3.3.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.3.2 Remove all casings refer to section 1.2.

3.3.3 Proceed as 2.2.1 to 2.2.7 "UNIT SERVICING".

3.3.4 To remove the electrode, remove the M3 securing screw and electrode from the pilot burner bracket, see diagram 2.3.

REASSEMBLY NOTE: When replacing pilot burner assembly take care not to damage the electrode, ensure that the spark gap and the pilot flame length are as shown in diagram 2.5.

## 6.1 SUPPLY CABLE CONNECTION

6.1.1 Unfasten the two screws that secure the electrical drawer, see diagram 6.1.

6.1.2 Slide the electrical drawer forwards to its stops and hinge downward taking care with wires connected to the drawer.

6.1.3 The unit requires a permanent mains supply through an external isolator which must also isolate any heating system controls, see diagram 6.2. Refer also to section 1.9 'ELECTRICAL'.

6.1.4 If connection to the mains supply is by a standard 3 pin plug, refer to User Instructions for cable connection to the plug. A 3 amp fuse must be used.

6.1.5 Feed the mains cable through the grommet/clamp in the rear of the electrical drawer and connect to the terminal strip, refer to diagrams 6.2 and 6.3. Ensure cable is clamped by tightening the two securing screws, see diagram 6.3, and that the wire is looped and secured in the clamp on the back panel of the unit, see diagram 6.4.

**6.1.7 Make sure the earth cable is longer than the live and neutral cables so that if the mains supply cable is strained then the earth cable will be the last to be disconnected.**

6.1.8 If heating time controls, room thermostat, etc. are to be fitted, they must be connected in series, to the unit terminal strip after removal of the Red link between 7 and 8, refer to diagram 6.3.

6.1.9 If heating time controls, room thermostat, etc. are to be fitted, we recommend that the cables be clamped using a strain relief clamp positioned near to the unit (position at the installers discretion) and the cable looped the same as the mains cable.

6.1.10 Slide the electrical drawer back and secure with the two screws previously removed.

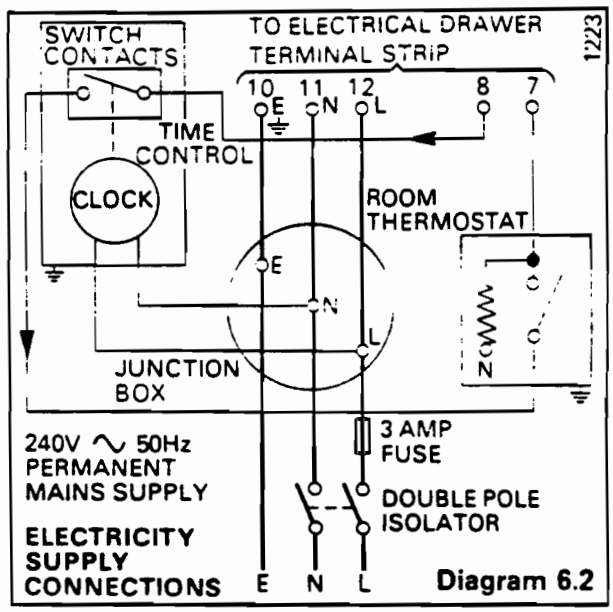


Diagram 6.2

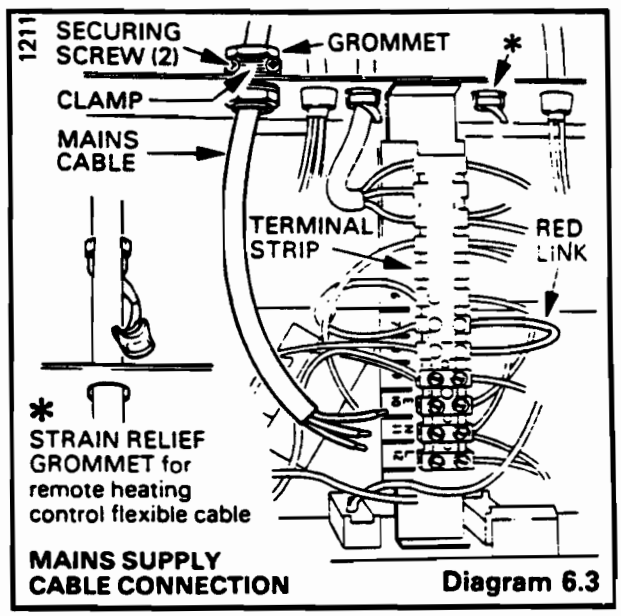


Diagram 6.3

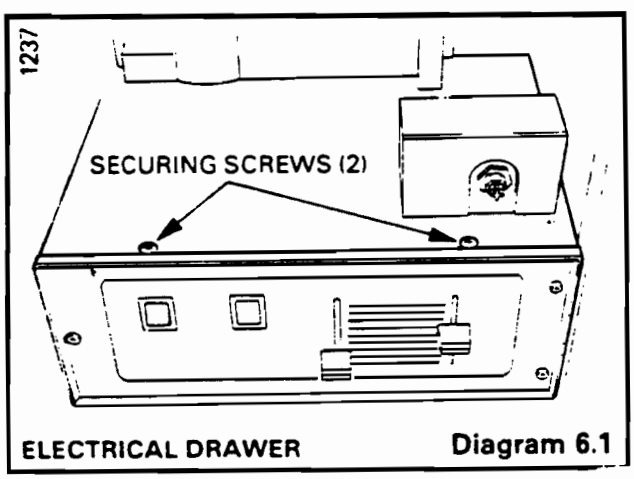


Diagram 6.1

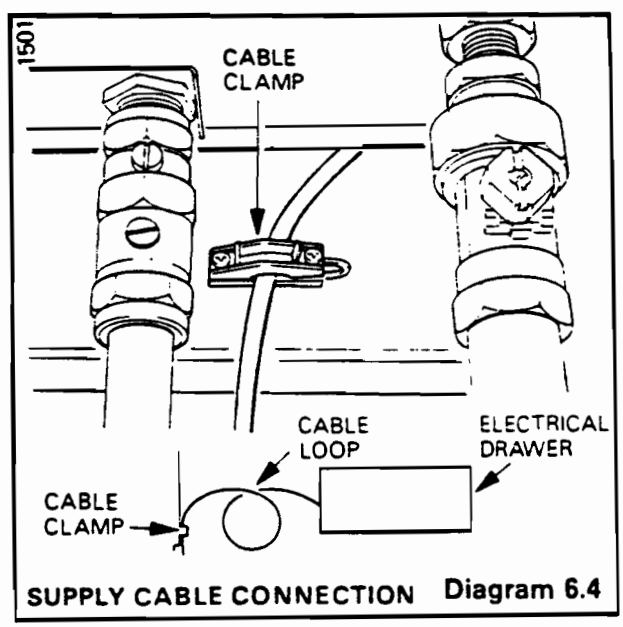


Diagram 6.4

## 6 ELECTRICAL

### 6.2 WIRING

All wiring of the installation must comply with current I.E.E. Wiring Regulations and any local regulations which apply. All cables and connections must be of the approved type.

### 6.3 FROST PROTECTION

If the installation requires frost protection, isolate the mains supply and connect a single pole frost thermostat between terminals 7 and 12 of the Combination Unit to override any time controls and unit switches. Restore mains supply and test the frost thermostat.

### 6.4 TESTING

In the event of an electrical fault occurring after installation of the unit, preliminary electrical systems checks must be carried out, as described in the British Gas Multimeter Instruction Book.

## 7 COMMISSIONING AND TESTING

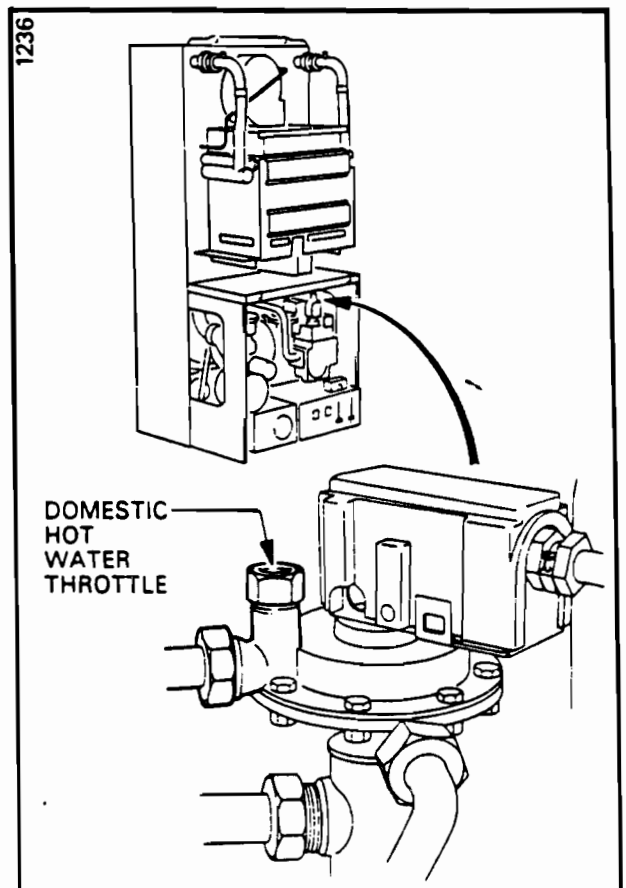
### 7.1 DOMESTIC WATER FLOW RATE

7.1.1 Ensure that the electricity supply to the unit is switched OFF at the external isolator and open the D.H.W. service cocks, slots in line with the pipework (see diagram 5.1).

7.1.2 Open all hot water draw off taps. Progressively close each tap, when water flows, starting with the tap at the lowest level. Check for water soundness at all joints and fittings.

7.1.3 Fully open the largest hot water draw off tap, unscrew the domestic hot water throttle and check for maximum flow (see diagram 7.1). It should not take more than 10.5 seconds to fill a 1 litre container or 6 seconds to fill a 1 pint container (5.7 litres/min. or 1.25 gallons/min.).

7.1.4 If the flow rate is less than that stated above, check that the system conforms with the requirements of diagram 3.2 and that there is no partial blockage. Rectify as necessary. Adjust the domestic hot water throttle to obtain a flow rate of 7.7 litres/min. or 1.7 gall./min.. This is equal to 8 seconds to fill a 1 litre container or 4.5 seconds to fill a 1 pint container. Turn OFF the hot water draw off tap.




DOMESTIC HOT WATER FLOW RATE ADJUSTMENT — Diagram 7.1

# 4 FAULT FINDING

## 4.1 INITIAL CHECK LIST

4.1.1 If unit does not operate proceed as below.

| CHECK | | CAUSE/REMEDY |
|---|---|---|
| Is the electricity supply 'ON' to the unit? | NO → | Electrical supply fault. Contact an electrician. |
| YES ↓ | | |
| Are the fuses in order? | NO → | Unit fault. Refer 'Fault Finding'. |
| YES ↓ | | |
| Has the unit overheated, causing the cut-off to operate? | YES → | Press the cut-off reset button, refer to 'Commissioning and Testing' Installation Instructions. |
| NO ↓ | | |
| Are all remote heating controls and switches calling for duty? | NO → | Remote heating control fault. Test for continuity. |
| YES ↓ | | |
| Is mains water supply to premises in order? | NO → | Water Supply fault. Contact plumber or local Water Undertaking. |
| YES ↓ | | |
| Is water flowing from hot water taps? | NO → | Unit fault. Refer to 'Fault Finding'. |
| YES ↓ | | |
| Is there gas at the unit? | NO → | Gas Supply fault. Contact Local Gas Region. |
| YES ↓ | | |
| Has the gas supply been purged of air? | NO → | Refer to Installation Instructions 'Commissioning and Testing'. |
| YES ↓ | | |
| Has the heating system been vented? | NO → | Bleed air from radiators etc., with system off. |
| YES ↓ | | |
| Has the unit been vented? | NO → | Refer to Installation Instructions, 'Commissioning and Testing'. |
| YES ↓ | | |

If after carrying out all the above procedures, the unit still fails to operate, consult the detailed Functional Flow Diagrams 4.1 and 4.2 in conjunction with the Fault Finding procedures Diagram 4.3 to 4.8.

## 4.2 ELECTRICAL

4.2.1 IMPORTANT: The preliminary electrical system checks, (as contained in the British Gas Multimeter instruction book), 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 checks 'A' Earth continuity, 'C' Polarity and 'D' Resistance to Earth must be repeated.

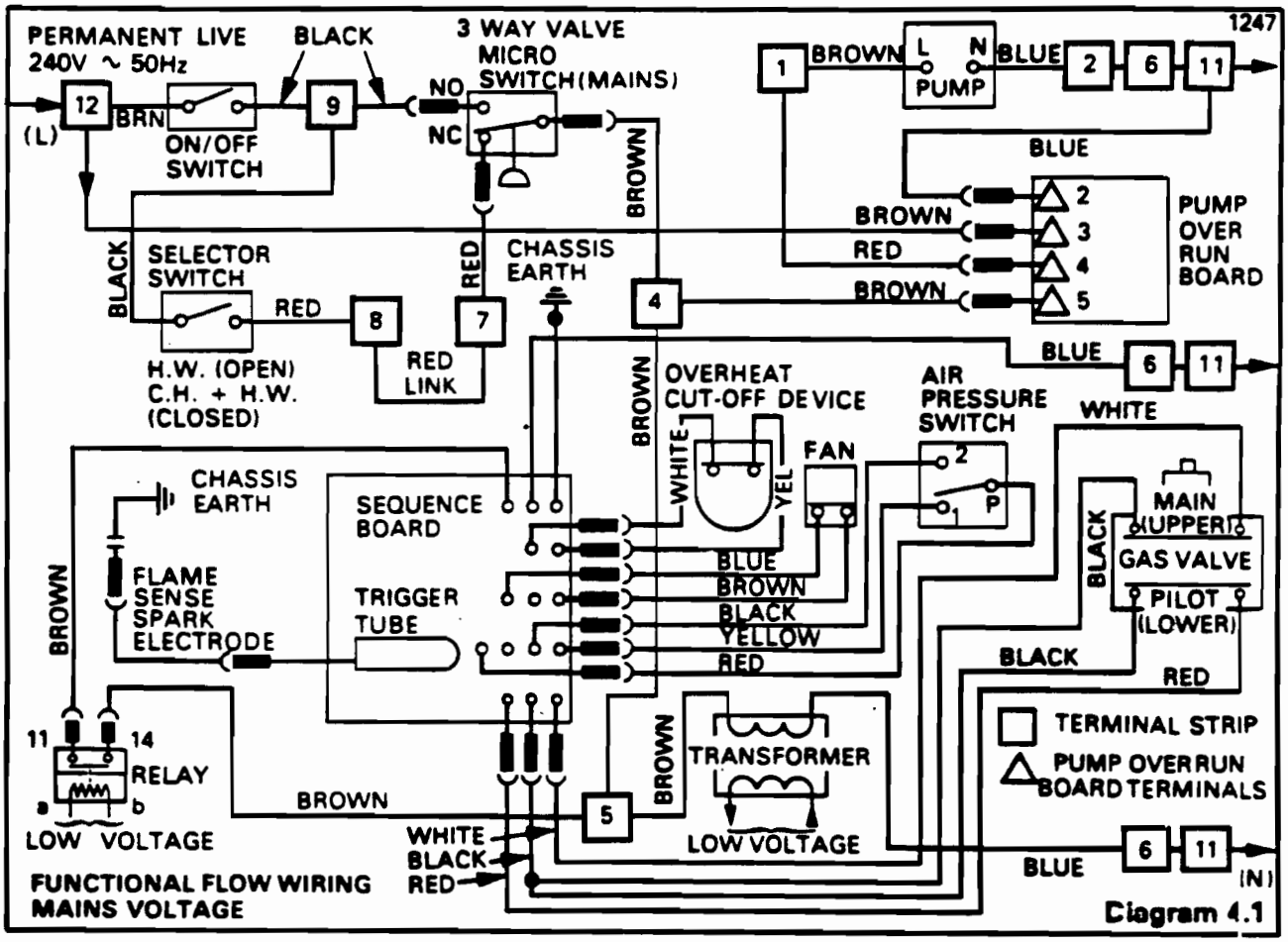
4.2.2 Isolate the electricity supply to the unit.

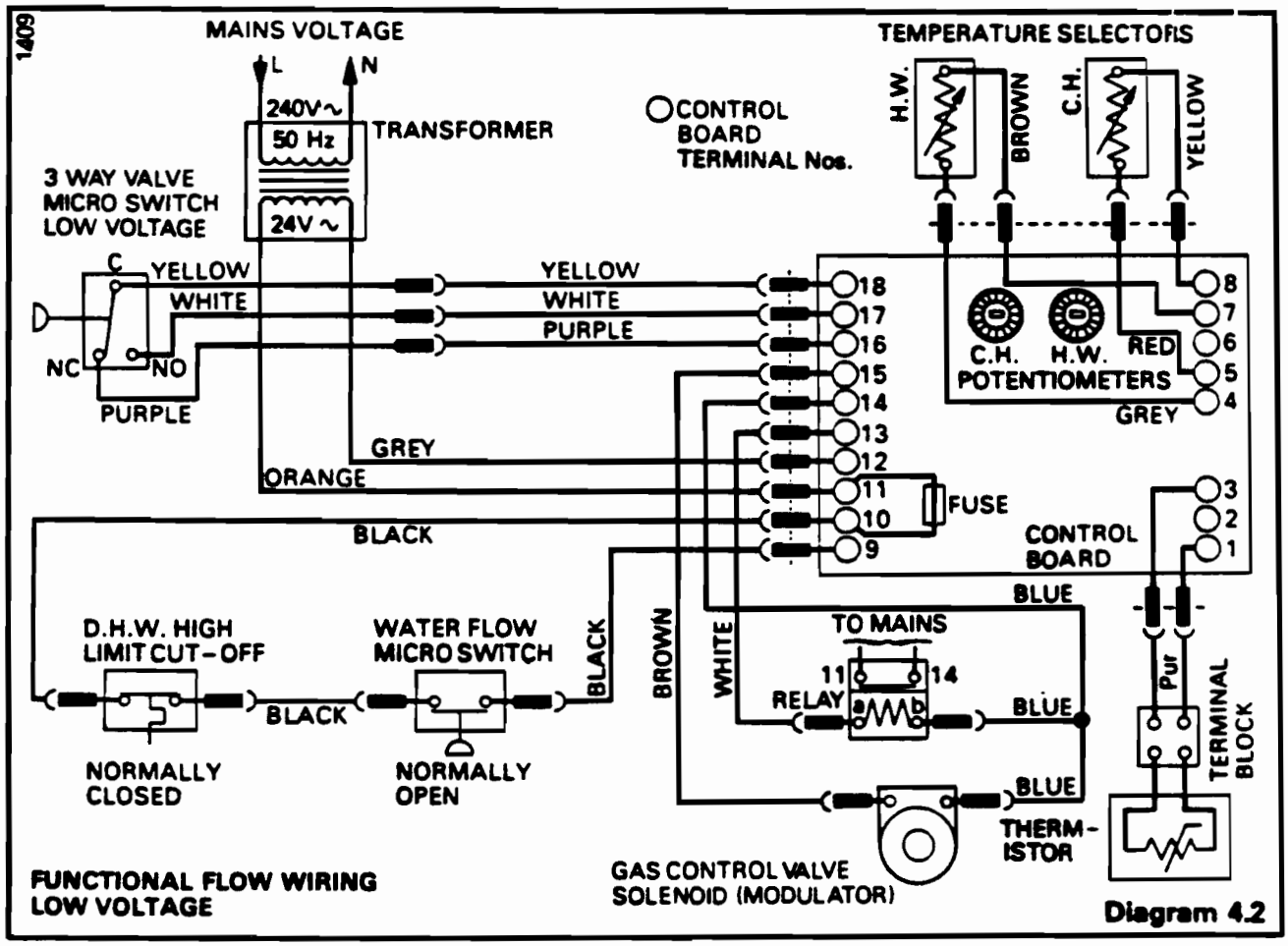
4.2.3 Gain access to the lower half of the unit. refer to 1.2.

4.2.4 Release the electrical drawer by removing the screws, slide forward to its stops and hinge down, taking care not to strain any of the cables, see diagram 3.14.

4.2.5 Physically check all wires and connections.

4.2.6 Check fuses of sequence board and control board, see diagram 3.11 and 3.12.


1247
PERMANENT LIVE
240V ~ 50Hz
(L)
BRN
ON/OFF SWITCH
BLACK
3 WAY VALVE MICRO SWITCH (MAINS)
NO
NC
BROWN
PUMP
BLUE
PUMP OVER RUN BOARD
SELECTOR SWITCH
RED
H.W. (OPEN)
C.H. + H.W. (CLOSED)
RED LINK
CHASSIS EARTH
OVERHEAT CUT-OFF DEVICE
AIR PRESSURE SWITCH
WHITE
FAN
YEL
MAIN (UPPER)
GAS VALVE
PILOT (LOWER)
SEQUENCE BOARD
TRIGGER TUBE
FLAME SENSE SPARK ELECTRODE
BLUE
BROWN
BLACK
YELLOW
RED
TERMINAL STRIP
PUMP OVERRUN BOARD TERMINALS
RELAY
LOW VOLTAGE
TRANSFORMER
FUNCTIONAL FLOW WIRING
MAINS VOLTAGE
Diagram 4.1


1409
MAINS VOLTAGE
240V~
50 Hz
TRANSFORMER
24V ~
3 WAY VALVE MICRO SWITCH LOW VOLTAGE
CONTROL BOARD TERMINAL Nos.
TEMPERATURE SELECTORS
H.W.
C.H.
BROWN
YELLOW
C.H. POTENTIOMETERS
H.W.
RED
GREY
YELLOW
WHITE
PURPLE
ORANGE
FUSE
CONTROL BOARD
BLACK
BLUE
TO MAINS
RELAY
TERMINAL BLOCK
D.H.W. HIGH LIMIT CUT-OFF
WATER FLOW MICRO SWITCH
NORMALLY CLOSED
NORMALLY OPEN
THERM-ISTOR
GAS CONTROL VALVE SOLENOID (MODULATOR)
FUNCTIONAL FLOW WIRING
LOW VOLTAGE
Diagram 4.2

## MAINS VOLTAGE CIRCUIT

1520/1

START
Switch on the electricity supply at the isolator. Is there 240V±10% between [11] & [12] ?

NO → Isolate the electricity supply, check fuses and cable to the appliance.

YES

Set 'ON/OFF' switch to 'OFF'. Is there 240V±10% between [9] & [11] ?

YES → Faulty 'ON/OFF' switch assembly. Isolate the electricity supply and renew.

NO

Isolate the electricity supply. Disconnect 'ON/OFF' switch at [9] & [12] . Test switch for continuity. Is switch operating correctly?

NO → Faulty 'ON/OFF' switch assembly, renew.

YES

Reconnect switch assembly. Set 'ON/OFF' switch to 'ON'. With 'HW/HW + CH' selector set to 'HW'. Is there 240V±10%. between [8] & [11] ?

YES → Faulty 'HW/HW + CH' selector assembly. Isolate the electricity supply and renew.

NO

Isolate the electricity supply. Disconnect 'HW/HW + CH' selector at [8] & [9]. Test switch for continuity. Is switch operating correctly?

NO → Faulty 'HW/HW + CH' selector assembly, renew.

YES

Is there 240V±10% between [7] & [11] (No remote controls fitted)?
or
Is there 240V±10% between [7] & [11] (With remote heating controls fitted and calling for duty)?

NO → Isolate the electricity supply. Check 'RED LINK' and connectors between [8] & [7]. Repair or renew.

NO → Isolate the electricity supply. Is there continuity between [8] & [7] ?

NO → Check remote heating controls.

YES

Isolate the electricity supply. Set 'HW/HW + CH' selector to 'HW' with taps closed. Test the microswitch assembly (Three Way Valve) between [7] & [4]. Is there continuity?

NO → Check the cable connections at [7] & [4]. If in order, renew faulty microswitch assembly.

YES

Open a hot water tap. Does the plunger of the Three Way Valve move upwards and operate the microswitches?

NO → Refer to 'Replacement of Parts', Three Way Valve.

YES

With the hot water tap open has the continuity between [7] & [4] been interrupted?

NO → Faulty microswitch assembly (Three Way Valve). Renew.

YES

With the hot water tap still open test for continuity of microswitch assembly (Three Way Valve) between [9] & [4]. Is there continuity?

NO → Check the cable connections at [9] & [4]. If in order, renew faulty microswitch assembly.

YES

Close hot water tap, has the continuity between [9] & [4] been interrupted?

NO → Faulty microswitch assembly (Three Way Valve). Renew.

YES → Continued

NO ← Continued

**Diagram 4.3**

## MAINS VOLTAGE CIRCUIT (CONT)

15202

START

Continued

YES

Restore electricity supply. Set 'HW/HW + CH' selector to 'HW + CH'. Is there 240V±10% between [4] & [11] ?

NO → Continued

YES

Is water circulating through the unit?

NO → See PUMP OVERRUN BOARD FAULT FINDING.

YES

Is there 240V±10% between [5] & [11] ?

NO → Isolate the electricity supply. Check Brown bridging cable between [4] & [5]. Repair or renew.

YES

Isolate the electricity supply. Connect meter probes to the Orange and Grey cables connections at the transformer. Restore electricity supply. Is the reading 20/24 V AC?

NO → Isolate the electricity supply. If the Brown & Blue cables from the transformer to 5 & 6 respectively are in order and the Blue bridging cable between [6] & [11] is also in order. Faulty transformer, renew.

YES

Feed to Low Voltage Circuit is satisfactory, by switching 'ON' and 'OFF' the unit, does the Relay contacts open and close?

NO → Refer to the LOW VOLTAGE CIRCUIT fault finding.

YES

Isolate the electricity supply. Disconnect the Brown cable between the Relay and Sequence Board at the relay contacts (11). Connect the meter between the Relay contact and (N) [11]. Restore the electricity supply. Is there 240V±10%?

NO → Refer to the RELAY 'MAINS' fault finding.

YES

Isolate the electricity supply. Disconnect the meter and reconnect the Brown cable. Restore the electricity supply. Does the trigger tube flash at approx 1 second intervals?

NO → Refer to the SEQUENCE BOARD fault finding.

YES

Is there a spark at the Flame Sense/Spark Electrode seen through the viewing window?

NO → Refer to the SEQUENCE BOARD fault finding.

YES

Does Pilot light?

NO → Refer to the SEQUENCE BOARD fault finding.

YES

Does Main Burner light?

NO → Refer to the SEQUENCE BOARD fault finding.

YES

Check Modulation of Burner, see Modulation Control - Gas Valve.

NO → Refer to the SEQUENCE BOARD fault finding.

**Diagram 4.3 (Cont.)**

## LOW VOLTAGE CIRCUIT

1517/1

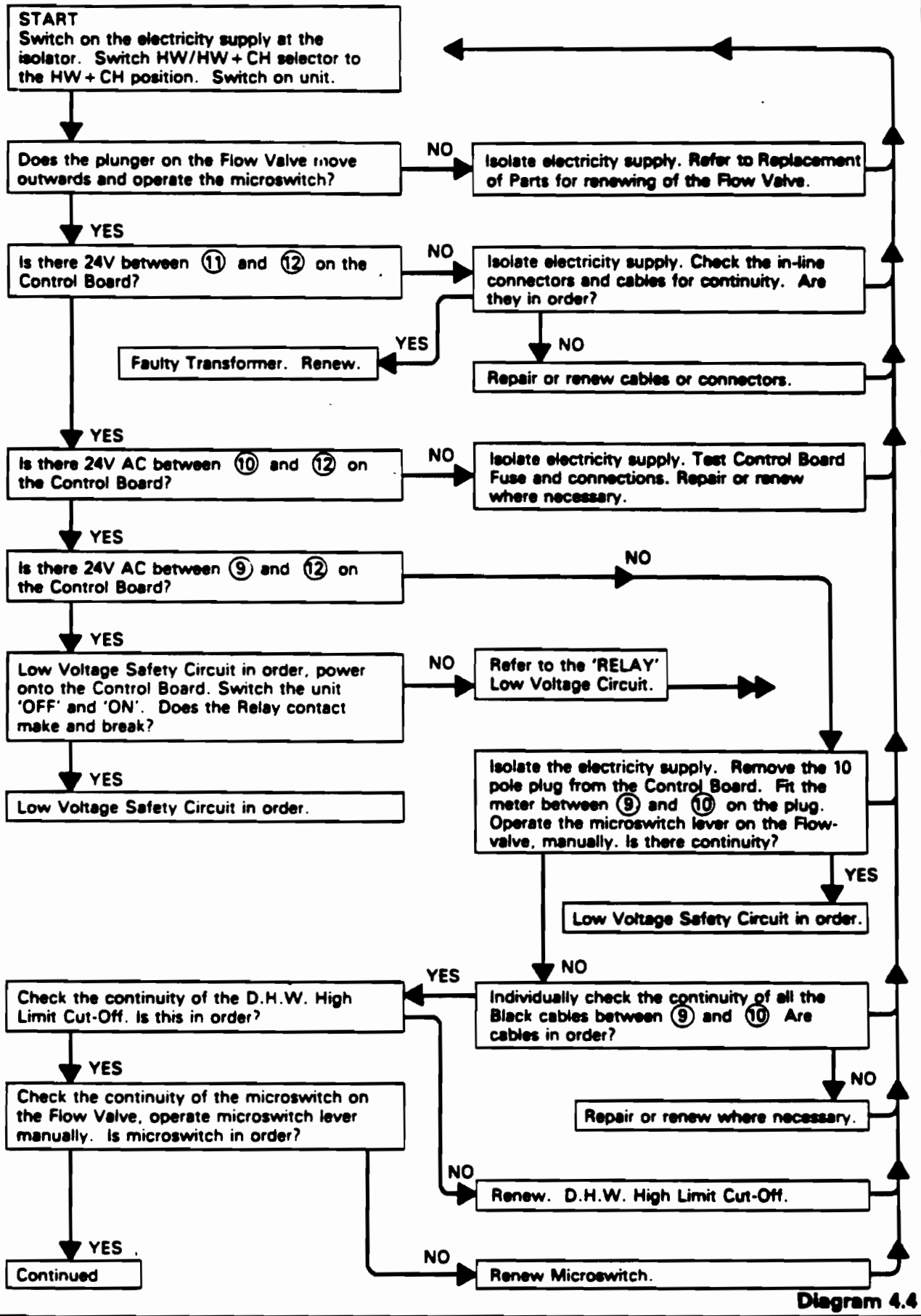



Diagram 4.4

## LOW VOLTAGE CIRCUIT (CONT)

1517/2

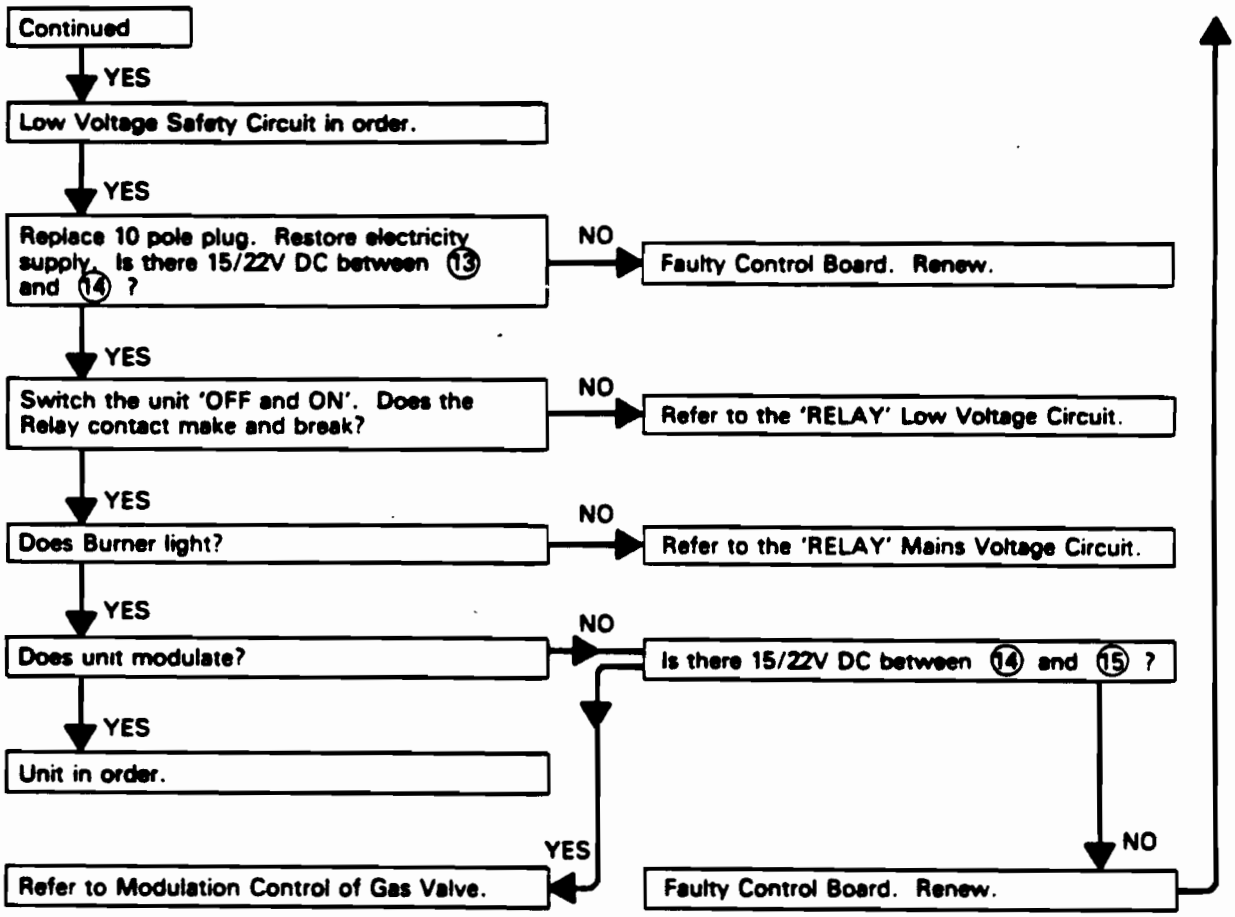



**Diagram 4.4 (Cont.)**

1518

## PUMP OVERRUN BOARD

△ Pump overrun Board  □ Mains Terminal Strip

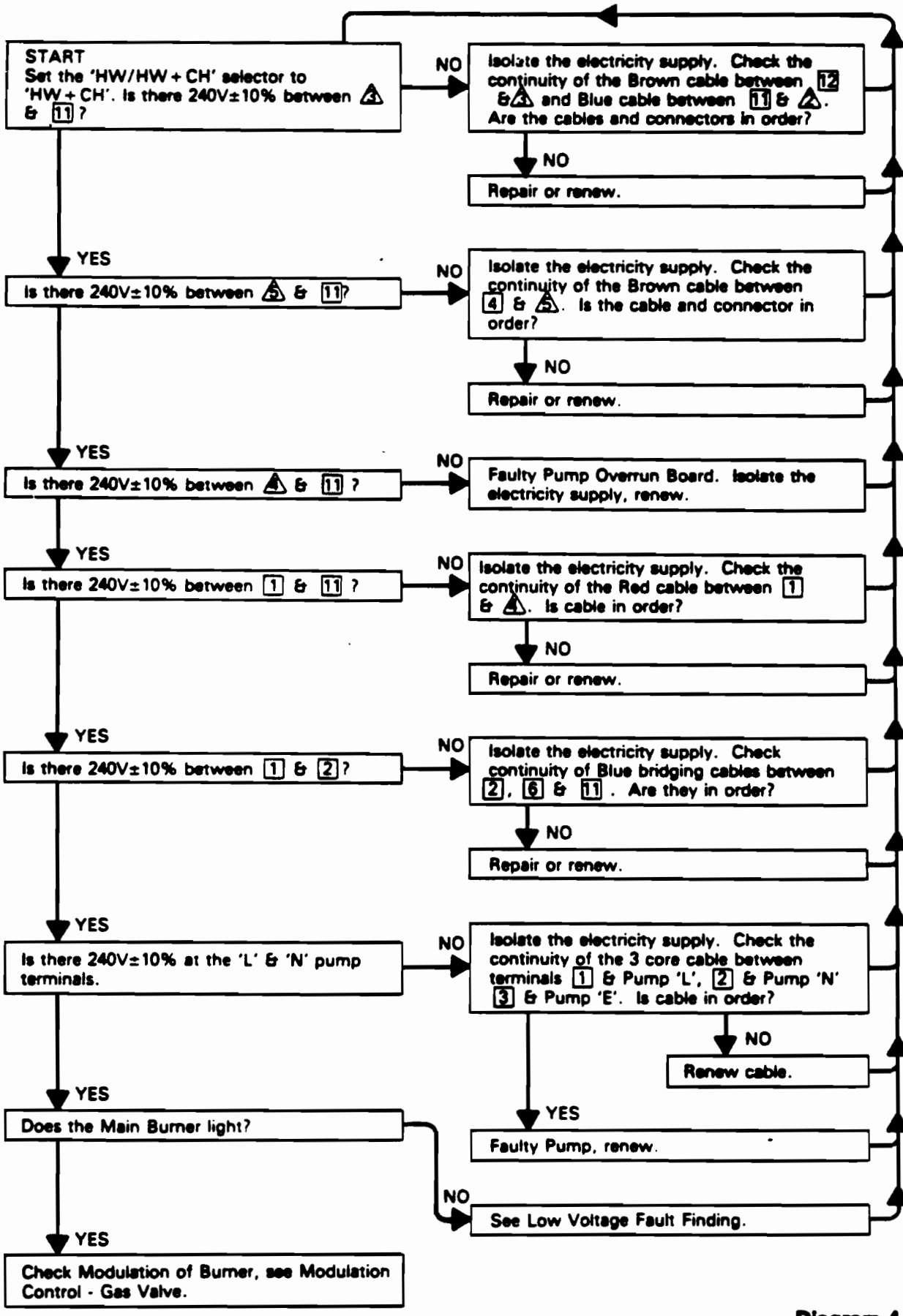



Diagram 4.5

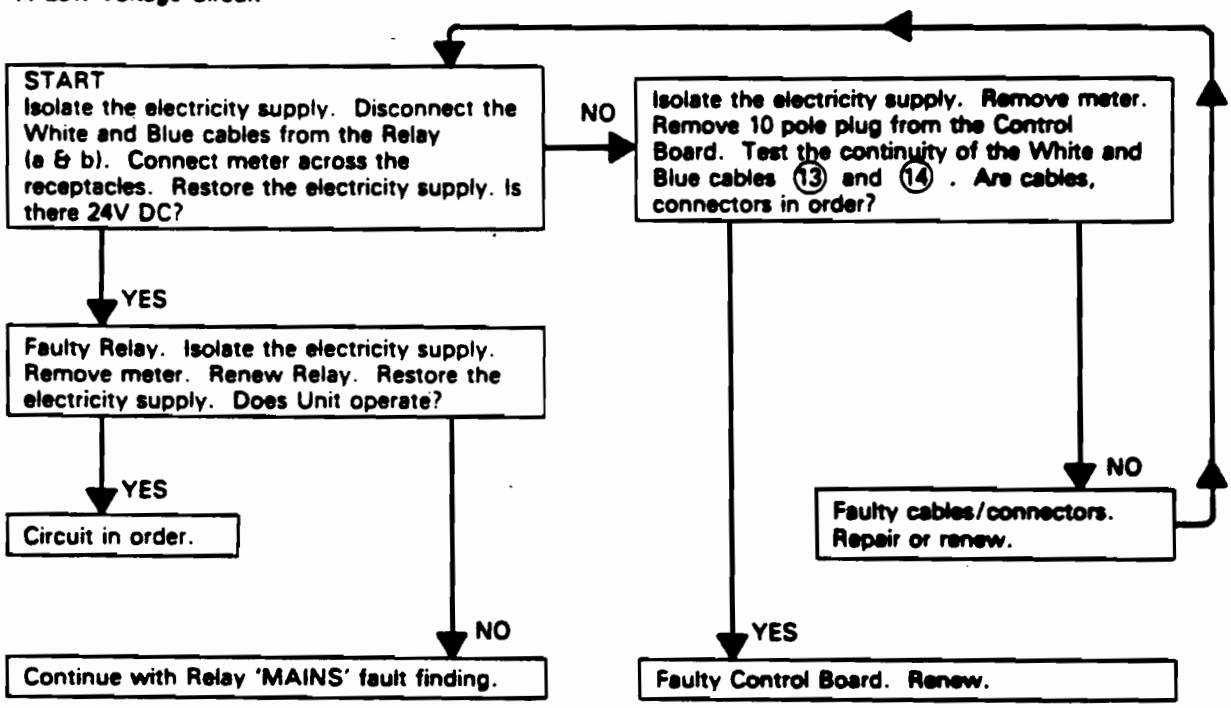
1516

## RELAY

KEY:- □ Main Terminal Strip
○ Control Board
( ) Relay

### LOW VOLTAGE

(i) Low Voltage Circuit




### MAINS

(ii) Mains Voltage Circuit.

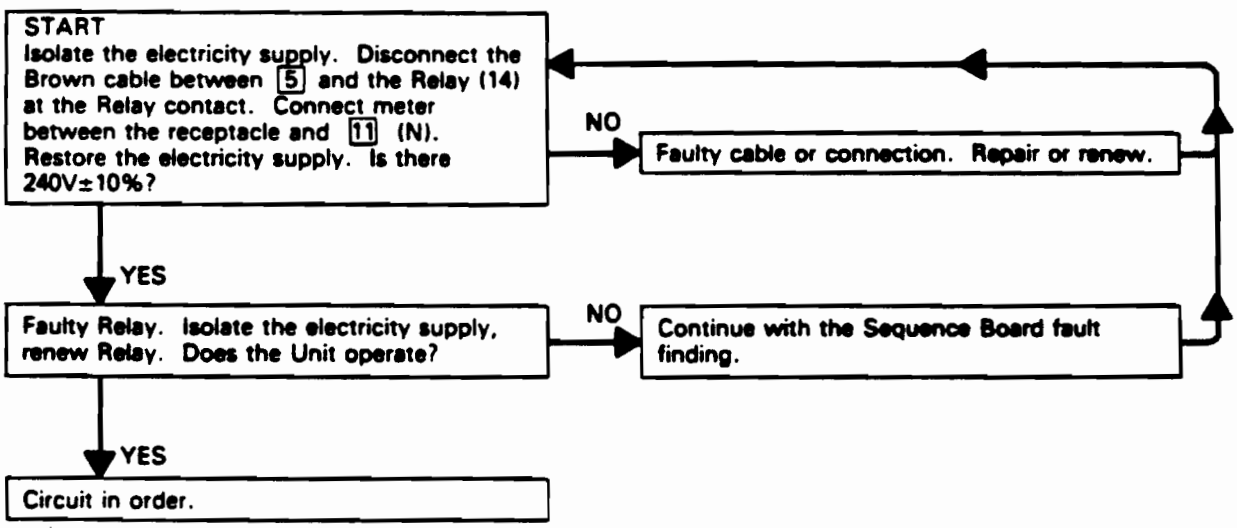



Diagram 4.6

1765/1

## SEQUENCE BOARD

With the following fault finding procedures carried out:-
1. Mains Voltage 2. Low Voltage 3. Relay Circuit
Test the following components for continuity before restoring the electricity supply and continuing with the fault finding procedure.

FAN
Remove the 2 pole plug from sequence board.
Test for continuity across the blue and brown cables. Is there continuity?

YES → Replace 2 pole plug and continue with further component tests.

NO → Remove casing and individually test cables and connections for continuity, renew if necessary.

PRESSURE SWITCH
Remove 3 pole plug from sequence board.
(Red, Black, Yellow cables)
Test for continuity across red and yellow cables. Is there continuity?

YES → Remove case and fit a suitable flexible tube to the sensing tube, L/hd side of combustion chamber beneath the baffle. Test for continuity across red and black cables whilst creating positive pressure a switch by blowing down the tube. Is there continuity?

NO → Remove air pressure switch cover and individually test cables & connections for continuity, renew if necessary. *Note* check flexible tubes and restrictor for any obstructions.

YES → Replace 3 pole plug and continue with further component tests.

GAS VALVE
Remove 3 pole plug from sequence board.
(Red, Black, White).
Test for continuity across red and black cables (pilot solenoid). Is there continuity?

YES → Test for continuity across white and black cables (main solenoid).
Is there continuity?

NO → Remove lower casing and individually test cables & connections for continuity. renew if necessary.

YES → Replace 3 pole plug and continue with further component tests.

Continued

**Diagram 4.7**

1765/2

## SEQUENCE BOARD (CONT)

Continued

OVERHEAT CUT-OFF
Break the in-line connectors white & yellow cables. Test for continuity across the receptacles on the cables to the over heat cut-off.
Is there continuity?

NO → Remove the cover off the overheat cut-off and individually test cables & connections for continuity, renew if necessary.

YES

With all the above components cables and connections tested and casings replaced proceed as follows:-
Restore the electricity supply. Switch HW/HW + CH selector to the HW + CH mode. Check that all hot water taps are off and that the remote controls are calling for duty. Switch on the unit.

Does the burner ignite?

NO → Does fan operate?

YES

Does the unit modulate?
Refer to Gas Valve Modulation fault finding.

YES

NO

Isolate the electricity supply. Remove the 2 pole plug from sequence board. Restore the electricity supply. Is there 240V±10% between pins on board.

YES

Faulty Fan renew

NO

Faulty Sequence Board renew

YES

Is there a spark on the sequence board, trigger tube.

YES

NO

Isolate the electricity supply. Remove the 3 pole plug from the sequence board, (red, black, yellow cables). Restore the electricity supply. Is there 240V±10% between the top pin (red cable) and N on main terminals.

YES

Continued

NO

Continued

**Diagram 4.7 (Cont.)**

1765/3

## SEQUENCE BOARD (CONT)

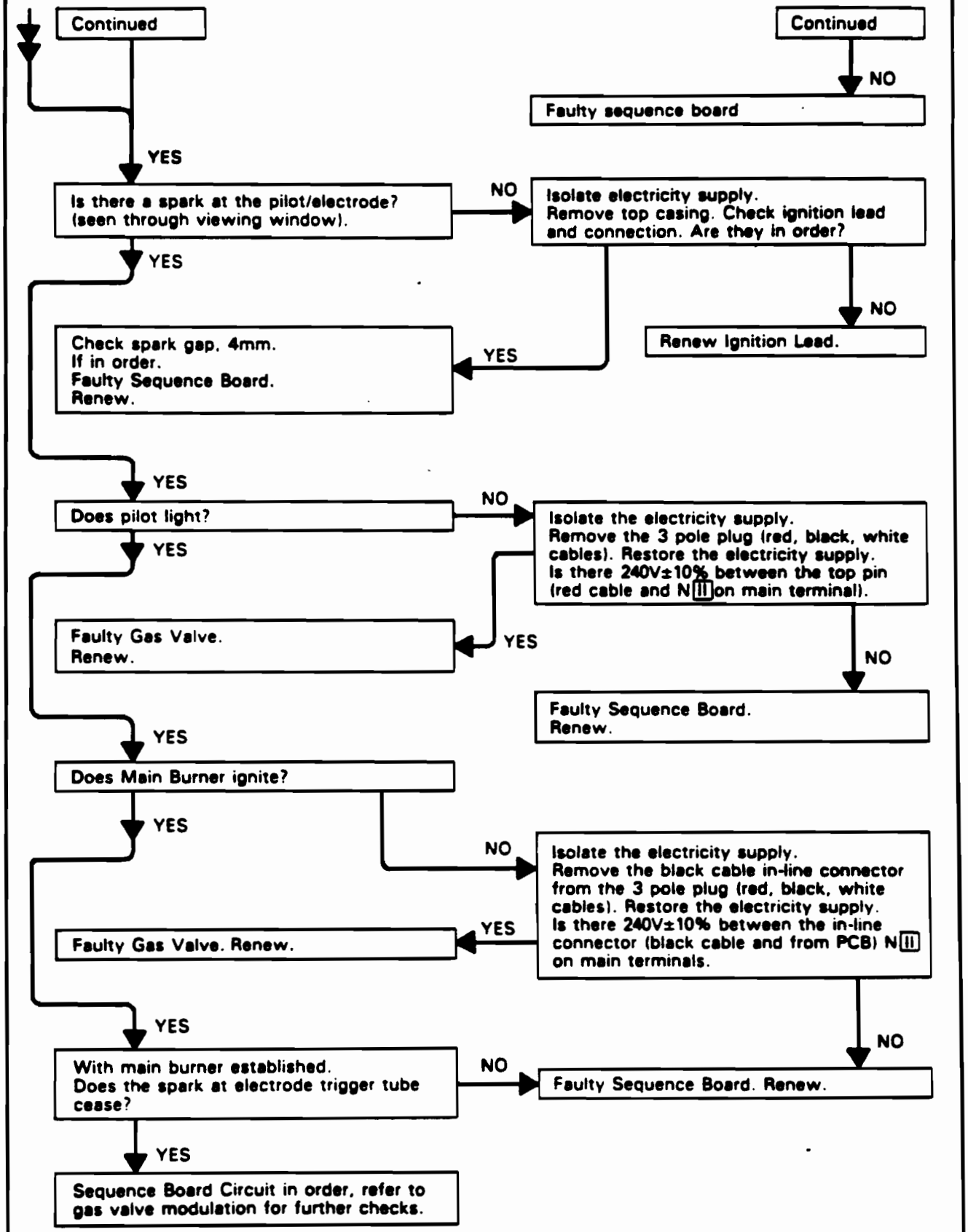



**Diagram 4.7 (Cont.)**

1519/1

## MODULATION CONTROL OF GAS VALVE

KEY:- ◯ CONTROL BOARD

With the following fault finding operations completed:-

(1) Mains Voltage Circuit
(2) Low Voltage Circuit
(3) Relay Circuit
(4) Sequence Board Circuit

Isolate electricity supply and check the following electrical components

(i) MODULATOR COIL

Disconnect cables, Brown & Blue from the coil. Test with ohmeter across the coil connections. Is resistance 50kΩ + 5kΩ at 20°C ambient?

NO → Faulty Coil, renew Gas Valve.

YES ▼

Remove 10 pole plug. Test continuity of cables Brown (15) Blue (14). Is there continuity?

NO → Repair or renew cable connections.

YES ▼

(ii) THERMISTOR

Disconnect Thermistor assembly cables from the connector. Connect ohmeter across wires. Is the resistance 10kΩ at 15-20°C ambient temperature?

NO → Faulty Thermistor, renew.

YES ▼

Reconnect Thermistor assembly cables.

YES ▼

(iii) CENTRAL HEATING TEMPERATURE SELECTOR

Disconnect the 5 pole plug from the Control Board. Connect ohmeter across (8) yellow and (5) red. With selector at minimum position (bottom). Is resistance 10kΩ?

NO → If connections are in order faulty Temperature Selector. Renew.

YES ▼

Slide Temperature Selector upwards. Does the resistance decrease?

NO → Faulty Temperature Selector. Renew.

YES ▼

Temperature Selector in order.

YES ▼

(iv) HOT WATER TEMPERATURE SELECTOR

Connect ohmeter across 7 brown and 4 grey. With selector at minimum position (bottom). Is resistance 10kΩ?

NO → If connections are in order, faulty Temperature Selector.

Continued

Diagram 4.8

1519/2

## MODULATION CONTROL OF GAS VALVE

Continued

Slide Temperature Selector upwards. Does the resistance decrease?

NO → Faulty Temperature Selector. Renew.

YES

Temperature Selector in order. Reconnect the 5 Pole Plug.

(v) 3 WAY VALVE MICRO SWITCH (LOW VOLTAGE)

Disconnect 10 pole plug from the Control Board. Is there continuity across the plug terminal (16) Purple and (18) Yellow?

NO → If in-line connectors within the controls drawer and cables Yellow, White and Purple from 10 pole plug to in-line connectors are in order. Faulty Microswitch assembly. Renew. Replace 10 pole plug.

With the meter still connected between (16) and (18). Open a hot water tap, the 3 Way Valve plunger will operate the microswitch. Is there continuity?

YES → Faulty Microswitch assembly. Renew. Close hot water tap. Replace 10 pole plug.

NO

Remove meter and connect between (17) white (18) yellow. Is there continuity?

NO → If the White cable from (17) to the in-line connector within the controls drawer is in order, faulty Microswitch assembly. Renew. Close hot water tap. Replace 10 pole plug.

YES

Microswitch assembly in order. Close hot water tap. Replace 10 Pole Plug.

## MODULATION OF CENTRAL HEATING MODE

With all the above components in order, continue with the following procedures.

Turn OFF gas. Slacken Pressure Test Screw from Gas Valve outlet test point. Fit a manometer. Turn ON gas. Close all Hot Water taps. Restore electricity supply. Set HW/HW + CH Selector to HW + CH mode, with remote control calling for duty. Switch 'ON' unit. With burner ignited and the HW + CH temperature selector at maximum position (top). Turn the CH potentiometer on the Control Board clockwise. Does the burner pressure vary?

NO → Faulty Control Board. Renew.

YES

Control Board in order.

Continued

**Diagram 4.8 (Cont.)**

## MODULATION CONTROL OF GAS VALVE

1519/3

Continued

With burner ignited and pressure adjusted. Does the burner pressure vary by adjusting the CH temperature selector from maximum (top) to minimum (bottom)?

→ Faulty Control Board. Renew.

YES

Central Heating Modulation. In order. Turn Off gas, remove manometer and tighten test point screw.

## MODULATION OF HOT WATER MODE

With all the above components in order, continue with the following procedures:-

Turn OFF gas. Slacken Pressure Test Point Screw from Gas Valve outlet test point. Fit a manometer. Turn ON gas.
Restore the electricity supply.
Set the HW/H/W + CH selector to 'HW' mode.
Switch CN unit. Open a hot water tap. With the burner ignited and the HW selector at maximum (top).
Turn the HW potentiometer on the Control Board clockwise. Does the burner pressure vary?

NO → Faulty Control Board. Renew.

YES

Control Board in order.

With burner ignited and pressure adjusted. Does the burner pressure vary by adjusting the HW selector from maximum (top) to minimum (bottom)?

NO → Faulty Control Board. Renew. Close hot water tap.

HW Modulation in order. Close hot water tap. Turn OFF gas. Remove manometer and tighten test point screw.

Modulation of Central Heating and Hot Water in order.

**Diagram 4.8 (Cont.)**

### 3.4 BOILER OVERHEAT CUT OFF DEVICE

3.4.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.4.2 Remove lower casing refer to 1.2.1.

3.4.3 Slacken off the upper screw of the clip securing the coiled capillary to the flow pipe, see diagram 3.1. DO NOT disturb the position of the lower screw or the clip on the pipe. Slide coiled capillary from behind the pipe.

3.4.4 Remove the cover from the overheat cut-off device by removing the securing screw and lifting the cover off, see diagram 3.2.

3.4.5 Disconnect the two electrical snap-on connectors on the cut off device and unscrew the securing nut to remove, see diagram 3.2.

REASSEMBLY NOTE: When refitting cover ensure that the capillary is positioned through the slot in the cover and is not trapped. Smear heatsink compound supplied, between the coiled capillary and the water pipe when replacing. Do not overtighten the nut, securing the overheat cut-off body to its bracket.

### 3.5 DOMESTIC HOT WATER HIGH LIMIT CUT-OFF

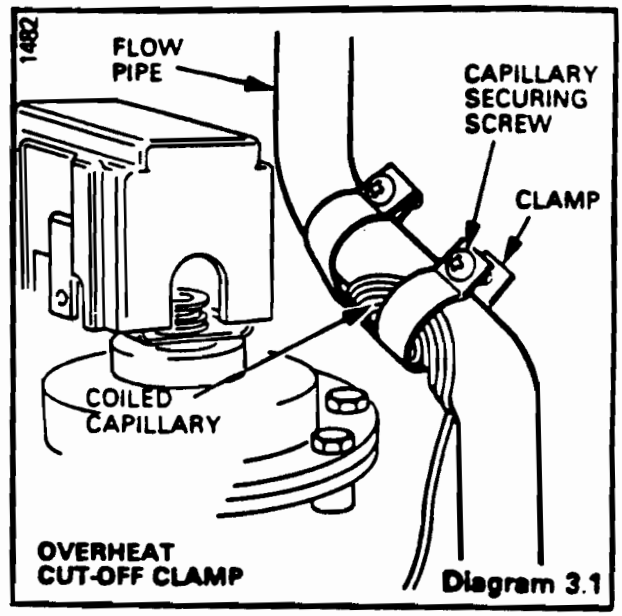
3.5.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.5.2 Remove all casings refer to section 1.2.

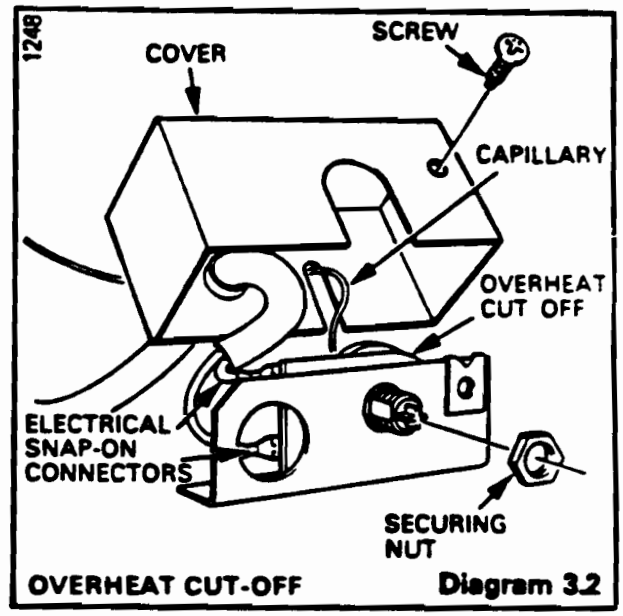
3.5.3 Disconnect electrical snap-on connectors from the D.H.W. high limit cut-off, see diagram 3.3.

3.5.4 Remove the two screws, nuts, and washers to release cut-off.

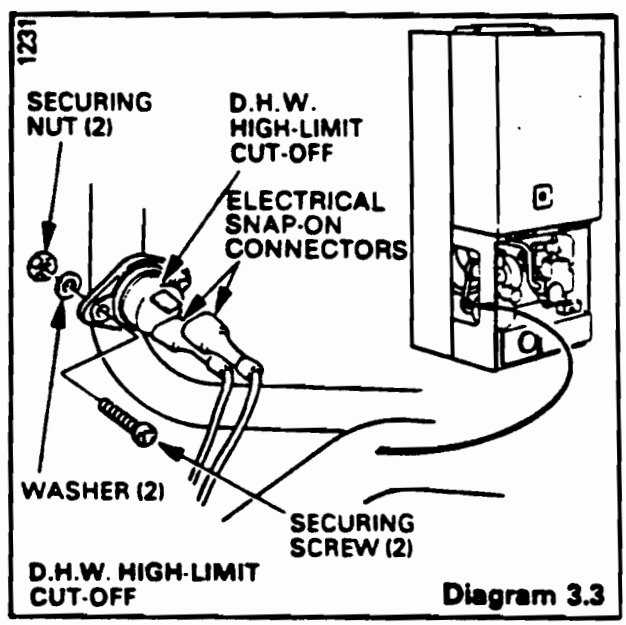
REASSEMBLY NOTE: When replacing cut-off use a little heat sink compound between the cut-off and the pipe, to ensure a good contact after reclamping.




OVERHEAT CUT-OFF CLAMP — Diagram 3.1




OVERHEAT CUT-OFF — Diagram 3.2




D.H.W. HIGH-LIMIT CUT-OFF — Diagram 3.3

### 3.6 THERMISTOR

3.6.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.6.2 Remove all casings refer to section 1.2.

3.6.3 Release water pressure on the central heating circuit of the boiler and drain, refer to section 1.3.

3.6.4 Disconnect the thermistor cables and the purple cables at the terminal block, see diagram 3.4.

NOTE: To improve access to the thermistor, unscrew the auto air vent from the air separator.

3.6.5 Unscrew the thermistor and remove from its housing, complete with 'O' ring, see diagram 3.4.

REASSEMBLY NOTE: When refitting the thermistor fit a new 'O' ring. Twin together the purple and the thermistor cables. Refit auto air vent. Fill and vent the unit, then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

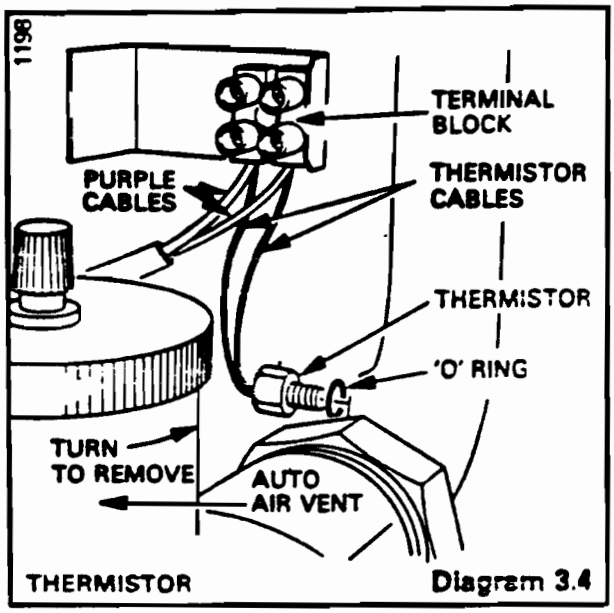


Diagram 3.4

### 3.7 GAS VALVE

3.7.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.7.2 Remove the lower casing refer to 1.2.1.

3.7.3 Disconnect pilot tubing nut at the gas valve and ease the tube from the valve, see diagram 3.5.

3.7.4 Disconnect the electrical snap-on connectors at the gas valve, noting the colours and positions of connections.

3.7.5 Release the upper cover by removing the securing screw. Disconnect the main valve electrical snap-on connectors and the earth screw, see diagram 3.5.

3.7.6 Remove the four screws to disconnect the burner supply pipe from the outlet of the gas valve.

3.7.7 Support the gas valve and remove the four screws to release the inlet pipe. Ease the pipes from the gas valve and remove the gas valve complete with two 'O' rings.

3.7.8 Release the lower cover and disconnect the pilot valve electrical snap-on connectors as in 3.7.5.

REASSEMBLY NOTES: Refer to diagram 3.7 and 3.8 when reconnecting cables. Ensure gas valve is correctly orientated when refitting (direction of gas flow is indicated by an arrow on the base of the gas valve). Fit new 'O' rings as supplied with the valve. It will be necessary to check that the pressure setting and pilot flame length are correct, refer to 'Commissioning and Testing' in the Installation Instructions, and see diagram 2.5.

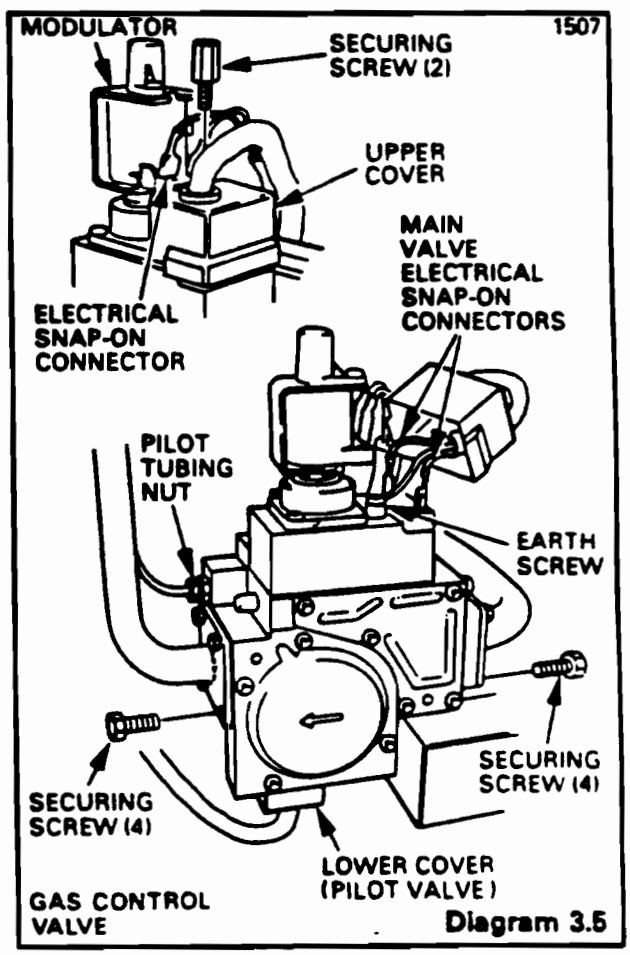


Diagram 3.5

### 3.8 THERMO-PRESSURE GAUGE

3.8.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.8.2 Remove the lower casing refer to 1.2.1.

3.8.3 Unfasten the two thumb screws from below the thermo/pressure gauge panel and carefully pull the panel forward, see diagram 1.5. Invert the thermo pressure gauge and resecure it using one of the screws, to prevent any strain on the cables and capillaries.

3.8.4 Release water pressure and drain, refer to section 1.3.

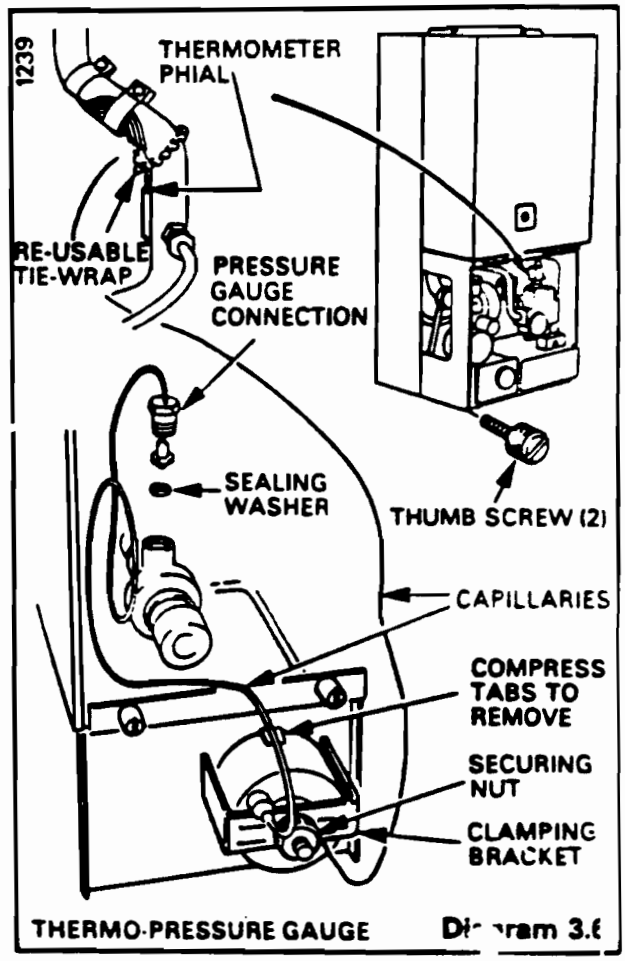
3.8.5 Unscrew the pressure gauge connection from the safety valve and release the pipe complete with nut, and sealing washer, see diagram 3.6.

3.8.6 Remove the thermometer phial from its pocket on the pipe after removing the reusable tie wrap, see diagram 3.6.

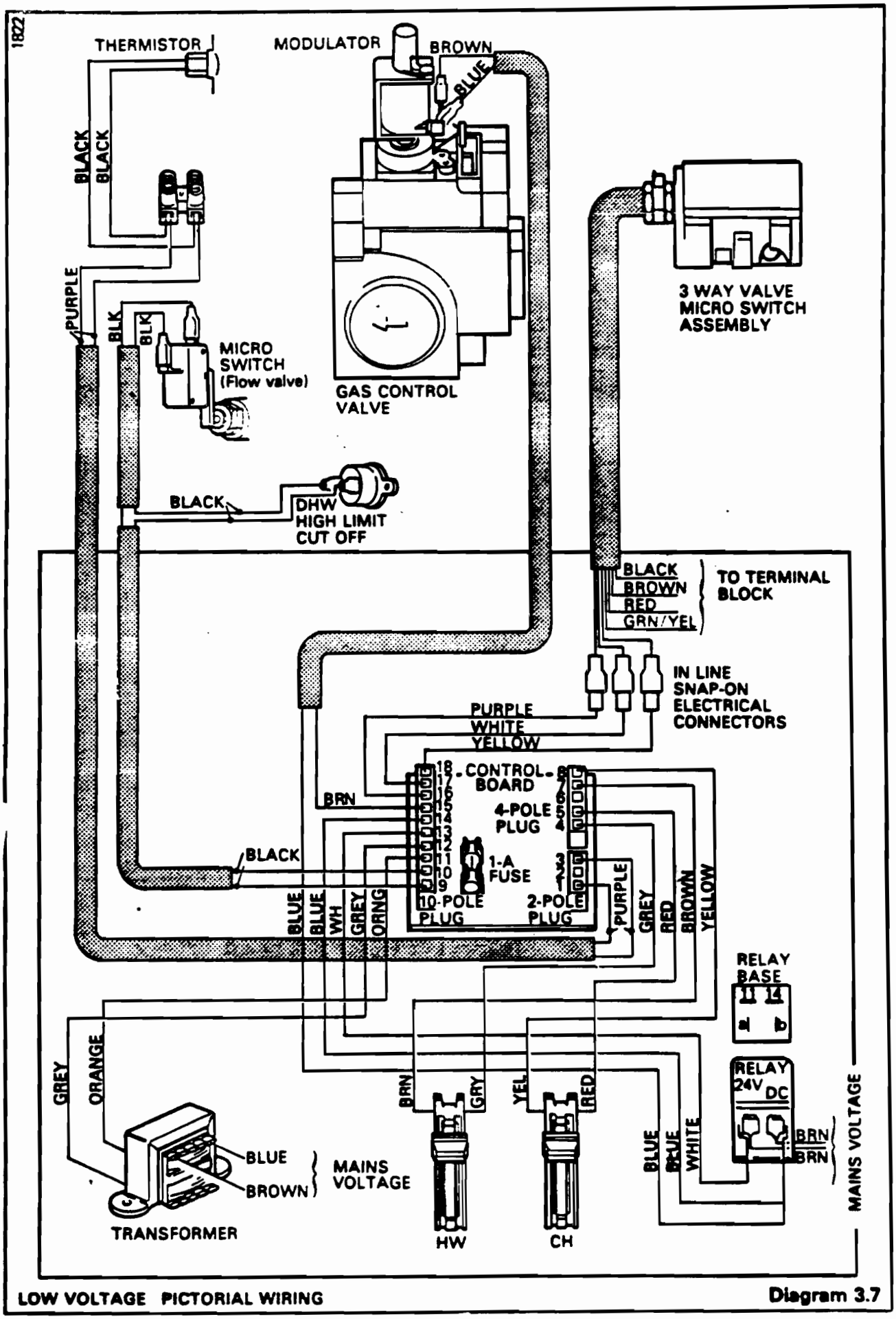
3.8.7 Remove the securing nut and clamping bracket at the rear of the gauge.

3.8.8 Remove the thermo/pressure gauge complete with capillary pipes, from the panel, by squeezing the wedges on either side of the gauge, enabling it to be drawn through the hole in the bracket, see diagram 3.6.

REASSEMBLY NOTE: When refitting make sure that the sealing washer is in position under the pressure gauge connection, and that the capillaries are not bent tightly or will not become trapped. Ensure that the thermometer phial is pushed fully home in its pocket, and that the thermo-pressure gauge is positioned the correct way up. Fill and vent the unit, refer to section 1.3 then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.




THERMO-PRESSURE GAUGE Diagram 3.6




LOW VOLTAGE PICTORIAL WIRING

Diagram 3.7

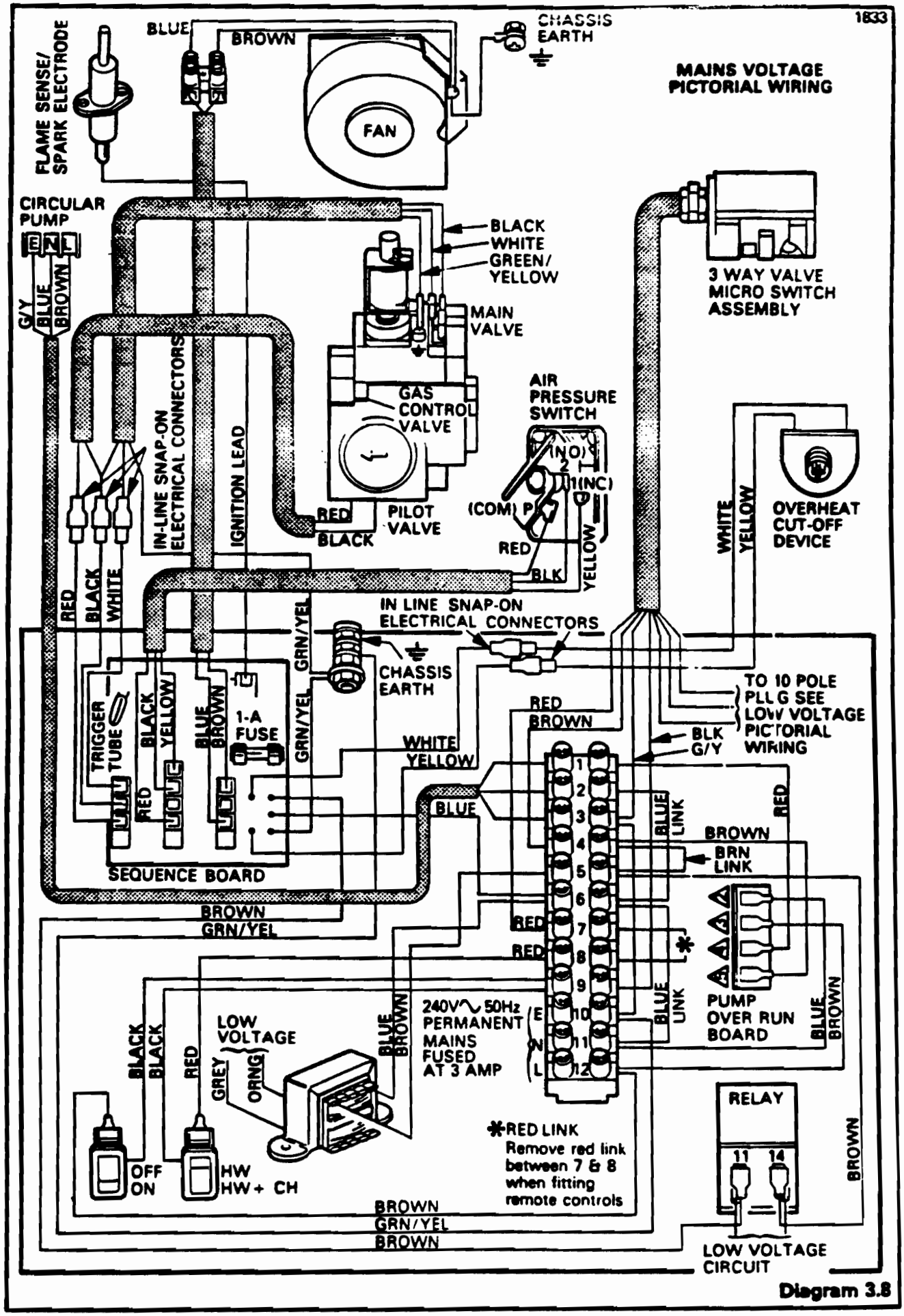

1833
MAINS VOLTAGE
PICTORIAL WIRING
FLAME SENSE/
SPARK ELECTRODE
BLUE
BROWN
CHASSIS
EARTH
FAN
CIRCULAR
PUMP
G/Y
BLUE
BROWN
BLACK
WHITE
GREEN/
YELLOW
MAIN
VALVE
3 WAY VALVE
MICRO SWITCH
ASSEMBLY
GAS
CONTROL
VALVE
AIR
PRESSURE
SWITCH
(NO)
(NC)
(COM)
IN-LINE SNAP-ON
ELECTRICAL CONNECTORS
IGNITION LEAD
RED
BLACK
PILOT
VALVE
RED
BLK
YELLOW
WHITE
YELLOW
OVERHEAT
CUT-OFF
DEVICE
RED
BLACK
WHITE
GRN/YEL
IN LINE SNAP-ON
ELECTRICAL CONNECTORS
CHASSIS
EARTH
TO 10 POLE
PLUG SEE
LOW VOLTAGE
PICTORIAL
WIRING
TRIGGER
TUBE
BLACK
YELLOW
BLUE
BROWN
1-A
FUSE
GRN/YEL
RED
BROWN
BLK
G/Y
WHITE
YELLOW
BLUE
1
2
3
4
5
6
7
8
9
10
11
12
BLUE
LINK
RED
BROWN
BRN
LINK
SEQUENCE BOARD
BROWN
GRN/YEL
RED
RED
*
PUMP
OVER RUN
BOARD
BLUE
BROWN
BLACK
BLACK
RED
LOW
VOLTAGE
GREY
ORNG
BLUE
BROWN
240V~ 50Hz
PERMANENT
MAINS
FUSED
AT 3 AMP
E
N
L
RELAY
11
14
BROWN
OFF
ON
HW
HW + CH
*RED LINK
Remove red link
between 7 & 8
when fitting
remote controls
BROWN
GRN/YEL
BROWN
LOW VOLTAGE
CIRCUIT

Diagram 3.8

3.9 MICROSWITCH - FLOW VALVE

3.9.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.9.2 Remove the lower casing refer to 1.2.1.

3.9.3 Unfasten the two thumb screws from below the thermo/pressure gauge panel and pull the panel carefully forward, see diagram 1.5. Invert the thermo/pressure gauge and resecure it using one of the screws, to prevent any strain on the cables and capillaries.

3.9.4 Disconnect the electrical snap-on connectors on the microswitch, see diagram 3.9.

3.9.5 Remove the securing nut to release the bracket and switch, see diagram 3.9.

3.9.6 Remove the screws, shakeproof washers, and nuts to release switch and insulation from the bracket.

REASSEMBLY NOTE: When refitting make sure that the insulation is fitted between the microswitch and the bracket, the polarity of the connections is unimportant.

3.10 MICROSWITCH ASSEMBLY - (3-WAY VALVE)

3.10.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.10.2 Remove the lower casing refer to 1.2.1.

3.10.3 Unfasten the two screws that secure the electrical controls drawer, see diagram 3.10.

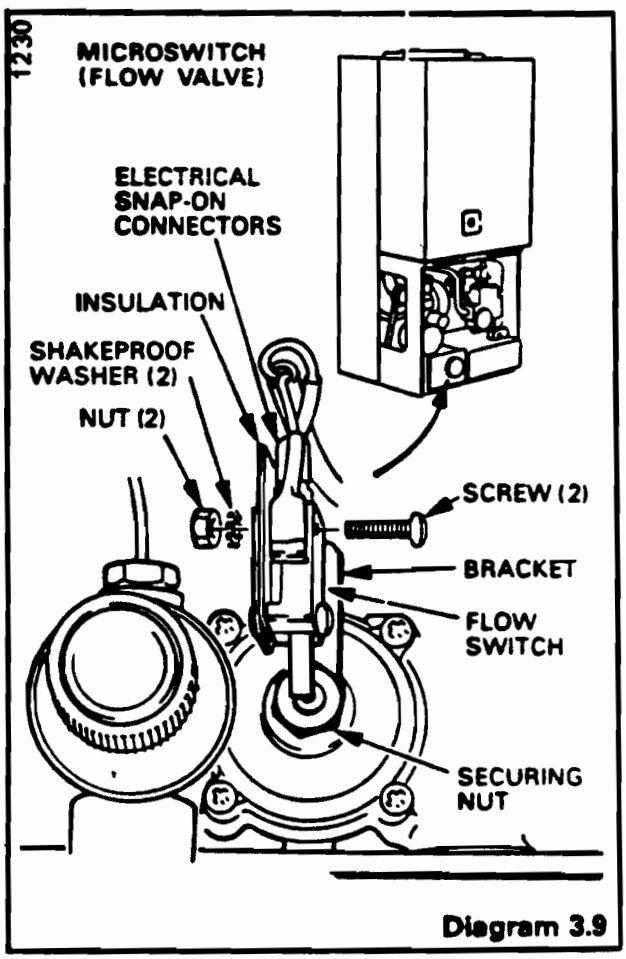
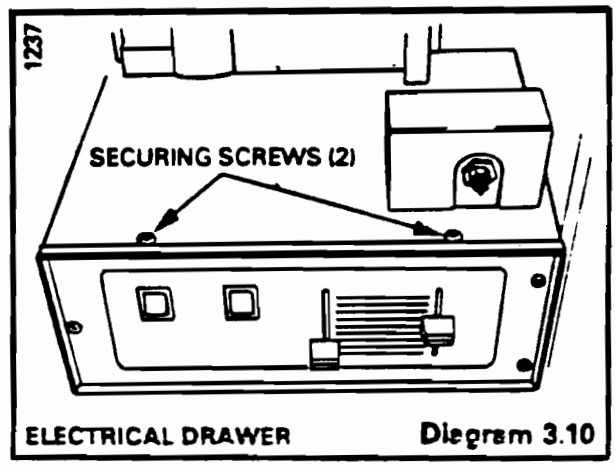


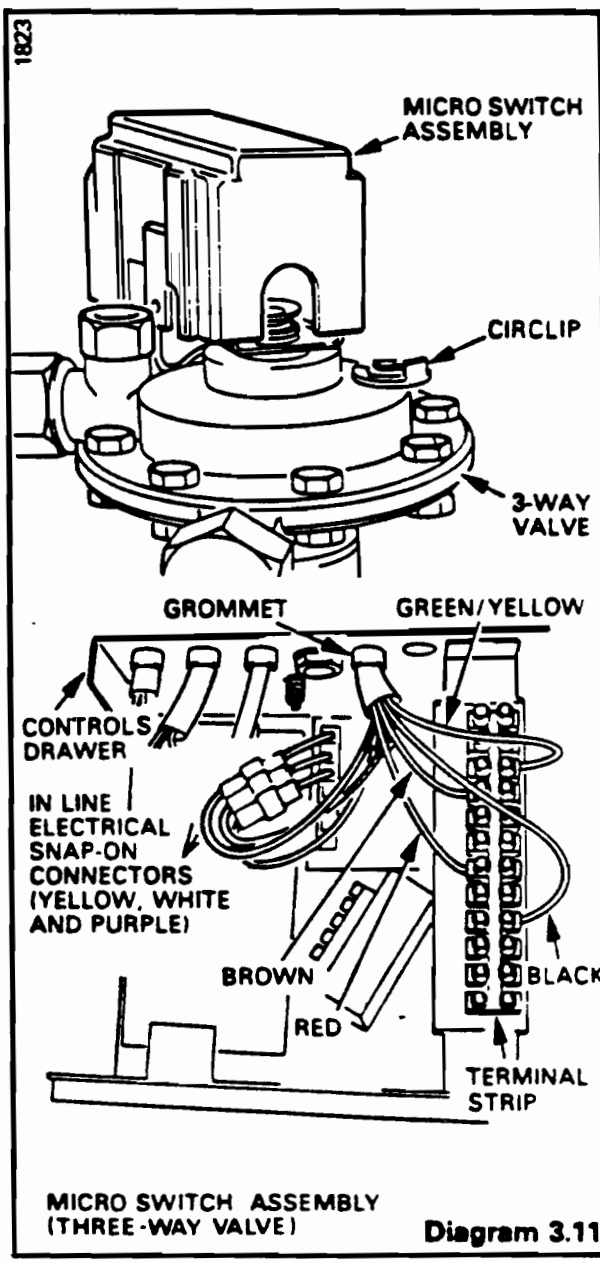

Diagram 3.9

3.10.4 Slide the electrical drawer forward to its stops and hinge downward, taking care with cables connected to the drawer.

3.10.5 Remove the circlip fastening the microswitch assembly to the three way valve, see diagram 3.11.




ELECTRICAL DRAWER Diagram 3.10




MICRO SWITCH ASSEMBLY (THREE-WAY VALVE) Diagram 3.11

3.10.6 Disconnect the three in-line connectors (Yellow, White, and Purple), inside the controls drawer. Disconnect the four cables (Brown, Black, Red, and Green/yellow) from the terminal strip. Withdraw all the cables and the Heyco bush from the controls drawer.

3.10.7 Remove the reusable tie-wrap from the cables at the rear of the drawer.

3.10.8 Remove microswitch assembly from the unit.

REASSEMBLY NOTE: When reconnecting cables refer to diagrams 3.7 and 3.8. When fitting new assembly ensure that the in-line connectors are completely covered by their insulation boots and the circlip is correctly located in its groove. Resecure all cables with reusable cable tie, previously removed.

### 3.11 TEMPERATURE SELECTORS

3.11.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.11.2 Remove the lower casing refer to 1.2.1.

3.11.3 Remove electrical controls drawer refer to 3.10.3 and 3.10.4.

3.11.4 Disconnect the multi-pin plug (4 pole) from the control board, see diagram 3.12.

3.11.5 Pull off the two temperature selector knobs.

3.11.6 Remove the controls drawer facia by removing the three screws, see diagram 3.12.

3.11.7 Remove the four securing screws to release both the temperature selectors, cables and plugs as assemblies.

REASSEMBLY NOTE: Refer to diagram 3.7 to position the selectors correctly; 'HW' selector left side of 'HW+CH' selector and with the connections at the top. Make sure that the multi pin plug is connected correctly, see diagram 3.12. Do not overtighten the screws securing the temperature selectors.

### 3.12 IGNITION LEAD

3.12.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

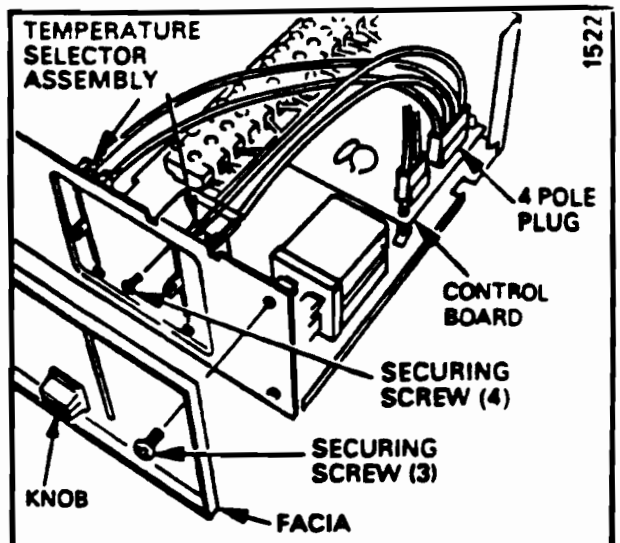
3.12.2 Remove all casings refer to section 1.2.

3.12.3 Release one of the gland plates on the left hand side where the ignition lead passes through the back panel.

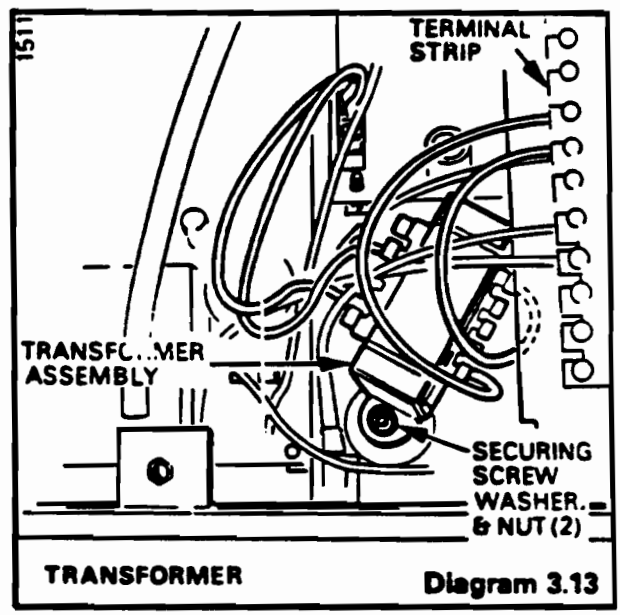
3.12.4 Remove the ignition lead retaining tubes on the pilot pipe. Remove the two screws securing the electrical drawer, and slide the drawer forward to its stops, and hinge down, taking care not to strain any cables connected to it.

3.12.5 Disconnect the ignition lead at the sequence board, see diagram 3.8. Remove lead noting the route of the lead.

REASSEMBLY NOTE: Fit the replacement lead with the clear insulated end connected to the electrode and the black end connected to the sequence board.




TEMPERATURE SELECTOR ASSEMBLY — Diagram 3.12




TRANSFORMER — Diagram 3.13

### 3.13 TRANSFORMER ASSEMBLY

3.13.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.13.2 Remove the lower casing refer to 1.2.1.

3.13.3 Remove the electrical controls drawer refer to 3.10.3 and 3.10.4.

3.13.4 Disconnect the two cables from the transformer at the terminal strip, Blue at No.6 and Brown at No.5. Disconnect the Orange and Grey cables at the electrical snap-on connectors at the transformer, see diagram 3.13.

3.13.5 Remove the transformer, complete with Blue and Brown cables, screws and nuts, by removing the securing nuts and washers.

REASSEMBLY NOTE: Refer to wiring diagram 3.7 when refitting cables.

### 3.14 SEQUENCE BOARD

3.14.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.14.2 Remove all casings refer to section 1.2.

3.14.3 Remove the electrical controls drawer, refer to 3.10.3 and 3.10.4.

3.14.4 Disconnect the two in-line connectors (White and Yellow) and the three multi-pin plugs, see diagram 3.8.

3.14.5 Disconnect the Blue cable at terminal strip No.6.

3.14.6 Disconnect the Brown cable at the electrical snap-on connector at the relay.

3.14.7 Disconnect the Green/Yellow cable at the earth screw.

3.14.8 Disconnect the ignition lead from the sequence board.

3.14.9 Remove sequence board by easing it from the posts.

REASSEMBLY NOTE: When renewing sequence board ensure plugs and cables are correctly fitted, refer to diagram 3.8.

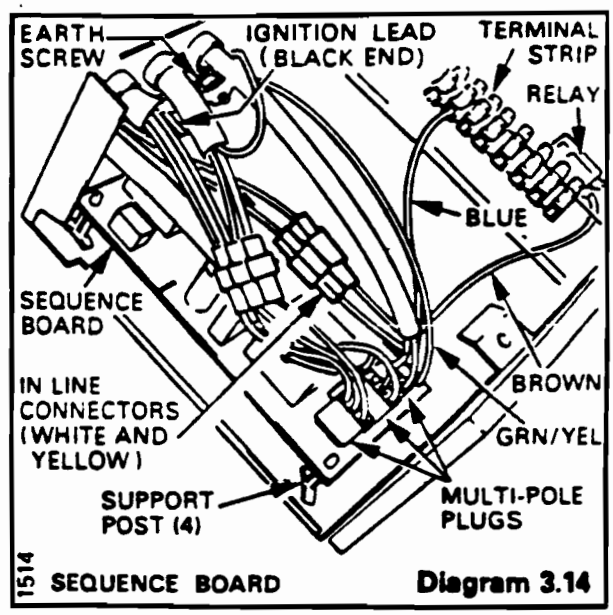


Diagram 3.14

### 3.15 RELAY

3.15.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.15.2 Remove all casings refer to section 1.2.

3.15.3 Remove the electrical controls drawer, refer to 3.10.3 and 3.10.4.

3.15.4 Remove the screw, nut, and washer nearest to the rear of the drawer, see diagram 3.15.

3.15.5 Slacken the front screw, washer, and nut sufficiently to allow the relay to be released, taking care as the relay is still electrically connected.

3.15.6 Disconnect the electrical snap-on connectors at the relay.

REASSEMBLY NOTE: When reconnecting the relay, refer to diagrams 3.7 and 3.8, and ensure that the connections are correct.

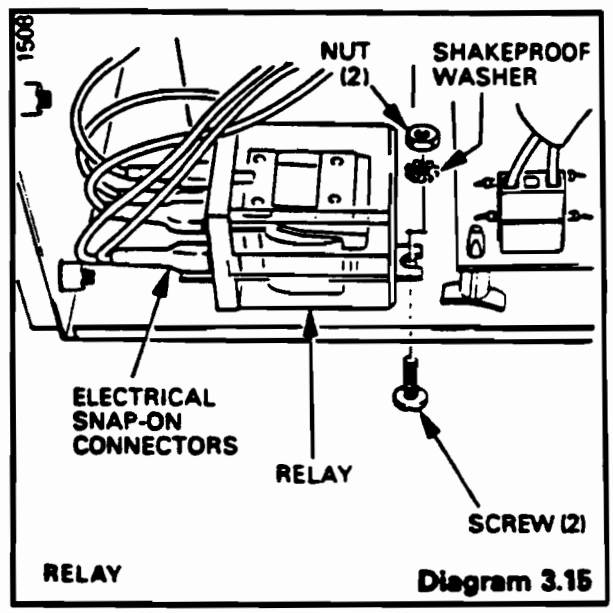


Diagram 3.15

### 3.16 CONTROL BOARD

3.16.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.16.2 Remove the lower casing refer to 1.2.1.

3.16.3 Remove the electrical controls drawer refer to 3.10.3 and 3.10.4.

3.16.4 , Disconnect all three multi-pin plugs at the control board, see diagram 3.16.

3.16.5 Ease control board off the posts.

REASSEMBLY NOTE: When reconnecting the multi-pin plugs make sure that they are connected correctly, see diagram 3.8.

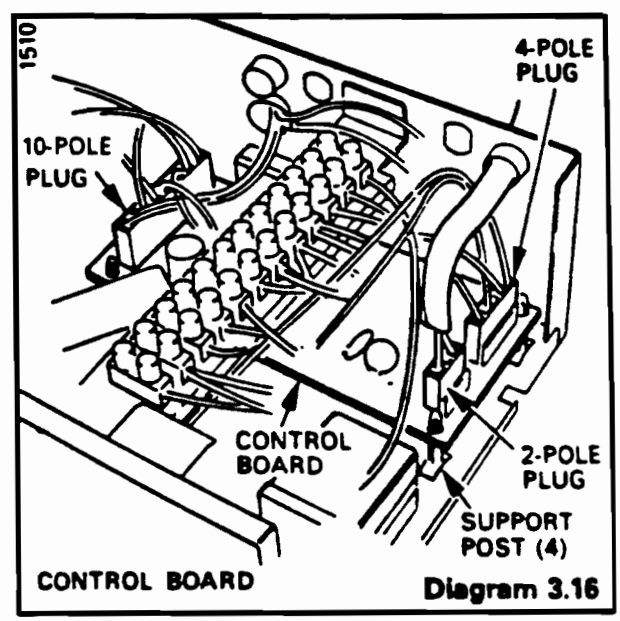


Diagram 3.16

### 3.17 PUMP OVERRUN BOARD

3.17.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.17.2 Remove lower casing refer to 1.2.1.

3.17.3 Remove the electrical controls drawer, refer to 3.10.3 and 3.10.4.

3.17.4 Disconnect the electrical snap-on connectors from the board, see diagram 3.17.

3.17.5 Remove the pump overrun board by easing it from the posts.

REASSEMBLY NOTE: When renewing the pump overrun board, refer to diagrams 3.17 and 3.7.

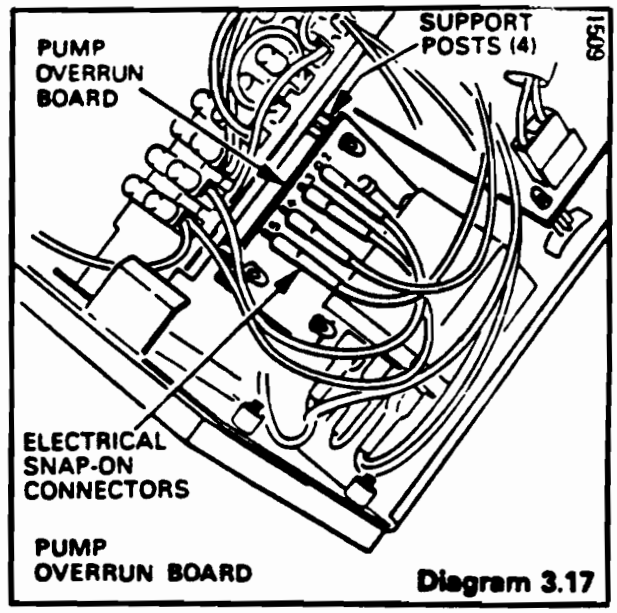


Diagram 3.17

### 3.18 AIR PRESSURE SWITCH

3.18.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.18.2 Remove lower casing refer to 1.2.1.

3.18.3 Remove the cover by removing the securing screw, slide cover to the right to release it, see diagram 3.18.

3.18.4 Disconnect the electrical snap-on connectors from the air pressure switch noting their positions, see diagram 3.19.

3.18.5 Disconnect the flexible tubes at the switch, note that the tube containing the air restrictor is connected to the nozzle on the air switch marked "-", see diagram 3.18.

3.18.6 Slide the air pressure switch to the left out of the bracket.

REASSEMBLY NOTE: When renewing the switch, fit the tube containing the air restrictor to the lower front connection marked -.
Re-connect the electrical snap-on connectors, refer to diagram 3.8.
Locate the lugs in the cover behind the switch bracket, slide to the left and secure with the screw previously removed.

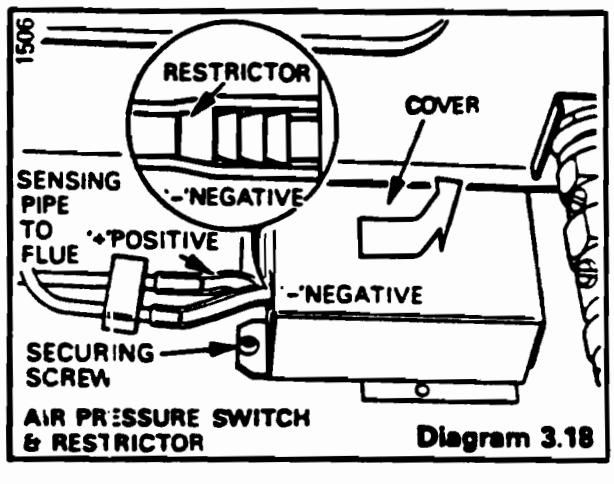


Diagram 3.18

### 3.19 AIR RESTRICTOR

3.19.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.19.2 Remove lower casing refer to 1.2.1.

3.19.3 Remove the air restrictor from the pressure switch and renew or clean by blowing out any obstruction. Do not use wire or sharp instruments to clean.

REASSEMBLY NOTE: Refer to diagram 3.18 when replacing the air restrictor, and ensure that it is on the low pressure side marked "-" on the pressure switch with the lower flexible pipe pushed onto it, also ensure that the upper flexible pipe is connected to the connector marked "+" on the pressure switch.

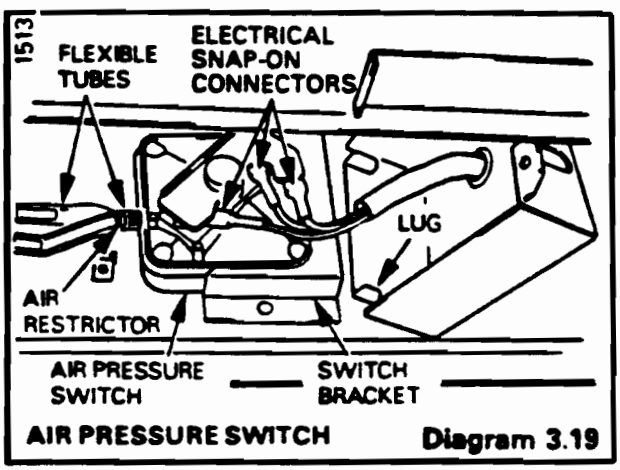


Diagram 3.19

### 3.20 FAN ASSEMBLY

3.20.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.20.2 Remove all casings refer to section 1.2.

3.20.3 Disconnect the fan cables from the connector and the earth screw, remove the screw clamping the 'P' clip and release the fan cables.

3.20.4 Remove the screw and clip securing the tube to the fan casing.

3.20.5 Remove the two screws to release the fan assembly and remove.

NOTE: To facilitate ease of fan removal pull the sensing tube from the upper grommet and ease downward.

3.21 ON/OFF AND HW/HW+CH SWITCH ASSEMBLIES

3.21.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.21.2 Remove the lower casing refer to 1.2.1.

3.21.3 Remove the electrical controls drawer refer to 3.10.3 and 3.10.4.

3.21.4 Disconnect the appropriate cables at the terminal block, see diagram 3.8.

3.21.5 Remove the appropriate switch and cable assembly, by exerting a force on the location lugs, see diagram 3.20.

REASSEMBLY NOTES: Refer to diagram 3.8 when replacing and reconnecting. Note that the left hand switch has Brown and Black cables and the right hand switch has Red and Black cables. Both switches must be positioned with the white marker facing upwards.

3.22 SAFETY VALVE

3.22.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.22.2 Remove the lower casing refer to 1.2.1.

3.22.3 Remove the two screws and carefully pull forward the thermo pressure gauge panel, see diagram 1.5. Invert the thermo pressure gauge and resecure it using one of the screws, to prevent any strain on the cables and capillaries.

3.22.4 Release water pressure and drain, refer to section 1.3.

3.22.5 Unscrew the pressure gauge connection from the safety valve and release the capillary pipe complete with nut and washer, see diagram 3.21.

3.22.6 Remove the thermometer phial from its pocket on the pipe, after removing the reusable tie wrap, see diagram 3.6.

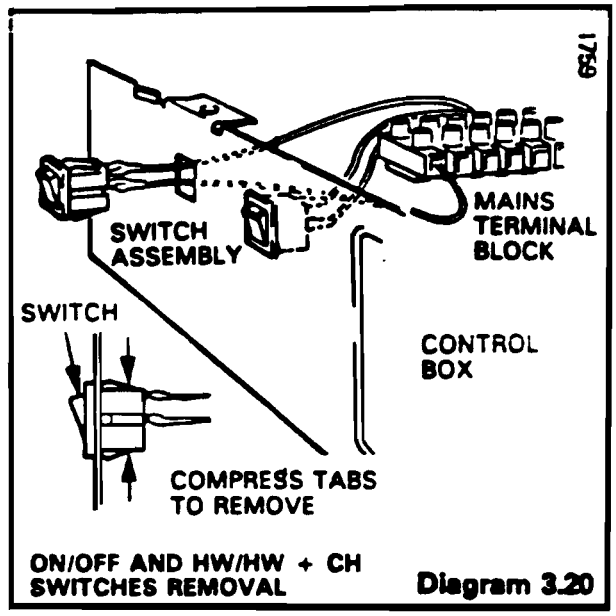
3.22.7 Remove panel complete with thermo/pressure gauge and capillary pipes.

3.22.8 Unscrew the drain pipe connection from the safety valve, see diagram 3.21. Disconnect the pipe and remove the fitting from the outlet of the valve, complete with washer.

3.22.9 Disconnect the snap-on electrical connectors at the flow valve microswitch. Remove the four screws retaining the flow valve cover assembly, see diagram 3.22. Remove flow valve cover complete with microswitch.

3.22.10 Unscrew the safety valve.

REASSEMBLY NOTES: When refitting use a little jointing compound on the male threads and make sure that the sealing washer is in position under the pressure gauge connection, and on the fitting on the drain pipe. Ensure that the thermometer phial is fully home in its pocket and that the reusable tie wrap is in refitted. Fill and vent the unit refer to 'Commissioning and Testing' in the Installation Instructions.




ON/OFF AND HW/HW + CH SWITCHES REMOVAL **Diagram 3.20**

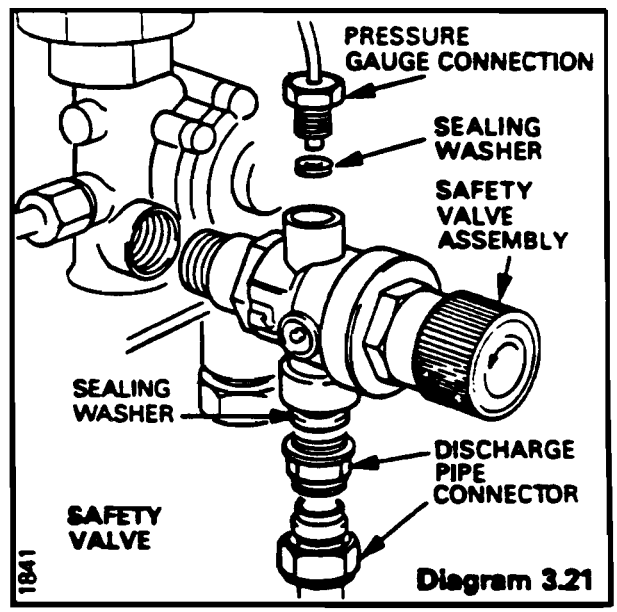
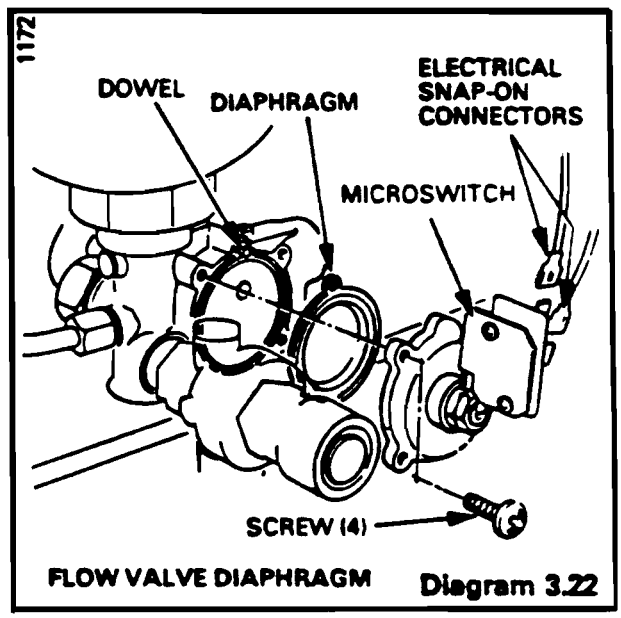



**Diagram 3.21**




FLOW VALVE DIAPHRAGM **Diagram 3.22**

3.23 FLOW VALVE DIAPHRAGM

3.23.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.23.2 Remove lower casing refer to 1.2.1.

3.23.3 Remove the two thumbscrews and carefully pull forward the thermo pressure gauge panel, see diagram 1.4. Invert the thermo pressure gauge and resecure it using one of the screws, to prevent any strain on the capillaries.

3.23.4 Release water pressure and drain, refer to section 1.3.

3.23.5 Remove the pressure gauge connection refer to 3.8.5 and diagram 3.21.

3.23.6 Disconnect the electrical snap-on connectors from the micro switch.

3.23.7 Remove the four screws retaining the flow valve cover assembly, see diagram 3.22. Remove flow valve cover assembly complete with microswitch.

3.23.8 Remove exposed rubber diaphragm from the locating dowel on the flow valve body, see diagram 3.22.

REASSEMBLY NOTES: When refitting diaphragm ensure the moulded shape fits snugly into the body. Refit flow valve cover assembly verifying that it also locates correctly on the dowel. When refitting pressure gauge connection at safety valve make sure that the sealing washer is in place. Vent the unit refer to section 1.3 then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

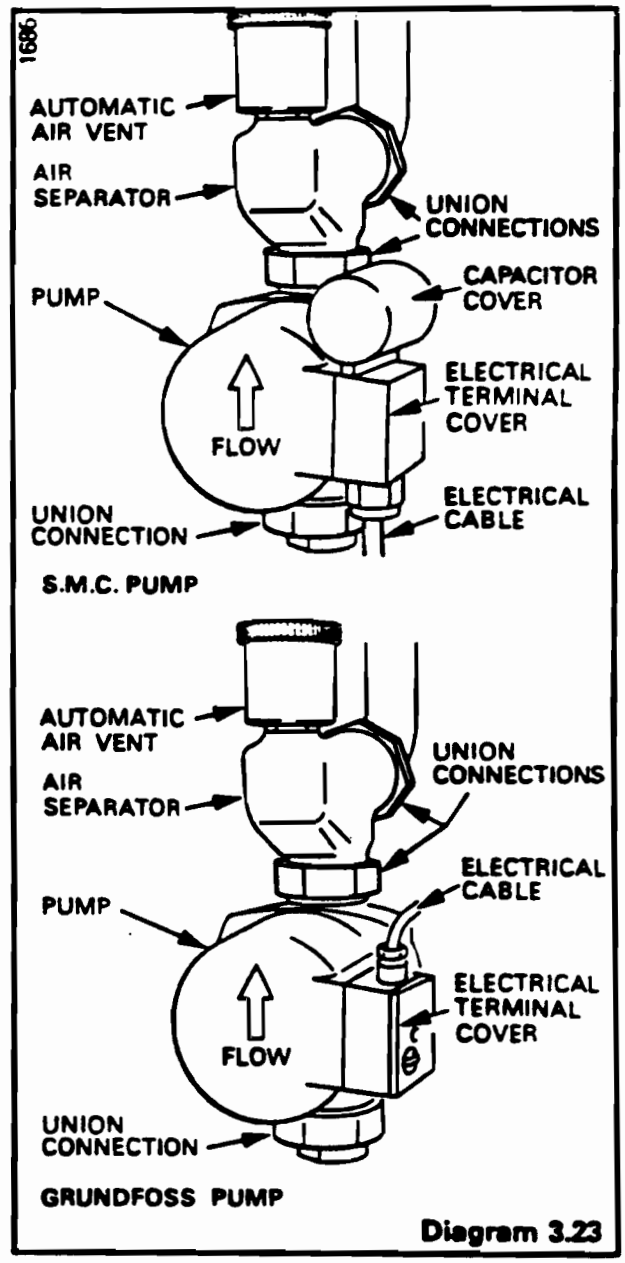


Diagram 3.23

3.24 PUMP

3.24.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.24.2 Remove the lower casing refer to 1.2.1.

3.24.3 Remove the two screws and carefully pull forward the thermo pressure gauge panel, see diagram 1.4. Invert the thermo pressure gauge and resecure it using one of the screws, to prevent any strain on the cables and capillaries.

3.24.4 Release the water pressure and drain see section 1.3.

3.24.5 Remove pressure gauge connection, refer to 3.8.5 and diagram 3.21.

3.24.6 Remove electrical terminal cover from the pump and disconnect the electrical wiring.

3.24.7 Break union connections at top and bottom of the pump see diagram 3.23, remove pump clear of unit. Take care not to damage thermistor or cables.

REASSEMBLY NOTES - SMC PUMP: Connect electrical cable to new pump, and refit capacitor cover and electrical terminal cover, before fitting new pump, see diagram 3.23.

REASSEMBLY NOTES - GRUNDFOS PUMP: Connect electrical cable to new pump, and refit electrical terminal cover, before fitting new pump, see diagram 3.23.

REASSEMBLY NOTES - GENERAL: Fit new pump with flow directional arrow pointing up, and fit new washers. If the automatic air vent requires replacement it would be advantageous to do it at this stage. Unscrew the air vent from the air separator and refit using new 'O' ring. Fill and Vent the unit refer to section 1.3 then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

### 3.25 THREE WAY VALVE

3.25.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.25.2 Remove the lower casing refer to 1.2.1.

3.25.3 Release water pressure and drain, refer to section 1.3.

3.25.4 Remove the gas valve, see section 3.12.

3.25.5 Remove circlip holding the microswitch assembly onto the three way valve, see diagram 3.11.

3.25.6 Lift microswitch assembly away from 3-way valve, do not allow the cables to be strained.

3.25.7 Disconnect the five unions to the 3-way valve and withdraw valve forward see diagram 3.24. NOTE: After disconnection slacken the union connection and rotate supply pipe for better access.

REASSEMBLY NOTE: When refitting make sure that the sealing washers are in place within the connections. Ensure the circlip is correctly located in its groove. Renew sealing washers if necessary. Adjust the water throttle screw on the 3-way valve, as necessary. Fill and vent the transfer tank, then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

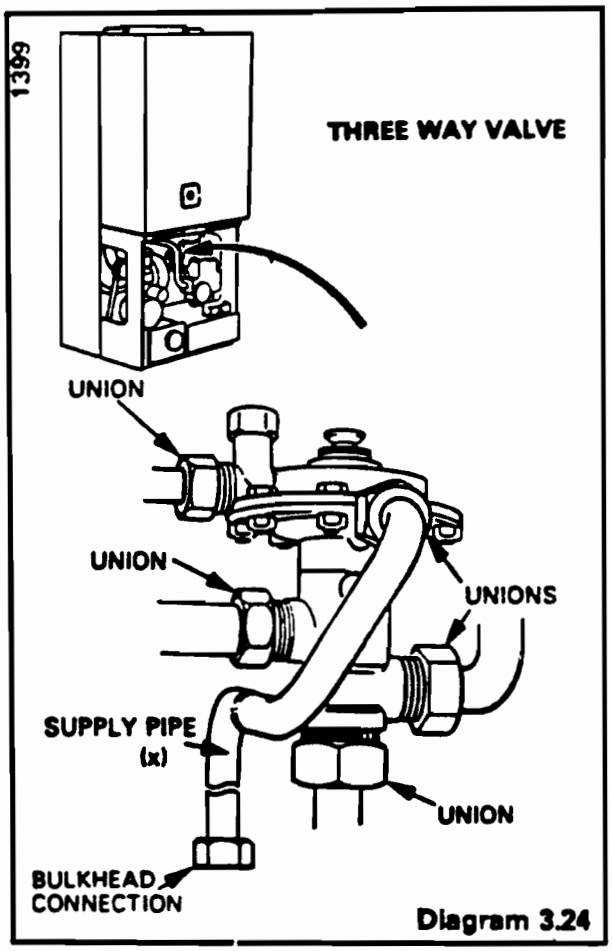


Diagram 3.24

### 3.26 HEAT TRANSFER TANK

3.26.1 Isolate the electricity supply and turn OFF the gas and water supplies to the unit. Refer to section 1.1.

3.26.2 Remove the lower casing refer to 1.2.1.

3.26.3 Release water pressure and drain, refer to section 1.3.

3.26.4 Remove the gas valve, refer to 3.7.

3.26.5 Support the transfer tank then disconnect the four unions to the tank, see diagram 3.25.

3.26.6 Carefully remove tank complete with washers through the space vacated by the gas valve.

REASSEMBLY NOTE: When refitting fit new washers supplied, ensure washers are in the correct positions. Fill and vent the transfer tank refer to section 1.3, then repressurise the system. Refer to 'Commissioning and Testing' in the Installation Instructions.

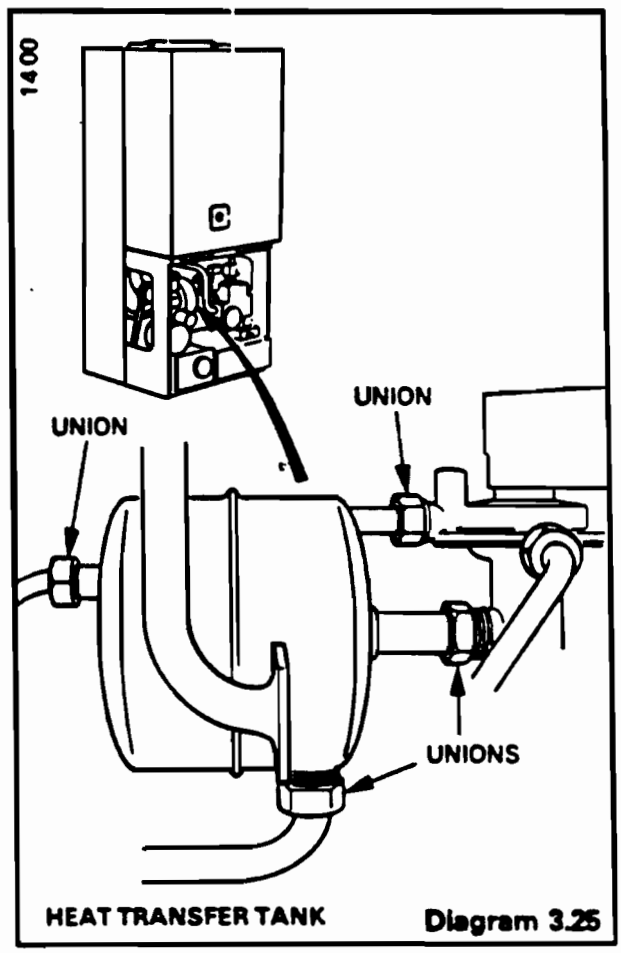


Diagram 3.25

### 3.27 HEAT EXCHANGER

3.27.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.27.2 Remove all casings refer to section 1.2.

3.27.3 Release water pressure and drain the unit, refer to section 1.3. Open vents on heat exchanger and drain from position shown in diagram 3.27.

3.27.4 Remove the flue hood, combustion chamber, and main burner refer to 2.2.1 to 2.2.3 and 2.2.9.

3.27.5 Cover the pilot burner/electrode to prevent deposits entering them, when removing heat exchanger.

3.27.6 Undo the heat exchanger flow and return connections, see diagram 3.26.

3.27.7 Disengage the heat exchanger connections and remove heat exchanger from the unit.

REASSEMBLY NOTES: When fitting heat exchanger ensure that the tabs on the combustion chamber sides locate into the slots in the side plates of the heat exchanger. Refit combustion chamber front panel with the four screws and wing nut previously removed. Before fitting the flue hood check that the gasket is in good condition renew if necessary, gluing new one in place with the adhesive supplied. Secure the flue hood with securing angle hook bolts and wing nuts. Refit the two flue hood securing screws and secure the flue hood to the back panel. Fill and Vent the unit refer to 'Commissioning and Testing' in the Installation Instructions.

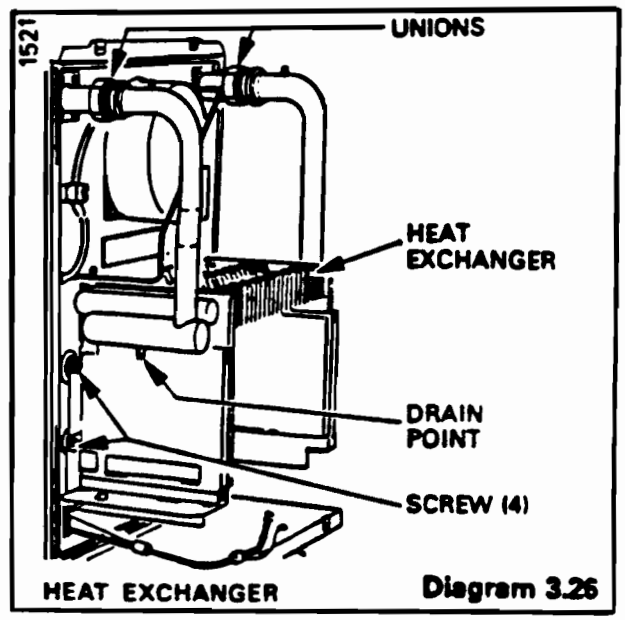


Diagram 3.26

### 3.28 COMBUSTION CHAMBER FRONT/SIDE/REAR INSULATION

3.28.1 Isolate the electricity supply and turn OFF the gas supply to the unit. Refer to section 1.1.

3.28.2 Remove all casings refer to section 1.2.

3.28.3 Proceed as 2.2.1 to 2.2.2.

3.28.4 To remove front insulation, remove the securing screw and slide out the insulation panel, see diagram 3.27.

3.28.5 To remove the side insulation slide out the insulation panels, see diagram 3.27.

3.28.6 To remove rear insulation, remove main burner. Proceed as 2.2.1 to 2.2.3.

3.28.7 Push down lightly on the pilot burner assembly, pull main burner towards you, off the injector, and upwards through the combustion chamber, taking care not to damage insulation panels.

3.28.8 Remove the four screws securing the combustion chamber to the unit backplate see diagram 3.26. Lower and remove the combustion chamber from the unit.

3.28.9 Remove the rear insulation panel.

REASSEMBLY NOTE: Replacement of all insulation panels is by reversal of the above procedures.

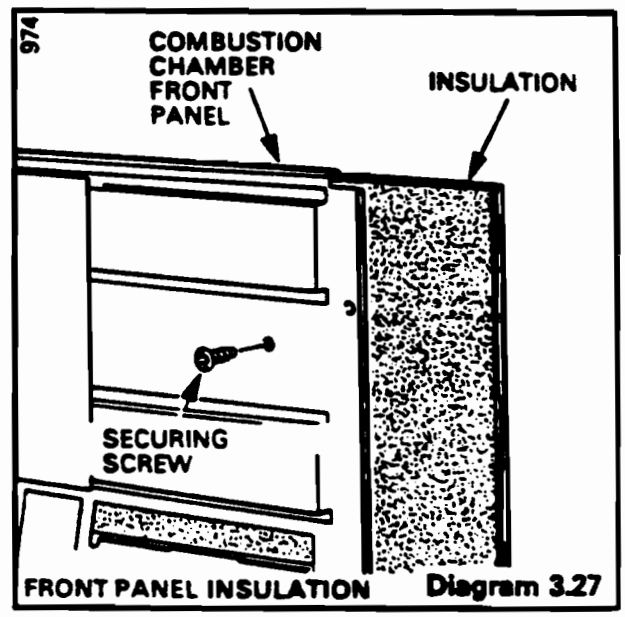


Diagram 3.27

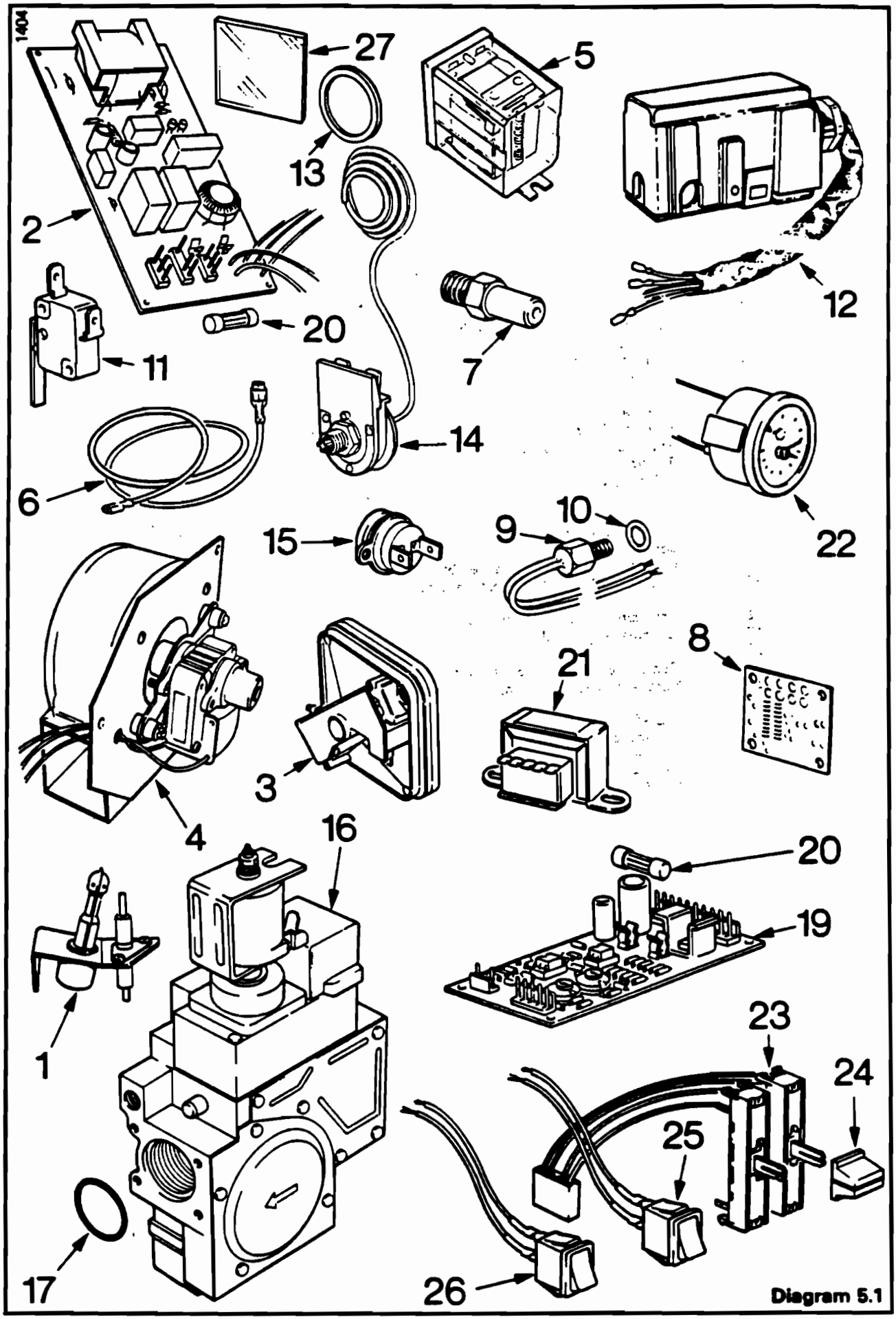



Diagram 5.1

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

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