

# Glow worm

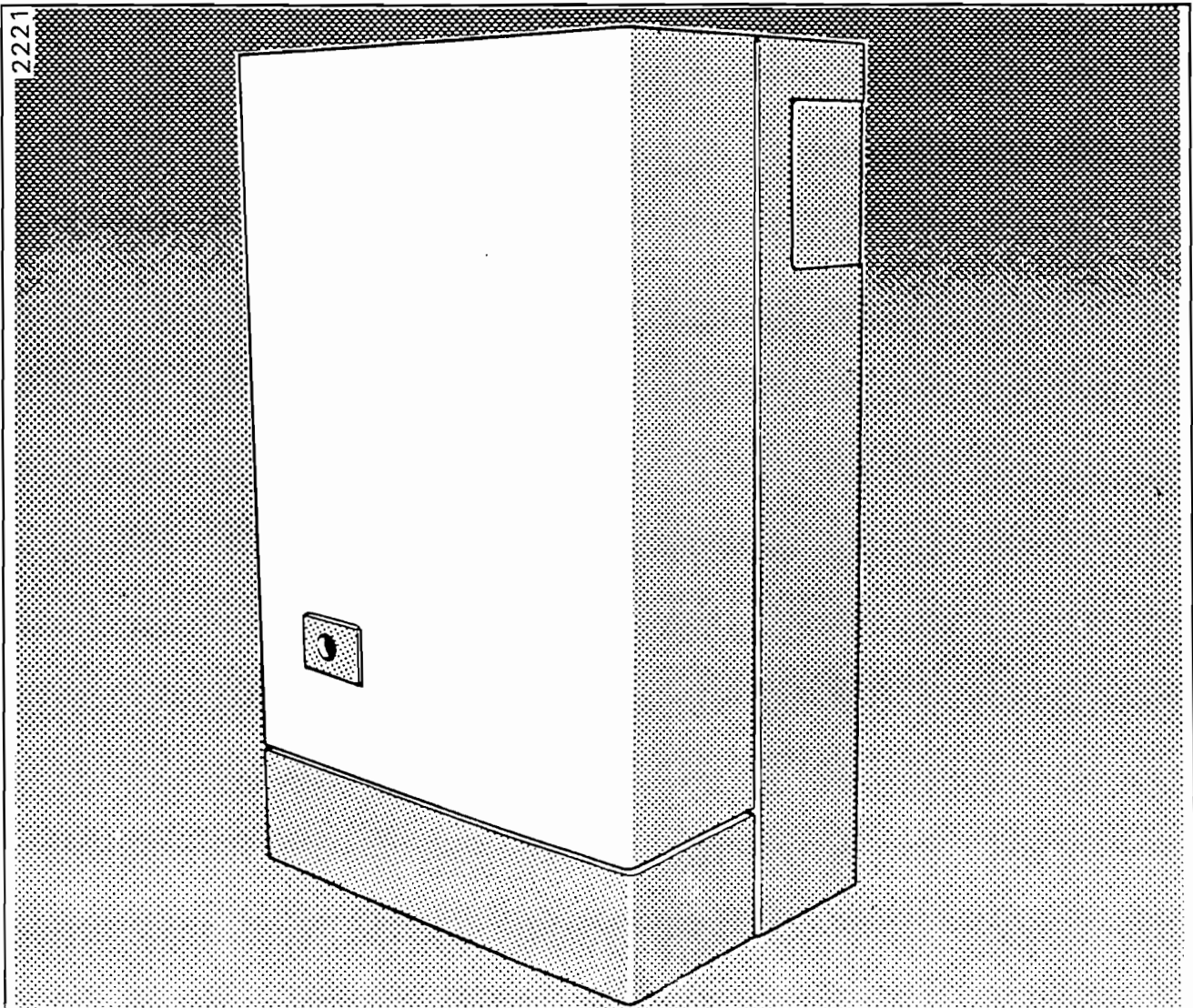
## Installation & Servicing Instructions

To be left with the user

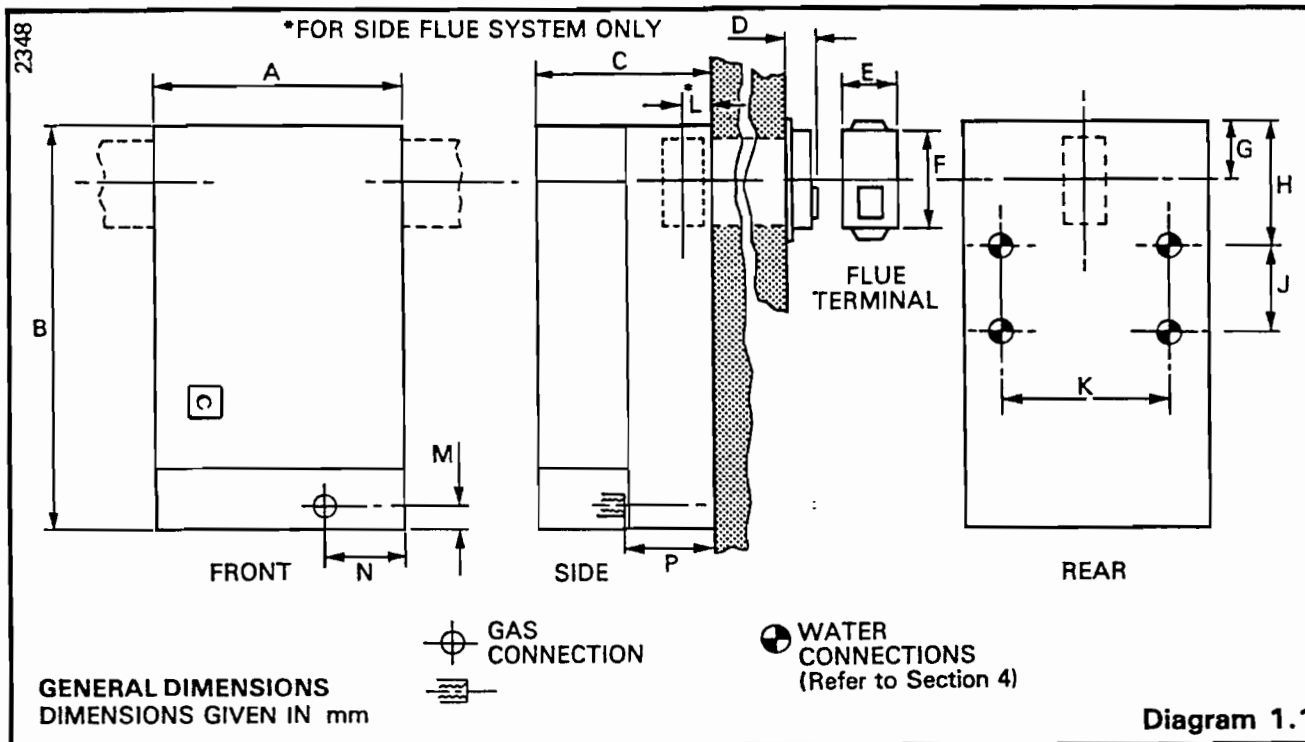
# SPACE SAVER 65 - 75F

*Fanned Flue Boiler*

G.C No. 41 313 38



# 1 GENERAL



A	B	C	D	E	F	G	H	J	K	L*	M	N	P		2349
544	788	343	70	109	196	113	244	168	392	44	37	216	184		

## 1. GENERAL NOTES AND INFORMATION

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

### IMPORTANT NOTICE

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

### SHEET METAL PARTS

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

### 1.1 STATUTORY REQUIREMENTS

THE INSTALLATION OF THE BOILER MUST BE CARRIED OUT BY A COMPETENT PERSON IN ACCORDANCE WITH THE RELEVANT REQUIREMENTS OF THE CURRENT ISSUE OF: THE GAS SAFETY (Installation and Use) REGULATIONS, THE BUILDING REGULATIONS, I.E.E., WIRING REGULATIONS, LOCAL WATER UNDERTAKING BYLAWS, THE BUILDING STANDARDS (Scotland) REGULATIONS (applicable in Scotland).

Detailed recommendations are contained in the current issue of the following British Standard codes of practice

BS6798, BS5440 Parts 1 and 2, BS5546 Part1, BS5449, BS6891

### 1.2 DATA

Weight	72kg (159lb)
Water content	7.5 litre (1.65g)
Gas connection	Rc 1/2
Water connection	Rc 1
Electrical supply	240V~ 50Hz fused 3A
Data Badge	On Top of electrical drawer cover, lower left of boiler.
Power rating	67W

### 1.3 RANGE RATING

This boiler is range rated and may be adjusted to suit the individual system requirements. Table 1 gives the rating and settings.

### 1.4 B.S.I. CERTIFICATION

This boiler is certificated to British Standard 6332 Part 1:1983, invoking BS5258 Part 1: 1986 for performance and safety. It is, therefore, important that no alteration is made to the boiler without permission, in writing, from Hcpworth Heating Ltd. Any alteration that is not approved by Hcpworth Heating Ltd., could invalidate the B.S.I., Certification of the boiler warranty and could also infringe the current issue of the Statutory Requirements, Section 1.1.

### 1.5 GAS SUPPLY

The gas installation shall be in accordance with BS6891.

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

### 1.6 ELECTRICAL SUPPLY

**Warning: This boiler must be earthed**

All system components shall be of an approved type and shall be connected in accordance with the current issue of the I.E.E., Wiring Regulations and any applicable local regulations.

Connection of the boiler and system controls to the mains supply must be through a common isolator and must be fused at 3A, maximum. The method of connection should be preferably, an unswitched shuttered socket outlet and 3 pin (BS1363) plug. Alternatively, a double pole isolating switch may be used provided it has a minimum contact separation of 3mm in both poles. The isolator should be clearly marked, showing its purpose, preferably positioned close to the boiler. See also Section 1.11. Cables within the boiler casing must be to BS6500 Table 9 not less than  $0.75\text{mm}^2$  (24/0.20mm).

### 1.7 CONTENTS OF PACKAGING

The boiler is delivered in one pack which contains:-

- Boiler with outer case and wall frame.
- Burner.
- Combustion chamber shield.
- Side Panels.
- Flue terminal.
- Flue and air ducts.
- Loose items pack - with check list.

### 1.8 WATER SYSTEM

This boiler shall only be used on an unrestricted open vented system with the water supply taken from a feed and expansion tank, having a static head between 1m (3ft3in) minimum and 27m (90ft) maximum.

### 1.9 DRAINING TAP

A draining tap must be provided at the lowest points of the system which will allow the entire system, the boiler and hot water cylinder to be drained. Draining taps shall be to BS2879, type 1.

TABLE 1

SPACE SAVER 65-75F RANGE RATING			
RANGE RATING	Min.	Med.	Max.
NOMINAL HEAT INPUT kW	25.60	27.39	29.10
Btu/h	87350	93450	99300
NOMINAL HEAT OUTPUT kW	19.05	20.52	21.98
Btu/h	65000	70000	75000
BURNER SETTING m bar	11.3	13.2	15.2
PRESSURE in.wg	4.5	5.3	6.1
APPROX GAS RATE $\text{m}^3/\text{h}$	2.5	2.7	2.8
$\text{ft}^3/\text{h}$	88	94	100
INJECTOR MARKING	203070		

### 1.10 SAFETY VALVE

Where a safety valve is fitted it must be on the flow pipe, as near to the boiler as possible there must not be any intervening valve or cock. Safety valves shall be to BS6759.

### 1.11 LOCATION

This boiler is not suitable for outdoor installation.

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

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

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

Where the installation of the boiler will be in an unusual location, special procedures are necessary, refer to the current issue of BS6798 for guidance. A compartment used to enclose the boiler must be designed and specifically constructed for that purpose. An existing cupboard or compartment modified for the purpose may be used. Detailed requirements are given in the current issue of BS6798.

# 1 GENERAL

## 1.12 BOILER CLEARANCE

Refer to diagram 1.2.

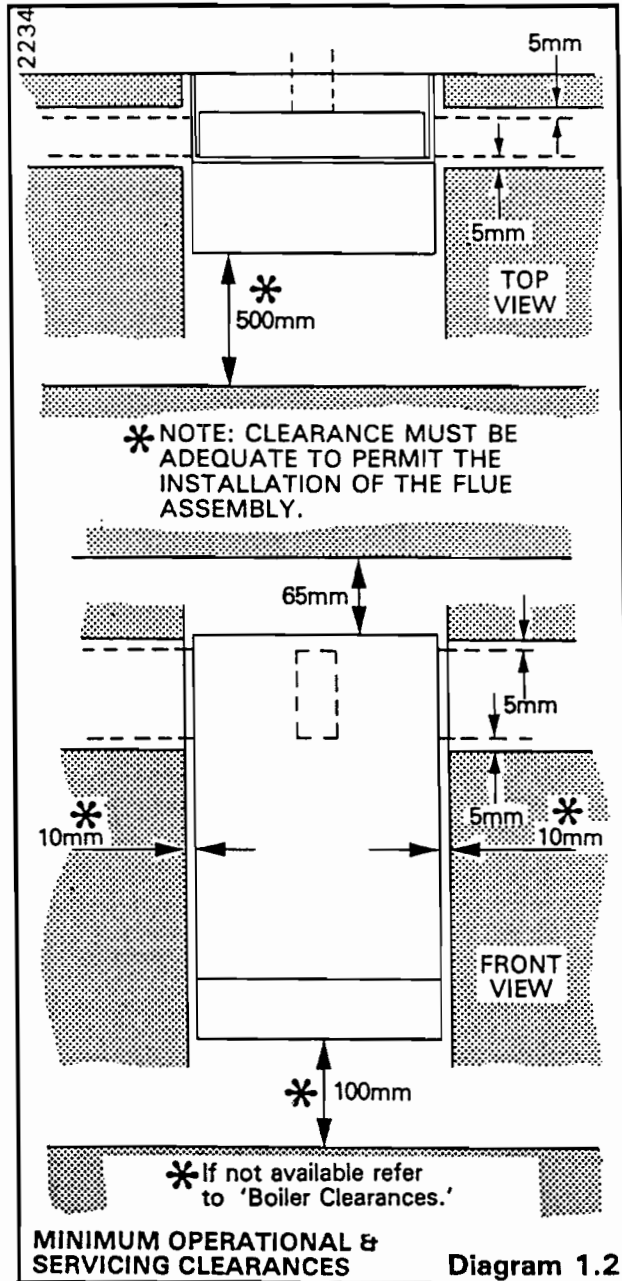
The boiler should be positioned so that at least the minimum operational and servicing clearances are provided.

Additional clearances will be required for installation.

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

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

At least 100mm clearance is required beneath the boiler to make the gas connection. Connection can however be made with less clearance, 15 to 100mm, by using the gas supply kit, available to special order, Kit Part No. 419027.



2. FLUE AND VENTILATION

The flue must be installed in accordance with the current issue of BS5440 Part 1.

2.1 TERMINAL POSITION

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

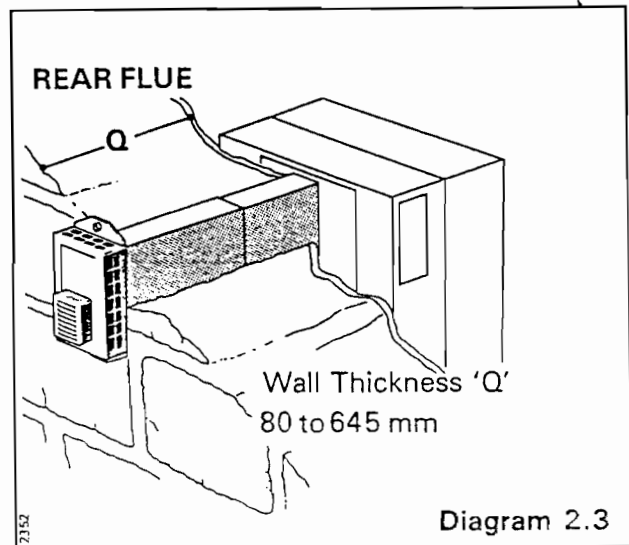
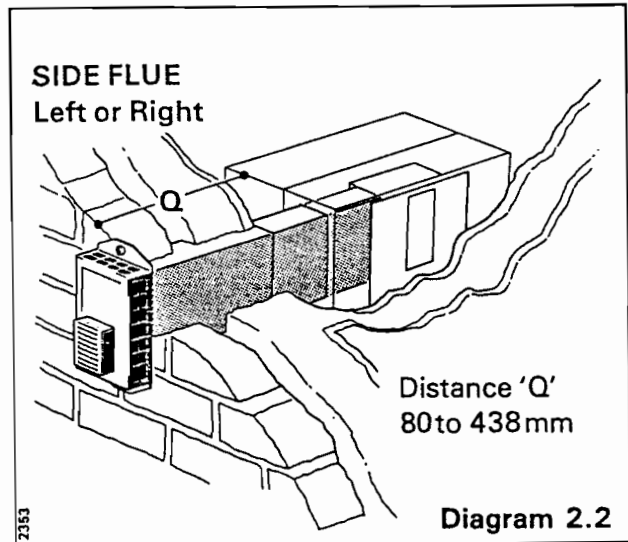
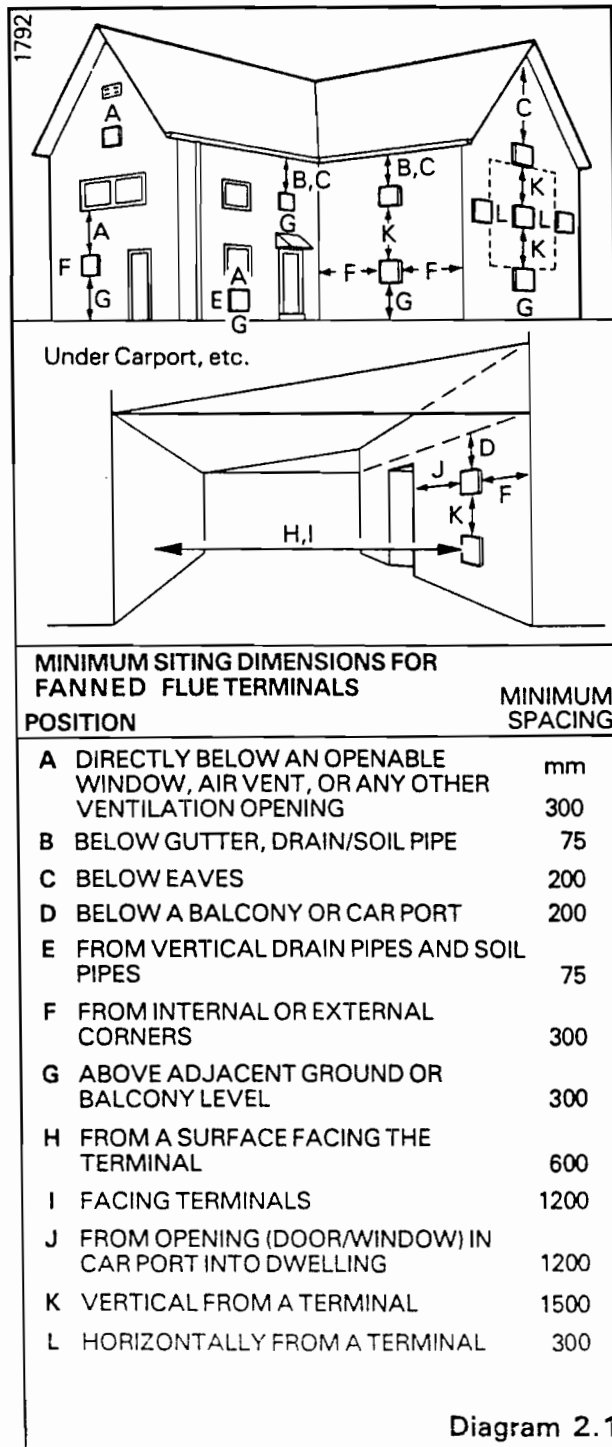
Where the terminal is fitted within 850mm (34in) below plastic guttering or within 450mm (18in) of painted eaves or painted gutters an aluminium shield 750mm (2ft6in) long should be fitted to the underside and immediately beneath the guttering/eaves.

2.2 TERMINAL PROTECTION

Where the terminal is less than 2m (6ft6in) above the level of any ground, balcony, flat roof etc., to which any person has access and which adjoins the wall in which the terminal is situated the terminal must be protected by a guard of durable material. Guards are available from Tower Flue Components Ltd., Tonbridge 351555, quoting reference type "H" black, or Quinell Barrett and Quinell Ltd., 88, Old Kent Road, London, S.E.15, quoting reference type "C52".

2.3 WALL THICKNESS

Refer to diagrams 2.2 and 2.3.



## 2 FLUE AND VENTILATION

### 2.4 CUPBOARD/COMPARTMENT VENTILATION

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

### 2.5 TIMBER FRAME BUILDINGS

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

TABLE 2

SPACE SAVER 65-75F COMPARTMENT AIR VENT TABLE				
COMPARTMENT VENTILATION REQUIREMENTS	HIGH LEVEL VENT AREA		LOW LEVEL VENT AREA	
	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>
VENTILATION FROM ROOM OR SPACE	262	40	262	40
VENTILATION FROM OUTSIDE	131	20	131	20

## 3 WATER SYSTEM

### 3.1 CYLINDERS

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

### 3.2 GRAVITY DOMESTIC HOT WATER WITH PUMPED HEATING

It is important that the flow and return connections are in the same relative positions as shown in diagram 3.1. The domestic flow and return must both be on one side of the heat exchanger. The heating flow and return are taken from the other.

### 3.3 PUMPED HEATING AND HOT WATER

It is important that the flow and return connections are made as shown in diagram 3.2. These connections may be fitted on the opposite side to that shown but always in the same relative positions.

### 3.4 PUMP

This should be fitted on the flow pipe and have isolating valve fitted each side, integral, if possible. The pump should be set to give a temperature difference of 11°C (20°F) between flow and return, with the boiler thermostat set at "MAX" which is approximately 82°C (180°F). The resistance through the boiler can be found from Table 3.

### 3.5 CORROSION INHIBITOR

When an inhibitor is to be used in the system, contact the inhibitor manufacturer so that they can recommend their most suitable product.

When installing the boiler in to an existing system, special care should be taken to drain the entire system, including radiators, then thoroughly flush before installing the boiler and adding the inhibitor.

TABLE 3

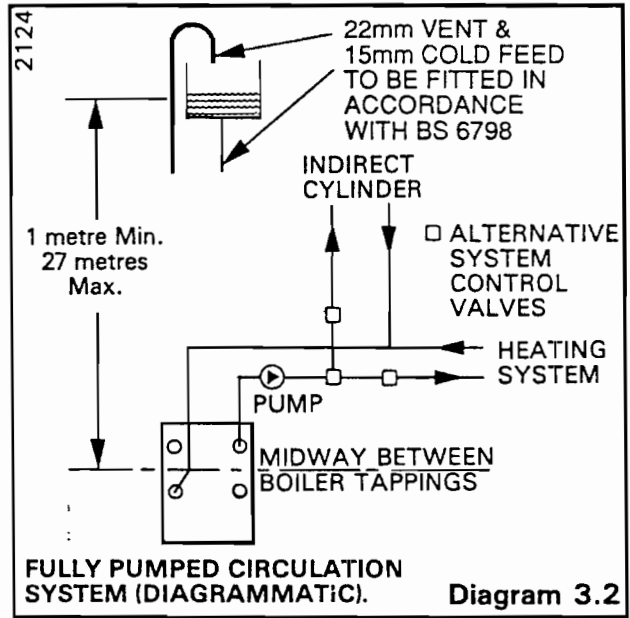
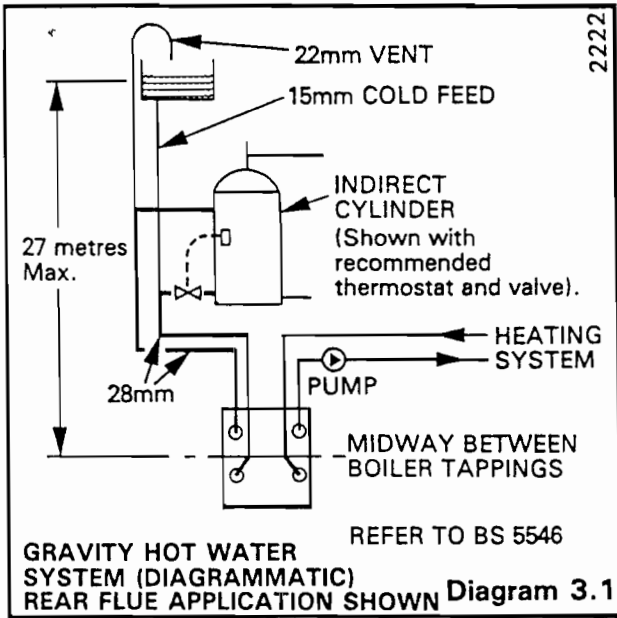
SPACE SAVER 65-75F WATER FLOW RATE At 11°C (20°F) differential			
UNIT	HEAT SETTING		
	Min.	Medium	Max.
litre/min.	20.8	24.6	28.4
gal./min.	4.6	5.4	6.3

The graph plots water pressure loss against flow rate. The top x-axis shows flow rate in gallons/minute (0 to 6), and the bottom x-axis shows flow rate in litres/minute (0 to 30). The left y-axis shows water pressure loss in mm head of water (0 to 300), and the right y-axis shows water pressure loss in inches head of water (0 to 12). A curve labeled 'WITH DISTRIBUTION TUBE' and 'PRESSURE LOSS OF BOILER' shows that pressure loss increases with flow rate. For example, at 10 litres/minute (2.6 gal/min), the pressure loss is approximately 50 mm (2 inches). At 30 litres/minute (7.9 gal/min), the pressure loss is approximately 280 mm (11 inches).

### 3.6 FROST PROTECTION

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



UNPACKING AND PREPARATION 4

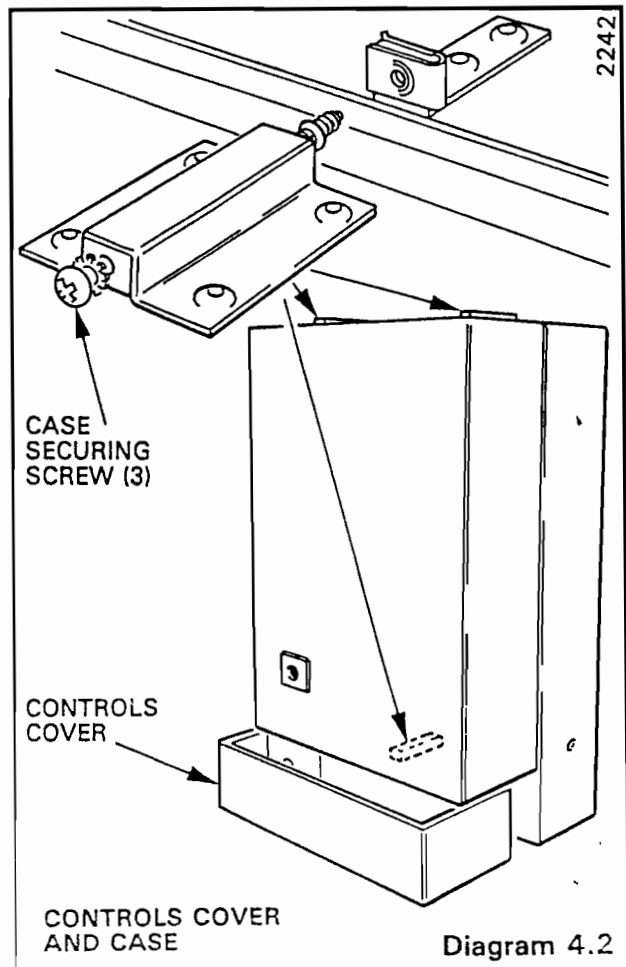
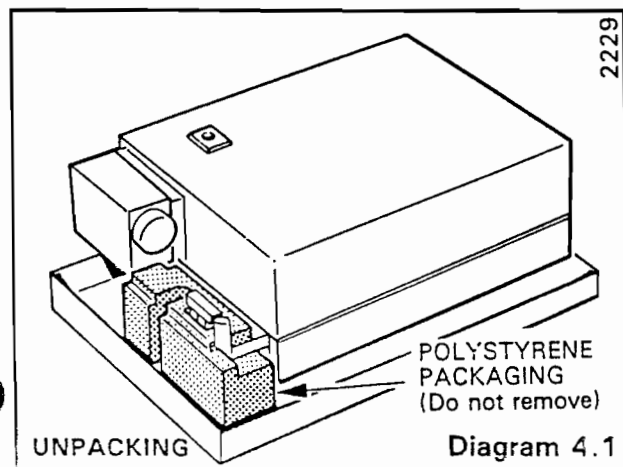
4.1 UNPACKING

Remove the carton wrap, foam protection sheet and end cardboard pad. Leave the polystyrene packaging taped to the gas pipe and electrical drawer, see diagram 4.1.

Packed separately in the base carton are the combustion chamber shield, side panels, flue and air ducts, flue terminal and bag of loose items.

4.2 BOILER PREPARATION

Slide the controls cover forward from the runners on the case, see diagram 4.2. Put the cover in a safe place.



## 4 UNPACKING AND PREPARATION

Remove the case, secured by one lower and two upper screws. Put the case in a safe place.

Disconnect the electrical connectors at the fan and remove the cable clip, one screw, see diagram 4.3. Slacken the extended screws to release the fan seal housing. Disconnect the air flow sensing tubes at the union nuts to the left of the flue hood and at the rear of the fan.

Remove the flue hood and fan assembly, secured by a screw and washer at each side.

Remove the four screws that secure the flue box and wall mounting frame to the boiler, see diagram 4.4, do not discard.

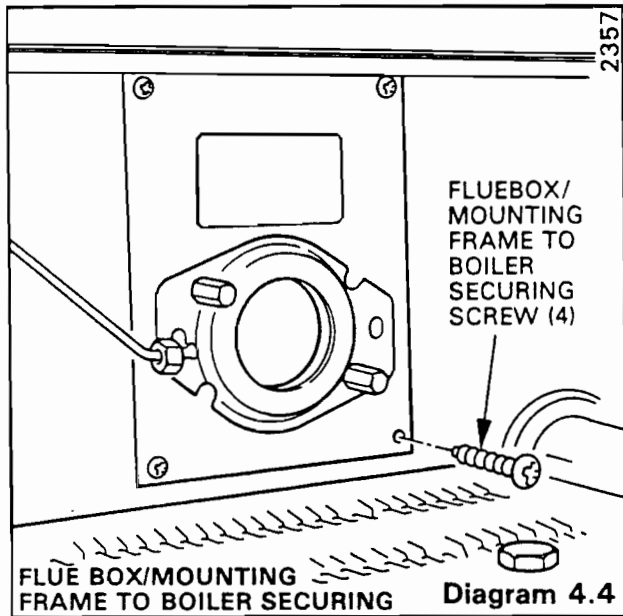
Remove boiler from base carton, leaving the wall mounting frame behind.

Turn the boiler onto its front, supporting at the casting and combustion chamber to prevent damage to the electrical drawer.

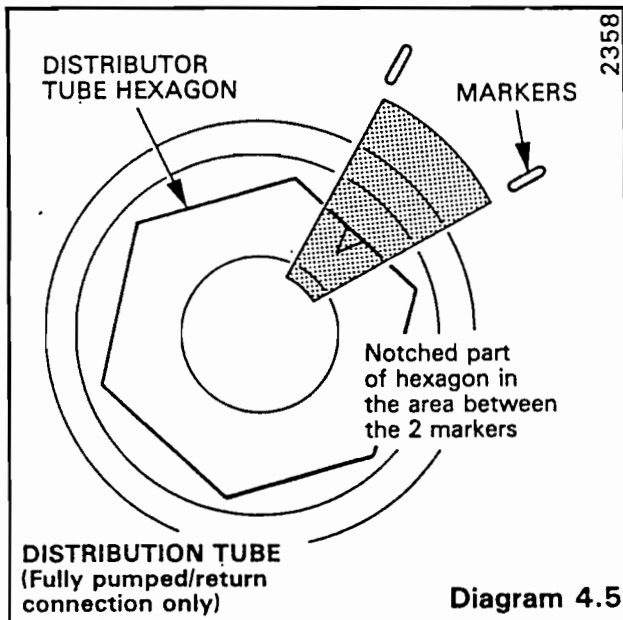
### 4.3 PIPEWORK PREPARATION

The flow and return pipework will need to be routed to suit the requirements of the particular installation.

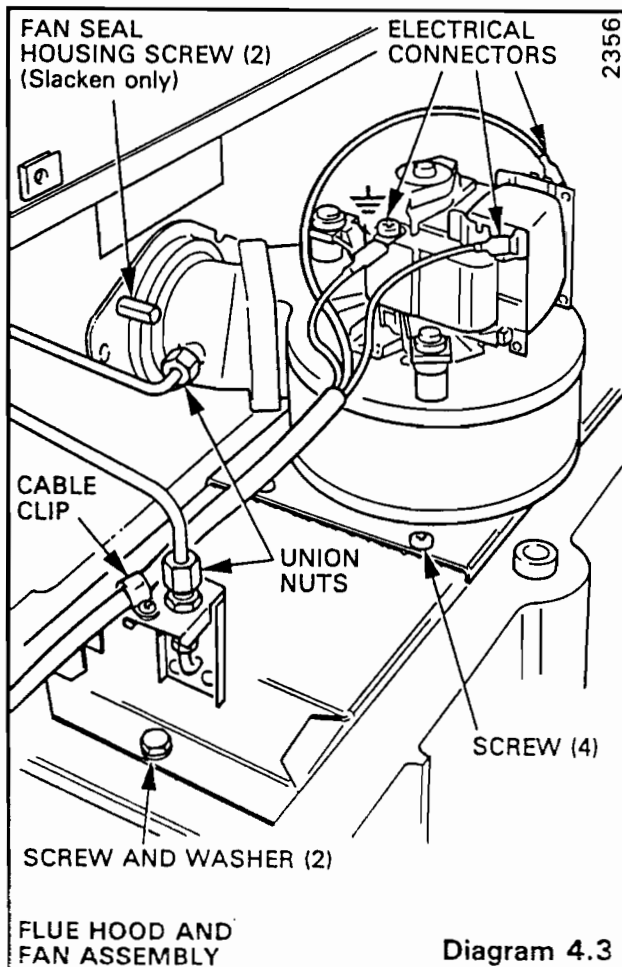
Fit the distribution tube, provided in the loose items pack, into the appropriate pumped return connection, positioning the notched part of the hexagon between the two markers, see diagram 4.5.



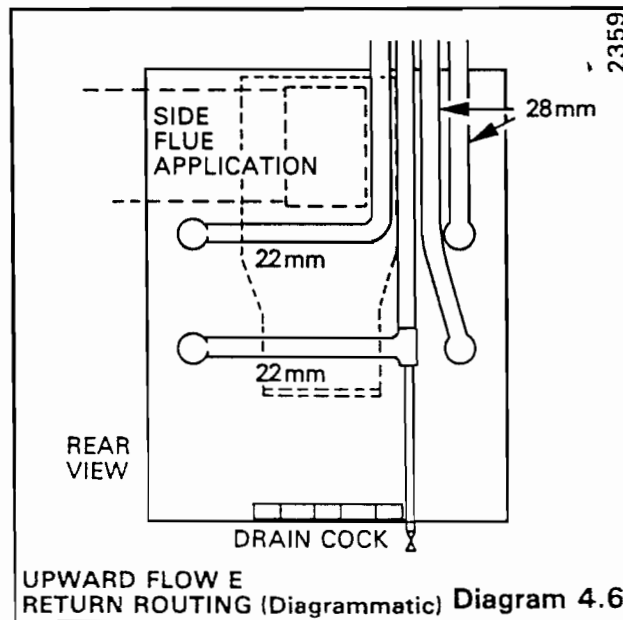
FLUE BOX/MOUNTING FRAME TO BOILER SECURING SCREW (4)  
FLUE BOX/MOUNTING FRAME TO BOILER SECURING Diagram 4.4



DISTRIBUTOR TUBE HEXAGON MARKERS  
Notched part of hexagon in the area between the 2 markers  
DISTRIBUTION TUBE (Fully pumped/return connection only) Diagram 4.5



FAN SEAL HOUSING SCREW (2) (Slacken only)  
ELECTRICAL CONNECTORS  
CABLE CLIP  
UNION NUTS  
SCREW (4)  
SCREW AND WASHER (2)  
FLUE HOOD AND FAN ASSEMBLY Diagram 4.3



22mm  
22mm  
SIDE FLUE APPLICATION  
28mm  
REAR VIEW  
DRAIN COCK  
UPWARD FLOW E RETURN ROUTING (Diagrammatic) Diagram 4.6



Fit suitable fittings with Rc (BSPT) threads into the appropriate boiler tappings, refer to Section 3 "Water Systems". Tighten to final position to suit the pipework route for the particular installation.

If left or right hand flue application is being installed and all pipework is being routed upwards, there is sufficient space for all pipework to pass the wall mounting frame on the opposite side to the flue ducting, see diagram 4.6.

Fit suitable short lengths of tube into the fittings which will terminate in an accessible position when the boiler is fixed.

Remove the wall mounting frame from the carton and offer it up to the boiler to ensure that the fittings and pipework will not foul the frame when the boiler is wall mounted, see diagram 4.7.

Check that all fittings and connectors are fully tightened.

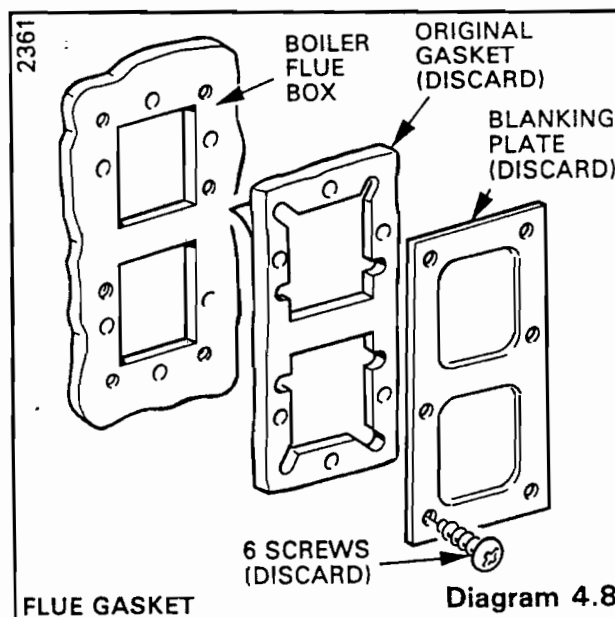
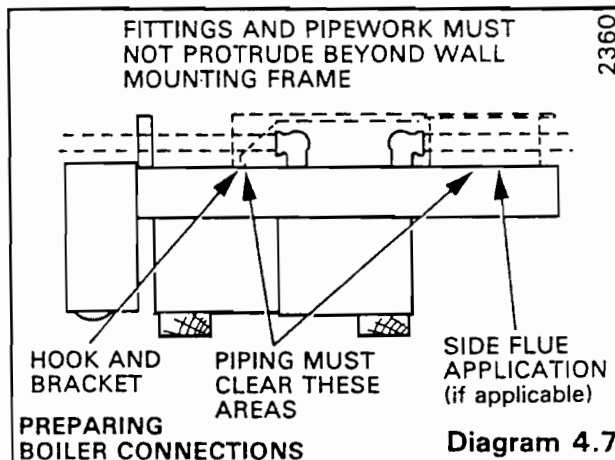
If all the pipework runs are downward, an air vent must be fitted to reduce the risk of air locks when the boiler and system are filled. Ensure that the gas supply connection is not obstructed.

If all pipework runs are upward, a draining tap must be fitted in an accessible position to enable the boiler to be drained.

#### 4.4 FLUE PREPARATION

If a rear flue system is to be connected, remove and discard the rear flue blanking plate and gasket from the flue box, see diagram 4.8

If a side flue system is to be connected remove and discard the flue blanking plate and gasket from the appropriate side of the flue box.



## 5 BOILER FIXING

### 5.1 REAR FLUE APPLICATION

Having selected the boiler location, with due regard to terminal position, refer to Section 2 "Flue and Ventilation", mark the horizontal and vertical flue centre lines, see diagrams 1.1 and 5.1.

Mark the flue hole position from these centre lines.

Cut the hole in the wall with sufficient clearance to accept the air duct. Make good both the internal and external wall faces as neatly and accurately as possible, see diagram 5.1.

Remove the flue duct and air ducts from the base carton.

Remove and discard the two transit screws that secure the flanged air duct to the flue duct.

Secure the flanged air duct temporarily to the flue box with the No6x19mm screws provided in the loose items pack.

Insert the air duct into the prepared hole in the wall, align the registration marks indented on the wall mounting frame with the previously marked centre lines on the wall, ensuring that the frame is horizontal.

Mark the position of the five fixing holes. Drill the holes suitable for the No12 wall plugs provided in the loose items pack and insert the plugs.

Measure the wall thickness "X", see diagram 5.2.

Remove the flanged air duct from the flue box.

Assemble the flanged and plain air ducts to the required length of "X"+12mm.

Tape the ducts together with the yellow tape provided in the loose items pack.

Note: for wall thicknesses less than 300mm (11<sup>7</sup>/<sub>8</sub>in) the plain air duct is discarded. For lesser distances the flanged air duct must be shortened to the required length of "X"+12mm by cutting the plain end, down to the minimum wall thickness of 80mm (3<sup>1</sup>/<sub>8</sub>in) i.e. 92mm (3<sup>5</sup>/<sub>8</sub>in) duct length.

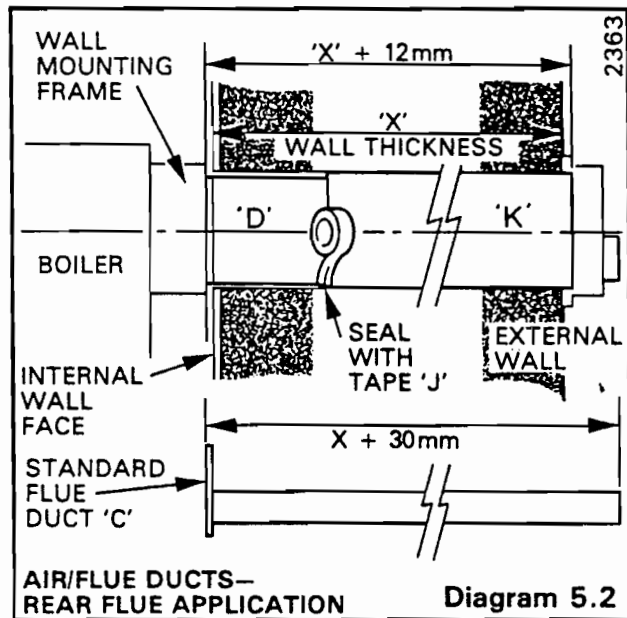
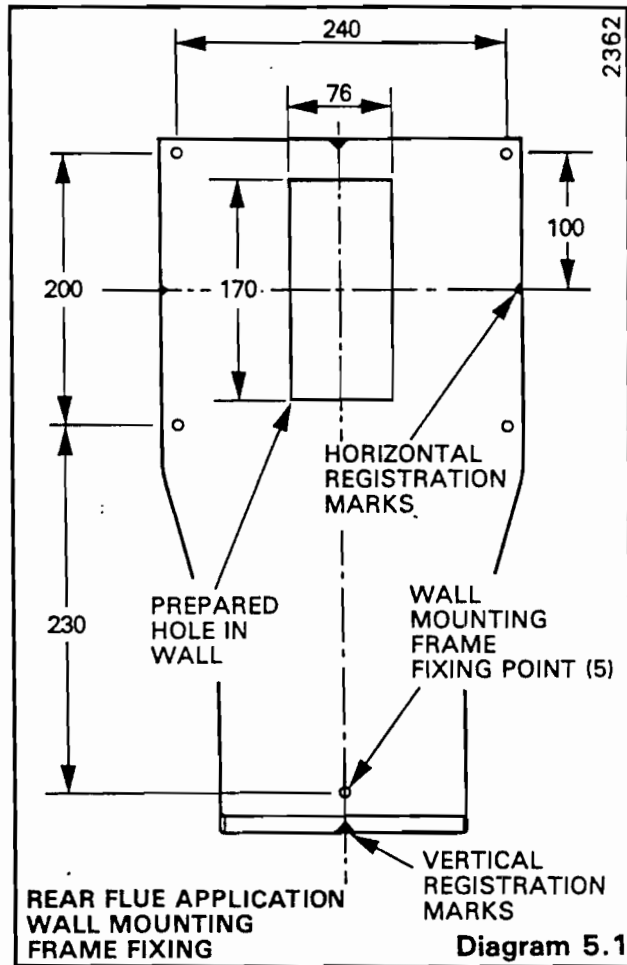
Cut the flue duct to the required length of "X"+30mm, see diagram 5.2.

Assemble the flue duct and air ducts together with gaskets as shown in diagram 5.3, secure to the wall mounting frame with the six No6x19mm screws provided through the back of the flue box.

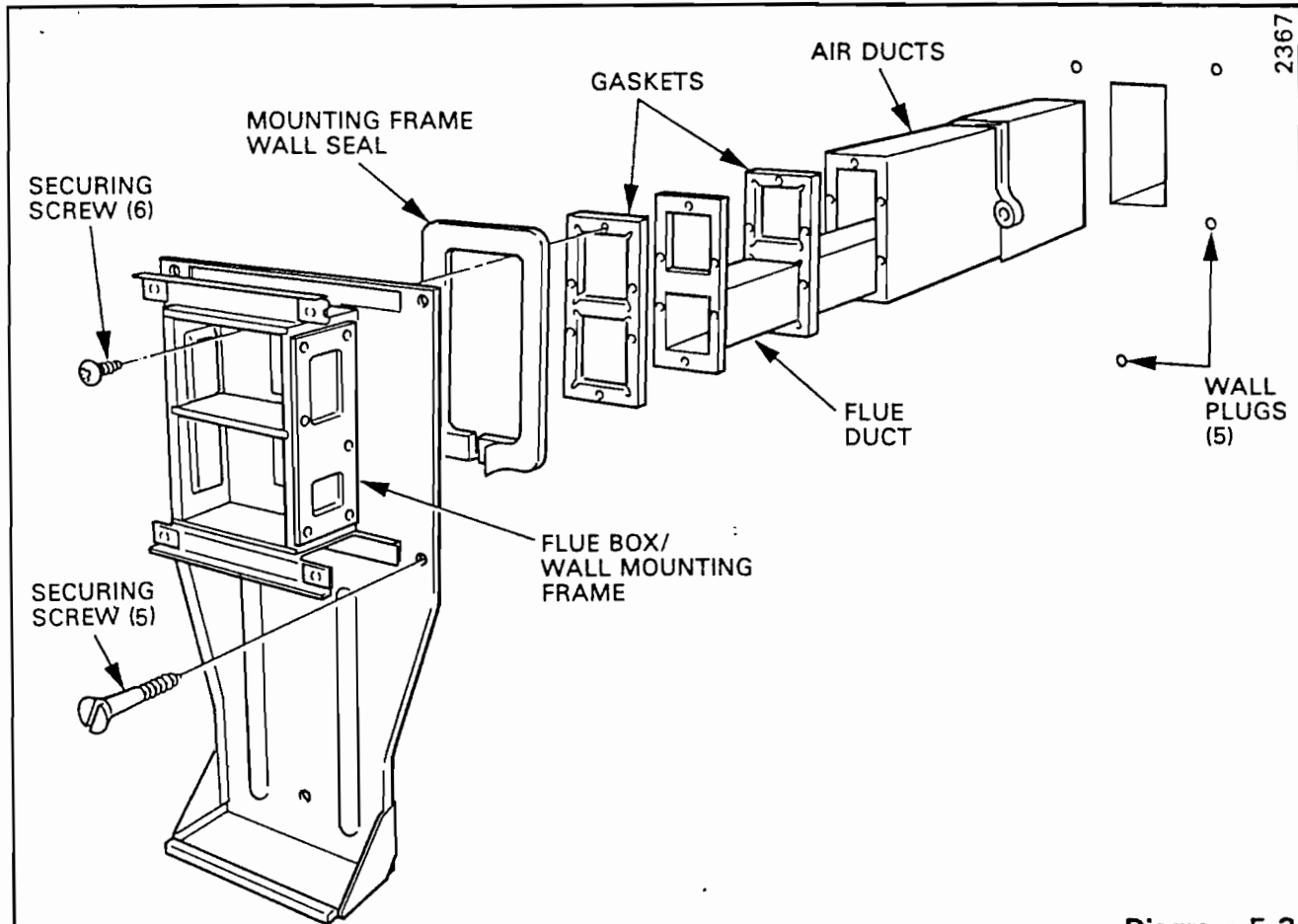
Note: ensure that the flue duct is assembled in the lower half of the air duct.

Affix the small section self-adhesive wall seal into the recess on the rear wall mounting frame, positioning it around the air duct.

Pass the ducting through the wall and secure the wall mounting frame with the five No12x50mm screws provided in the loose items pack.



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REAR FLUE APPLICATION

Diagram 5.3

5.2 SIDE FLUE APPLICATION

Having selected the boiler location, with due regard to the terminal position, refer to Section 2 "Flue and Ventilation", mark the horizontal and vertical flue centre lines, see diagrams 1.1. and 5.1.

Extend the horizontal flue centre line left or right as appropriate to where the flue system is to exit to the outside.

Mark the flue hole position from this centre line to the dimensions shown in diagram 5.4.

Cut the hole in the wall with sufficient clearance to accept the air duct. Make good both internal and external wall faces as neatly and accurately as possible, see diagram 5.4.

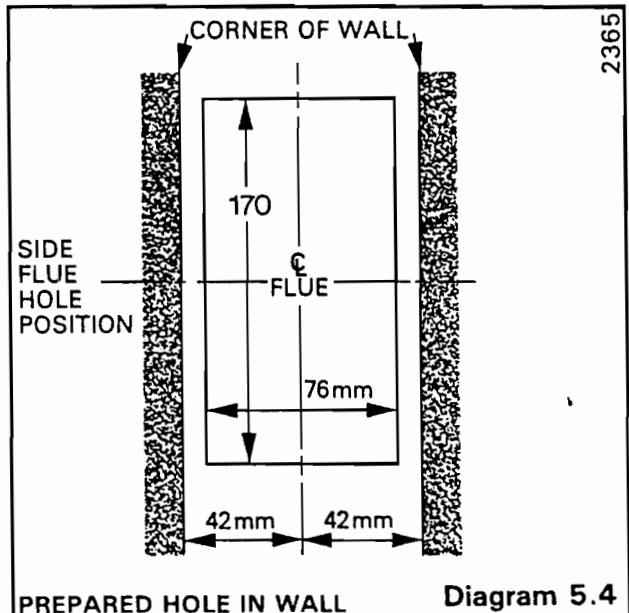
Remove the flue and air duct from the base carton.

Remove and discard the two transit screws that secure the flanged air duct to the flue duct.

Secure the flanged air duct temporarily to the relative side of the flue box with the No6x19mm screws provided.

Insert the air duct into the prepared hole in the wall, align the registration marks indented on the wall mounting frame with the previously marked centre lines on the wall, ensuring that the frame is horizontal.

Mark the position of the five fixing holes.



PREPARED HOLE IN WALL

Diagram 5.4

Drill the holes suitable for the No12 wall plugs provided in the loose items pack and insert the plugs.

Remove the temporarily secured air duct from the side of the flue box.

## 5 BOILER FIXING

Temporarily secure the wall mounting frame to the wall using two or more of the No12x25mm screws provided.

Measure the distance "Y" from the external wall face to the side of the flue box, see diagram 5.5. remove wall mounting frame from wall.

Assemble the flanged and plain air ducts to the required length of "Y"+6mm. Tape the ducts together with the yellow tape provided.

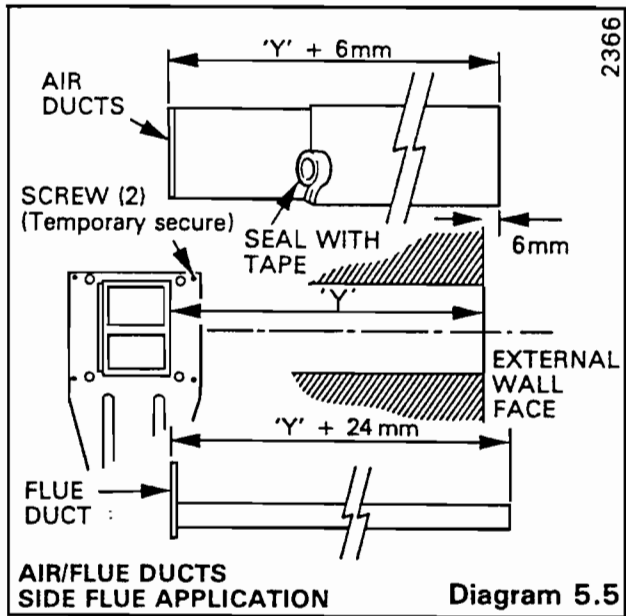
Note, if distance "Y" is between 304mm (12in) and 390mm (15<sup>3</sup>/<sub>8</sub>in) the PLAIN air duct MUST be shortened to 310mm (12<sup>1</sup>/<sub>4</sub>in) i.e. same size as flanged air duct.

Cut the flue duct to the required length of "Y"+24mm, see diagram 5.5.

Assemble the flue duct and air ducts together with gaskets as shown in diagram 5.6, secure to the wall mounting frame with the six No6x19mm screws provided through the side of the flue box.

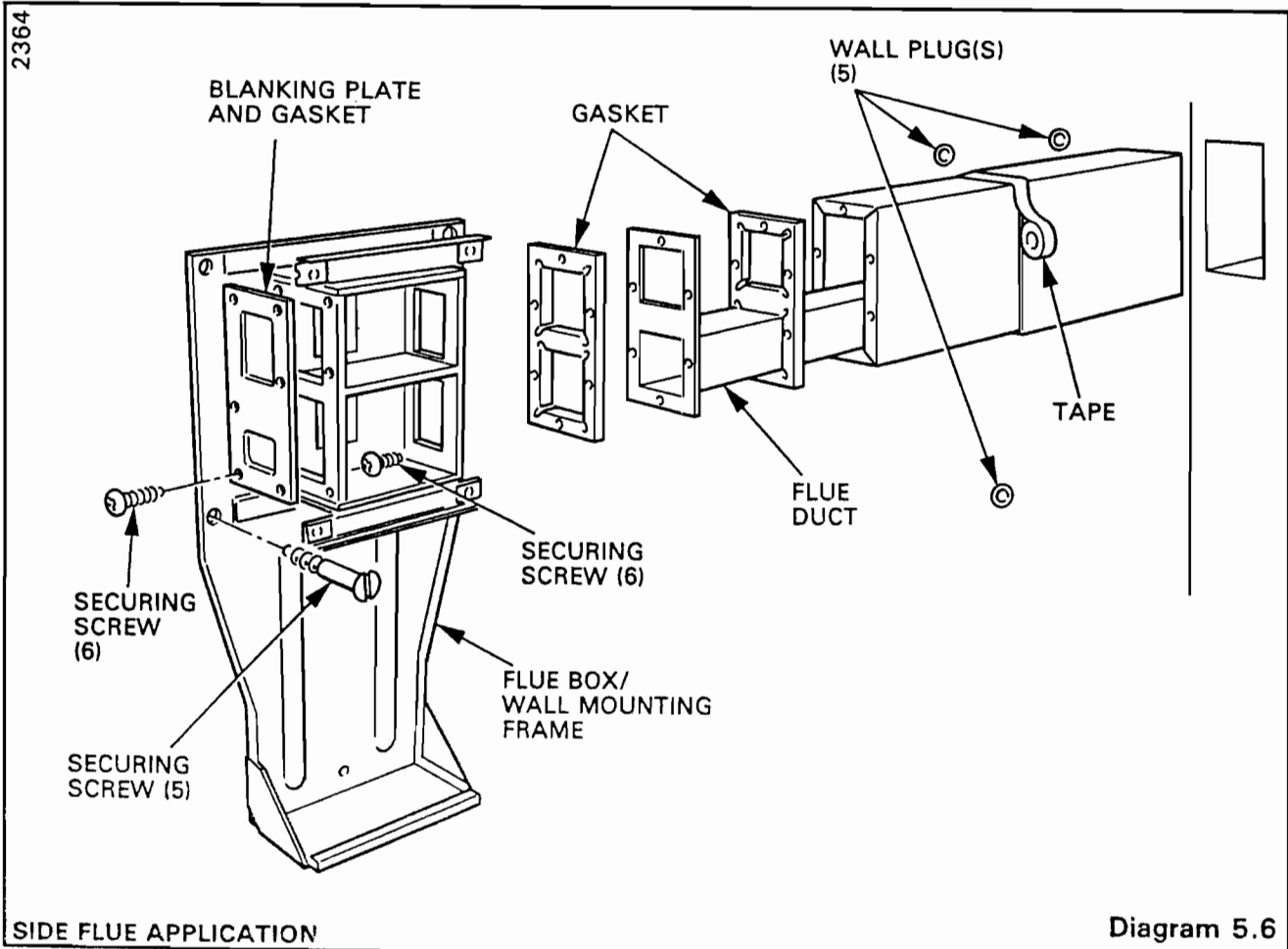
Note, ensure that the flue duct is assembled in the lower half of the air duct.

To improve access to the screws it is permissible to remove the opposite blanking plate and gasket. IT IS ESSENTIAL THAT THE BLANKING PLATE IS REPLACED TOGETHER WITH NEW GASKET PROVIDED.



Pass the ducting through the wall and secure to the wall mounting frame with the five No12x50mm screws provided, ensuring that the wall mounting frame is horizontal.

Make good inner wall around air duct.



**5.3 TERMINAL**

Remove the terminal from the base carton and affix the large section self adhesive wall seal to the rear face of the terminal, see diagram 5.7.

Locate the terminal onto the flue and air ducts and mark the two screw positions.

Remove the terminal and drill holes suitable for the No10 wall plugs supplied in loose items pack and insert the plugs.

Secure the terminal with the two No10x37mm stainless screws provided in the loose items pack.

If a terminal guard is to be fitted, refer to Section 2.2. "Terminal Protection" ensure that the guard is positioned the correct way up and central over the terminal.

**5.4 BOILER MOUNTING**

Raise the boiler into the vertical position, resting on the polystyrene packing piece to prevent damage to the boiler controls.

Lift the boiler and locate the hook on the back of the boiler onto the wall mounting frame, then secure using the four screws previously removed, see diagram 5.8. Make sure that the gasket seals the flue box to the rear of the boiler.

Check that the water connections to the system are accessible, then remove the polystyrene packing piece by breaking up if necessary.

**5.5. WATER CONNECTION**

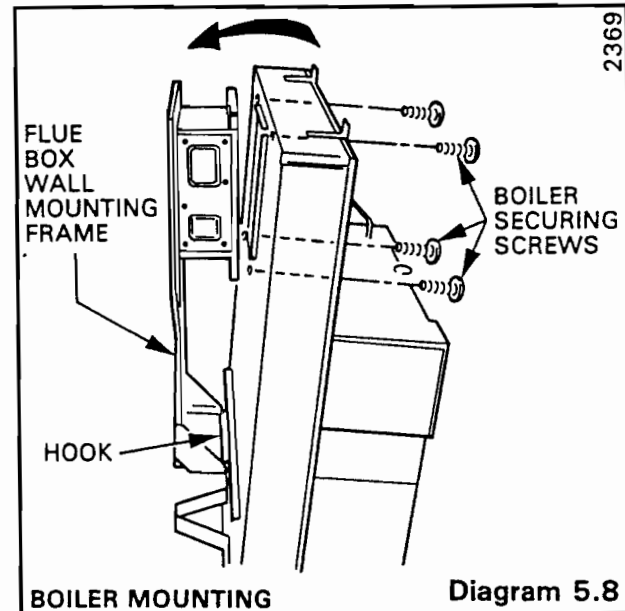
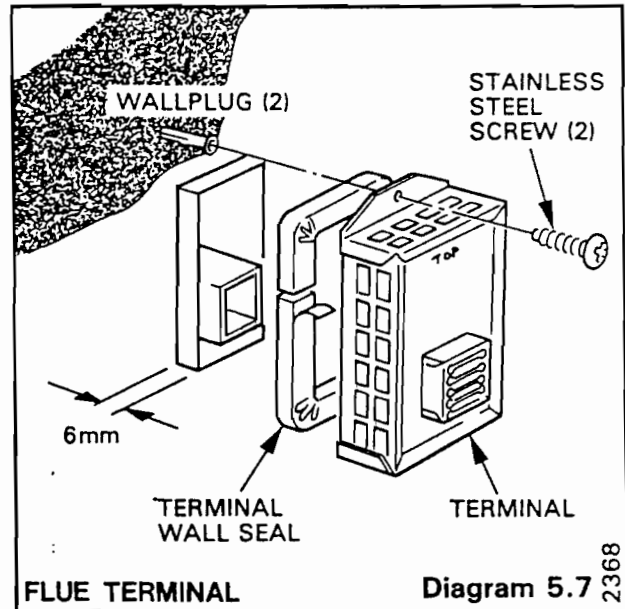
Make the connections between the water system and the prepared pipework using compression fittings.

**5.6 GAS CONNECTION**

Make the gas connection to the gas service cock. Do not subject the service cock or gas valve to heat from soldering as damage may result.

If making the gas connection with less than 100mm bottom clearance, we advise the use of the gas supply kit, refer to Section 1.12 'Boiler Clearances'.

Test the complete gas installation for soundness and purge in accordance with the recommendations of BS6891.



## 6 ELECTRICAL CONNECTIONS

### 6.1. SYSTEM CONTROLS

The electrical installation must comply with the current issue of the I.E.E., Wiring Regulations and any local regulations which apply.

All controls and connections must be of the approved type.

### 6.2 CABLE CONNECTION

Release the electrical drawer by removing the two securing screws at the top and slide the drawer forward to the stops.

Slacken the cable clamp, pass the cable through the grommet and connect to the terminals as shown in diagram 6.1. Use heat resistant flexible cable with a rating as stated in Section 1.6 "Electricity Supply". Make the earth conductor longer so that it would be the last to be disconnected if the cable is strained.

**THE BOILER MUST BE EARTHED.**

It is essential that the polarity is correct.

Secure the cable with the cable clamp, making sure that there is sufficient cable to allow the electrical drawer to slide forward to the stops and be released when necessary for servicing requirements. A cable length of approximately 300mm is recommended between the terminals and the cable clamp.

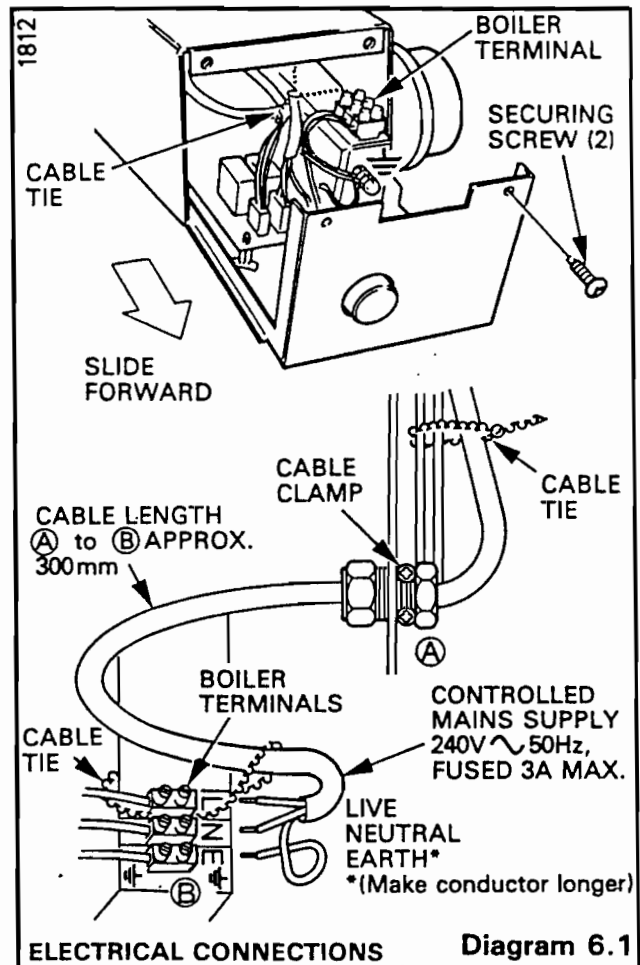
Secure the cable with the two cable ties, one fitted inside the electrical drawer and one fitted outside it, at the right.

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

### 6.3 TESTING

Checks to ensure electrical safety must be carried out by a service engineer.

In the event of an electrical fault after installation of the system, the preliminary electrical system checks, (as contained in the British Gas Multimeter Instruction Book, or equal), are the first checks to be carried out.



**7.1 BOILER ASSEMBLY**

Hook the combustion chamber shield, which is supplied in the boiler base carton, on to the front of the combustion chamber, making sure that it is flush with the combustion chamber front and horizontal, see diagram 7.1.

Fit the flue hood and fan assembly, carefully inserting the fan outlet into the fan seal housing. Take care not to trap the thermostat capillary.

Secure the flue hood with the two screws and washers previously removed. Tighten the two extended fan seal housing screws and connect the air flow sensing tubes at the unions to the left of the flue hood and at the rear of the fan.

Fit the electrical connectors to the fan, the green and yellow earth to the connector marked with the earth symbol  $\perp$ . The polarity of the other connectors is not important. Secure the fan cable with the clip and screw previously removed.

**7.2 SYSTEM COMMISSIONING**

Carry out the flushing, venting and filling of the system as recommended in the current issue of BS6798.

Visually check for any water leaks at all joints after flushing, venting and filling.

**7.3 INITIAL LIGHTING, TESTING AND ADJUSTMENT**

Check that the boiler is isolated from the electricity supply.

Make sure that the boiler thermostat is turned to "O" the OFF position.

Turn the gas service cock ON. The indicator slot is horizontal for ON.

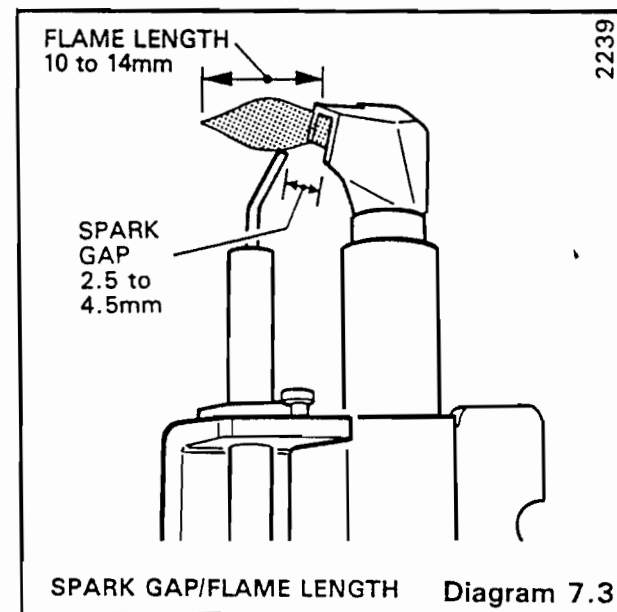
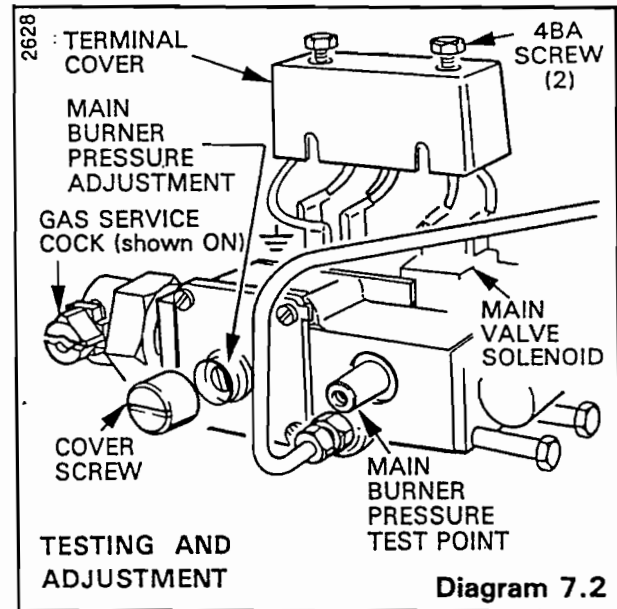
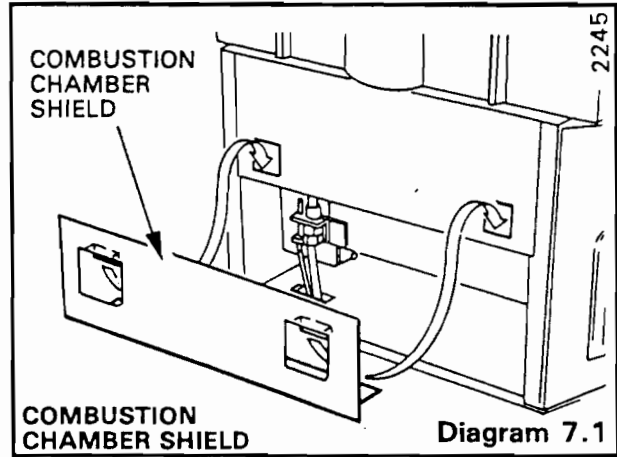
Test the pilot supply tube and its connections for gas soundness as follows:- Remove the terminal cover from the gas valve, see diagram 7.2. Temporarily disconnect the black lead from the main valve solenoid. Refit the terminal cover, temporarily.

Switch on/connect the electricity supply to the boiler and heating system. Make sure that any time control, room or cylinder thermostats are calling for heat.

**WARNING;**  
THE GAS VALVE AND FAN OPERATE ON MAINS VOLTAGE, TERMINALS WILL BECOME "LIVE". Turn the boiler thermostat knob fully clockwise and the fan will operate, sparks will be generated and the pilot flame will ignite. Test the pilot supply and connections for gas soundness, using a suitable leak detection fluid.

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

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



## 7 COMPLETION AND COMMISSIONING

Remove the terminal cover, reconnect the black lead ensuring that the insulating boot is fitted to the main valve solenoid, see diagram 7.2, then refit the terminal cover to the valve.

Attach the self-adhesive arrow indicator to the data badge, against the rating that the boiler has been adjusted to, for future reference. The arrow is supplied in the loose items pack.

Fit the case and secure with the three screws, ensuring that a good seal is made with the sealing strip on the boiler.

Loosen the main burner pressure test point screw and connect a suitable pressure gauge, see diagram 7.2.

Make sure that any time control, room or cylinder thermostats are calling for heat.

Switch on/connect the electricity supply to the boiler and heating system.

Turn the boiler thermostat knob fully clockwise to the maximum setting. After a period of time the main burner will light.

The lighting sequence is automatic, as follows:-

- The fan operates.
- The spark ignition system operates.
- The pilot solenoid opens.
- The pilot burner lights.
- The ignition spark stops.
- The main solenoid valve opens.
- The main burner lights.

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

Test for gas soundness around boiler gas components using suitable leak detection fluid.

Check the main burner pressure at least 10 minutes after the boiler has lit, refer to Table 4, "Range Rating".

If the gas pressure requires adjustment, remove the cover screw for access to the main burner adjustment screw, see diagram 7.2. Adjust the gas pressure to obtain the required setting (turning clockwise to decrease the pressure).

Should any doubt exist about the gas rate, check the rate using the gas meter test dial and stop watch, at least 10 minutes after the boiler has lit. The gas rates quoted in Table 4 "Range Rating" are only approximate for guidance purposes.

Turn the boiler thermostat knob to "O". Disconnect the pressure gauge from the test point and refit the screw previously removed, ensuring that a gas tight seal is made.

When the boiler switches OFF both pilot and main burners are extinguished. The automatic lighting sequence will operate when heat is required again.

When the boiler thermostat knob is turned to "O", the OFF position, wait for at least 30 seconds before turning ON again.

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

TABLE 4

SPACE SAVER 65-75F RANGE RATING				
RANGE RATING		Min.	Med.	Max.
NOMINAL HEAT INPUT	kW	25.60	27.39	29.10
	Btu/h	87350	93450	99300
NOMINAL HEAT OUTPUT	kW	19.05	20.52	21.98
	Btu/h	65000	70000	75000
BURNER SETTING PRESSURE	m bar	11.3	13.2	15.2
	in.wg	4.5	5.3	6.1
APPROX GAS RATE	m <sup>3</sup> /h	2.5	2.7	2.8
	ft <sup>3</sup> /h	88	94	100
INJECTOR MARKING		203070		

Remove the boiler side panels from the base carton and fit, if required, to each side of the boiler. Hook the top of the side panels over the upper bracket on the main panel and secure at the bottom with the No6x6mm screws provided in loose items pack.

If a side flue application has been fitted it will be necessary to remove the factory fitted infill panel from the appropriate side panel.

Refit controls cover by sliding it onto the runners on the case.

### 7.4 SYSTEM ADJUSTMENT

Make adjustments to the pump and heat emitters to obtain the design temperature difference of 11°C (20°F), across the system.

Set any system controls and the boiler thermostat at the desired settings.

Operate the system, checking that any system controls operate correctly.

### 7.5 USER INFORMATION

Hand the User Instructions to the user for their retention.

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

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.

Advise the user that for continued safe and efficient operation of the boiler servicing should take place at least once a year, preferably at the end of the heating season or as recommended by the local gas region.

Leave these instructions with the user for use during future service calls.



**8.1 IMPORTANT**

THIS BOILER MUST ONLY BE SERVICED BY A SERVICE ENGINEER.

AFTER COMPLETING ANY SERVICING OR REPLACEMENT OF GAS CARRYING COMPONENTS, ALWAYS TEST FOR GAS SOUNDNESS AND CARRYOUT FUNCTIONAL CHECKS OF CONTROLS.

BEFORE COMMENCING ANY SERVICING, ISOLATE THE BOILER FROM THE ELECTRICITY SUPPLY AND TURN OFF THE GAS SUPPLY AT THE GAS SERVICE COCK. (Indicator slot is vertical for OFF).

**8.2 ACCESS**

Gain access to the boiler by sliding the controls cover forward from the runners on the case.

Remove the case, secured by one lower and two upper screws, see diagram 4.2.

Remove the combustion chamber shield by unhooking it.

Remove the main burner by unscrewing the locking screw and washer at the left hand side. Lift the left hand end of the burner to disengage the locating pin. Slide the burner off the injector by moving it to the left, taking care not to damage the pilot burner and electrode assembly. Bring the right hand end of the burner through the opening first, see diagram 10.1.

Disconnect the electrical connectors at the fan and remove cable clip (one screw), see diagram 4.3. Slacken the extended screws to release the fan seal housing. Disconnect the air flow sensing tubes at the union nuts to the left of the flue hood and at the rear of the fan.

Remove the flue hood and fan assembly, secured by a screw and washer at each side.

**8.3 CLEANING THE HEAT EXCHANGER**

Cover the injector and pilot burner assembly prior to cleaning the flueways.

Brush through the individual flueways in the heat exchanger to remove any deposits.

Clean any debris from the combustion chamber base and remove the temporary covering used.

**8.4 CLEANING THE MAIN BURNER**

Use a vacuum cleaner or suitable brush to clean the burner thoroughly, ensuring that all of the flame ports are clean and unobstructed.

**8.5 CLEANING PILOT INJECTOR**

Disconnect the pilot supply tube by unscrewing the pilot tubing nut, holding the pilot injector hexagon with another spanner, see diagram 10.2. Ease the supply tube from the injector.

Remove the pilot injector by unscrewing from the pilot burner assembly.

Inspect and clean or renew as necessary. Clean by blowing clear only, do not use wire or sharp instrument.

**8.6 SERVICE CHECKS**

Inspect the pilot burner and spark electrode, clean or renew as necessary. If replacement is necessary refer to Section 10.4.

Check that the spark gap between the pilot burner and spark electrode is correct, see diagram 7.3.

Remove and inspect the main burner injector, clean or renew as necessary. Clean by blowing clear only. Do not use wire or sharp instrument.

Check the condition of all seals and gaskets, renew as necessary before refitting any component.

**8.7 RE-ASSEMBLY**

Re-assemble components in the reverse order to dismantling.

Make sure that the main burner locating pin fits into the hole in the pilot bracket and the burner rests on the tabs, see diagram 10.1. Secure burner by refitting the locking screw and washer.

Make sure that the combustion chamber shield is fitted correctly i.e., hooked to the front of the combustion chamber, positioned flush and horizontal, see diagram 7.1.

Fit the flue hood and fan assembly, carefully inserting the fan outlet into the fan seal housing. Take care not to trap the thermostat capillary.

Secure the flue hood with the two screws and washers previously removed. Tighten the two extended fan seal housing screws and connect the air flow sensing tubes at the union nuts to the left of the flue hood and at the rear of the fan.

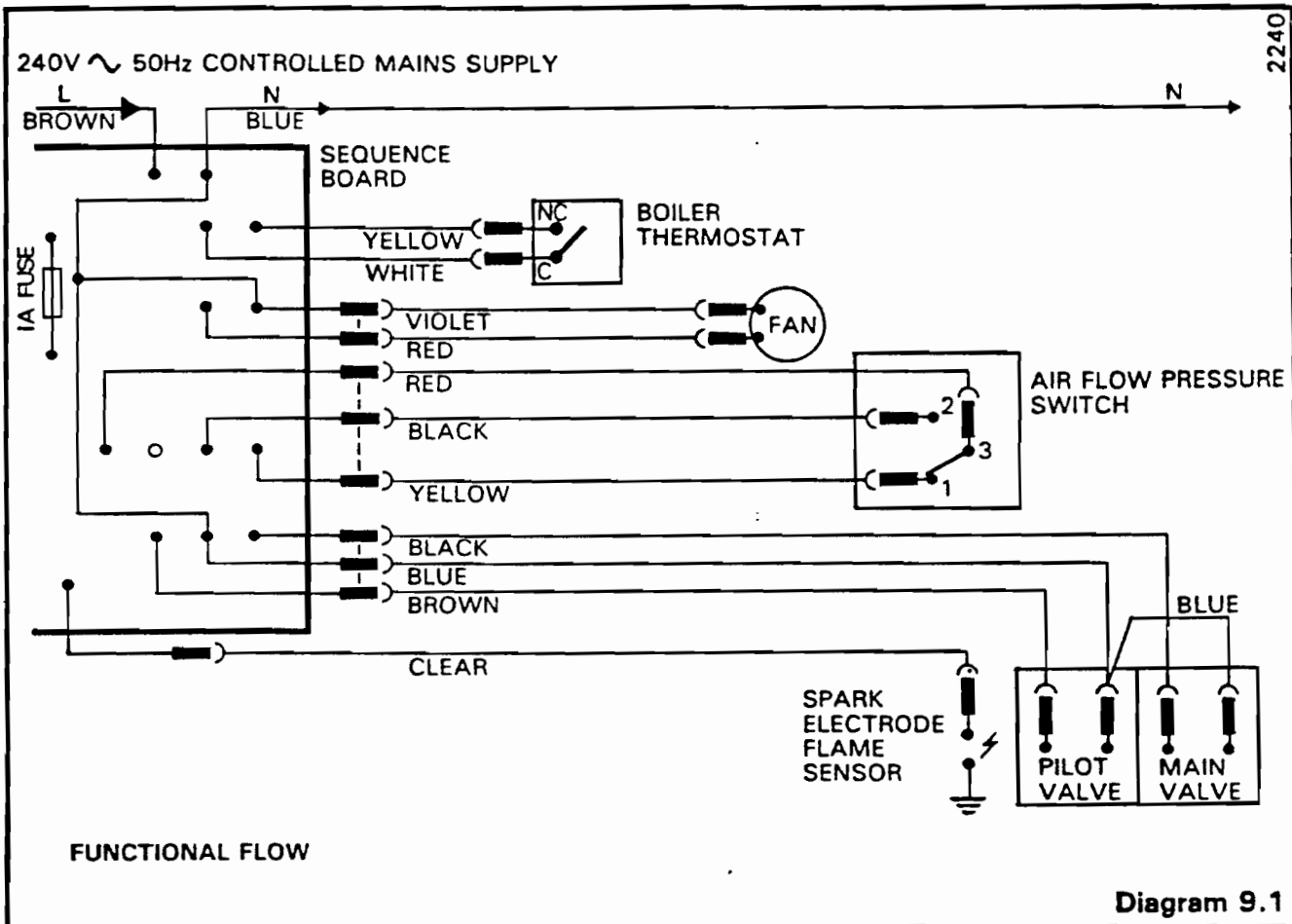
Fit the electrical connectors to the fan, the green and yellow earth to the connector marked with the earth symbol  $\oplus$ . The polarity of the other connectors is not important. Secure the fan cable with the clip and screw previously removed.

Test all gas joints for gas soundness using a suitable leak detection fluid, refer to Section 7 "Completion and Commissioning".

**8.8 OPERATIONAL CHECKS**

Operate the boiler to carry out the operational checks and any necessary adjustments as described in Section 7.3 "Initial Lighting, Testing and Adjustment".

The arrow on the data badge indicates the rating requirement of the system.



9.1 INITIAL CHECKS

If the boiler fails to operate first check the following:-

Is the electricity supply to the boiler and heating system on and available at the boiler ?.

Are all the electricity supply fuses in order ?.

Are all remote heating and hot water controls, if fitted, calling for heat ?.

Is the gas supply on and available at the boiler ?.

If the answer to all the above questions is yes, then proceed as follows in this section.

9.2 ELECTRICAL

The preliminary electrical system checks, as contained in the British Gas plc Multimeter Instruction Book, or equal, are the first checks to be carried out during a fault finding procedure.

On completion of the fault finding task which has required the disconnection and making of electrical connections, then the checks "A" Earth continuity, "C" Polarity and "D" Resistance to Earth must be carried out.

Isolate the boiler and heating system from the electrical supply.

Gain access to the electrical controls by sliding the controls cover forward from the runners on the case then release the control drawer by removing the two screws at the top and slide the drawer forward to the stops.

Physically check all cables and connectors.

Check the sequence board fuse. A spare fuse is provided in the front of the control drawer.

Follow the functional flow diagram and fault finding procedure in diagram 9.1 and 9.2. The sequence operation of the boiler components is shown from left to right.

**ELECTRICAL FAULT FINDING**

START

Determine that gas and electricity supplies are available and that the system is full of water. If any of the above are not in order, contact the relevant authority or rectify before proceeding. Check that the gas service cock is in the ON position. Isolate the boiler from the electricity supply. Remove the screws securing the electrical drawer, then withdraw it forward. Check all connections and cables. Rectify any that are faulty.

Restore electricity supply (240V ~ 50 Hz). Check that polarity is correct and the boiler is earthed.

Is there 216 to 240V ~ between boiler terminals L and N?

NO  
Check that all remote controls are calling for duty. Check supply fuses and connections. Renew fuse or rectify faulty connection.

YES  
Is there 216 to 240V ~ between white cable connection C on thermostat and boiler terminal N?

NO  
Isolate and test continuity of fuse on sequence board. Is fuse in order?  
NO  
Renew fuse.  
YES  
Faulty sequence board, renew.

YES  
Turn thermostat to max. setting (5). Is there 216 to 240V ~ between yellow cable connection NC on thermostat and boiler terminal N, with boiler cold?

NO  
Faulty thermostat. Isolate and renew.

YES  
Turn thermostat to '0' (off). Is the voltage now zero between yellow cable connection NC on thermostat and boiler terminal N?

NO  
Faulty thermostat. Isolate and renew.

YES  
Turn thermostat to max. setting. Does fan run?

NO  
Isolate and remove cover from the air pressure switch. Test continuity between terminals 1 and 3 on air pressure switch. Is there continuity?

YES  
Isolate and remove case. Restore supply; is there 216 to 240V ~ between red and violet (N) cables at the fan connections?

NO  
Faulty air pressure switch, renew.

YES  
Faulty fan. Isolate and renew. Refit case.

NO  
Faulty cable harness or connections. Isolate and rectify fault.

Continued on next page.

From following page.

Diagram 9.2

ELECTRICAL FAULT FINDING (CONT.)

Continued on previous page

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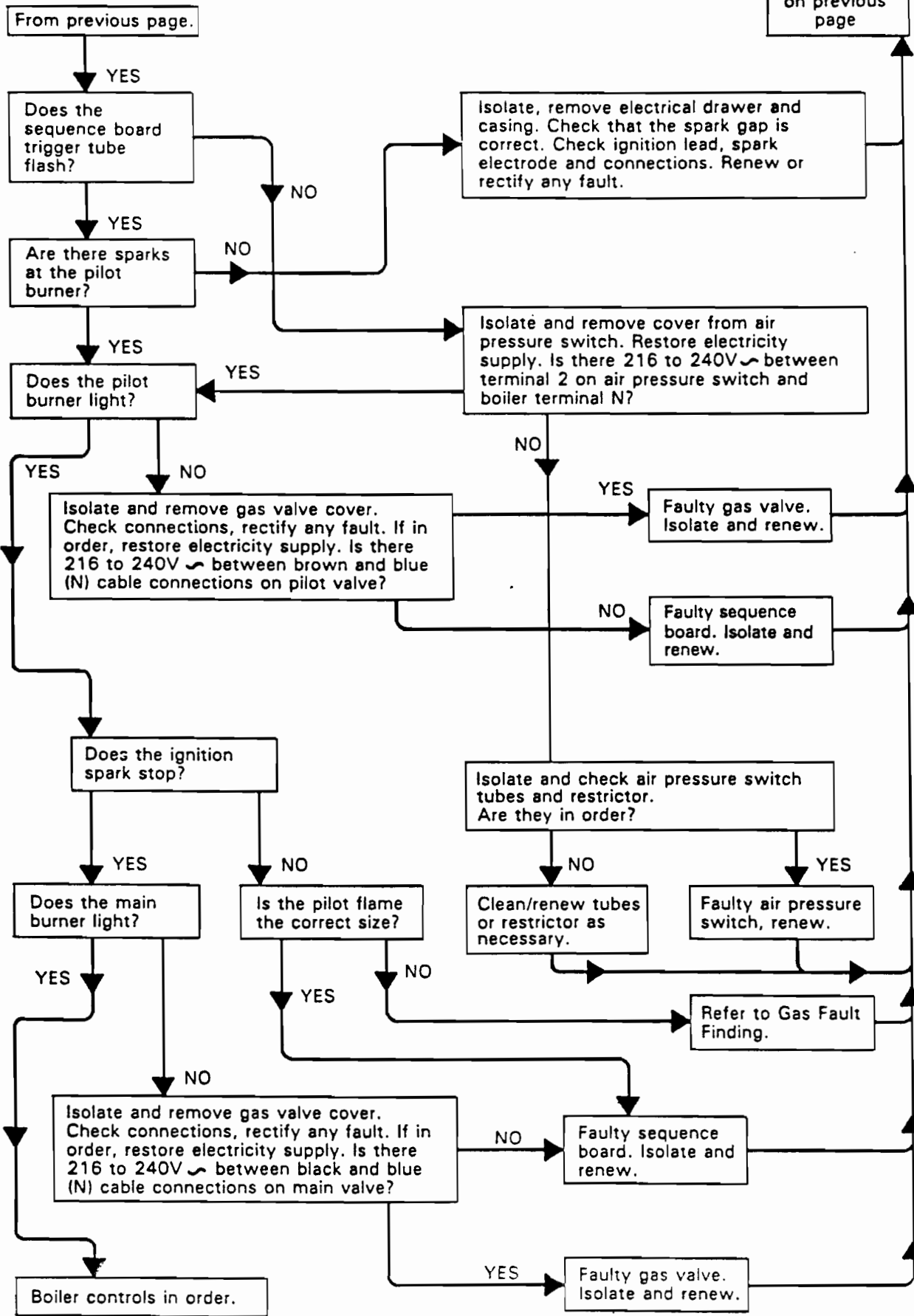


Diagram 9.2 cont.

**GAS FAULT FINDING**

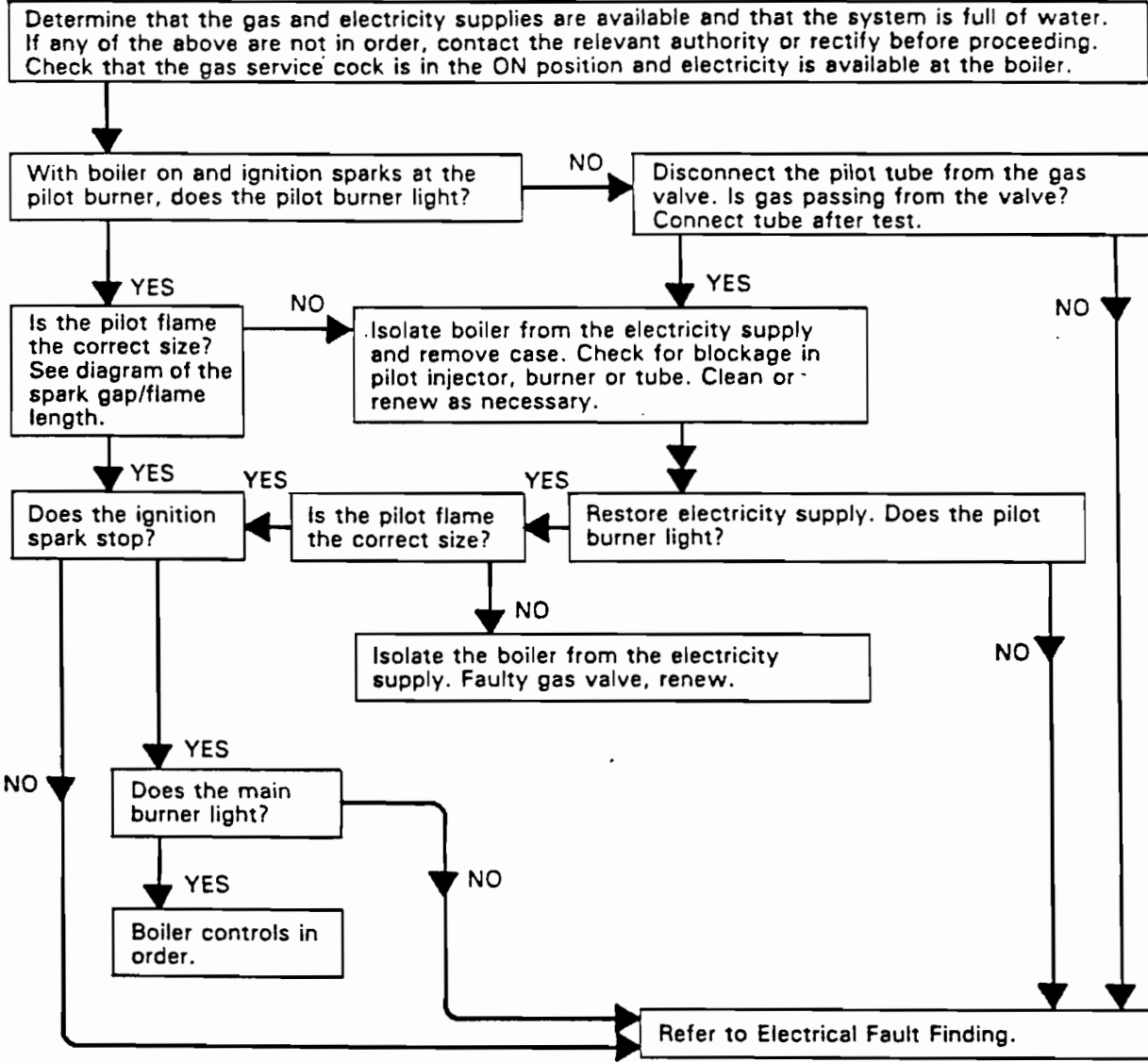


Diagram 9.3

**9.3 GAS**

Follow the fault finding procedure shown in diagram 9.3.

## 10 REMOVAL AND REPLACEMENT OF PARTS

REMOVAL AND REPLACEMENT OF PARTS MUST BE CARRIED OUT BY A SERVICE ENGINEER.

BEFORE REMOVING ANY COMPONENT, ISOLATE THE BOILER FROM THE ELECTRICITY SUPPLY AND ALSO TURN OFF THE GAS SUPPLY AT THE GAS SERVICE COCK. (Indicator slot is vertical for OFF).

FIT COMPONENTS IN THE REVERSE ORDER TO THAT FOR REMOVAL UNLESS STATED OTHERWISE.

AFTER COMPLETING THE REPLACEMENT OF ANY COMPONENT, ALWAYS TEST FOR GAS SOUNDNESS.

CARRY OUT FUNCTIONAL CHECKS OF CONTROLS. Refer to Section 7 "Completion and Commissioning".

### 10.1 CONTROLS COVER

Slide the controls cover forward from the runners on the case, see diagram 4.2.

### 10.2 CASE

Remove the case, secured by one lower and two upper screws, see diagram 4.2.

### 10.3 MAIN BURNER

Gain access to the main burner by removing the controls cover and case, refer to Sections 10.1 and 10.2.

Remove the combustion chamber shield by unhooking it.

Remove the main burner by unscrewing the locking screw and washer at the left hand side. Lift the left hand end of the burner to disengage the locating pin. Slide the burner off the injector by moving it to the left, taking care not to damage the pilot burner and electrode assembly. Bring the right hand end of the burner through the opening first, see diagram 10.1.

#### Reassembly notes:

Make sure that the main burner locating pin fits into the hole in the pilot bracket and the burner rests on the tabs, see diagram 10.1. Secure burner by refitting the locking screw and washer.

Make sure that the combustion chamber shield is fitted correctly, i.e., hooked to the front of the combustion chamber, positioned flush and horizontal, see diagram 7.1.

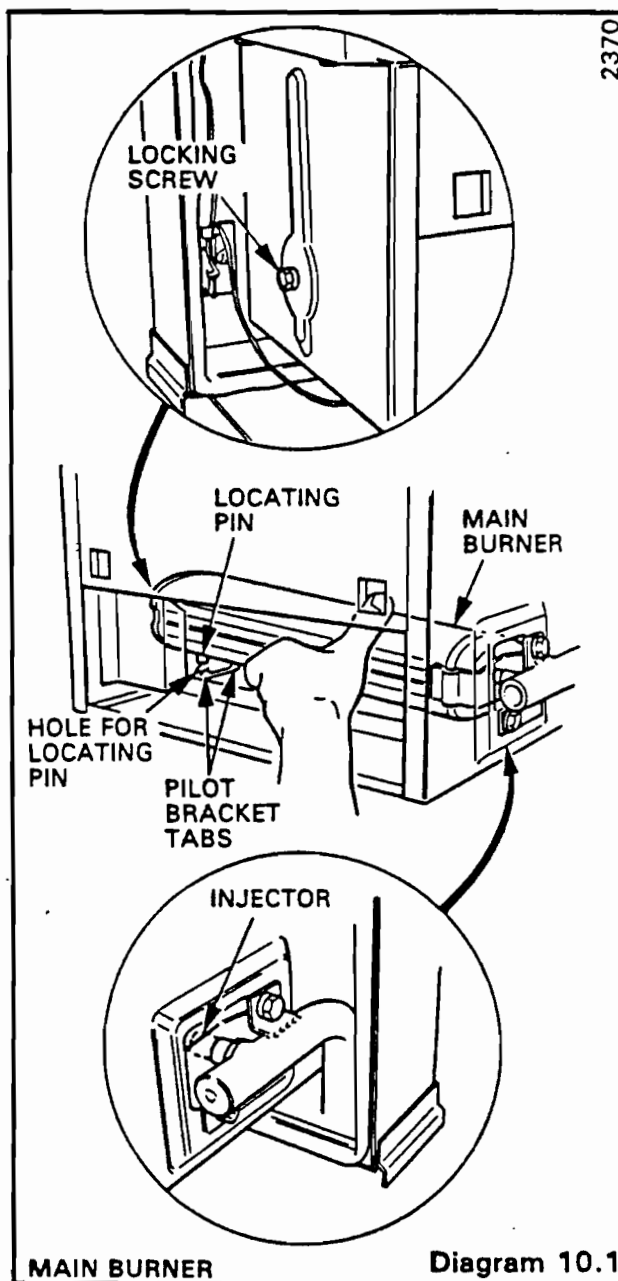
### 10.4 MAIN BURNER INJECTOR

Gain access to the burner by removing the controls cover and case, refer to Sections 10.1 and 10.2.

Remove the combustion chamber shield by unhooking it.

Remove the main burner, refer to Section 10.3.

Unscrew the injector from the manifold.



#### Reassembly note:

When refitting the injector use a little thread sealant on the external thread only to ensure gas soundness.

Make sure the main burner locating pin fits into the hole in the pilot bracket and the burner rests on the tabs, see diagram 10.1. Secure the burner by refitting the locking screw and washer.

Make sure that the combustion chamber shield is fitted correctly i.e., hooked to the front of the combustion chamber, positioned flush and horizontal, see diagram 7.1.

After assembly, test for gas soundness as described in Section 7.3 "Initial Lighting, Testing and Adjustment".

10.5 PILOT BURNER AND ELECTRODE ASSEMBLY

Gain access to the pilot burner and electrode by removing the controls cover and the case, refer to Sections 10.1 and 10.2.

Remove the combustion chamber shield by unhooking it.

Remove the main burner, refer to Section 10.3

Disconnect the ignition lead from the spark electrode, see diagram 10.2.

Disconnect the pilot supply by unscrewing the pilot tubing nut, holding the pilot injector hexagon with another spanner. Ease the supply tube from the pilot injector.

Remove the pilot burner and electrode assembly by slackening the left hand screw and nut and removing the right hand screw and nut.

Reassembly note:

Check that the spark gap between the pilot burner and electrode is correct before refitting assembly, see diagram 10.3.

After assembly, test for gas soundness as described in Section 7.3 "Initial Lighting, Testing and Adjustment".

Check that the pilot flame length is as shown in diagram 10.3.

10.6 PILOT BURNER INJECTOR

Gain access to the pilot burner and electrode by removing the controls cover and case, refer to Sections 10.1 and 10.2.

Remove the combustion chamber shield by unhooking it.

Disconnect the pilot supply by unscrewing the pilot tubing nut, holding the pilot injector hexagon with another spanner. Ease the supply tube from the pilot injector, see diagram 10.2.

Remove the pilot injector from the pilot assembly by unscrewing it.

Reassembly notes:

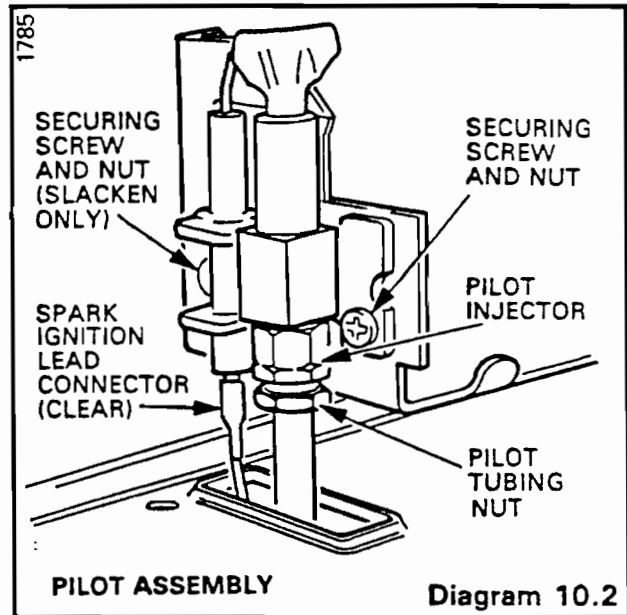
After assembly test for gas soundness as described in Section 7.3 "Initial Lighting, Testing and Adjustment"

Check that the pilot flame length is as shown in diagram 10.3.

10.7 GAS VALVE

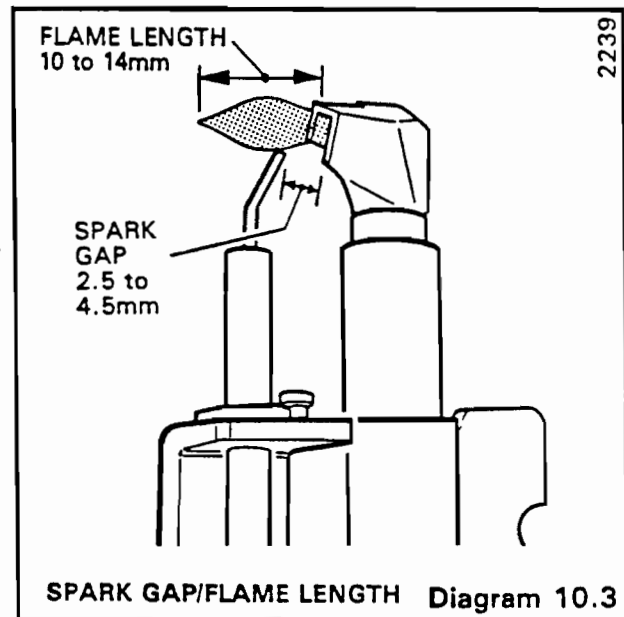
Gain access to the gas valve by removing the controls cover and case, refer to Sections 10.1 and 10.2.

Remove the pressure test point from the gas valve and fit to the replacement, see diagram 10.4. Use a little sealant on the external thread, to ensure gas soundness.



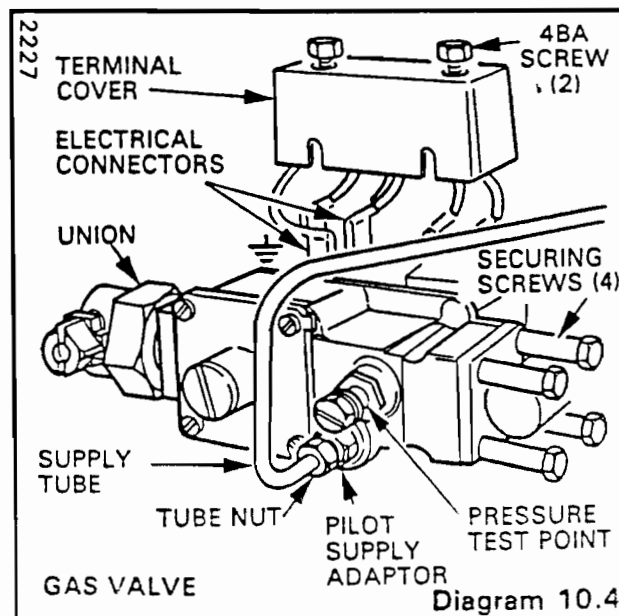
PILOT ASSEMBLY

Diagram 10.2



SPARK GAP/FLAME LENGTH

Diagram 10.3



GAS VALVE

Diagram 10.4

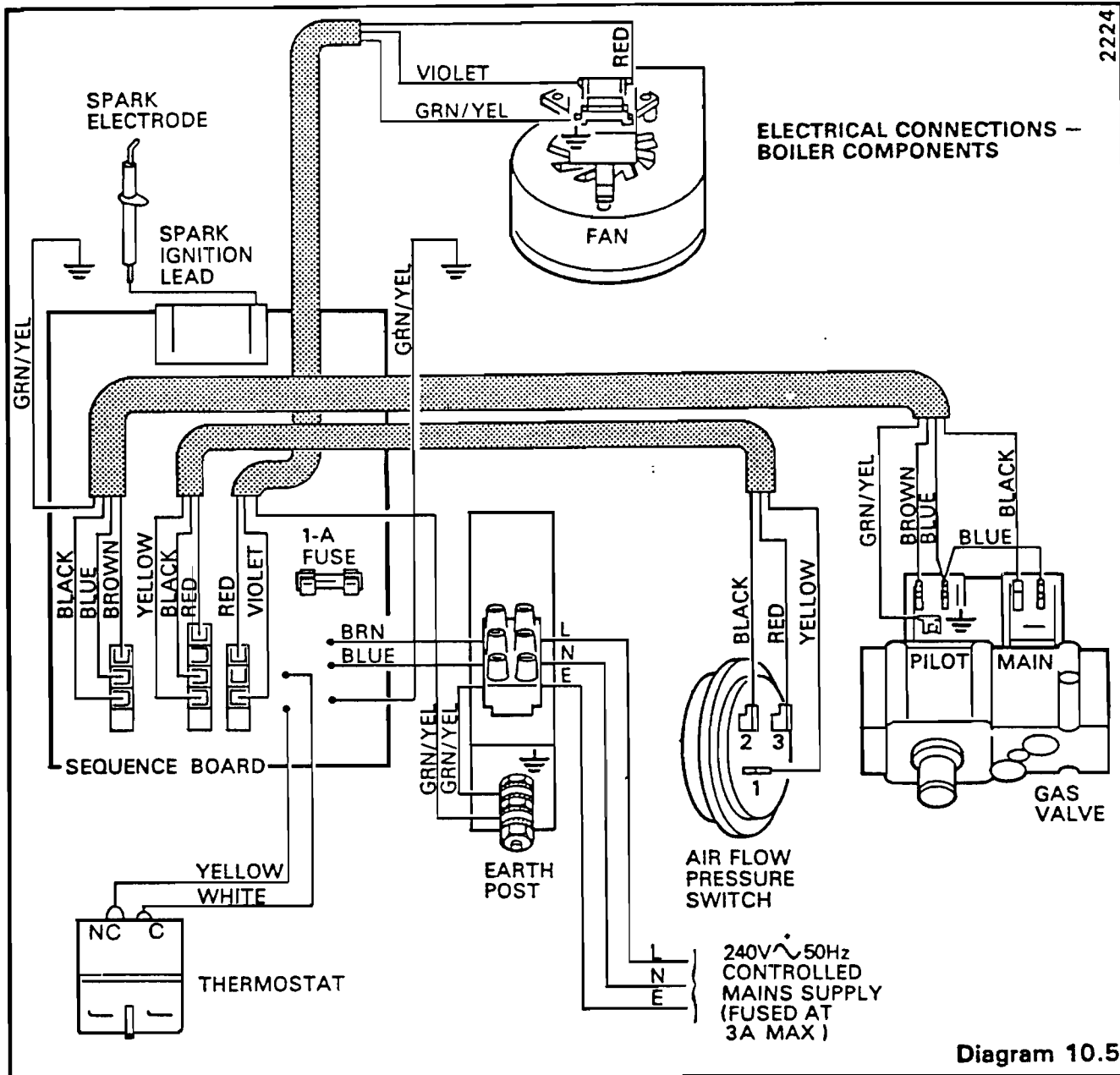


Diagram 10.5

Disconnect the pilot supply by unscrewing the tubing nut at the gas valve, holding the pilot supply adaptor with another spanner. Ease the pilot supply tube from the pilot supply adaptor, see diagram 10.4.

Remove the pilot supply adaptor from the gas valve and fit to the replacement, using a little sealant on the external thread to ensure gas soundness.

Remove the terminal cover from that gas valve, secured by two 4BA screws

Disconnect the electrical connectors.

Support the gas valve, disconnect the union on the gas service cock then remove the four screws from the flanged connection at the right hand side. Ease the flange and union apart to remove the valve.

Transfer the half union of the gas service cock to the inlet of the replacement gas valve, using a little thread sealant on the external thread to ensure gas soundness.

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

Reassembly notes:

To reconnect the electrical leads to the valve, see diagram 10.5. Make sure that the insulation boot is fitted to the BLACK lead.

After assembly test for gas soundness and adjust the gas valve to the rating required as described in Section 7.3 "Initial Lighting, Testing and Adjustment".



### 10.8 PILOT FILTER

The pilot filter is an integral part of the gas valve. The filter is of large capacity, designed to last the life of the gas valve, under normal operating conditions.

If the pilot filter becomes completely blocked under normal operating conditions, it is recommended that the gas valve is renewed and the old valve returned to Glow-worm Ltd., marked "Pilot filter blocked". Provided that this is the only fault and the cause is substantiated, the replacement will be supplied free of charge.

### 10.9 THERMOSTAT

Gain access to the thermostat by removing the controls cover and the case, refer to Sections 10.1 and 10.2.

Pull the thermostat knob off the spindle.

Release the electrical drawer by removing the two screws at the top then slide the drawer forward to the stops. Remove the electrical drawer from its housing by raising the front and withdrawing to clear the drawer stops. Take care not to strain any of the cables.

Where the electrical drawer cannot be rested on the floor or worktop, it should be supported by turning anti-clockwise and rested on the runners as shown in diagram 10.6.

Release the thermostat capillary from its securing clip on the drawer.

Disconnect the electrical leads at the thermostat.

Release the capillary from its clips at the left hand side of the boiler.

Remove the two sealing plates in the lower corner where the capillary passes through the back panel.

Remove the retaining split pin from the phial pocket and remove the phial.

Remove the thermostat, secured by two screws, then feed the capillary and phial through the hole in the back panel. Note the capillary route before removing.

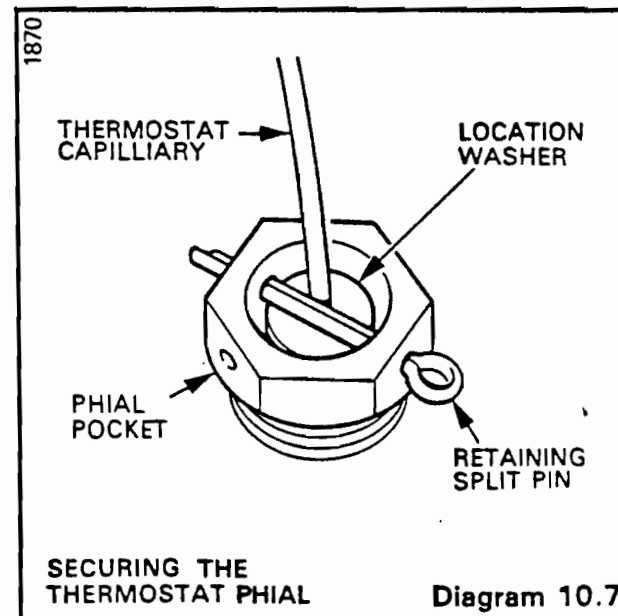
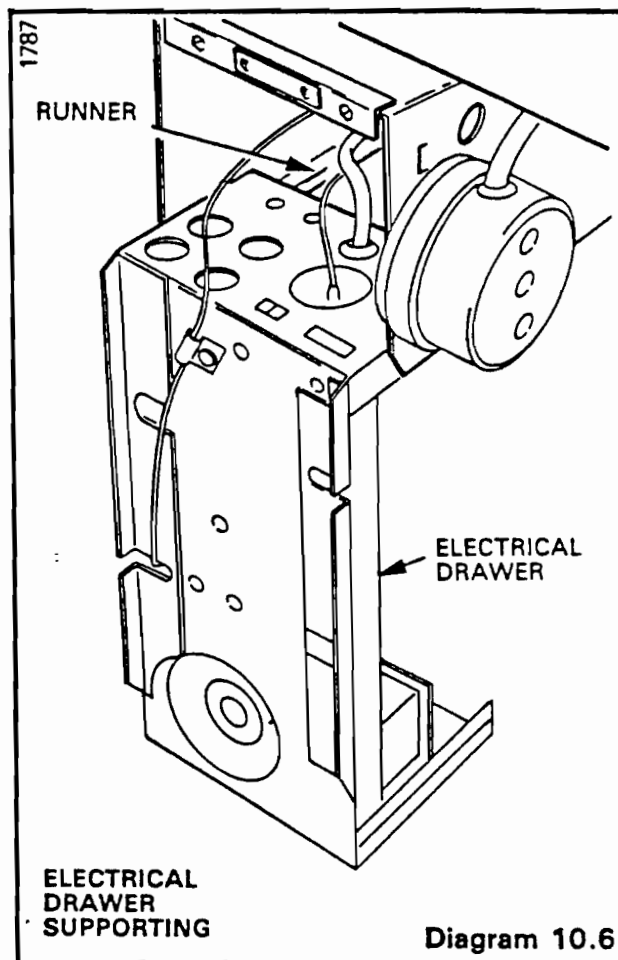
#### Reassembly notes:

Ensure the thermostat is refitted the correct way up - capillary at the bottom.

Ensure that the thermostat phial is fully inserted into the phial pocket and is secured with the location washer behind the retaining split pin, see diagram 10.7.

Ensure that thermostat capillary is located in the clips at the left hand side of the boiler and also ensure correct refitting of the sealing plates, do not tighten until both are fitted.

To reconnect the electrical leads to the thermostat, see diagram 10.5.



When reassembled, ensure that sufficient length of capillary is available to withdraw the electrical drawer.

Ensure all multi-pole plugs are correctly located on the sequence board.

## 10.10 SEQUENCE BOARD

Slide the controls cover forward from the runners on the case, see diagram 4.2.

Release the electrical drawer by removing the two screws at the top, then slide the drawer forward to the stops.

Remove the cable tie securing the electrical leads and disconnect the three multi-pole plugs at the front, see diagram 10.8.

Disconnect the electrical leads at the thermostat and also the sequence board live and neutral leads at the terminal, (brown and blue).

Disconnect the sequence board earth lead at the rear of the electrical drawer (green/yellow).

To remove the sequence board, ease the front of the board off the fixing studs and withdraw forward from the location tags and support posts. Ease board forward then disconnect spark ignition lead.

### Reassembly notes:

Reconnect spark ignition lead prior to locating sequence board. Ensure that sequence board is located in the tags at the rear of the drawer and pushed onto the fixing studs at the front.

Reconnect all electrical leads, see diagram 10.5. Make sure that the electrical leads are resecured with the cable tie previously removed.

## 10.11 FAN ASSEMBLY

Gain access to the fan by removing the controls cover and case, refer to Section 10.1 and 10.2.

Disconnect the electrical connectors at the fan and remove cable clip, one screw, as diagram 4.3. Slacken the extended screws to release the fan seal housing. Disconnect the air flow sensing tubes at the union nuts to the left of the flue hood and at the rear of the fan.

Remove the flue hood and fan assembly, secured by a screw and washer each side.

Remove the fan assembly from the flue hood, secured by four screws.

### Reassembly notes:

Fit the flue hood and fan assembly, carefully inserting the fan outlet into the fan seal housing. Take care not to trap the thermostat capillary.

Secure the flue hood with the two screws and washers previously removed. Tighten the two extended fan seal housing screws and connect the air flow sensing tubes at the union nuts to the left of the flue hood and at the rear of the fan.

Fit the electrical connectors to the fan, the green/yellow earth to the connector marked with the earth symbol  $\oplus$ . The polarity of the other connectors is not important. Secure the fan cable with the clip and screw previously removed.

