PUBLICATION NO ZKLIT 400 OCT.88
THESE INSTRUCTIONS APPLY IN THE U.K. ONLY

These instructions are to be left with the user or at the gas meter

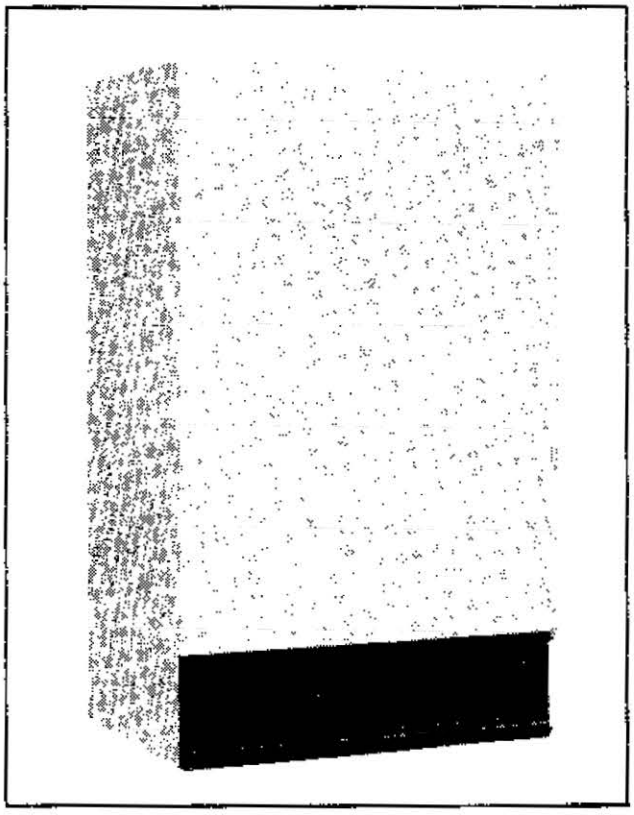
WORCESTER
HEAT SYSTEMS

HEATSLAVE 9.24 RSF

ROOM SEALED FAN ASSISTED FLUE

Wall Hung Combination Boiler for Central Heating and Mains Fed Domestic Hot Water.

Installation and Maintenance Instructions



INSTALLATION REQUIREMENTS

The installation of this appliance must be in accordance with the relevant requirements of the Gas Safety (Installation and use), 'Current' IEE Wiring Regulations, local building regulations and bye laws of the local water undertaking. It should be in accordance also with the relevant recommendations of the following British Standards and Codes of Practice:- BS 6798:87, BS 5449:1:1977, BS 5546:1:1979, BS 5440:1:1978, BS 5440:2:1976 and BS 6891.

Gas Safety (Installation and use) Regulations 1984:- It is the law that all gas appliances are installed by a competent person, in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your interest, and that of safety, to ensure compliance with the law.

The Manufacturers notes must not be taken, in any way, as overriding statutory obligations.

GC NUMBER 47 311 03

IMPORTANT This appliance is for use with **NATURAL GAS ONLY**

BOILER OUTPUT

To Hot Water
Automatic Modulating Control
MINIMUM 8·8 kW (30,000 Btu/h)
MAXIMUM 24·0 kW (82,000 Btu/h)

To Central Heating
Automatic Modulating Control
MINIMUM 8·8 kW (30,000 Btu/h)
MAXIMUM 19·0 kW (64,800 Btu/h)

CONTENTS

WORCESTER HEAT SYSTEMS LTD
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1. GENERAL INFORMATION

(See Fig. 1)

1. THE HEATSLAVE 9.24 RSF INCORPORATES:

(a) A low thermal capacity boiler having a maximum output of 24.0 kW (82,000 Btu/h).

(b) A multi-directional horizontal fanned flue system – right, left or rear.

(c) A standard flue assembly suitable for flue lengths from 100 mm (4 in.) to 1000 mm (39 in.). An extension flue from 1000 mm (39 in.) to 2000 mm (78 in.) maximum length is available as an optional extra.

(d) A water flow operated diverter valve to direct the boiler output either to domestic hot water or central heating as required.

(e) A heat exchanger to supply domestic hot water.

(f) A circulating pump with interconnecting pipework to provide both central heating and hot water.

(g) An electronic control system which in conjunction with an automatic multifunctional gas valve automatically modulates the boiler between minimum and maximum settings in response to domestic hot water and central heating demand.
The control circuit provides automatic ignition. A permanent pilot is not used.

(h) Users Operating Switch for selection of domestic hot water only or heating and domestic hot water.
A programmer is available as an optional extra.

2. PRIMARY COLD FEED AND VENT ARRANGEMENTS

The appliance is designed for connection to an open vent primary water system or a sealed system using the combined cold feed and vent pipe connection. See Fig. 1.

3. NATURAL GAS SUPPLY

The boiler requires 2.9 m^3/h (101 ft^3/hr) of gas. The gas meter and supply pipes must be capable of supplying this quantity of gas in addition to the demand from any other appliances being served. Under no circumstances should the gas supply be less than the appliance inlet connection. IT IS RECOMMENDED THAT A 22 mm dia. SUPPLY PIPE IS USED. The meter outlet governor must ensure a nominal pressure of 20 m.bar (8in.wg.). The complete installation including the meter, should be inspected and tested for soundness and purged in accordance with the recommendations of BS 6891.

4. INSTALLATION WARNING

CARE SHOULD BE TAKEN TO ENSURE THAT NO FOREIGN MATTER IS LEFT IN EITHER THE GAS OR WATER PIPEWORK AS THIS COULD CAUSE DAMAGE TO THE APPLIANCE.

5. SAFETY VALVE

In an open (vented) water system the provision of a safety valve is not necessary. A safety valve must be fitted in a sealed water system. For further details on the fitting of a safety valve refer to Section 10, Fig. 25, in these instructions.

6. ELECTRICAL SUPPLY

Mains supply 240V, ~ 50 Hz , 135 watts.

Connection shall be made to the mains adjacent to the appliance via a 3 amp fused, 3 pin plug from an unswitched shuttered socket both complying with the requirements of B.S. 1363.

7. CONTROLS

All controls included with the appliance are specified in the 'Short Parts List' included in this leaflet. See Section 18. There is provision for a room thermostat and frost thermostat to be connected to the appliance. See Fig. 26.

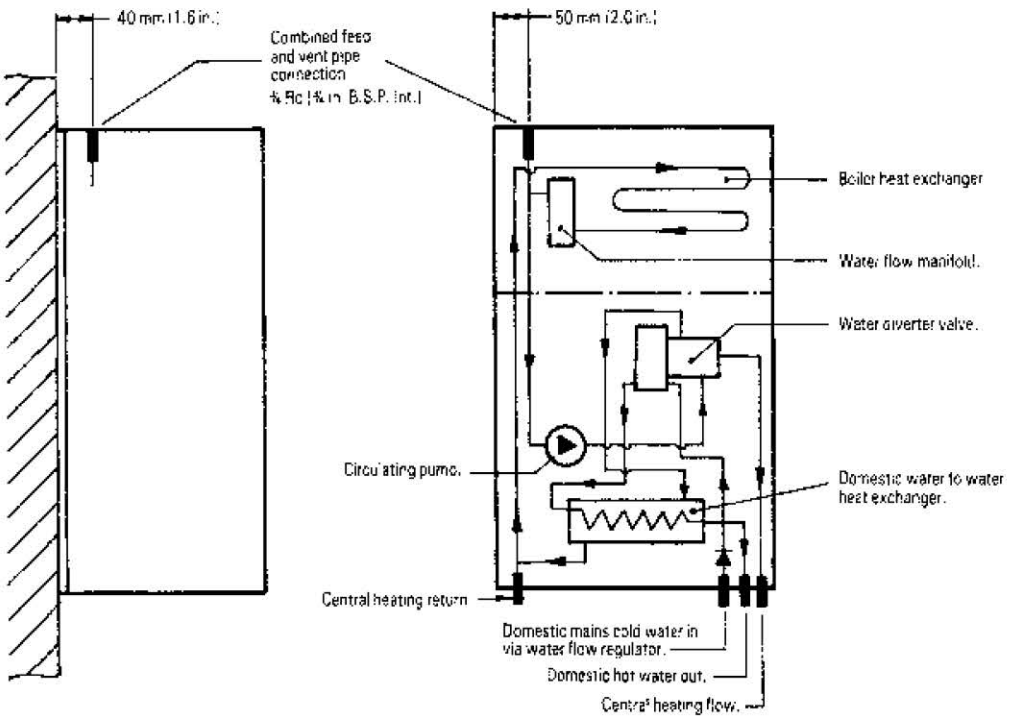
Thermostatic radiator valves can be used in the system; however, **a suitable by-pass must be incorporated with this type of control.**

8. PACKAGING

The appliance is dispatched in two packages. One package contains the boiler assembly the other the flue terminal and duct assemblies. Each package contains a check list and the contents should be verified before proceeding with the installation.

The extension flue assembly is packaged separately to order.

Fig. 1. Position of feed and vent pipe connection. Appliance water flow diagram.



TECHNICAL DATA

NOTE: THE DATA PLATE IS POSITIONED BEHIND THE FRONT PANEL ON TOP OF THE ELECTRICAL COVER

Table 1

NOMINAL BOILER RATINGS AT NORMAL OPERATING TEMPERATURE (10 minutes after lighting)								
MODE	OUTPUT		INPUT		BURNER SETTING PRESSURE		GAS RATE	
	kW	(Btu/h)	kW	(Btu/h)	m.bar	(in. wg)	m^3/h	(ft^3/h)
HEATING RANGE	8.8	(30,000)	12.6	(43,000)	3.3	(1.3)	1.2	(42.3)
	11.0	(37,500)	15.1	(51,550)	4.2	(1.7)	1.44	(50.7)
	13.0	(44,350)	17.6	(60,000)	5.6	(2.2)	1.67	(59.0)
	15.0	(51,200)	20.0	(68,250)	7.2	(2.8)	1.90	(67.2)
	17.0	(58,000)	22.2	(75,800)	8.8	(3.5)	2.11	(74.6)
	19.0	(64,800)	24.6	(84,000)	10.6	(4.3)	2.34	(82.7)
WATER ONLY	24.0	(82,000)	30.6	(103,700)	15.5	(6.2)	2.89	(102.0)

Note: The Pressure test point is located on the gas valve (See Fig. 30).

Table 2

FLUE DETAILS (SEE NOTE BELOW)		
	mm	(INCHES)
WALL HOLE DIA. FOR AIR DUCT	125	(5)
MINIMUM FLUE LENGTH, STANDARD FLUE	100	(4)
MAXIMUM FLUE LENGTH, STANDARD FLUE	1000	(39)
FLUE LENGTH WITH EXTENSION	1001 to 2000	(39 to 78)

Note. Flue Length:
The appliance is supplied with a standard flue assembly suitable for flue lengths from 100mm (4 in.) to a maximum of 1000mm (39 in.). For applications requiring a flue length from 1001mm (39 in.) to 2000mm (78 in.) an extension flue is available from Worcester Heat Systems.

Important: One extension flue only to be used per appliance.

Table 3 (Refer to Fig. 2)

SPECIFICATIONS	
CENTRAL HEATING FLOW	22 mm COPPER TUBE
CENTRAL HEATING RETURN	22 mm COPPER TUBE
COLD WATER MAINS INLET	15 mm COPPER TUBE
DOMESTIC HOT WATER OUTLET	15 mm COPPER TUBE
COMBINED FEED AND VENT CONNECTION	¾ Rc (¾ in. B.S.P.)
GAS INLET	15 mm COPPER TUBE
HEIGHT	820 mm (32.3 in.)
WIDTH	500 mm (19.7 in.)
DEPTH	360 mm (14.2 in.)
WEIGHT	54.5 kg (120 lbs.)
PRIMARY CAPACITY	2.7 Litres (0.59 galls.)
BURNER	FURIGAS. REF 156-500-002
MAIN INJECTOR	FURIGAS. REF 015-002-000 (4.3 Dia.)
PILOT INJECTOR	HONEYWELL. REF 45004-108-005
IGNITION	FULL SEQUENCE CONTROL SPARKING TO A PILOT
CONTROLS AND IGNITION COMPONENTS	SEE SECTION 18—SHORT PARTS LIST
MAXIMUM INLET DOMESTIC WATER PRESSURE	10 Bar. (145 p.s.i.)
MINIMUM INLET DOMESTIC WATER PRESSURE	2 Bar. (30 p.s.i.)
MAXIMUM CENTRAL HEATING FLOW TEMPERATURE (APPROXIMATE)	82°C (180°F)

SPECIFICATIONS	
* MAXIMUM STATIC HEAD – PRIMARY	30 m (97 ft.)
* MINIMUM STATIC HEAD – PRIMARY	0.3m (12 in.)
CIRCULATING PUMP	GRUNDFOS UPS 18 – 60, OR SMC COMMODORE 2
OUTPUT TO HEATING MAXIMUM	19 kW (64,800 Btu/h)
OUTPUT TO DOMESTIC HOT WATER	Modulating 8.8 – 24 kW (30 – 82,000 Btu/h)
MAXIMUM DOMESTIC HOT WATER FLOW RATE	Nominally 8.5 ± 15% litres/min. (1.8 gall/min.)
TEMPERATURE RISE. DOMESTIC HOT WATER AT 8.5 LITRES/MIN.	40°C (72°F)

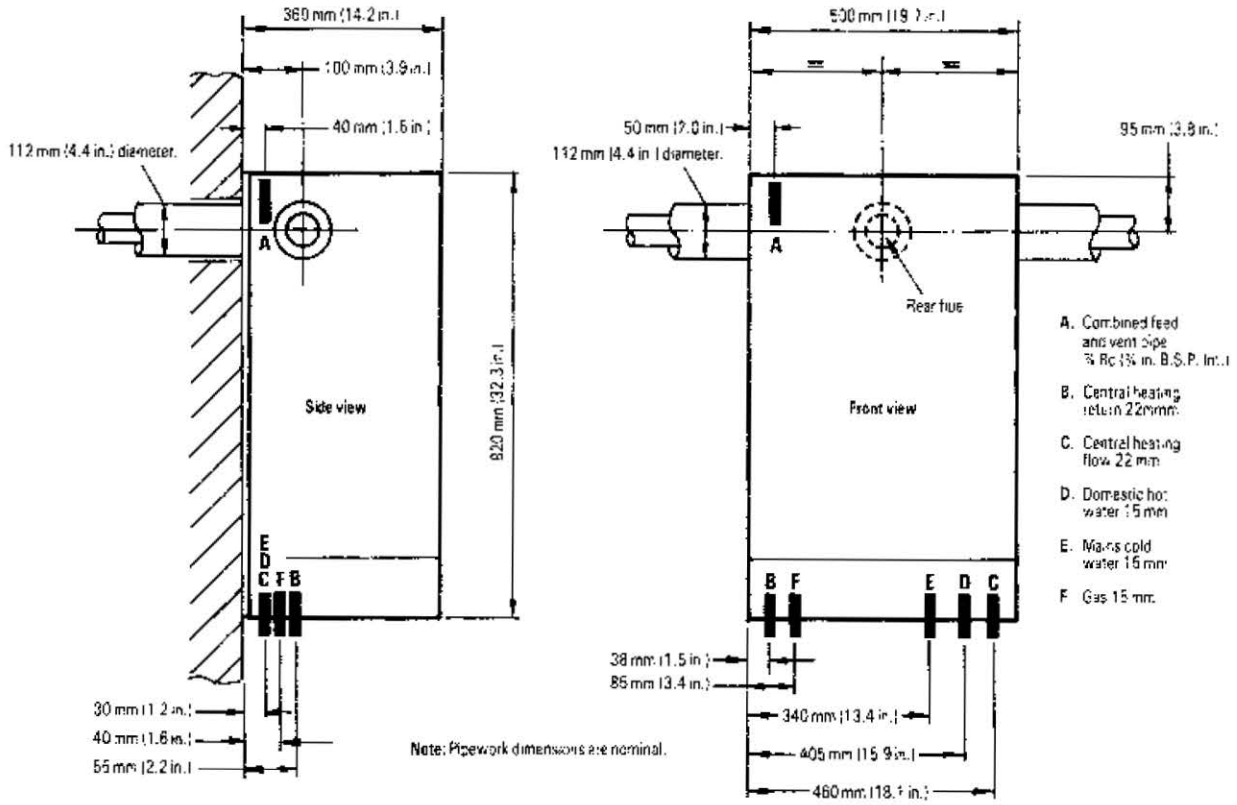
* Appliance static head is measured from the top of the casing to the water level in the feed tank. See Fig. 24.

Table 4

AVAILABLE PUMP HEADS						
HEATING OUTPUT		HEADS		MINIMUM FLOW RATE		TEMPERATURE RISE
kW	(Btu/h)	METRES	(FEET)	LITRES/MIN.	(GALL/MIN.)	
8.8	(30,000)	4.65	(15.2)	11.4	(2.5)	11°C (20°F) Heating flow and return
11.0	(37,500)	4.2	(13.8)	14.2	(3.1)	
13.0	(44,350)	3.75	(12.3)	16.8	(3.7)	
15.0	(51,200)	3.25	(10.7)	19.4	(4.3)	
17.0	(58,000)	2.65	(8.7)	22.0	(4.8)	
19.0	(64,800)	2.1	(6.9)	24.5	(5.4)	

3. DIMENSIONS

Fig. 2. Appliance dimensions and pipework connections.



4. SITING THE APPLIANCE

The appliance may be installed in any room although particular attention is drawn to the requirements of the I.E.E. Wiring Regulations and, in Scotland, the electrical provisions of the Building Regulations applicable in Scotland.

With respect to the installation of the appliance in a room containing a bath or shower. Where a room sealed appliance is installed in a room containing a bath or shower, any electrical switch or appliance control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

(Refer also to sections 2, 3, 6, 7 and 8.)

1. The appliance is wall mounted, no special wall protection is required. If the building is of a timber frame construction the guide lines and recommendations laid down by the British Gas Corporation should be followed when making the balanced flue aperture.
2. The wall to which the appliance is to be fixed must be capable of supporting its weight (refer to Technical Data Section 2). The wall mounting plate together with the fixing template, Fig. 4 should be used to enable the fixing screws and balanced flue cut out position to be determined.
3. The following clearances must be left to allow for installation and servicing:-

Installation

Above	150 mm (6 in.)
In front	600 mm (24 in.)
Below	450 mm (18 in.)
Side	See note below.

Care must be given to ensure adequate space is available either side for mounting the appliance, this is left to the discretion of the installer.

NOTE: On side flue applications a side clearance of 75 mm (3 in.) is required to facilitate making good internal wall face when left or right hand flue outlet is selected.

Servicing and Operation

Above	50 mm (2 in.)
In front	600 mm (24 in.)
Below	280 mm (11 in.)
Right and Left Side	20 mm (0.7 in.)

5. SYSTEM CONSIDERATIONS

1. It is most important that the flow rate shown in Table 4 corresponding to the heating output that has been selected is achieved and a suitable by-pass must be included as described in Section 9.
2. For circuit design purposes the pressure drop across the appliance should be obtained from Table 4 using the pressure drop corresponding to the heating output chosen, there is no need to take into account the higher boiler output used for domestic hot water.
3. When a demand is made for central heating the boiler output is modulated automatically from 8.8 kW to 19 kW (30 – 64,800 Btu/h) in order to give predominantly stable room temperatures.
4. When a demand is made for domestic hot water the boiler output is modulated automatically from 8.8 to 24.0 kW (30 – 82,000 Btu/h) in order to give predominantly stable hot water temperatures.
5. The unit heats the domestic hot water instantaneously and for the time that domestic hot water is being drawn off the central heating system is temporarily interrupted. When hot water only is selected the unit will be completely cold and a few seconds will elapse while the heat exchangers pre-heat before hot water is obtained.
6. The appliance includes a circulating pump and no other is required
7. Where room and frost thermostats are to be used they must be suitable for mains application.

6. AIR SUPPLY

1. The room in which the appliance is installed does not require a purpose air vent.
2. If the appliance is installed in a cupboard or compartment, permanent air vents are required in the cupboard or compartment, one at high level, and one at low level, either direct to outside air or to a room. Both high and low level air vents must communicate with the same room or must both be on the same wall to outside air. The minimum effective areas required are given in Table 5.

Table 5

Position of Air Vents	Air from room	Air direct from outside
High Level	276 cm^2 (42 in^2)	138 cm^2 (21 in^2)
Low Level	276 cm^2 (42 in^2)	138 cm^2 (21 in^2)

7. FLUE TERMINAL POSITION

IMPORTANT

1. **Flue length.** See note in Section 2 – Technical Data regarding standard flue assembly and extension flue.
2. **The flue must be installed in accordance with the recommendations of B.S. 5440: Part 1.**

Minimum siting dimensions for positioning the balanced flue terminal:

TERMINAL POSITION (See Fig. 3)	MIN. DISTANCE
A – Directly below an openable window or other opening e.g. air brick	300 mm (12in.)
B – Below gutters, soil pipes or drain pipes	75 mm (3in.)
C – Below eaves	200 mm (8in.)
D – Below balconies or car port roof	200 mm (8in.)
E – From vertical drain pipes and soil pipes	75 mm (3in.)
F – From internal or external corners	300 mm (12in.)
G – Above ground, roof or balcony level	300 mm (12in.)
H – From a surface facing a terminal	600 mm (24in.)
I – From a terminal facing a terminal	1200 mm (47in.)
J – From an opening in a car port (e.g. door, window) into dwelling	1200 mm (47in.)
K – Vertically from a terminal on the same wall	1500 mm (59in.)
L – Horizontally from a terminal on the same wall	300 mm (12in.)

GENERAL NOTES

1. The terminal must be positioned such that the combustion products can disperse freely at all times.
2. In certain weather conditions a terminal may steam and positions where this could cause a nuisance should be avoided.
3. If the terminal discharges into a pathway or passageway check that combustion products will not cause a nuisance and that the terminal will not obstruct the passageway.
4. If the terminal is fitted within 850 mm of a plastic gutter or within 450 mm of painted eaves, an aluminium shield of at least 750 mm long should be fitted to the underside of the gutter or painted surface. (Dimensions B and C in the diagram.)
5. If a terminal is fitted less than 2 metres above a balcony, above ground or above a flat roof to which people have access then a suitable terminal guard should be provided.

   A terminal protective guard is available from:

   Tower Flue Components Limited, Vale Rise, Tonbridge, TN9 1TB. Reference: GC 393 553 – K2

8. INSTALLATION (General)

NOTE: Flue Length. See note in Section 2—Technical Data about standard flue assembly and extension flue.

To check whether an extension flue is required:-

Rear flue length L is measured from the rear of the appliance to the outside face of the wall, i.e. wall thickness. Side flue length L is measured from the appliance white side panel to the outside face of the wall. See Section 2 - Technical Data Table 2.

1. Unpack the appliance and check the contents against the enclosed check list.
2. Unpack the standard flue assembly and flue extension, if required, and check the contents against the enclosed check list. Ensure all cardboard packing in the standard flue assembly and flue extension is removed.
3. With the aid of the fixing template and dimensions given in Fig. 4, pin the template to the wall on which the appliance is to be fixed. To ensure the top edge of the template is level use a plumb-line to align the vertical centre-line of the template.
4. Mark the flue position and fixing holes on the wall:-

(a) **Rear flue position**—from the fixing template.

(b) **Side flue position**—extend the horizontal centre line of the flue sideways. Using the side flue template, mark the flue position on the wall. The horizontal centre line must not slope upwards or downwards. See Fig. 4.

5. Remove the fixing template.
6. Cut a hole in the wall 125 mm (5 in.) diameter.
7. Drill the four retaining screw holes 7 mm (0.27 in.) dia. x 70 mm (2.75 in.) deep. Fit the wall plugs provided.
8. **IMPORTANT.** For side flue applications the aperture in the wall mounting plate must be blanked off with one of the blanking off caps provided before fixing to the wall as follows:-

(a) Align the hole in the wall mounting plate with the hole in the clamping plate by adjusting the two socket headed screws on the top edge of the wall mounting plate. See Fig. 6.

(b) Fit a blanking off cap into the aperture in the wall mounting plate from the rear. Ensure the flange of the blanking off cap is located against the clamping plate. Tighten the two screws on the top edge of the wall mounting plate. Ensure the blanking off cap is held securely. See Fig. 6.

Fig. 3 Siting of flue terminal.

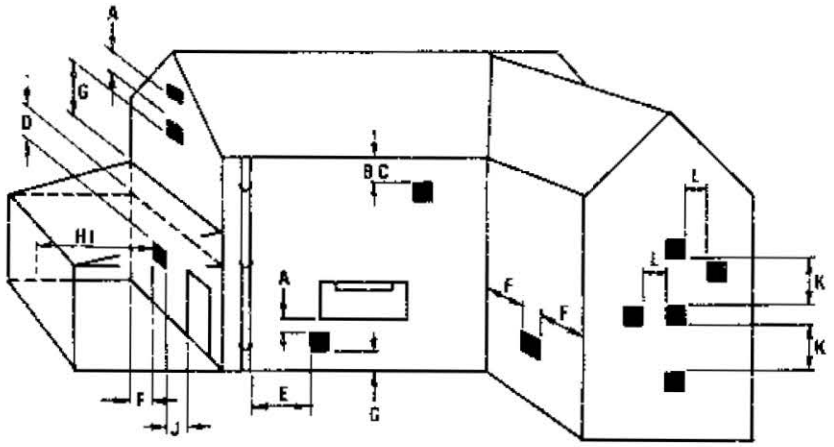


Fig. 4 Wall preparation

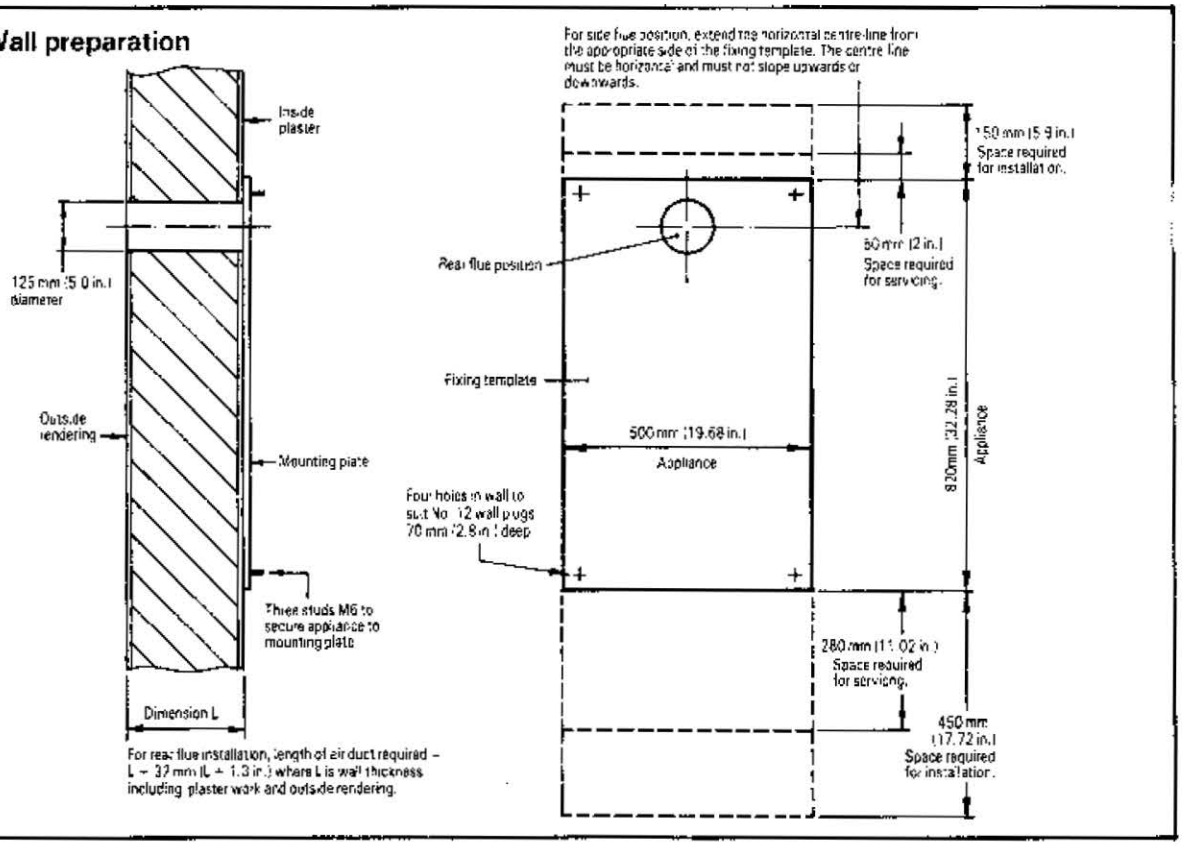
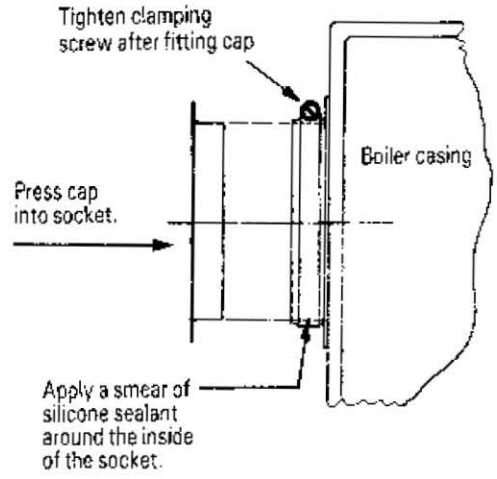
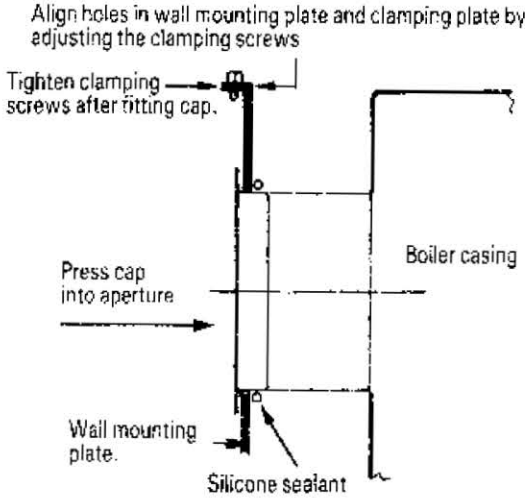


Fig. 5. Rear flue application.



BLANK OFF BOTH SIDE FLUE POSITIONS

Fig. 6. Side flue application.



BLANK OFF REAR FLUE POSITION AND ONE SIDE FLUE POSITION

9. Screw the wall mounting plate in position using the four No. 12 x 60 mm (2.5 in.) long screws provided. Ensure the top edge is level.

10. Unscrew the three M6 nuts and washers, two at the top and one at the bottom of the wall mounting plate and retain for future use.

11. Protecting the rear of the appliance and taking care not to damage the exposed pipes at the base lift the appliance off its wooden pallet and lie on its back. Then:

(a) Remove the cabinet front cover by pulling forward at the bottom edge and unhooking from the side panel top edges.

(b) Unscrew the M5 hexagon headed screw at the front inside edge of each cabinet side panel locating it to the electrical control panel and retain.

(c) Unscrew the M5 captive extension screw at the top inside edge of each cabinet side panel locating it to the rear of the appliance.

(d) Unscrew the M5 screw at the bottom inside edge of each cabinet side panel two to three turns and lift each panel off the key-hole slot.

12. Remove the inner cover by unscrewing the six M5 screws situated two at the top, two at the centre and two at the bottom.

13. The appliance can be flued in one of three directions, right, left or rear. Select the flue direction required. Flue positions not required must be blanked off and sealed with the two blanking off caps and silicone sealant supplied, as follows:

(a) **Rear Flue Direction**

Both side flue positions must be blanked off:-

(i) Apply a smear of silicone sealant around the inside of each socket on either side of the boiler casing. Press a blanking off cap into each socket and tighten the clamping screw on the socket. Remove any surplus sealant. See Fig. 5.

(ii) Replace the cabinet side panels. Locate the bottom key hole slot over the M5 screw and tighten. Screw the M5 captive extension screw at the top inside edge of each side panel to the rear of the appliance.

(iii) Fit the M5 hexagon headed screw – previously retained, to the front inside edge of each side panel and locate it to the electrical control panel.

(b) **Side Flue Direction**

Rear flue position and one side flue position must be blanked off:

(i) A blanking off cap must be fitted into the aperture in the wall mounting plate before fixing it to the wall. This operation is detailed in Instruction 8.

(ii) Fit a blanking off cap in the side flue position not required. Apply a smear of silicone sealant around the inside of the appropriate socket on the side of the boiler casing. Press a blanking off cap into the socket and tighten the clamping screw on the socket. Remove any surplus sealant. See Fig. 5.

(iii) Replace the cabinet side panel to the side of the appliance with the flue position blanked off. Locate the bottom key-hole slot over the M5 screw and tighten. Screw the M5 captive extension screw at the top inside edge of the side panel to the rear of the appliance.

(iv) Fit the M5 hexagon headed screw previously retained to the front inside edge of the side panel and locate it to the electrical control panel.

14. Determine the flue length L required and refer to the following sections for the correct flue/boiler assembly procedure.

Section	Direction	Length L
8a	Rear	100 mm – 1000 mm (4 in. – 39.9 in.)
8b	Rear	1001 mm – 1200 mm (39.3 in. – 47.2 in.)
8c	Rear	1201 mm – 2000 mm (47.3 in. – 78.7 in.)
8d	Side	100 mm – 1000 mm (4 in. – 39.3 in.)
8e	Side	1001 mm – 1200 mm (39.3 in. – 47.2 in.)
8f	Side	1201 mm – 2000 mm (47.3 in. – 78.7 in.)

15.

(a) Flush the heating system out with clean water before making connections to the appliance.

(b) Make the gas and water connections to the boiler. See Fig. 2 and Sections 11 and 12. To facilitate making the connections the electrical tray may be lowered as follows:

Unscrew the hexagon headed screw at the front inside edge of each side panel, and ease the electrical tray forwards off the four ball studs locating it to the rear of the appliance. Allow the electrical tray to pivot vertically downwards supported by the two plastic stops.

Supplied with the appliance is a ½ in. Rp x 15 mm spherical ball plug valve. This should be connected to the ½ in. R connection of the mains cold water inlet filter body. On the left hand side of the filter body is a plugged ¼ in. Rp connection and is for the fitting of a water pressure limiting device, should this be necessary.

NOTE: IT IS MOST IMPORTANT THAT ALL PIPE WORK IS ROUTED SO AS NOT TO OBSTRUCT ACCESS TO THE CIRCULATING PUMP, DIVERTER VALVE AND HEAT EXCHANGER.

16. Connect the mains lead to a 3 pin plug fused at 3 amps. The socket for the plug should be an unswitched shuttered type. For frost and room thermostat connections see Section 12.

17. Test the gas pipework for soundness in accordance with BS 6891.

8a. BOILER FLUE ASSEMBLY
REAR 100 mm – 1000 mm (4 in. – 39.3 in.)

NOTE: A flue extension kit is **not** required.

1. Measure and cut the air duct to length as follows:

(a) Measure the wall thickness L and add 32 mm (1.25 in.) See Fig. 4. This is the overall length of 110mm (4.5 in.) diameter air duct required.

(b) Reduce the air duct to the length required i.e. L + 32 mm (1.25 in.) by cutting the surplus from the plain end. Do not cut the expanded end. See Fig. 7.

2. Fit the flue terminal adaptor into the expanded end of the air duct. Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes in the expanded end of the air duct as a guide, drill through the adaptor and flue terminal with the 3 mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 8.

3. From the outside ease the air duct and terminal assembly through the hole prepared in the wall. Ensure the air duct engages in the hole in the wall mounting plate. It may be necessary to align the hole in the wall mounting plate with the hole in the clamping plate by adjusting the two socket headed screws on the top edge of the wall mounting plate. See Fig. 13.

4. From inside adjust the air duct until it projects 12 mm (0.5 in.) from the front face of the wall mounting plate. See Fig. 13.

5. Tighten the two screws on the top edge of the wall mounting plate firmly to locate the air duct. See Fig. 13 and 14. Ensure the air duct is securely fixed in position and the flue assembly is in a horizontal plane. Make good external brickwork or wall rendering, the inside edge of the rolled channel fixed to the flue terminal will protrude approximately 10 mm (0.4 in.) from the wall. See Fig. 13 and 14.

6. Apply the silicone sealant in a bead approximately 6 mm (0.25 in.) diameter around outside of the air duct and in contact with the wall mounting plate. See Fig. 13.

7. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and air duct on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.

8. Remove the fan and flue hood assembly.

(a) Disconnect the electrical connection to the fan at the plug in terminal strip.

(b) Ease the flexible tube from the left hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

9. Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

10. Reduce the 60 mm (2.4 in.) diameter flue duct to the required length which is L + 120 mm (4.75 in.)

NOTE: Cut the surplus from the plain end. Do not cut the flared end. See Fig. 7.

11. Fit the flue duct clamping ring and flue duct and replace the fan and flue hood assembly as follows:-

(a) Slide the flue duct clamping ring onto the flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 7.

(b) From inside, slide the flue duct assembly into the air duct engaging the end of the flue duct into the flue terminal. See Figs. 13 and 14.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 8.

(c) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(d) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and two M4 extension wing bolts previously removed, See Fig. 13 or 15.

(e) Replace the fan assembly and secure with the M5 screw previously removed.

(f) Replace the flexible tube to the connection at the left-hand side of the fan housing.

(g) Reconnect the electrical connection to the fan at the plug in terminal strip.

12. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

8b. BOILER FLUE ASSEMBLY
REAR 1001 mm – 1200 mm (39.3 in. – 47.2 in.)

NOTE: For flue length 1001 mm to 1200 mm (39.4 in. to 47.2 in.) use the standard flue assembly and extension flue.

1. Cut and assemble the air duct as follows:-

(a) Measure the flue length L and add 32 mm (1.25 in.) See Fig. 14. This is the overall length of 110 mm (4.5 in.) diameter air duct required.

(b) Reduce the length of the standard air duct to 900 mm (35.5 in.). Cut surplus from plain end. Do not cut expanded end. See Fig. 9.

(c) Reduce the length of the extension air duct by cutting from the end without holes until the required overall length after engagement of the two ducts is obtained. See Fig. 9.

(d) Fully engage the extension air duct into the expanded end of the shortened standard air duct. Ensure the overall length is correct and the two holes in the extension air duct are positioned at the extreme end. See Fig. 9.

(e) Using the two holes in the expanded end as a guide, drill two 3 mm diameter holes using the drill supplied. Disengage the air ducts and apply a smear of silicone sealant around the outside of the extension duct. Reassemble and secure with the two self-tapping screws supplied. See Fig. 9.

2. Slide the flue terminal into the extension air duct up to the rolled stop channel.

NOTE: The flue terminal adaptor is not required and must be discarded.

Using the holes in the extension air duct as a guide, drill through the flue terminal with the 3mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 10.

3. From the outside ease the air duct and terminal assembly through the hole prepared in the wall. Ensure the air duct engages in the hole in the wall mounting plate. It may be necessary to align the hole in the wall mounting plate with the hole in the clamping plate by adjusting the two socket headed screws on the top edge of the wall mounting plate. See Fig. 13.

4. From inside, adjust the air duct until it projects 12 mm (0.5 in.) from the front face of the wall mounting plate. See Fig. 13.

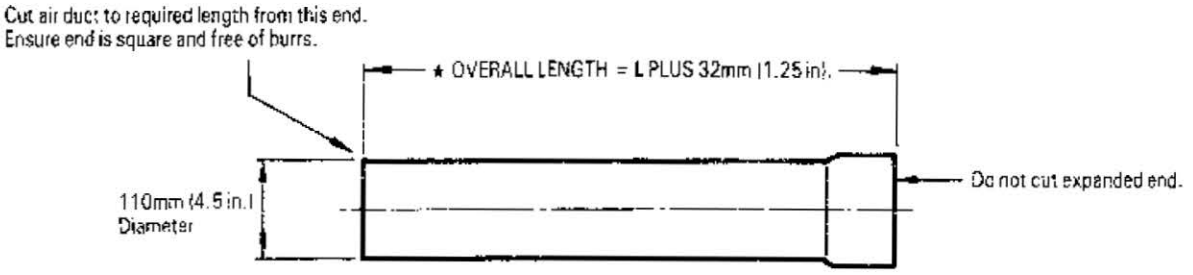
5. Tighten the two screws on the top edge of the wall mounting plate firmly to locate the air duct. See Fig. 13 and 14. Ensure the air duct is securely fixed in position and the flue assembly is in a horizontal plane. Make good external brickwork or wall rendering, the inside edge of the rolled channel fixed to the flue terminal will protrude approximatley 10 mm (0.4 in.) from the wall. See Fig. 13 and 14.

Fig. 7 Rear flue application

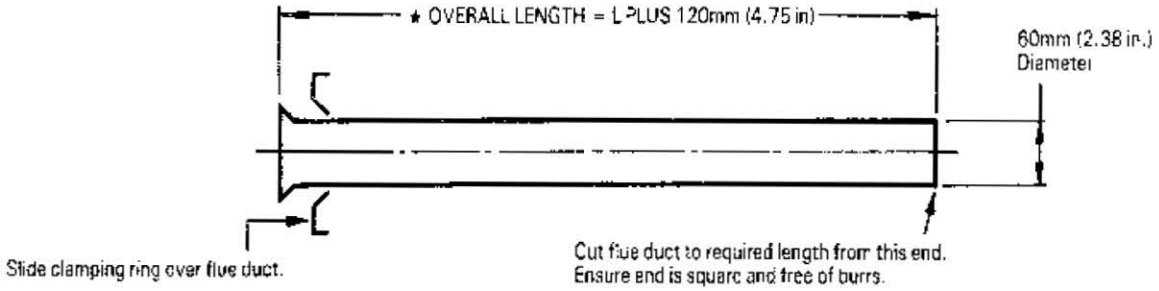
FOR WALL THICKNESSES 100 mm to 1000 mm (4.0 in. to 39.3 in.) USE THE STANDARD FLUE SUPPLIED.

Important. Refer to instructions in Section 8a. before cutting air or flue ducts.

Air duct—Rear flue application.



Flue duct—Rear flue application.

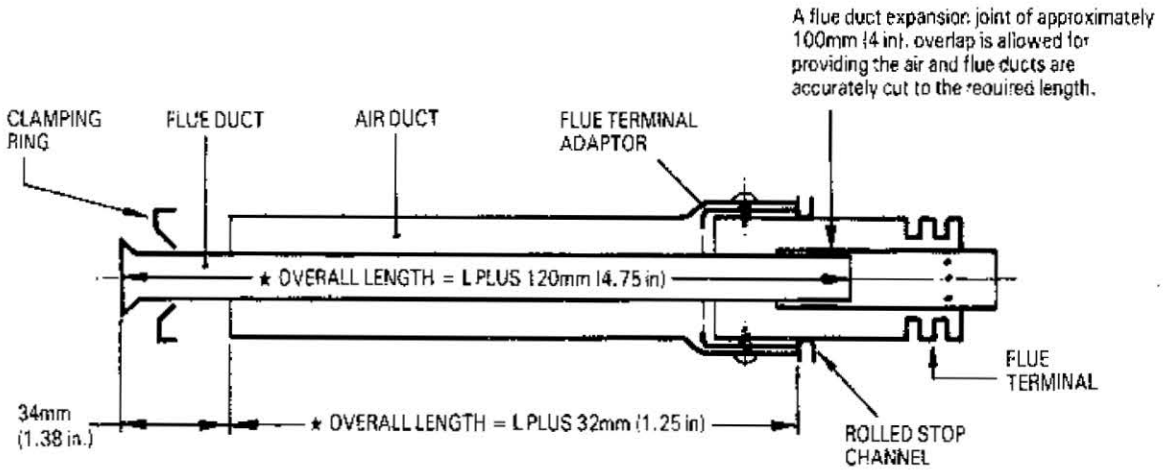


★ L = Wall thickness including plaster work and wall rendering.

Fig. 8 Rear flue duct assembly.

FOR WALL THICKNESSES 100 mm to 1000 mm (4.0 in. to 39.3 in.) USE THE STANDARD FLUE SUPPLIED.

Important. Refer to instruction in Section 8a. before assembly



Fit flue terminal adaptor into expanded end of air duct. Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes already in the expanded end of the air duct, drill through the adaptor and flue terminal with the 3mm drill supplied. Secure the assembly together with the two self tapping screws No 6 x 10mm supplied.

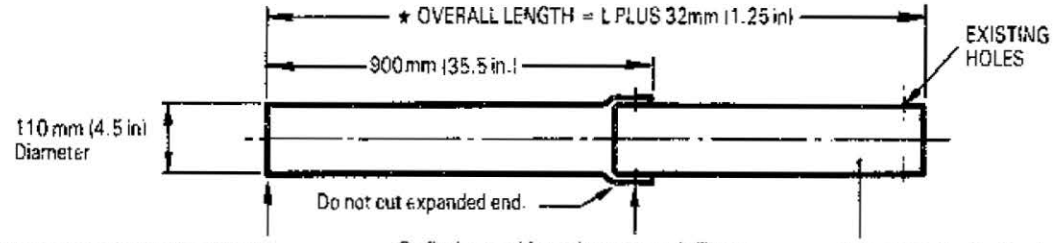
★ L = Wall thickness including plaster work and wall rendering.

Fig. 9 Rear flue application.

FOR WALL THICKNESSES/FLUE LENGTHS 1001 mm to 1200 mm (39.4 in. to 47.0 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8b. before cutting air or flue ducts.

Air duct—Rear flue application.

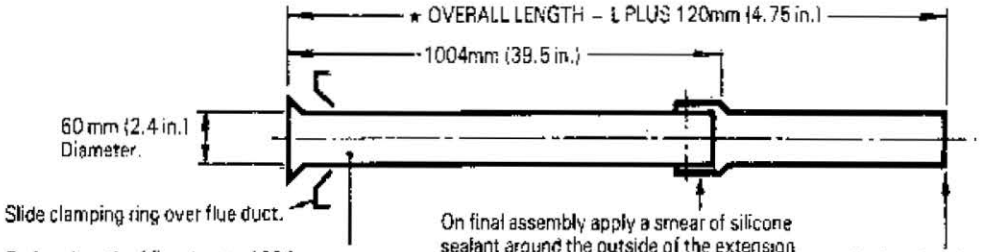


Reduce length of air duct to 900mm (35.5 in). Cut surplus from this end. Ensure end is square and free of burrs.

On final assembly apply a smear of silicone sealant around the outside of the extension duct.

Reduce length of extension piece by cutting from end without holes.

Flue duct—Rear flue application.



Reduce length of flue duct to 1004 mm (39.50 in) by cutting surplus from plain end. Ensure end is square and free of burrs.

On final assembly apply a smear of silicone sealant around the outside of the extension duct.

NOTE: Support spider is not required

Reduce length of extension piece by cutting surplus from this end. Ensure end is square and free of burrs.

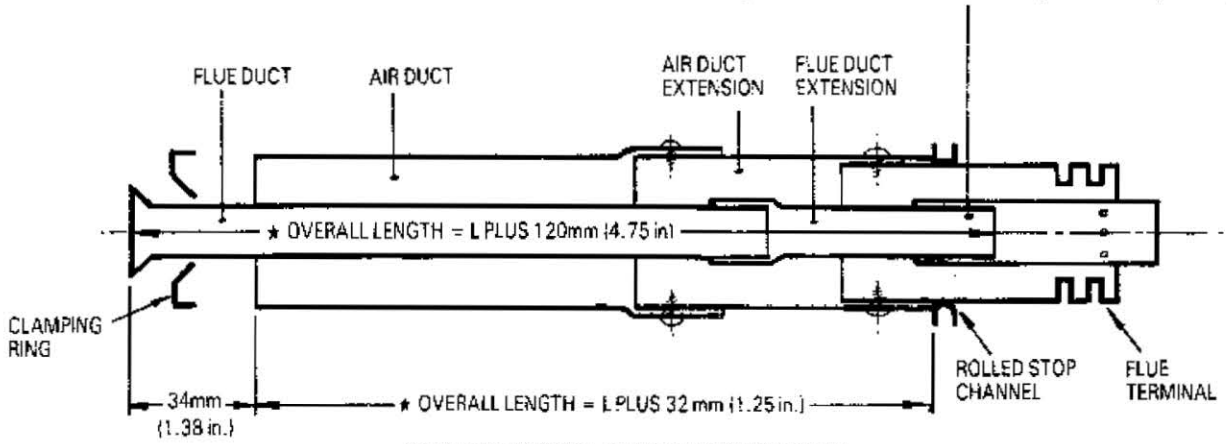
★ **L** = Distance measured from wall on which appliance is to be fixed to outside wall including plasterwork and wall rendering.

Fig. 10 Rear flue duct assembly.

FOR WALL THICKNESSES/FLUE LENGTHS 1001 mm to 1200 mm (39.4 in. to 47.0 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8b. before assembly.

A flue duct expansion joint of approximately 100mm (4 in) overlap is allowed for providing the air and flue ducts are accurately cut to the required length



NOTE: FLUE TERMINAL ADAPTOR IS NOT REQUIRED.

Fit flue terminal into end of air duct extension up to the rolled stop channel. Using the holes in the air duct extension as a guide drill two 3 mm diameter holes through the flue terminal with the drill supplied. Secure assembly together with two self tapping screws supplied.

★ **L** = Distance measured from wall on which appliance is to be fixed to outside wall including plasterwork and wall rendering.

6. Apply the silicone sealant in a bead approximately 6 mm (0.25 in.) diameter around outside of the air duct and in contact with the wall mounting plate. See Fig. 13.

7. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and air duct on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.

8. Remove the fan and flue hood assembly:

(a) Disconnect the electrical connection to the fan at the plug-in terminal strip.

(b) Ease the flexible tube from the left-hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

9. Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

10. Cut and assemble the flue duct as follows:

(a) Reduce the length of the standard flue duct to 1004 mm (39.5 in.). Cut surplus from plain end. Do not cut expanded end. See Fig. 9.

(b) Fully engage the shortened standard flue duct into the expanded end of the extension flue duct. Using the two holes in the expanded end as a guide. Drill two 3 mm diameter holes using the drill supplied. Disengage the flue ducts.

(c) Slide the flue clamping ring onto the standard flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 9.

(d) Apply a smear of silicone sealant around the outside of the standard flue duct. Reassemble and secure with the two self-tapping screws supplied. See Fig. 9.

NOTE: The support spider is not required and should be discarded.

(e) The overall length of the flue duct required is L + 120 mm (L + 4.75 in.). Reduce the overall length of the assembly to this dimension by cutting surplus from the plain end of the extension piece.

11. Fit the flue duct and replace the fan and flue hood assembly as follows:-

(a) From inside, slide the flue duct assembly into the air duct engaging the end of the flue duct into the flue terminal. See Figs. 13 and 14.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 10.

(b) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(c) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and two M4 extension wing bolts previously removed. See Figs. 13 or 15.

(d) Replace the fan assembly and secure with the M5 screw previously removed.

(e) Replace the flexible tube to the connection at the left hand side of the fan housing.

(f) Reconnect the electrical connection to the fan at the plug in terminal strip.

12. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

8c. BOILER FLUE ASSEMBLY

REAR 1201 mm – 2000 mm (47.3 in. – 78.7 in.)

NOTE: Use the standard flue assembly and the extension flue.

1. Cut and assemble the air duct as follows:

(a) Measure the flue length L and add 32 mm (1.25 in.). See Fig. 14. This is the overall length of 110 mm (4.5 in.) diameter air duct required.

(b) Do not reduce the length of the standard duct. See Fig. 11.

(c) Reduce the length of the extension air duct by cutting from the end without holes until the required overall length after engagement of the two ducts is obtained. See Fig. 11.

(d) Fully engage the extension air duct into the expanded end of the standard air duct. Ensure the overall length is correct and the two holes in the extension air duct are positioned at the extreme end. See Fig. 11.

(e) Using the two holes in the expanded end as a guide, drill two 3 mm diameter holes using the drill supplied. Disengage the air ducts and apply a smear of silicone sealant around the outside of the extension duct. Reassemble and secure with the two self-tapping screws supplied. See Fig. 11.

2. Slide the flue terminal into the extension air duct up to the rolled stop channel.

NOTE: The flue terminal adaptor is not required and must be discarded.

Using the holes in the extension air duct as a guide drill through the flue terminal with the 3 mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 11 and 12.

3. From the outside, ease the air duct and terminal assembly through the hole prepared in the wall. Ensure the air duct engages in the hole in the wall mounting plate. It may be necessary to align the hole in the wall mounting plate with the hole in the clamping plate by adjusting the two socket headed screws on the top edge of the wall mounting plate. See Fig. 13.

4. From inside adjust the air duct until it projects 12 mm (0.5 in.) from the front face of the wall mounting plate. See Fig. 13.

5. Tighten the two screws on the top edge of the wall mounting plate firmly to locate the air duct. See Fig. 13 and 14. Ensure the air duct is securely fixed in position and the flue assembly is in a horizontal plane. Make good external brickwork or wall rendering, the inside edge of the rolled channel fixed to the flue terminal will protrude approximatley 10 mm (0.4 in.) from the wall. See Fig. 13 and 14.

6. Apply the silicone sealant in a bead approximately 6 mm (0.25 in.) diameter around outside of the air duct and in contact with the wall mounting plate. See Fig. 13.

7. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and air duct on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.

8. Remove the fan and flue hood assembly:

(a) Disconnect the electrical connection to the fan at the plug-in terminal strip.

(b) Ease the flexible tube from the left-hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers, one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

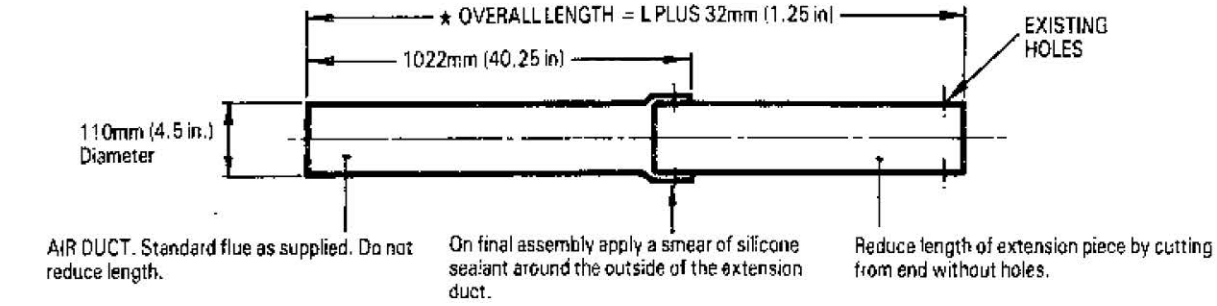
(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

Fig. 11 Rear flue application.

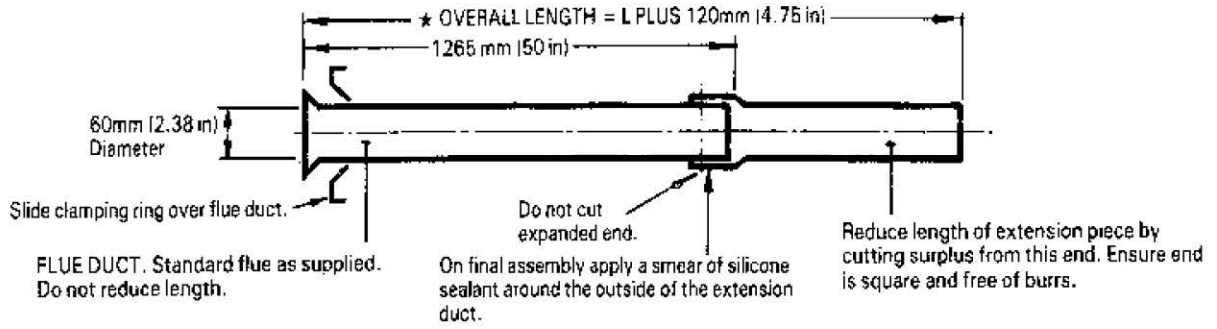
FOR WALL THICKNESSES/FLUE LENGTHS FROM 1201 mm to 2000 mm (47.3 in. to 78.7 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8c. before cutting air or flue ducts.

Air duct—Rear flue application.



Flue duct—Rear flue application.

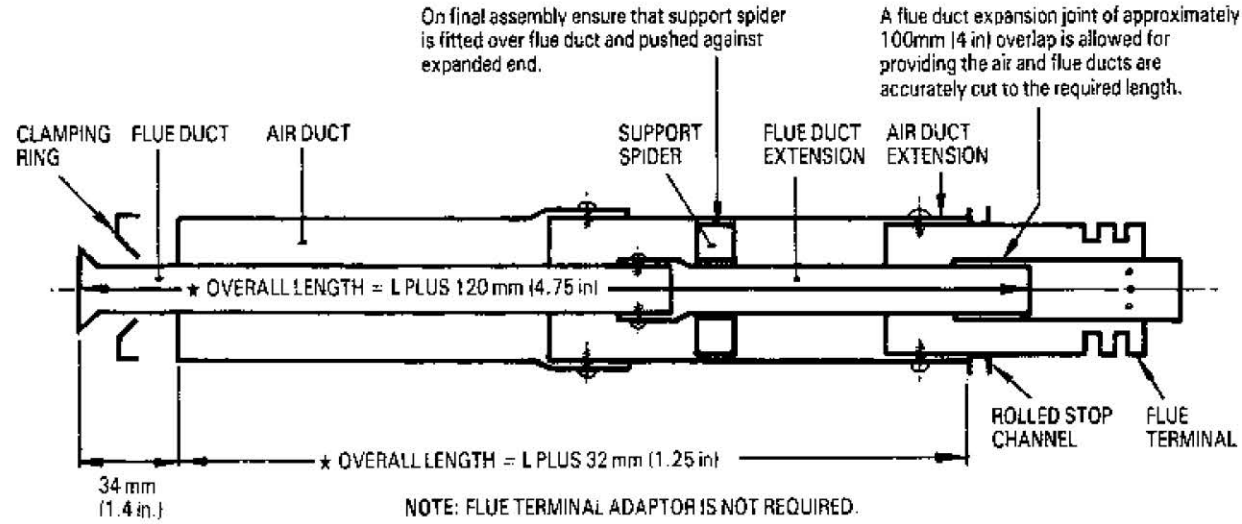


★ L = Distance measured from wall on which appliance is to be fixed to outside wall including plasterwork and wall rendering.

Fig. 12 Rear flue duct assembly.

FOR WALL THICKNESS/FLUE LENGTHS FROM 1201 mm to 2000 mm (47.3 in. to 78.7 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8c. before assembly.



NOTE: FLUE TERMINAL ADAPTOR IS NOT REQUIRED.

Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes in the end of air duct as a guide drill through the flue terminal with the 3mm drill supplied. Secure the assembly together with two self tapping screws.

★ L = Distance measured from wall on which appliance is to be fixed to outside wall including plasterwork and wall rendering.

9. Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

10. Cut and assemble the flue duct as follows:

(a) Do not reduce the length of the standard flue duct. See Fig. 11.

(b) Fully engage the standard flue duct into the expanded end of the extension flue duct. Using the two holes in the expanded end as a guide, drill two 3 mm diameter holes using the drill supplied. Disengage the flue ducts.

(c) Slide the flue clamping ring onto the standard flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 11.

(d) Apply a smear of silicone sealant around the outside of the standard flue duct. Reassemble and secure with the two self tapping screws supplied. See Fig. 11.

(e) The overall length of the flue duct required is L + 120 mm (L + 4.75 in.). Reduce the overall length of the assembly to this dimension by cutting surplus from the plain end of the extension piece.

Fit the support spiders onto the extension flue duct and slide into position to finish against the expanded end of the extension flue duct. See Fig. 12.

11. Fit the flue duct and replace the fan and flue hood assembly as follows:-

(a) From inside, slide the flue duct assembly into the air duct engaging the end of the flue duct into the flue terminal. See Figs. 13 and 14.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 12.

(b) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(c) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and two M4 extension wing bolts previously removed. See Figs. 13 and 15.

(d) Replace the fan assembly and secure with the M5 screw previously removed.

(e) Replace the flexible tube to the connection at the left hand side of the fan housing.

(f) Reconnect the electrical connection to the fan at the plug in terminal strip.

12. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

Fig. 13 Arrangement of rear flue application.

STANDARD FLUE ASSEMBLY. For dimensions using flue extension see Fig. 14.

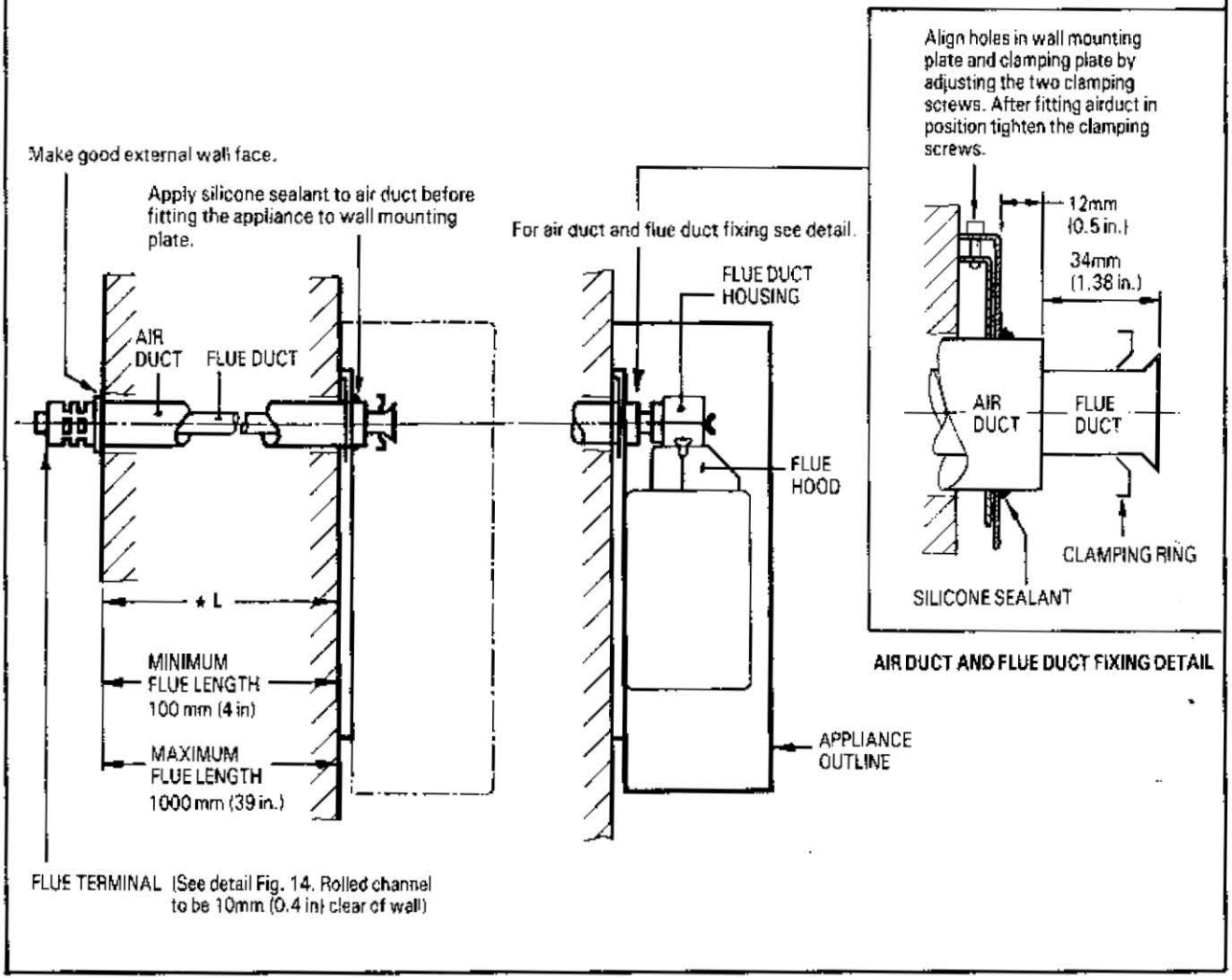


Fig. 14 Arrangement of rear flue application.
STANDARD FLUE ASSEMBLY AND EXTENSION FLUE.

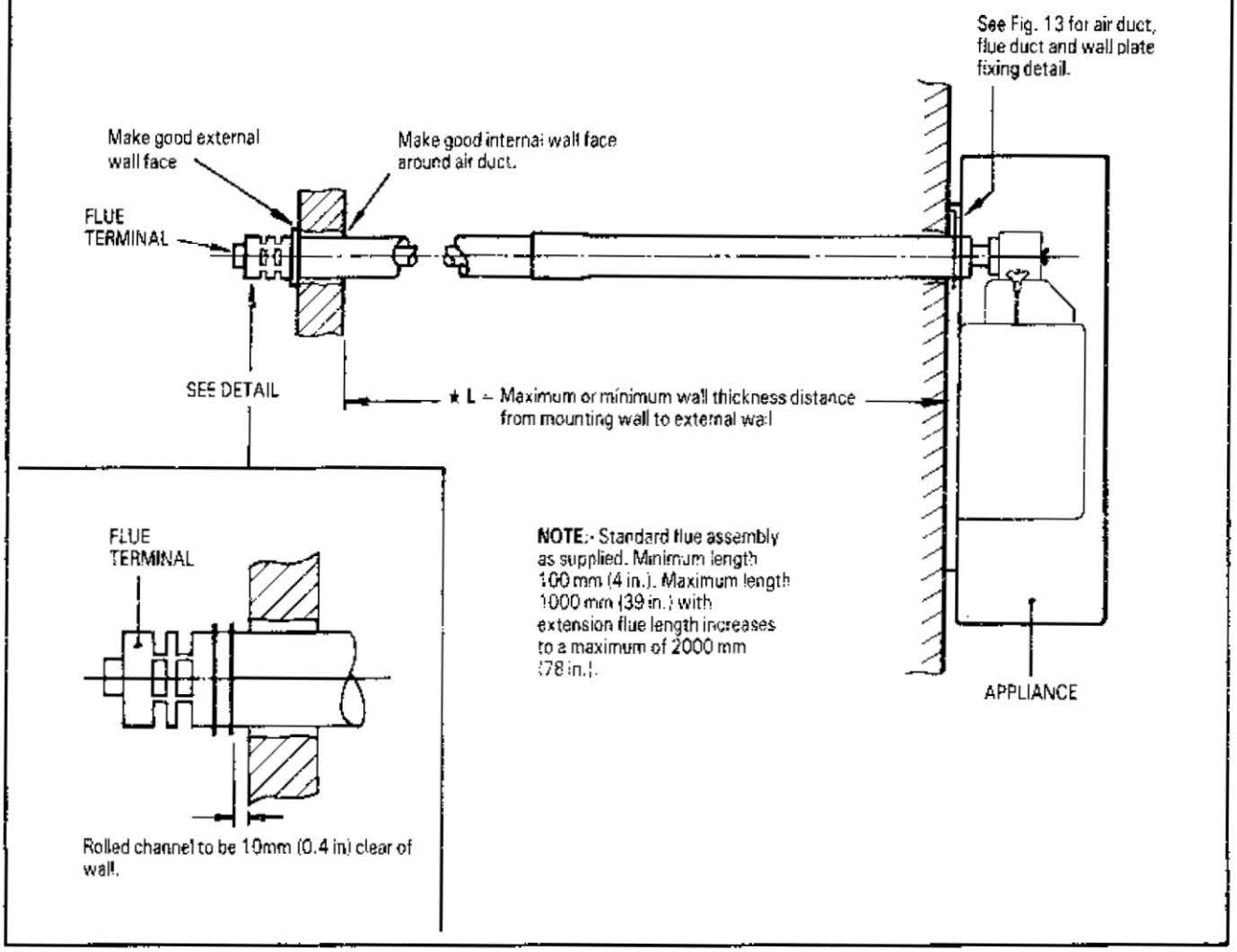
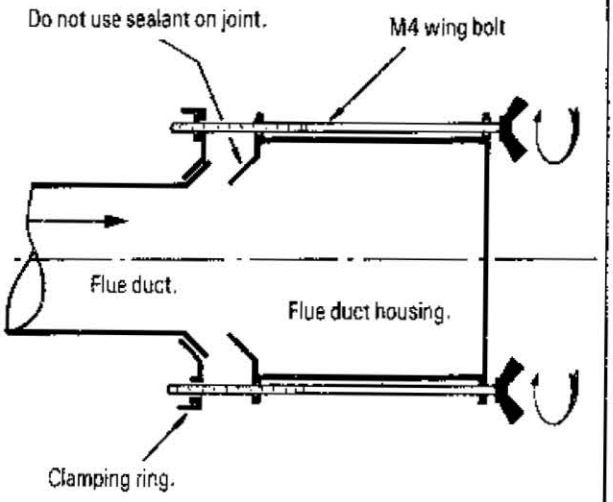


Fig. 15 Rear flue application.



8d. BOILER FLUE ASSEMBLY

SIDE 100 mm—1000 mm (4 in.—39.3 in.)

1. Apply a bead of silicone sealant approximately 6 mm (0.25 in.) diameter around the outside of the blanking off cap and against the wall mounting plate. See Fig. 6.
2. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and blanking off cap on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.
3. Remove the fan and flue hood assembly:

(a) Disconnect the electrical connection to the fan at the plug in terminal strip.

(b) Ease the flexible tube from the left hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers, one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

4. Cut and measure the air duct assembly as follows:

NOTE: For flue length 100 mm to 1000 mm (4 in. to 39.3 in.) use the standard flue assembly. An extension flue is **not** required.

(a) Measure the distance L along the horizontal flue centre line from the outside of the appliance to the outside of the wall. See Fig. 22. The overall length of 110 mm (4.5 in.) diameter standard air duct for the installation will be L + 34 mm (L + 1.3 in.)

(b) Reduce the standard air duct to the required length. Cut surplus from plain end. Do not cut expanded end. See Fig. 16.

(c) Fit the flue terminal adaptor into the expanded end of the air duct. Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes in the expanded end of the air duct as a guide, drill through the adaptor and flue terminal with the 3mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 17.

5. Cut and assemble the flue duct as follows:

(a) Reduce the 60 mm (2.4 in.) diameter standard flue duct to the required length. The overall length of the standard flue duct for the installation will be L + 260 mm (L + 10.25 in.).

(b) Cut the surplus from the plain end, do not cut the expanded end. See Fig. 16.

(c) Slide the flue clamping ring onto the flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 16.

6. Assemble the flue duct into the air duct and engage the end of the flue duct into the flue terminal. See Fig. 17.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 17.

7. Rearrange the flue duct housing position for side flue application. Replace the flue hood assembly. Fit the flue assembly and replace the fan assembly as follows:-

(a) Unscrew the four M5 screws securing the flue duct housing onto the flue hood. Rearrange the flue outlet to the required side flue position. Replace the four M5 screws.

(b) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(c) Apply a smear of silicone sealant around the inside of the air duct socket on the side of the boiler.

(d) From the outside, ease the flue assembly through the hole prepared in the wall. Pass the flue duct clamping ring through the air duct socket as shown in Fig. 23. Fully engage the air duct into the socket on the side of the boiler. Tighten the clamping screw. See Fig. 22.

(e) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and the two M4 extension wing bolts previously removed. See Fig. 15.

(f) Make good external brickwork or wall rendering. The inside edge of the rolled channel fixed to the flue terminal will protrude approximately 10 mm (0.4 in.) from the wall. Make good internal brickwork or wall finish. Ensure the flue assembly is in a horizontal plain.

(g) Replace the fan assembly and secure with the M4 screw previously removed.

(h) Replace the flexible tube to the connection at the left hand side of the fan housing.

(i) Reconnect the electrical connection to the fan at the plug-in terminal strip.

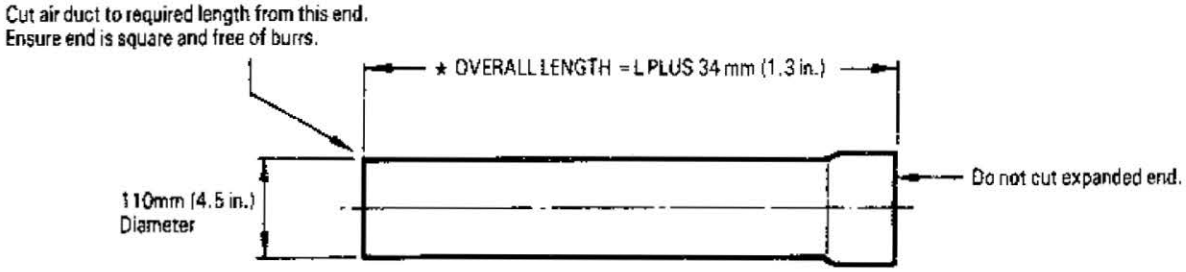
8. Remove the knock out area in the cabinet side panel to fit over the air duct. Remove any sharp edges.
9. Replace the cabinet side panel. Locate the bottom keyhole slot over the M5 screw and tighten. To engage panel it will need to be tilted to allow engagement onto the bottom screw. Screw the M5 captive extension screw at the top inside edge of the side panel to the rear of the appliance.
10. Fit the M5 hexagon headed screw previously retained to the front inside edge of each side panel and locate it to the electrical control panel.
11. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

Fig. 16 Side flue application.

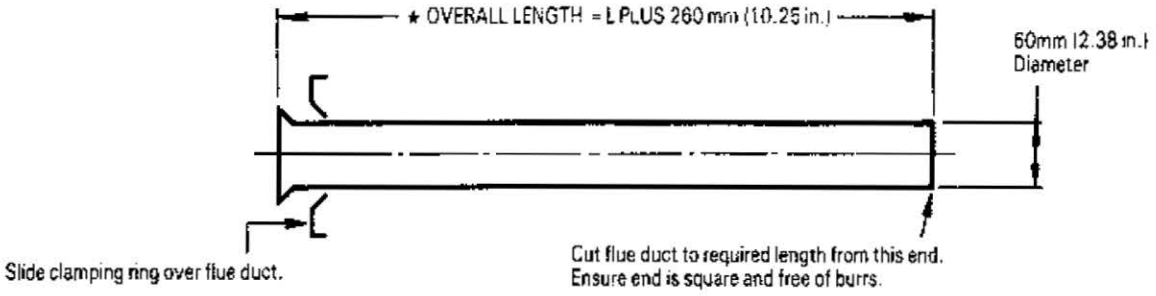
FOR WALL THICKNESSES 100 mm to 1000 mm (4.0 in. to 39.3 in.) USE THE STANDARD FLUE SUPPLIED.

Important. Refer to instructions in Section 8d. before cutting air or flue ducts.

Air duct—Side flue application.



Flue duct—Side flue application.

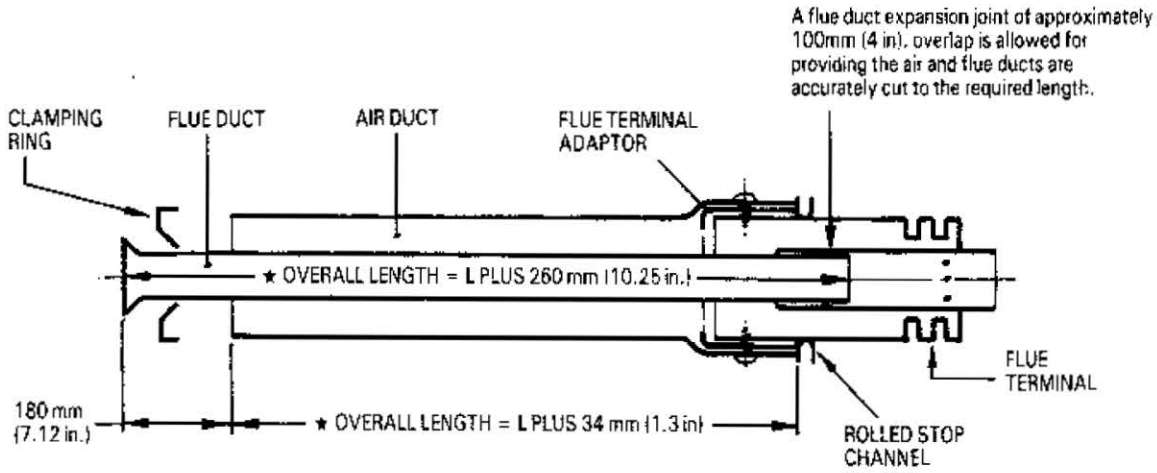


★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

Fig. 17 Side flue duct assembly.

FOR WALL THICKNESSES 100 mm to 1000 mm (4.0 in. to 39.3 in.) USE THE STANDARD FLUE SUPPLIED.

Important. Refer to instruction in Section 8d. before assembly.



Fit flue terminal adaptor into expanded end of air duct. Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes already in the expanded end of the air duct, drill through the adaptor and flue terminal with the 3mm drill supplied. Secure the assembly together with the two self tapping screws No 6 x 10mm supplied.

★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

8e. BOILER FLUE ASSEMBLY
SIDE 1001 mm – 1200 mm (39.3 in. – 47.2 in.)

NOTE: For flue length 1001 mm to 1200 mm (39.4 in. to 47.2 in) use the standard flue assembly and extension flue.

1. Apply a bead of silicone sealant approximately 6 mm (0.25 in.) diameter around the outside of the blanking off cap and against the wall mounting plate. See Fig. 6.
2. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and blanking off cap on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.
3. Remove the fan and flue hood assembly:

(a) Disconnect the electrical connection to the fan at the plug in terminal strip.

(b) Ease the flexible tube from the left hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers, one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

4. Cut and assemble the air duct as follows:

(a) Measure the distance **L** along the horizontal centre line from the outside of the appliance to the outside of the wall. See Fig. 22. The overall length of 110 mm (4.5 in.) diameter standard air duct for the installation will be: L + 34 mm (L + 1.3 in.)

(b) Reduce the length of the standard air duct to 900 mm (35.5 in.) Cut surplus from plain end. Do not cut expanded end. See Fig. 18.

(c) Reduce the length of the extension air duct by cutting from the end without holes until the required overall length after engagement is obtained. See Fig. 18.

(d) Fully engage the extension air duct into the expanded end of the standard air duct. Ensure the overall length is correct and the two holes in the extension air duct are positioned at the extreme end. See Fig. 18.

(e) Using the two holes in the expanded end as a guide, drill two 3 mm diameter holes. Apply a smear of silicone sealant around the outside of the extension duct. Reassemble and secure with the two self tapping screws supplied. See Fig. 18.

(f) Slide the flue terminal into the air duct up to the rolled stop channel.

NOTE: The flue terminal adaptor is not required and must be discarded.

Using the holes in the extension air duct as a guide, drill through the flue terminal with the 3 mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 19.

5. Cut and assemble the flue duct as follows:

(a) Reduce the length of the standard flue duct to 1140 mm (45 in.) Cut surplus from plain end. Do not cut expanded end. See Fig. 18.

(b) Fully engage the shortened standard flue duct into the expanded end of the extension flue duct. Using the two holes in the expanded end as a guide drill two 3 mm diameter holes using the drill supplied. Disengage the flue ducts.

(c) Slide the flue clamping ring onto the standard flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 18.

(d) Apply a smear of silicone sealant around the outside of the standard flue duct. Reassemble and secure with the two self-tapping screws supplied. See Fig. 18.

NOTE: The support spider is not required and should be discarded.

(e) The overall length of the duct required is L + 260 mm (L + 10.25 in.). Reduce the overall length of the assembly to this dimension by cutting surplus from the plain end of the extension piece.

(f) Assemble the flue duct into the air duct and engage the end of the flue duct into the flue terminal. See Fig. 19.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 19.

6. Rearrange the flue duct housing position for side flue application. Replace the flue hood assembly, fit the flue assembly and replace the fan assembly as follows:-

(a) Unscrew the four M5 screws securing the flue duct housing onto the flue hood. Rearrange the flue outlet to the required side flue position. Replace the four M5 screws.

(b) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(c) Apply a smear of silicone sealant around the inside of the air duct socket on the side of the boiler.

(d) From the outside, ease the flue assembly through the hole prepared in the wall. Pass the flue duct clamping ring through the air duct socket as shown in Fig. 23. Fully engage the air duct into the socket on the side of the boiler. Tighten the clamping screw. See Fig. 22.

(e) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and the two M4 extension wing bolts previously removed. See Fig. 15.

(f) Make good external brickwork or wall rendering. The inside edge of the rolled channel fixed to the flue terminal will protrude approximately 10 mm (0.4 in.) from the wall. Make good internal brickwork or wall finish. Ensure the flue assembly is in a horizontal plain.

(g) Replace the fan assembly and secure with the M4 screw previously removed.

(h) Replace the flexible tube to the connection at the left hand side of the fan housing.

(i) Reconnect the electrical connection to the fan at the plug in terminal strip.

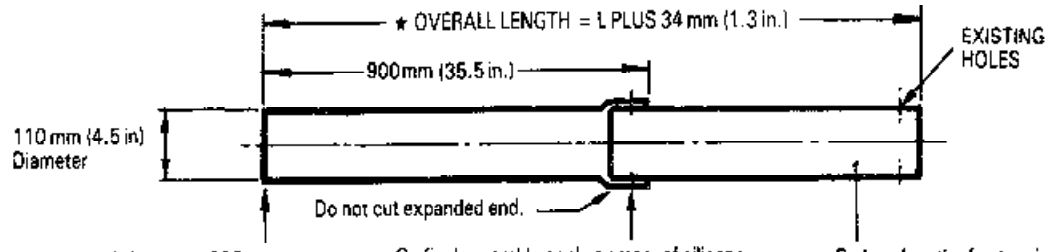
7. Remove the knock out area in the cabinet side panel to fit over the air duct. Remove any sharp edges.
8. Replace the cabinet side panel. Locate the bottom key hole slot over the M5 screw and tighten. To engage panel it will need to be tilted to allow engagement onto the bottom screw. Screw the M5 captive extension screw at the top inside edge of the side panel to the rear of the appliance.
9. Fit the M5 hexagon headed screw previously retained to the front inside edge of each side panel and locate it to the electrical control panel.
10. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

Fig. 18 Side flue application.

FOR WALL THICKNESSES/FLUE LENGTHS 1001 mm to 1200 mm (39.4 in. to 47.0 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8e. before cutting air or flue ducts.

Air duct—Side flue application.

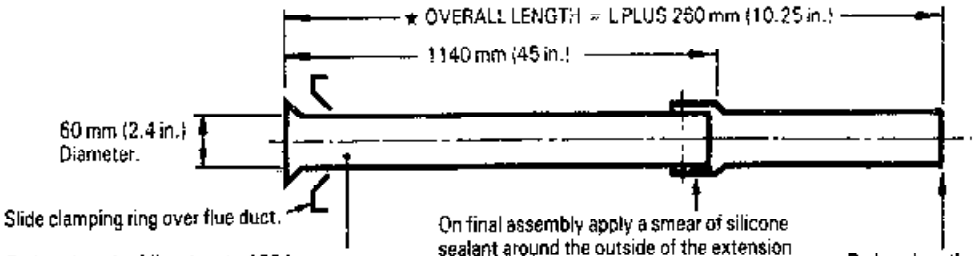


Reduce length of air duct to 900mm (35.5 in). Cut surplus from this end. Ensure end is square and free of burrs.

On final assembly apply a smear of silicone sealant around the outside of the extension duct.

Reduce length of extension piece by cutting from end without holes.

Flue duct—Side flue application.



Reduce length of flue duct to 1004 mm (39.50 in) by cutting surplus from plain end. Ensure end is square and free of burrs.

On final assembly apply a smear of silicone sealant around the outside of the extension duct.

NOTE: Support spider is not required

Reduce length of flue duct to 1140 mm (45.0 in.) by cutting surplus from plain end. Ensure end is squre and free of burrs.

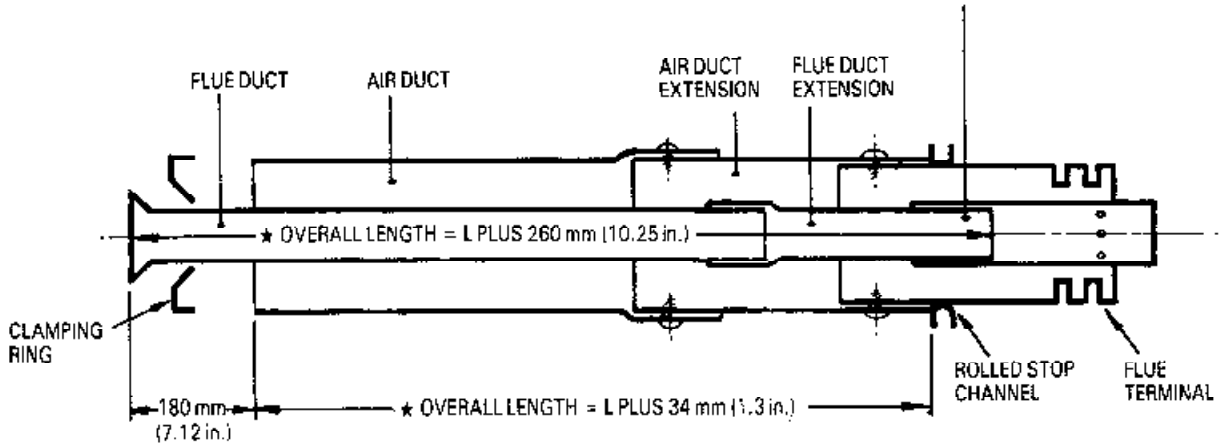
★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

Fig. 19 Side flue duct assembly.

FOR WALL THICKNESSES/FLUE LENGTHS 1001 mm to 1200 mm (39.4 in. to 47.0 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8e. before assembly.

A flue duct expansion joint of approximately 100mm (4 in) overlap is allowed for providing the air and flue ducts are accurately cut to the required length



NOTE: FLUE TERMINAL ADAPTOR IS NOT REQUIRED.

Fit flue terminal into end of air duct extension up to the rolled stop channel. Using the holes in the air duct extension as a guide drill two 3 mm diameter holes through the flue terminal with the drill supplied. Secure assembly together with two self tapping screws supplied.

★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

8f. BOILER FLUE ASSEMBLY

SIDE 1201 mm – 2000 mm (47.3 in. – 78.7 in.)

NOTE: For flue length 1201 mm to 2000 mm (47.3 in. – 78.7 in.) use the standard flue assembly and extension flue.

1. Apply a bead of silicone sealant approximately 6 mm (0.25 in.) diameter around the outside of the blanking off cap and against the wall mounting plate. See Fig. 6.
2. Lift the appliance onto the wall mounting plate. Engage the two support tabs into the slots in the back of the appliance casing. Locate the three M6 studs and blanking off cap on the wall mounting plate into the back of the appliance casing. Fasten the appliance to the wall mounting plate with the three M6 nuts and washers previously removed.
3. Remove the fan and flue hood assembly:

(a) Disconnect the electrical connection to the fan at the plug-in terminal strip.

(b) Ease the flexible tube from the left hand side of the fan housing.

(c) Remove the M5 screw holding the fan housing to the boiler casing.

(d) Slide the fan assembly out of the boiler casing.

(e) Unscrew the two M4 wing nuts and washers, one from each side of the flue hood assembly. Ease the flue hood assembly off the heat exchanger and out of the boiler casing.

(f) Unscrew the two M4 extension wing bolts and remove the flue duct clamping ring from the flue duct housing.

Retain the fan assembly and M5 screw, M4 wing nuts and washers, flue hood assembly, M4 extension wing bolts and clamping ring. Take care not to damage the components.

4. Cut and assemble the air duct as follows:

(a) Measure the distance L along the horizontal flue centre line from the outside of the appliance to the outside of the wall. See Fig. 22. The overall length of 110 mm (4.5 in.) diameter air duct for the installation will be L + 34 mm (L + 1.3 in.)

(b) Do not reduce the length of the standard duct. See Fig. 20.

(c) Reduce the length of the extension air duct by cutting from the end without holes until the required overall length after engagement is obtained. See Fig. 20.

(d) Fully engage the extension air duct into the expanded end of the standard air duct. Ensure the overall length is correct and the two holes in the extension air duct are positioned at the extreme end. See Fig. 20.

(e) Using the two holes in the expanded end as a guide, drill two 3 mm diameter holes. Apply a smear of silicone sealant around the outside of the extension duct. Reassemble and secure with the two self tapping screws supplied. See Fig. 20.

(f) Slide the flue terminal into the air duct up to the rolled stop channel.

NOTE: The flue terminal adaptor is not required and must be discarded.

Using the holes in the extension air duct as a guide, drill through the flue terminal with the 3 mm drill supplied. Secure the assembly together with the two No. 6 x 10 mm self tapping screws. See Fig. 21.

5. Cut and assemble the flue duct as follows:

(a) Do not reduce the length of the standard flue duct. See Fig. 20.

(b) Fully engage the standard flue duct into the expanded end of the extension flue duct. Using the two holes in the expanded end as a guide drill two 3 mm diameter holes using the drill supplied. Disengage the flue ducts.

(c) Slide the flue clamping ring onto the standard flue duct and locate at the expanded end of the duct with the chamfer against the expanded end. See Fig. 20.

(d) Apply a smear of silicone sealant around the outside of the standard flue duct. Reassemble and secure with the two self-tapping screws supplied. See Fig. 20.

(e) The overall length of the duct required is L + 260 mm (L + 10.25 in.). Reduce the overall length of the assembly to this dimension by cutting surplus from the plain end of the extension piece. Fit the support spider onto the extension flue duct and slide into position to finish against the expanded end of the extension flue duct. See Fig. 21.

(f) Assemble the flue duct into the air duct and engage the end of the flue duct into the flue terminal. See Fig. 21.

NOTE: The flue duct should slide into the terminal approximately 100 mm (4.0 in.). See Fig. 19.

6. Rearrange the flue duct housing position for side flue application. Replace the flue hood assembly. Fit the flue assembly and replace the fan assembly as follows:-

(a) Unscrew the four M5 screws securing the flue duct housing onto the flue hood. Rearrange the flue outlet to the required side flue position. Replace the four M5 screws.

(b) Replace the flue hood assembly. Ensure the two M4 bolts are correctly located and secure with the two M4 wing nuts and washers previously removed.

(c) Apply a smear of silicone sealant around the inside of the air duct socket on the side of the boiler.

(d) From the outside, ease the flue assembly through the hole prepared in the wall. Pass the flue duct clamping ring through the air duct socket as shown in Fig. 23. Fully engage the air duct into the socket on the side of the boiler. Tighten the clamping screw. See Fig. 22.

(e) Assemble the flue duct to the flue duct housing and fix together with the clamping ring and the two M4 extension wing bolts previously removed. See Fig. 15.

(f) Make good external brickwork or wall rendering. The inside edge of the rolled channel fixed to the flue terminal will protrude approximately 10 mm (0.4 in.) from the wall. Make good internal brickwork or wall finish. Ensure the flue assembly is in a horizontal plain.

(g) Replace the fan assembly and secure with the M4 screw previously removed.

(h) Replace the flexible tube to the connection at the left hand side of the fan housing.

(i) Reconnect the electrical connection to the fan at the plug-in terminal strip.

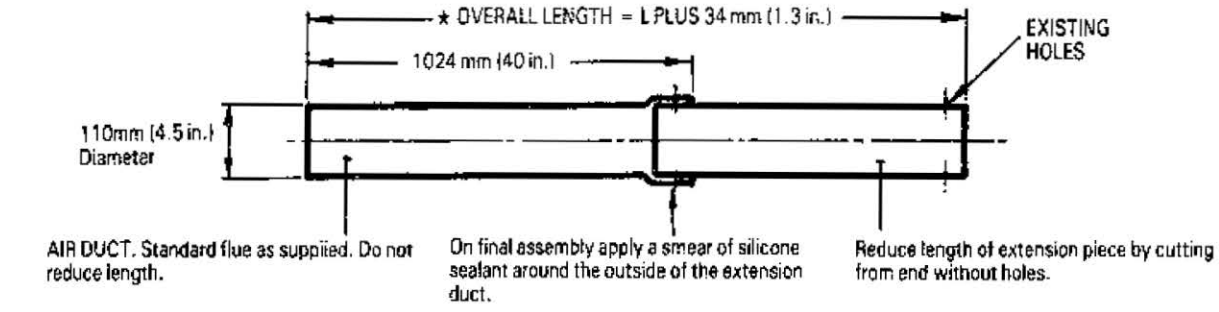
7. Remove the knock out area in the cabinet side panel to fit over the air duct. Remove any sharp edges.
8. Replace the cabinet side panel. Locate the bottom key hole slot over the M5 screw and tighten. To engage panel it will need to be tilted to allow engagement onto the bottom screw. Screw the M5 captive extension screw at the top inside edge of the side panel to the rear of the appliance.
9. Fit the M5 hexagon headed screw previously retained to the front inside edge of each side panel and locate it to the electrical control panel.
10. Complete the remainder of the installation as detailed in Section 8, paragraph 15 onwards.

Fig. 20 Side flue application.

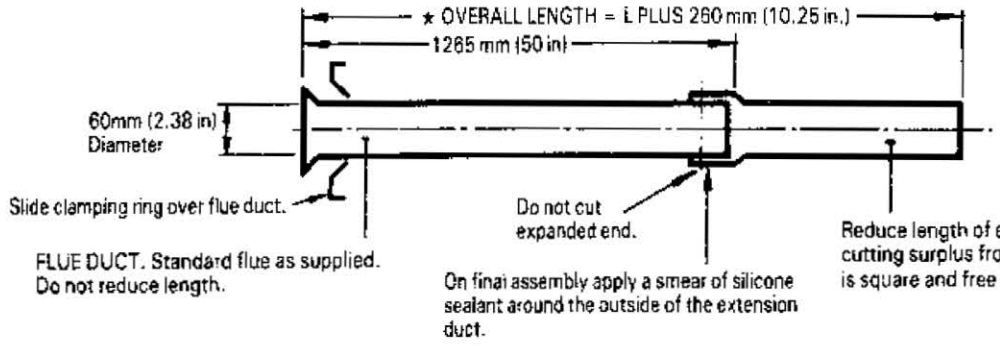
FOR WALL THICKNESSES/FLUE LENGTHS FROM 1201 mm to 2000 mm (47.3 in. to 78.7 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8f. before cutting air or flue ducts.

Air duct—Side flue application.



Flue duct—Side flue application.

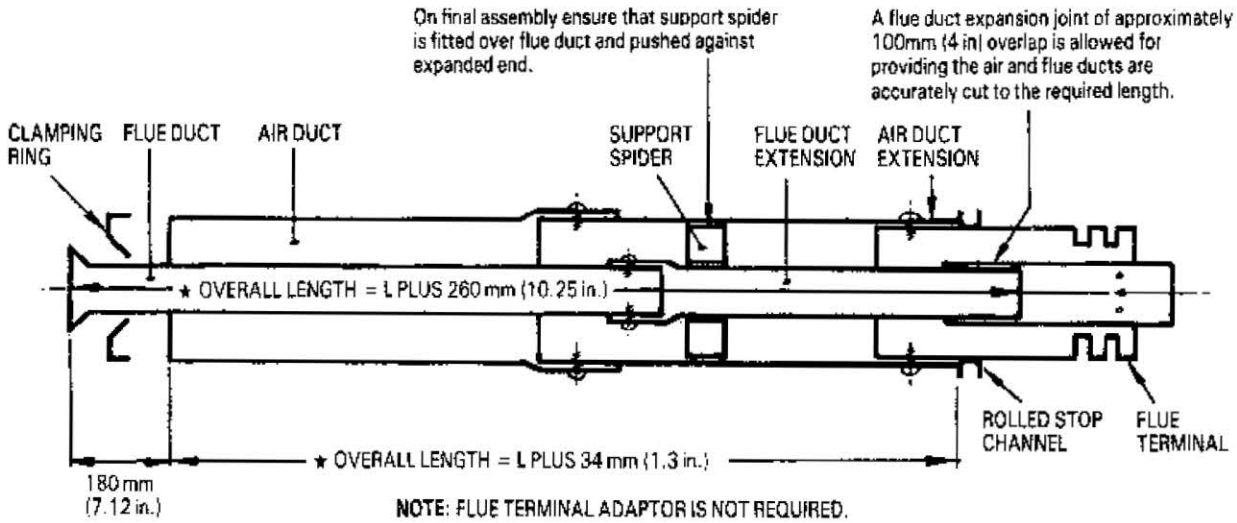


★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

Fig. 21 Side flue duct assembly.

FOR WALL THICKNESS/FLUE LENGTHS FROM 1201 mm to 2000 mm (47.3 in. to 78.7 in.) USE THE STANDARD FLUE SUPPLIED AND THE EXTENSION FLUE.

Important. Refer to instructions in Section 8f. before assembly.



NOTE: FLUE TERMINAL ADAPTOR IS NOT REQUIRED.

Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes in the end of air duct as a guide drill through the flue terminal with the 3mm drill supplied. Secure the assembly together with two self tapping screws.

★ L = Distance measured from outside of appliance casing to outside of wall face including wall rendering.

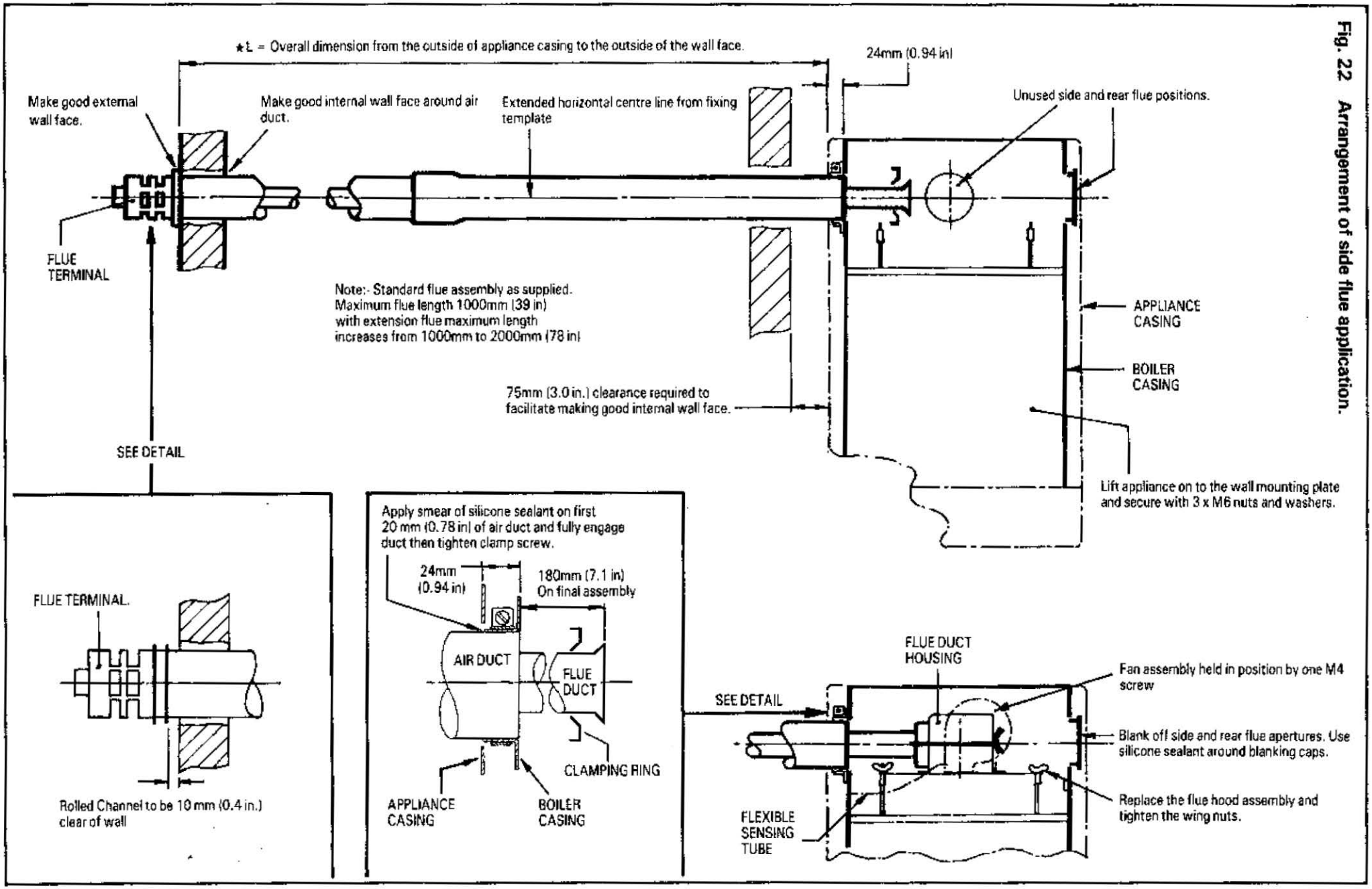
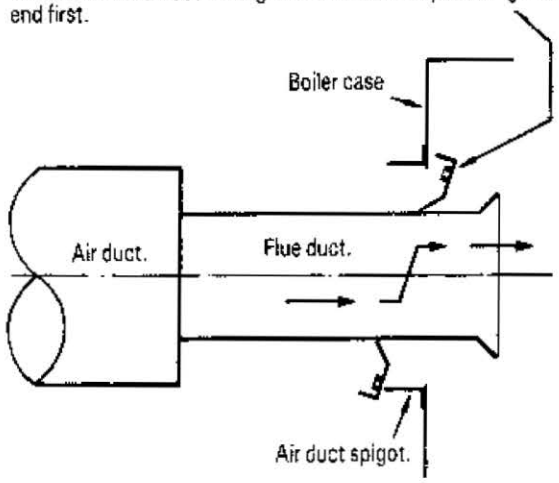


Fig. 22 Arrangement of side flue application.

Fig. 23 Side flue application.



9. OPEN VENT PRIMARY SYSTEM

See Fig. 24.

NOTE: A 22 mm combined feed and vent pipe must be connected to the ¾ Rc (¾ in. B.S.P.Int.) connection at the top of the appliance. See Fig. 1.

1. For sizes of flow and return pipework refer to Technical Data, Section 2 and Fig. 2.

2. **FEED AND EXPANSION CISTERN**

   The feed and vent pipe should be 22 mm diameter rising continuously from the appliance to the feed and expansion cistern. The use of long horizontal runs should be avoided.

   The feed and expansion cistern should be arranged so that it provides a minimum static head of 300 mm (12 in.) above the top of the appliance or above the highest point in the heating circuit, whichever is the greater.

3. **FILLING AND VENTING**

   A manual air vent is fitted to the outlet pipe of the black water to water heat exchanger situated below the boiler, air should be vented from this point manually as filling takes place. See Fig. 40.

   Any other air within the appliance will be expelled via the feed and vent connection or dissipated into the rest of the system. The heating system should be fitted with manual air vents at any high point.

4. **SYSTEM BY-PASS**

   See Table 4.

   A suitable by-pass designed to give the minimum flow rate indicated in Table 4 corresponding to the heating output used must be fitted.

   A suitable position for the by-pass is shown in Fig. 24. The by-pass must be connected between the main 22 mm flow and return pipes at least 2m (7 ft.) from the appliance.

   The by-pass must contain a suitable valve to provide adjustment and can be 15 mm diameter if the length is less than 1 m (3 ft.). If the length of the by-pass is greater than 1 m (3 ft.) then 22 mm diameter pipe must be used. To adjust the by-pass the appliance should be operated on hot water and central heating with the radiator valves and system by-pass set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system. Restrict the by-pass by the minimum amount necessary to give a temperature rise across the flow and return pipe of 11°C (20°F).

5. **PUMP**

   If the pump is fitted with speed adjustment it will be set at MAXIMUM and should not be reduced.

6. The appliance can be used with a sealed water system provided additional external components are fitted as detailed in Section 10.

10. REQUIREMENTS FOR SEALED PRIMARY SYSTEMS

1. **GENERAL** See Fig. 25.

   The installation must comply with the requirements of BS 6798:1987 and BS 5449:1. For sizes of flow and return pipework refer to Technical Data, Section 2 and Fig. 2.

2. **SAFETY VALVE**

   A spring loaded safety valve set to operate at 3 bar (45 lb/in²) must be used. The safety valve must be fitted close to the appliance on the vent pipe by a horizontal or vertically upward connection. There must not be any valves between the safety valve and the appliance. It should be accessible for testing. The valve must be positioned, or any discharge pipe so arranged that discharge of water or steam from the valve cannot create a hazard to occupants of the premises or cause damage to electrical components and wiring. The safety valve should comply with the general requirements of BS. 759.

3. **PRESSURE GAUGE**

   A pressure gauge covering at least the range 0—4 bar (0—60 p.s.i.) must be fitted to the system

4. **THE EXPANSION VESSEL**

   A diaphragm type expansion vessel must be connected to the appliance vent pipe close to the appliance. See Fig. 25. The expansion vessel must be chosen to suit the volume of water in the system. Refer to BS. 5449:1 1977, clause 25, for further details. The charge pressure must not be less than the static head at the point of connection (i.e. height of the top point of the system above the expansion vessel).

   The ratio of total system volume to expansion vessel volume depends on several factors such as vessel charge pressure, initial system pressure and maximum boiler temperature. For most systems the ratio will be between 8:1 and 12:1. Se BS. 5449:1 for specific information. The volume of water in the appliance is 2.7 litres (0.59 gallons).

Sizing Table

Air or Nitrogen charge pressure (bar)	0.5		1.0	
Pre-pressurisation pressure (bar)	None	1.0	None	1.0
Expansion vessel volume (litres)	A x 0.087	A x 0.15	A x 0.11	A x 0.20

A = SYSTEM VOLUME (LITRES)

5. **MAKE UP**

   Provision must be made for replacing water lost from the system either from a make up vessel mounted in a position higher than the top point of the system and connected through a non return valve to the system on the return side on the heating circuit, or where access to a make up vessel would be difficult, provision for make up can be made by pre-pressurisation of the system.

6. **MAINS CONNECTION**

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

7. **FILLING**

   The system should be fitted with a filling point at low level. Methods of filling and making up sealed systems are described in BS 5376:part 2:1976 Appendix A. Two methods of filling a sealed system are shown in Fig. 25.

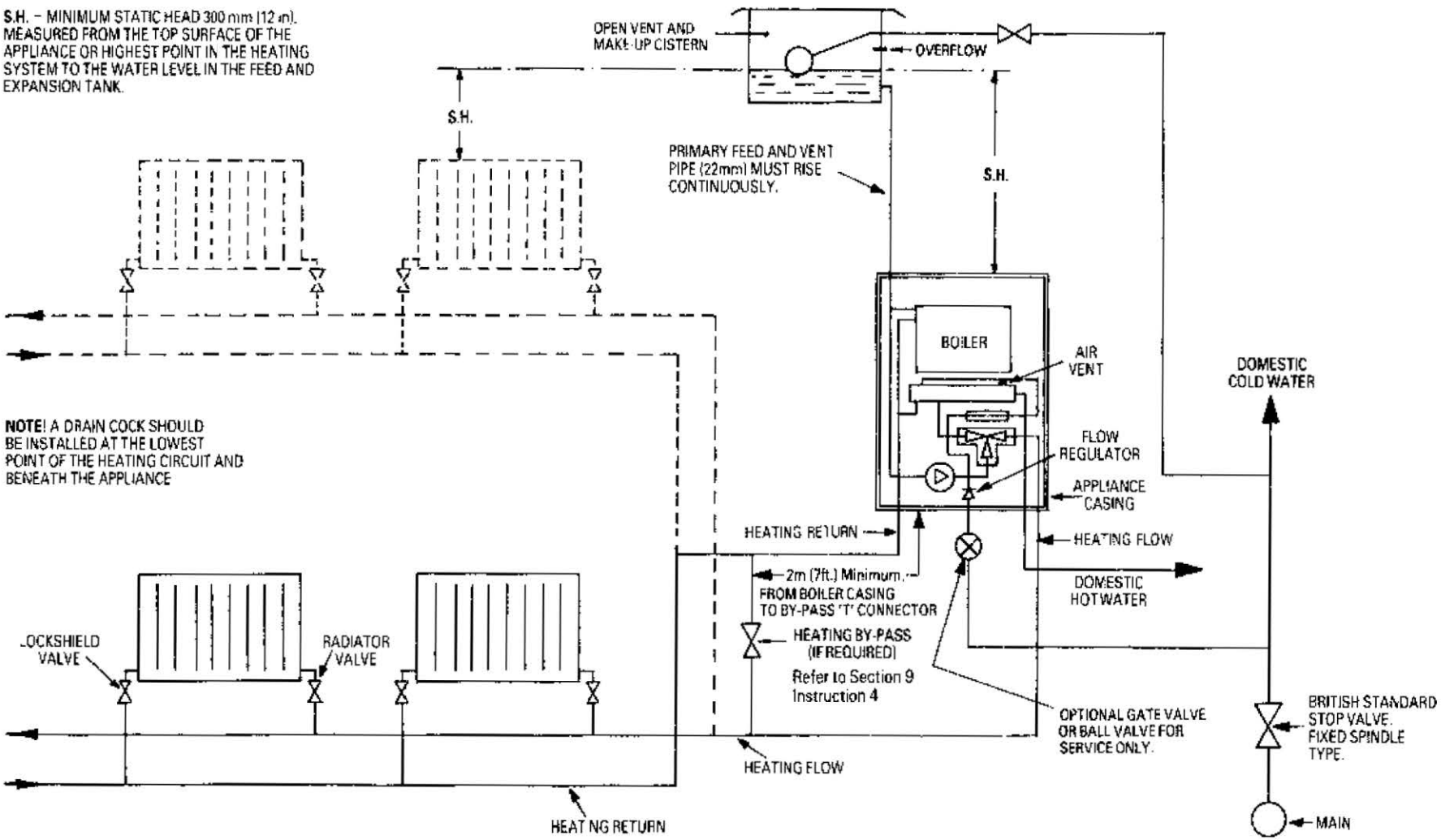


Fig. 24. System filling and make-up.

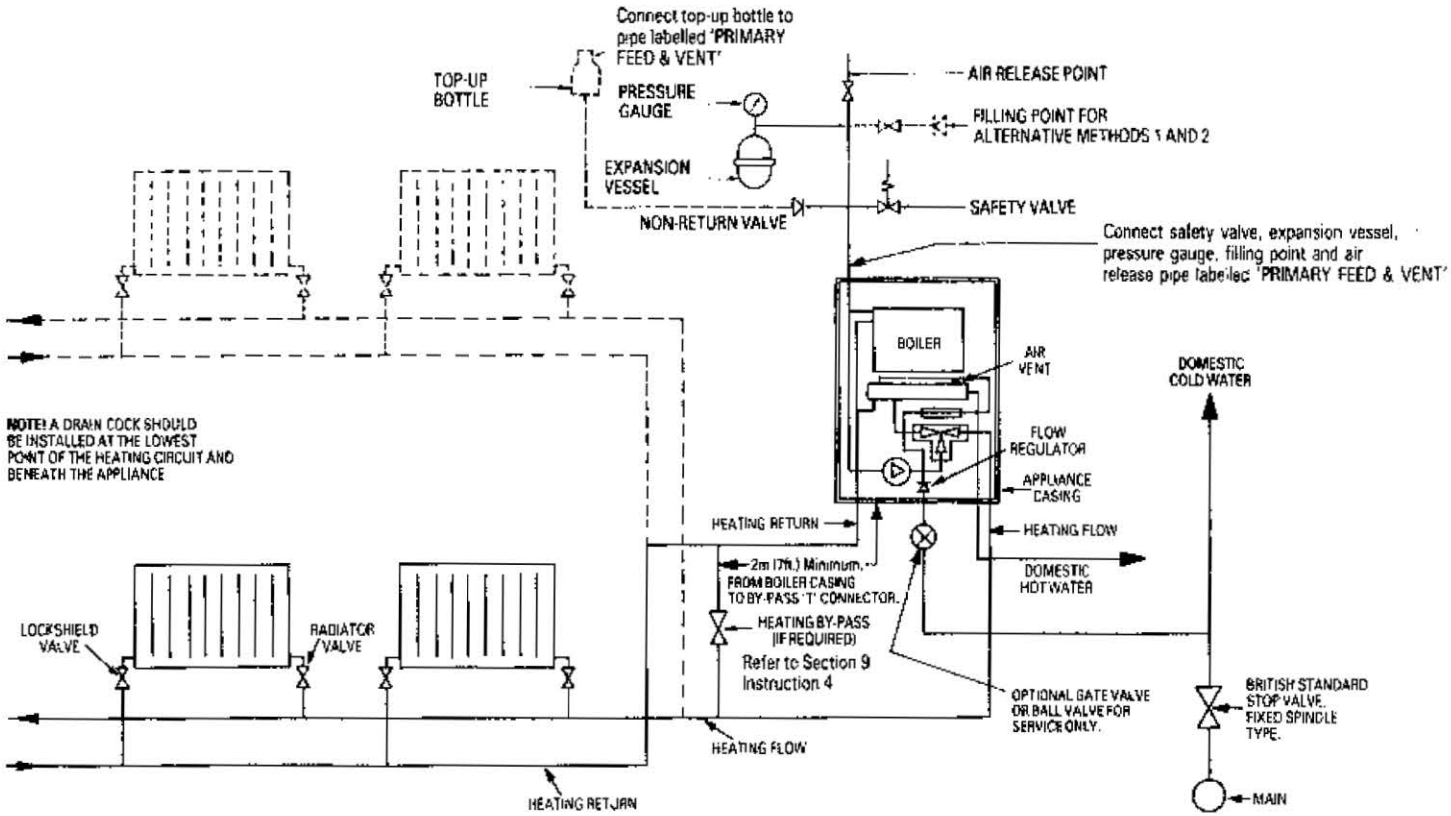
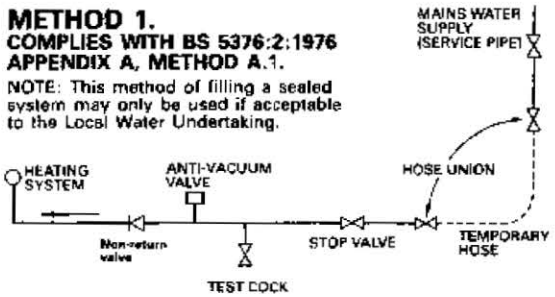


Fig. 25. Sealed primary water system.

Two methods of filling a sealed water system.

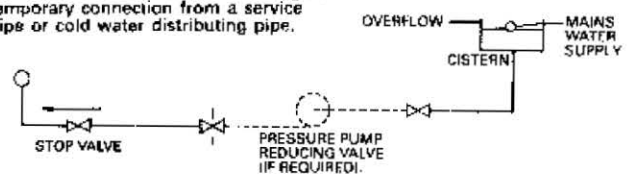
METHOD 1.
COMPLIES WITH BS 5376:2:1976 APPENDIX A, METHOD A.1.

NOTE: This method of filling a sealed system may only be used if acceptable to the Local Water Undertaking.



METHOD 2.
COMPLIES WITH BS 5376:2:1976 APPENDIX A, METHOD A.2.

NOTE: Cistern to be supplied through a temporary connection from a service pipe or cold water distributing pipe.



8. COMMISSIONING

(a) Flush the whole system with cold water and fill until the pressure gauge registers 1.5 bar (21.5 p.s.i.). Clear any air locks and check for water soundness.

(b) Check operation of the safety valve. Release water from the system until the initial system design pressure is obtained. Taking into account any difference in height between the pressure gauge and the point at which the pressure vessel is connected.

NOTE: The initial system design pressure to be 0.3 bar (4.5 p.s.i.) plus the static head of the system. Total pressure must not exceed 1.5 bar (21.5 p.s.i.).

(c) Light the boiler and heat the system to maximum working temperature. Check for water soundness. Turn off appliance and drain the system while it is still hot.

(d) Refill and vent system. Adjust to the initial system design pressure. Any set pointer on the pressure gauge should be set to coincide with the indicating pointer.

11. DOMESTIC WATER SUPPLY

See Fig. 24.

NOTE: The following instructions are general installation recommendations and reference should be made to the local water undertaking before fitting any of these appliances.

In the event of difficulty please contact the manufacturer.

1. MAINS COLD WATER INLET

Connection is made as shown in Fig. 24.

There should be no device capable of preventing the flow of expansion water unless separate arrangements for expansion water are made. The final 600 mm mains cold water connection to the appliance should be made in copper only.

The appliance is suitable for connection to a mains supply having a maximum pressure of 10 bar. (145 lb/in^2). It should not be used if a pressure greater than this is anticipated.

The appliance is supplied with an isolating valve. This should be fitted to the cold inlet connection for appliance servicing.

2. HOT SUPPLY AND FLOW REGULATION

No adjustment of the water flow is required as the appliance is fitted with a water flow regulator. The maximum flow of domestic hot water available through the appliance is limited to 8.5 ± 15% litres/min. (1.9 gallons/min.).

NOTE: The flow regulator contained within the flow regulator housing is plastic. Do not heat the housing during soldering operations on adjacent joints.

3. TAPS AND VALVES

Hot and cold taps and mixing valves used with this appliance must be suitable for operating at mains pressure.

4. SHOWERS (FIXED HEAD TYPE)

No anti-syphonage arrangements are necessary.

5. SHOWERS (LOOSE OR FLEXIBLE HEAD TYPE)

If a loose head shower with flexible hose is to be used over a bath, the hose must be fixed so that the head cannot fall closer than 13 mm (0.5 in.) above the top edge of the bath in order that the head is prevented from being immersed in bath water, or the shower must incorporate or be fitted with an anti-syphonage device at the point of flexible hose connections.

6. BIDETS

The supply of hot and cold mains water direct to a bidet is permitted provided that the bidet is of the over-rim flushing type. The outlet(s) should be shrouded and unable to have any temporary hand held spray attached. No anti-syphonage arrangements are necessary.

7. USE IN HARD WATER AREAS

As the maximum temperatures of the domestic hot water heat exchanger is limited by the electronic control circuit, there is normally no need for water treatment to prevent scale accumulation. In exceptional circumstances the 'Worcester In-Line Scale Inhibitor' can be fitted if desired. The unit is supplied complete with wall mounting bracket and installation instructions.

12. ELECTRICAL

See Figs. 26, 27, 28 and 29.

In order to gain access to the electrical terminal strip:

(a) Isolate the electrical supply. Remove the cabinet front cover by pulling forward at the bottom edge and unhook the panel from the side panel top edges.

(b) Remove the two self tapping screws holding the top of the facia to the top of the electrical tray.

(c) Remove the two self tapping screws from under the electrical tray which hold the front facia in position. Pull off the thermostat control knob and slide the facia forward. When the facia is disengaged from the electrical tray release the plug-in terminal strip from inside the electrical cover which connects the three position switch, or programmer assembly if this has been fitted.

If a room or frost thermostat is to be fitted, it should be wired into the appliance terminal strip as shown in Fig. 26. One or both of the blanking plugs should be removed from the electrical cover and the cable passed through the hole. A Heyco cord strain relief bush, packed separately with these instructions, should be used to retain the cables at this point. The cables should be routed neatly away from hot surfaces to a convenient exit point from the cabinet.

MAINS WIRING

LIVE – BROWN; NEUTRAL – BLUE; EARTH – YELLOW/GREEN.

ELECTRICITY SUPPLY

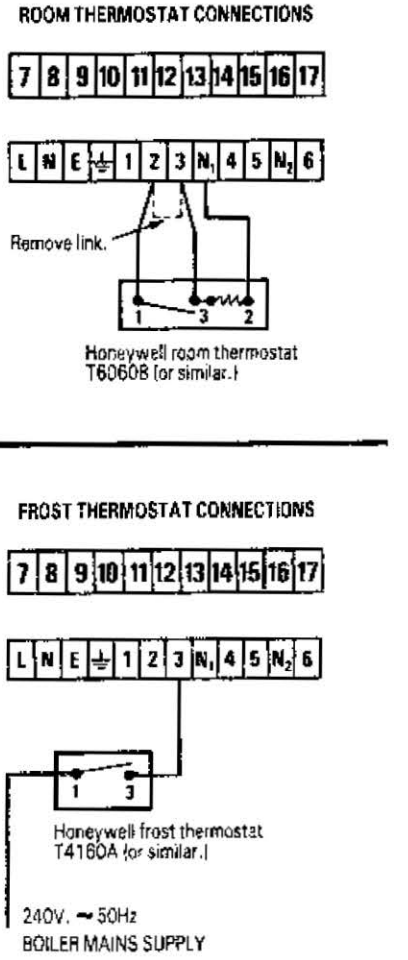
240V, ~ 50Hz via a 3 pin plug, fused at 3 Amps from an unswitched shuttered socket both complying with requirements of BS. 1363, adjacent to the appliance.

Mains Cable: Three core 0.75 mm^2 (24 x 0.20mm). Should the factory fitted mains cable need to be replaced then the new cable should be connected into the terminals marked on the left hand appliance terminal strip. The cable should then be passed through the cable clamp located in the left hand side of the electrical tray and clipped into the cable retaining clip fixed to the left hand side. Care should be taken that the cable is clipped neatly into place, and cannot contact the hot water pipes beneath the appliance. All external wiring shall comply with the current IEE Wiring Regulations, and any local regulations which apply. The appliance must be earthed.

SAFETY CHECK

In the event of an electrical fault after installation of the appliance, preliminary electrical system checks shall be carried out (i.e. earth continuity, polarity and resistance to earth, etc., as described in the British Gas Multimeter Handbook).

Fig. 26. Room thermostat and frost thermostat connections.



13. COMMISSION THE APPLIANCE

See Figs. 30 and 31.

1. **Primary Installation:** Before connecting the appliance to the primary system it must be flushed through with clean water.
2. **Gas Installation:** the whole of the gas installation including the meter shall be inspected and tested for soundness, and purged in accordance with the recommendations of BS 6891.
3. Check that the gas service cock is off and the electrical supply is off, turn the thermostat knob to maximum, do not fit the inner cover.
4. Open all radiator valves and fill the system venting as necessary. The appliance is fitted with a manual air vent on the outlet of the black heat exchanger. See Fig. 40. Check for water soundness.
5. Drain the heating system and boiler completely and refill the system venting as detailed in Instruction 4.
6. Position the User's Operating Switch to **OFF**. If a programmer is fitted, switch both hot water and heating selector switches to **OFF**. Switch the electrical supply off.
7. Test the pilot supply pipe for gas soundness and adjust the pilot flame.

(a) Ease the two pink wires from the terminals on the left hand side of the gas valve.

(b) Ensure Instruction 6 has been carried out.

(c) Turn on the gas at the gas service cock and reconnect the electricity supply.

(d) Position the users operating switch to **HEATING AND WATER** or if a programmer is fitted position the two programme selector switches to **24 hrs** setting. Turn the room thermostat to maximum.

NOTE:
(i) A continuous spark will occur until the pilot is alight and sensed by the electronic circuit.
(ii) The fan will run but the main burner will not light.

(e) Test for gas soundness at the joint between the pilot supply pipe tubing nut and the pilot bracket with leak detection fluid.

(f) Observe the pilot flame. It should be between 20 mm and 25 mm (0.75 in. and 1.0 in.) long and envelope the tip of the spark electrode.

(g) To adjust the length of the pilot flame, turn the pilot throttle screw on the gas valve. Clockwise to decrease and anti-clockwise to increase the length of the flame. See Fig. 30.

(h) Position the Users Operating Switch to **OFF** or if a programmer is fitted position the two programme selector switches to **OFF**. Disconnect the electrical supply at the mains.

(i) Reconnect the two pink wires to the terminals on the left hand side of the gas valve. Polarity is not important.

(j) Replace the boiler inner cover and ensure the gasket seal is correctly located. Fasten with the six M5 screws previously removed. Tighten the screws evenly and sufficiently to ensure there is no air leakage around the boiler inner cover.

8. Loosen the burner pressure test point screw one turn and connect a pressure gauge, See Fig. 30.
9. Position the Users Operating switch to **HEATING AND WATER**, or if a programmer is fitted, position selector switches to **24 hrs** setting. Turn the room thermostat, if fitted, to maximum.

   NOTE: The appliance is fully sequence controlled. In this mode of operation a continuous spark will occur until the pilot is alight and sensed by the electronic circuit. The main burner will then light automatically and smoothly. Check the pilot shape and size. Refer to item 7f and 7g for sizes and method of adjustment. If the pilot and burner will not light contact Worcester Heat Systems Service Dept.

   Test all joints and components for gas soundness using leak detection fluid.
10. Check that the circulating pump is operating correctly by the circulation of water around the heating system. Position the User's Operating Switch to **WATER ONLY** or if a programmer is fitted, position the central heating selector switch to **OFF**.

11.

(a) Turn on a hot water tap to maximum. Check that the gas pressure is between 15 and 16 m bar. (6.0 – 6.4 in.wg.). If this pressure is low check that the supply pressure to the gas valve is at least 19 m bar. (7.5 in. wg.).

(b) After a short warming up period the gas pressure will modulate and the water temperature remain constant. To check the minimum gas pressure it may be necessary to reduce the water flow at the tap if the water inlet temperature is low. The minimum gas pressure is between 3.0 and 3.5 m bar. (1.2 and 1.4 in. wg.).

NOTE: The hot water gas pressure adjustment is factory set, and, if after establishing the supply pressure it is not sufficient, Worcester Heat Systems Service Department should be contacted.

(c) A water flow restrictor is fitted within the appliance to limit flow rate to a nominal rate of 8.5 ± 15% litres/min. (1.8 gallons/min.).

(d) Using a suitable measuring device check the water flow rate.

(e) Turn off the hot water tap. The pump will continue running until the boiler has cooled to a pre-determined temperature. Any residual heat will be dissipated in the radiator circuit.

Fig. 27 Wiring Diagram

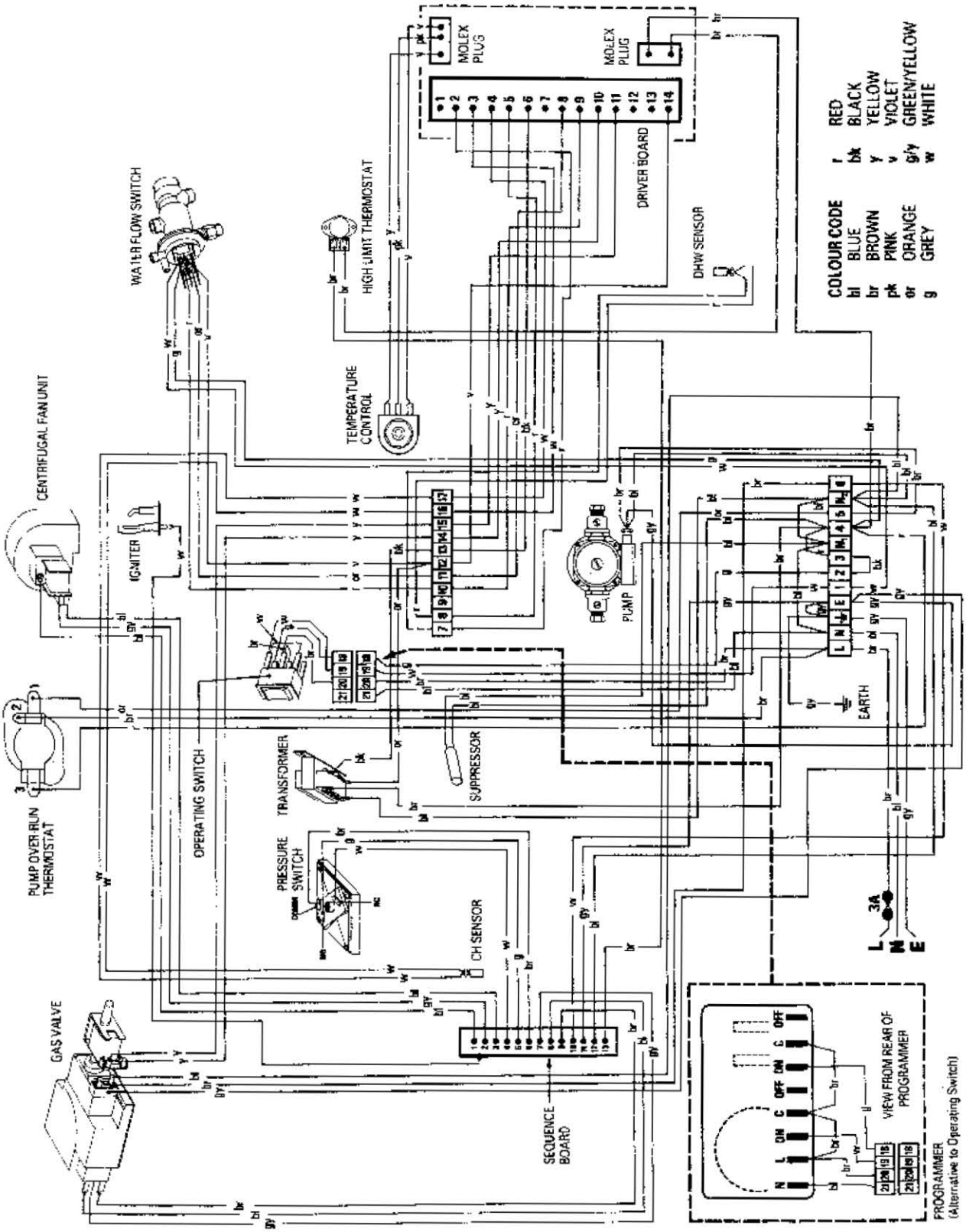


Fig. 28. Functional Flow Diagram – Hot Water Mode.

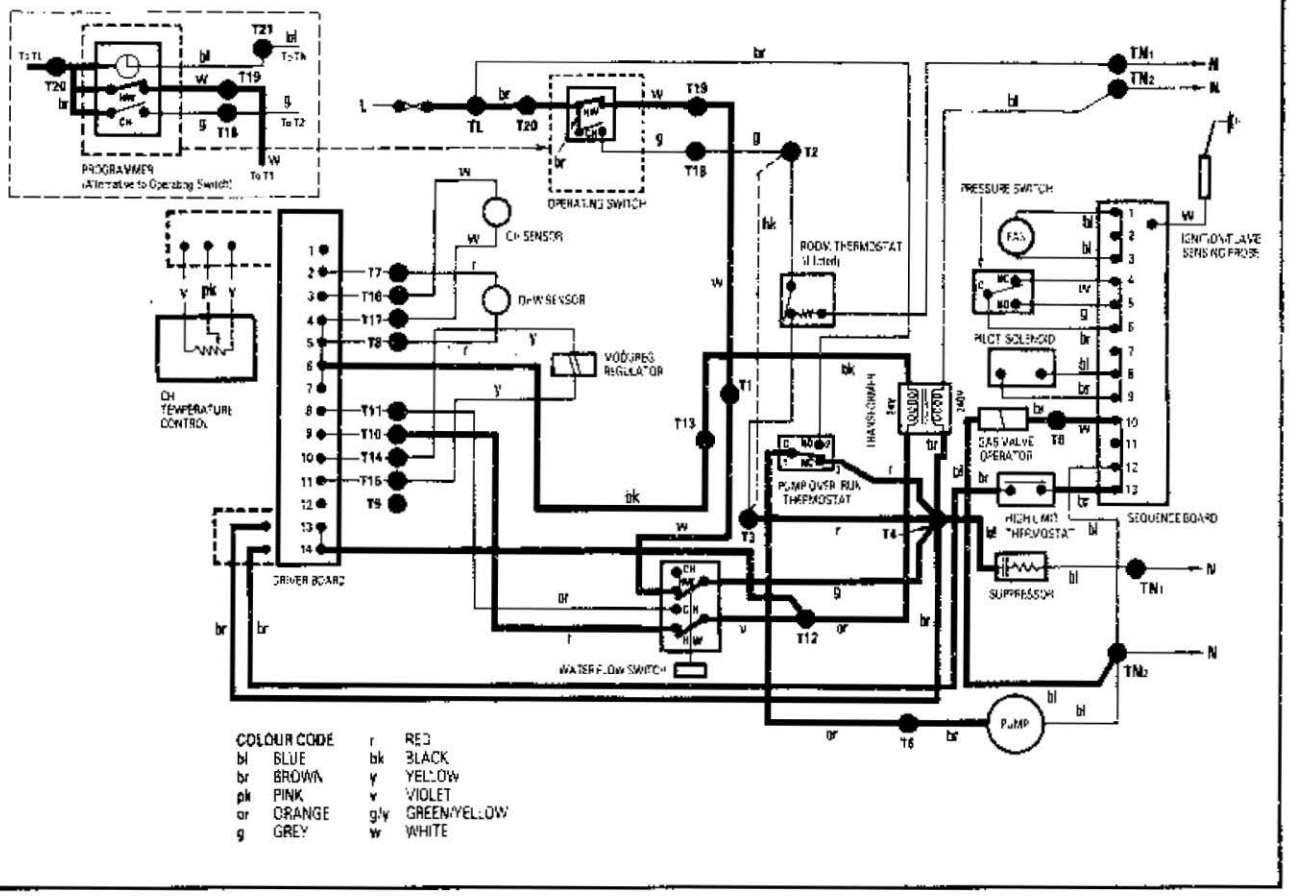


Fig. 29. Functional Flow Diagram – Central Heating Mode.

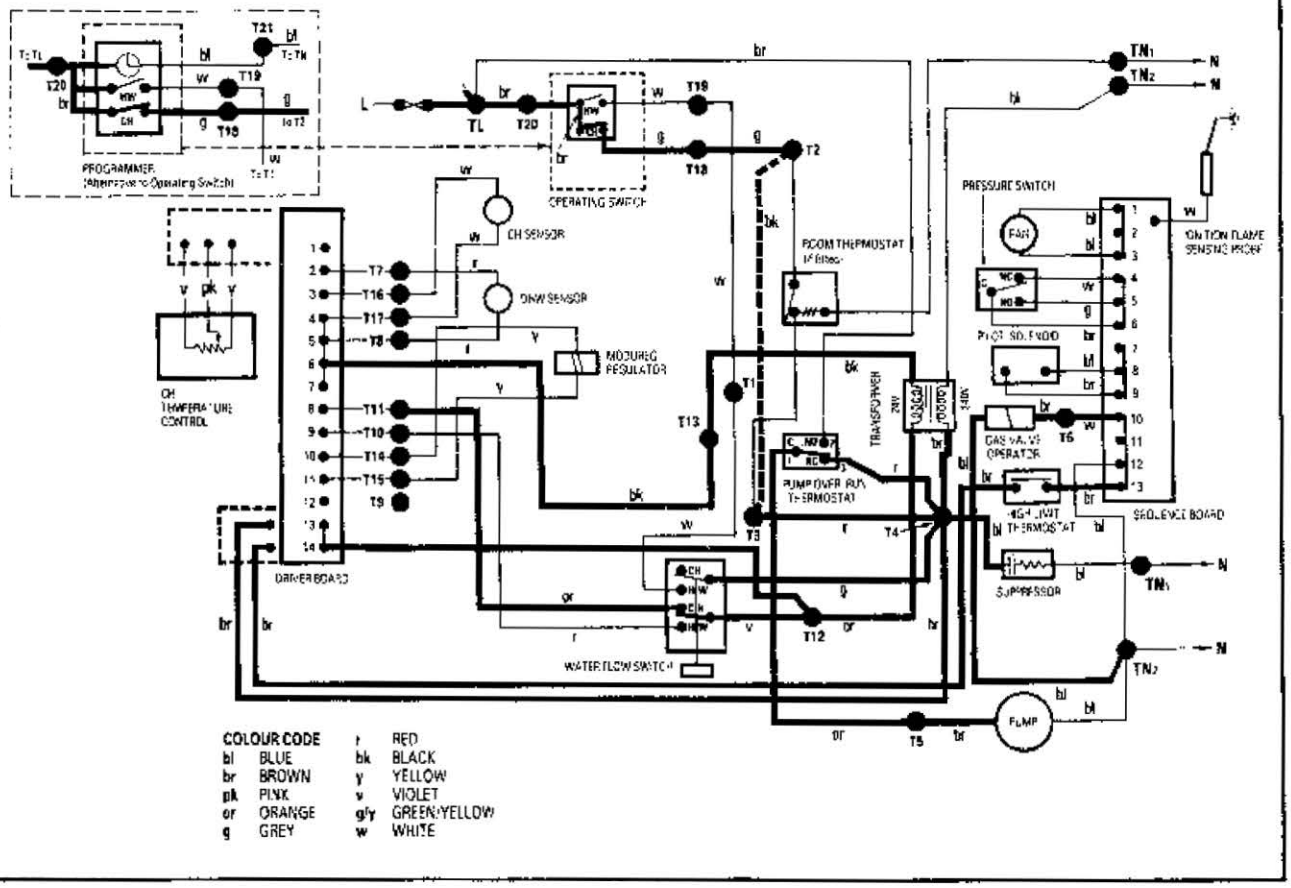


Fig. 30. Gas control valve.

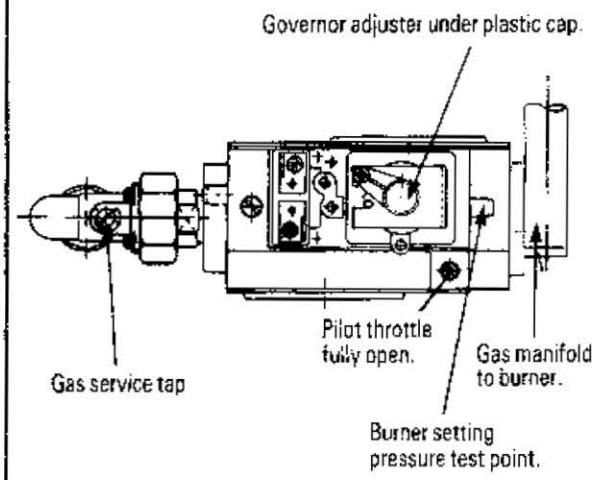
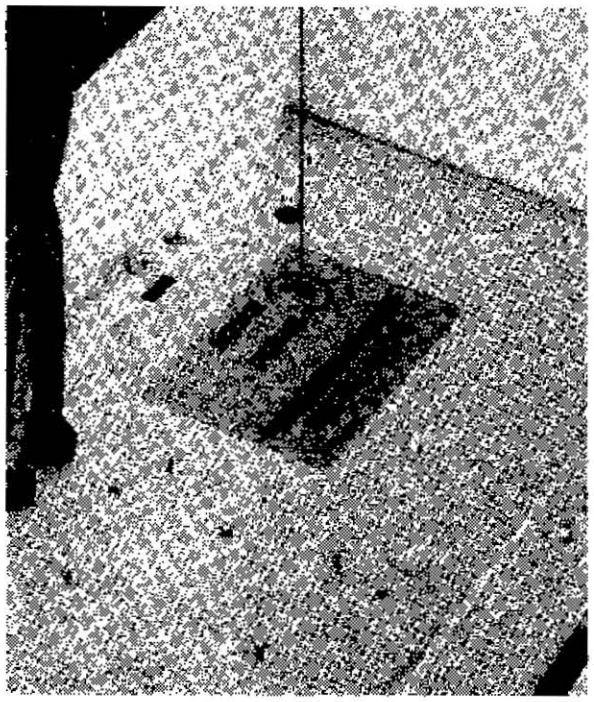


Fig. 31

Pressure adjustment



12. Position the Users Operating Switch to **HEATING AND WATER** or, if a programmer is fitted, reposition the central heating selector switch to **24 hrs**. Check that all the radiator valves are fully open and the boiler temperature control is at maximum. The boiler will modulate at the dictates of the central heating sensor initially operating at an output of 8.8 kW (30,000 Btu/h), see Table 1 for the equivalent burner pressure. The output will increase up to the factory set output of 15 kW (51,200 Btu/h), see Table 1 for the equivalent burner pressure. Balance the system as described in Section 9, instruction 4. It may be necessary to remove the two yellow leads from the gas to ensure that the valve does not modulate and maintains a fixed maximum burner pressure, for the purposes of balancing the system. If the heat load is in excess of 15 kW (51,200 Btu/h) then reset the controls to the maximum of 19 kW (64,800 Btu/h) by carefully rotating the adjustment potentiometer anti-clockwise. See Fig. 31. Access is gained to the adjustment point by lowering the electrical control panel.
13. Shut down all the radiators but one and observe the burner pressure fall in response to the lower output requirements. Open all the radiators and check that the burner pressure rises.
14. With the boiler operating in the central heating mode, ensure the room thermostat, if fitted, is set to maximum. Check the operation of the flame failure device and boiler thermostat.
(a) Turn the pilot throttle screw on the gas valve clockwise until fully closed. See Fig. 30.
(b) Observe through the viewing window the pilot and main burner to go out and continuous sparking from the spark electrode.
(c) Unscrew the pilot throttle screw two full turns. Observe the pilot to re-light and the main burner to re-ignite.
(d) Allow the central heating system time to warm up. Turn the thermostat knob towards the minimum setting and observe the main burner to go out. Turn the thermostat knob to maximum and repeat the operation.
15. Position the User Operating Switch to **OFF**, or if a programmer is fitted, switch to **OFF**. Disconnect the pressure gauge and retighten the test point screw. Test for gas soundness around screw.
16. Stick the arrow on the data badge in the space provided indicating the heat output and burner setting pressure.
17. Replace the electrical tray in reverse order (see Instruction 12). Position the Users Switch to **OFF** or, if a programmer is fitted, position the selector switches to **OFF**. Replace the white cabinet front cover.
18. Position the room thermostat if fitted to the desired setting.

14. USER'S INSTRUCTIONS

Hand the Users Instructions to the user or purchaser for retention and instruct in the efficient and safe operation of the appliance and heating/hot water system.

Advise the user or purchaser of the precautions necessary to prevent damage to the heating/hot water system and to the building in the event of the heating system remaining inoperative during frost conditions.

Inform the User of the system pressure on a sealed system installation and advise them not to operate the unit if a drop in pressure is observed on the pressure gauge indicating a loss of water from the system.

Finally advise the user or purchaser that for continued efficient and safe operation of the appliance it is important that adequate servicing is carried out at intervals recommended by the Local Gas Region.

Worcester Heat Systems Ltd. will be pleased to discuss and offer a comprehensive maintenance contract.

15. ROUTINE CLEANING AND INSPECTION

1. The following should be carried out at periods not exceeding one year.
(a) Carry out a pre-service check and note any operational faults.
(b) Clean the fan.
(c) Clean the burner.
(d) Clean the heat exchanger.
(e) Clean the burner and pilot injectors.
(f) Check the condition of the spark electrode
(g) Check the condition of the combustion chamber insulation.
(h) Check that the flue terminal is unobstructed and that the flue system, including the flue canopy assembly, is sealed correctly.
(i) If the appliance has been installed in a compartment, check that the ventilation areas are clear.

SOME OF THE SERVICING POINTS ARE COVERED MORE FULLY IN THE FOLLOWING INSTRUCTIONS.

2. PRE SERVICE CHECK

(a) Remove the cabinet front cover by pulling forward at the bottom edge and unhooking from the side panel top edge.

(b) Operate the appliance and system, noting any faults which may need to be corrected during the service.

WARNING: Disconnect the electrical supply at the mains before commencing any servicing. Turn off the gas at the gas service cock. After completing any service work always test for gas soundness and function of controls.

3. REMOVE BOILER INNER COVER, FAN, FLUE HOOD ASSEMBLY AND BURNER

(See Fig. 32.)

Remove boiler inner cover.

(a) Remove the six M5 screws holding the inner cover onto the boiler casing. Remove the cover.

Remove fan.

(b) Disconnect the electrical connection to the fan at the plug-in terminal strip fixed to the righthand side of boiler casing.

(c) Ease the flexible tube from the left-hand side of the fan housing.

(d) Remove the M5 screw holding the fan housing to the boiler casing.

(e) Slide the fan assembly out of the locations and clear of the boiler casing.

Remove the flue hood assembly.

(f) Unscrew the two M4 extension wing bolts securing the flue duct clamping ring to the flue duct housing and remove the extension wing bolts.

Fig. 32

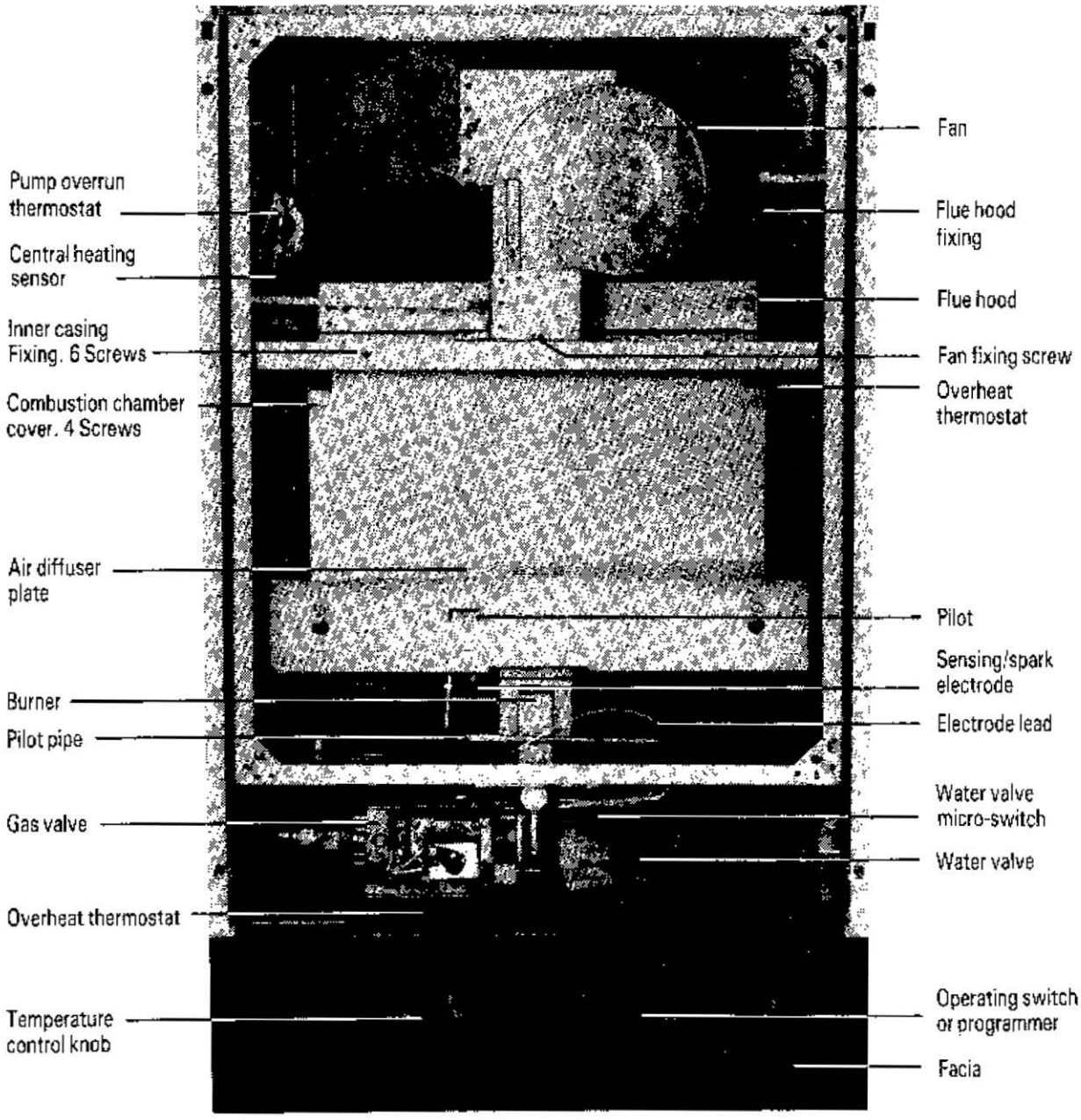


Fig. 33

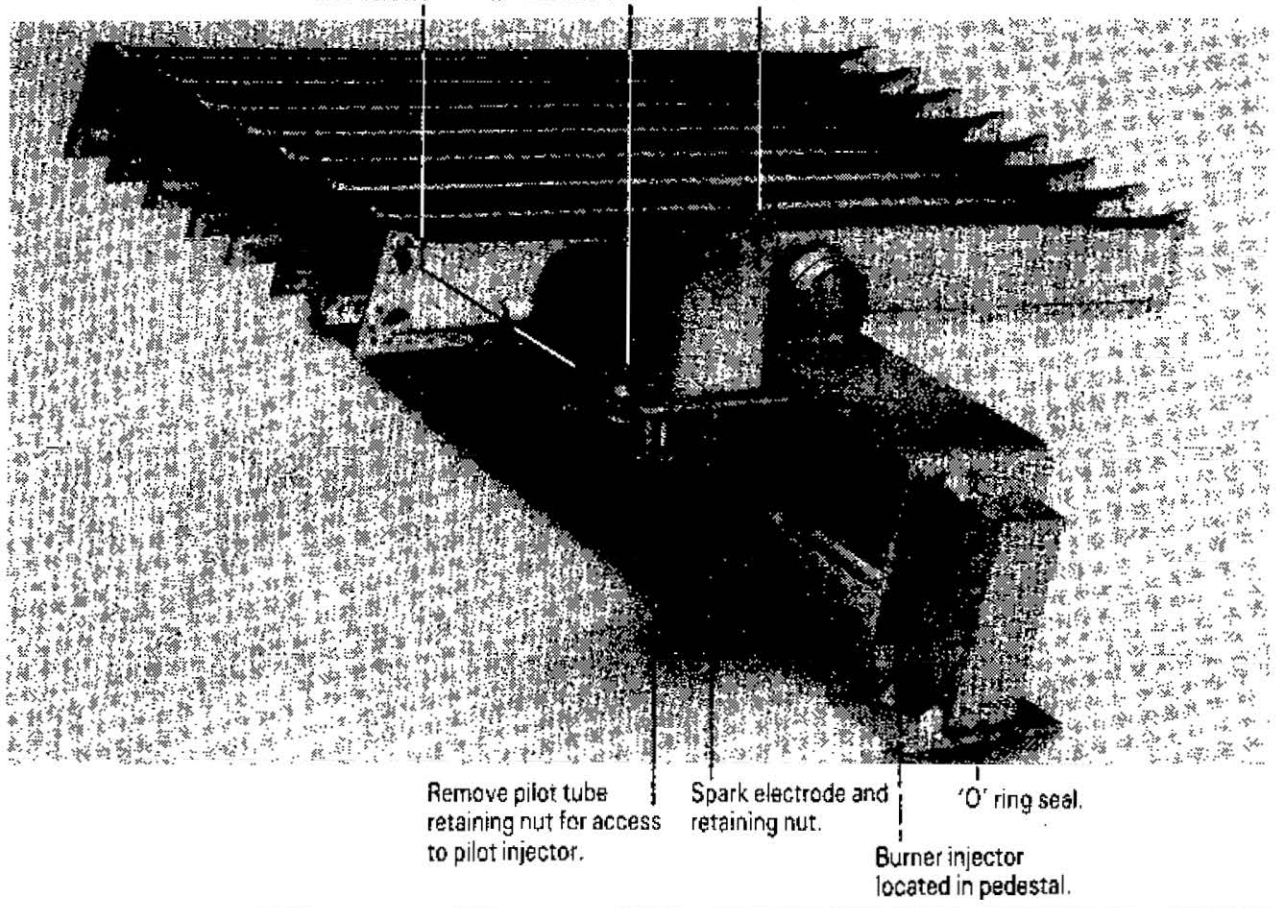
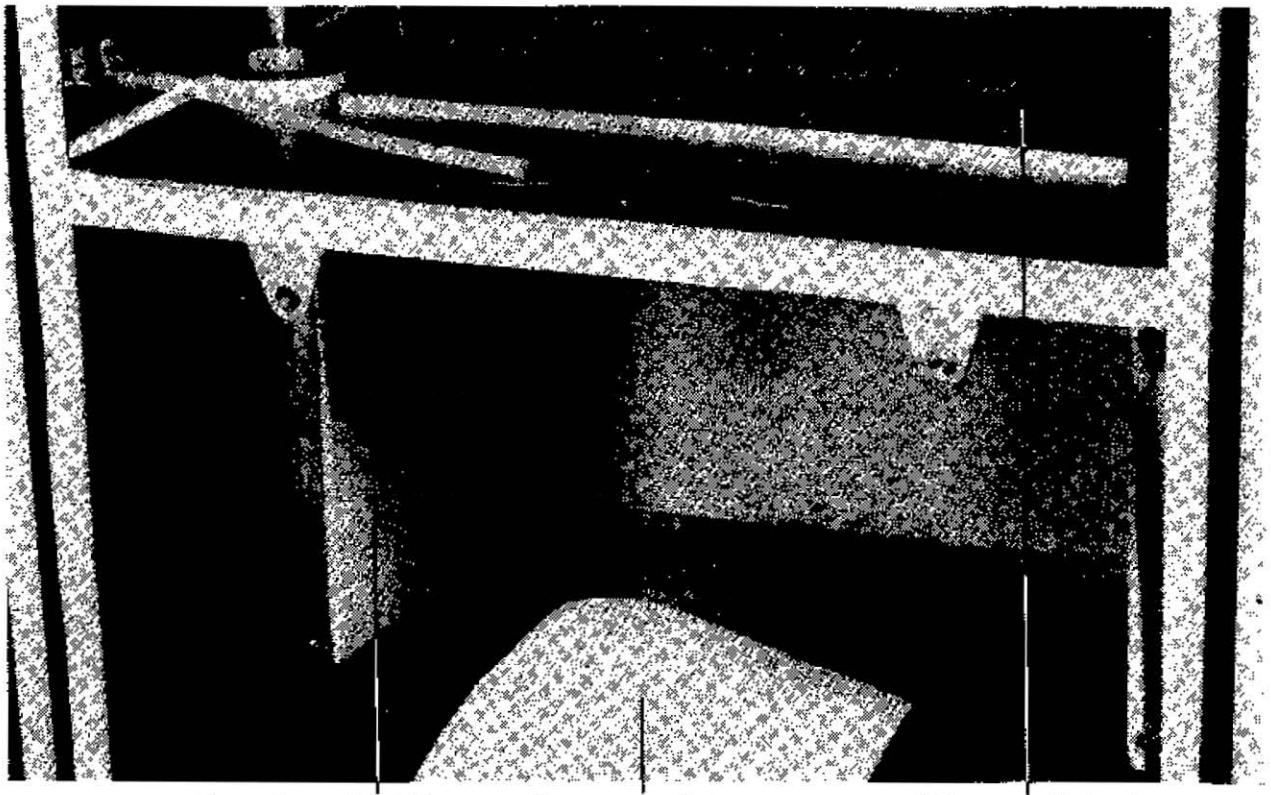

M4 screws.
M4 screws and nuts.
Pilot shield.
Remove pilot tube retaining nut for access to pilot injector.
Spark electrode and retaining nut.
'O' ring seal.
Burner injector located in pedestal.

Fig. 34


Do not damage insulation.
Cover open end of gas manifold and pilot supply pipe with cloth.
Using a suitable brush clean fins from above and below.

(g) Unscrew the two M4 wing nuts and washers, one from each side of the flue hood assembly.

(h) Ease the flue hood assembly off the heat exchanger and clear of the boiler casing.

Remove the burner.

(i) Slacken the two M5 screws locating the air guide to the combustion chamber. Using the keyholes, ease the air guide plate off the screws and out of the boiler casing.

(j) Remove the four M5 screws securing the front of the combustion chamber. Remove the front face of the combustion chamber.

(k) Unscrew the pilot tube retaining nut from the pilot bracket. Pull out the pilot supply pipe and remove the pilot injector.

(l) Pull the cable from the spark electrode.

(m) Remove the two M5 screws at the front of the burner holding the burner pedestal to the gas manifold.

(n) Slide the burner out of the rear locations and remove from boiler casing.

NOTE: An 'O' ring seal will be found in the burner foot which seals with the gas manifold flange. This should be removed and retained for assembly.

4. CLEANING THE FAN

Inspect the fan motor and fan impellor for cleanliness. Any accumulation of dust or fluff should be carefully removed using a soft brush or by blowing. No sharp instruments to be used which may damage the fan motor or fan wheel.

5. SERVICING THE BURNER

(See Fig. 33.)

(a) Brush the burner top and check the flame ports are clear. Any blockages may be removed using a suitable brush.

(b) Clean the pilot shield and pilot burner.

Remove the pilot shield by unscrewing the two M4 screws and nuts. Clean if necessary. Remove the pilot bracket and electrode by unscrewing the two M4 screws. Clean if necessary.

(c) Reassemble the pilot burner and electrode with the two M4 screws. Reassemble the pilot shield with the two M4 screws and nuts.

(d) Remove the burner injector. Clean any deposits from the injector and from the burner venturi using a suitable brush.

(e) Clean any deposits from the pilot injector by rinsing in warm water or using a suitable brush.

NOTE: Do not use a wire brush or any other implement likely to cause damage.

6. CLEANING THE HEAT EXCHANGER

(See Fig. 34.)

(a) Cover the open end of the gas manifold and the pilot supply pipe and controls contained in the lower part of the appliance.

(b) Using a suitable brush clean the heat exchanger fins from above and below.

NOTE: The insulation used on the inside surfaces of the combustion chamber is delicate. Great care should be taken when cleaning the heat exchanger not to abrade it. No attempt should be made to clean the insulation and the sections should be replaced if there is any visible deterioration whatsoever.

7. RE-ASSEMBLE

Reassemble the appliance in reverse order to the dismantling procedure.

(a) Refit the burner injector to the burner.

NOTE: Thread sealing compound shall not be used to seal the injector.

(b) Inspect the 'O' ring seal, if there is any sign of damage or deterioration it must be replaced.

(c) Refit the 'O' ring seal into the burner foot and replace the burner in position under the combustion chamber. Ensure the burner is fitted correctly in the rear location, the 'O' ring seal is not displaced and the pilot tubing is not damaged.

(d) Refit the two M5 screws holding the burner pedestal to the gas manifold.

(e) Reconnect the cable to the electrode.

(f) Refit the pilot injector and the pilot supply pipe to the pilot burner assembly making sure that the pilot injector is clean and not blocked. The spark electrode should be replaced if it shows signs of damage or erosion. (See Section 16, part 4 Replacement of Parts.)

(g) Replace the front face of the combustion chamber and hold it in position using the four M5 screws. Leave screws loose.

(h) Replace the air guide plate to the combustion chamber and tighten screws to secure air guide plate and combustion chamber.

(i) Inspect the flue hood assembly sealing gasket and replace if damaged. See Section 16, Replacement of Parts, Instruction 7.

(j) Replace the flue hood assembly positioning it centrally over the heat exchanger. Ensure the two extension bolts are located. Secure with the two M4 wing nuts and washers.

(k) Reassemble the flue duct clamping ring to the flue duct housing and secure with the two extension wing bolts. Ensure the extension wing bolts pass through the clearance holes in the flue duct housing and engage in the threaded holes in the flue duct clamping ring.

(l) Slide the fan assembly fully into the locations and secure in position with the M4 screw.

(m) Reconnect the flexible tube to the lefthand side of the fan housing and electrical connection to the plug-in terminal strip fixed to the right-hand side of the boiler casing.

(n) Inspect the flue terminal and flue terminal guard if fitted.

8. TEST THE PILOT SUPPLY PIPE FOR GAS SOUNDNESS

(a) Ease the two pink wires from the terminals on the lefthand side of the gas valve.

(b) Position the User's Operating Switch to **OFF** or, if a programmer is fitted position the two programme selector switches to **OFF**.

(c) Turn on the gas at the gas service cock and reconnect the electricity supply.

(d) Position the users operating switch to **HEATING AND WATER** or, if a programmer is fitted position the two programme selector switches to **24 hrs** setting, turn the room thermostat to maximum.

NOTE:

(i) A continuous spark will occur until the pilot is alight and sensed by the electronic circuit.

(ii) The fan will run but the main burner will not light.

(e) Test for gas soundness at the joint between the pilot supply pipe tubing nut and the pilot bracket with leak detection fluid.

(f) Position the Users Operating Switch to **OFF** or, if a programmer is fitted position the two programme selector switches to **OFF**. Disconnect the electrical supply at the mains.

(g) Reconnect the two pink wires to the terminals on the left hand side of the gas valve, polarity is not important.

(h) Inspect the boiler inner cover sealing gasket. If there is damage or deterioration replace the boiler front cover.

(i) Replace the boiler inner cover. Ensure the gasket seal is correctly located. Fasten with the six M5 screws previously removed. Tighten the screws evenly and sufficiently to ensure there is no air leakage around the boiler inner cover.

9. TEST APPLIANCE AND INSTALLATION

(a) Ensure that the gas is turned on at the gas service cock and reconnect the electricity supply.

(b) Ensure that the Users Operating Switch is **OFF** or, if a programmer is fitted, position the two programme selector switches to **OFF**.

(c) Loosen the burner pressure test point screw one turn and connect a pressure gauge.See Fig. 30.

(d) Position the Users Operating Switch to **HEATING AND WATER** or, if a programmer is fitted position the two programme selector switches to **24 hrs** setting. Turn the room thermostat to maximum.

(e) Check through the viewing window that the main burner ignites smoothly. With the main burner alight test for gas soundness using a suitable leak detection fluid.

NOTE: The appliance is fully sequence controlled. In this mode of operation a continuous spark will occur until the pilot is alight and sensed by the electronic circuit. The fan will run and the main burner will then light automatically.

(f) Check the operation of the boiler as described in Section 13 – Commissioning, Instruction 12.

(g) Turn on a domestic hot water tap to maximum. Check that the gas pressure is between 15 and 16 m bar (6 - 6.4 in. wg.). If not refer to fault finding chart.

(h) Position the controls to **OFF**. Disconnect the pressure gauge and retighten test point screw.

Test for gas soundness around screw.

(i) Make sure that there is no flammable material left inside the appliance casing, and that if the appliance is fitted in a cupboard, there is adequate ventilation.

(j) Refit the appliance front cover. Leave the appliance set to the customers requirements.

16. REPLACEMENT OF PARTS

For replacement of the following parts the cabinet front cover and boiler inner cover must be removed:

(a) Remove the cabinet front by pulling forward at the bottom edge and unhooking from the side panel top edges.

(b) Remove the six M5 screws holding the inner cover onto the boiler casing. Remove the inner cover.

WARNING

Disconnect the electrical supply at the mains and turn off the gas at the gas service cock before commencing any further work. After completing any replacement of parts always test for gas soundness and function of controls

1. TO REPLACE THE FAN

(See Fig. 32)

(a) Remove the fan as described in Section 15 Routine Cleaning and Inspection, parts 3b, c, d and e.

(b) Slide a new fan assembly fully into the locations and secure in position with the M4 screw.

(c) Reconnect the flexible tube to the lefthand side of the fan housing and electrical connection to the plug-in terminal strip.

2. TO REPLACE THE BURNER INJECTOR, 'O' RING SEAL OR BURNER

(See Fig. 33)

(a) Remove the burner as described in Section 15 Routine Cleaning and Inspection, parts 3i, j, k, l, m and n.

(b) Remove the burner injector from the burner pedestal. Replace with a new burner injector if necessary. Sealing compound must not be used on the thread.

(c) Remove the 'O' ring seal from the burner foot and inspect for damage. The 'O' ring seal must be replaced if there is any sign of damage or deterioration.

(d) Unscrew the M4 nut securing the rear support bracket to the burner.

(e) Remove the pilot shield by unscrewing the two M4 screws and nuts. Remove the pilot bracket with electrode by unscrewing the two M4 screws.

(f) Fit the rear support bracket to the replacement burner using the existing M4 nut.

(g) Reassemble the pilot bracket and pilot shield to the replacement burner using the existing M4 screw and nuts.

(h) Reassemble the burner as described in Section 15 Routine Cleaning and Inspection, Instruction 7.

3. TO REPLACE THE PILOT INJECTOR AND ADJUST THE PILOT

(See Fig. 35.)

(a) Unscrew the pilot tube retaining nut from the pilot bracket and ease the pilot supply pipe out of the pilot bracket.

(b) The pilot restrictor is a push fit inside the pilot bracket. Remove the restrictor and replace with a new one.

(c) Reconnect the pilot supply pipe.

(d) Turn the pilot gas throttle screw in the gas valve clockwise until fully closed then fully open the throttle by turning the screw anti-clockwise two full turns (See Fig. 30).

(e) The pilot flame should be between 20 and 25mm (0.75—1.0 in.) long and envelope the tip of the spark electrode. To adjust the length of the pilot flame turn the pilot gas throttle screw clockwise to decrease and anti-clockwise to increase the length of flame. (See fig. 30.)

(f) Check for gas soundness, as described in Section 15 Routine Cleaning And Inspection, Instruction 8.

4. TO REPLACE THE SPARK ELECTRODE

(See Fig. 35)

(a) Pull the cable off the spade connector on the spark electrode.

(b) Unscrew the retaining nut from the pilot bracket and remove the spark electrode.

(c) Fit a new spark electrode to the pilot bracket. Secure with the retaining nut and refit the cable. Check that the spark gap is between 3 and 4mm (0.12—0.16 in.).

5. TO REPLACE THE PILOT BRACKET AND PILOT SHIELD

(See Fig. 33)

(a) Remove the burner as described in Section 15 Routine Cleaning and Inspection, parts 3i, j, k, l, m and n.

(b) Unscrew the retaining nut from the pilot bracket and remove the spark electrode.

(c) Unscrew the two M4 screws and nuts securing the pilot shield to the pilot bracket.

(d) Unscrew the two M4 screws securing the pilot bracket to the burner. Remove the pilot shield and pilot bracket.

(e) Reassemble the original or new pilot shield to the pilot bracket using the original two M4 screws and nuts.

(f) Reassemble the original or new pilot bracket to the burner using the original two M4 screws.

(g) Reassemble the burner in the reverse order.

(h) Test for gas soundness at the joint between the pilot supply pipe tubing nut and pilot bracket as described in Section 15 Routine Cleaning and Inspection, Instruction 8.

(i) Check the pilot flame size as described in Section 16 Replacement of Parts, Instruction 3e.

6. TO REPLACE THE COMBUSTION CHAMBER INSULATION

(See Fig. 36)

(a) Remove the burner as described in Section 15 Routine Cleaning and Inspection, parts 3i, j, k, l, m and n.

(b) Unscrew two M4 wing nuts positioned one each side of the combustion chamber until they are at the start of the thread on the 'J' bolts.

(c) Push each 'J' bolt in an upwards direction until they clear the brackets on the inside of the boiler casing.

(d) Lower the combustion chamber assembly clear of the heat exchanger and ease out of the boiler casing.

NOTE: Take great care not to damage or pull on the heat exchanger.

(e) Remove the fibre insulation from the combustion chamber front section, rear section and side sections.

(f) Replace the fibre insulation. Ensure the hard side faces outwards towards the heat exchanger.

Fig. 35

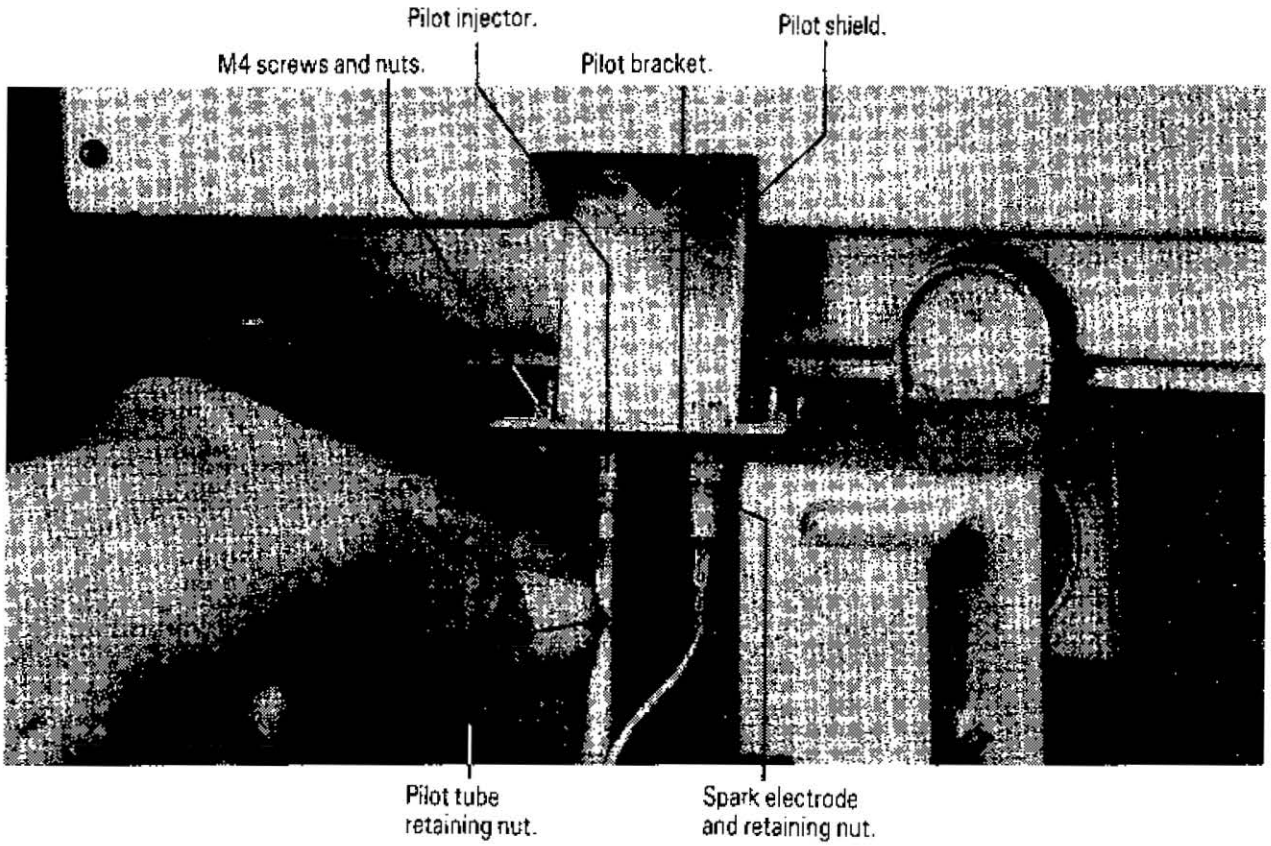
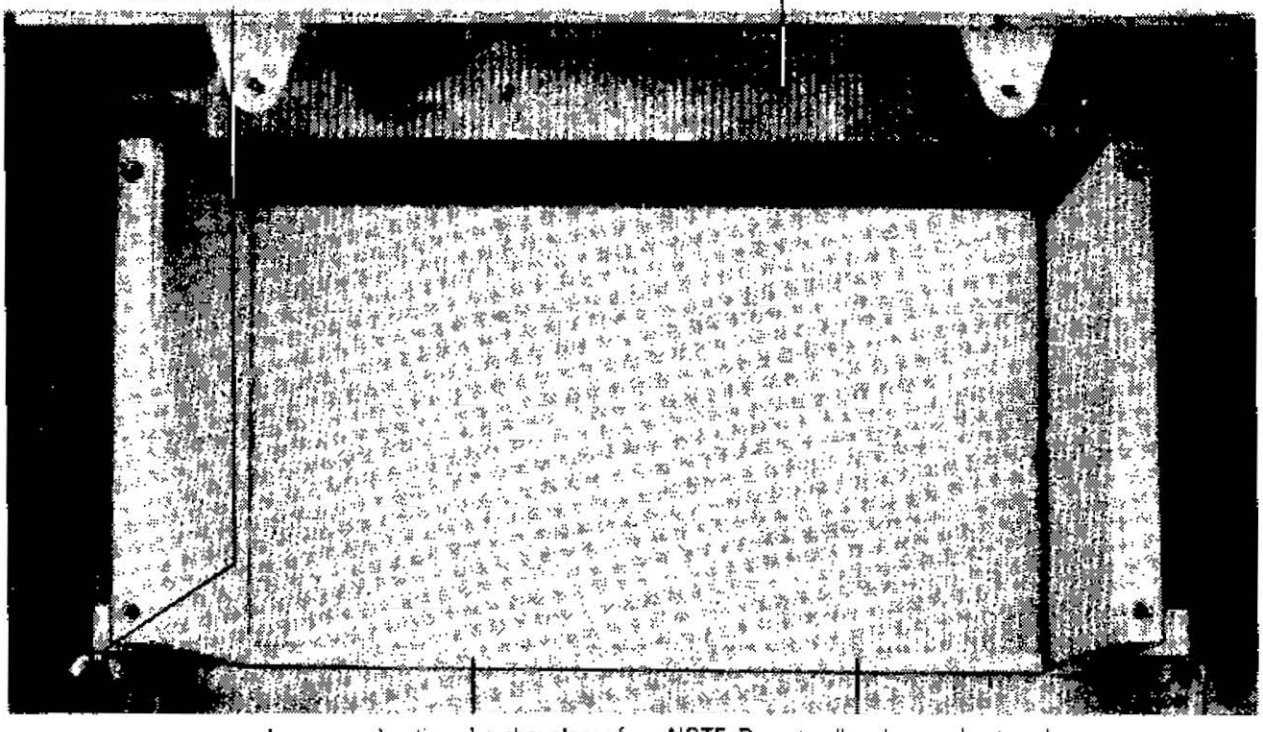


Fig. 36 Unscrew two M4 wing nuts from each side of combustion chamber.



Lower combustion chamber clear of heat exchanger and ease out of casing.

NOTE: Do not pull or damage heat exchanger. Remove fibre insulation from front, sides and rear sections.

(g) Ensure a 'J' bolt is located in the bracket on each side of the combustion chamber with the M4 washer and M4 wing nut at the start of the thread.

(h) Reassemble in the reverse order. Push each 'J' bolt in an upwards direction until they are located in the brackets on the inside of the boiler casing.

(i) Test for gas soundness at the joint between the pilot supply pipe tubing nut and pilot bracket as described in Section 15 Routine Cleaning and Inspection, Instruction 8.

For replacement of the following parts the electrical tray must be hinged downwards:

Unscrew the hexagon headed screw at the front inside edge of each side panel and ease the electrical tray forwards off the four ball studs locating it to the rear of the appliance. Allow the electrical tray to pivot vertically downwards supported by the two plastic stops.

7. TO REPLACE THE BOILER HEAT EXCHANGER

(See Fig. 37)

(a) Drain down the heating system and the appliance.

NOTE: A drain cock is fitted to the rear right hand side of the hot water heat exchanger. See Fig. 40.

(b) Remove the fan, flue hood assembly and burner as described in Section 15 Routine Cleaning and Inspection, parts 3b, c, d, e, f, g, h, i, j, k, l, m and n.

(c) Remove the combustion chamber as described in parts 8b and c.

(d) Unscrew the two flat face union connections securing the heat exchanger to the water flow manifold and return pipework.

(e) Ease the heat exchanger off the pipework and lower out of the boiler casing. Remove the fibre sealing washers if attached to the appliance pipework.

(f) Refit a new heat exchanger in the reverse order using new fibre sealing washers.

NOTE: The heat exchanger will only fit in one direction. The heat exchanger pipes are offset and the heat exchanger is installed with the smaller offset towards the base of the boiler.

(g) Open all radiator valves and fill the system venting as necessary. The appliance is fitted with a manual air vent on the outlet of the black hot water heat exchanger. See Fig. 40.

(h) Test for gas soundness at the joint between the pilot supply pipe tubing nut and pilot bracket as described in Section 15 Routine Cleaning and Inspection, Instruction 8. Check the pilot flame size as described in Section 16 Replacement of Parts, Instruction 3e.

(i) Inspect the boiler front cover sealing gasket. If there is any damage or deterioration replace the inner cover.

(j) Replace the boiler inner cover as described in Section 15 Routine Cleaning and Inspection, Instruction 8(i).

8. TO REPLACE THE GAS VALVE

(See Fig. 38.)

(a) Disconnect the pilot supply pipe and the gas service cock at the union fitting.

(b) Pull off the two yellow wires connected to the gas valve terminals. Undo the fixing screw securing the electrical cover aside. Disconnect the leads at the push-on terminals. Unscrew the earth connection.

(c) Remove the four M5 screws attaching the gas valve to the gas manifold and ease the valve out of the appliance sufficiently to allow access to the rear. Do not lose the sealing washer.

(d) Undo the fixing screw securing the rear electrical cover and ease the electrical cover backwards. Disconnect the push-on terminals. Unscrew the earth terminal and remove the gas valve.

(e) Remove the gas service cock union tail and nut and fit to the replacement gas valve using a suitable sealing compound on the threads.

(f) Reassemble the gas valve in the reverse order taking care to replace the sealing washer between the gas valve and manifold. The two yellow wires should be connected to the green modureg coil on the gas valve in any order. Check that the correct mains connections to the solenoid operators have been made. Refer to the wiring diagram, Fig. 27.

(g) Turn on the gas at the gas service cock. Turn on the electrical supply.

Fig. 37

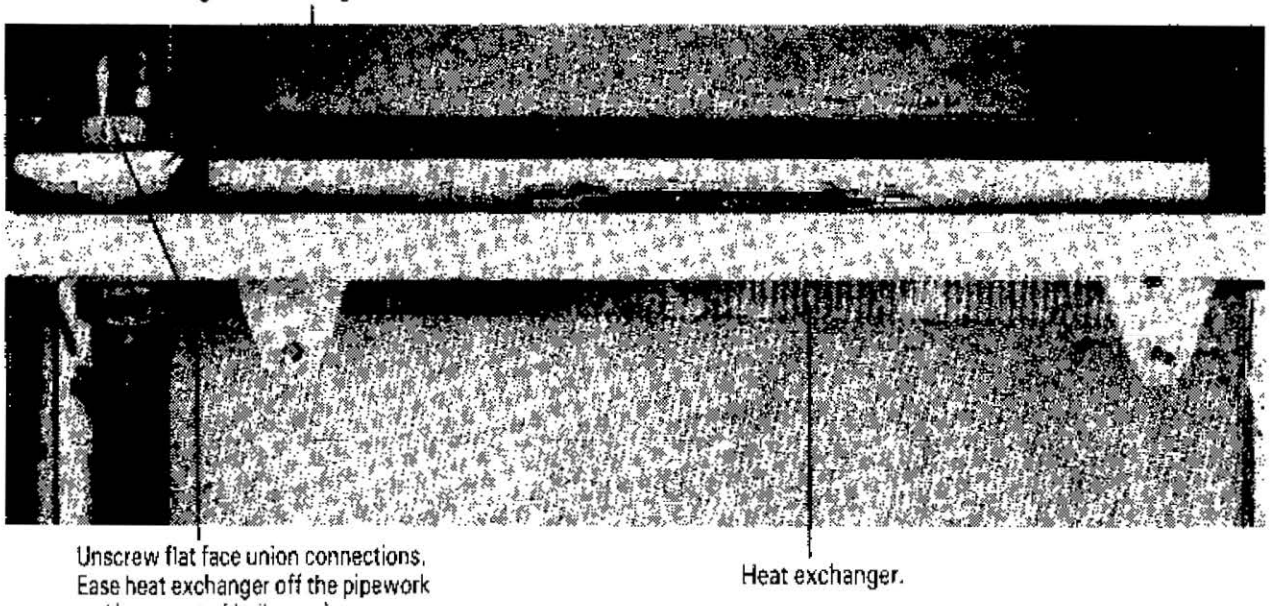
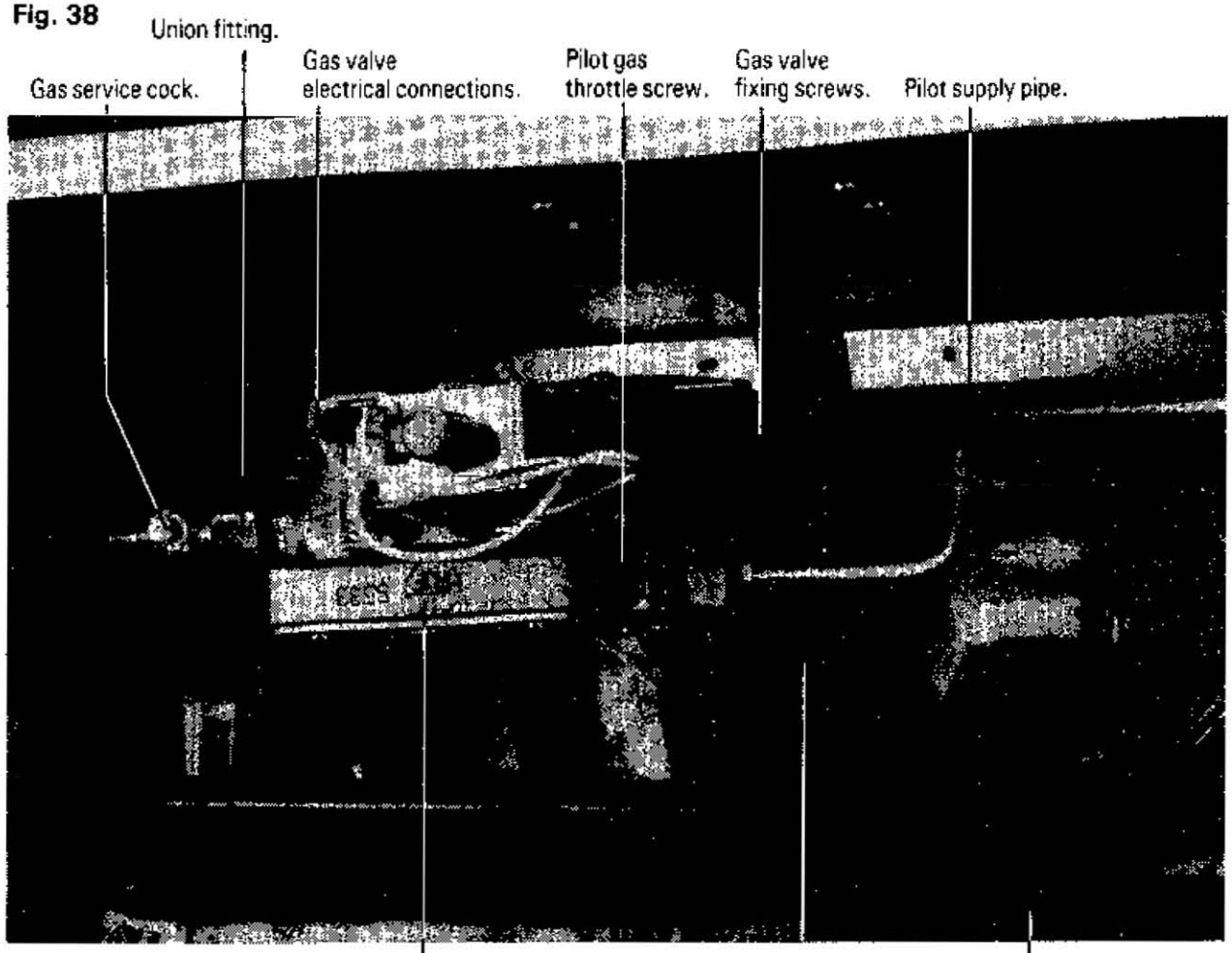


Fig. 38



(h) Test for gas soundness and correct operation of the gas valve as described in Section 15 Routine Cleaning and Inspection, parts 9a, b, c, d, e, f, g and h.

9. TO REPLACE THE PILOT FILTER

If problems are experienced with the pilot filter then fit a new gas valve as described in Instruction 8 preceding.

10. TO REPLACE THE HOT WATER FLOW SENSOR

(See Fig. 39.)

(a) Turn off the mains cold water supply at the service cock.

(b) Pull off the two red wires from the flow sensor terminals and unscrew the flow sensor from the fitting.

(c) Refit a new sensor. Reconnect the two red wires in any order.

11. TO REPLACE THE HOT WATER HEAT EXCHANGER

(See Figs. 39 and 40).

(a) Turn off the mains cold water supply and drain down the domestic and heating water systems.

NOTE: A drain cock is fitted to the rear right hand side of the hot water heat exchanger. See Fig. 40.

(b) Release the two connections made on to the water diverting valve from the black cylindrical heat exchanger. See Fig. 40.

(c) Pull off the two red connections made on to the flow sensor. See Fig. 39.

(d) Unscrew the 15 mm compression fitting nut securing the hot water outlet connection.

(e) Unscrew the 22 mm compression fitting securing the boiler return connection into the left hand rear of the heat exchanger.

(f) Remove the three M4 taptite screws holding the heat exchanger to the side brackets.

(g) Remove the heat exchanger from the appliance and unscrew the flow sensor from the fitting.

(h) Refit the flow sensor to the replacement heat exchanger.

(i) Replace the heat exchanger in the reverse order using new sealing washers on the two connections made onto the water diverting valve.

(j) Open all radiator valves and fill the system venting as necessary. The appliance is fitted with a manual air vent on the outlet of the black heat exchanger. See Fig. 40.

12. TO REPLACE THE WATER DIVERTING VALVE

(Figs. 39 and 41.)

(a) Rotate the body of the micro-switch assembly around until access is gained to the retaining cir-clip at the opposite end to the cord strain relief.

(b) Using a pair of fine nosed pliers, pull the cir-clip off and remove the micro-switch assembly from the valve.

(c) Drain down the heating and domestic water systems. Remove the hot water heat exchanger described in Part 11, a, b, c, d, e, f and g.

(d) Undo the remaining water connections to the diverting valve and remove complete with the fibre sealing washers.

(e) Reassemble a new valve in the reverse order replacing the fibre washers between each connection. No other sealing compound should be used.

(f) Open all radiator valves and fill the system venting as necessary. The appliance is fitted with a manual air vent on the outlet of the black heat exchanger. See Fig. 40.

13. TO REPLACE THE FLOW REGULATOR

(Figs. 40 and 41.)

(a) Turn off the mains cold water supply at the service cock. Unscrew the flow regulator housing union nut.

(b) Ease the cold water connection aside and remove the sealing washer, wire filter and plastic flow regulator from the housing. If this is prevented because the pipework is fixed:

(i) Turn off the mains cold water supply to the dwelling.
(ii) Unscrew the flow regulator housing union nut and 15 mm compression fitting at the service cock.
(iii) Ease the assembly away from the pipework and remove the sealing washer wire filter and plastic flow regulator from the housing.

(c) Fit a replacement flow regulator. Clean the wire filter and reassemble in reverse order replacing the fibre sealing washer. No other sealing compound should be used.

14. TO REPLACE THE CIRCULATING PUMP

(Fig. 38.)

(a) Remove the four No. 6 self tapping screws holding the service cover into the base of the electrical tray.

(b) Turn off the isolating valves mounted on the inlet and outlet of the pump.

(c) Hinge the electrical tray up and clip back into place. Secure the electrical tray to one of the side panels with the original M5 hexagon headed screw located on the front inside edge of the side panel.

(d) Undo the two union nuts and remove the pump from between the pipework.

(e) Supporting the pump so as not to strain the electrical cable, remove the electrical cover and disconnect the electrical wires. Take note of the wire positions.

(f) Install a replacement circulating pump with new sealing washers in reverse order.

NOTE: The direction of flow on the circulating pump should point from left to right. The replacement pump if fitted with speed adjustment should be set at maximum speed.

15. TO REPLACE THE WATER DIVERTING VALVE MICRO-SWITCH ASSEMBLY

(Figs. 39 and 41)

(a) Rotate the body of the micro-switch assembly around until access is gained to the retaining cir-clip at the opposite end to the cord strain relief.

(b) Using a pair of fine nosed pliers pull the cir-clip off and remove the micro-switch assembly from the valve.

(c) Hinge the electrical tray up and temporarily clip back into position. To ensure the electrical tray does not drop, replace one of the M5 hexagon headed screws to the front inside edge of one side panel and screw finger tight.

(d) Remove the thermostat knob by grasping firmly and pulling forward off the thermostat spindle.

(e) Remove the two self tapping screws from the top edge of the facia and two self-tapping screws from under the electrical tray, recessed in two clearance holes, which hold the front facia in position.

(f) Pull the facia forward to disengage it from the electrical tray. Then, supporting the facia, release the plug-in terminal strip from inside the electrical cover which connects the 3-position switch or programmer assembly if this has been fitted. Unplug the Molex connector at the driver board.

(g) Disconnect the grey, white, red, orange and violet wires of the micro-switch assembly wiring harness from terminals 4, 1, 10, 11 and 12 respectively.

(h) Remove from the micro-switch assembly wiring harness the cable tie and the "Heyco" cord strain relief bush restraining it to the rear of the electrical panel. Withdraw the harness.

(i) Reassemble in the reverse order with a new switch and harness assembly.

16. TO REPLACE THE PUMP OVERRUN THERMOSTAT

(Fig. 42.)

Check that the electrical supply has been turned OFF.

(a) Remove the electrical connections to the thermostat making careful note of their position.

(b) Unscrew the two M4 screws securing the thermostat to its mounting plate.

(c) Fit the new thermostat and reconnect the electrical leads, referring to the wiring diagram Fig. 27.

17. TO REPLACE THE OVERHEAT THERMOSTAT

(Fig. 43.)

Check that the electricity supply has been turned OFF.

(a) Remove the inner casing and the right hand cabinet side panel as described in Section 8—Installation, Instructions 11a and 11b.

(b) Remove the sealing cover on the right hand side of the boiler casing held in position with two M5 screws, accessible from inside the boiler casing.

(c) Remove the split pin from the pocket located on the heat exchanger at the right hand side and remove the thermostat phial.

(d) Raise the electrical tray and temporarily secure it in position by replacing one M5 hexagon head screw to the front inside edge of the left hand side panel.

(e) Remove the facia assembly by following Instruction 15 d, e and f.

(f) Remove the central clamping nut. Push the thermostat back to disengage the spindle and ease away from the support bracket sufficiently to gain access to the electrical connections.

(g) Pull off the electrical connections from the thermostat.

(h) To withdraw the thermostat carefully thread the capillary through the hole in the rear of the electrical cover.

(i) Fit a new thermostat in the reverse order.

For replacement of the following parts the electrical tray must be hinged downwards: Unscrew the hexagon headed screw at the front inside edge of each side panel. Hinge the electrical tray down a small amount until it can slide forward on it's two hooks. Slide the tray forward to the front of each hook then allow the electrical tray to pivot vertically downwards supported by the two hooks.

The facia assembly may then be removed by following instructions 15 d, e and f.

18. TO REPLACE THE FAN PRESSURE SWITCH

(Fig. 44.)

(a) Pull off the two flexible tubes from the bottom of the pressure switch.

(b) Pull off the three electrical connections from the front of the pressure switch.

(c) Remove two M4 screws holding the pressure switch to the electrical cover and remove the switch.

(d) Replace the new fan pressure switch in the reverse order and ensure:

i) The three electrical connections are made to the following terminals marked on the pressure switch: 1NC white, 2NO grey and PCOM brown.
ii) The flexible tube ends are marked + and − and must be connected to the correct pressure points on the pressure switch. The − pressure point is near the front and the + pressure point is near the back.

Fig. 39

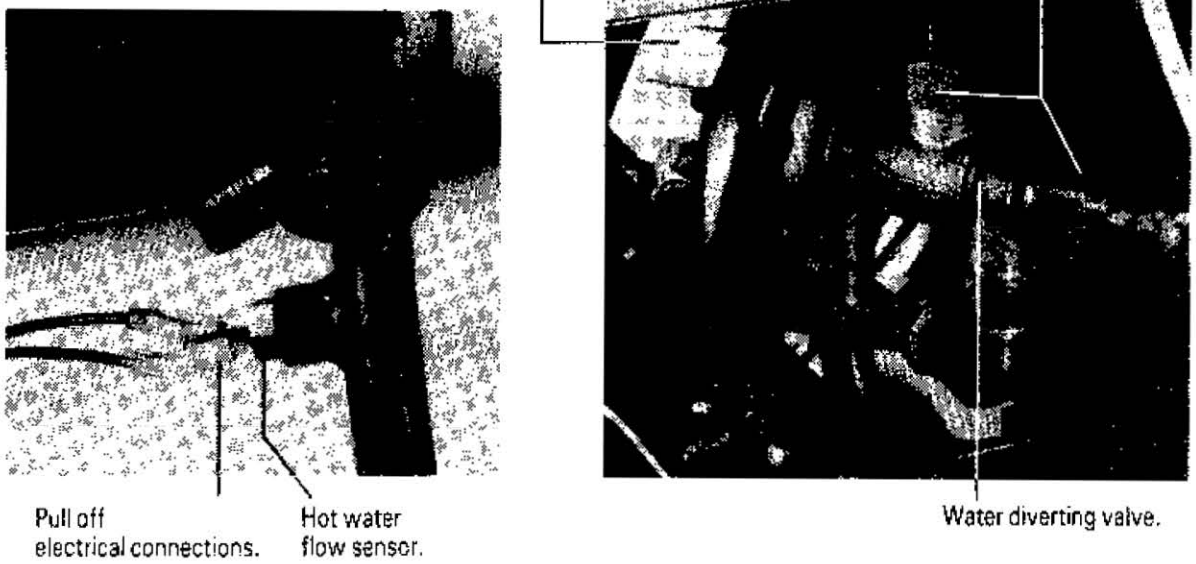

Remove hot water heat exchanger.
Unscrew remaining water connections
to the diverter valve.
To facilitate removal of circlip
rotate body of micro-switch assembly.
Pull off
electrical connections.
Hot water
flow sensor.
Water diverting valve.

Fig. 40

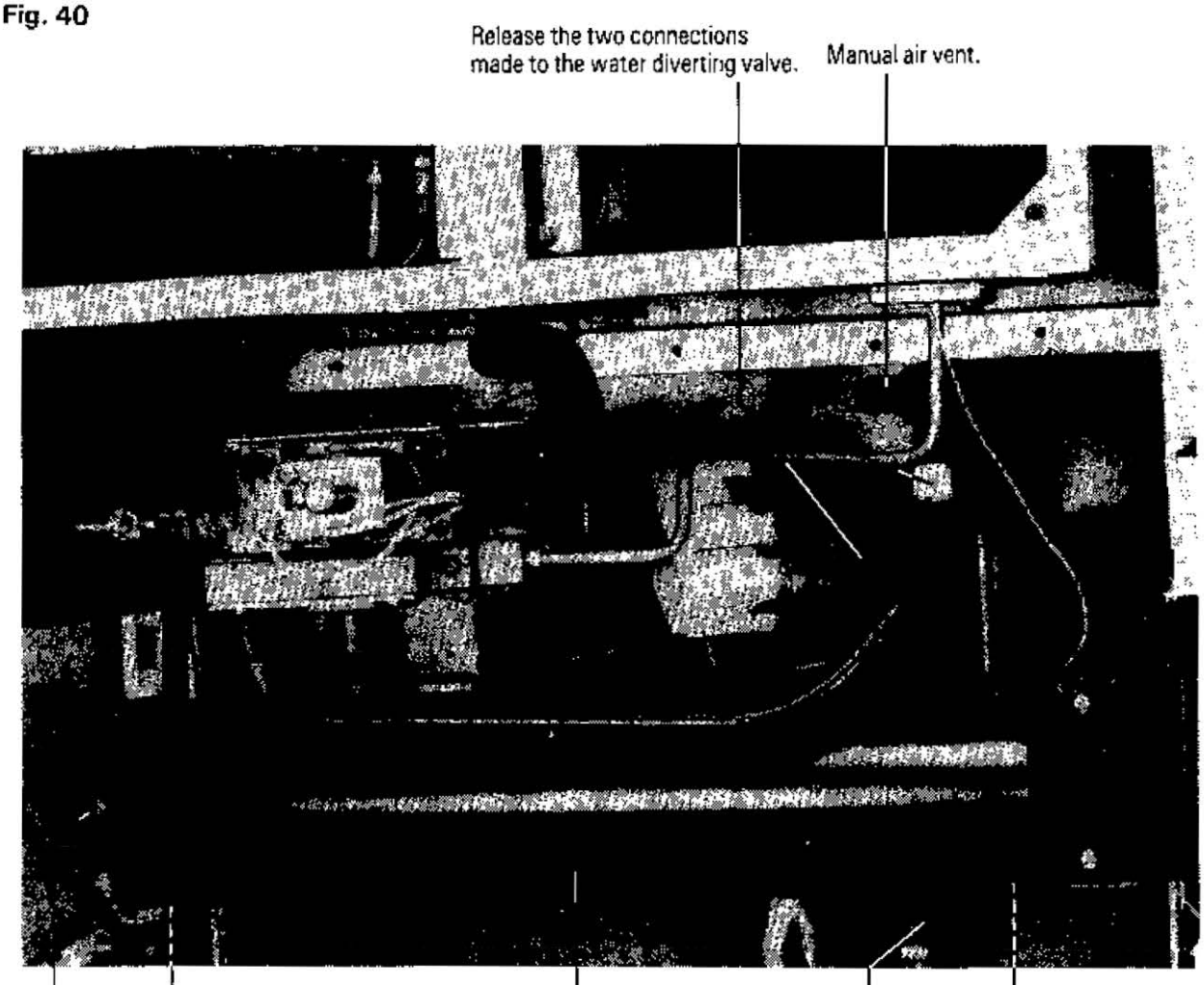

Release the two connections
made to the water diverting valve.
Manual air vent.
Unscrew 22mm Compression fitting at rear.
Remove four retaining screws.
Hot water heat exchanger.
For access to flow regulator
and water filter unscrew the
flow regulator housing union nut.
Drain point on underside of
hot water heat exchanger.

Fig. 41

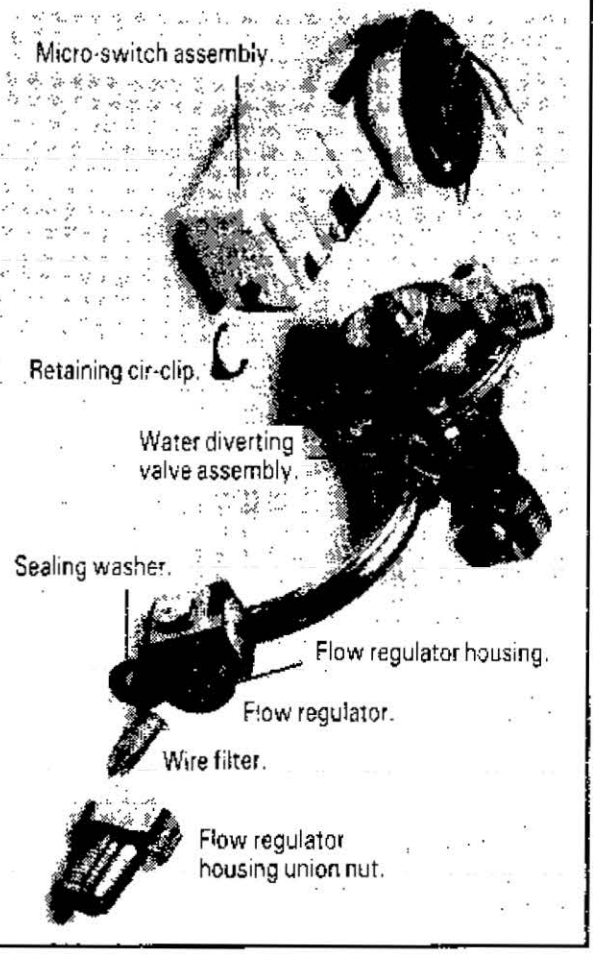


Fig. 42

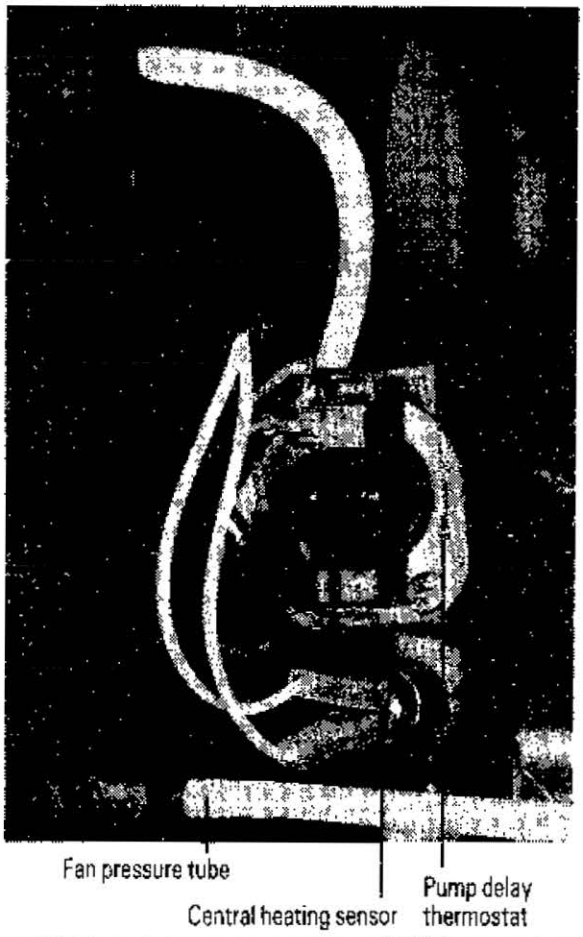
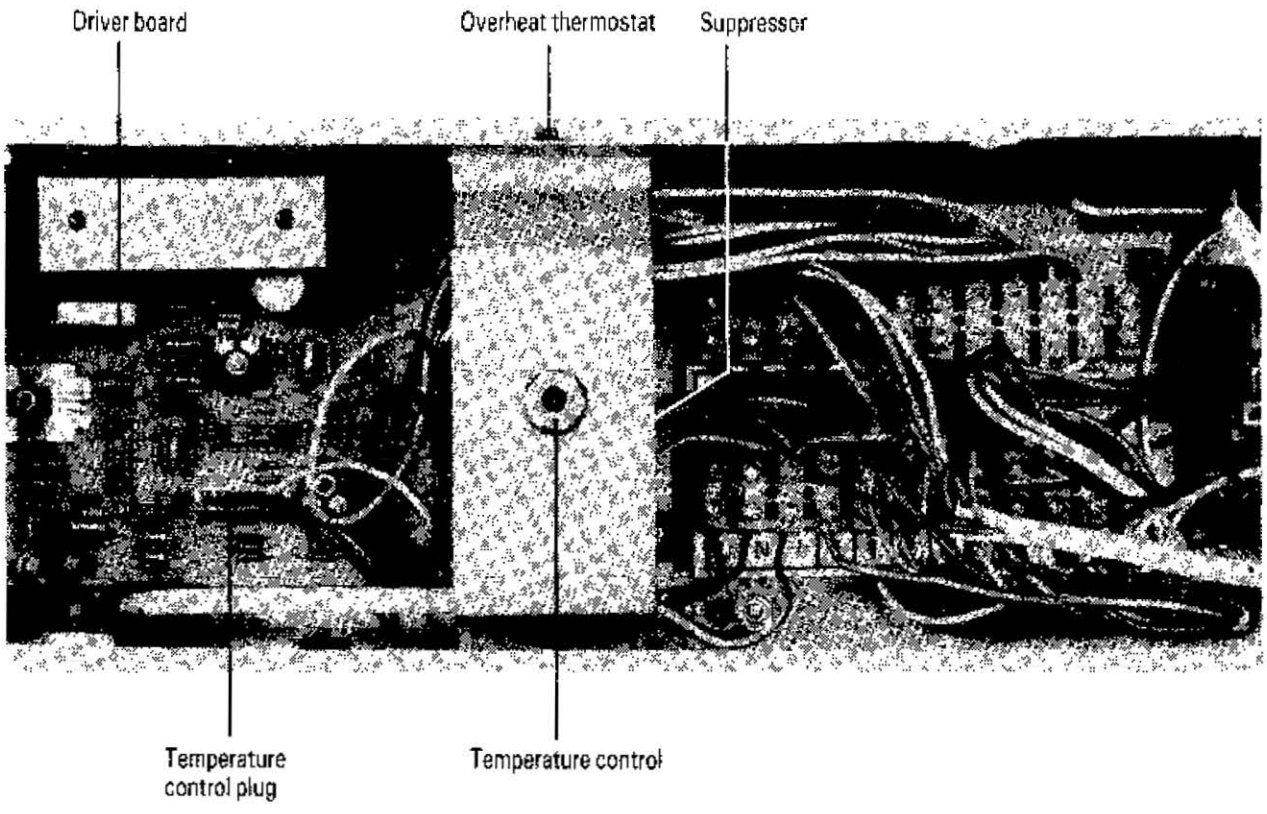


Fig. 43



19. TO REPLACE THE SPARK ELECTRODE CABLE

(See Figs. 44 and 45.)

(a) Pull the cable off the spade connector on the spark electrode.

(b) Remove the sealing cover on the bottom of the boiler casing held in position with one M5 screw. Feed the spark electrode cable through the hole in the boiler casing.

(c) Pull the cable off the electrical connection on the sequence control board positioned at the top right-hand corner. Remove the cable threading it through the hole in the rear of the electrical panel.

(d) Hinge the electrical tray downwards by following the general notes prior to Instruction 7.

(e) Remove the cable clamp securing the spark electrode cable from the rear of the electrical panel.

(f) Remove the cable threading it through the hole in the rear of the electrical panel.

(g) Remove the two protective sleeves from the spark electrode cable.

(h) Replace the new cable in the reverse order and ensure:

i) The sealing cover is replaced and seals the casing.

ii) The electrical connection is made to the terminal on the sequence control board marked HT and positioned at the top right-hand corner.

20. TO REPLACE THE ELECTRONIC DRIVER BOARD

(See Figs. 43 and 44.)

(a) Remove the fan pressure switch as described in Part 18a, b and c.

(b) Release the plastic catch on the end of each mounting post pulling the printed circuit board forward approximately 3 mm to prevent the plastic catch from returning.

(c) Pull the board off the remainder of the mounting posts until it is free.

(d) Grasping the board firmly pull off the electrical edge connection, the temperature control connection and the two-way Molex plug..

(e) Remove the plastic pressure adjustment spindle from the rear of the driver and insert into the replacement driver board.

(f) Locate the electrical edge connector in place and push on to the printed circuit board. The edge connector has three ribs which locate into three matching slots in the board so ensuring correct orientation.

Similarly reconnect the temperature control and the two-way Molex plug.

(g) Locate the new board over the four mounting posts and push back squarely until the plastic catch on the end of each post clicks into place.

(h) Reassemble the fan pressure switch in the reverse order as described in Part 18 d.

21. TO REPLACE THE TRANSFORMER

(Figs. 44 and 45.)

(a) Follow the wires from the transformer to the main terminal block and disconnect the blue, brown, orange and black wires from terminals N, 6, 12 and 13 respectively.

(b) Remove the two M4 taptite screws securing the transformer inside the electrical cover.

(c) Remove the transformer and the paxolin insulation.

(d) Refit a new transformer in the reverse order. The holes in the paxolin insulation are off centre and the insulation should be replaced with the wide section under the transformer electrical connections.

22. TO REPLACE THE SUPPRESSOR

(Fig. 44.)

(a) The suppressor is located to the left of the terminal blocks and held by a 'P' clip secured by a screw. Remove the screw and ease the suppressor clear of the bracket.

(b) Disconnect the suppressor leads from terminals N 2 and 4 on the terminal strip and remove.

(c) Replace with a new suppressor and reassemble in reverse order.

23. TO REPLACE THE SEQUENCE CONTROL BOARD

(Figs. 44 and 45.)

(a) Remove the transformer as described in Part 21b and c.

(b) Pull the spark electrode cable off the electrical connection, at the top right hand corner of the sequence control board, marked HT.

(c) Disconnect the four Molex plugs noting their positions.

(d) Release the plastic catch on the end of each mounting post pulling the printed circuit board forward approximately 3 mm to prevent the plastic catch from returning.

(e) Pull the board off the remainder of the mounting plate until it is free.

(f) Locate the new board over the four mounting posts and push back squarely until the plastic catch on the end of each post clicks into place.

(g) Reassemble in the reverse order and ensure:

i) The spark electrode cable is connected to the terminal marked HT at the top right-hand corner of the sequence control board.

ii) The Molex plugs are fitted to the correct terminals. Plugs are not interchangeable and will only fit the socket they were removed from.

24. TO REPLACE THE 3-POSITION SWITCH

(a) Remove the push-on connections from the rear of the switch taking note of their positions.

(b) Squeeze together the two plastic retaining lugs and remove the switch from the front of the facia.

(c) Snap in the replacement switch and with the aid of the wiring diagram. See Fig. 27. Connect the push-on connections.

25. TO REPLACE THE PROGRAMMER ASSEMBLY

(a) Remove the clamping bracket from each end of the programmer by unscrewing the four M4 taptite screws retaining them to the facia.

(b) Remove the old programmer complete with its wiring harness and front bezel.

(c) Refit the new programmer in the reverse order complete with its new bezel and wiring harness using the old clamping brackets and screws.

26. TO REPLACE THE CENTRAL HEATING SENSOR

Check that the electricity supply has been turned off.

(a) Turn off the CH flow and return connections to the boiler and drain the appliance.

(b) Pull off the two wires from the sensor and unscrew the sensor.

(c) Fit the new sensor and reconnect the two wires.

(d) Open the valves and refill the system venting as necessary.

Fig. 44

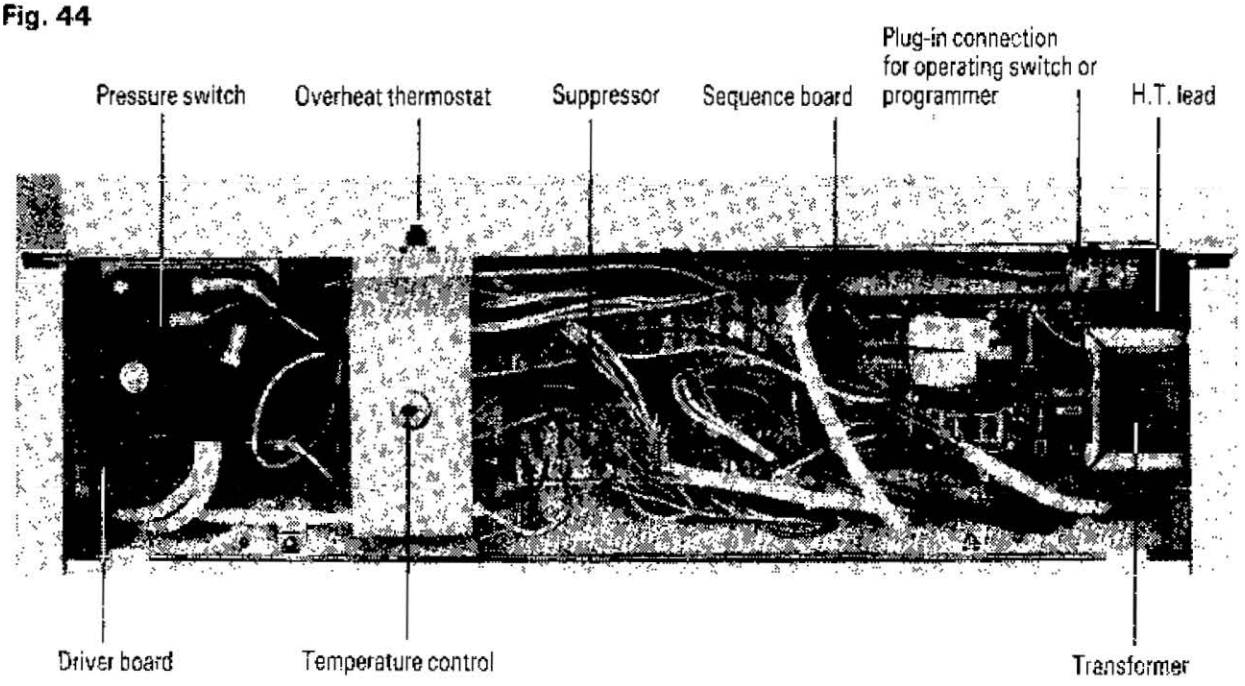
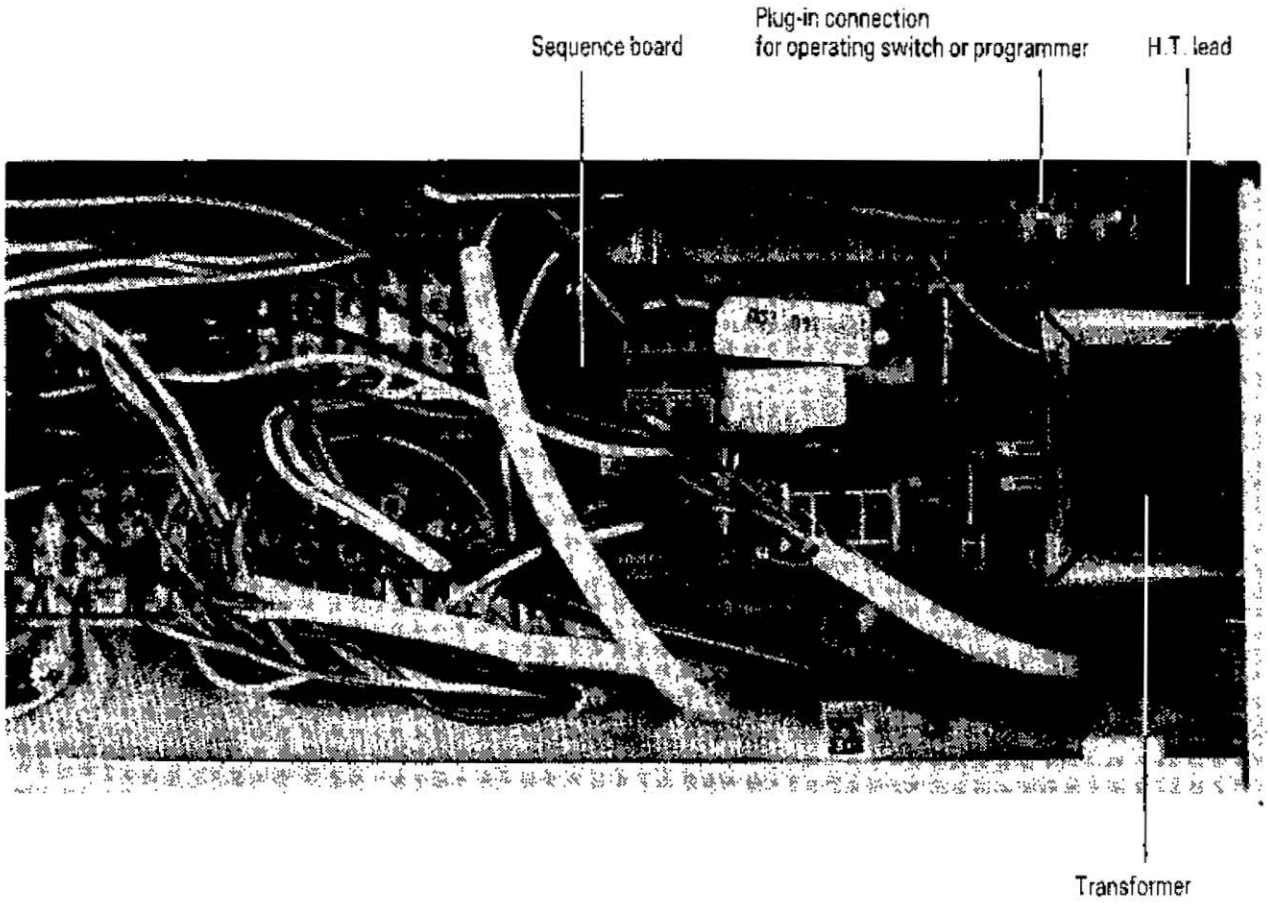
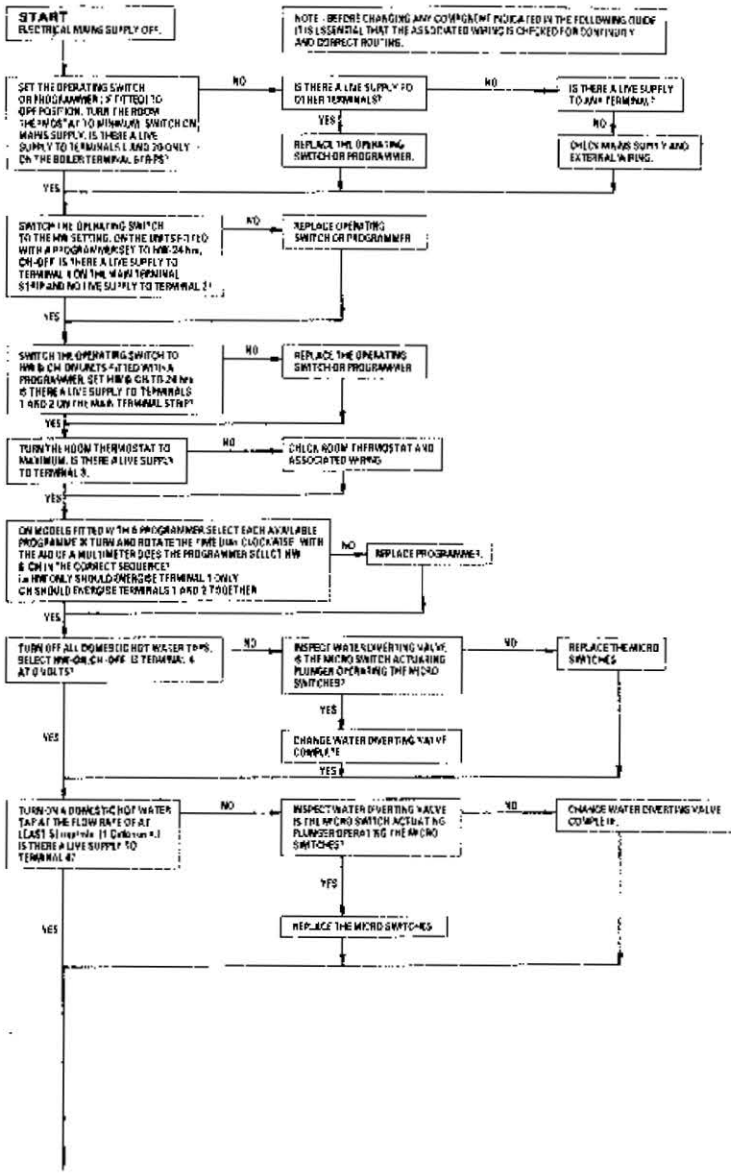

Pressure switch
Overheat thermostat
Suppressor
Sequence board
Plug-in connection for operating switch or programmer
H.T. lead
Driver board
Temperature control
Transformer

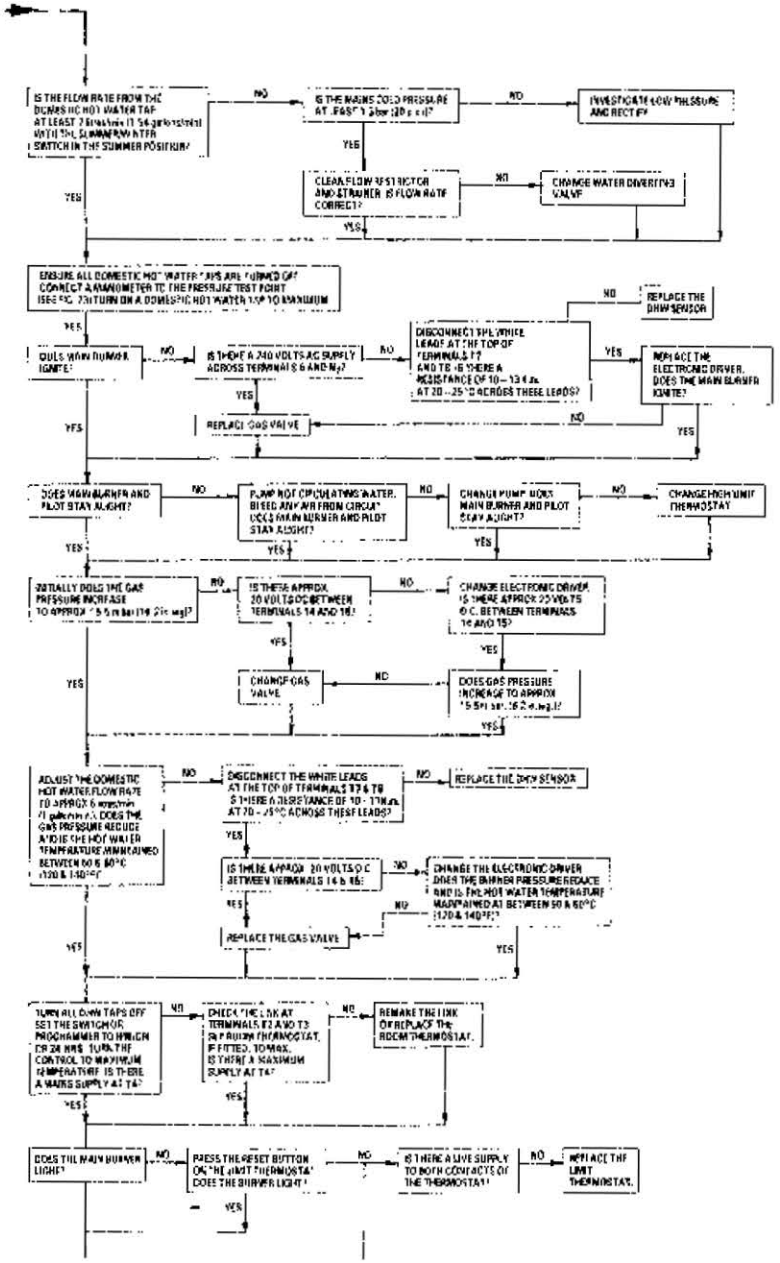
Fig. 45

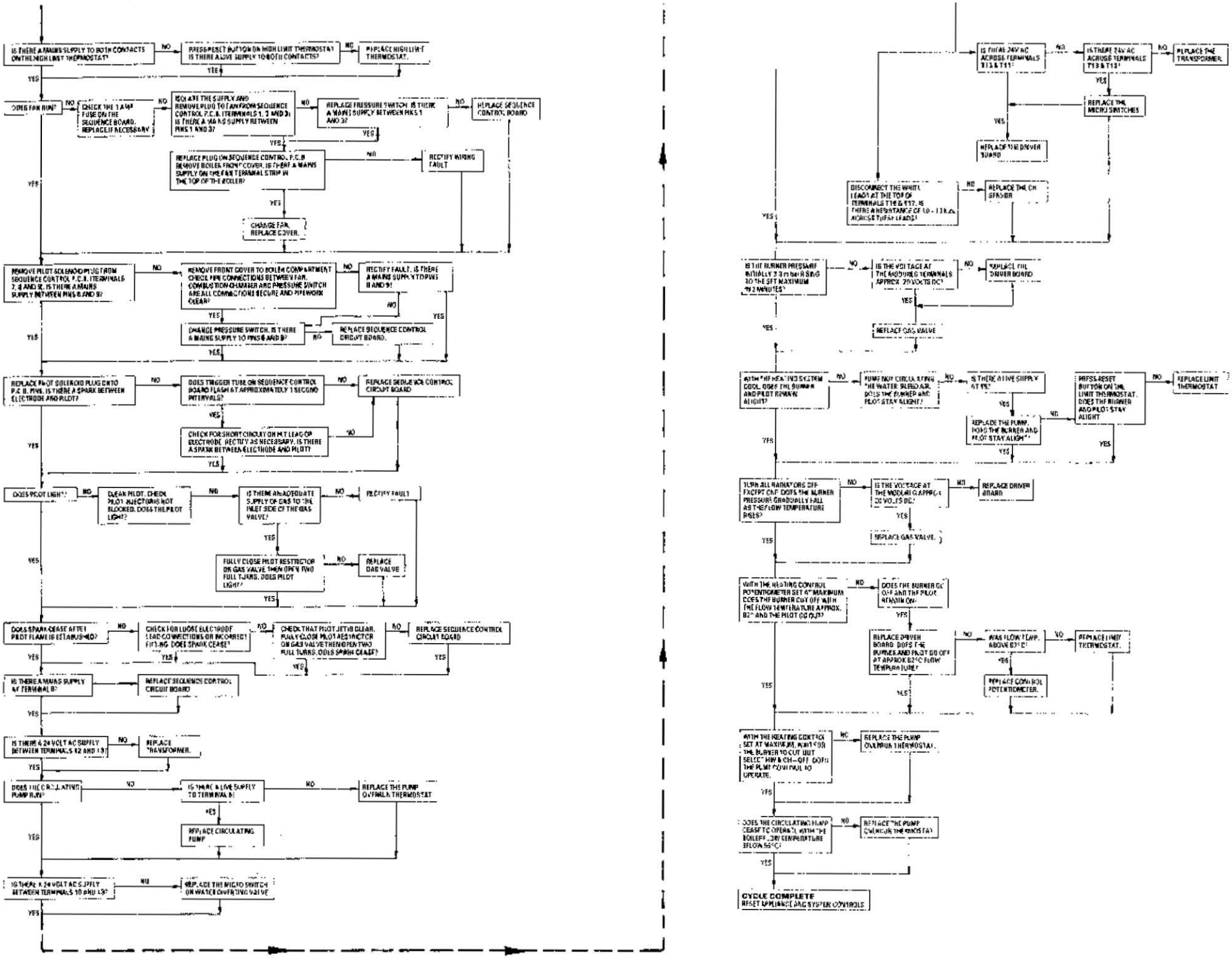

Sequence board
Plug-in connection for operating switch or programmer
H.T. lead
Transformer

17. FAULT FINDING

NOTE: Preliminary electrical system checks as contained in the BGC Multimeter Instruction Book are the first electrical checks to be carried out during a fault finding procedure. On completion of the Service/Fault Finding task which has required the breaking and remaking of electrical connections, then checks A, EARTH CONTINUITY, C, POLARITY, D, RESISTANCE TO EARTH—**MUST** be repeated.






IS THERE A MAINS SUPPLY TO BOTH CONTACTS ON THE HIGH LIMIT THERMOSTAT?
NO
PRESS RESET BUTTON ON HIGH LIMIT THERMOSTAT IS THERE A LIVE SUPPLY TO BOTH CONTACTS?
NO
REPLACE HIGH LIMIT THERMOSTAT.
YES
YES
DOES FAN RUN?
NO
CHECK THE 1 AMP FUSE ON THE SEQUENCE BOARD. REPLACE IF NECESSARY
NO
ISOLATE THE SUPPLY AND REMOVE PLUG TO FAN FROM SEQUENCE CONTROL P.C.B. (TERMINALS 1, 2 AND 3) IS THERE A 'HA NO SUPPLY BETWEEN PINS 1 AND 3?
NO
REPLACE PRESSURE SWITCH. IS THERE A MAINS SUPPLY BETWEEN PINS 1 AND 3?
NO
REPLACE SEQUENCE CONTROL BOARD
YES
YES
REPLACE PLUG ON SEQUENCE CONTROL P.C.B REMOVE BOILER FRONT COVER. IS THERE A MAINS SUPPLY ON THE FAN TERMINAL STRIP IN THE TOP OF THE BOILER?
NO
RECTIFY WIRING FAULT
YES
CHANGE FAN. REPLACE COVER.
YES
REMOVE PILOT SOLENOID PLUG FROM SEQUENCE CONTROL P.C.B. (TERMINALS 7, 8 AND 9). IS THERE A MAINS SUPPLY BETWEEN PINS 8 AND 9?
NO
REMOVE FRONT COVER TO BOILER COMPARTMENT CHECK PIPE CONNECTIONS BETWEEN FAN, COMBUSTION CHAMBER AND PRESSURE SWITCH ARE ALL CONNECTIONS SECURE AND PIPEWORK CLEAR?
NO
RECTIFY FAULT. IS THERE A MAINS SUPPLY TO PINS 8 AND 9?
YES
NO
YES
YES
CHANGE PRESSURE SWITCH. IS THERE A MAINS SUPPLY TO PINS 8 AND 9?
NO
REPLACE SEQUENCE CONTROL CIRCUIT BOARD.
YES
YES
REPLACE PILOT SOLENOID PLUG ONTO P.C.B. PINS. IS THERE A SPARK BETWEEN ELECTRODE AND PILOT?
NO
DOES TRIGGER TUBE ON SEQUENCE CONTROL BOARD FLASH AT APPROXIMATELY 1 SECOND INTERVALS?
NO
REPLACE SEQUENCE CONTROL CIRCUIT BOARD
YES
CHECK FOR SHORT CIRCUIT ON HT LEAD OF ELECTRODE. RECTIFY AS NECESSARY. IS THERE A SPARK BETWEEN ELECTRODE AND PILOT?
NO
YES
YES
DOES PILOT LIGHT?
NO
CLEAN PILOT. CHECK PILOT INJECTORS NOT BLOCKED. DOES THE PILOT LIGHT?
NO
IS THERE AN ADEQUATE SUPPLY OF GAS TO THE INLET SIDE OF THE GAS VALVE?
NO
RECTIFY FAULT
YES
YES
FULLY CLOSE PILOT RESTRICTOR ON GAS VALVE THEN OPEN TWO FULL TURNS. DOES PILOT LIGHT?
NO
REPLACE GAS VALVE
YES
YES
DOES SPARK CEASE AFTER PILOT FLAME IS ESTABLISHED?
NO
CHECK FOR LOOSE ELECTRODE LEAD CONNECTIONS OR INCORRECT FITTING. DOES SPARK CEASE?
NO
CHECK THAT PILOT JET IS CLEAR. FULLY CLOSE PILOT RESTRICTOR ON GAS VALVE THEN OPEN TWO FULL TURNS. DOES SPARK CEASE?
NO
REPLACE SEQUENCE CONTROL CIRCUIT BOARD
YES
YES
YES
IS THERE A MAINS SUPPLY AT TERMINAL 8?
REPLACE SEQUENCE CONTROL CIRCUIT BOARD
YES
IS THERE A 24 VOLT AC SUPPLY BETWEEN TERMINALS 12 AND 13?
NO
REPLACE TRANSFORMER.
YES
DOES THE CIRCULATING PUMP RUN?
NO
IS THERE A LIVE SUPPLY TO TERMINAL 8?
NO
REPLACE THE PUMP OVERRUN THERMOSTAT
YES
REPLACE CIRCULATING PUMP
YES
IS THERE A 24 VOLT AC SUPPLY BETWEEN TERMINALS 10 AND 13?
NO
REPLACE THE MICRO SWITCH ON WATER DIVERTING VALVE
YES
IS THERE 24V AC ACROSS TERMINALS T13 & T15?
NO
IS THERE 24V AC ACROSS TERMINALS T13 & T13?
NO
REPLACE THE TRANSFORMER
YES
REPLACE THE MICRO SWITCHES
YES
REPLACE THE DRIVER BOARD
DISCONNECT THE WHITE LEADS AT THE TOP OF TERMINALS T16 & T17. IS THERE A RESISTANCE OF 10 - 13 Ω ACROSS THESE LEADS?
NO
REPLACE THE CH SENSOR
YES
IS THE BURNER PRESSURE INITIALLY 2.3 m bar RISING TO THE SET MAXIMUM IN 2 MINUTES?
NO
IS THE VOLTAGE AT THE MODULE TERMINALS APPROX. 24 VOLTS DC?
NO
REPLACE THE DRIVER BOARD
YES
REPLACE GAS VALVE
YES
WITH THE HEATING SYSTEM COOL DOES THE BURNER AND PILOT REMAIN ALIGHT?
NO
PUMP NOT CIRCULATING THE WATER. BLEED AIR. DOES THE BURNER AND PILOT STAY ALIGHT?
NO
IS THERE A LIVE SUPPLY AT T8?
YES
REPLACE THE PUMP. DOES THE BURNER AND PILOT STAY ALIGHT?
NO
PRESS RESET BUTTON ON THE LIMIT THERMOSTAT. DOES THE BURNER AND PILOT STAY ALIGHT
NO
REPLACE LIMIT THERMOSTAT
YES
YES
YES
TURN ALL RADIATORS OFF EXCEPT ONE. DOES THE BURNER PRESSURE GRADUALLY FALL AS THE FLOW TEMPERATURE RISES?
NO
IS THE VOLTAGE AT THE MODULE APPROX 24 VOLTS DC?
NO
REPLACE DRIVER BOARD
YES
REPLACE GAS VALVE.
YES
WITH THE HEATING CONTROL POTENTIOMETER SET AT MAXIMUM DOES THE BURNER CUT OFF WITH THE FLOW TEMPERATURE APPROX. 82° AND THE PILOT GO OUT?
NO
DOES THE BURNER GO OFF AND THE PILOT REMAIN ON?
YES
REPLACE DRIVER BOARD. DOES THE BURNER AND PILOT GO OFF AT APPROX 82°C FLOW TEMPERATURE
NO
WAS FLOW TEMP. ABOVE 83°C?
NO
REPLACE LIMIT THERMOSTAT.
YES
REPLACE CONTROL POTENTIOMETER.
YES
YES
WITH THE HEATING CONTROL SET AT MAXIMUM, AND FOR THE BURNER TO CUT OUT SELECT HW & CH — OFF. DOES THE PUMP OVERRUN TO OPERATE.
NO
REPLACE THE PUMP OVERRUN THERMOSTAT.
YES
DOES THE CIRCULATING PUMP CEASE TO OPERATE WITH THE BOILER FLOW TEMPERATURE BELOW 55°C?
NO
REPLACE THE PUMP OVERRUN THERMOSTAT
YES
CYCLE COMPLETE
RESET APPLIANCE AND SYSTEM CONTROLS

17. SHORT PARTS LIST

Key No	GC. No.	Description	No.	Part No
21	324 943	Burner 'Furigas' Type R. 156-500-002	1	ZAGAS070
23	394 185	Burner Injector 'Furigas' Ref. 015-002-000 (Marked '4,3N')	1	ZAGAS075
82	382 483	Gas Valve 'Honeywell' VR.4920M (½" B.S.P.)	1	ZAGAS032
97	381 702	Pilot Injector 'Honeywell' Ref. 45.004.108.005	1	ZBGAS045
88	324 982	Lead (to electrode) 'Kigas' Ref. 7774 x 1000mm Long.	1	ZBGAS033
24	382 448	Electrode – Spark. 'Honeywell' Ref. 45.003939.001	1	ZBGAS050
221	389 376	Pump 'Grundfos' Super Selectric UPS 18-60	1	ZAMAJ169
222	381 836	Pump (Alternative) 'S.M.C.' Commodore 2-130-60S	1	ZAMAJ170
20	324 941	Fan 'Sifan Systems' Ref 42/1500 Drg No 5.4215/77	1	ZAMAJ049
71	324 816	Water Diverting Valve Type V.E. 322292	1	ZAGAS050
139	382 482	Overheat Thermostat 'Ranco' LM7 (T85.540)	1	ZAMAJ130
138		Temperature Control 'OMEG' 20 BU	1	
141	324 920	Water Diverting Valve Micro Switch Assembly	1	ZFGAS010
136	324 852	Transformer and Lead Assembly 240V-24V 16VA	1	ZAGAS045
140	384 542	Radio Suppressor 'Erie' 0.047m F – 100ohm Type TS.121	1	ZDELE061
134		Electronic Driver Board 'Honeywell' W.9335B	1	
		Pump Overrun Thermostat 'Therm-O-Disc' 60T		
137	324 978	Sequence Control Board 'Pactrol' 400501 Issue 1	1	ZAGAS055
137	324 978	Sequence Control Board 'Vernitron'	1	ZAGAS055
129	324 853	Operating Switch. C.1470 VQN 8142 MATT	1	ZDELE235
214	381 755	Programmer 'Horstman' 425 'TIARA'	1	ZAMAJ160
96	324 984	Pilot Bracket 'Honeywell' Q389A-TYPE 27	1	ZBGAS040
143	381 835	Hot Water Flow Sensor 'Honeywell' T 7335A. 1004	1	ZAGAS040
78	324 823	Flow Regulator (Water) Type E, 8.5 ± 15% litres/min	1	ZBUNC138
142	394 279	Fan Pressure Switch 'Dung' LGW-3A1	1	ZAGAS060
38	324 948	Boiler Front Cover and Gasket	1	SMPCOMB35250/1
39	324 949	Flue Hood Seal	1	ZBUNC191
11	324 925	Flue Duct Housing Gasket	1	SMPCOMB35870/3
77	324 822	Water Filter	1	ZBUNC230
87	324 883	Burner 'O' Ring Seal	1	ZDELE241
	381 835	Central Heating Sensor 'Honeywell' T 7335A 1004	1	ZAGAS 040