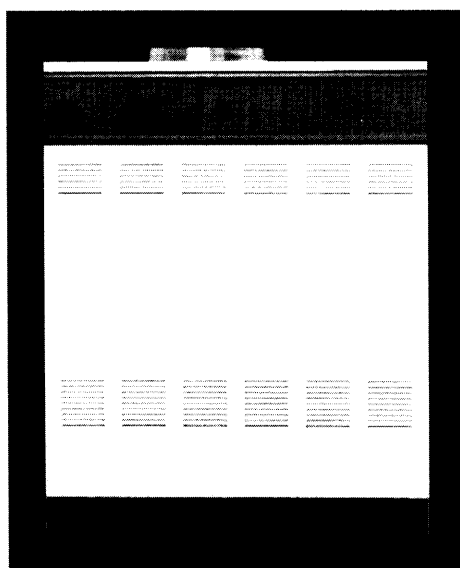




# Highflow 4.5 OF

FLOOR STANDING COMBINATION BOILER FOR CENTRAL HEATING AND MAINS FED DOMESTIC HOT WATER

## INSTALLATION AND SERVICING INSTRUCTIONS



GC NUMBER 41 311 41

### BOILER OUTPUT

To Hot Water On/Off Control

**Maximum 22.9 kW** (78,000 Btu/h)

To Central Heating On/Off Control, Range Rated

**Minimum 8.8 kW** (30,000 Btu/h)

**Maximum 22.9 kW** (78,000 Btu/h)

**IMPORTANT: THIS APPLIANCE IS FOR USE WITH NATURAL GAS ONLY**

**THESE INSTRUCTIONS APPLY IN THE UK ONLY**

**THESE INSTRUCTIONS ARE TO BE LEFT WITH THE USER OR AT THE GAS METER**

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## INSTALLATION REQUIREMENTS

The installation of this appliance must be in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations, local Building Regulations, Building Standards (Scotland) (Consolidation), current IEE wiring regulations and bye laws of the local water undertaking. It should be in accordance with the relevant recommendations of the following British Standards and Codes of Practice: BS 6798:1987, BS 5449:1:1990, BS 5546:1:1990, BS 5440:1:1990, BS 5440:2:1989 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.

## 1. GENERAL INFORMATION

See Fig. 1.

### 1. THE HIGHFLOW 4.5 INCORPORATES:

- An open flued low thermal capacity boiler having a maximum heat output of 22.9 kW (78,000 Btu/h).
- A heatbank having a nominal capacity of 92 litres (21 gallons) of circulating primary hot water and positioned at the side of the appliance. A copper finned water to water heat exchanger is fitted into the heatbank. Secondary mains supply domestic hot water passes through the heat exchanger.
- A diverting valve to direct the boiler output either to domestic hot water or central heating as required.
- Two integral circulating pumps.
- A multifunctional gas valve and electrical control system to individually control the domestic hot water and central heating.
- Boiler and hot water temperature control thermostats providing control for central heating and domestic hot water.
- An Operating Switch for selection of water only or central heating and water. A programmer kit is available as an optional extra.
- An expansion vessel, pressure gauge, pressure release valve and auto air vent to enable the appliance to be connected to a sealed water system.
- An electronic pump delay control board which enables the central heating pump to run on for a period of about 5 minutes after each operating cycle.

### 2. THE HEATING SYSTEM

The appliance is supplied for connection to a sealed system.

**IMPORTANT:** The pipe connections made throughout the system must be capable of sustaining a pressure of up to 3 bar. When the appliance is fitted to an existing installation and that system is upgraded to a sealed system then the water connections must be checked and replaced if necessary.

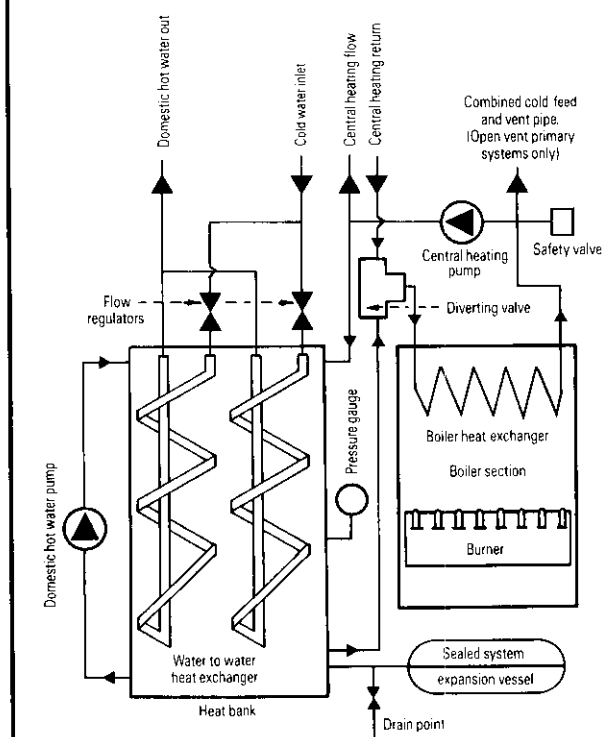
If thermostatic radiator valves are to be fitted to the system then they must conform to the requirements of BS 2767:1972.

A combined cold feed and vent pipe connection is available for use when the boiler is fitted to an open vented system. See Fig. 2. Provision is made in the top panel for access.

### 3. NATURAL GAS SUPPLY

The boiler requires 2.8 m<sup>3</sup>/h (98.5 ft<sup>3</sup>/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. It is recommended that a 22 mm dia. supply pipe is used up to the appliance. Under no circumstances should the size of the gas supply pipe be less than that of the appliance inlet connection (22 mm diameter). The meter outlet governor must ensure a nominal pressure of 20 mbar (8 in.wg.) at the appliance. The complete installation, including the meter, should be inspected and tested for soundness and purged in accordance with the recommendations of BS 6891.

Fig. 1. Appliance water flow diagram.



#### 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

The safety valve may be removed and sealed if the boiler is fitted to an open vented system. The safety valve drain connection must be directed away from any electrical components. See Section 13.8.

#### 6. ELECTRICAL SUPPLY

Mains supply 240V~ 50 Hz, 240 watts. External Fuse 3 amps.

#### 7. CONTROLS

All controls included with the appliance are specified in Section 18—Short Parts List, included in this booklet. There is provision for a room thermostat and frost thermostat to be connected to the appliance. See Section 11—Electrical.

Thermostatic radiator valves can be used in the system but a suitable by-pass is recommended with this type of control.

When using a sealed primary system, particular care should be exercised that only radiator valves of high quality to BS 2767:10 should be fitted.

#### 8. DRAINAGE

A drain cock to drain water from the boiler and the heat bank is fitted in the pipe connecting the primary heat bank to the sealed system pressure vessel. A drain cock should also be fitted to the lowest point of the system.

#### 9. MAINS COLD WATER SUPPLY PRESSURE

If the mains supply pressure to the appliance is expected to be low, it is recommended that a 22 mm diameter supply pipe is used from the rising main to the appliance.

#### 10. SHOWERS, BIDETS, TAPS AND MIXING VALVES

Standard hot and cold taps and mixing valves used with the appliance must be suitable for operating at mains pressure. The use of a thermostatically controlled shower valve will give added comfort and safeguard against flow of water at too high a temperature. If a loose head shower is fitted then the hose must be fixed to prevent the shower head falling closer than 25 mm (1 in.) above the top edge of the bath to prevent it being immersed in the bath water. Alternatively an anti-siphonage device must be fitted. Hot and cold mains fed water can be supplied to an over rim flushing bidet, but is subject to local Water Authority requirements.

#### 11. APPLIANCE OPERATION

See Fig. 1.

The appliance output is range rated for central heating from 8.8 kW (30,000 Btu/h) to 22.9 kW (78,000 Btu/h). The output is preset at 15 kW (51,200 Btu/h). If this output is not suitable it should be adjusted to match the central heating requirement. The domestic hot water output is preset at 22.9 kW (78,000 Btu/h) and must not be adjusted. See Section 14—Commissioning the Appliance.

The control system ensures the heatbank is maintained at the temperature set by the hot water temperature control thermostat.

With the Operating Switch (or Programmer) in the heating and hot water mode, priority will be given to satisfy the heatbank. Hot water will automatically be diverted to the central heating system, the temperature being regulated by the central heating temperature control thermostat.

With the Operating Switch (or Programmer) in the domestic hot water mode, no heat will pass into the central heating system. Domestic hot water may be drawn off at a nominal rate of 21 litres/min. (4.5 gal/min.) governed by two pre-set flow restrictors located in the cold water inlet manifold.

The appliance includes a domestic hot water pump and a central heating pump. With the appliance in the domestic hot water mode both pumps are energised. The domestic hot water pump circulates primary water around the heat bank and the central heating pump circulates primary water around the heat bank and the boiler.

With the appliance in the central heating mode the domestic hot water pump is de-energised and the central heating pump is energised. Primary water then circulates around the boiler and the central heating system.

In the event of an unacceptable rise in temperature of the heatbank due to continuous operation of the burner a high limit thermostat is fitted which will shut down the boiler. This overheating is caused by a tap not being turned off properly and allowing a very small flow of water past the heatbank control thermostat phial.

An overheat thermostat is fitted to the flow pipe from the boiler section. In the event of a malfunction, the gas pilot circuit will be interrupted which will completely shut off the gas valve.

#### 12. PACKAGING

The appliance is despatched in one package.

## 2. TECHNICAL DATA

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

**Table 1**

NOMINAL BOILER RATINGS (10 minutes after lighting)							
OUTPUT		INPUT		BURNER SETTING PRESSURE		GAS RATE	
kW	Btu/h	kW	Btu/h	mbar	in. wg	m <sup>3</sup> /h	ft <sup>3</sup> /h
8.8	30,000	12.1	41,300	2.5	1.0	1.15	40.7
11	37,500	14.9	50,800	4.0	1.6	1.42	50.0
13	44,350	17.5	59,700	5.8	2.3	1.67	58.8
15	51,200	19.9	67,900	7.0	2.8	1.90	66.9
17	58,000	22.5	76,800	9.0	3.6	2.15	75.7
19	64,800	24.8	84,600	11.0	4.4	2.37	83.3
22.9	78,000	29.3	100,000	14.3	5.7	2.80	98.5
DOMESTIC HOT WATER							
22.9	78,000	29.3	100,000	14.0	5.62	2.80	98.5

**Note:** The Pressure test point is located on the gas valve (See Fig. 13).

**Table 2**

SPECIFICATIONS	
CENTRAL HEATING FLOW	28 mm Copper tube
CENTRAL HEATING RETURN	28 mm Copper tube
COLD WATER MAINS INLET	22 mm Copper tube
DOMESTIC HOT WATER OUTLET	22 mm Copper tube
GAS INLET	22 mm Copper tube
HEIGHT	860 mm (33.9 in.)
WIDTH	685 mm (27 in.)
DEPTH	600 mm (23.6 in.)
WEIGHT (DRY)	155 kg (340 lbs.)
PRIMARY CAPACITY	98 litres (21.6 galls.)
MAXIMUM STATIC HEAD	25 metres (81 ft.)
MINIMUM STATIC HEAD	1 metre (39 in.)
CIRCULATING PUMPS (2)	Grundfoss UPS 15-60
EXPANSION VESSEL	12 litres charged 0.5 bar
MAXIMUM OUTPUT TO HEATING	22.9 kW (78,000 Btu/h)
OUTPUT TO DOMESTIC HOT WATER	22.9 kW (78,000 Btu/h)
MAXIMUM DOMESTIC HOT WATER FLOW RATE	Nominally 21 litres/min. (4.5 gal/min.)
GAS RATE (after 10 min.)	2.8 m <sup>3</sup> /h (98.52 ft <sup>3</sup> /h)
MAXIMUM CENTRAL HEATING FLOW TEMPERATURE	82°C (180°F)

**NOTE.** Appliance static head is measured from the top surface of the appliance or the highest point in the heating system to the top of the water level in the feed and expansion tank. See Fig. 7.

**Table 3**

AVAILABLE PUMP HEAD						
BOILER OUTPUT		HEAD		MINIMUM FLOW RATE		TEMPERATURE RISE ACROSS HEATING FLOW AND RETURN
kW	Btu/h	metres	feet	litres/min.	gal/min.	
8.8	30,000	5.1	16.6	11.5	2.5	11°C (20°F)
11	37,500	4.7	15.5	14.5	3.2	
13	44,350	4.3	14.1	17.0	3.8	
15	51,200	3.8	12.6	19.5	4.3	
17	58,000	3.3	10.9	22.5	4.9	
19	64,800	2.2	7.2	24.8	5.4	
22.9	78,000	1.7	5.5	30.0	6.6	

### 3. DIMENSIONS AND WALL PREPARATION

Fig. 2. Appliance dimensions and pipework connections.

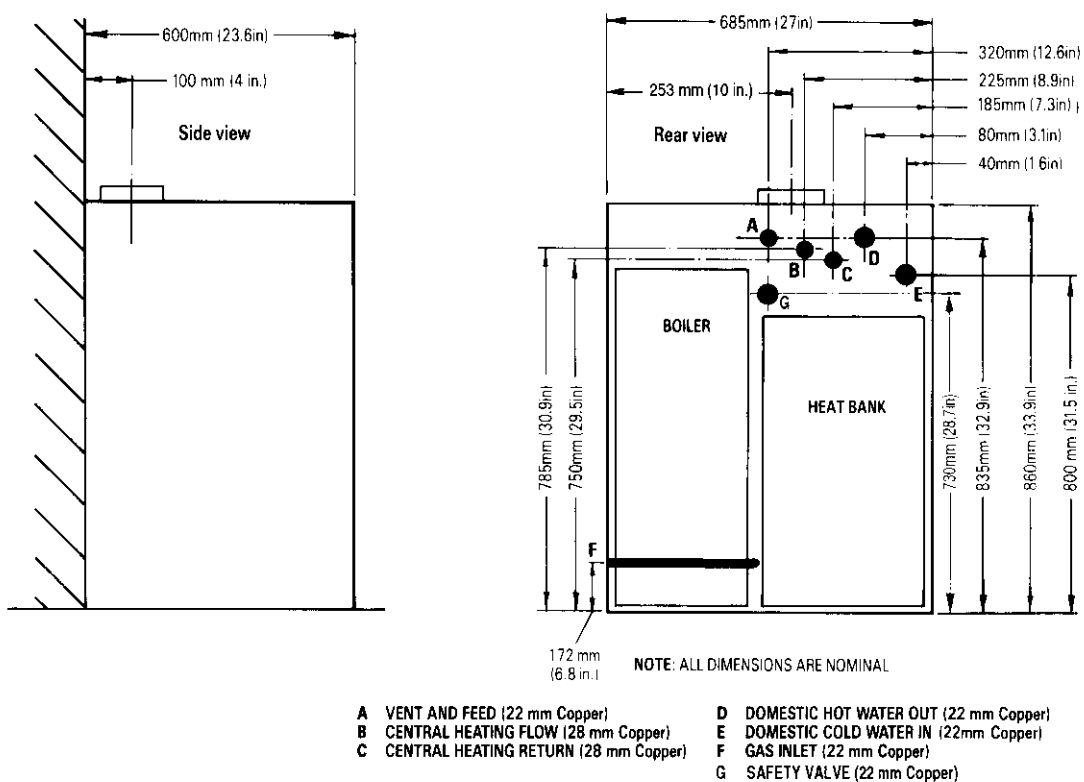
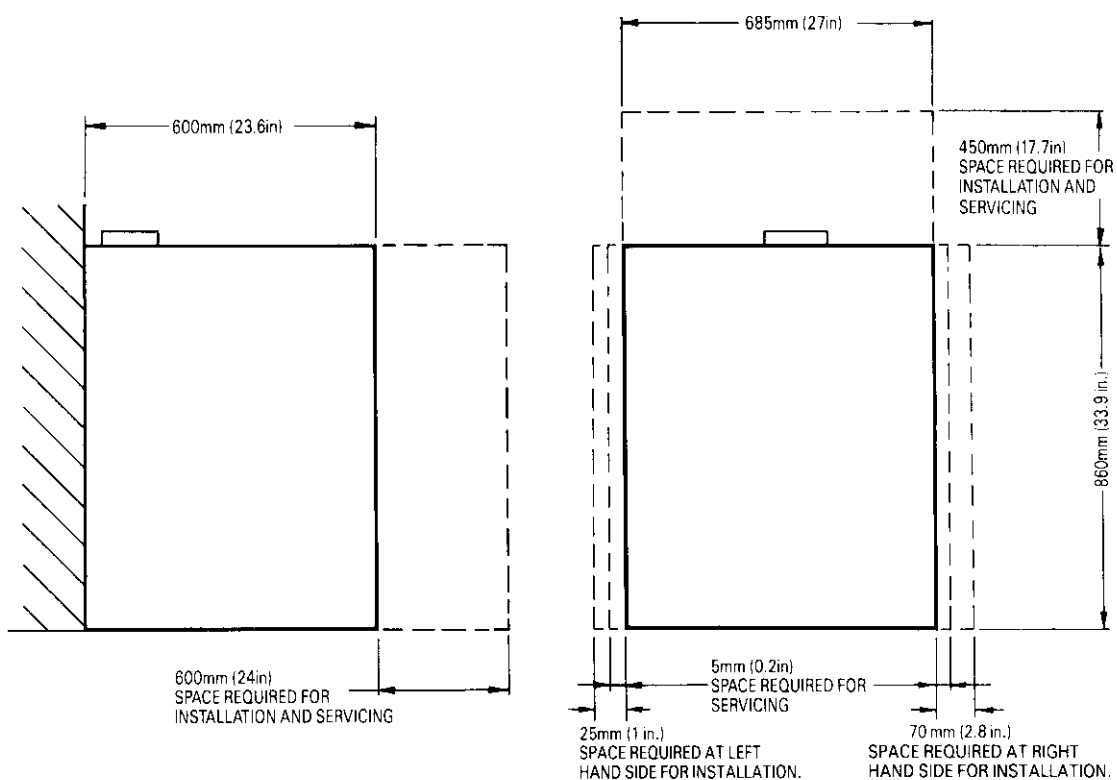


Fig. 3. Installation and servicing clearance



## 4. SITING THE APPLIANCE

### IMPORTANT

The appliance must not be installed in a bedroom or bed-sitting room or in a room containing a bath or shower.

The appliance may be installed in any other room although particular attention is drawn to the requirements of the current 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.

1. The appliance is floor standing. The floor must be firm and level.
2. Siting must allow for the provision of an open flue termination. See Section 5—Flue
3. If the appliance is to be fitted in a timber frame building then it must be fitted in accordance with the British Gas publication "Guide for Gas Installations in Timber Framed Housing".

4. The following clearances must be left to allow for servicing and ventilation:

(a) Above the appliance:	Servicing 450 mm (18 in.) Ventilation 5 mm (0.2 in.)
(b) In front of the appliance:	Servicing 600 mm (24 in.) Ventilation 150 mm (6 in.)
(c) Left-hand side: (Viewed from front)	Servicing 25 mm (1.0 in.) Ventilation 5 mm (0.2 in.)
(d) Right-hand side: (Viewed from front)	Servicing 70 mm (2.8 in.) Ventilation 70 mm (2.8 in.) If a standard work surface is fitted then the gap should be 100 mm (4 in.)

Take care to ensure that adequate space is available at either side to manoeuvre the appliance during installation. This is left to the discretion of the installer.

5. Refer to Sections 2, 3, 5, 6 and 7 for additional information.

## 5. FLUE

The appliance must be connected to a flue conforming to BS715 and incorporate a suitable adapter.

The appliance flue outlet has an internal diameter of 144mm. The flue pipe fitted to the boiler must have an internal diameter of 125 mm (5 in.). If the outside diameter of the flue pipe is greater than 144 mm then an adapter must be fitted.

An acceptable means of disconnection e.g. a slip or split socket, must be incorporated in the installation immediately above the draught diverter.

The appliance must be connected to a flue which will provide a consistent up-draught without undue cooling of the flue gases. The requirements of BS 5440:1 should be followed.

Horizontal flue runs should be avoided and the flue should terminate in accordance with the relevant recommendations given in BS 5440:1. The flue must be fitted with a terminal which has been tested and found satisfactory by British Gas. The terminal must not be installed within 600mm (24 in.) of an openable window, air vent or any other ventilation opening.

Existing chimneys may be suitable but must be swept first and usually require an approved liner to be fitted. If in doubt regarding the suitability of a flue, consult the local Gas Region for advice.

If the flue is required to be taken through the wall behind the boiler then adequate space should be allowed for a suitable flue bend to be fitted. **Right angle bends must not be used.**

When the flue is taken through a ceiling and into the roof space or room above, it must be provided with a sleeve of non-combustible material sufficient to allow an air space between the sleeve and the flue of 25 mm (1 in.) minimum. A suitable non-combustible sleeve or plate must be fitted to centre the flue and maintain the 25 mm

(1 in.) air gap. The space between the plate or sleeve and the flue pipe should be filled with mineral wool or similar non-combustible, non conducting materials.

**IMPORTANT:** It is **ESSENTIAL** to ensure, in practice, that products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors or other sources of natural air infiltration or forced ventilation or air conditioning. If this eventuality should occur, the appliance **MUST** be turned off immediately and the local Gas Region called in to investigate.

## 6. AIR SUPPLY

The appliance must have clearance at the right hand side for air movement of at least 70 mm (2.8 in.) or 100 mm (4 in.) if a work surface has been fitted above the appliance. See Section 4.

The appliance must not be boxed in tightly with kitchen cupboards etc. Air supply must be provided in accordance with BS 5440:2.

1. If the appliance is installed in a room, then the room must have a permanent air vent direct to outside air, or to an adjacent room which itself has a permanent air vent direct to outside air. The minimum effective area of the air vent(s) required is 100 cm<sup>2</sup> (15 in<sup>2</sup>).
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 the outside air. The minimum effective areas are given in Table 4. Where the cupboard or compartment is

ventilated to a room, the room itself must have an air vent direct to the outside air of a minimum effective area of 100 cm<sup>2</sup> (15 in.<sup>2</sup>). Details of essential features of cupboard/compartiment design, including airing cupboard installation, are given in BS 6798:1987.

3. If there is any type of extract fan fitted in the premises, spillage of the products from the appliance flue could occur when the fan is operating unless an adequate air inlet area from outside is provided.
4. A spillage test as detailed in BS 5440:1 must be carried out and any remedial action taken to ensure the installation meets these standards.

Table 4

Position Air Vents	Air from room	Air direct from outside
High Level	264 cm <sup>2</sup> (41 in. <sup>2</sup> )	132 cm <sup>2</sup> (20.5 in. <sup>2</sup> )
Low Level	528 cm <sup>2</sup> (82 in. <sup>2</sup> )	264 cm <sup>2</sup> (41 in. <sup>2</sup> )

Additional information in respect of air supply and installation data is given in BS 6798 and BS 5440:Part 2.

## 7. SYSTEM CONSIDERATIONS

1. For circuit design purposes it is most important that the flow rate and pressure drop across the appliance corresponding to the system temperature differential and maximum heating output chosen, should be as given in Table 3.
2. The appliance includes a central heating circulating pump and no other circulating pump is required. When fitting a room or frost thermostat refer to Section 11—Electrical. The appliance will operate satisfactorily on a two pipe small bore or microbore system
3. The heatbank contains two finned copper heat exchangers which provide domestic hot water. A control system is incorporated that gives priority to the domestic hot water and the central heating will be turned off when a demand for hot water is made. For large quantities of hot water the Hot Water Temperature Control Knob should be set at maximum and after use a few minutes may be required to re-heat the heatbank. The central heating will remain off during this period.
4. The appliance is supplied suitable for direct connection to a sealed system.
5. It is essential that the fittings and joints in a sealed system are capable of maintaining the chosen system pressure.

**It is generally advisable to fit a by-pass to all systems.**

## 8. SEALED PRIMARY SYSTEM

See Figs. 5 and 6

### 1. GENERAL

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

The open end of the combined feed and vent pipe must be sealed.

**IMPORTANT:** The pipe connections made throughout the system must be capable of sustaining a pressure of up to 3 bar. When the appliance is fitted to an existing installation and that system is upgraded to a sealed system then the water connections must be checked and replaced if necessary

### 2. SAFETY VALVE

The spring loaded safety valve is set to operate at 3 bar (45 p.s.i.). The discharge pipe must be so arranged that the discharge of water or steam from the tundish pipe cannot create a hazard to occupants of the premises or cause

damage to electrical components and wiring. See Section 13 – Installation.

The safety valve complies with the general requirements of BS759.

### 3. PRESSURE GAUGE

A pressure gauge fitted to the appliance covers the range 0–4 bar (0–60 p.s.i.).

### 4. THE EXPANSION VESSEL

The appliance incorporates a 12 litre diaphragm type expansion vessel charged to 0.5 bar. The expansion vessel is charged with air and is fitted with a Schraider type valve. The charge pressure is therefore adjustable by using a tyre pump and pressure gauge and should be increased if necessary.

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 vessel as supplied is, therefore, suitable for systems with a static head of 0.5 bar which is equivalent to 5 metres (17 ft.).

### 5. SYSTEM VOLUME

The expansion vessel accommodates differing system volumes depending upon the initial charge pressure and pre-pressurisation of the system if any. Reference should be made to Table 5 to establish the approximate system volume that can be accommodated under different conditions with the standard expansion vessel. If it is found that the system volume is in excess of that catered for by the expansion vessel supplied, then an extra vessel can be added as close to the return connection of the appliance as possible so that the total expansion volume is sufficient. Refer to BS 5449:1 and BS 6798:1987 for further information.

Table 5

TOTAL SYSTEM VOLUME IN LITRES (Gallons)			
Initial System Pressure (bar)	Initial Charge Pressure (bar)		
	0.5	1.0	1.5
0.5	156 (35)	—	—
1.0	96 (21)	122.5 (27)	—
1.5	51.5 (11.5)	69.5 (15.5)	85 (18.5)
2.0	24 (5.5)	32.5 (7)	39.5 (9)

**NOTE.** Because of the increased primary capacity of this appliance care should be exercised over the correct sizing of the expansion vessel in order to check that the standard vessel (or standard vessel together with any supplementary vessel) capacity is adequate, first ensure that with the system cold the initial system pressure is correctly set. Allow the system to heat fully with the hot water and central heating thermostats set to maximum. Check that the system pressure has not exceeded 2.6 bar. If the system pressure has exceeded 2.6 bar a supplementary vessel should be fitted as described previously or if one has already been fitted then this should be increased in size.

### 6. 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. See Fig. 5. Or, where access to a make-up vessel would be difficult, provision for make up can be made by pre-pressurisation of the system.

**The appliance must not be operated without the system being full of water and properly vented. Repeated venting will reduce the quantity of water in the system. It is essential that this water is replaced and the system pressure maintained.**

## 7. MAINS CONNECTION

Connection to the mains water supply or to a water storage cistern supplying domestic water even through a non return valve must not be made without the approval of the local Water Authority.

## 8. 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 5449:Part 1. Two methods of filling a sealed system are shown in Fig. 6.

## 9. VENTING

The automatic air vent fitted to the appliance is fitted with a protective black plastic screw cap. This should be removed and discarded. Air will now automatically be vented from this point during filling. See Fig. 29.

The heating system should be fitted with manual air vents at all high points.

## 10. COMMISSIONING

For a complete description of the commissioning procedure refer to Section 14—Commissioning the Appliance.

- 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.
- Check the 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 should 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.).

- Light the boiler and heat the system to maximum working temperature. Check for water soundness. Turn off the appliance and drain the system while it is still hot.
- Refill and vent the 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. SYSTEM BY-PASS

A suitable by-pass designed to give the minimum flow rate corresponding to the heating output used must be fitted. See Table 3.

A suitable position for the by-pass is shown in Fig. 5. The by-pass should be connected in 22 mm diameter pipe at least 2 metres (7 ft.) from the appliance and fitted with a suitable valve to provide adjustment.

To adjust the by-pass, the boiler should be operated on central heating with the system by-pass and radiator valves set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system and 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).

## 12. PUMP

The central heating pump has been set at **MAXIMUM** and must not be adjusted.

Fig. 5. Sealed primary water system.

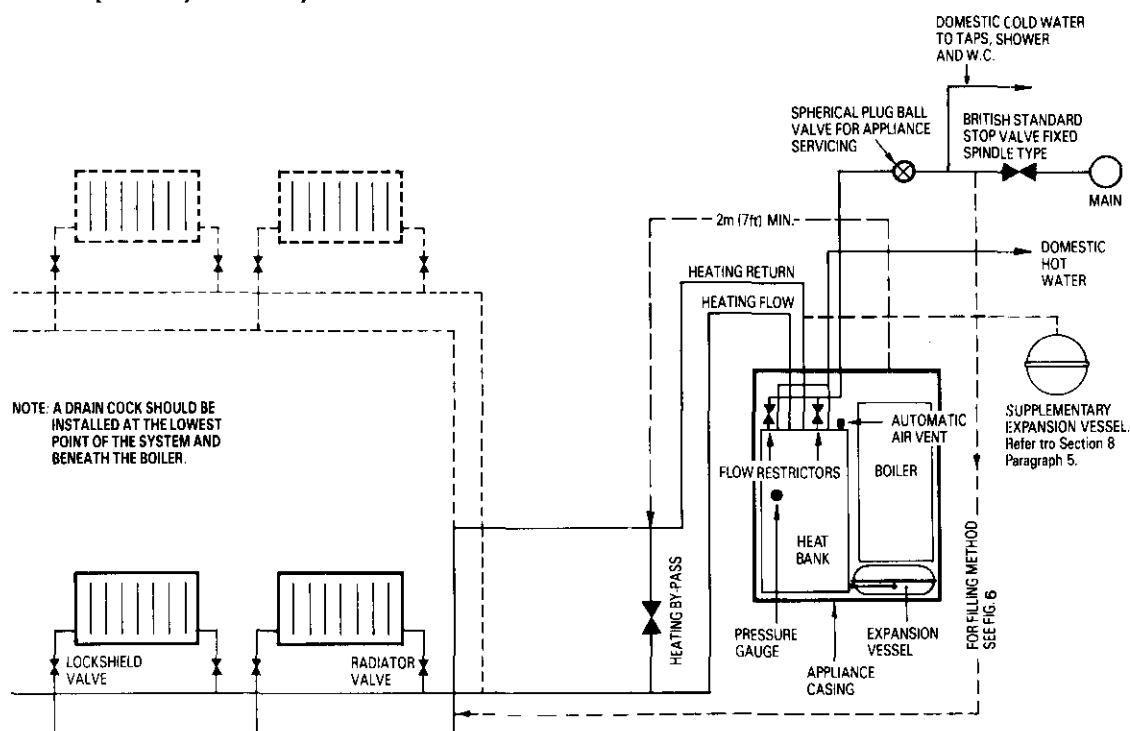
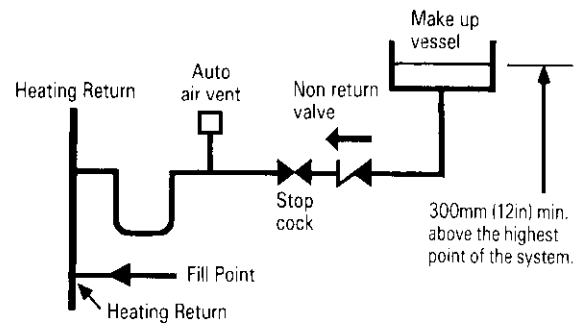
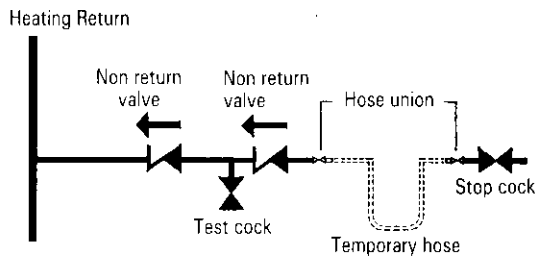




Fig. 6. System filling and make-up.



## 9. OPEN VENT PRIMARY SYSTEM

See Fig. 7.

1. For sizes of flow and return pipework refer to Section 2—Technical Data and Fig. 2.
2. **FEED AND EXPANSION CISTERN**  
The feed and expansion pipe must rise continuously from the appliance avoiding any horizontal runs.  
The cistern must be arranged to provide a minimum static head of 1 metre (39 in.) above the top of the appliance or above the highest point in the heating circuit whichever is the greater.
3. **SAFETY VALVE**  
A safety valve is not required on an open vented system. If preferred, it may be removed from the appliance and the tapping blanked off. If the valve is left in position, a discharge pipe must be fitted which terminates in a position such that if water or steam is discharged it would not cause a hazard to the occupants of the premises or damage the electrical components and wiring. See Fig. 5.

### 4. FILLING AND VENTING

An auto air vent (which initially requires the top to be loosened) is fitted to the top of the insulated heat exchanger adjacent to the boiler. See Fig. 29. Air should be released as necessary from this point during filling. 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.

### 5. SYSTEM BY-PASS

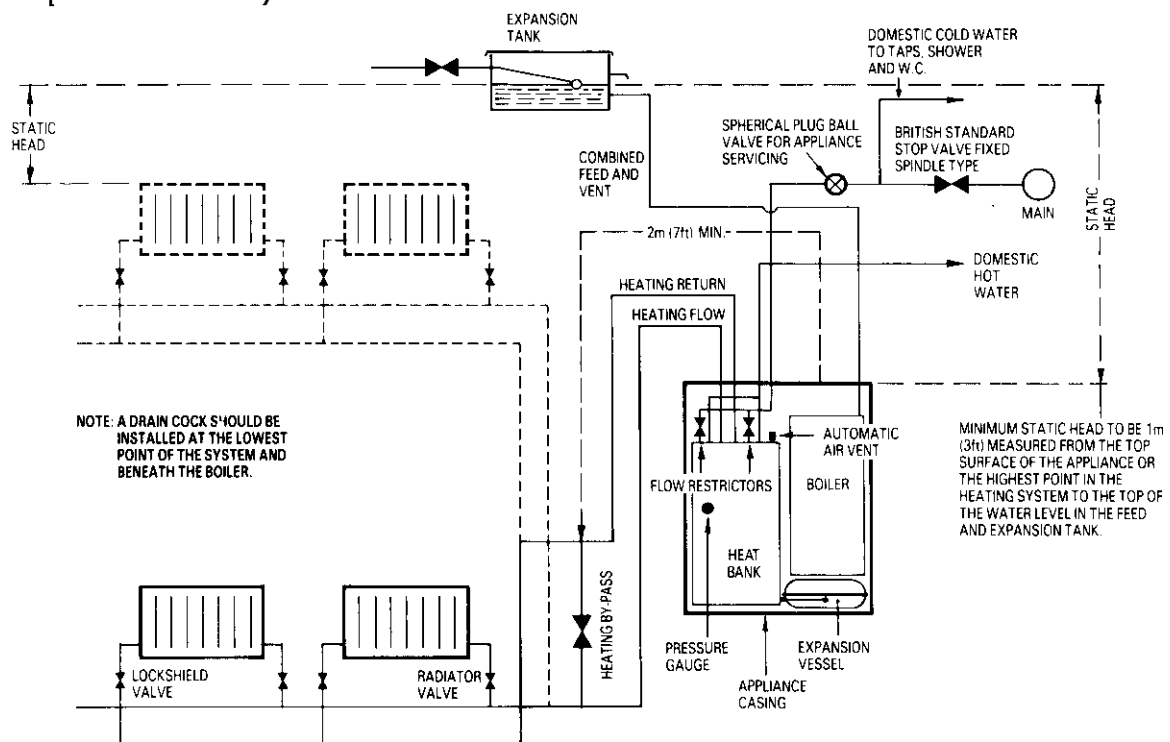
A suitable by-pass must be fitted, designed to give the minimum flow rate indicated in Table 3 corresponding to the heating output used. A suitable position for the by-pass is shown in Fig. 5. The by-pass should be connected in 22 mm diameter pipe at least 2 metres (7 ft.) from the appliance and fitted with a suitable valve to provide adjustment.

To adjust the by-pass, the boiler should be operated on central heating with the by-pass and radiator valves set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system and restrict the by-pass by the minimum amount necessary to give a temperature rise across the flow and return pipes of 11°C (20°F).

### 6. PUMP

The central heating pump has been set at **MAXIMUM** and must not be adjusted.

Fig. 7. Open vent water system.



## 10. DOMESTIC WATER SUPPLY

See Figs. 5 and 7.

**NOTE:** The following instructions are general installation recommendations and reference should be made to the local Water Authority 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 Figs. 5 and 7.

Devices capable of preventing the flow of expansion water should not be fitted unless separate arrangements for expansion water are made. The final 600 mm (23.6 in.) of the mains cold water connection to the appliance should be made in copper only.

### 2. HOT WATER SUPPLY AND FLOW REGULATION

The appliance is fitted with two water flow regulators.

The maximum flow of domestic hot water available through the appliance is limited to 21 litres/min. (4.5 gal./min.).

**NOTE:** The flow regulators contained within the flow regulator housing are plastic. Do not heat the housing during soldering operations on adjacent joints, e.g. remove and replace after soldering.

### 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-siphonage 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 25 mm (1 in.) above the top edge of the bath in order that the head is prevented from being immersed in bath water. Alternatively the shower must incorporate or be fitted with an anti-siphonage device at the point of the 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-siphonage arrangements are necessary.

### 7. USE IN HARD WATER AREAS

If the appliance is used in any area where the temporary hardness exceeds 200 ppm a Worcester 'In-Line' scale inhibitor (available from Worcester Heat Systems Ltd.) must be fitted into the cold supply to the appliance.

Installation should be strictly in accordance with the requirements of the local Water Authority. An isolating valve to facilitate servicing may be incorporated.

## 11. ELECTRICAL

See Figs. 8, 9, 10 and 11.

**NOTE.** Switch off the mains supply before removing the control box cover.

To gain access to the electrical terminal strip:

- Remove the cabinet top panel by snatching squarely upwards.
- Release the five pozi-drive screws securing the cover of the electrical control box and remove.

### ROOM AND FROST THERMOSTATS

If the room or frost thermostat is to be fitted, it should be wired into the appliance terminal strip as shown in Fig. 8. One or both of the blanking plugs must be removed from the electrical cover and the cable passed through the hole. A Heyco cord strain relief bush (packed separately with these instructions) must 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

The method of connection to the appliance must facilitate the complete isolation of the appliance, preferably via a 3 amp fused three-pin plug and unswitched shuttered socket outlet, both complying with the requirements of BS 1363. Alternatively connection may be made via a double pole isolator with a contact separation of 3 mm in all poles and supplying the boiler and controls only.

Mains Cable: 0.75 mm<sup>2</sup> (24 × 0.20 mm) to BS 6500 Table 16.  
Temperature rated at 100°C.

Should the factory fitted mains cable need to be replaced then the new cable must be connected into the terminals marked L, N and ÷ at the left hand side of the appliance terminal strip. The cable should then be passed through the cable clamp located in the left hand side of the electrical cover and clipped to the two cable retaining clips fixed to the left hand side panel. Care should be taken that the cable is clipped neatly into place.

**NOTE.** Ensure that the earth wire is longer than the live and neutral conductors so that they become taut before the earth.

The external wiring between the appliance and the electrical supply shall comply with 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. 9. Room thermostat and frost thermostat connections.

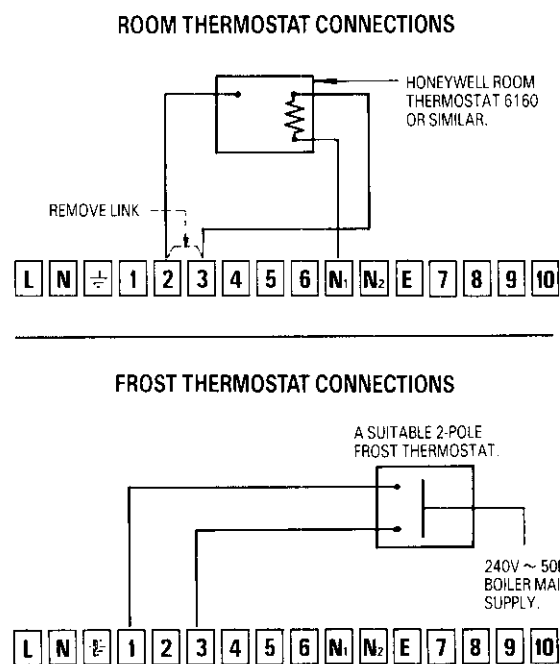


Fig. 10. Functional flow diagram—Hot water mode.

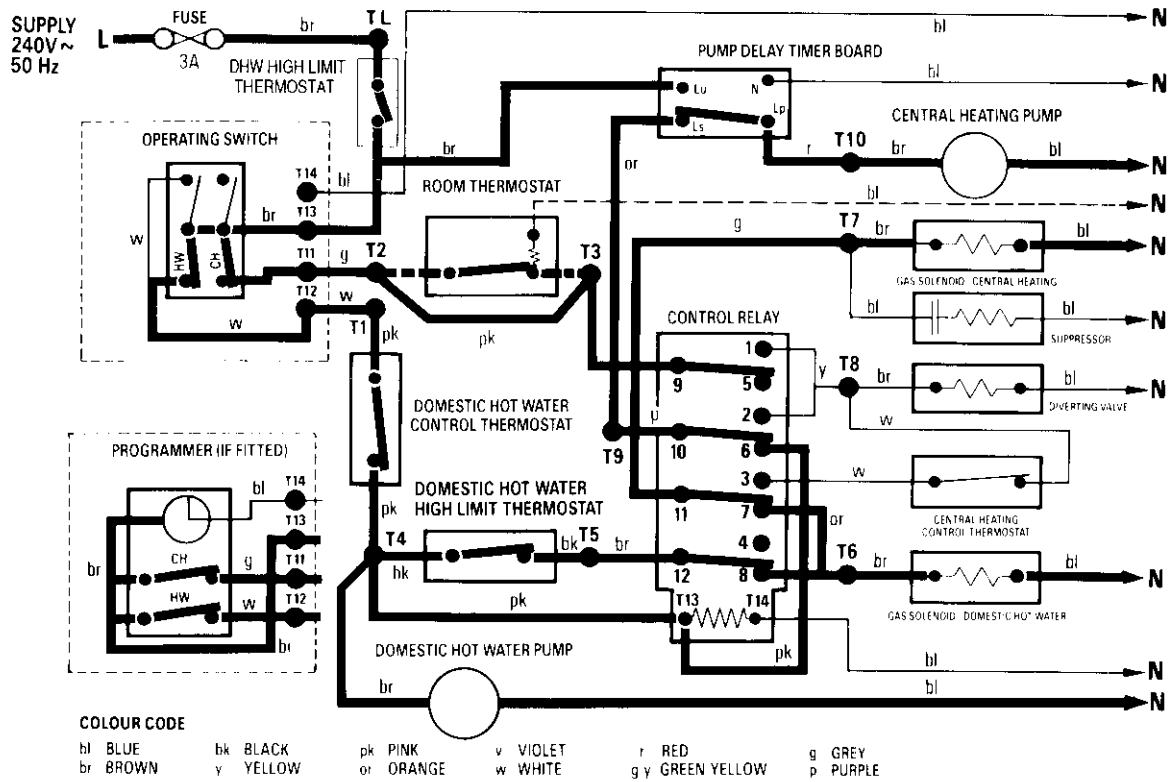


Fig. 11. Functional flow diagram—Central heating mode.

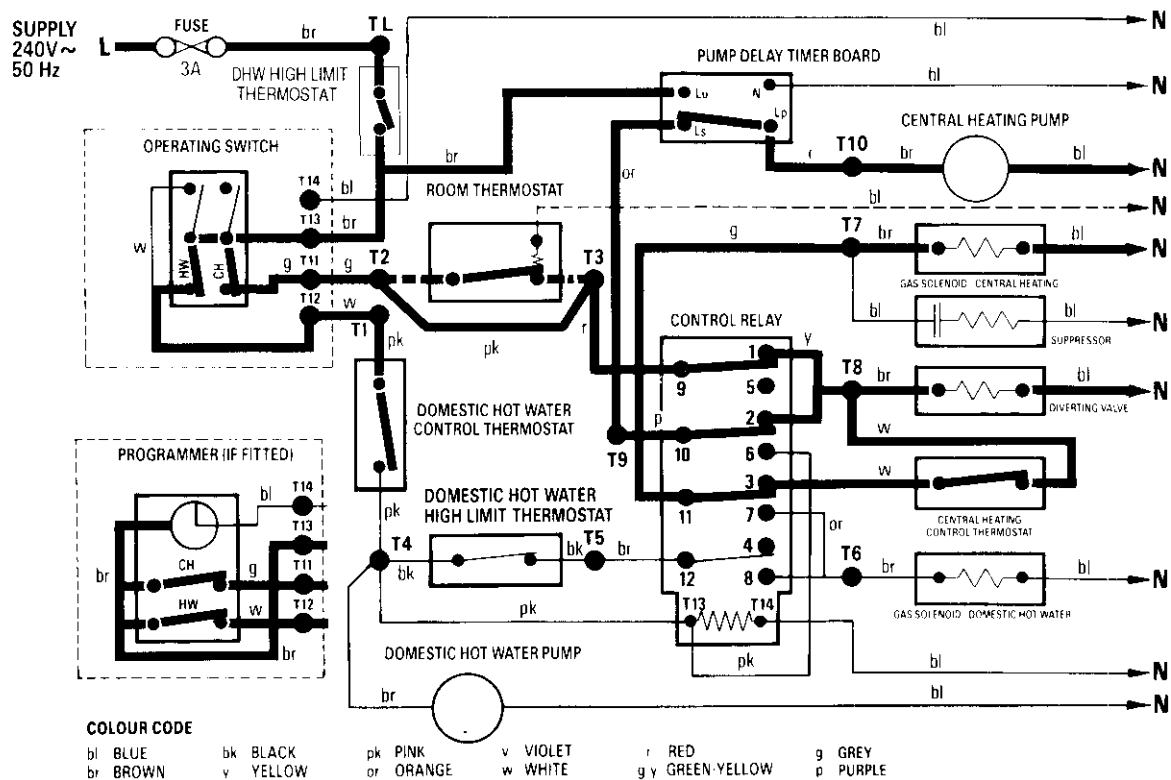
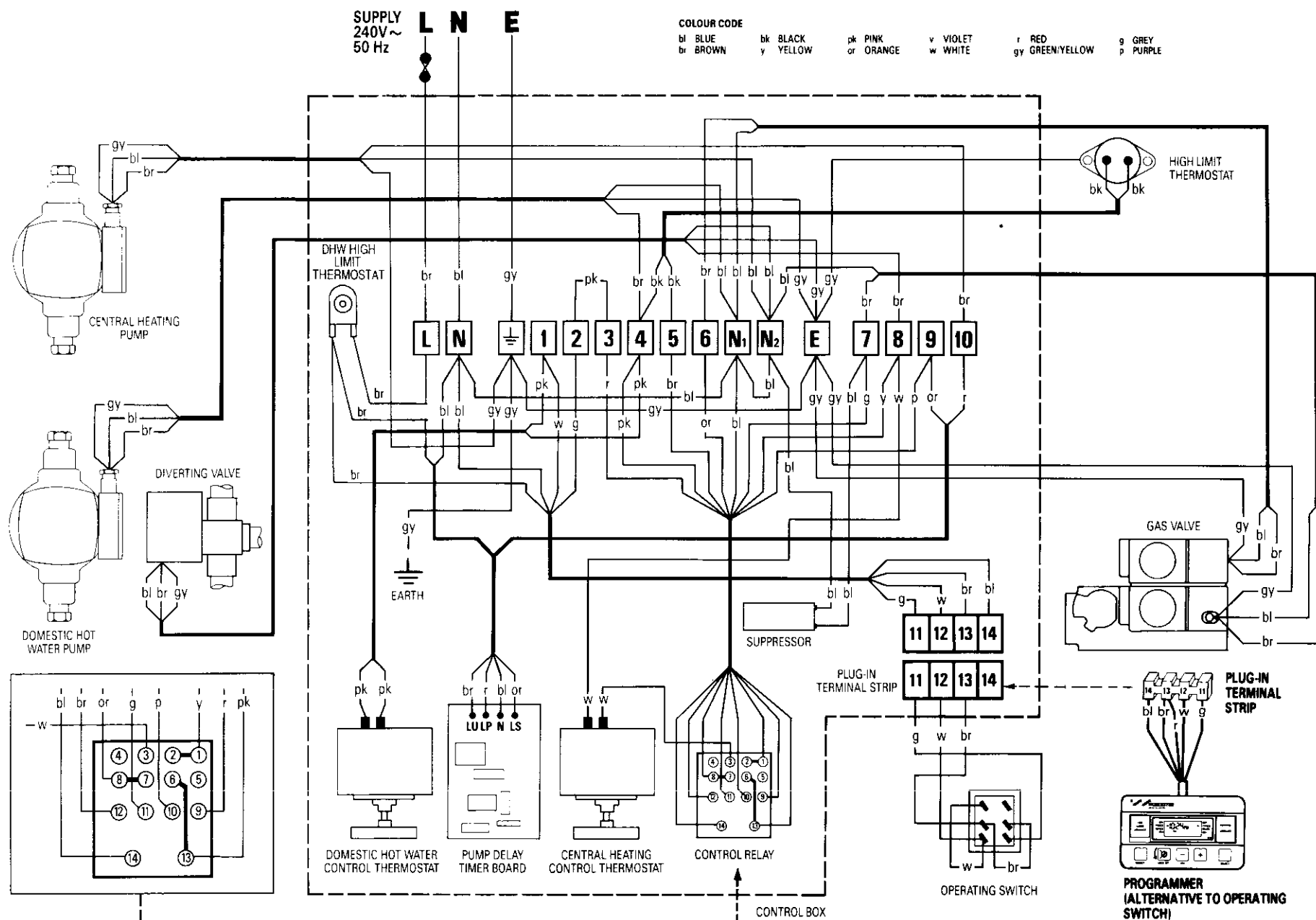


Fig. 11. Wiring diagram.



## 12. REMOVAL OF THE CABINET

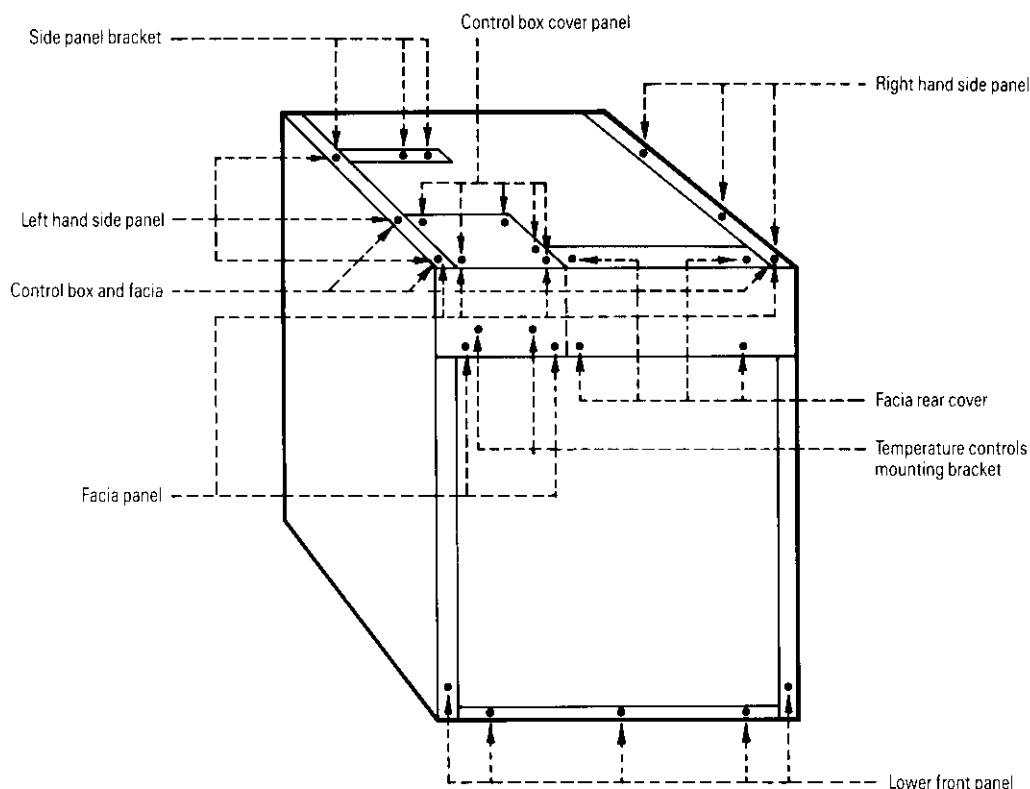
See Fig. 12.

**NOTE.** It is necessary to remove the cabinet top panel, front panel, left and right hand side panels and lower grille to aid installation.

- (a) Remove the appliance top panel by snatching squarely upwards to release the clips.
- (b) Remove the front panel by pulling firmly at the base and lifting upwards and outwards.

- (c) Undo the five pozi-drive screws holding the lower front grille kick strip to the side panels and base frame.
- (d) Remove the two thermostat knobs and release the three pozi-drive screws securing the control box and facia panel to the side panels. Lift the control box and facia and rest the assembly on top of the boiler. Take care not to stretch any electrical cables or thermostat capillaries.
- (e) Remove the three screws remaining at the top of each of the panels one in the left hand and two in the right hand panel. Draw the side panels slightly forward and release them from the securing lugs in the base plate. Disengage the wiring from the left hand panel location clip.

Fig. 12. Cabinet and control panel fixing screws.



## 13. INSTALLATION

See Figs. 2, 3, and 12.

**NOTE:** Refer to Section 4—Siting the Appliance, for space required for installing the appliance and for minimum clearances for servicing the appliance.

A knock-out panel is provided in the cabinet top panel to facilitate vertical pipe connections.

The following description covers one method of installation. If connections are made in a different way then the space required for installation may be greater.

Compression fittings may be used on all water connections to facilitate easier installation and servicing of the appliance.

It is most important that the pipework is routed so as not to obstruct access to the circulating pumps, diverting valve or heat exchanger (heat bank).

1. Check that the proposed position of the boiler is firm and level. No special floor protection is required. **Do not place the boiler in its final position at this stage.**
2. Remove the cabinet top, front, lower grille, left hand and right hand side panels. See Section 12.

**NOTE:** Rest the control box and facia assembly at the top right hand side of the boiler.

3. Remove the cabinet left hand side panel support strap by removing the two rear M5 screws securing it to the boiler inner casing.
4. Make the gas connection to the end of the gas supply pipe at the right hand side of the appliance.
5. Fit a 22 mm elbow to the primary feed pipe so that its outlet will face upwards through the cabinet top panel cut-out.
6. Fit a 15 mm elbow to the domestic cold water inlet manifold and a 22 mm elbow to the domestic hot water outlet manifold. The outlets may face upwards through the cabinet top panel cut-out or towards the left hand side of the appliance.
7. Fit a 28 mm x 28 mm compression fitting elbow to the central heating flow and return pipes. The outlets may face upwards through the cabinet top panel cut-out or towards the left hand side of the appliance.
8. **Sealed Systems Only**  
Fit a 22 mm copper pipe to the outlet of the tundish pipe to lead any possible discharge from the safety valve away from the boiler.

(On open vent systems the safety valve may be removed and the connection capped. Take care not to damage the pipe).

The discharge pipe from the tundish must be continued in 22 mm copper pipe, and laid to a continuous fall to avoid the retention of any discharge water within the pipework. A fall in excess of 1 in 200 will be satisfactory.

The pipework should have a resistance to flow of water not greater than that of a straight pipe 9 metres long.

The termination of the discharge pipe must be visible, but in a location not readily accessible to persons.

Discharges at low level are acceptable providing that a wire cage or similar is positioned to prevent contact, while maintaining visibility.

9. Move the appliance into its correct position with the rear of the appliance base plate parallel with the wall or skirting board.
10. Connect the gas pipe to the gas inlet on the appliance at the left hand side. The connection must be close to the side of the appliance.

## 14. COMMISSIONING THE APPLIANCE

After the appliance has been finally connected and the heating system flushed out (See Section 1, Paragraph 4—Installation Warning), check that the electricity supply is off, the gas service cock is off, the appliance thermostat control knobs are turned to maximum and the system controls are calling for heat.

1. Open all radiators and lockshield valves and fill the system. Vent as necessary. See Section 9, Paragraph 4. Check for water soundness.
2. Switch the electrical supply on at the mains socket.  
**NOTE:** Immediately mains electricity is applied to the boiler the pump delay timer is energised causing the central heating pump to run for about 5 minutes. This occurs whether or not the controls are calling for heat. The pump will subsequently only run in the course of the normal operation of the boiler.
3. Position the Operating Switch to **HEATING & WATER**. If a programmer is fitted, switch to the **ON** programme. Leave the system to work in a cold state for about 20 minutes, venting as necessary. Position the Operating Switch or programmer to **OFF**.
4. Turn the gas on at the gas service cock.
5. Push hard on the grey gas valve button and keep it pressed in. At the same time, separately push in the red igniter button. When it clicks, the pilot (seen through the observation window) should light. If the pilot does not light immediately, press the igniter button repeatedly until it does. When the pilot lights, continue to hold the gas valve button in for a further 15 seconds, then release it slowly.

**NOTE:** If the pilot does not stay alight, twist the gas valve button in the direction of the arrow. Wait for three minutes and repeat operation 5 until the pilot is lit. Continue to hold the gas valve button in for a longer period, then release it slowly. Check the pilot flame length is as indicated in Fig. 19. If it is not, then adjust the pilot throttle, clockwise to reduce the size or anti-clockwise to increase the size of the pilot flame. See Fig. 13.

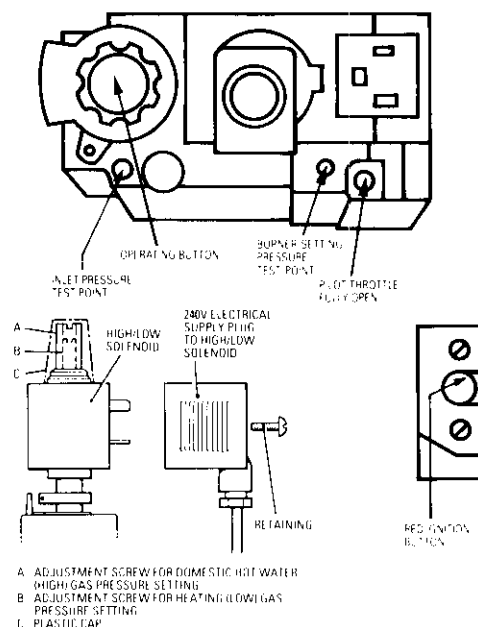
**NOTE:** The minimum recommended thermocouple output is 8mV closed circuit.

6. Loosen the burner pressure test point screw one turn and connect a pressure gauge. See Fig. 13.
7. Position the Operating Switch to **HEATING & WATER**, or, if a programmer is fitted, switch to **ON** programme. Check the main burner ignites smoothly.
8. Test for gas soundness around the boiler gas components using leak detection fluid. Refer to Section 16, Paragraph 7c for details of the method of checking the burner manifold joint for gas soundness.

Turn off the boiler and replace the boiler inner casing cover immediately after checking the gas soundness. Check the main burner through the observation window.

11. Check the gas pipework up to the appliance gas service cock for gas soundness in accordance with BS6891.
12. Connect the water system pipes at the rear of the appliance.
13. Thoroughly flush the whole of the water system with cold water. Fill the system, vent the boiler and check for water soundness.
14. Connect the first section of the flue to the socket on top of the boiler. See Section 5 – Flue. Properly seal the flue pipe into the socket. Complete the installation of the flue. **DO NOT OPERATE THE APPLIANCE WITHOUT THE FLUE FULLY CONNECTED.**
15. Connect the mains lead as described in Section 11 – Electrical. For frost and room thermostat connections refer also to Section 11.
16. Reassemble the appliance leaving off the cabinet front panel until the commissioning has taken place. See Section 14. Push the wiring back into the locating clip on the left-hand side panel.

Fig. 13. Gas control valve.



Check the burner setting pressures. See Section 2—Technical Data.

### ADJUSTING DHW (HIGH) GAS PRESSURE

Refer to Fig. 13

- (a) Allow the boiler to fire for at least 10 minutes before making any adjustments.
- (b) Turn the DHW thermostat to maximum. Turn the HEATING thermostat OFF.
- (c) If DHW service gas pressure needs adjustment refer to TECHNICAL DATA. Using a 10mm blade width screwdriver, turn the screw 'A' clockwise to increase and counter-clockwise to decrease pressure until the desired setting is achieved.
- (d) Check several times if main burner ignites smoothly, by operating the DHW thermostat, before proceeding to check the HEATING (LOW) gas pressure.

ADJUSTMENT OF HEATING (LOW) GAS PRESSURE Refer to Fig. 13

- (e) Turn the DHW thermostat to OFF. Set the HEATING thermostat to maximum.
- (f) If the HEATING gas pressure requires adjustment refer to TECHNICAL DATA
- (g) Using a small screwdriver turn the screw 'B' clockwise to increase and counter-clockwise to decrease pressure until the desired setting is achieved
- (h) Operate the HEATING thermostat several times to ensure the main burner ignites smoothly before checking that gas valve switches from HIGH to LOW correctly.

- (ii) Using the DHW and HEATING control thermostats switch the boiler from HIGH to LOW and back several times to ensure correct gas pressures. Replace the plastic cap 'C'.
9. Position the Operating Switch to **OFF**, or, if a programmer is fitted, set select button to **OFF**. Disconnect the pressure gauge and retighten the test point screw. Test for gas soundness around screw.
10. Check the operation of the flame failure device to ensure that it will shut off the gas to the main burner within 60 seconds. To do this, switch off the electricity supply at the mains and turn off the gas supply at the gas cock. After 60 seconds, check for the correct operation of the flame failure device by turning the gas back on at the gas cock and attempting to re-light the pilot without depressing the gas valve button. If the pilot can be lit in this way, turn off the gas supply and contact Worcester Heat Systems Ltd. Service Dept.
11. Position the Operating Switch to **HEATING & WATER** or, if a programmer is fitted, set select button to **OFF**. Re-light the appliance and allow it to operate, venting as necessary.  
**NOTE:** It will take about 15 minutes for the heat bank to be satisfied before the central heating system will receive heat. Check for water soundness.  
**Important:** The complete appliance must be checked for water leaks. Should any leaks be found they must be rectified before proceeding further. Check for spillage from the down draught diverter outlet at the right hand side of the appliance. Refer to BS 5440, Part 2, 1978.
12. Position the Operating Switch to **OFF**, or, if a programmer is fitted, set select button to **OFF**. Switch the electrical supply off at mains. Turn the pilot gas off at the gas valve as described in paragraph 5. While the water is still hot, drain the water at the drain points on the appliance and in the system.
13. Refill the appliance and system (see Instruction 1) and repeat Instructions 2 and 3.
14. Light the pilot (see Instruction 5) and repeat Instruction 7.
15. Check for correct operation of the user controls including the room thermostat (if fitted) and leave set to the customers requirements.
16. Refit the cabinet front panel.

## 15. USERS INSTRUCTIONS

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

Advise the user or purchaser of the precautions necessary to prevent damage to the heating and 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 significant 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 Limited will be pleased to discuss and offer a comprehensive maintenance contract.

Set the system controls to the users requirements.

## 16. ROUTINE CLEANING AND INSPECTION

To ensure continued efficient operation of the appliance, it must be checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but in general, once per year should be adequate. It is the law that any service work must be carried out by a competent person such as British Gas or other Corgi registered personnel.

### 1. The following should be carried out at periods not exceeding one year.

- (a) Carry out a pre-service check noting any operational faults.
- (b) Clean the burner.
- (c) Clean the burner and pilot injectors.
- (d) Inspect the heat exchanger and clean if necessary.
- (e) Check the condition of the spark electrode and thermocouple.
- (f) Check the condition of the combustion chamber insulation.
- (g) Check that the flue terminal is unobstructed and that the flue system, including the flue canopy assembly, is sealed correctly.
- (h) If the appliance has been installed in a compartment check that the ventilation areas are clear.
- (i) Check that the pipe connections throughout the system remain capable of sustaining a pressure of up to 3 bar. Remake or replace any fittings which show evidence of water leakage.

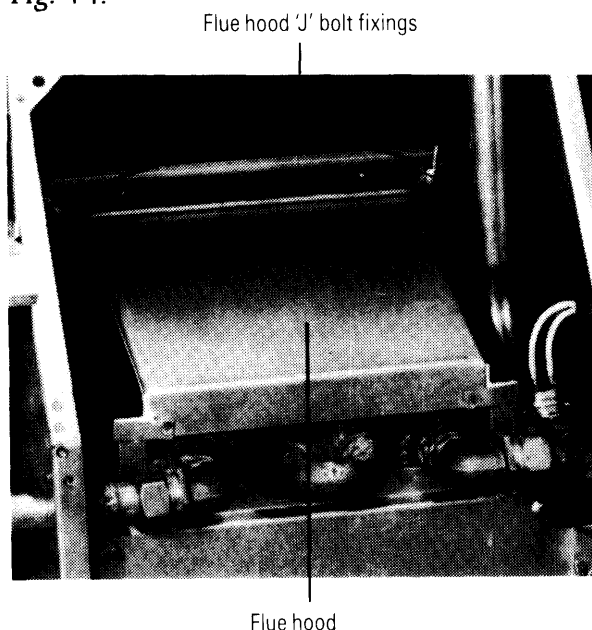
SOME OF THE SERVICING POINTS ARE COVERED MORE FULLY IN THE FOLLOWING INSTRUCTIONS.

### 2. PRE-SERVICE CHECK

- (a) Remove the cabinet front and top panels as described in Section 12, paragraphs (a) and (b).
- (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 check the function of the controls.

Fig. 14.



**3. REMOVE THE BOILER INNER COVER, FLUE HOOD, COMBUSTION CHAMBER FRONT PLATE, BURNER AND PILOT ASSEMBLY**

**(a) Remove the boiler inner casing cover**

(See Fig. 23.)

Remove the six M5 screws and washers holding the inner cover onto the boiler casing. Remove the inner cover.

**(b) Remove the flue hood**

(See Fig. 14.)

Slacken the wing nuts securing the 'J' bolts until the 'J' sections can be manipulated to pass upwards through their location brackets.

Lift the flue hood clear of the heat exchanger and remove from the casing. Gently prise upwards at the front sides to disengage if necessary. Take care not to disturb the overheat thermostat connections.

**(c) Remove the combustion chamber front plate**

Remove by releasing the six M5 fixing screws.

**(d) Remove the burner and pilot assembly**

(See Fig. 17.)

Disconnect the thermocouple nut at the pilot burner assembly and ease the thermocouple from the assembly.

Carefully pull the electrode lead off the connector tab at the electrode.

Disconnect the pilot tube within the combustion chamber at the adaptor.

Release the two extended M5 screws securing the burner manifold block at the front.

Carefully remove the burner and pilot assembly.

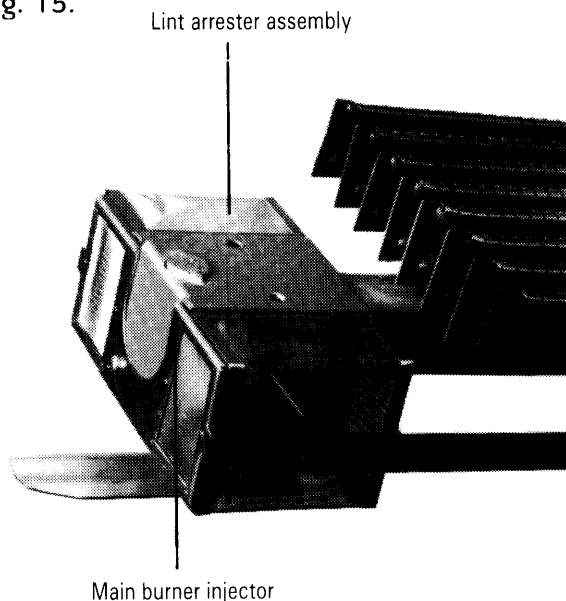
**NOTE:** The 'O' ring in the burner manifold block which seals with the gas manifold flange should be removed and retained for reassembly.

**4. CLEANING THE BURNER ASSEMBLY**

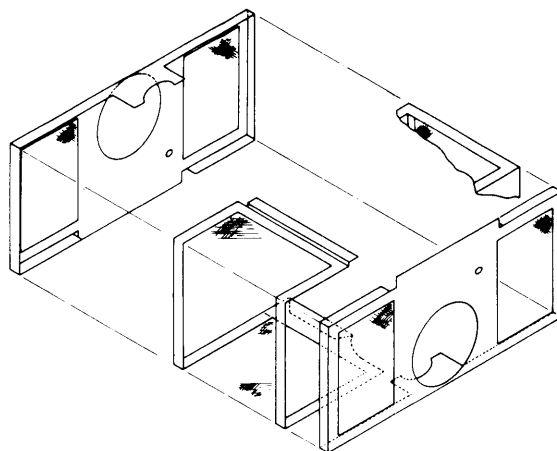
(See Fig. 17.)

- (a) Disconnect the pilot pipe from the pilot burner and remove the pilot injector which fits loosely between the pipe and burner.
- (b) Release the screw and carefully dismantle the lint arrester assembly, see Section 17—Instructions 2 and Figs. 15 and 16.
- (c) Carefully remove the main injector from the burner and check that there is no blockage or damage.
- (d) Brush the burner blades and check that the flame ports are clear. Do not use a brush with metallic bristles.

**Fig. 15.**



**Fig. 16. Lint arrester assembly**



- (e) Inspect the pilot burner and ignition electrode. Ensure that they are clean and in good condition. Check that the spark gap is 3–4mm (0.14 in.). See Fig. 19.
- (f) Check that the thermocouple tip is not burned or cracked. If it shows any sign of damage a new thermocouple must be fitted.
- (g) Clean the lint arrester gauze to remove any lint or fluff. Do not use a brush with metallic bristles.
- (h) Reassemble the burner components in the reverse order, not forgetting the pilot and main burner injectors. Thread sealing compound must not be used to seal the injectors. Do not fully tighten the pilot pipe at this stage.

**5. CLEANING THE HEAT EXCHANGER**

(See Fig. 26.)

- (a) Cover the pilot gas inlet adaptor and the main gas inlet within the combustion chamber.
- (b) Using a suitable brush, clean the inside surface of the heat exchanger and the fins.
- (c) Clean the flue duct.
- (d) Remove any deposits which fall to the bottom of the boiler casing.
- (e) Check the condition of the rear, sides and front combustion chamber insulation.

**NOTE:** The insulation used on the inside surfaces of the combustion chamber is delicate. Take great care not to abrade this insulation when cleaning the heat exchanger. Do not attempt to clean the insulation which should be replaced if there are any signs of deterioration. See Section 17—Replacement of Parts, Instruction 9.

**6. RE-ASSEMBLE THE APPLIANCE**

Re-assemble the appliance in the reverse order to the dismantling procedure.

- (a) Replace the flue hood on to the heat exchanger ensuring that the hood is properly located on the heat exchanger.
- (b) Locate the 'J' bolts in the side brackets, ensuring that they are hooked into the bracket, and hand tighten. Do not over tighten.
- (c) Inspect the 'O' ring seal. Replace the seal if there are any signs of deterioration.
- (d) Refit the 'O' ring into the burner foot. Replace the burner and pilot assembly and fit the burner location bracket into the bracket in the combustion chamber.
- (e) Secure the burner manifold with the extended M5 screws.
- (f) Connect and tighten the pilot feed pipe at the adaptor. Fully tighten the connection at the pilot assembly.
- (g) Reconnect the thermocouple.



- (h) Reconnect the piezo igniter lead to the electrode.
- (i) Check that all joints are tight.
- (j) Replace the combustion chamber front plate.
- (k) Brush any dust or deposits from the gas control and associated pipework.
- (l) Reassemble the cabinet in the reverse order to its removal. Do not fit the boiler inner casing cover, fascia or the cabinet front panel at this stage.

## 7. TEST THE APPLIANCE AND INSTALLATION

- (a) Turn on the gas at the gas service cock and reconnect the electrical supply.
- (b) Refer to the lighting instructions on the appliance front panel.
- (c) **Carefully** light the boiler and check for gas soundness (including the burner manifold connection within the combustion chamber) in accordance with BS 6891. It is necessary to operate the boiler for a short period with the boiler inner cover casing removed. **The action must be undertaken with great care.** Turn off the boiler and replace the boiler inner casing cover immediately after checking the gas soundness. Check the main burner through the observation window.
- (d) With the central heating off, check that the domestic hot water operates correctly. When the priority thermostat is satisfied, switch the central heating on and check that the water diverting valve operates and supplies hot water to the central heating circuit.
- (e) Set the Operating Switch (or programmer) to **OFF**.
- (f) Loosen the burner pressure test point one turn and connect a pressure gauge. See Fig. 24. Set the Operating Switch to **WATER & HEATING** (or programmer to **HW—24 hrs, CH—24 hrs**). Set the Hot Water Temperature Control Knob to off and the Central Heating Temperature Control Knob to maximum. If necessary, adjust the gas pressure at the governor on the gas valve. See Section 14—Commissioning the Appliance.
- (g) Set the Operating Switch to **WATER** (or programmer to **HW — ON**). Set the Central Heating Temperature Control Knob to off and the Hot Water Temperature Control Knob to maximum. Check the burner pressure. See Technical Data, Table 1. Should the pressure require adjustment, contact Worcester Heat Systems Service Dept.
- (h) Set the controls to **OFF**. Disconnect the pressure gauge and retighten the test point screw. Relight and test for gas soundness around the test point screw.
- (i) Before leaving the site the service engineer should check that no flammable material is left inside the appliance casing and that the ventilation requirements remain at the required

Fig. 17.



standard. See Section 7.

- (j) If the appliance is fitted in a cupboard check that the cupboard ventilation remains adequate. See Section 6.
- (k) Refit the fascia, cabinet front panel and top panel.

## 17. REPLACEMENT OF PARTS

**WARNING:** Disconnect the electrical supply at the mains and turn off the gas service cock before commencing any further work.

After replacement of components, check for gas soundness and carry out the functional checks as described in Section 14—Commissioning the Appliance.

### COMPONENT ACCESS

To replace appliance parts it is necessary to remove one or more sections of the cabinet and cover plates within the appliance as described below.

- (a) **Cabinet Top Panel**  
Snatch squarely upwards to release the clips.
- (b) **Cabinet Front Panel**  
Pull firmly at the base to release the clips and lift upwards and out.
- (c) **Facia Panel**  
Remove the six pozi-drive screws and the plug-in terminal strip connection. See Fig. 12. Remove the remaining screw in the right hand side panel to allow the removal of the facia.
- (d) **Control Box and Facia**  
Remove the cabinet top and front panels. Release the three pozi-drive screws and rest the assembly on the appliance. See Fig. 12. Release the remaining screw in the right hand side panel to allow the removal of the control box and facia.
- (e) **Boiler Inner Casing Cover**  
Remove the six slotted hexagon head screws and washers. See Fig. 23.
- (f) **Combustion Chamber Panel**  
Remove the six slotted hexagon head screws.
- (g) **Cabinet Lower Front Panel**  
Remove the five pozi-drive screws securing the panel. See Fig. 12.
- (h) **Control Box Cover**  
Remove the five pozi-drive screws. See Fig. 12.
- (i) **Control Box**  
Remove the facia panel. Remove the single pozi-drive screw in the top of the left hand side panel. See Fig. 12. Support the box so that undue strain is not placed upon the electrical cable and thermostat capillaries.
- (j) **Left Hand and Right Hand Cabinet Side Panels**  
Remove the cabinet top, front and lower front panels and the control box and facia. Remove the three screws remaining at the top of each of the panels, one in the left hand and two in the right hand panel. See Fig. 12. Draw the panels slightly forward to release them from the securing lugs in the base plate and lift away from the appliance.

### COMPONENT LOCATION

The following components can be replaced if the cabinet top panel, cabinet front panel, inner casing and combustion chamber cover are removed. See 17(a), (b), (e) and (f) preceding.

- 1: Main Burner
- 2: Main Burner Injector
- 3: Lint Arrestor Assembly
- 4: Pilot Injector
- 5: Spark Electrode
- 6: Pilot Shield
- 7: Pilot Burner
- 8: Thermocouple
- 9: Electrode Lead
- 10: Combustion Chamber Insulation.

The following components can be replaced if the cabinet front panel is removed. See 17(b) preceding.

- 11: Piezo Generator
- 12: Pressure Gauge

The following components can be replaced if the cabinet front panel, lower front panel and the inner casing are removed. See 17(b), (e) and (g) preceding.

Check that the electrical supply and the gas service cock are shut off.

- 13: Domestic Hot Water Pump
- 14: Gas Valve
- 15: Pilot Filter
- 16: Sealed System Expansion Vessel.

The following components can be replaced if the cabinet top panel, front panel and inner casing are removed. See 17(a), (b) and (e) preceding.

- 17: Overheat Thermostat

The following components can be replaced if the cabinet top panel, cabinet front panel, facia and the control box cover are removed. See 17(a), (b), (c) and (h) preceding.

Check that the electrical supply has been disconnected.

- 19: Domestic Hot Water High Limit Thermostat
- 20: Central Heating Control Thermostat
- 21: Domestic Hot Water Control Thermostat
- 22: Operating Switch
- 23: Control Relay
- 24: Programmer (if fitted)
- 25: Suppressor
- 26: Pump Delay Timer Board.

The following components can be replaced if the cabinet top panel is removed. See 17(a) preceding.

Check that the electrical supply has been disconnected.

- 27: Central Heating Pump
- 28: Flow Regulators
- 29: Safety Valve.

The following component can be replaced if the cabinet top panel, cabinet front panel, control box cover, inner casing, control box and facia and combustion chamber cover are removed. See 17(a), (b), (d), (e), (f) and (h) preceding.

Check that the electrical supply has been disconnected.

- 30: Diverting Valve.

The following component can be replaced if the cabinet top panel, cabinet front panel, control box and facia are removed. See 17(a), (b) and (d) preceding.

- 31: Automatic Air Vent.

The following components can be replaced if the cabinet top panel, cabinet front panel, lower front panel, inner casing, combustion chamber cover, control box and facia are removed. See 17(a), (b), (d), (e), (f) and (g) preceding.

- 32: Heat Bank
- 33: Heat Exchanger.

### 1. THE MAIN BURNER

Fig. 17.

- (a) Disconnect the thermocouple nut at the pilot burner assembly and ease it from the assembly.
- (b) Carefully pull the electrode lead off the connector tab at the electrode.
- (c) Disconnect the pilot tube within the combustion chamber at the adaptor.
- (d) Release the two extended M5 screws securing the burner manifold block at the front of the chamber.
- (e) Carefully remove the burner and pilot assembly from the combustion chamber by lifting and pulling.
- (f) Remove the pilot assembly by removing the two screws and nuts. Remove the main injector.

- (g) Reassemble in the reverse order. Ensure that the O-ring is located in the end of the burner manifold.
- (h) Check the gas soundness of the connection between the burner manifold and the gas line. See Section 16—Routine Cleaning and Inspection.

## 2. THE MAIN BURNER INJECTOR

Fig. 18.

- (a) Remove the burner. See Instruction 1 preceding.
- (b) Remove the lint arrestor assembly.
- (c) Remove the main injector from the burner.
- (d) Fit the new main injector and re-assemble the main burner assembly in the reverse order.

## 3. THE LINT ARRESTER ASSEMBLY

- (a) Remove the main burner. See Instruction 1 preceding.
- (b) Remove the M5 screw securing the lint arrestor assembly and lift the rear frame away from the burner.
- (c) Remove the clip beneath the arrestor assembly and lift away the side frames to left and right.
- (d) Lift the front frame up and away from the burner mixing tube.
- (e) Clean the gauze by shaking, washing in soapy water or brushing with a non-metallic brush. Take care not to damage the gauze or its assembly housing.

## 4. THE PILOT INJECTOR

Remove the main burner assembly. See Instruction 1 preceding.

- (a) Disconnect the thermocouple nut at the pilot burner assembly and ease it from the assembly.
- (b) Disconnect the pilot pipe from the pilot burner. Slacken the pilot tube connection at the adaptor within the combustion chamber and move the pilot pipe away from the pilot assembly.
- (c) The pilot injector may now be removed. It may be necessary to carefully ease the injector free.
- (d) Fit a new pilot injector and reassemble in the reverse order.

## 5. THE SPARK ELECTRODE

Fig. 20.

Remove the main burner assembly. See Instruction 1 preceding.

- (a) Release the hexagon nut securing the spark electrode to the pilot assembly and remove.
- (b) Fit a new spark electrode. Check that the spark gap is 3—4 mm (0.14 in.). See Fig. 19.

## 6. THE PILOT SHIELD

Fig. 21.

Remove the main burner assembly. See Instruction 1 preceding.

- (a) Remove the two M4 screws and nuts securing the pilot shield to the pilot bracket.
- (b) Fit a new pilot shield and reassemble in the reverse order.

## 7. THE PILOT BURNER

Fig. 20.

Remove the main burner assembly. See Instruction 1 preceding.

- (a) Remove the spark electrode, pilot shield and injector as previously described.
- (b) Remove the remaining M4 screw from the pilot bracket and remove the pilot burner.
- (c) Fit a new pilot burner and reassemble in the reverse order. Check that the pilot assembly is fitted above the mounting bracket on the main burner.

## 8. THE THERMOCOUPLE

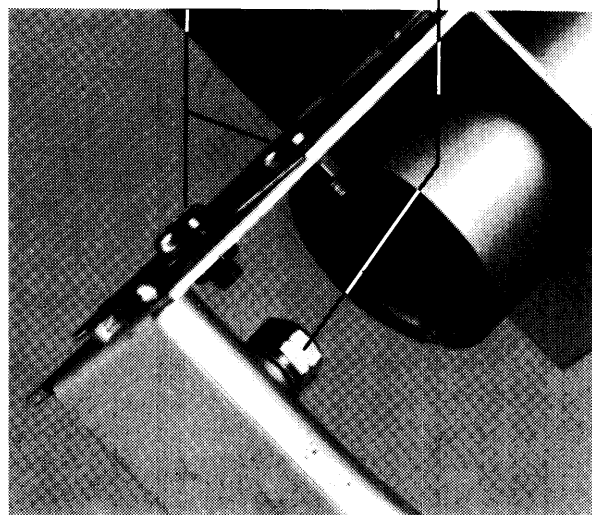
Fig. 17.

- (a) Disconnect the thermocouple nut at the pilot bracket and ease the thermocouple from the assembly.

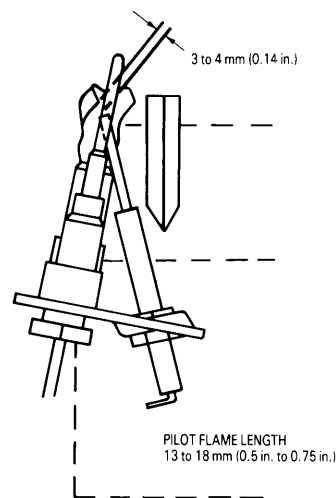
**Fig. 18.**

Lightback shield  
fixing screws

Main burner injector



**Fig. 19. Pilot head/electrode position.**



- (b) Release the thermocouple from its connection at the right hand side of the gas valve.
- (c) Remove the sealing cover and gasket from the boiler base by releasing the M5 screw.
- (d) Remove the thermocouple from the boiler. To prevent the risk of damage, remove the electrode lead before removing the thermocouple.
- (e) Reassemble in the reverse order using a new thermocouple. Avoid sharp bends in the thermocouple lead and ensure that it follows the same route as the original. Check that the thermocouple is seated correctly against the gasket where it enters the burner compartment. Fit a new gasket if necessary.

## 9. THE ELECTRODE LEAD

Fig. 22.

- (a) Carefully pull the lead off the connector tab at the electrode and at the piezo unit.
- (b) Remove the lead and fit a replacement.

## 10. THE COMBUSTION CHAMBER INSULATION

Fig. 17.

- (a) Cover the burner and pilot with a clean cloth to prevent any loose matter falling onto the assembly.
- (b) Remove the flue hood as described in Section 16 (3b)—Routine Cleaning and Inspection.

- (c) Drain the boiler.
  - (d) Loosen, but do not completely remove, the two M5 screws at the top of each side of the combustion chamber securing it to the inner casing.
  - (e) Release the union connections at the heat exchanger and carefully manoeuvre the heat exchanger out of the inner casing taking care not to mislay the fibre washers.
  - (f) Remove and discard the insulation and fit the replacement pads. Do not forget the pad fitted to the combustion chamber front cover.
  - (g) Refit the heat exchanger ensuring that it is correctly positioned. Do not forget the union washers.
- NOTE.** Do not forget to remove the cloth from the burner and pilot assembly.
- (h) Refit the combustion chamber cover.
  - (i) Tighten the combustion chamber fixing screws.
  - (j) Reassemble the appliance in the reverse order checking that all the components have been fitted correctly.

#### 11. THE PIEZO GENERATOR

Fig. 22.

- (a) Carefully pull the lead off the connector tab at the piezo generator.
- (b) Remove the two M5 fixing screws and remove the piezo generator.
- (c) Fit a new generator and reassemble in the reverse order checking that the overheat thermostat leads are not trapped by the generator bracket.

#### 12. THE PRESSURE GAUGE

Fig. 30.

- (a) Isolate the boiler and drain off the central heating and domestic hot water systems.
- (b) Unscrew the pressure gauge from the heat bank.
- (c) Fit a new pressure gauge.
- (d) Open all the radiator valves and refill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank.

Fig. 20.



#### 13. DOMESTIC HOT WATER PUMP

Fig. 30.

Check that the electrical supply has been disconnected.

- (a) Turn off the isolating valves mounted on the inlet and outlet of the pump.
- (b) Undo the two union nuts and remove the pump. Discard the sealing washers.
- (c) Support the pump and remove the two screws holding the electrical cover onto the pump and disconnect the electrical leads. Note the wire positions.
- (d) Fit the replacement circulating pump using new sealing washers.

**NOTE.** The direction flow indicator on the pump should point upwards towards the top of the appliance. The replacement pump should be set at **maximum** if fitted with a speed adjuster.

Fig. 21.

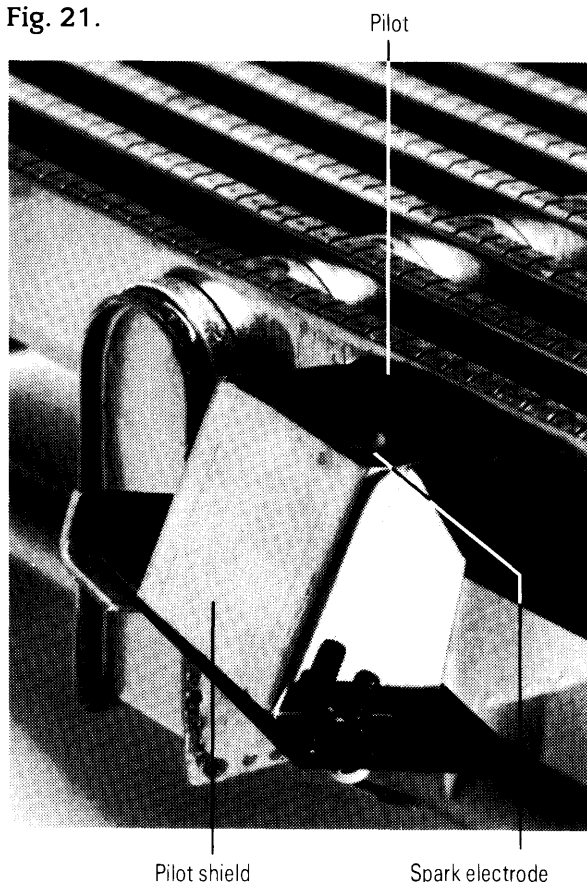
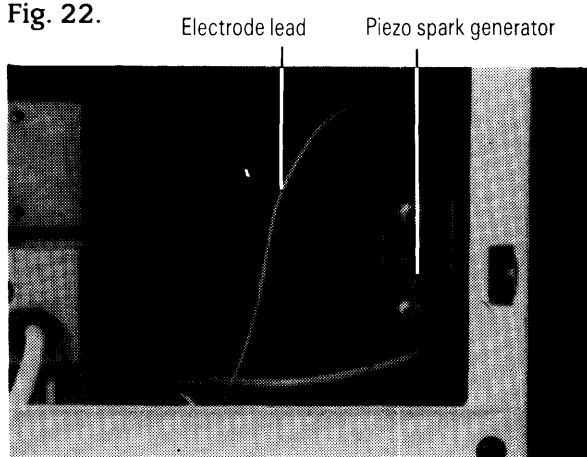


Fig. 22.



#### 14. THE GAS VALVE

Fig. 24.

- Disconnect the thermocouple from its connection at the right hand side of the gas valve. Disconnect the pilot pipe at its entry to the combustion chamber and at the gas valve. Remove the pipe.
- Unscrew the retaining screws from the solenoid electrical connection plugs, then pull each plug off of its respective set of terminals.  
**NOTE:** The plugs are dissimilar and therefore not interconnectable.
- Remove the four **M5** screws securing the right hand gas line flange connection to the gas valve.
- Remove the screw securing the gas valve support bracket located within the combustion chamber.
- Release the gas line union connection and carefully withdraw the valve assembly.
- Unscrew the limit thermostat lead from the rear of the gas valve.
- Remove the inlet elbow and transfer all the ancillary components to the new gas valve, using seating compound where necessary.
- Re-assemble in the reverse order, taking care to replace the sealing washer. Ensure that the limit thermostat lead is correctly positioned in the thermocouple interrupter before tightening the thermocouple unit.
- Turn on the gas supply at the gas service cock. Refer to the lighting instructions and light the pilot.
- Check connections for gas soundness.
- Turn on the electrical supply. Test for the correct operation of the gas valve and check for soundness.

#### 15. THE PILOT FILTER

Figs. 13 and 24.

Check that the electrical supply and the gas service cock are shut off.

- Release the cover from the central heating solenoid. There is no need to remove the electrical connections.
- Remove the governor and solenoid assembly by removing the four pozi-drive screws and put the assembly to one side. Do not strain the electrical leads. Do not disturb the sealing gasket.
- Remove the single pozi-drive screw securing the exposed cover plate and carefully lift away the plate.
- Replace the pilot filter.
- Reassemble in the reverse order taking great care to ensure that the gaskets are properly fitted and that the screws are tight. Replace the gaskets if any damage is apparent.
- Turn on the gas supply.
- Turn on the electrical supply. Refer to the lighting instructions and light the pilot. Check for gas soundness.
- Test for the correct operation of the gas valve and check for gas soundness.

#### 16. THE SEALED SYSTEM EXPANSION VESSEL

Fig. 25.

- Drain off the central heating and domestic hot water systems.
- Remove the gas valve as described in Instruction 14 preceding.  
**NOTE:** Lay the assembly to one side. It is not necessary to disconnect the main central heating and domestic hot water solenoid leads.
- Disconnect the main burner by removing the two extended M5 screws at the combustion chamber. Do not mislay the O-ring.
- Remove the four M5 screws and remove the gas line from the boiler.

- Remove the piezo generator as described in Instruction 10 preceding. The piezo generator bracket must be removed by releasing the two M5 screws securing it to the vertical member.
- Undo the union connection joining the expansion vessel to the heat bank.

**NOTE:** There will be a small quantity of water remaining in the heat bank.

Fig. 23.

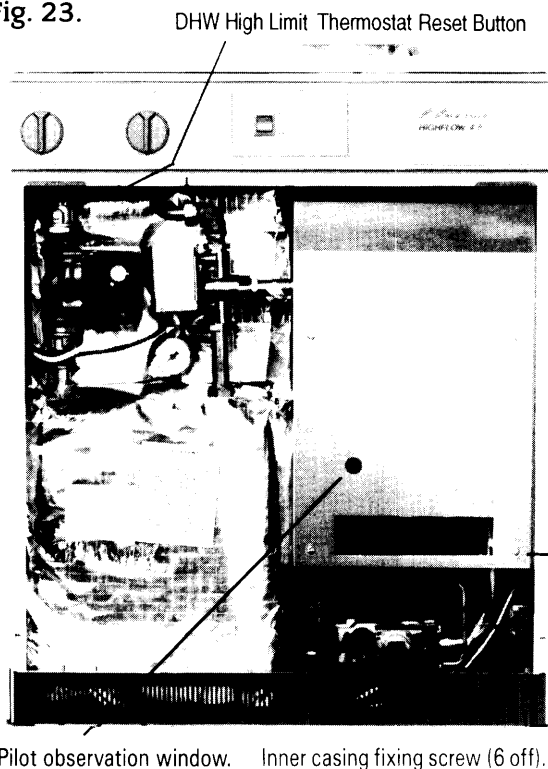
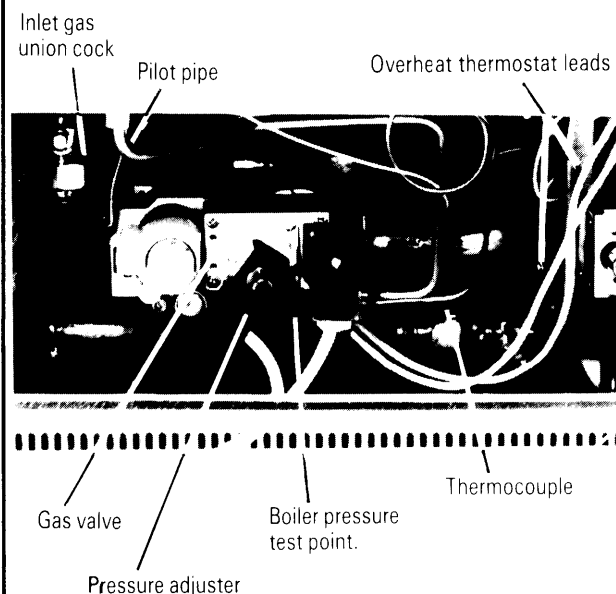


Fig. 24.



- (g) Remove the complete union fittings from the heat bank. Withdraw the expansion vessel. It will be necessary to slightly displace the gas line. Protect the threads of the gas line union.
- (h) Refit the new expansion vessel after transferring the short connector pipe assembly. Reassemble the appliance in the reverse order.
- (i) Refill the system and check for the correct operation of the controls and for the gas soundness of all relevant joints.

#### 17. THE OVERHEAT THERMOSTAT

Fig. 26.

- (a) Remove the two M3 taptite screws holding the overheat thermostat to the flow pipe.
- (b) Unscrew the limit thermostat leads from the gas valve. One is located at the rear of the gas valve. It will be necessary to remove the pilot pipe to gain access to the rear connection. The connection is a hexagon nut and an M10 open ended spanner will be required to release the nut to allow it to be unscrewed.
- (c) Push the grommet situated in the side of the inner casing inwards into the casing.
- (d) Thread the limit thermostat leads through into the inner casing and remove the thermostat.
- (e) Fit the new limit thermostat connecting the lead and grommet assembly in the reverse order. Take care not to overtighten the rear connection. Finger tight plus a quarter of a turn is sufficient.

**NOTE.** When fitting a replacement thermostat it is important to ensure that no foreign matter is present on the contact surfaces of both the thermostat and the mounting bracket. During manufacture thermal grease is smeared on the surfaces and may be left.

#### 18. THE BOILER INNER CASING COVER SEAL

Fig. 23.

- (a) Release the six slotted hexagon head screws and washers and remove the inner casing.
- (b) Remove the damaged sealing strip and fit the replacement strip using silicone adhesive. Check that the strip passes completely around the edge of the inner casing and across the centre channel with no gaps.
- (c) Refit the inner casing and tighten the screws evenly.

#### 19. THE DOMESTIC HOT WATER HIGH LIMIT THERMOSTAT

Fig 27.

- (d) Disconnect the thermostat leads at the terminal strip Refer to the wiring diagram (Fig 12) to ensure that the correct leads are disconnected. Do not leave any leads loose in the control box.
- (b) Release the strain relief bush by compressing the loose section of the bush and carefully withdraw the leads from the control box.
- (c) Remove the two M3 taptite screws holding the overheat thermostat to the flow pipe.

- (d) Fit a new thermostat and reconnect ensuring that the strain relief bush has been replaced. Refer to the electrical wiring diagram (Fig. 12) to ensure the correct connections are made.

**NOTE.** When fitting a replacement thermostat it is important to ensure that no foreign matter is present on the contact surfaces of both the thermostat and the mounting bracket. During manufacture thermal grease is smeared on the surfaces and may be left.

- (e) Re-assemble the appliance in the reverse order.

#### 20. THE CENTRAL HEATING CONTROL THERMOSTAT

Fig 27.

- (d) Unscrew the two slotted M5 screws located beneath the control box and ease away the thermostat and pump delay timer mounting bracket.
- (b) Using a pair of long nose pliers pull the retaining clip from the thermostat pocket situated in the flow pipe and remove the thermostat phial.

- (c) Remove the thermostat central clamping nut and washer.
- (d) Pull off the two electrical connections from the rear of the thermostat.
- (e) Push the thermostat body back to disengage the spindle from the mounting bracket.
- (f) Withdraw the thermostat and thread the capillary through the slot in the rear of the electrical control box.
- (g) Fit the new thermostat and reassemble in the reverse order. The capillary of the replacement thermostat must be uncoiled to assist its passage through the control box opening with the thermostat in position the excess capillary must be recoiled, without tight bends and positioned so that it is beneath the combined feed and vent pipe but not in contact with any hot surface. Ensure that the retaining clip is replaced into the thermostat pocket.

Fig. 25.

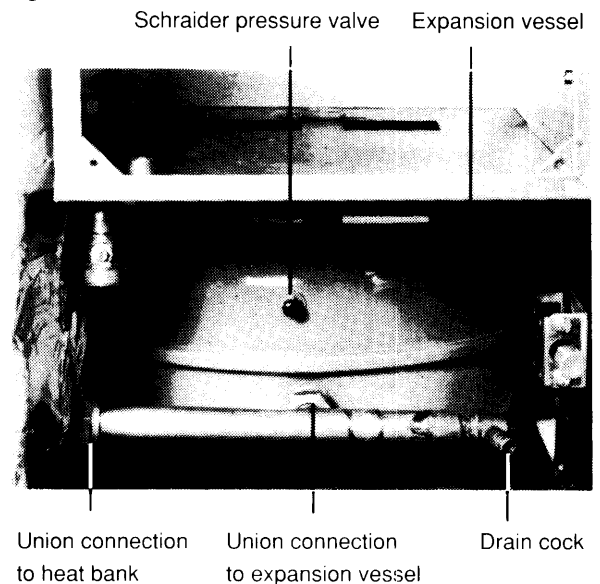
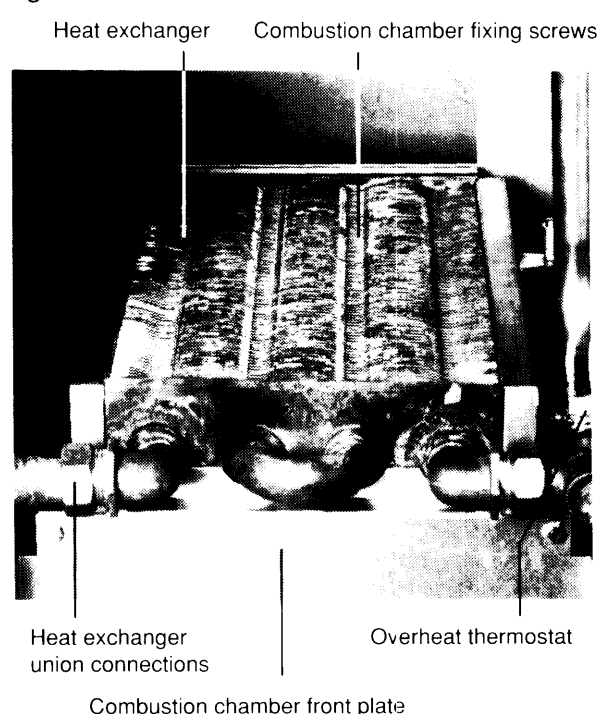


Fig. 26.



## 21. THE DOMESTIC HOT WATER CONTROL THERMOSTAT

Fig. 27.

- (a) Unscrew the two slotted M5 screws located beneath the control box and ease away the thermostat and pump delay timer mounting bracket.
- (b) Using a pair of long nose pliers pull the retaining clip from the thermostat pocket situated in the domestic hot water inlet pipe on the top of the heat bank at the rear and remove the thermostat phial.
- (c) Remove the central clamping nut and washer.
- (d) Pull off the two electrical connections from the rear of the thermostat.
- (e) Push the thermostat body back to disengage the spindle from the mounting bracket.
- (f) Withdraw the thermostat and thread the capillary through the slot in the rear of the electrical control box.
- (g) Fit the new thermostat and reassemble in the reverse order. The capillary of the replacement thermostat must be uncoiled to assist its passage through the control box opening. With the thermostat in position the excess capillary must be recoiled, without tight bends, and positioned so that it is beneath the combined feed and vent pipe but not in contact with any hot surface. Ensure that the retaining clip is replaced into the thermostat pocket.

## 22. THE OPERATING SWITCH

- (a) Disengage the rear cover of the fascia panel by releasing the four M5 screws, two at the top and two at the bottom.
- (b) Remove the push-on connections from the rear of the switch taking note of their positions.
- (c) Squeeze together the two plastic retaining lugs and remove the switch from the front of the fascia.
- (d) Snap in the replacement switch and with the aid of the wiring diagram (Fig. 11) reconnect the push-on connections.

## 23. THE CONTROL RELAY

Fig. 28.

- (a) Ease the relay from the base by pulling horizontally.
- (b) The new relay will fit in one direction only. Push the relay into the base until fully located.

## 24. THE PROGRAMMER (IF FITTED)

- (a) Remove the rear cover of the fascia panel by releasing the four M5 screws, two at the top and two at the bottom.
- (b) Remove the programmer by unscrewing the four screws securing it to the fascia, two at the top, two at the bottom.
- (c) Fit the replacement programmer and reassemble in the reverse order. Use only the specified programmer. Do not attempt to fit any other model or make.

## 25. THE SUPPRESSOR

Fig. 28.

- (a) Unscrew the two slotted M5 screws located beneath the control box and ease away the thermostat and pump delay timer mounting bracket.
- (b) The suppressor is located below the terminal strip and is held by a 'P' clip secured by a screw. Loosen the screw and ease the suppressor clear of the bracket.
- (c) Disconnect the suppressor leads from the terminal strip and remove.
- (d) Fit the replacement suppressor and reassemble in the reverse order. Refer to the electrical wiring diagram (Fig. 12) to ensure the correct connections are made.

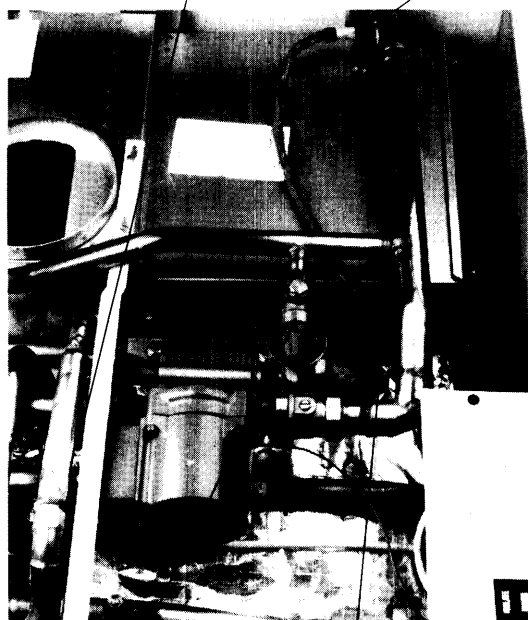
## 26. THE PUMP DELAY TIMER BOARD

Fig. 28.

- (a) Unscrew the two slotted M5 screws located beneath the control box and ease away the thermostat and pump delay timer mounting bracket.
- (b) Release the plastic catch on the end of each mounting post and pull the printed circuit board forward approximately 3 mm at a time to prevent the plastic catch from returning. It may be necessary to use an electrical screwdriver to assist in releasing the catches.
- (c) Pull the board off the mounting posts until it is free.
- (d) Disconnect the electrical connections at the terminal strip.
- (e) Locate the replacement board (with the leads at the top) over the four mounting posts and push back squarely until the plastic catch on the end of each post clicks into place.
- (f) Reconnect the leads with the aid of the wiring diagram (Fig. 11). It is important to reconnect the leads correctly.

Fig. 27.

Domestic hot water high limit thermostat      Domestic hot water overhear thermostat

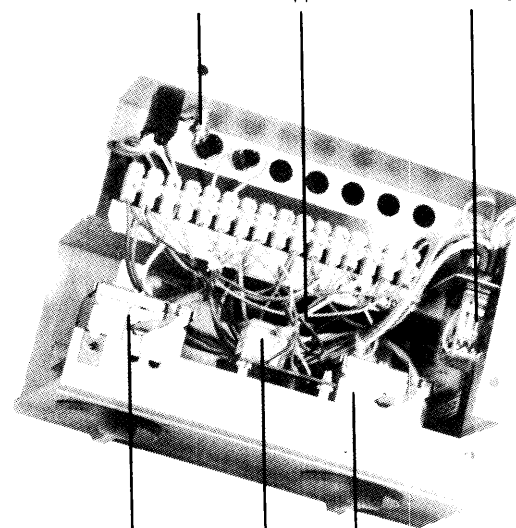


Safety valve

Central heating control thermostat

Fig. 28.

Earth screw      Suppressor      Control relay



Domestic hot water control thermostat

Central heating control thermostat

Pump delay timer board

## 27. THE CENTRAL HEATING CIRCULATING PUMP

Fig. 29.

- (a) Turn off the isolating valves mounted on the inlet and outlet pump.
- (b) Remove the left hand side panel support strap.
- (c) Undo the two union nuts, remove the pump and discard the sealing washers. If the connections are found to be excessively tight then the left hand cabinet side panel may be removed to give increased access.
- (d) Remove the two screws holding the electrical cover on the pump and disconnect the electrical leads and note the wire positions.
- (e) Fit the replacement circulating pump using new sealing washers.

**NOTE.** The direction flow indicator on the circulating pump should point towards the rear of the boiler. The replacement pump should be set at **maximum** speed if fitted with a speed adjuster.

- (f) Open the isolating valves.
- (g) Reassemble the appliance in the reverse order.

## 28. THE FLOW REGULATORS

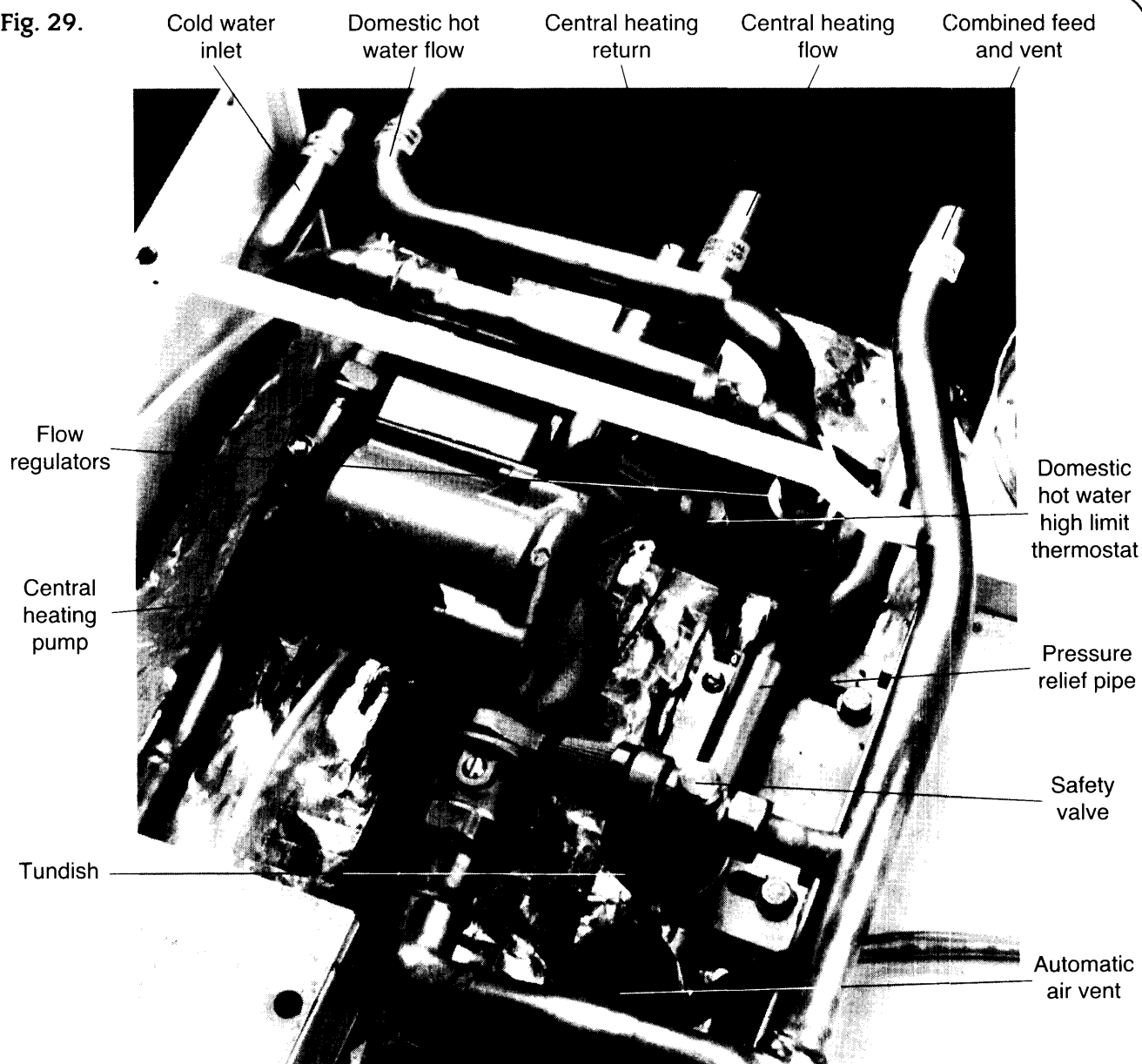
Fig. 29.

**NOTE.** The appliance is fitted with two plastic flow regulators and wire mesh filters in the cold water supply. They are located in the cold inlet manifold to the water-to-water heat exchangers.

For better access to the right hand flow regulator housing nut the central heating circulating pump may be removed. Follow instructions 27a, b and c ensuring the sealing washers are not mislaid. Place the pump on top of the heat bank taking care not to strain the wire.

- (a) Turn off the mains cold water supply. A residue of the water will remain in the pipe. Open a cold water tap to drain the pipework.
- (b) Unscrew the flow regulator housing union nuts and ease the cold water manifold aside. It may be necessary to unclip the supply pipe.
- (c) Remove the wire mesh filter from the upper half of the housing and take care not to loose the fibre washer. Wash the filter in clean water.
- (d) Remove the plastic flow regulator from the lower half of each housing. It may be necessary to prise the regulator from the housing.
- (e) Fit a new flow regulator (small diameter section first) and reassemble in the reverse order. Replace the fibre sealing washers if necessary. Sealing compound should not be used.

Fig. 29.





## 29. THE SAFETY VALVE

Fig. 27.

- (a) Drain off the central heating and domestic hot water systems.
- (b) Unscrew the safety valve from the feed and vent pipe taking care not to distort the pipe.
- (c) Fit a new safety valve using an approved jointing compound.
- (d) Open all the radiators and fill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank.

## 30. THE DIVERTING VALVE

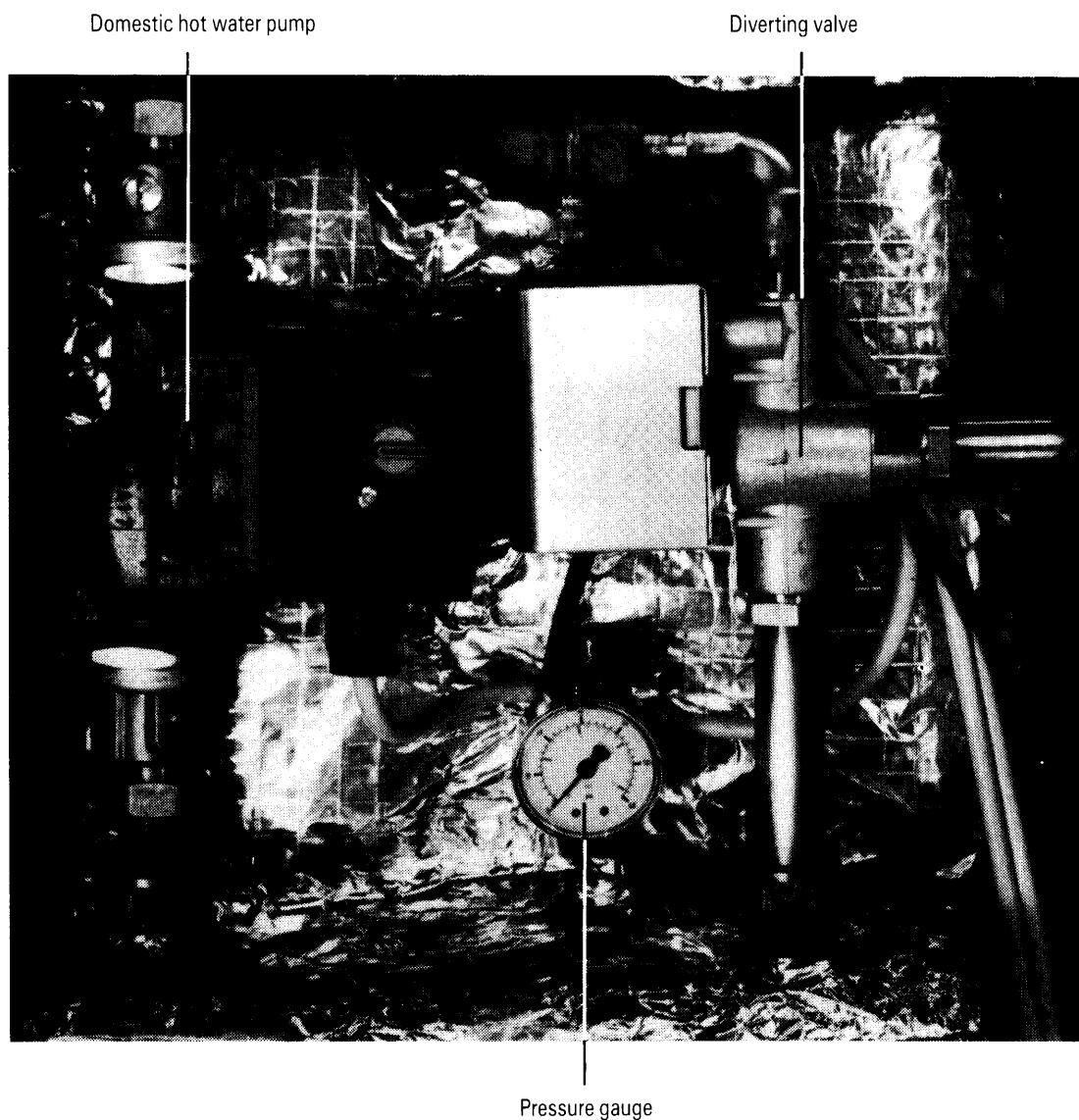
Fig. 30.

- (a) Drain down the central heating and domestic hot water systems.
- (b) Disconnect the diverting valve leads at the terminal strip. See Fig. 11. Release the strain relief bush and carefully withdraw the leads from the control box.
- (c) Loosen the top connection on the diverting valve and disconnect the other end of the elbow. Take care not to mislay the washer.

- (d) Release completely the left hand heat exchanger union connection taking care not to mislay the washer.
- (e) Release the remaining two union connections on the valve. Carefully rotate the connector pipe between the diverting valve and the heat exchanger to allow it to be drawn away from the diverting valve.
- (f) Lift the valve upwards and to the left to separate it from the pipes.
- (g) Fit the replacement diverting valve with the manual override lever facing downwards.
- (h) Reconnect the leads ensuring that the strain relief bush is replaced. Refer to the electrical wiring diagram (Fig. 11) to ensure the correct connections have been made.
- (i) Open all radiator valves and refill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank.
- (j) Check that the system operates satisfactorily.

**NOTE.** It is possible with some diverting valves to replace the operating mechanism only, leaving the valve body in-situ. Consult the diverting valve manufacturers instructions for further information.

Fig. 30.



### 31. THE AUTOMATIC AIR VENT

Fig. 29

- (a) Drain down the central heating and domestic hot water systems.
- (b) Unscrew the automatic air vent.
- (c) Fit the replacement air vent using an approved jointing compound.
- (d) Open all radiator valves and refill the system, venting as necessary.
- (e) Check that the system operates satisfactorily.

### 32. THE HEAT BANK

Should the heat bank fail or the domestic hot water heat exchanger within it become scaled up due to its use in a hard water areas without suitable water treatment, then Worcester Heat Systems Ltd. Service Department should be contacted, who will advise on suitable remedial action.

### 33. THE HEAT EXCHANGER

Figs. 16 and 26.

- (a) Drain down the heating system.
- (b) Slacken the wing nuts securing the 'J' bolts holding the flue hood until the 'J' sections can be manipulated to pass upwards through their location brackets.
- (c) Lift the flue hood clear of the heat exchanger and remove from the casing. Gently prise upwards at the front sides to disengage if necessary. Take care not to disturb the limit thermostat connections.
- (d) Slacken the two M5 screws securing the combustion chamber to the inner casing. See Fig. 26.
- (e) Release the two heat exchanger union connections. Ease back the pipe work and remove the heat exchanger by lifting it slightly to release it from the rear mountings.
- (f) Fit a new heat exchanger and reassemble in the reverse order, ensuring that it is correctly seated in its mountings. Do not forget to fit new washers.
- (g) Open all radiator valves and refill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank. See Fig. 29.
- (h) Reassemble the appliance.
- (i) Check that the appliance and system operates satisfactorily.

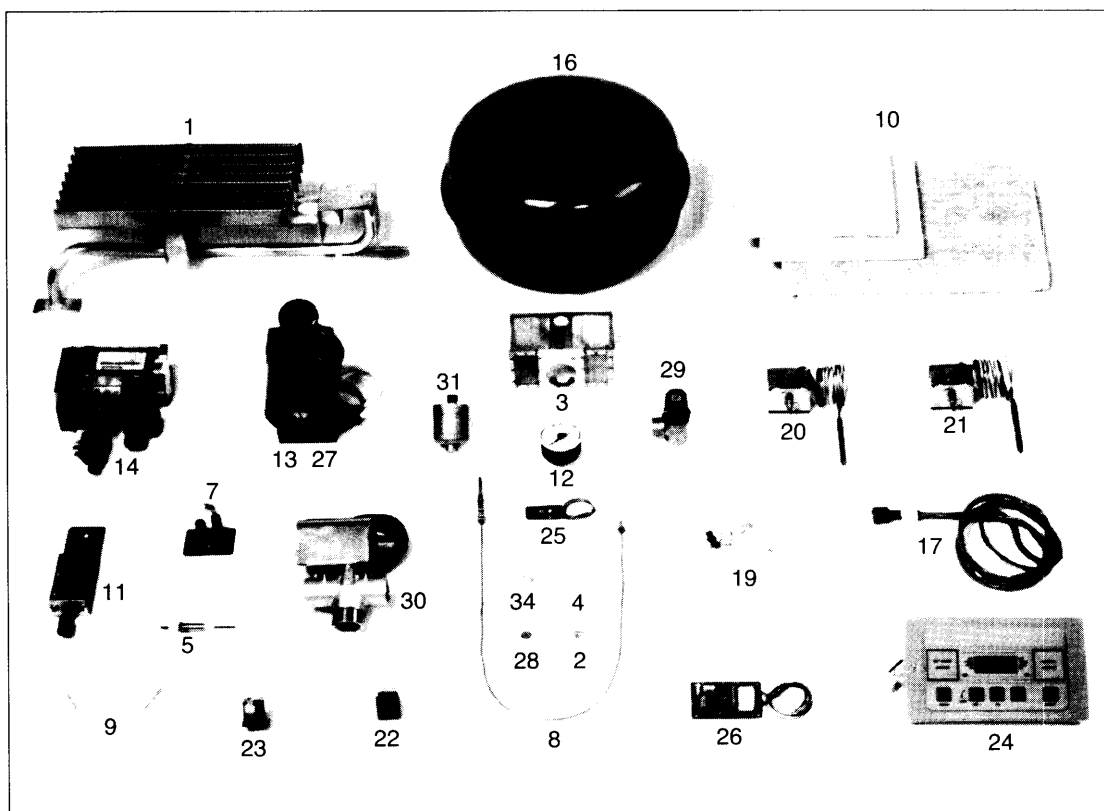
### 34. THE DHW HIGH LIMIT THERMOSTAT

Fig. 29

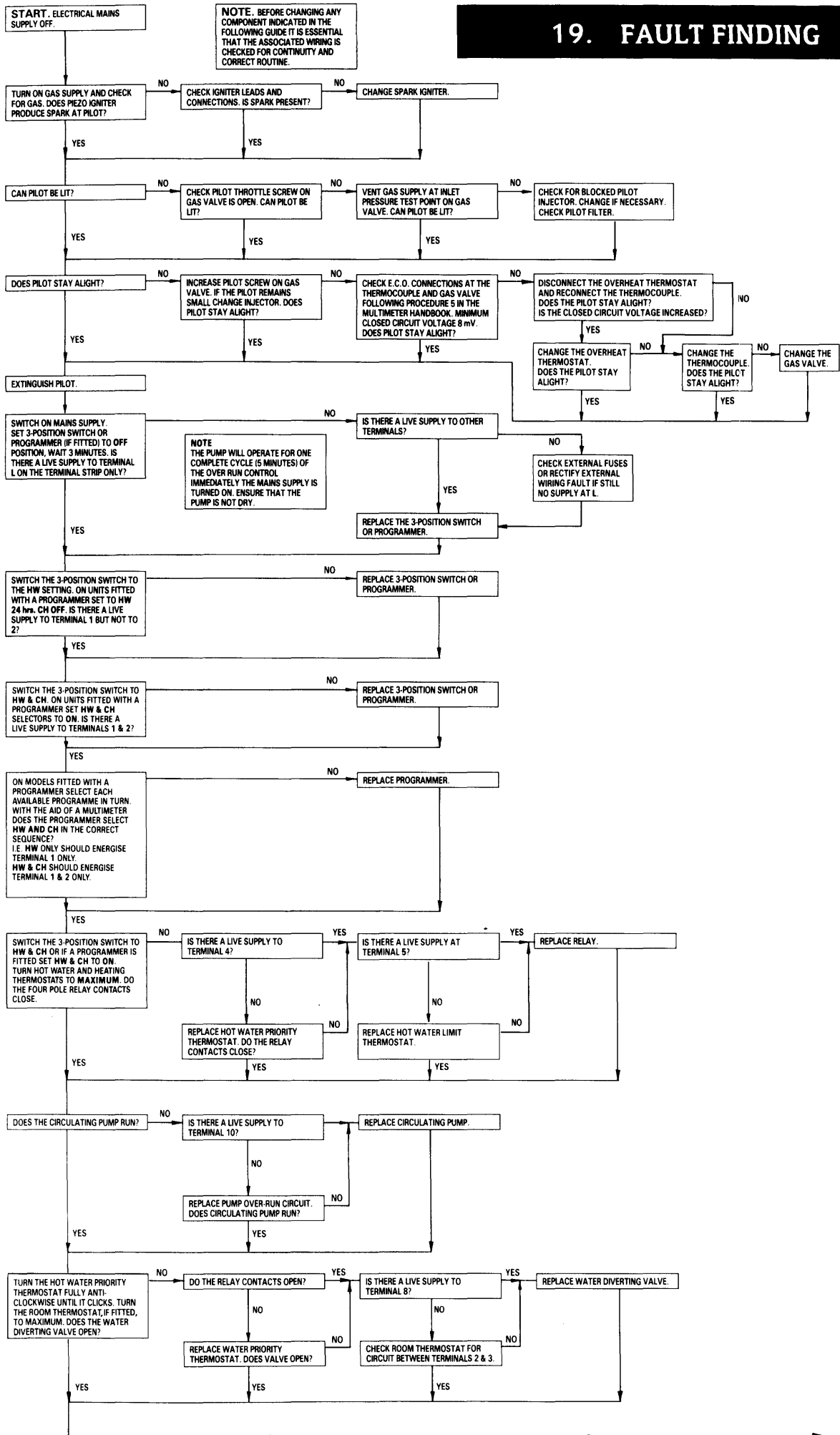
- (a) Remove the clip from the end of the overheat thermostat phial pocket.
- (b) Remove the thermostat phial from its pocket and feed it out of the exposed hole at the left-hand side of the electrical box.
- (c) Pull off the two electrical connectors at the thermostat. Polarity is not important.
- (d) Remove the thermostat centre post fixing nut situated under the control panel. Ease the thermostat out of its hole.
- (e) Replace with a new thermostat in reverse order, ensuring the split pin is replaced and any surplus capillary tube is coiled neatly OUTSIDE the control panel in the space below the control panel.

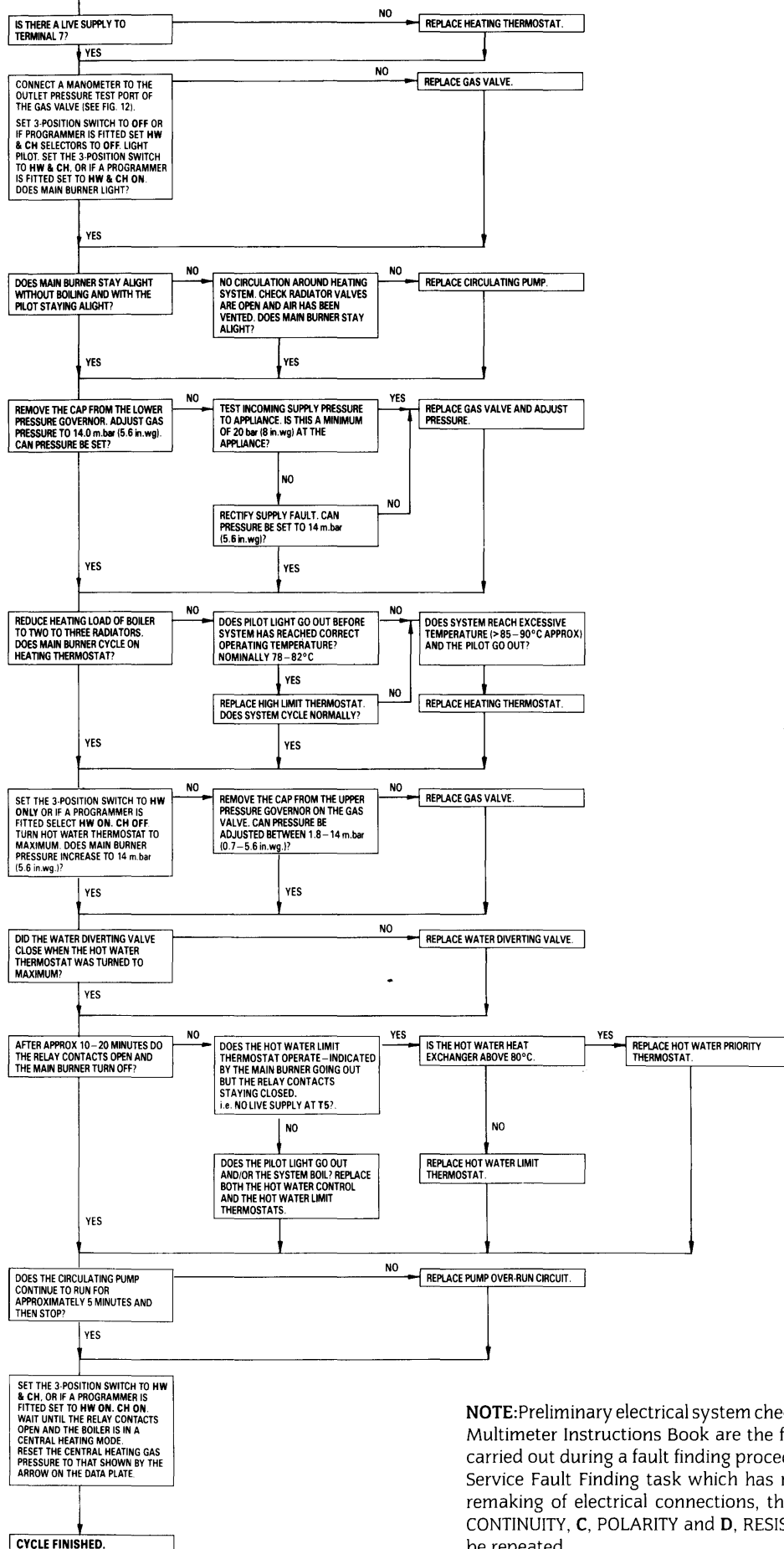
## 18. SHORT PARTS LIST

Key No.	GC No.	Description	Manufacturer's Reference	Qty	WHS Part No.
1	382849	Main Burner	Furigas 156.500.003	1	ZAGAS069
2	382851	Main Burner Injector	Furigas 515.001.000.4.5	1	ZAGAS076
3	371357	Lint Arrestor Assembly		1	ZBGAS068
4	382850	Pilot Injector	Honeywell 45.004.108.001B	1	ZBGAS016
5		Spark Electrode	Drq. No. 3/5382	1	ZBGAS062
7	391664	Pilot Burner	Honeywell Q359	1	ZBGAS017
8	390210	Thermocouple	Honeywell Q309 A2747	1	ZBGAS035
9	324887	Electrode Lead	Kigas 7774.700 long	1	ZBGAS025
10	371350-2	Combustion Chamber Insulation		1	ZEINS055-7
11	393652	Piezo Generator	Vernitron 0207	1	ZBGAS010
12	371376	Pressure Gauge	Wila 0-4.0 bar (0-60 psi)	1	ZBUNC145
13	299113	Domestic Hot Water Pump	Grundfos UPS15-60	1	ZAMAJ185
14	378743	Gas Valve	Honeywell V460002083	1	ZAGAS132
16	382883	Sealed System Expansion Vessel	Zilmet Type 541	1	ZMMIS084
17		Overheat Thermostat	Elmwood 2455RBV	1	ZAMAJ223
19	382897	Domestic Hot Water High Limit Thermostat	Elmwood 2455RC	1	ZAMAJ096
20	395958	Central Heating Control Thermostat	Ranco CL6PO128	1	ZAGAS008
21		Hot Water Control Thermostat	Ranco CL6PO147	1	ZAGAS207
22	386778	Operating Switch	Arrow 2004E	1	ZDELE237
23	368289	Control Relay	Omron MY4	1	ZDELE183
24	371531	Programmer (if fitted)	Twin Channel	1	ZAMAJ163
25	384542	Suppressor	ITT TS 121P	1	ZDELE061
26	371402	Pump Delay Timer Board	Pactrol 408401	1	ZAGAS080
27	378034	Central Heating Pump	Grundfos UPS15-60	1	ZAMAJ169
28	394291	Flow Regulator	Type E	2	ZBUNC140
29	386789	Safety Valve	Caleffi 3141	1	ZCVLV018
30	382854	Diverting Valve	ACL 6798	1	ZAMAJ116
31	324917	Automatic Air Vent		1	ZMMIS005
34	324822	Flow Regulator Filter	Drq. No. 3/5211	1	ZBUNC230
		DHW High Limit Thermostat	Ranco LM7-P5065	1	ZAMAJ134



# 19. FAULT FINDING





**NOTE:** Preliminary electrical system checks as contained in the BGC Multimeter Instructions 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 the checks—A, EARTH CONTINUITY, C, POLARITY and D, RESISTANCE TO EARTH—**MUST** be repeated.







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This booklet is accurate at the date of printing but will be superseded and should be disregarded if specifications and/or appearances are changed in the interests of continued improvement.

All goods sold are subject to our official Conditions of Sale, a copy of which may be obtained on application.

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