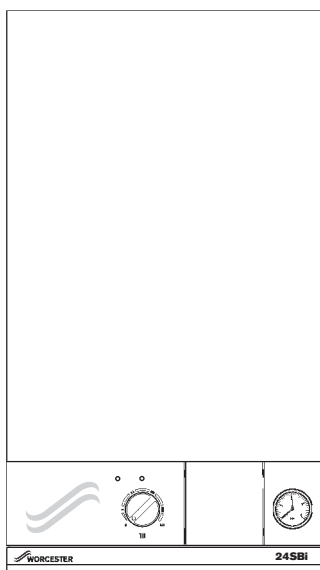


# 15SBi / 24SBi

WALL MOUNTED BOILERS FOR CENTRAL HEATING  
and Indirect supply of domestic hot water

## INSTALLATION AND SERVICING INSTRUCTIONS



This appliance is for use with Natural Gas or LPG (Cat II 2H3P).

15SBi GC NUMBER 41 311 43 (N.G.) 24SBi GC NUMBER 41 311 44 (N.G.)

15SBi GC NUMBER 41 311 45 (L.P.G.) 24SBi GC NUMBER 41 311 46 (L.P.G.)



### APPLIANCE OUTPUTS

CE	Natural Gas		LPG (Propane)	
		24SBi		
	Minimum	15.0 kW	Minimum	15.0 kW
	Maximum	24.0 kW	Maximum	24.0 kW
		15SBi		
	Minimum	6.0 kW	Minimum	6.0 kW
Maximum	15.0 kW	Maximum	15.0 kW	

IMPORTANT: THESE INSTRUCTIONS APPLY IN THE UK ONLY

AND MUST BE LEFT WITH THE USER OR AT THE GAS METER

Read the instructions before starting work - they have been written to make  
the installation easier and prevent hold-ups.

# Contents

1. Installation Regulations	Page 2
2. Introduction	Page 2
3. Technical Data	Page 4
4. Siting the Appliance	Page 6
5. Flue Terminal Positions	Page 7
6. Air Supply	Page 7
7. Sealed System	Page 8
8. Domestic Hot Water	Page 8
9. Gas Supply	Page 10

10. Electrical	Page 10
11. Installing the Appliance	Page 13
12. Commissioning the Appliance	Page 19
13. Instructions to the User	Page 21
14. Inspection and Service	Page 21
15. Replacement of Parts	Page 21
16. Component Parts List	Page 28
17. Operational Flow Diagrams	Page 29
18. Fault Finding	Page 30

## 1. Installation Regulations

### 1.1 Gas Safety (Installation & Use) Regulations 1998.

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.

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

1.3 The compliance with a British Standard or European Norm does not, in itself, confer immunity from legal obligations.

1.4 The installation of the appliance must be in accordance with the relevant requirements of the Gas Safety Regulations, current IEE Regulations, Building Regulations, Building Standards (Scotland) and local water bye-laws.

1.5 The installation should follow the recommendations of the following British Standards unless otherwise indicated and to any other relevant standards.

BS5440:1 - Flues and ventilation for gas appliances: Flues

BS5440:2 - Flues and ventilation for gas appliances: Air supply.

BS5449 - Central heating for domestic premises.

BS5482 - Domestic propane gas burning installations.

BS5546:1 - Installation of gas hot water supplies.

BS6700 - Domestic water supply (when relevant).

BS6798 - Installation of gas fired hot water boilers.

BS6891 - Low pressure gas pipework installations up to 28mm (R1).

BS7593 - Water treatment.

1.6 The appliance and/or components must conform, where applicable, to all relevant Directives.

1.7 In accordance with COSHH the appliance does not contain any substances which are harmful to health.

1.8 Product Liability regulations indicate that, in certain circumstances, the installer can be held responsible, not only for mistakes on his part but also for damage resulting from the use of faulty materials. We advise that to avoid any risk, only quality approved branded fittings are used.

1.9 LPG Installation. The appliance shall not be installed in a room or internal space below ground level when it is intended for use with LPG. This does not preclude the installation into rooms which are basements with respect to one side of the building but open to the ground on the opposite side.

1.10 These instructions cover, as far as possible, the foreseeable situations which may arise. Contact Worcester Heat Systems Technical Department, Telephone: 0990 266241, for advice on specific installations.

## 2. Introduction

### 2.1 General Information

The appliance is set to give the mid-range output of 19.5kW [24Sbi] or 10.8kW [15Sbi].

Kits are available to convert the appliance from Natural Gas to Propane operation and vice versa.

### 2.2 Electrical Supply

230V - 50Hz. Load 180 watts. External fuse 5A, Internal fuse F1 - 4A.

### 2.3 Gas supply

The 24Sbi appliance requires a maximum of 2.86 m<sup>3</sup>/h of natural gas (G20) or 1.1 m<sup>3</sup>/h of propane (G31).

The 15Sbi appliance requires a maximum of 1.78 m<sup>3</sup>/h of natural gas (G20) or 0.68 m<sup>3</sup>/h of propane (G31).

The installation and the connection of the gas supply to the appliance must be in accordance with BS6891.

The meter or regulator should deliver a dynamic pressure of 20 mbar (G20) or 37mbar (G31) at the appliance, which is equivalent to about 19 mbar or 36 mbar at the gas valve inlet pressure test point.

	Total length of gas supply pipe (metres)				Pipe size (Ømm)
	3	6	9	12	
Gas Discharge Rate (m <sup>3</sup> /hr)	<b>Propane</b>				
	1.5	–	–	–	15
	8.0	5.2	4.2	3.6	22
	15.9	8.8	8.5	7.2	28
	<b>Natural Gas</b>				
	8.7	5.8	4.6	–	22
	18.0	12.0	9.4	–	28

### 2.4 Installation

The appliance is suitable for indoor installation and for use with a sealed system only and includes a built in filling loop.

If the appliance is fitted in a cupboard or a compartment is built around it after installation, then the structure must conform with the requirements of BS6798. However, because of the low casing losses, there is no need for cooling ventilation openings in the compartment. The spaces specified for servicing **must** be maintained. Refer to Section 6.

An optional wall frame is available to create space for the service pipes to pass at the back of the appliance.

### 2.5 Flue

The flue can be to the right, left or rear. A vertical flue system is available.

An internal flue fitting kit is available. Fitting instructions are given in Section 11.9.

### 2.6 Controls

A control knob adjusts the CH temperature and switching.

A fascia mounted mechanical clock is available.

Only mains voltage external controls can be used.

A plug-in mid-position diverter valve is available as an optional extra.

### 2.7 System

All dirt must be flushed from the system before connecting the appliance. Refer to Fig. 5,6 and 7.

The system can be pre-piped and flushed before the appliance is fitted.

The connections in the system must withstand a pressure of up to 3 bar.

Radiator valves must conform to BS2767:10:1977.

### 2.8 Domestic Hot Water

Single feed direct cylinders are not suitable and must not be used.

A HW cylinder must be of the indirect coil type and suitable for working at a gauge pressure of, at least, 0.35bar above the relief valve setting.

Where a storage system will not have a vent to atmosphere the installation must comply with Building Regulations and Water Company bye-laws. If connecting to an existing system the local authority should be informed.

### 2.9 Safety

The appliance must not be operated with the inner casing cover removed.

The gas and electricity supplies must be turned off before servicing or working on the appliance.

### 2.10 Operation

#### Central Heating

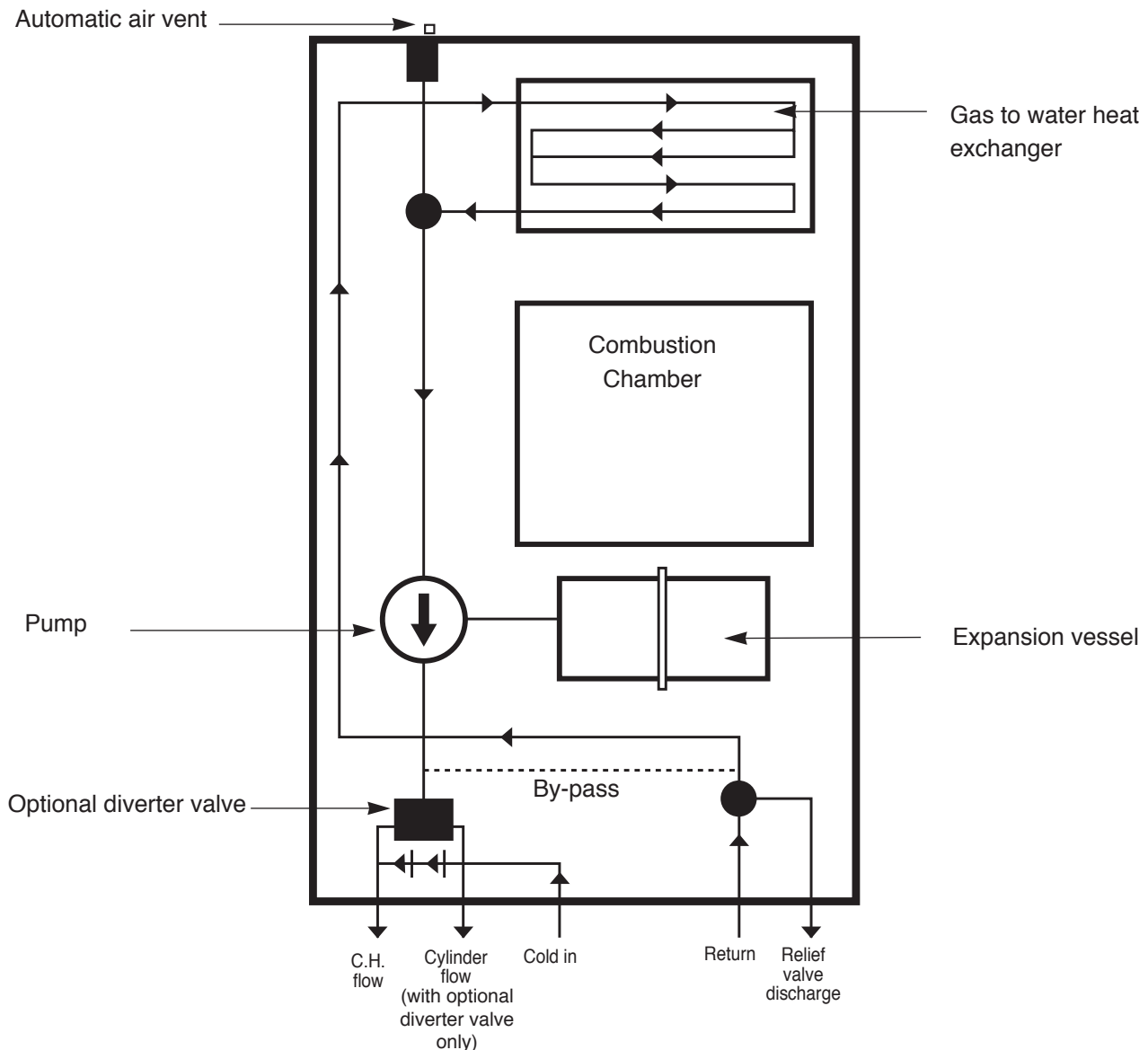
A demand for heat will ignite the burner. The temperature is controlled by the integral sensor. At the end of the demand the burner will go out and the pump will continue to run for up to 3 minutes to dissipate the heat.

#### Domestic Hot Water:

The supply of domestic hot water depends upon the type of hot water equipment installed and the control system. Refer to the separate leaflet.

The use of unvented cylinders must be in accordance with the manufacturers instructions relevant to British Standards

**Fig. 1. Water flow diagram.**



### 3. Technical Data

The data plate is fixed to the inner casing cover.

Table 1. 15SBi

NOMINAL BOILER RATINGS (10 Minutes After Lighting)			
BOILER ADJUSTED FOR G20 (Natural Gas)			
OUTPUT	INPUT (Net)	BURNER PRESSURE	GAS RATE
kW	kW	m bar.	m <sup>3</sup> /h
6	6.93	1.6	0.73
10.8	12	6.4	1.27
15	16.65	12	1.76
BOILER ADJUSTED FOR G31 (Propane)			
6	6.93	4.3	0.28
10.8	12	13.9	0.49
15	16.65	28.6	0.68

Natural Gas: Net Input = Gross Input x 0.901

Table 1. 24SBi

NOMINAL BOILER RATINGS (10 Minutes After Lighting)			
BOILER ADJUSTED FOR G20 (Natural Gas)			
OUTPUT	INPUT (Net)	BURNER PRESSURE	GAS RATE
kW	kW	m bar.	m <sup>3</sup> /h
15	17.5	4.5	1.85
19.5	22.1	8	2.34
24	27	12.5	2.86
BOILER ADJUSTED FOR G31 (Propane)			
15	17.5	13.5	0.72
19.5	22.1	22.5	0.9
24	27	35.5	1.1

LPG (Propane): Net Input = Gross Input x 0.922

Table 2.

FLUE DETAILS		
HORIZONTAL FLUE		mm
WALL HOLE DIAMETER	EXTERNAL FIX	110
	INTERNAL FIX	150
STANDARD FLUE	MINIMUM LENGTH	100
	MAXIMUM LENGTH	725
EXTENDED FLUE	MAXIMUM LENGTH	4000
FLUE ASSEMBLY DIAMETER		100

Table 3

MAXIMUM AVAILABLE PUMP HEAD			
BOILER OUTPUT kW	HEAD Metres	MIN. FLOW RATE L/min.	FLOW/RETURN DIFFERENTIAL °C
6.0	5.7	7.8	11
15.0	3.8	19.5	11
24.0	2	27	12.7

Table 4

MECHANICAL SPECIFICATIONS	
CENTRAL HEATING FLOW - COMPRESSION	22mm
RETURN - COMPRESSION	22mm
COLD WATER INLET - COMPRESSION	15mm
CYLINDER FLOW - COMPRESSION	22mm
GAS INLET	Rp ¾
RELIEF VALVE DISCHARGE - COMPRESSION	15mm
CASING HEIGHT	850mm
CASING WIDTH	450mm
CASING DEPTH	365mm
WEIGHT - LIFT	15SBi 35kg 24SBi 37kg
WEIGHT - PACKAGED	15SBi 42kg 24SBi 44kg

**Table 5**

PERFORMANCE SPECIFICATIONS	
PRIMARY WATER CAPACITY	2.0 litres
MAXIMUM MAINS INLET PRESSURE	10 bar
MAXIMUM CENTRAL HEATING FLOW TEMPERATURE	85°C (nom)
MAXIMUM CENTRAL HEATING SYSTEM SET PRESSURE	2.5 bar
MINIMUM CENTRAL HEATING SYSTEM SET PRESSURE	0.5 bar
OUTPUT TO CENTRAL HEATING	NATURAL GAS (G20) <b>15SBi</b> 6.0 - 15.0kw <b>24SBi</b> 15.0 - 24.0kw
	LPG - PROPANE (G31) <b>15SBi</b> 6.0 - 15.0kw <b>24SBi</b> 15.0 - 24.0kw
NOx CLASSIFICATION FOR BOTH 15 & 24SBi	Class 2

**Table 6**

GAS SUPPLY SYSTEM - BASED ON NG (G20)				
TOTAL LENGTH OF GAS SUPPLY PIPE (COPPER) metres				
3	6	9	12	
GAS DISCHARGE RATE - PRESSURE DROP mbar. m <sup>3</sup> /h				PIPE DIAMETER mm
8.7	5.8	4.6	3.9	22
18.0	12.0	9.4	8.0	28

**Table 7**

CLEARANCES (mm)		
	INSTALLATION	SERVICE
ABOVE APPLIANCE FLUE ELBOW	30	30
IN FRONT OF APPLIANCE	600	600
BENEATH APPLIANCE	200	200
RIGHT AND LEFT HAND SIDE	10	10

Refer to Section 6.

**Table 8**

SYSTEM CAPACITY			
TOTAL SYSTEM VOLUME litres			
INITIAL PRESSURE bar	INITIAL CHARGE PRESSURE bar		
	0.5	1.0	1.5
1.0	72	92	N/A
1.5	39	53	64

## 4. Siting The Appliance

The appliance may be installed in any room subject to the requirements of the current IEE regulations and, in Scotland, the relevant electrical provisions of the Building Regulations with respect to the installation of appliances in rooms containing baths or showers.

If the appliance is installed in a room containing a bath or shower, any switch or appliance control using mains electricity must NOT be able to be touched by a person using the bath or shower.

The appliance is NOT suitable for external installation.

The wall must be able to support the weight of the appliance. Refer to Table 4.

The specified clearances must be available for installation and servicing. Refer to Table 7 and Fig.2.

The appliance can be installed in a cupboard/compartament to be used for airing clothes providing that the requirements of BS6798 and BS5440/2 are followed. Refer to Section 2.4.

The clearance between the front of the appliance and the cupboard/compartament door should be not less than 250mm. LPG Installation. Refer to Section 1.10.

Fig. 2. Appliance casing dimensions and required clearances.

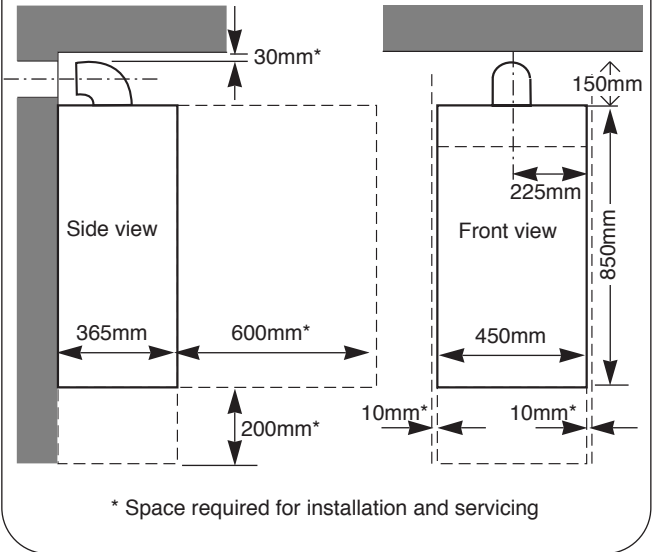
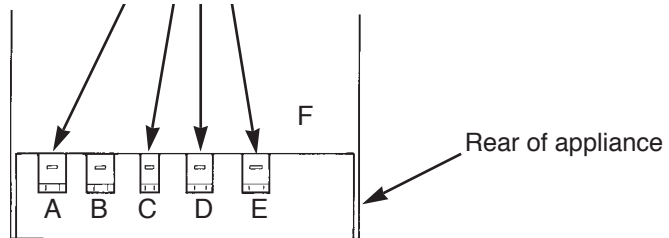
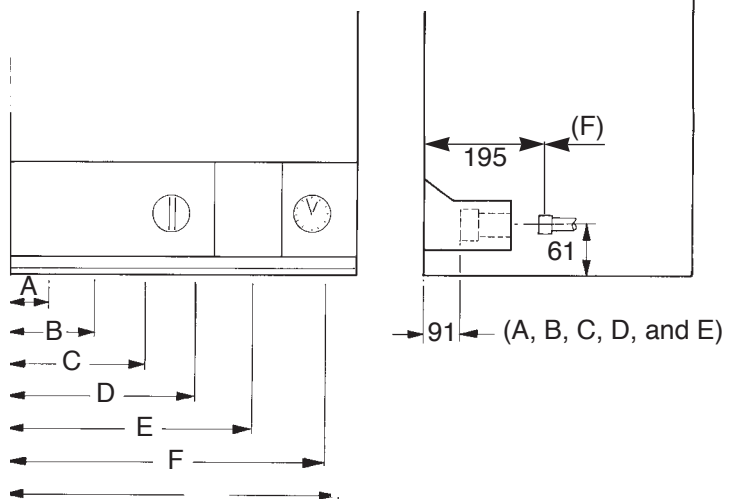


Fig. 3. Appliance pipework connections

Screw driver required to operate Valves.  
Valves shown closed.



View on underside of appliance showing connections



A	CH Flow	=	62.5
B	Cylinder Flow*	=	127.5
C	Cold In	=	192.5
D	Gas Inlet	=	257.5
E	Return	=	322.5
F	Safety Discharge	=	382.5

\*Use with optional diverter valve

## 5. Flue terminal positions

The flue system must be installed following the requirements of BS5440:1.

The standard flue kit length is 425 - 725mm. Extension kits for flues up to 4m are available.

The terminal must not cause an obstruction nor the combustion products a nuisance.

If the terminal is within 1m of a plastic or painted gutter or within 500mm of painted eaves then an aluminium shield at least 750mm long should be fitted to the underside of the gutter or painted surface.

If the terminal is less than 2m above a surface to which people have access then a guard must be fitted. The guard must be evenly spaced about the terminal and fixed with plated screws. A guard Type K2 can be obtained from Tower Flue Components, Vale Rise, Tonbridge, TN9 1TB.

It is essential that products of combustion cannot re-enter the building. Refer to Fig 4.

## 6. Air Supply

A separate vent for combustion air is not required.

If the appliance is in a cupboard or compartment it is not necessary to have additional ventilation for the boiler providing that the following clearances are provided:

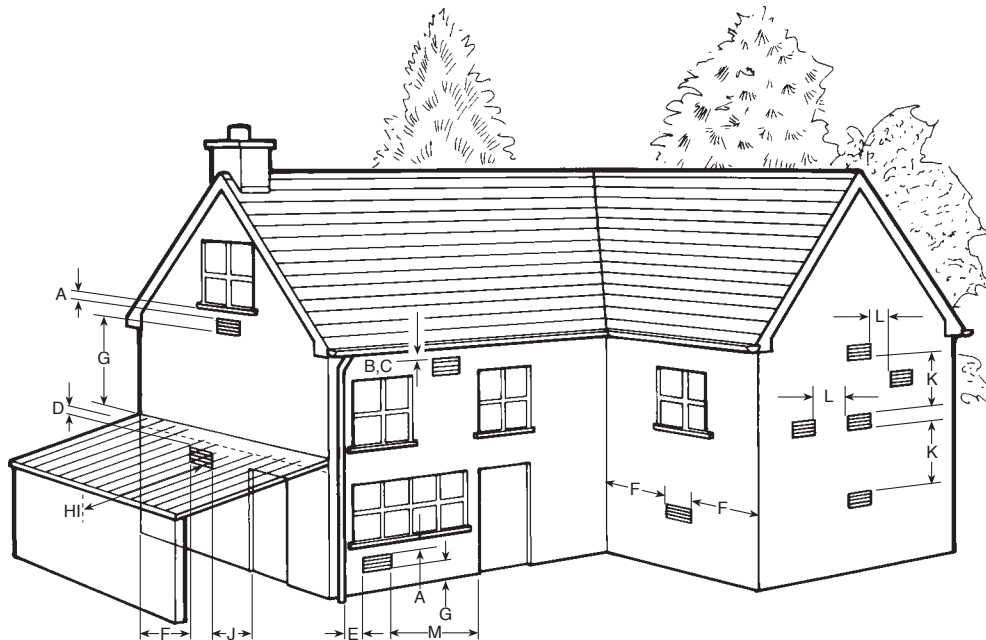
Above the flue turret	30mm
In front*	250 mm
Below	200mm
Right-hand side	75 mm
Left-hand side	75mm

\* Clearance to a removable panel i.e. door.

If the appliance is installed in a cupboard or compartment that does not allow these clearances then permanent air vents are required in the compartment, one at a high level and one at a low level. 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 requirements are:

Model	Position of vent	Air from room	Air from outside
24SBi	High	315cm <sup>2</sup>	158cm <sup>2</sup>
	Low	315cm <sup>2</sup>	158cm <sup>2</sup>
15SBi	High	315cm <sup>2</sup>	158cm <sup>2</sup>
	Low	315cm <sup>2</sup>	158cm <sup>2</sup>

Fig. 4. Siting of the flue terminal.



TERMINAL POSITION	MIN. DISTANCE	TERMINAL POSITION	MIN. DISTANCE
A- directly below an openable window or other opening e.g. air brick.	300mm (12in.)	I- From a terminal facing a terminal	1200mm (47in.)
B- Below gutters, soil pipes or drain pipes.	75mm (3in.)	J- From an opening in a car port (e.g. door window) into dwelling.	1200mm (47in.)
C- Below eaves.	25mm (1in.)	K- Vertically from a terminal on the same wall.	150mm (6in.)
D- Below balconies or car port roof.	25mm (1in.)	L- Horizontally from a terminal on the same wall.	300mm (12in.)
E- From vertical drain pipes and soil pipes.	25mm (1in.)	M- From door, window or air vent (achieve where possible).	150mm (6in.)
F- From internal or external corners.	25mm (1in.)		
G- Above ground, roof or balcony level.	300mm (12in.)		
H- From a surface facing a terminal.	600mm (24in.)		

## 7. Sealed System

### 7. Sealed System

The system must comply with requirements of BS6798 and BS5449.

The appliance must not be operated without the system being full of water and correctly pressurised.

The pressure relief valve will operate at 3 bar. The discharge pipe must be directed away from any electric's or from where it might be hazard.

All connections in the system must withstand a pressure of up to 3 bar.

The expansion vessel, to BS4814, has a capacity of 10 litres charged to 0.5 bar, which is suitable for a static head of 5 metres.

A schrader type valve allows the pressure to be increased if the static head is greater than 5 metres. Refer to BS 7074:1, BS5449 and Table 9 for a guide to the available system capacity. If the expansion vessel fails then it must be replaced with the designated spare part.

The maximum system design pressure is 1.5 bar. If the pressure is above 2.6 bar when at maximum temperature then another

expansion vessel must be fitted as near to the appliance as possible in the return pipe.

A filling loop is fitted to the appliance. Refer to Fig 8.

The system and the appliance must be properly vented. Repeated venting loses water from the system and usually indicates that there is a leak.

An adjustable by-pass is fitted to the appliance. Refer to Fig 9.

The pump is set at maximum and must be adjusted to suit the system load

## 8. Domestic Hot Water

It is NOT suitable for direct water supply.

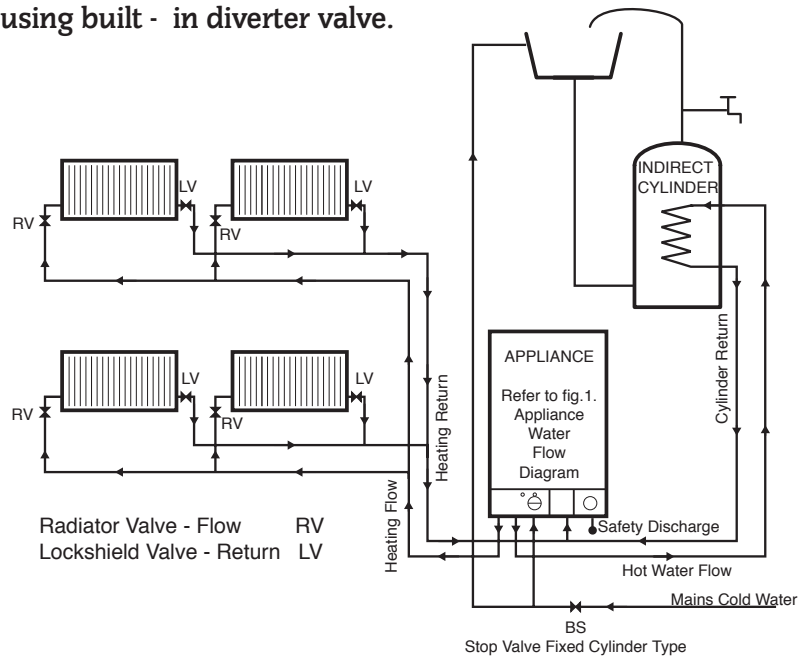
Do not connect to a direct cylinder.

The SBi can be connected to any indirect cylinder, i.e unvented or thermal store, all the benefits of a "dry loft" and mains pressure hot water can be realised. Refer to a separate leaflet or contact Worcester Heat Systems Technical Helpline. 0990 266241.

Fig. 5. System layout if using built - in diverter valve.

**Note:**

A drain cock should be fitted at the lowest point of the heating circuit and beneath the appliance



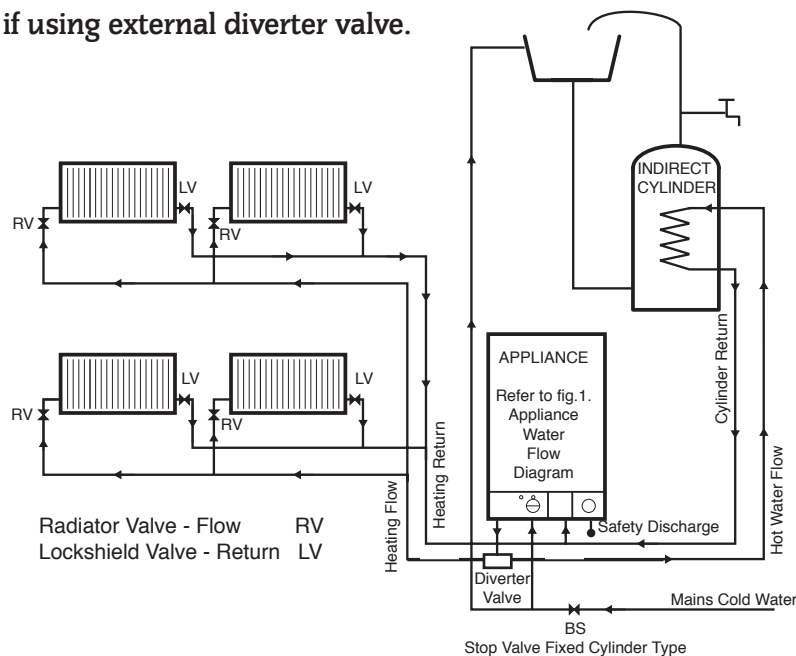
**IMPORTANT**

For Details of the wiring requirements for the system controls, please refer to the **SBi System Wiring Guide** and the **Instructions supplied with the Built-in Mid-Position Valve.**

Fig. 6. System layout if using external diverter valve.

**Note:**

A drain cock should be fitted at the lowest point of the heating circuit and beneath the appliance



**IMPORTANT**

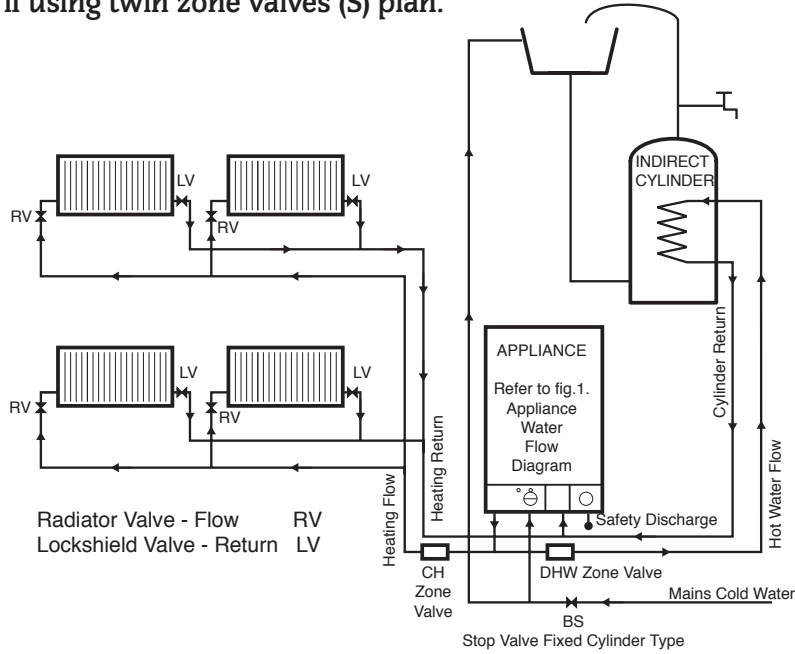
For Details of the wiring requirements for the system controls, please refer to the **SBi system wiring guide.**



**Fig. 7. System layout if using twin zone valves (S) plan.**

**Note:**

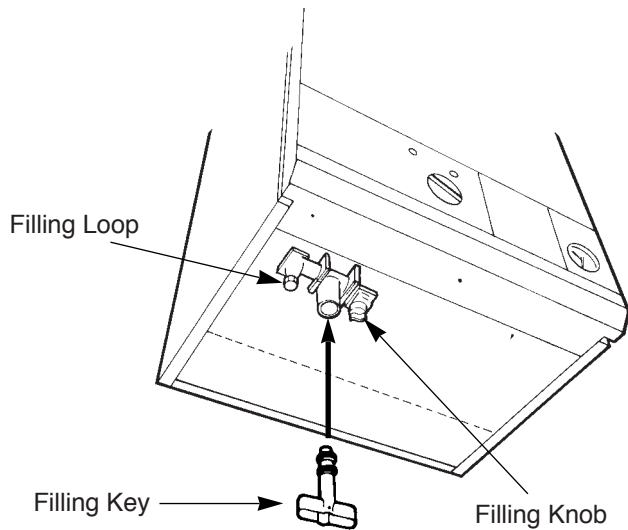
A drain cock should be fitted at the lowest point of the heating circuit and beneath the appliance



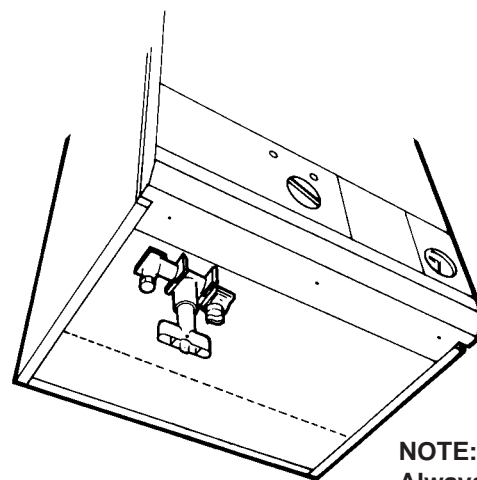
**IMPORTANT**

For Details of the wiring requirements for the system controls, please refer to the **SBi system wiring guide.**

**Fig. 8. Filling Loop.**

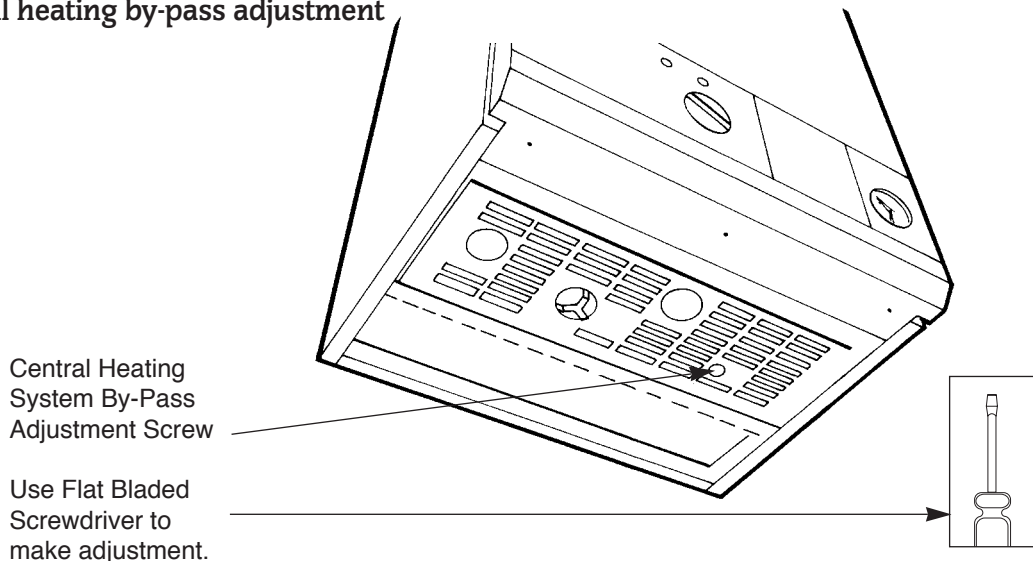


**Fig. 8a. Filling Key inserted for filling.**



**NOTE:**  
Always remove the filling key after filling

**Fig. 9. Central heating by-pass adjustment**



## 9. Gas Supply

The 24Sbi appliance requires a maximum of 2.86m<sup>3</sup>/h of natural gas (G20) or 1.1m<sup>3</sup>/h of propane (G31). Refer to Table 1.

The 15Sbi appliance requires a maximum of 1.76m<sup>3</sup>/h of natural gas (G20) or 0.68m<sup>3</sup>/h of propane (G31). Refer to Table 1.

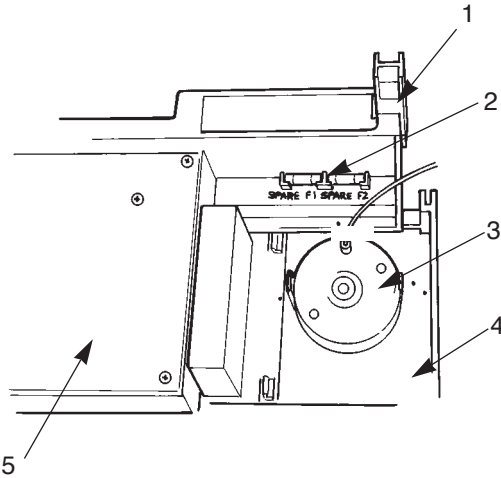
A natural gas appliance must be connected to a governed meter. The installation of the gas supply to the appliance must be in accordance with BS6891.

The meter and the pipework to the appliance must be checked, preferably by the gas supplier, to ensure that a dynamic pressure of 20mbar for natural gas or 37mbar for propane is available at the appliance [equivalent to about 18mbar or 35mbar at the gas valve inlet pressure connection] and that the gas flow is adequate for all the installed gas appliances.

## 10. Electrical

Mains supply: 230V ( 50 Hz 180watts. External fuse 5A. Internal fuse F1-4A. Spare internal fuse is supplied with the appliance.

Fig 10 - Replacement internal fuse



1. Control Panel Pivot Point
2. Fuse -F1
3. Pressure Gauge

4. Facia Panel
5. Control Board Assembly

The appliance must be earthed and it must be possible to completely isolate the appliance.

The mains cable must be 0.75mm<sup>2</sup> (24x0.20 mm) to BS6500 - Table 15 or 16.

The mains cable must be connected to the terminal marked L (red or brown lead), N (black or blue lead) and the Earth stud (green or green/yellow lead) and secured with the cable clamp.

The connection to the mains must be either : A 3A fused three-pin plug and unswitched socket outlet (both complying with BS1363) or a double pole isolator with a contact separation of 3mm in all poles and supplying the appliance and controls only.

Fig.11 . Mains electricity connections.

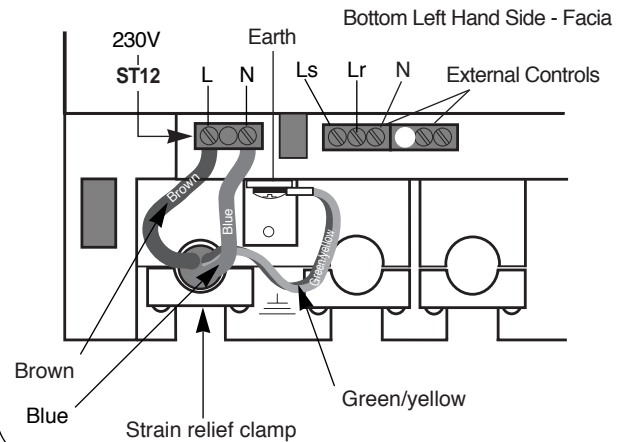
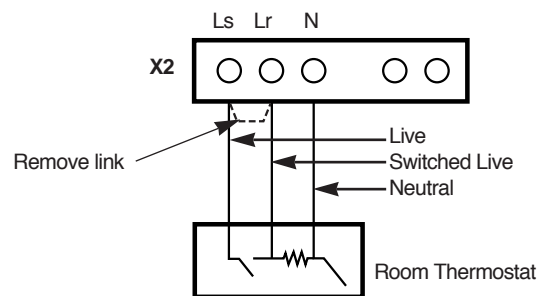
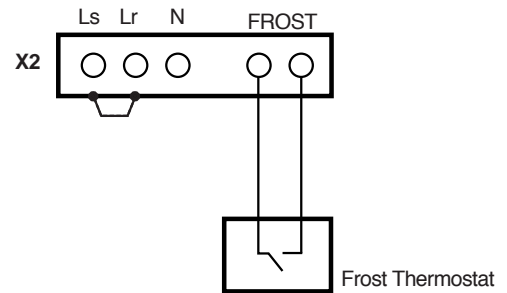


Fig 12 - Mains Voltage External Controls Connections

Room Thermostat - 230 Volt



Frost Thermostat - 230 Volt



A room thermostat must be suitable for mains voltage operation. A mechanical timer, to fit into the facia, is available.

A frost thermostat should be considered where parts of the system are remote from the appliance. For any frost thermostat function, the boiler temperature control knob must not be set to the 'off' position.

NOTE: In some cases these devices should not be connected at these points. Refer to separate system wiring guide booklet.

Safety Check: If there is an electrical fault after installation check for fuse failure, short circuits, incorrect polarity of connections, earth continuity or resistance to earth.

Fig.13 . Wiring diagram - pictorial.

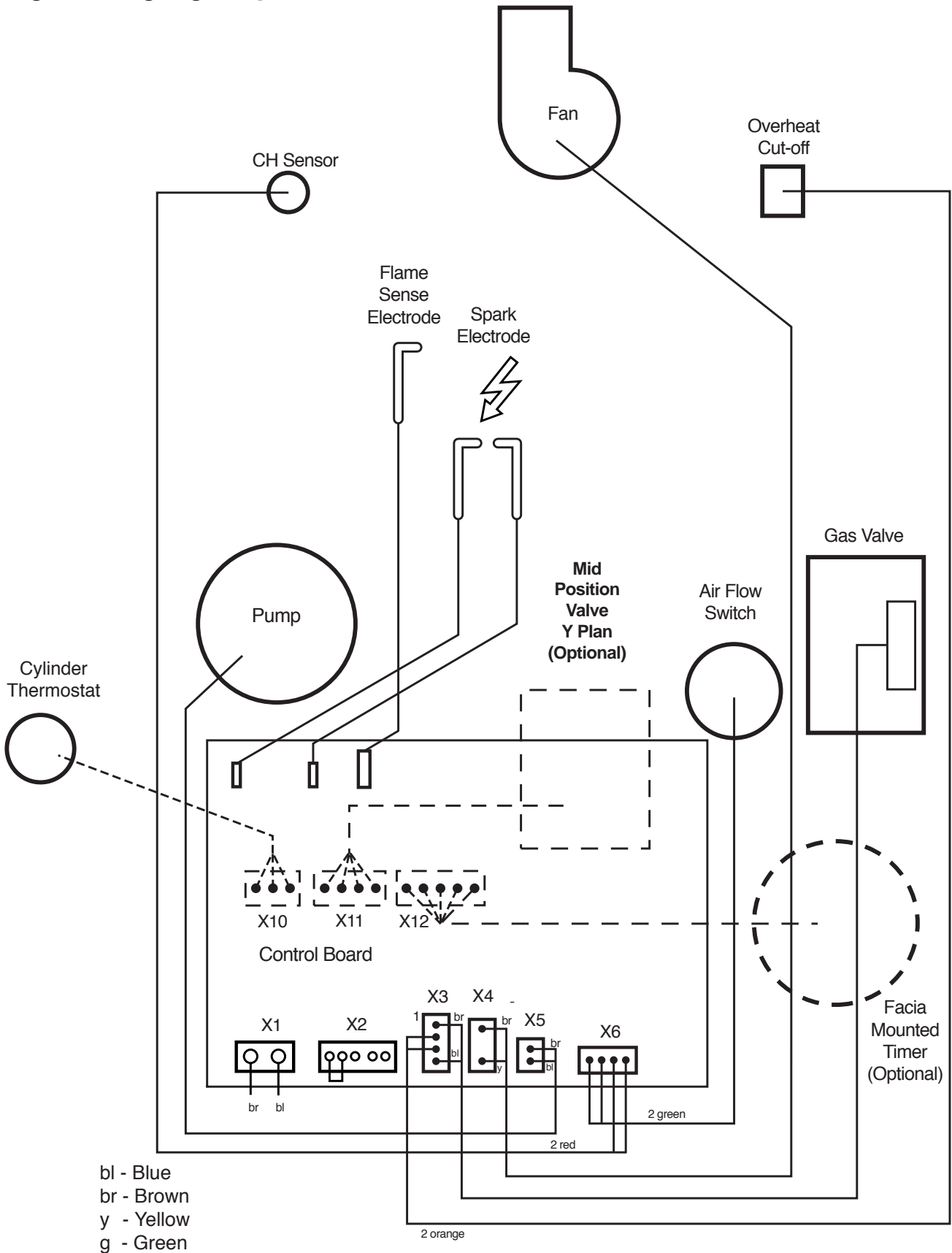
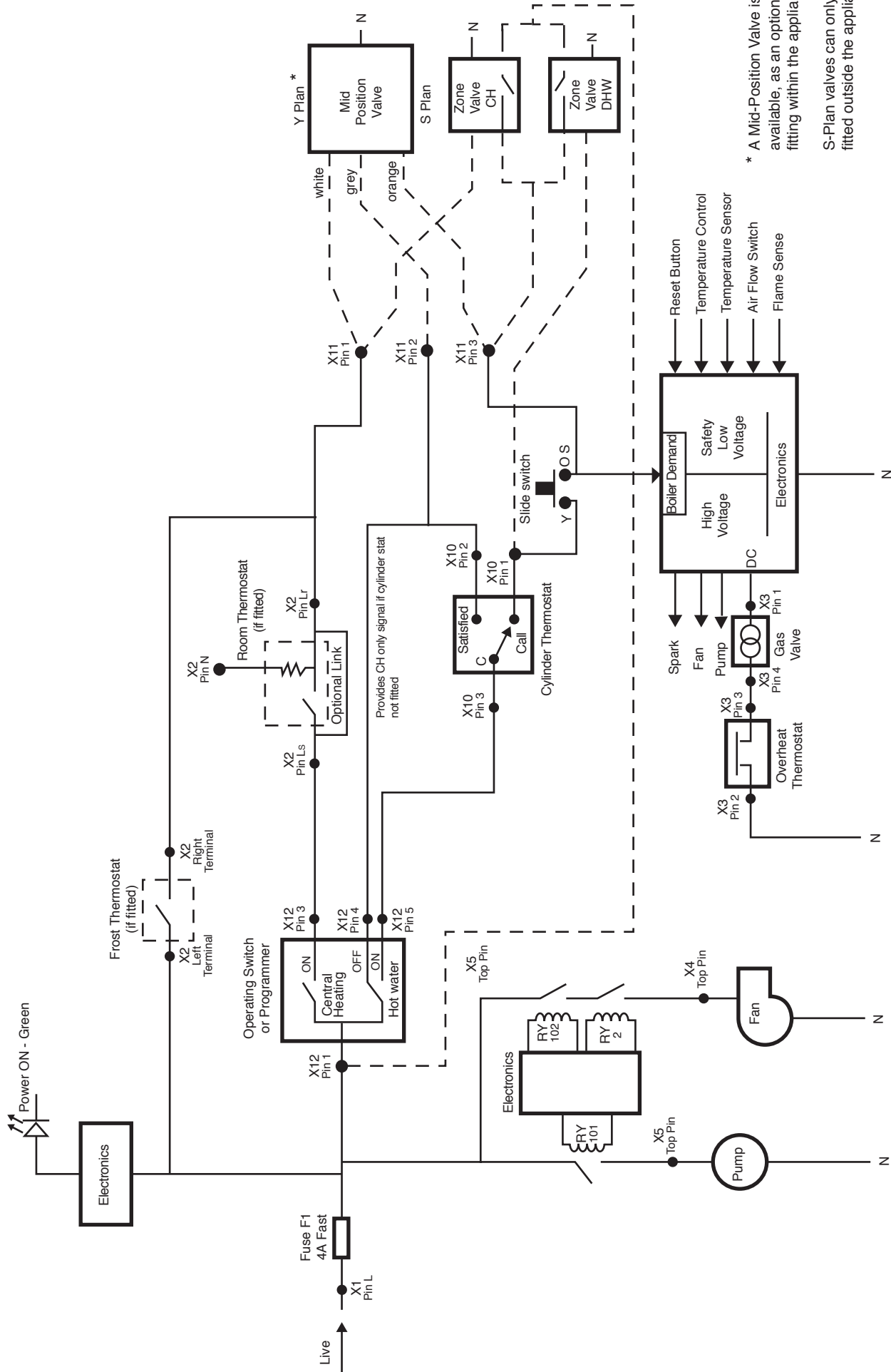


Fig.14 . Wiring diagram - functional



\* A Mid-Position Valve is available, as an option, for fitting within the appliance.  
S-Plan valves can only be fitted outside the appliance

# 11. Installing The Appliance

Note: READ THIS SECTION FULLY BEFORE COMMENCING THE INSTALLATION

## 11.1 Unpacking

Check the contents against the packing list.

Remove the wall mounting template and the manifold/mounting plate assembly.

## 11.2 Site Preparation

Check that the correct position for the appliance has been chosen and that the wall is sound, flat and will support the weight of the appliance. Refer to Sections 4 & 5 and Tables 4 and 8.

## 11.3 Fixing Holes and Flue Opening

If it is necessary for any of the pipes to run up the back of the appliance then the, optional extra, space frame must be fitted to the wall.

Hold the template to the wall. Check that the template is level.

Mark the position of the fixing holes and the flue opening. Refer to Fig 15.

Drill the fixing holes 60mm deep for the No. 12 size plugs.

Cut the flue duct hole at 110mm diameter [150mm diameter for internally fitted flues].

## 11.4 Wall Mounting Plate and Manifold

Fit the plugs and fix the mounting plate and manifold assembly to the wall. Refer to Fig 15.

## 11.5 Gas and Water Pipes

Fix the appropriate fitting to the gas cock to connect the inlet supply pipe. Refer Fig 16.

It is important that the system pipes are not fixed near the appliance using clips that put a strain on the connections.

Before the appliance is connected to the wall manifold thoroughly flush the system.

## 11.6 Install the Boiler

Lift off the cabinet front panel.

Check that the gas and water valves on the manifold are closed. Refer to Fig 16.

Remove the plastic cover and fit the seals to the service valves on the manifold. Refer to Fig 16.

Fig. 15 . Fixing the wall mounting plate.

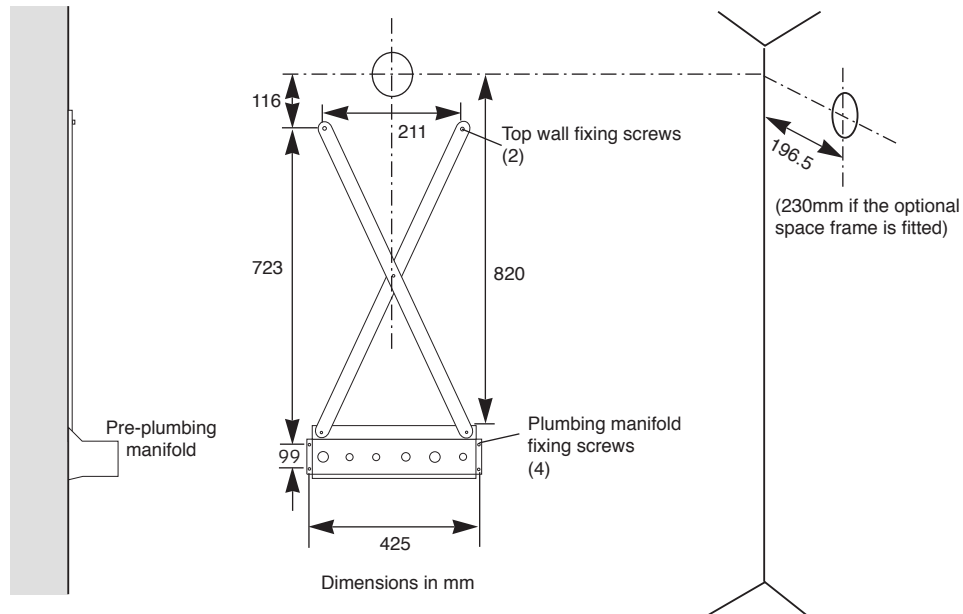
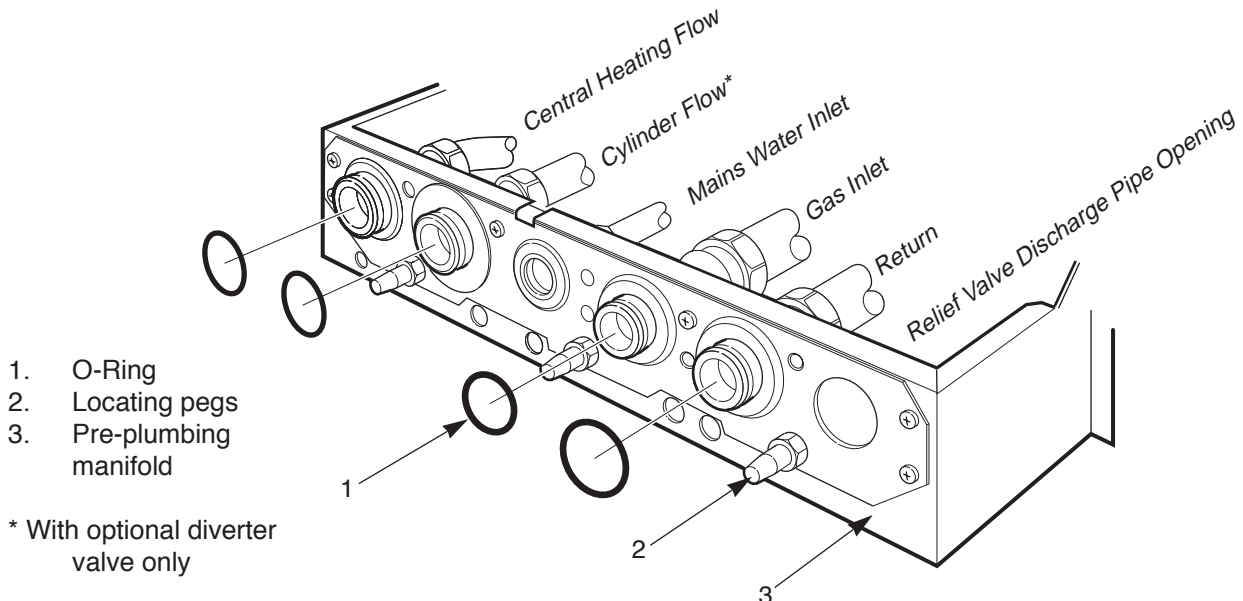
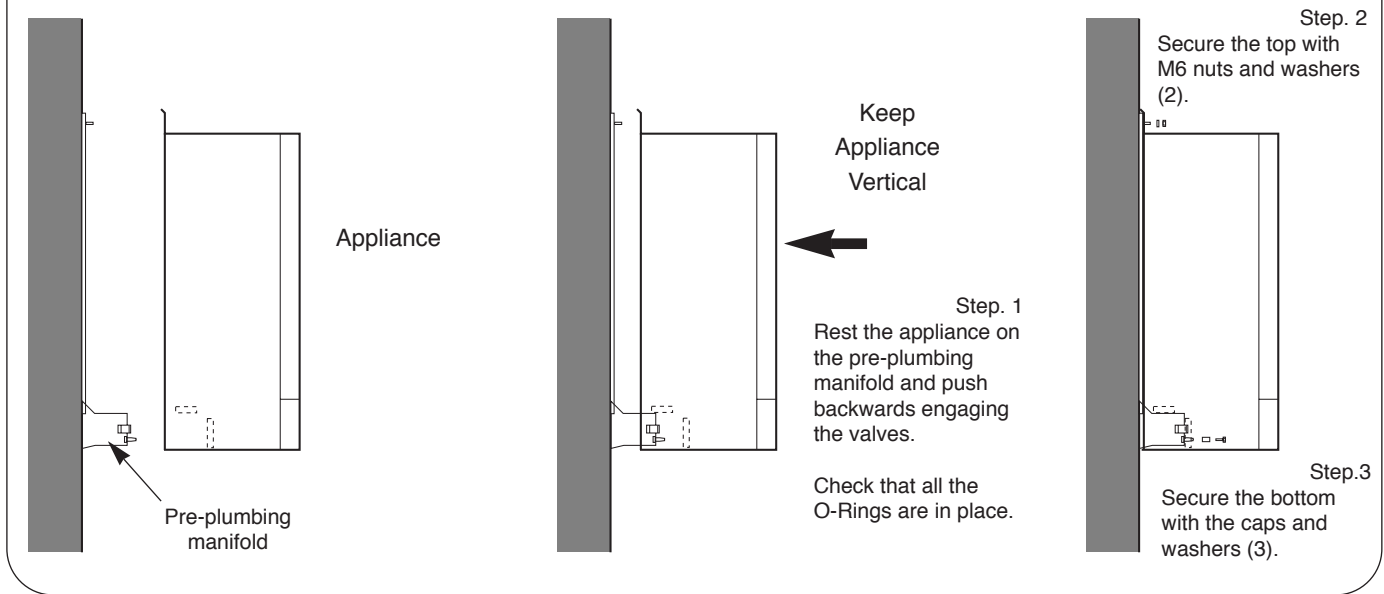


Fig. 16 .Mounting plate manifold.



**Fig. 17 . Fixing the appliance to the wall mounting plate.**



Lift the appliance against the wall to engage in the top support plate and lower onto the manifold assembly. Refer to Fig. 17. Tighten the gas and water connections. Lower the fascia and fit a discharge pipe to the relief valve leading it away from any electric's. The pipe must not be less than 15mm in diameter and must run continuously downward outside the appliance. Refer to Fig 47.

If the optional internally fitted diverter valve is to be connected then full instructions are sent with the valve. Refer to Fig. 20.

#### 11.7 Air and Flue Duct Preparation

The method of installation of the flue system may be varied to suit the actual site conditions. The instructions for connecting and fixing the ducts must, however, be strictly followed.

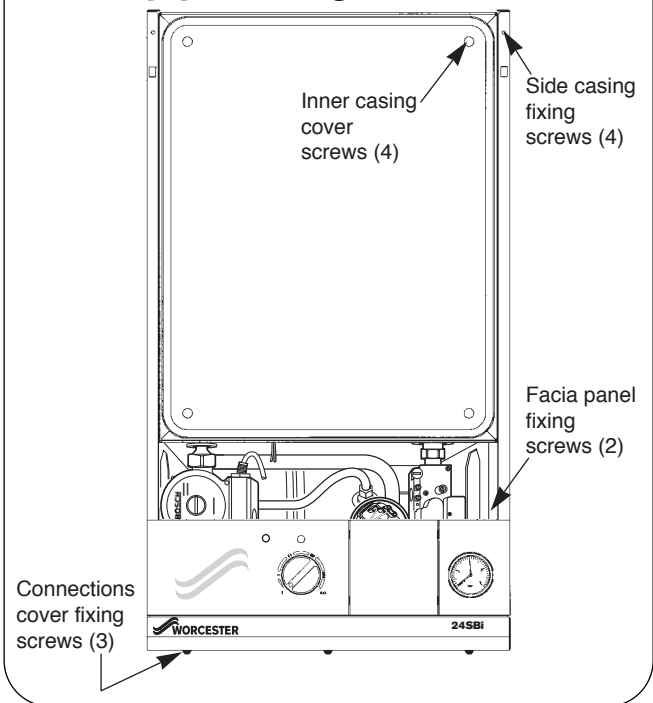
Remove all packing material from the flue components.

Fit the appropriate flue restrictor ring by unscrewing the flue spigot from the boiler. Refer to Fig.21.

24SBi	- 75mm	Horizontal flue	up to 1m
	- 75mm	Vertical flue	up to 1m
15SBi	- 74mm	Horizontal flue	up to 1m
	- 79mm	Vertical flue	up to 1m

The standard telescopic flue assembly is suitable for flues from 425mm up to 725mm measured from the centre-line of the boiler flue outlet to the outer face of the wall. Refer to Fig.22.

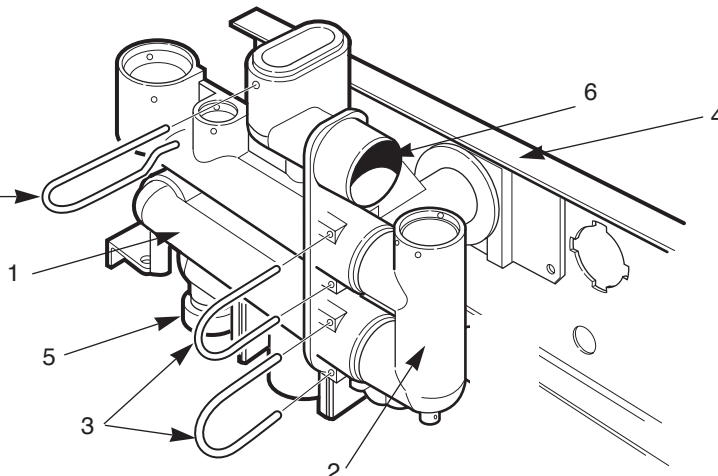
**Fig.18. Appliance casing and control equipment fixings.**



**Fig.19. Flow manifold assembly**

**IMPORTANT  
DO NOT REMOVE  
THIS CLIP!**

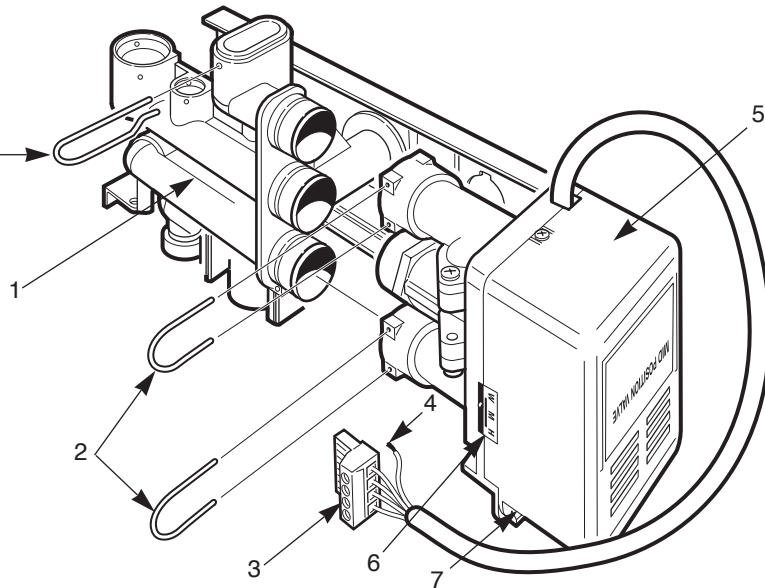
1. Flow manifold assembly
2. Connector
3. Clips (Removable)
4. Assembly mounting plate
5. Filling Loop
6. Protection cap



**Fig.20. Mid-position diverter valve (Optional)**

**IMPORTANT  
DO NOT REMOVE  
THIS CLIP!**

1. Flow manifold assembly
2. Clips (Removable)
3. Diverter valve connector plug
4. Earth connection
5. Mid-position diverter valve
6. Valve status indicator
7. Manual operating switch



If  $L > 725\text{mm}$  then extension duct kit/s will be required - each kit extends the flue by 750mm up to a maximum of 4m. See table below.

EXTENSION	MAXIMUM FLUE LENGTH mm
1	1475
2	2225
3	2975
4	3725
5	4000

**11.8 Measure and Cut the Ducts.**

**General:** Cut the ducts as necessary, ensuring that the ducts are square and free from burrs. Always check the dimensions before cutting.

Measure the distance L. Refer to Fig.24 and 25.

The standard flue can be telescopically adjusted to any length between 425mm and 725mm.

Fix the flue assembly together using the self-tapping screws provided. Refer to Fig.22.

It will only be necessary to cut the standard assembly if  $L < 425\text{mm}$ . Cut the flue turret assembly and the terminal assembly by the same amount i.e  $L = 350$  - remove 75mm from each assembly.

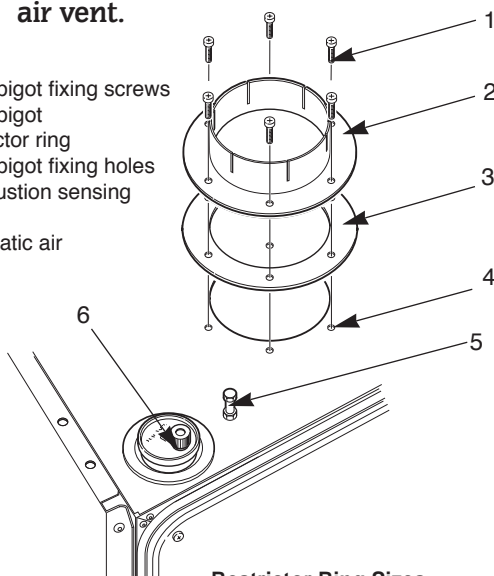
Minimum side flue length = 335mm (accommodating a 10mm Service clearance and a 100mm wall)

Minimum rear flue length = 296mm (accommodating a 100mm wall)

- If L is between
- 1175 - 1475mm (1 extension)
  - 1925 - 2225mm (2 extension)
  - 2675 - 2975mm (3 extension)
  - 3425 - 3725mm (4 extension) it is not necessary to cut the ducts.

**Fig.21. Flue turret fixing and automatic air vent.**

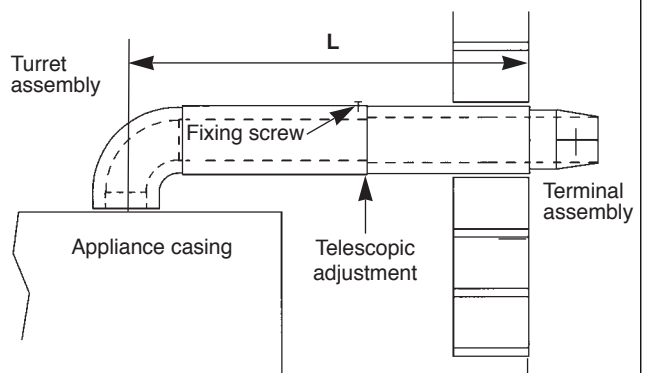
1. Flue spigot fixing screws
2. Flue spigot
3. Restrictor ring
4. Flue spigot fixing holes
5. Combustion sensing point
6. Automatic air vent



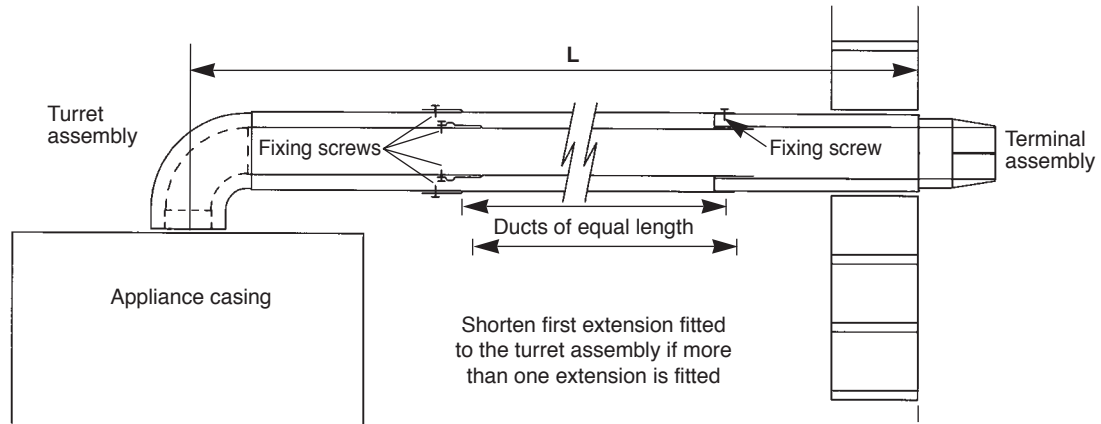
**Restrictor Ring Sizes**

- 24Sbi - 75mm horizontal and vertical flue up to 1m
- 15Sbi - 74mm horizontal flue up to 1m
- 15Sbi - 79mm vertical flue up to 1m

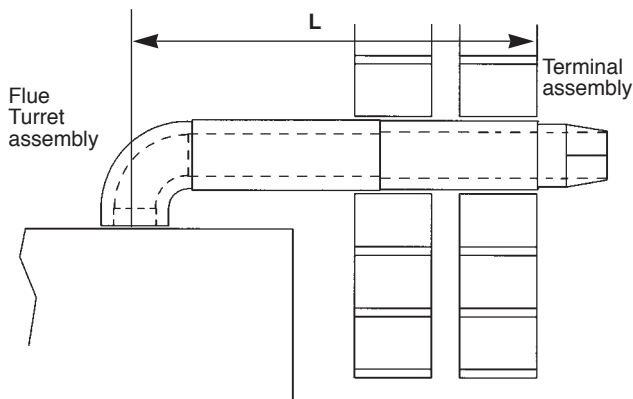
**Fig.22 . Standard flue assembly.**



**Fig.23 . Extension Duct.**



**Fig.24. Flue duct length (side flue).**



If L is between	725 - 1175mm	(1 extension)
	1475 - 1925mm	(2 extension)
	2225 - 2675mm	(3 extension)
	2975 - 3425mm	(4 extension)
	3725 - 4000mm	(5 extension)

It is necessary to shorten the assembly by cutting the first extension duct assembly i.e.  $L = 1000\text{mm}$  - remove 175mm from the air and flue ducts.

NOTE: Extension duct measurements do not include the socketed end. Unless specifically instructed the socketed end must not be removed.

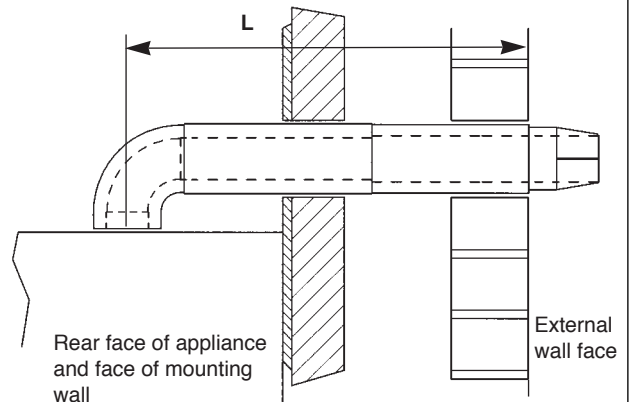
Fix the flue ducts together before fixing the surrounding air duct, the cut ducts fit into the flue assembly.

**11.9. Fitting the Flue Assembly with Access to the Terminal.**

Prepare the flue duct assembly as described in Section 11.8. Apply the plastic tape to the air duct in contact with the external brickwork.

From inside push the assembly through the wall. Align the flue turret and push fully onto the spigot on the appliance. Tighten the clamping ring. Refer to Fig.26.

**Fig.25 . Rear flue.**



Make good the internal wall face and the external brickwork or rendering.

Replace the inner casing.

**11.10 Fitting of the Flue Assembly without access to the Terminal.** The rubber gasket kit is available from Worcester Heat Systems. NOTE: A larger diameter opening opening in the wall is required. Refer to Table 2.

Prepare the flue assembly as described in Section 11.8.

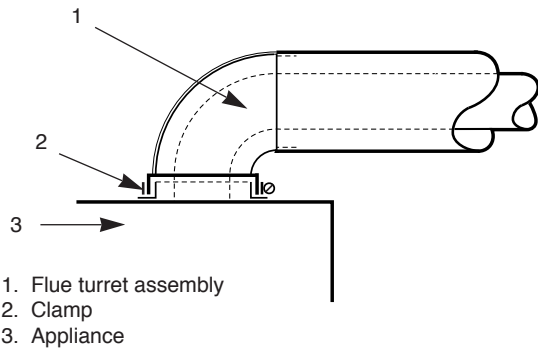
Fit the rubber sealing gasket centrally onto the terminal assembly and tighten the clamp. Refer to Fig. 27.

Apply the plastic tape to the air duct in contact with the external brickwork.

From inside push the assembly through the wall so that the gasket flange is against the outer face. Refer to Fig. 27. It may be necessary to adjust the legs of the flue centering ring. Align the flue turret and push fully onto the socket on the appliance. Tighten the clamping ring. Refer to Fig 26. Seal the gap around the duct at the inner wall face with the flexible seal provided and make good.



**Fig.26 . Flue Turret Fixing .**



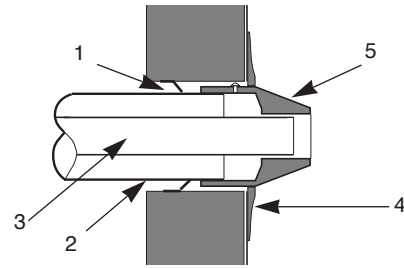
Replace the inner casing.

**11.11 Flue Bends.**

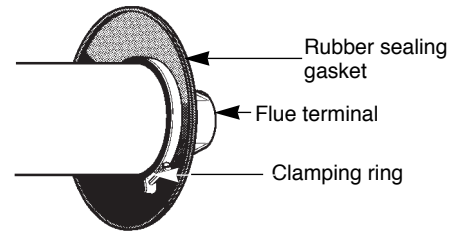
90° and 45° bends are available. A maximum of two bends may be used in addition to the first bend on the flue turret.

A 90° bend is equivalent to 1m of straight duct.

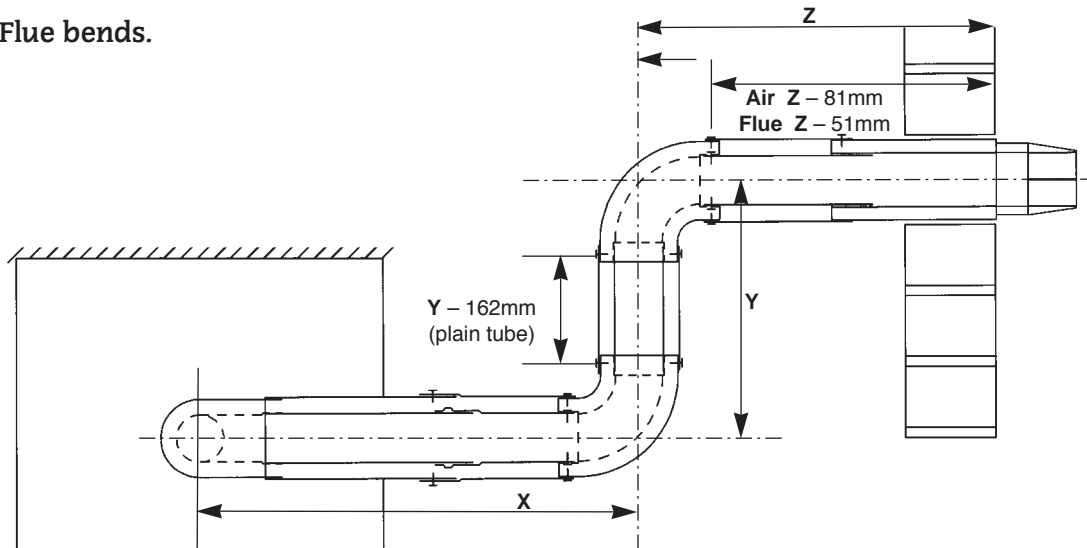
**Fig.27 . Terminal assembly for internal fitting of the flue.**



- 1. Flue centering ring
- 2. Air duct
- 3. Rubber sealing gasket
- 4. Flue Terminal



**Fig. 28. Flue bends.**



A 45° bend is equivalent to 0.5m of straight duct. A maximum flue assembly of 3m is possible with 1 X 90° bend and 2m with 2 X 90° bends.

Measure the lengths X,Y and Z. Refer to Fig.28. The maximum value of X using the turret assembly only is 506mm. Reduce the ducts to the appropriate length i.e. X = 406mm, cut 100mm from the air duct and 120mm (to cover the entry into the 45° or 90° elbow) from the flue duct. Refer to Fig.29.

NOTE: The flue system ducts between the elbows, dimension Y, requires the socketed ends (of the first extension if two or more are used) to be removed and the air and flue tubes to be cut to the same length.

Cut the ducts to a length Y - 162mm. Refer to Fig.28. The final section, dimension Z, of the flue system must include a section of plain duct assembly i.e. an extension assembly with the sockets removed. Reduce the final section, including the terminal assembly, by the appropriate amount i.e. Air duct Z - 81mm and the flue duct Z - 51mm. Refer to Fig.28.

If Z < 425mm it will be necessary to cut the air and flue ducts of the extension to a plain length of 100mm and reduce the length

of the terminal assembly i.e Z = 350mm - remove 75mm from the terminal assembly.

If Z in 425 - 725mm it is not necessary to cut the terminal assembly or use a second extension duct as the length can be set telescopically.

If Z > 725mm then two extension duct assemblies will be required, the first assembly being cut to length as plain tubes.

If more than two extension ducts are needed in any section to achieve the required length then the final section of the assembly must not be less than 325mm without cutting the terminal assembly.

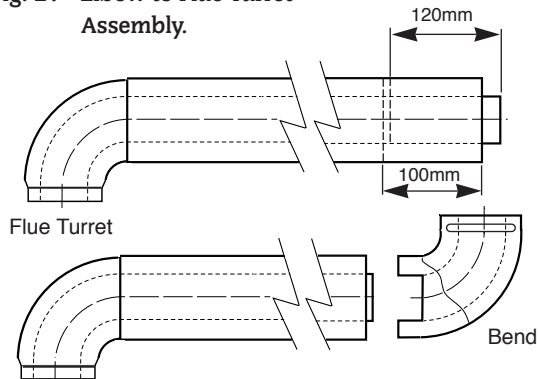
NOTE: The flue duct of the final extension must be 30mm longer than the air duct.

Each section must be connected to the previous section of the flue bend by fixing the flue ducts together and then similarly fixing the air ducts which engage the elbows.

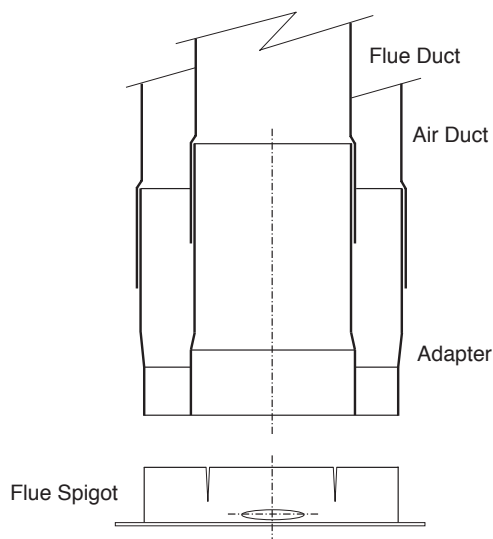
Fit the assembly as described in Section 11.9, 11.10 as appropriate.

Make good the internal and external brickwork or rendering.

**Fig. 29 - Elbow to Flue Turret Assembly.**



**Fig.30 Vertical Adapter.**



**11.12 Vertical Adapter for Horizontal Flues.**

An adapter is available for an initial short section of vertical flue. Refer to Fig. 30.

Measure and cut the flue as described in Section 11.11.

The first, vertical, section (equivalent to dimension X) is measured from the top of the boiler casing. Cut the vertical section of the extension duct to 167mm less than the measured distance. Do not remove the socketed ends.

The minimum measured distance is 167mm.

Seal the air duct to the turret using silicone sealant.

**11.13 Completion of the Installation.**

Check that all the connections on the manifold have been tightened. Refer to Fig.16.

Remove the fascia bottom panel. Refer to Fig.31.

Connect the mains electricity supply lead to the appliance and secure the cable clamp. Refer to Fig.11.

Check there is sufficient loose lead to allow the release of the fascia panel assembly and that the earth lead of the mains supply cable is longer than the live and neutral leads.

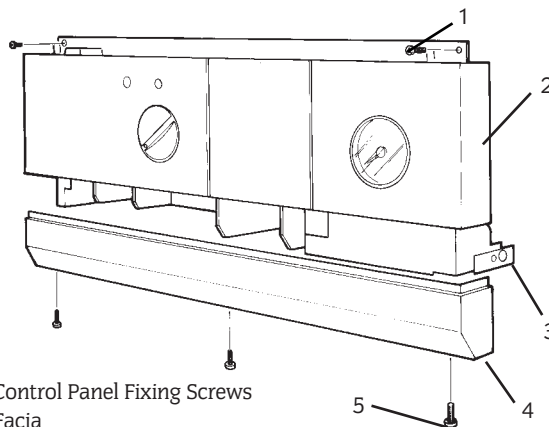
Fit the fascia mounted clock. Refer to Fig.34.

Connect any external controls ensuring that the leads pass through the appropriate clamps. refer to Fig.12 and 33.

Test for gas soundness as described in BS6891.

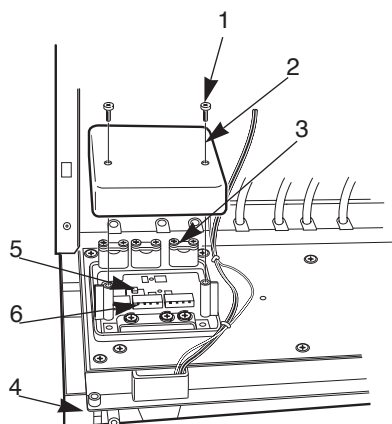
If the appliance is not commissioned immediately, replace the cabinet and fascia bottom panel. Check that the gas and electricity services have been turned off.

**Fig. 31 - Facia Connections Cover.**



1. Control Panel Fixing Screws
2. Facia
3. Control Panel Pivot Point
4. Connection Cover
5. Connection Cover Fixing Screws

**Fig.32. Rear Connections Cover**



1. Rear Connections Cover Fixing Screws (2)
2. Rear Connections Cover
3. Cable Entry With Clamps
4. Facia
5. System selector Switch
6. Controls Connections

**Fig.33. Rear Connection Point**

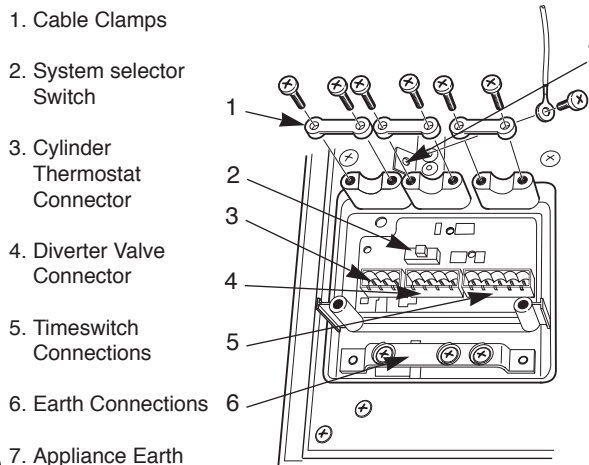
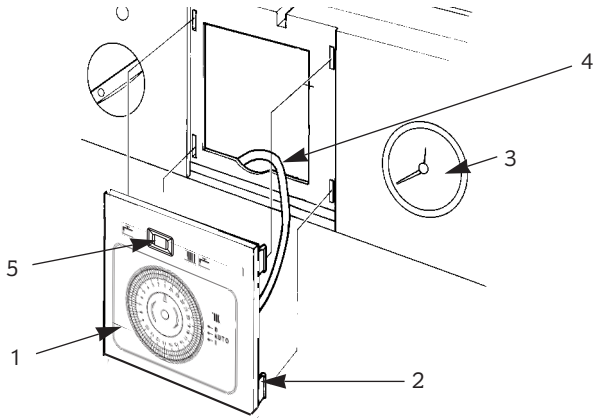


Fig 34 - Programmer Connection - Facia Position



- 1. Programmer
- 2. Programmer Fixing Clip
- 3. Pressure Gauge
- 4. Programmer Connector
- 5. switch

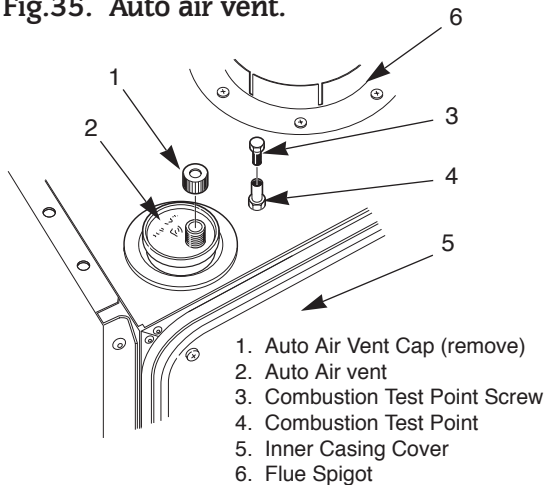
## 12. Commissioning The Appliance

12.1 Lift off the cabinet front panel .

Check that the electricity and gas supplies to the appliance are turned off and that all the water connections throughout the system are tight.

Open the system valves at the appliance. Refer to Fig 16. Open all the radiator valves. Remove the automatic air vent cap. Refer to Fig 35.

Fig.35. Auto air vent.



- 1. Auto Air Vent Cap (remove)
- 2. Auto Air vent
- 3. Combustion Test Point Screw
- 4. Combustion Test Point
- 5. Inner Casing Cover
- 6. Flue Spigot

Fill the system.

Remove the bottom panel to gain access to the filling loop. Insert the bayonet end of the filling key into the corresponding cut-outs in the filling loop housing and twist to lock the key in place. Refer to Fig. 8

Turn the grey knob anti-clockwise to allow water to fill the system until the pressure gauge shows 2.5bar.

Turn the grey knob clockwise to stop the water flow and remove the filling key by lining up the bayonet end of the key with the cut-outs in the filling loop housing and withdraw the key.

**Note: The key must always be removed from the filling loop housing after the system has been filled to prevent accidental filling and to comply with the Water Regulations.**

Check for water soundness throughout the system.

Vent each radiator in turn.

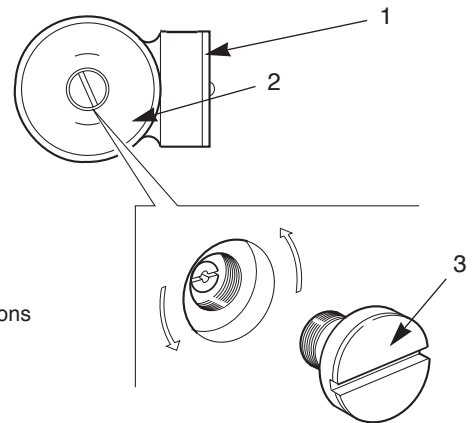
Remove the cap from the pump and turn the shaft about half a turn. Replace the cap. Refer to Fig. 36.

Lower the facia and check that the relief valve operates by turning the knob anti-clockwise until it releases. Refer to Fig. 37.

12.2 Set the Expansion Vessel Pressure

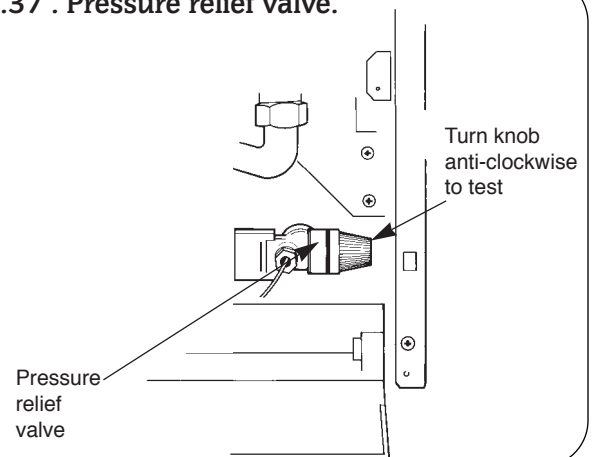
The charge pressure of the expansion vessel as dispatched is 0.5bar, which is equivalent to a static head of 5m [17ft].

Fig. 36. Pump venting.



- 1. Electrical Connections Cover
- 2. Pump
- 3. Cap

Fig.37 . Pressure relief valve.



The charge pressure must not be less than the static head at the point of connection. A Schraeder type valve is fitted to the expansion vessel to allow the charge pressure to be increased if necessary. Refer to Fig. 52. The expansion vessel must be charged to 0.3bar less than the initial system design pressure. Note: 1bar = 10.2m = 33.5ft of water.

12.3 Set the System Pressure

Fill the system through the filling loop until the pressure gauge is at 2.5bar and check for leaks.

Release water through the relief valve until the required system pressure is obtained, up to a maximum of 1.5bar.

Set the pointer on the pressure gauge to record the set system pressure.

If the pressure indicated on the gauge is greater than 2.6bar when operating at the maximum central heating temperature,

an extra expansion vessel must be fitted to the system as close as possible to the appliance in the central heating return connection.

The appliance [as despatched] can accommodate a system volume of about 90 litres. Refer to BS7074 Part 1, BS5449 and Table 9. If the system volume is greater then an extra vessel must be fitted as close as possible to the appliance in the central heating return vessel connection and pressurised to the same figure as the integral vessel.

12.4 Clock/Programmer: The controls fitted to the appliance should be set up at this stage.

12.5 Check that the gas and electricity supplies are turned off. Refer to Fig. 16.

Connect a pressure gauge to the gas valve. Refer to Fig. 39.

12.6 Checking the Burner Pressure

Set the temperature control knob to maximum and the clock/programmer to operate continuously.

Turn on the gas and electricity supplies. A continuous spark will occur until the burner is alight and sensed by the control circuit. The burner will light and ramp up to the factory set pressure. If the burner does not light then press the 'lock-out' reset button. Refer to Fig 40. Note: The burner pressure is factory set at the mid point of the range of the boiler and may be reset to match the system requirements. If, after checking that the supply pressure is sufficient i.e. 18.0mb approx [NG] or 35mb approx [Propane] at the gas valve inlet pressure test point, the required pressure cannot be obtained then contact Worcester Heat Systems Service Department.

Reset the pressure as necessary by adjusting the screw on the gas valve. Refit the plastic cap and re-seal using the sealing label Refer to Table 1 and Section 15.4.1. Refer to Fig.38.

Test for gas soundness at the joint between the burner and the gas valve with leak detection fluid.

12.7 Domestic Hot Water

Check that all external controls are calling for heat and that the flow pipe to the cylinder is hot after a short period. Check that the cylinder thermostat, if fitted, is set to about 55°C.

12.8 Central Heating

Check that all the radiators heat up evenly. If necessary carefully vent.

12.9 Balance the system to give a temperature differential of 11°C. An adjustable by-pass is fitted to the appliance.

12.10 Set the room thermostat to minimum and check that the burner goes out. Reset the room thermostat and the burner will re-light.

Turn off the gas service cock. The burner will go out but, after a short pause, the appliance will attempt to restart and spark for 10 seconds and then 'lock-out'. After 60 seconds carefully open the gas service cock, press the reset button and observe the burner re-light and follow the normal sequence of operation. Refer to Fig 16 and 40.

Turn off the gas service cock and the electricity supply to the appliance.

Drain the system while the appliance is hot.

Refill, vent and re-pressurise the system as described in Section 12.1, adding a suitable proprietary inhibitor. Further information is available from WHS Technical Information Dept, Telephone 0990 266241.

12.11 Completion of Commissioning

Disconnect the pressure gauge from the gas valve and tighten the test point screw.

Replace the fascia panel covers.

Restart the appliance and check for gas soundness around the test point screw.

Refit the cabinet casing.

If the appliance is to be passed over to the user immediately then set the controls to the users requirements.

If the appliance is to be left inoperative in frosty conditions then set the programmer, if fitted, to continuous and the appliance to operate at a low temperature under the control of a frost thermostat, if fitted.

If there is any possibility of the appliance being left totally unused in freezing conditions then switch off the gas and electricity and drain the appliance and the system.

Fig. 38. Gas valve - Softlite adjustment.

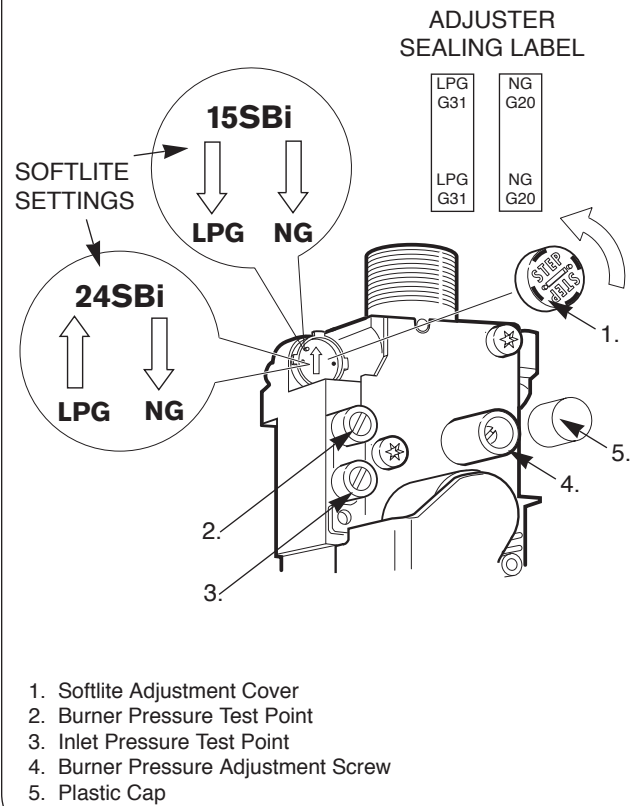
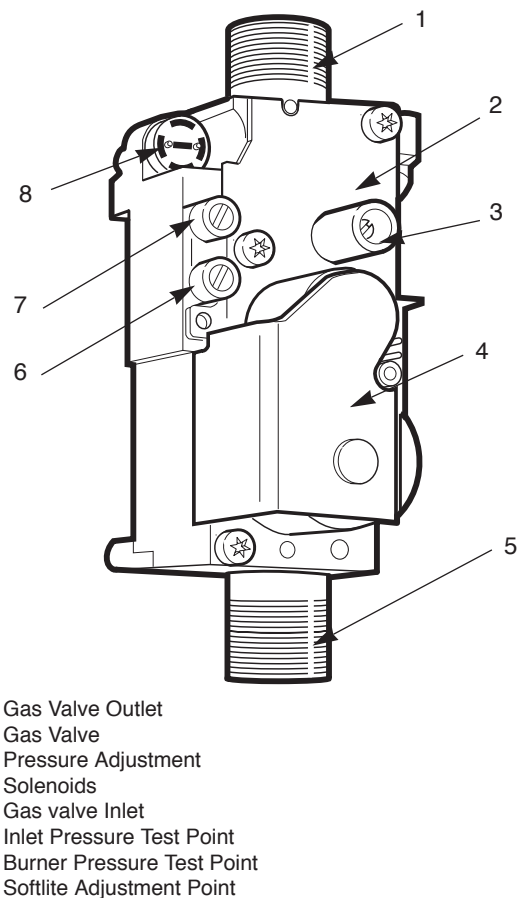
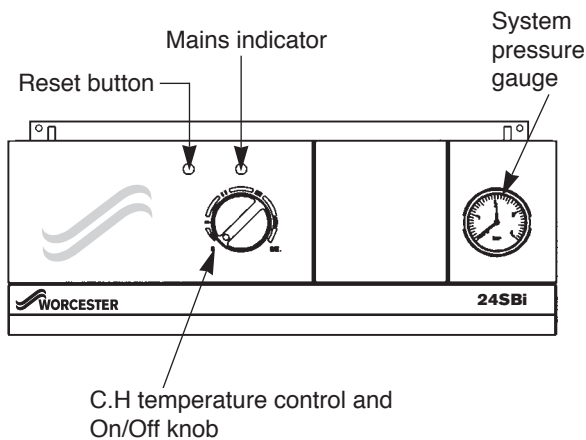


Fig. 39. Gas Valve.



## 13. Instructions To The User

Fig.40 . User controls.



- 13.1 Hand over the User Booklet and explain how to operate the appliance safely and efficiently.
- 13.3 Tell the user what to do if the appliance is not to be used in very cold conditions.
- 13.4 Tell the user what to do if the system pressure falls.
- 13.5 Explain that regular servicing will maintain the safe and efficient operation and extend the life of the appliance. WHS can offer a comprehensive maintenance contract.
- 13.6 Tell the user that any work on the appliance must only be carried-out by a competent person.

## 14. Inspection And Service

14.1 The extent of the service will be determined by the operating condition of the appliance. It is the law that any service work is carried-out by a competent person.

### 14.2 Inspection

Check that the terminal and the terminal guard, if fitted, are clear and undamaged.

If the appliance is in a compartment or cupboard check that the specified clearances are clear. Refer to Table 8.

Check all the joints and connections in the system and remake any that show signs of leakage. Refill and re-pressurise as described in Section 12-Commissioning.

Operate the appliance and take note of any irregularities. Refer to Section 18-Fault Finding.

Check the combustion performance

Remove the screw from the sample point on the top of the appliance and connect the meter. Refer to Fig 35.

With the appliance at maximum rate and stable expect readings of about 6.5% - 7.00% CO<sub>2</sub> and 0.002% CO.

Refit and tighten the sample point screw after the test.

Always test for gas soundness after the service has been completed.

Disconnect the electrical supply at the mains and turn off the gas supply at the gas service cock on the appliance before starting any service procedures.

### 14.3 Component Access

Remove some or all of the following parts to gain access to components.

**Cabinet Front Panel.** Lift off the supports.

**Facia.** Unscrew the two screws and lower. Refer to Fig 18.

**Inner Casing.** Unscrew the four screws and remove. Refer to Fig 18.

**Combustion Chamber.** Unscrew the two screws at the top. Loosen but do not remove the two wing-nut extended screws at the sides, unhook the clips and remove the chamber. Refer to Fig 41 and 42.

**Fan.** Carefully pull off the electrical connections and the tubes from the air flow detector. Unscrew the three screws to remove the fan assembly. Refer to Fig 51.

**Flue Hood.** Remove the fan. Unscrew the two screws at the front and withdraw the hood. Ensure that the replaced hood passes under the lip at the rear of the appliance.

**Burner.** Remove the combustion chamber. Release the union nut at the top of the gas valve. Carefully pull-off the connections to the spark electrode and separate the in-line connector to the flame sensing electrode. Refer to Fig 43 and 44.

### 14.4 Component Cleaning

Do not use a brush with metal bristles to clean components.

Clean the fan taking care not to block air flow detector.

Clean the burner to ensure that the blades and injector are clear. Do not use a metal probe to clean the injector.

Clean the electrodes and check the alignment. Replace if there is any sign of deterioration.

Clean the heat exchanger after covering the gas inlet tube. Straighten any distorted fins on the heat exchanger.

Check the combustion chamber insulation and replace if there is any sign of damage or deterioration. Refer to Section 15.4.5.

Carefully refit any components removed and check that all screws are tight and the connections properly re-made with the appropriate gaskets/O-rings.

Re-commission, as necessary, for correct operation to the users requirements. Refer to Section 12 Commissioning.

## 15. Replacement Of Parts

**Important:** Turn off the gas and electricity supplies and drain, where necessary, before replacing any components.

15.1 Always check for gas soundness where relevant and carry-out functional checks as described in Section 12-Commissioning. Any O-ring or gasket that appears damaged must be replaced.

### 15.2 Component Access

Refer to Section 14.3 Inspection and Servicing for access to components.

### 15.3 Draining the Appliance

Turn off the heating flow and return valves at the appliance. Refer to Fig 16.

Remove the casing bottom panel by releasing it from the clips. Fit a tube to each of the drain connections and open the taps. Refer to Fig 47. Close the taps when the flow has stopped.

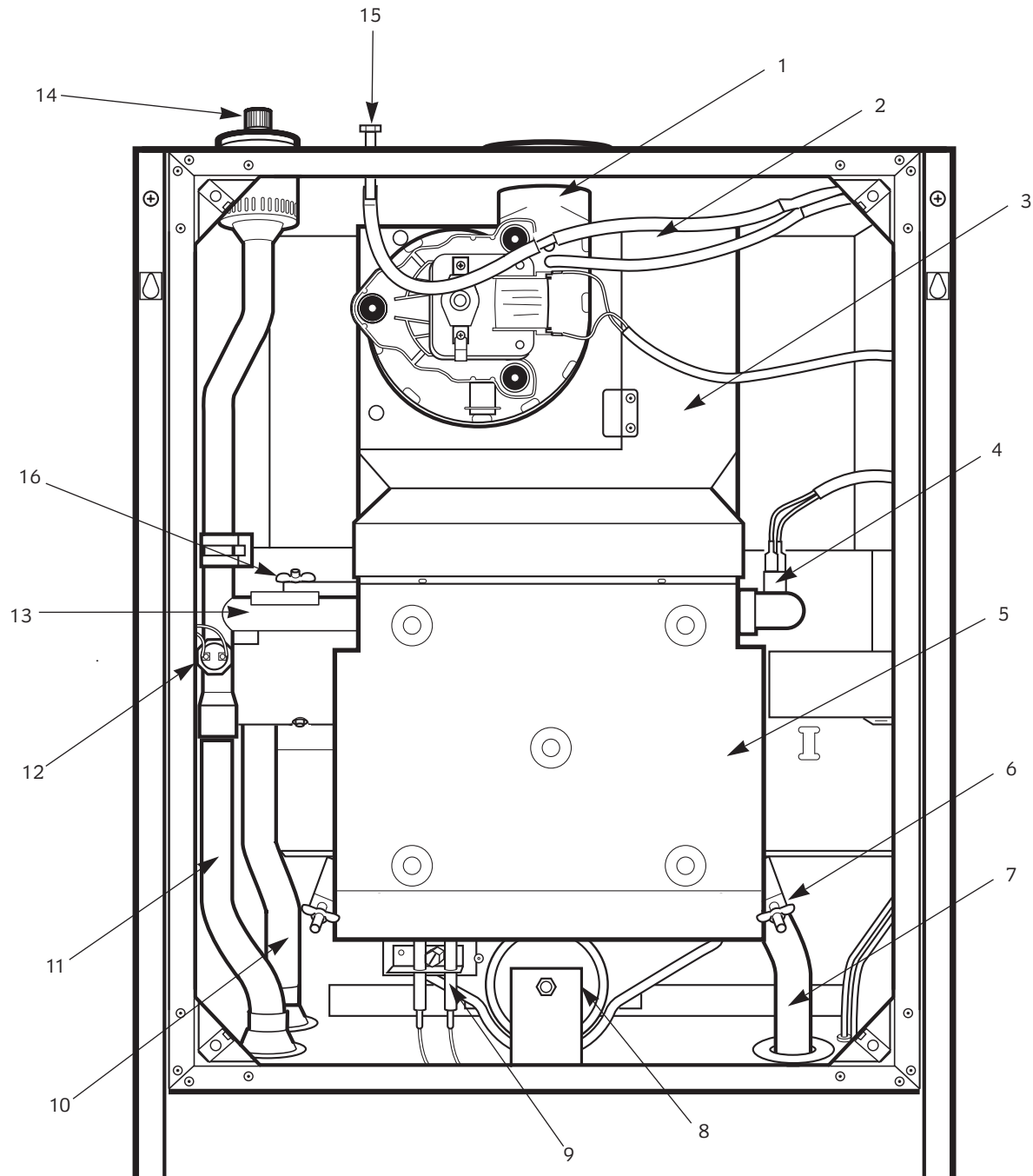
**Important:** A small quantity of water will remain in some components. Protect any electrical components when removing items that might retain water.

### 15.4 Component Replacement

Refer to Fig 41, 42 and 43 for the location of the components.

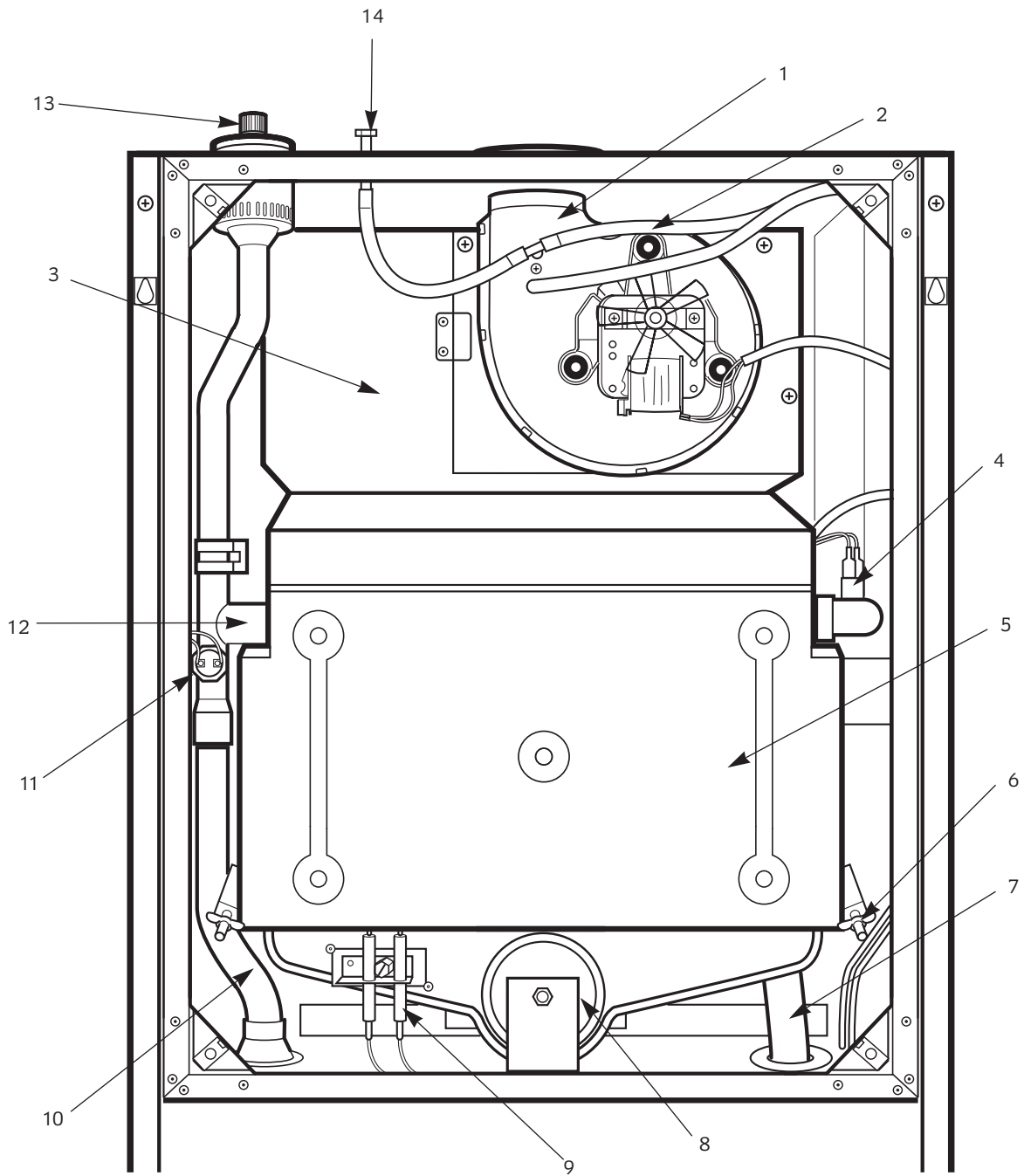
Replace any components removed from the appliance in the reverse order using new gaskets/O-rings/sealant/heat transfer paste where necessary. Always check that any electrical connections are correctly made and that all screws are tight.

Fig. 41. Inner Casing 15SBi



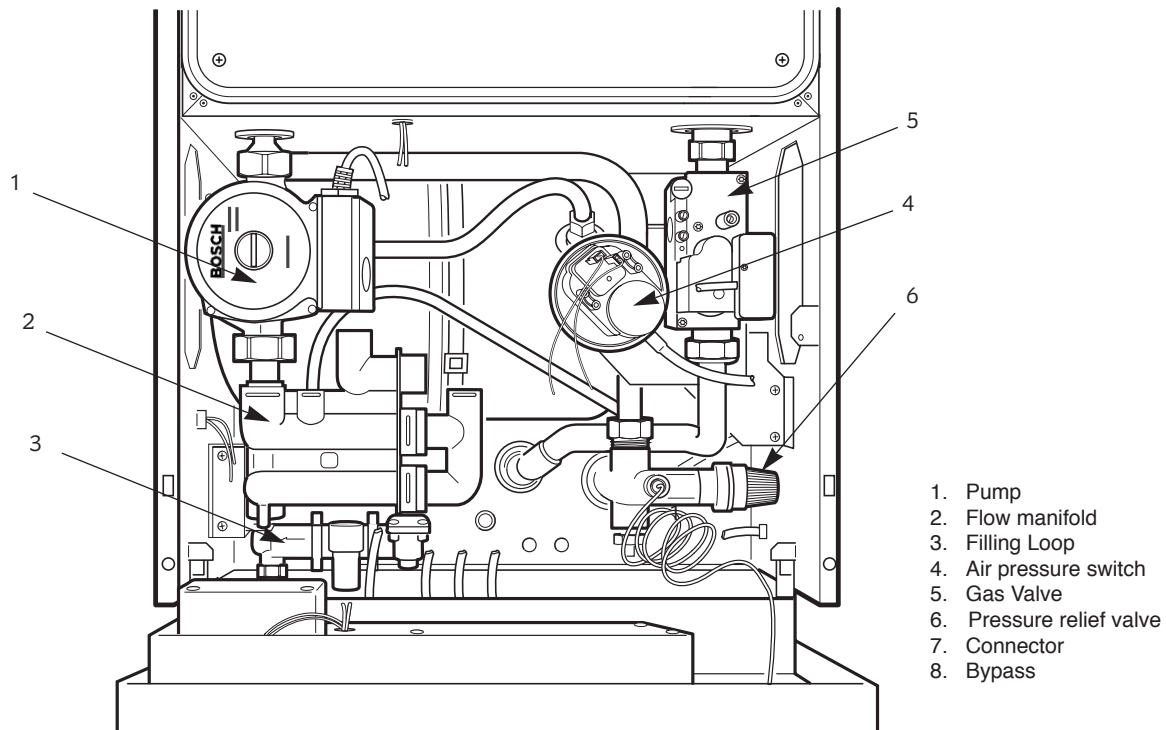
1. Fan Assembly
2. Air Flow Sensing Tubes
3. Flue Hood
4. Overheat Thermostat
5. Combustion Chamber
6. Combustion Chamber Fixing Screws
7. Gas Pipe (Burner Assembly)
8. Burner Assembly
9. Spark Electrode Assembly
10. Return Pipe
11. Flow Pipe
12. Flow Sensor
13. Heat Exchanger
14. Auto Air Vent
15. Combustion Sampling Point
16. Wing Nut

**Fig. 42. Inner Casing 24SBI**



- 1. Fan Assembly
- 2. Air Flow Sensing Tubes
- 3. Flue Hood
- 4. Overheat Thermostat
- 5. Combustion Chamber
- 6. Combustion Chamber Fixing Screws
- 7. Gas Pipe (Burner Assembly)
- 8. Burner Assembly
- 9. Spark Electrode Assembly
- 10. Flow Pipe
- 11. Flow Sensor
- 12. Heat Exchanger
- 13. Auto Air Vent
- 14. Combustion Sampling Point

**Fig.43 . Lower Casing - Gas and Water Controls.**



**15.4.1 Gas Valve**

Do not remove the inner casing.  
 Unscrew the fixing screw and unplug the connections.  
 Remove the air pressure switch. refer to section 15.4.19.  
 Unscrew the union connections above and below the gas valve, unscrew the mounting bracket and remove the assembly. Use new gaskets when replacing the valve. Refer to Fig. 43.  
 Set the Gas Valve:  
 Connect a pressure gauge to the burner pressure test point on the valve. Refer to Fig. 39.  
 Switch on the gas and electricity supplies. Check for gas soundness at the gas valve inlet.  
 Refer to Section 12-Commissioning for the method of checking the pressures.  
 Check for gas soundness at the gas valve outlet.  
 Adjust the gas valve to obtain the required pressure.  
 Switch off the appliance, disconnect the pressure gauge and tighten the test point screw. Refer to Fig. 43.

**15.4.2 Spark Electrode**

Remove the inner casing and the combustion chamber.  
 Lower the facia  
 Carefully pull off the leads at the electrodes. Loosen the screw and remove the electrode assembly. Refer to Fig .44.

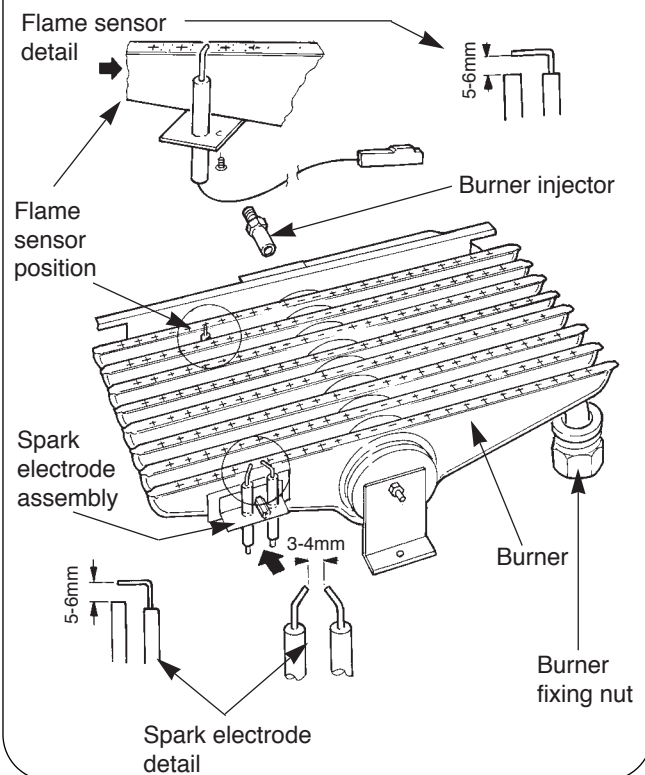
**15.4.3 Flame Sense Electrode**

Remove the inner casing and the combustion chamber.  
 Lower the facia.  
 Separate the in-line connector located in the controls compartment. Remove the burner. Refer to Section 15.4.4.  
 Loosen the screw and remove the electrode assembly. Refer to Fig.44. Ensure that the new electrode is at the correct height above the burner blade.

**15.4.4 Burner**

Remove the inner casing and the combustion chamber.  
 Separate the flame sense electrode in-line connector located in the controls compartment.

**Fig.44 . Burner and Electrode**



Release the union connection beneath the burner and remove the burner from the appliance. Refer to Fig. 43 and 44.  
 Do not omit the gasket when fitting the new burner.



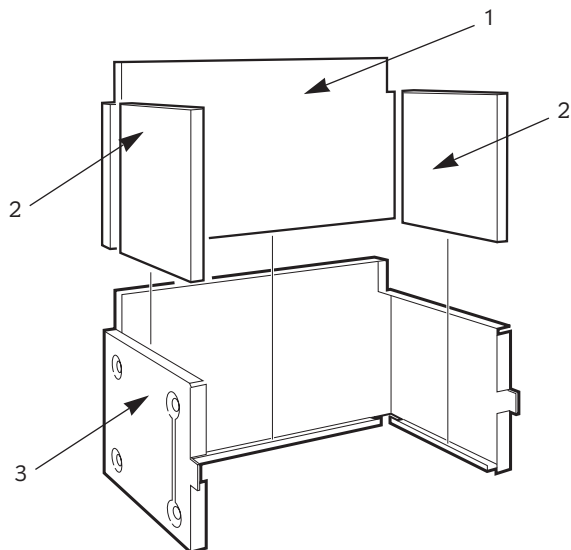
**15.4.5 Combustion Chamber Insulation**

Remove the burner and the primary heat exchanger. Refer to Section 15.3.4, 15.4.21.

Replace the side and front pads in the combustion chamber assembly.

Replace the rear insulation pad. Refer to Fig.45

**Fig.45. Combustion Chamber Insulation.**



- 1. Combustion Chamber Insulation - Front Panel
- 2. Combustion Chamber Insulation - Side Panel
- 3. Combustion Chamber Assembly

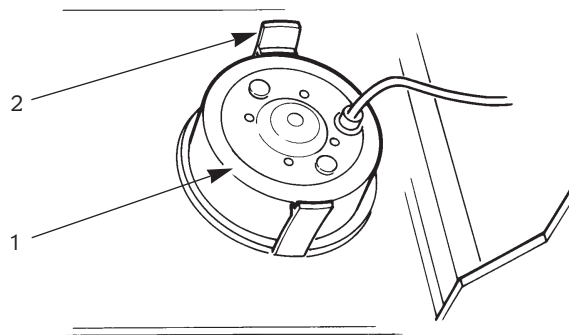
**15.4.6 Pressure Gauge**

Remove the cabinet front panel and lower the facia panel. Drain the appliance as described in Section 15.3 preceding.

Withdraw the clip and remove the pressure sensor. Unclip the gauge head and remove. Refer to Fig. 46 and 47.

Do not omit the O-ring from the pressure capillary when fitting the replacement gauge.

**Fig.46. Pressure Gauge Fixing.**



- 1. Pressure Gauge Head
- 2. Pressure Gauge Head Fixing Clips

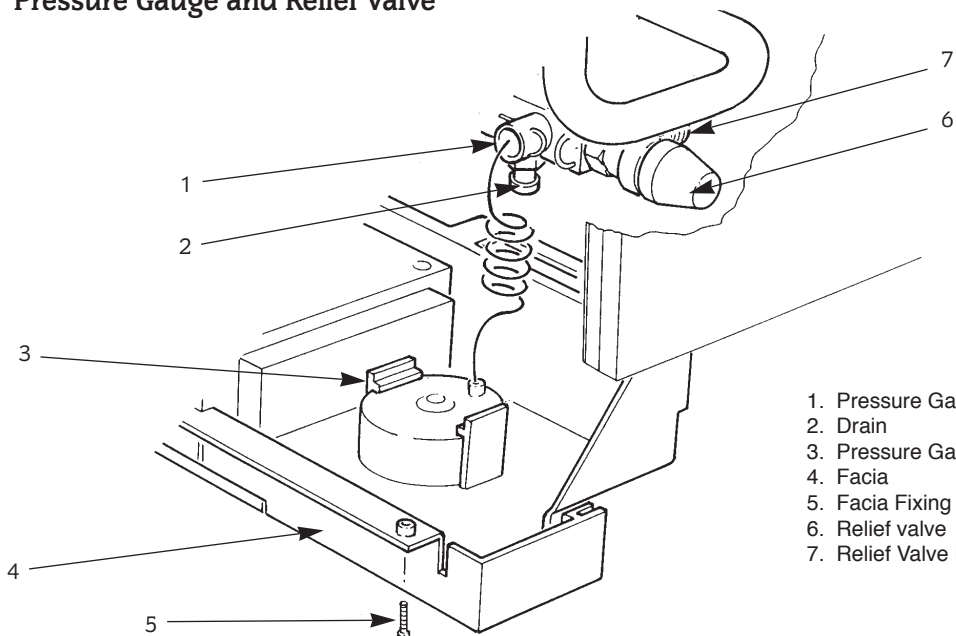
**15.4.7 Relief Valve**

Remove the cabinet front panel and lower the facia panel. Drain the appliance as described in Section 15.3 preceding. Remove the casing bottom panel and disconnect the discharge pipe and pressure gauge sensor. Refer to section 15.4.6. Withdraw the clip and withdraw, at an angle, the valve. Refer to Fig .37 and 43.

**15.4.8 Diverter Valve. [if fitted]**

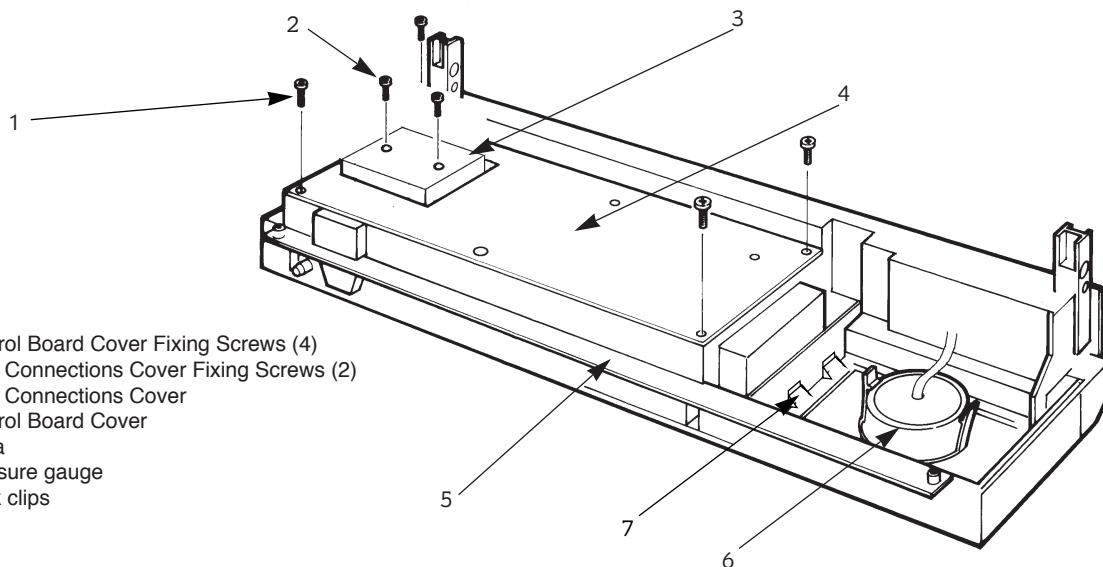
Remove the cabinet front panel and lower the facia panel. Drain the appliance as described in Section 15.3 preceding. Disconnect the electrical connections. Pull out the correct clips and remove the valve. Refer to Fig.20

**Fig.47. Pressure Gauge and Relief Valve**



- 1. Pressure Gauge Sensor Fixing
- 2. Drain
- 3. Pressure Gauge Head Fixing
- 4. Facia
- 5. Facia Fixing Screw (2)
- 6. Relief valve
- 7. Relief Valve Discharge Pipe Connection

**Fig.48. Rear Control Board Cover.**



- 1. Control Board Cover Fixing Screws (4)
- 2. Rear Connections Cover Fixing Screws (2)
- 3. Rear Connections Cover
- 4. Control Board Cover
- 5. Facia
- 6. Pressure gauge
- 7. clock clips

**15.4.9 Control Board**

Remove the facia bottom panel and carefully disconnect all the electrical connections. Refer to Fig. 11 and 12.  
 Lower the facia panel and remove the splash cover. Refer to Section 14.3.  
 Disconnect the earth connection at the appliance. Refer to Fig. 33.  
 Remove the rear connection cover, unplug the connections and release the cable clamps.  
 Unscrew the four screws to remove the metal cover. Refer to Fig. 48.  
 Lift out the control board.

**15.4.10 Clock**

Remove the cabinet front panel and lower the facia panel.  
 Remove the splash cover and the rear connection cover.  
 Disconnect the clock/programmer. Refer to Fig. 34  
 Release the two clips adjacent to the pressure gauge and remove clock. Refer to Fig. 44.

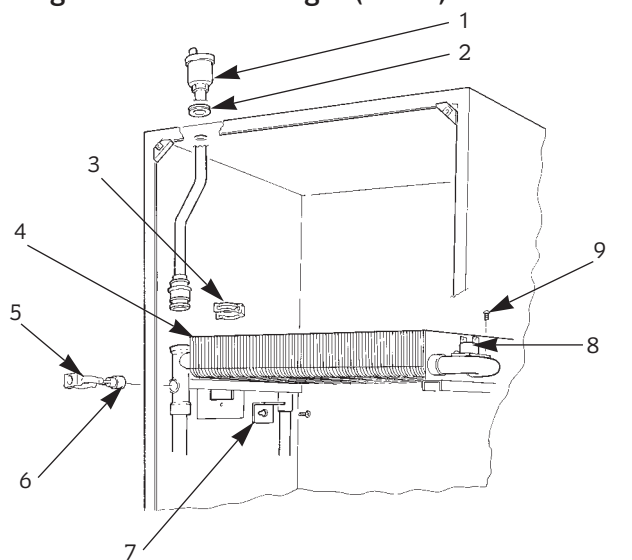
**15.4.11 Heat Exchanger**

Drain the appliance as described in Section 15.3 preceding.  
 Remove the combustion chamber, fan and flue hood as described in Section 14.3, Inspection and Servicing.  
 Remove the temperature sensors as described in 15.4.15, 16, 17.  
 Refer to Fig.49.  
 Remove the auto-air vent and connecting pipe.  
 Release the connections and remove the heat exchanger

**15.4.12 Pump**

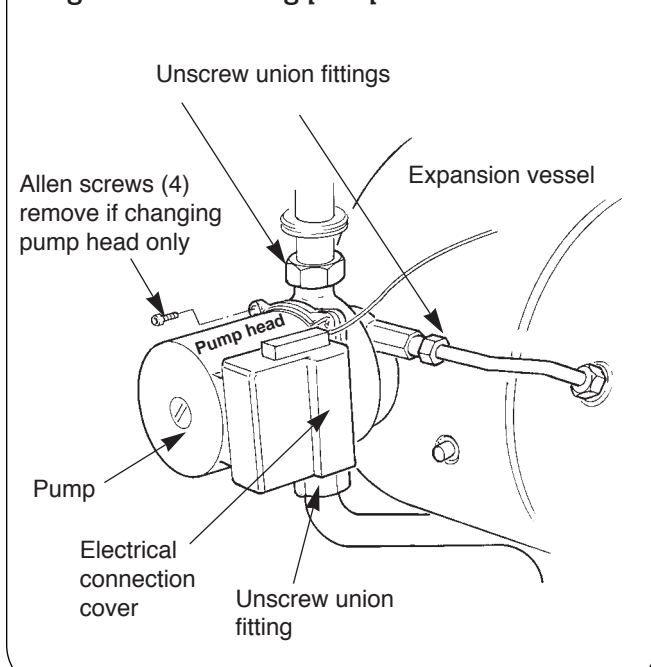
Remove the cabinet front panel and lower the facia panel.  
 Drain the appliance as described in Section 15.3 preceding.  
 Release the water connections and remove the pump. Refer to Fig.50.  
 Disconnect and transfer the electrical connections to the new pump. Set the pump speed to that of the replaced pump. Do not forget to fit the gaskets at the connections.  
 Alternatively replace the pump head only by unscrewing the four Allen screws.

**Fig.49 . Heat exchanger (24SBi)**

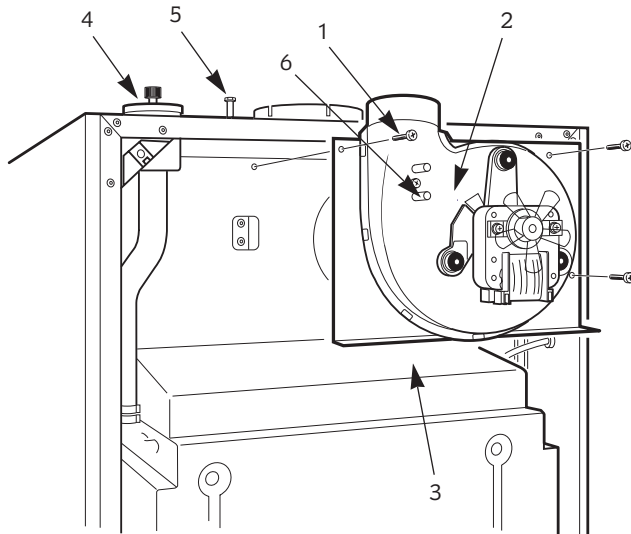


- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Auto Air Vent</li> <li>2. Inner Casing Seal</li> <li>3. Auto Air Vent Assembly Clip</li> <li>4. Gas to Water Heat Exchanger</li> <li>5. Flow Sensor Clip</li> <li>6. Primary flow Sensor</li> </ul> | <ul style="list-style-type: none"> <li>7. Heat Exchanger Support Bracket</li> <li>8. Overheat Thermostat</li> <li>9. Overheat Thermostat Fixing Screws</li> </ul> |
|---|---|

**Fig.50 . Circulating pump**



**Fig.51. Fan /Flue Hood Assembly**



1. Fan Assembly Fixing Screws (3)
2. Fan Assembly
3. Flue Hood
4. Auto Air Vent
5. Combustion Products Test Point
6. Air Flow Sensor

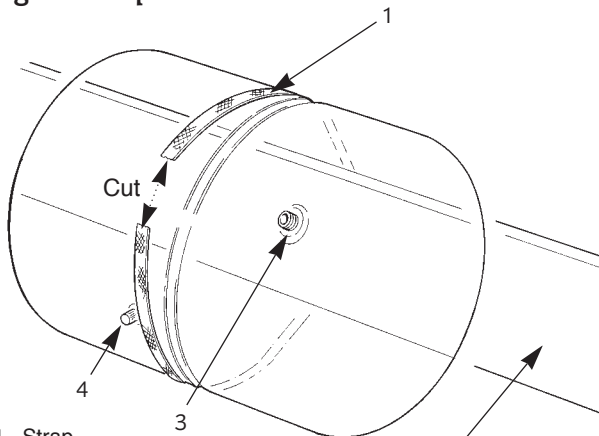
**15.4.13 Fan**

Remove the inner casing.  
Remove the fan as described in Section 14.3 Inspection and Servicing. Ensure that all the connections are correctly made to the new fan. Refer to Fig. 51.  
Do not use any sealant on the fan/flue duct connection.

**15.4.14 Expansion Vessel**

Drain the appliance as described in Section 15.3 preceding.  
Remove the cabinet front and lower the facia.  
Remove the air flow switch and bracket. Refer to Section 15.4.19.  
Remove the pump. Refer to Section 15.4.12.  
Remove the bypass pipe by removing the clips.  
Remove the flow manifold and mid-position diverter valve (if fitted) and the filling loop assembly.  
Disconnect the return pipe from the relief valve. Refer to Fig 43 and 52.  
Cut the plastic retaining clip and remove the expansion vessel.  
When replacing the components do not omit any seals, gaskets or O-rings replace any that are damaged  
Alternatively the specified replacement can be fitted into the system return as close to the appliance as possible. Re-fill and pressurise the system as described in Section 12 Commissioning.

**Fig.52 . Expansion Vessel**



1. Strap
2. Support bar
3. Pressure valve
4. Connection

**15.4.15 Air Flow Detector**

Remove the fan as described in 15.3.13. Unscrew and withdraw, through the fan outlet, the air flow detector. Refer to Fig .51. The detector is 'handed' - do not force it into place.

**15.4.16 Primary Flow Sensor**

Carefully pull-off the connections.  
Pull off the clip and remove the sensor. Refer to Fig .49.

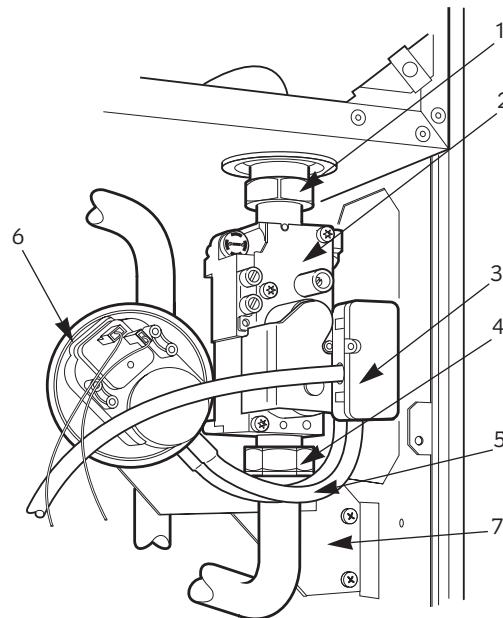
**15.4.17 Overheat Thermostat**

Carefully pull-off the connections. Twist the sensor to expose the fixing screws. Refer to Fig.49.  
Unscrew and remove the sensor.  
Carefully position the replacement sensor so that the connections are away from the flue hood.

**15.4.18 Auto Air Vent**

Drain the appliance as described in Section 15.3 preceding.  
Unscrew and remove the auto air vent.  
Do not omit the O-ring when fitting the replacement air vent.  
Remove the cap. Refer to Fig.49.  
Ensure that the casing seal is not disturbed.

**Fig.53 . Air pressure switch.**



1. Gas Valve Outlet connection
2. Gas Valve
3. Gas Valve Electrical Connection
4. Gas valve Inlet Connection
5. Air Flow Sensing Pipes, Clear (front), Red (rear)
6. Air Pressure Switch
7. Gas Valve Mounting Bracket

**15.4.19 Air Pressure Switch**

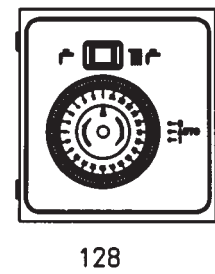
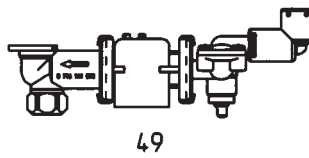
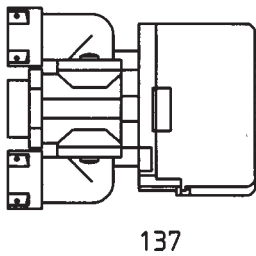
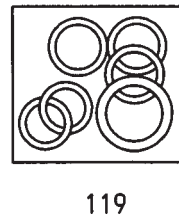
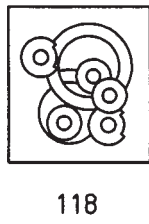
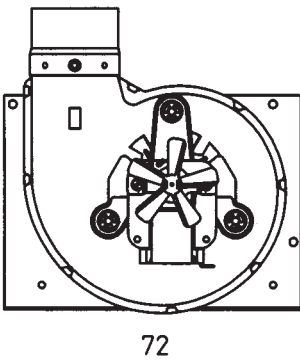
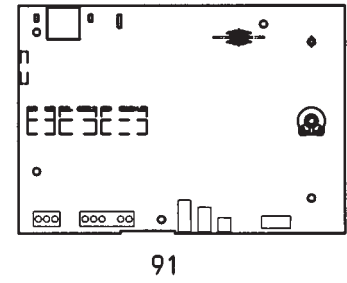
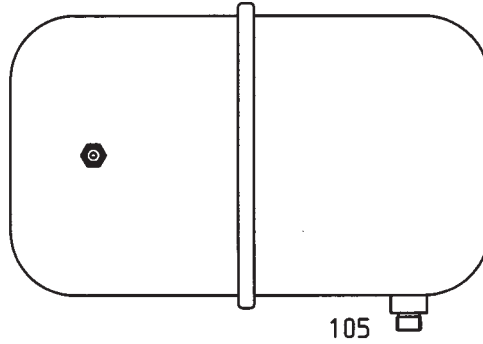
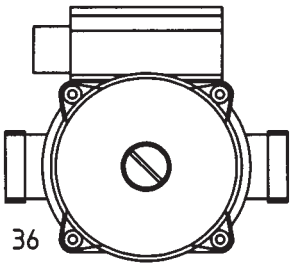
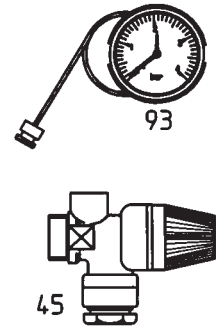
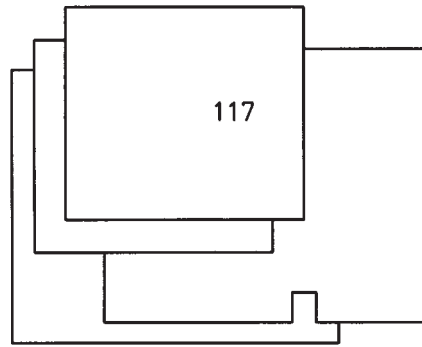
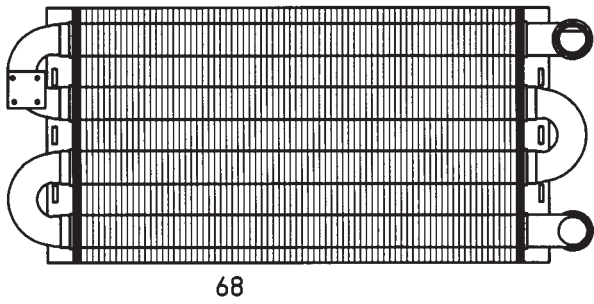
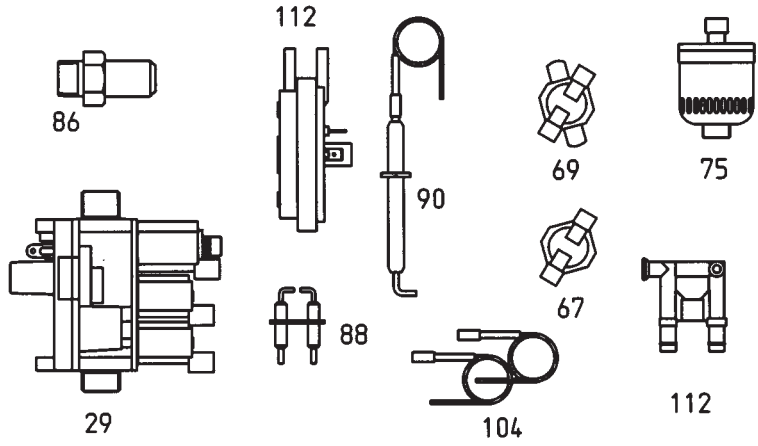
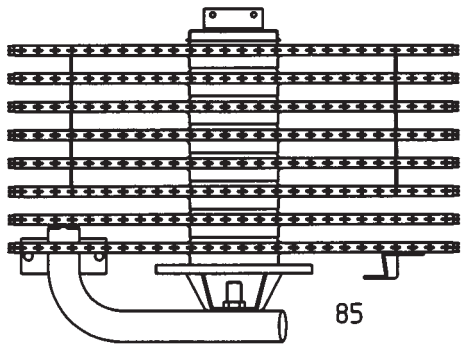
Carefully disconnect the air (note the position of each tube) and electrical connections to the switch. Unscrew the fixing screws and remove the switch. Refer to Fig.53.  
Ensure that the connections are correctly made on the replacement switch.

**15.4.20 Sight Glass**

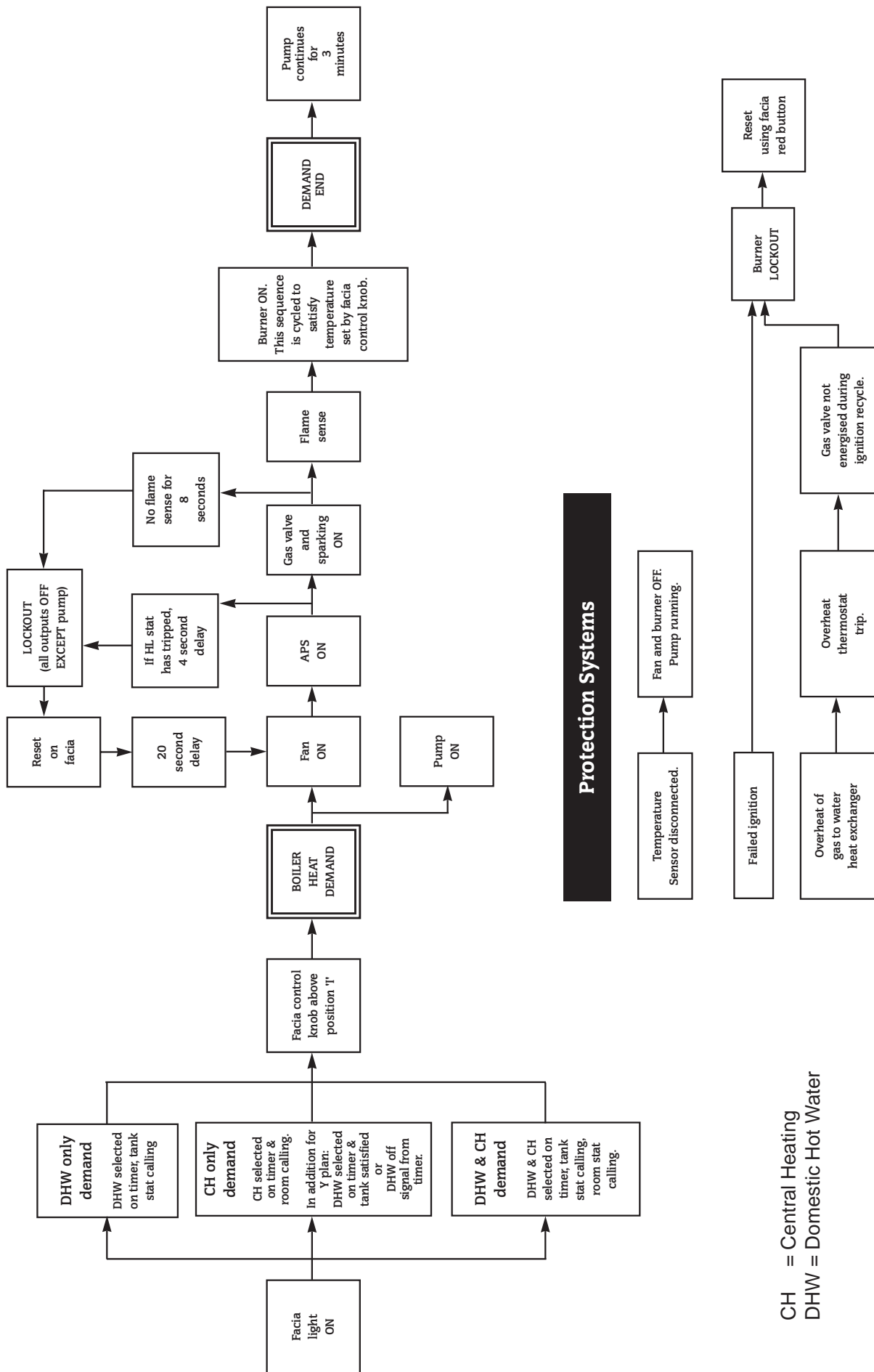
Remove and replace the complete inner casing cover if the sight-glass is damaged. Refer to Section 14.3, Inspection and Servicing..

## 16. Short Parts List

Key No.	G.C. No.	Part	Manufacturer's Reference	Qty	WHS Part No.
		15Sbi Burner NG	Aeromatic AC23/053591	1	8 716 142 647 0
		15Sbi Burner LPG	Aeromatic AC23/053592	1	8 716 142 648 0
85		24Sbi Burner NG	Aeromatic AC23/053593	1	8 716 142 649 0
		24Sbi Burner LPG	Aeromatic AC23/053594	1	8 716 142 650 0
		15Sbi Burner Injector NG	Stereomatic, type 7, 3.6mm dia.	1	8 716 156 396 0
		15Sbi Burner Injector LPG	Stereomatic, type 7, 2.35mm dia.	1	8 716 156 397 0
86	173 091	24Sbi Burner Injector NG	Stereomatic, type 7, 4.5mm dia.	1	8 716 140 208 0
	E00 741	24Sbi Burner Injector LPG	Stereomatic, type 7, 2.78mm dia.	1	8 716 140 209 0
29		Gas Valve Assembly	Honeywell, VK4105T1009	1	8 716 156 751 0
112		24Sbi Air Pressure Switch	HUBA 605.99482	1	8 716 146 153 0
113		15Sbi Air Pressure Switch	HUBA 605.99483	1	8 716 146 156 0
88	375 697	Spark Electrode Assembly	Bucclench, BE/3462/SI	1	8 716 142 100 0
90	E01 903	Harness - Flame Sensor		1	8 716 120 126 0
104	E01 598	Ignition Harness Assembly		1	8 716 120 236 0
		15Sbi Heat Exchanger	ELM 8716142812	1	8 716 142 812 0
68	299 352	24Sbi Heat Exchanger	Giannoni, ref PR22 323 003, spec D2107	1	8 716 142 800 0
117		15Sbi Insulation Pack		1	7 716 192 204 0
117		24Sbi Insulation Pack		1	7 716 192 204 0
75	E00 717	Auto Air Vent 3 <sup>8</sup> in BSP	Caleffi, Mini Call 502030	1	8 716 140 500 0
93	299 506	Pressure Gauge 4 Bar Dark Gray		1	8 716 142 300 0
45	375 699	Pressure Relief valve	Caleffi, 312439	1	8 716 142 404 0
36	E01 602	Pump c/w Harness Assembly		1	8 716 143 107 0
105		Pipe - Expansion Vessel		1	8 716 100 642 0
91		PCB Control Board	Honeywell	1	8 716 146 328 0
69	173 015	Overheat Thermostat	Elmwood, 2455R98789	1	8 716 142 303 0
67	375 696	Thermister Sensor	Elmwood, 665590035	1	8 716 142 302 0
49		Charging Link assembly		1	8 716 121 443 0
		15Sbi Fan	MVL-RLD76/0027-3020L-207	1	8 716 121 484 0
72		24Sbi Fan	Sifan FFB0226-029	1	8 716 121 456 0
120		Fuse 4A Fast blow 20X5mm (10 Pack)		1	8 716 156 013 0
118	299 355	Fibre Washer Pack		1	8 716 192 205 0
119		SBi O-Ring Pack		1	8 716 192 244 0
128		SBi Twin Channel Mechanical Timer		1	8 716 192 020 0
137		Mid Position Diverter Valve		1	8 716 192 195 0



# 17. Operational Flow Diagram



## Protection Systems

CH = Central Heating  
DHW = Domestic Hot Water

## 18. Fault Finding

**NOTE:** This fault finding information is for guidance only. Worcester Heat systems cannot be held responsible for costs incurred by persons not deemed to be competent.

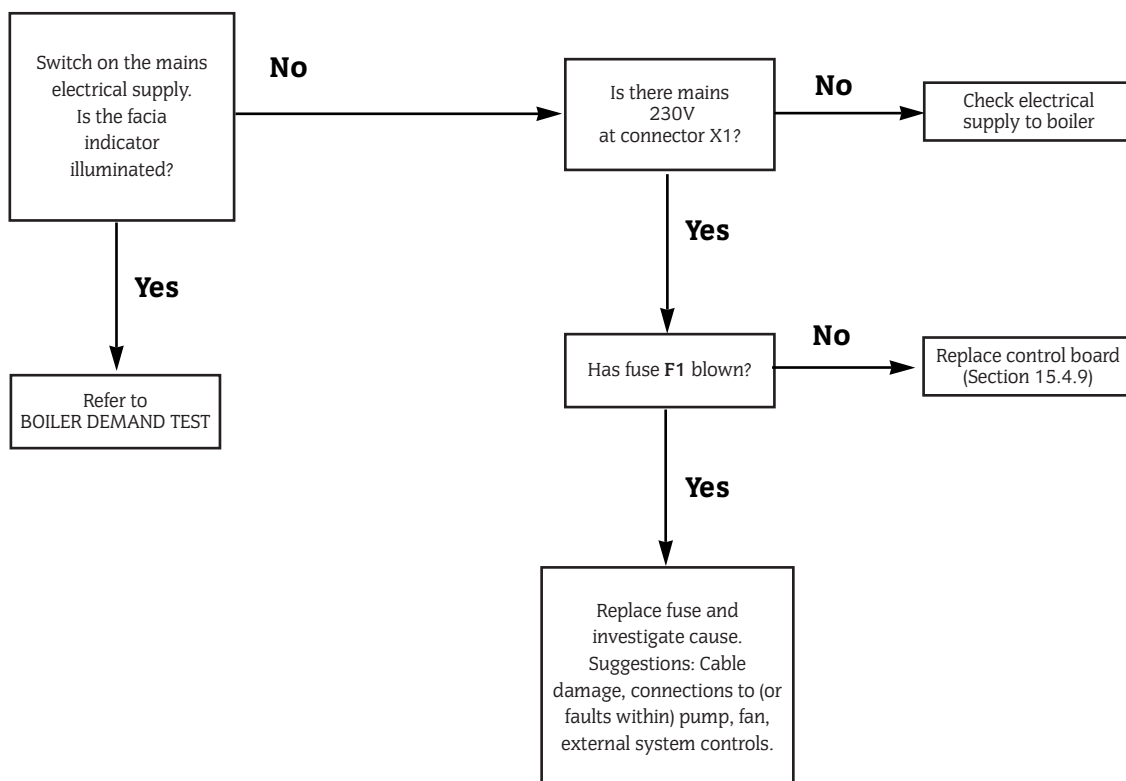
To use this guide, operate the boiler and follow the observations down the left hand column until the boiler fails. The associated tests will help find the fault.

This guide assumes a component failure has occurred following a period of normal running. It is not intended to solve installation errors.

### PRELIMINARY CHECKS

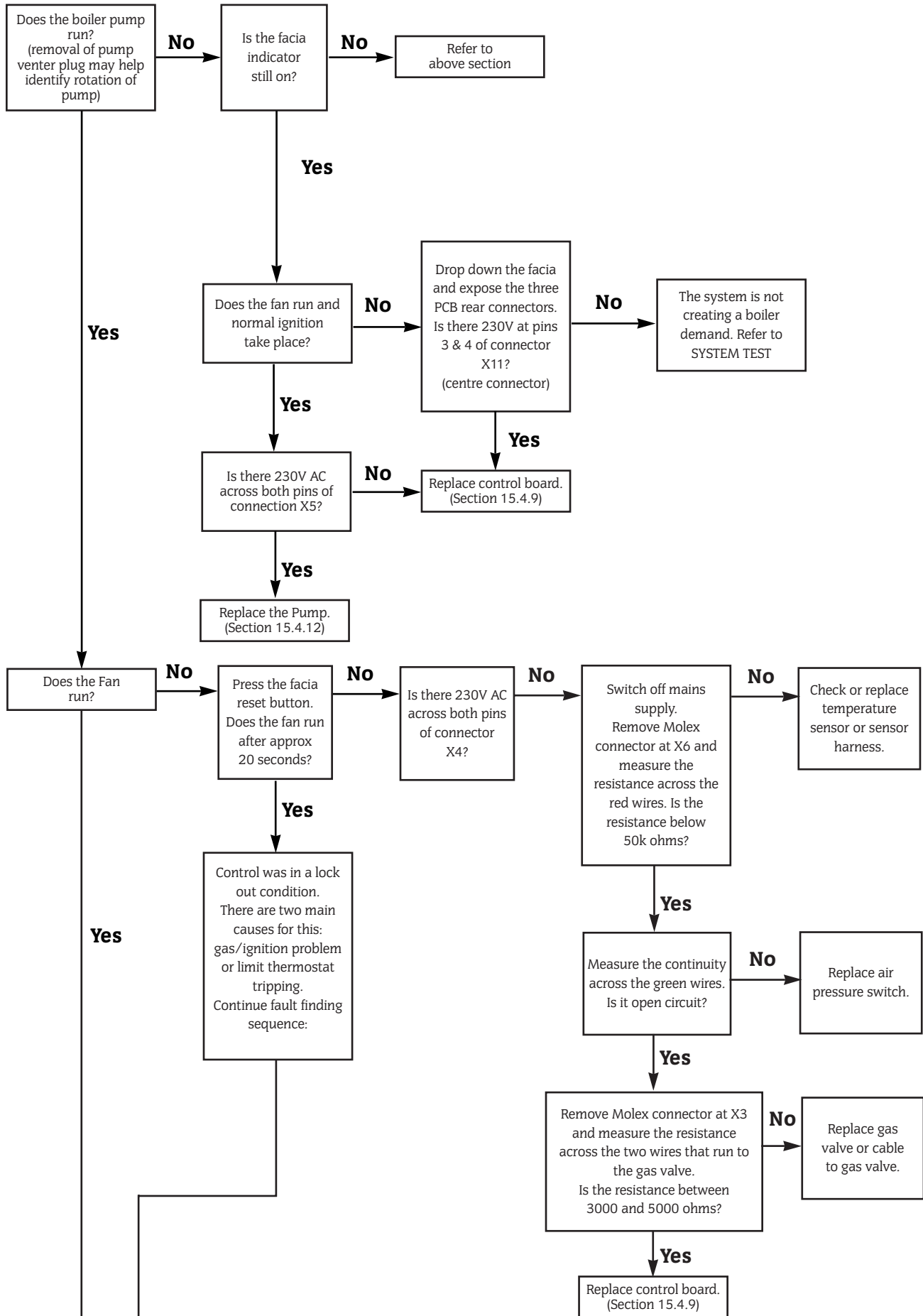
Preliminary electrical system checks are the first electrical checks to be carried out during a fault-finding procedure. On completion of the Service/Fault-finding task which has required the breaking and remaking of electrical connections, check (a) EARTH CONTINUITY, (b) SHORT CIRCUIT CHECK, (c) POLARITY and (d) RESISTANCE TO EARTH.

### FACIA INDICATOR TEST

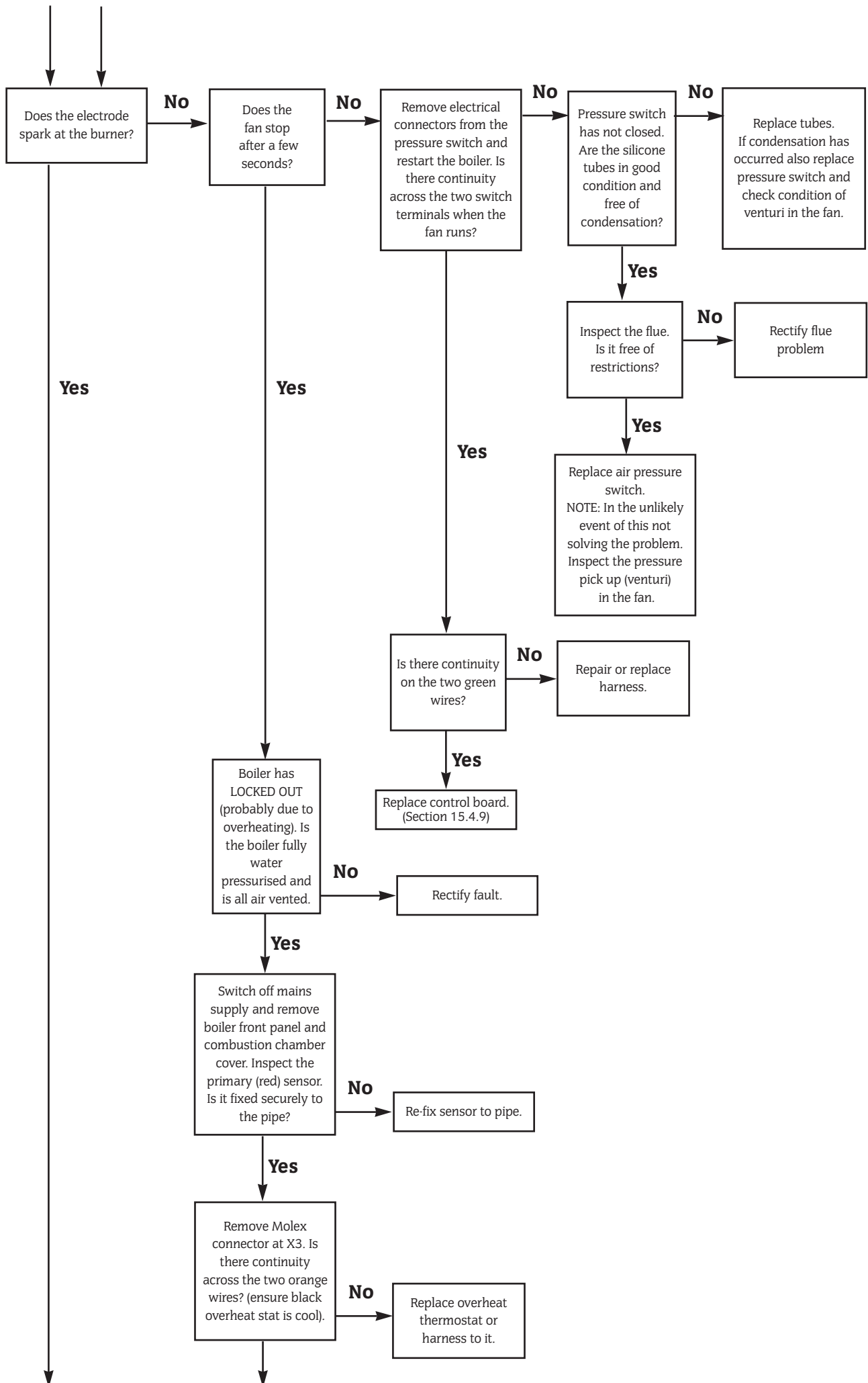


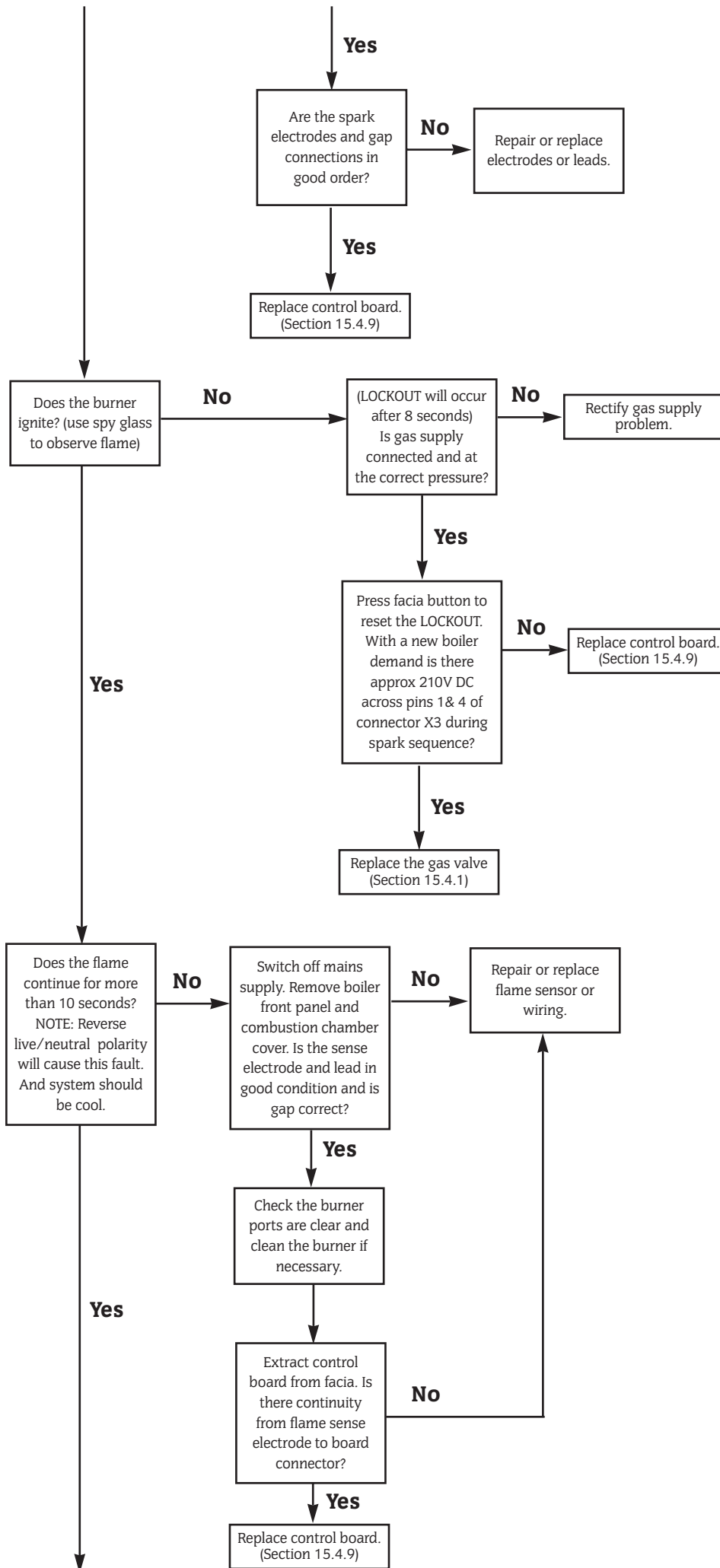
## BOILER DEMAND TEST

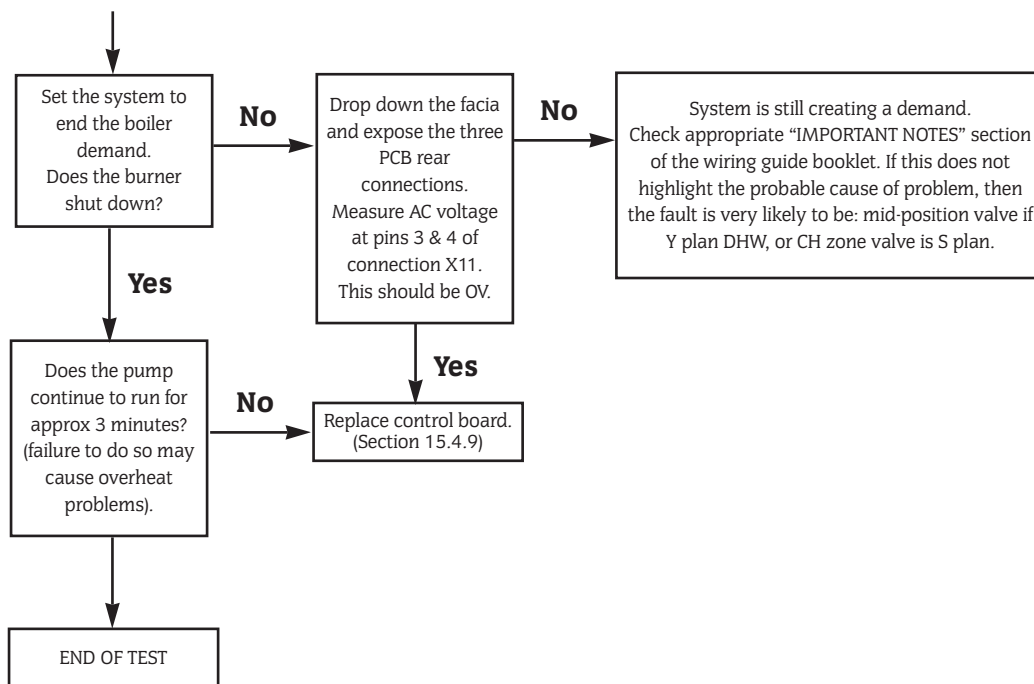
Set the system to create a boiler demand. Turn facia control knob to maximum.





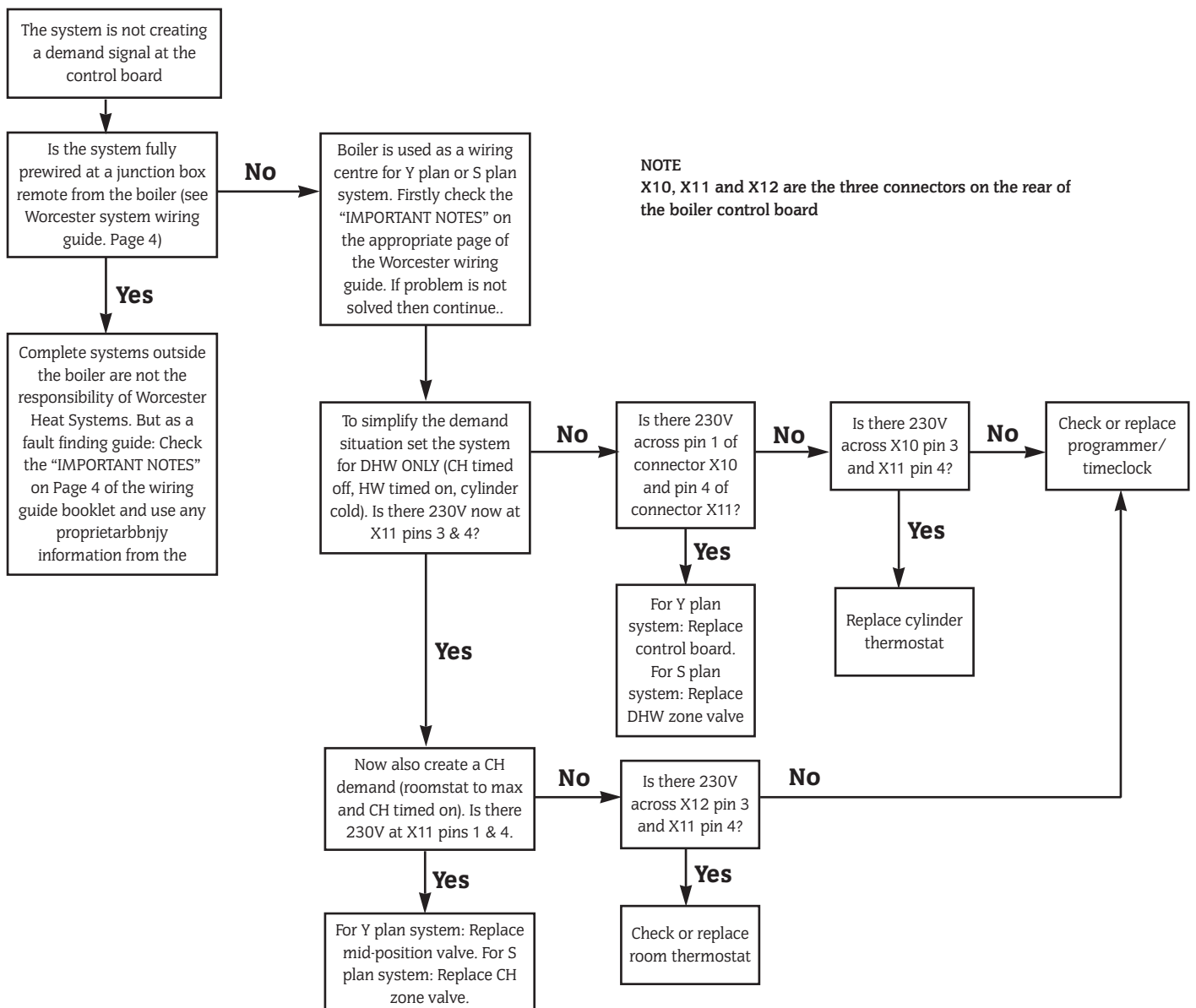






## SYSTEM TEST

This test assumes the system is set to create a boiler demand, but mains voltage is not present at the connector X11 pins 3 & 4



**NOTE**  
X10, X11 and X12 are the three connectors on the rear of the boiler control board



*Worcester Heat Systems Limited, Cotswold Way, Warndon, Worcester WR4 9SW.  
Telephone: (01905) 754624. Fax: (01905) 754619.  
Technical Helpline (0990) 266241.*

---

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.

**PUBLICATION 8 716 145 191 b 07/99**