

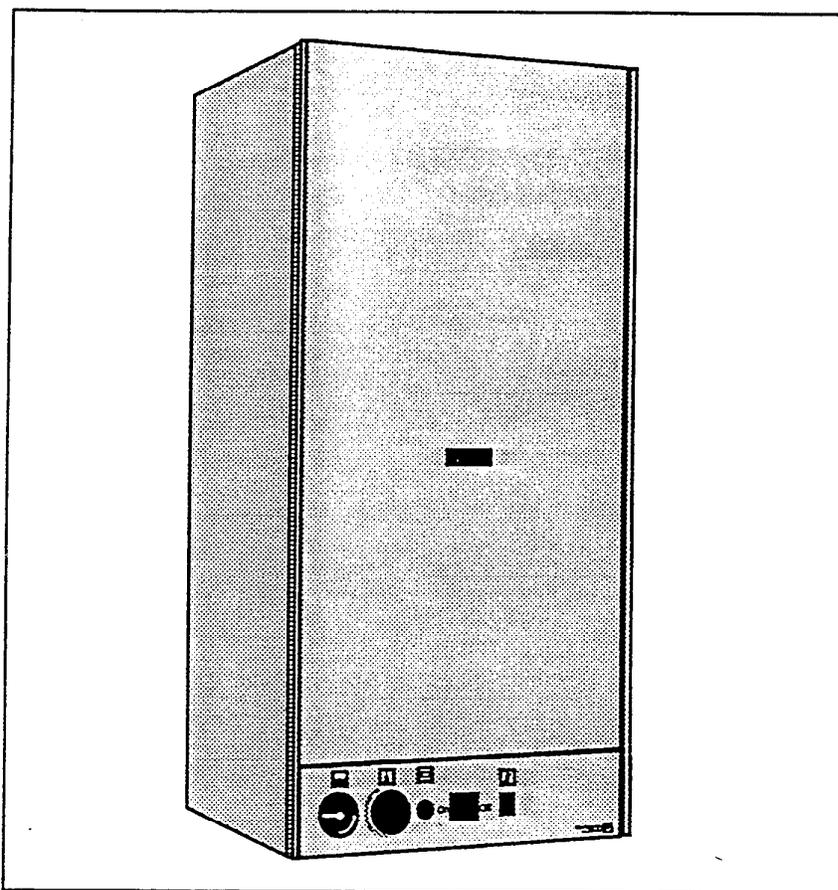
# Sterling System Boiler

## Sterling SB 60 & 80

Room Sealed Fanned Balanced Flue  
Sealed System Boiler

### GAS SAFETY (INSTALLATION AND USE) REGULATIONS.

It is the law that all gas appliances are installed by a competent person  
in accordance with the above regulations  
(For use on natural gas only. G20)



## Installation and Servicing Instructions

(leave these instructions with the user)

**Chaffoteaux  
et Maury**   
Looking Good.Heating Better

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## **CONTROL OF SUBSTANCES HARMFUL TO HEALTH**

### **IMPORTANT**

To comply with the Control of Substances Harmful to Health Regulation 1988 we are required to provide information on the following substance that is contained in this appliance.

**Description**                      Combustion Chamber Lining

**Material**                              Alumino Silicone Fibre

**Precautions**                      During servicing, keep the dust generation to a minimum and avoid inhaling any dust and contact with the skin and eyes. Normal handling and use will not present any discomfort, although some people with a history of skin complaints may be susceptible to irritation.

When disposing of the lining ensure that it is securely wrapped and wash hands after contact.

# 1. INTRODUCTION

The STERLING SB is a wall mounted, low water content fanned balanced flue appliance suitable for central heating and hot water via a fast recovery indirect cylinder. The maximum output is 17,5 kW (60,000 Btu/h) and 23,3 kW (80,000 Btu/h).

The boiler is designed for sealed systems only and included in the appliance are the expansion vessel, circulating pump, optional 3 ports mid position valve, a pressure gauge, safety valve, electrical connection and plug by-pass.

1) The standard flue assembly supplied with the boiler is 100 mm (4 ins) diameter pipe, it can be directed to the rear or to the left or right and, can be extended to a maximum length of 3 meters, or 1,6 meters horizontally using the available 90° bend (see sections 1.4.1, 1.4.2 and 1.4.3, figures 2, 3, 3a, 3b, 3c).

2) Vertical flue option available is 125 mm (5 ins) diameter pipe which can extend up to a maximum of 9,5 meters straight, 8 meters with 2 x 45° bends, or 6 meters with 2 x 90° bends (see section 1.4.4).

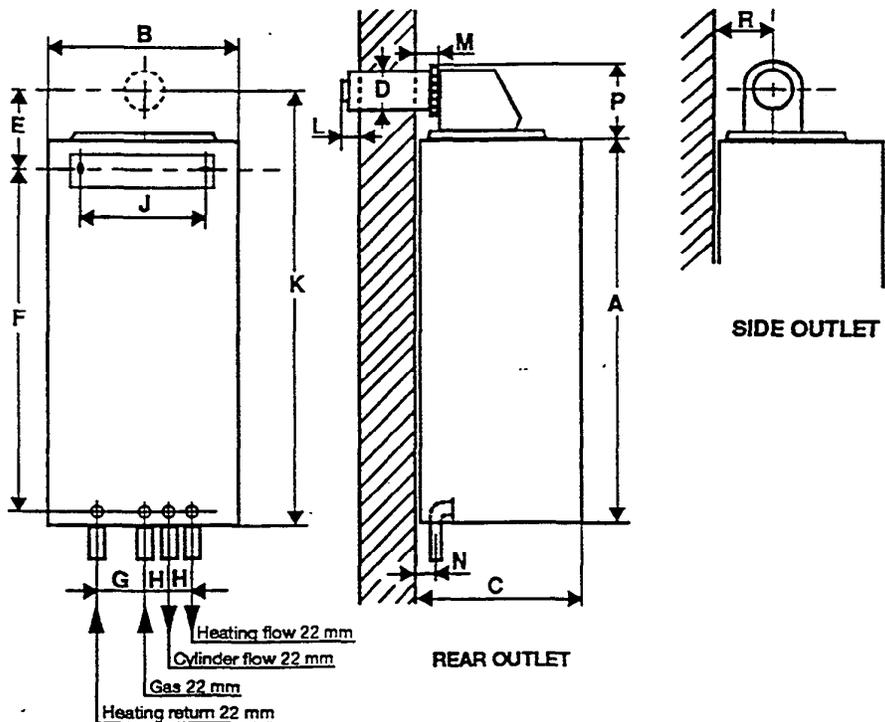
**Special features include -**

- Fully range rated between 10 to 23 kW for SB 80 and 9 to 17.5 kW for SB 60.
- High efficiency.
- Fixing plate.
- Adjustable flow temperature central between a nominal 60° C and 82° C.
- High limit thermostat.
- Built in by-pass.
- Integral pump.
- expansion vessel.

## GUARANTEE

The manufacturer's guarantee on this appliance is for 12 months from the date of purchase. The guarantee is null and void, if the appliance is not installed in accordance with the recommendations made herein.

### 1.1 DIMENSIONS



|   | mm    | in   |
|---|-------|------|
| A | 820.5 | 32.3 |
| B | 391.0 | 15.4 |
| C | 365.0 | 14.4 |
| D | 100.0 | 4.0  |
| E | 169.5 | 6.7  |
| F | 654.5 | 25.7 |
| G | 100.0 | 4.0  |
| H | 50.0  | 2.0  |
| J | 260.0 | 10.2 |
| K | 972.5 | 38.3 |
| L | 13.0  | 0.5  |
| M | 61.0  | 2.4  |
| N | 30.0  | 1.2  |
| P | 152.0 | 6.0  |
| R | 112.0 | 4.4  |

Fig. 1

## 1.2 TECHNICAL DATA

| Central heating   | STERLING SB 80         |                          | STERLING SB 60        |                          |
|---|------------------------|--------------------------|-----------------------|--------------------------|
|   | Maximum input.....     | 26.1 kW                  | 89058 Btu/h           | 19.80 kW                 |
| Maximum output.....   | 23.4 kW                | 79845 Btu/h              | 17.75 kW              | 60566 Btu/h              |
| Gas rate (maximum).....   | 2.63 m <sup>3</sup> /h | 92.98 ft <sup>3</sup> /h | 2 m <sup>3</sup> /h   | 70.71 ft <sup>3</sup> /h |
| Burner pressure.....  | 9 mbar                 | 3.6 in wg                | 7.2 mbar              | 2.9 in wg                |
| Minimum input.....  | 12 kW                  | 40946 Btu/h              | 11.10 k               | 37875 Btu/h              |
| Minimum output.....   | 10 kW                  | 34122 Btu/h              | 9 kW                  | 30709 Btu/h              |
| Gas rate (minimum).....   | 1.0 m <sup>3</sup> /h  | 35.31 ft <sup>3</sup> /h | 1.0 m <sup>3</sup> /h | 35.31 ft <sup>3</sup> /h |
| Burner pressure.....  | 1.3 mbar               | 0.5 in wg                | 1.7 mbar              | 0.6 in wg                |
| Minimum flow rate.....  | 500 l/h                | 1.8 gal/min              | 300 l/h               | 1.1 gal/min              |
| Maximum pressure.....   | 2.5 bar                | 36.5 psi                 | 2.5 bar               | 36.5 psi                 |
| <b>At the maximum pressure loss of the flue</b>                   |                        |                          |                       |                          |
| Temperature of the products of combustion : .....                 |                        |                          | 98 °C                 | 208 °F                   |
| The CO content of the dry free air products of combustion : ..... | 0.0136%                |                          | 0.0136%               |                          |
| <b>Natural gas</b>  |                        |                          |                       |                          |
| Injectors number  | 14                     |                          | 12                    |                          |
| Manifold injectors .....  | 1.28 mm                | 0.05 in                  | 1.28 mm               | 0.05 in                  |
| Manifold restrictors .....  | 4.7 mm                 | 0.18 in                  | 3.8 mm                | 0.15 in                  |

|   |                  |   |
|---|------------------|---|
| <b>Connections</b>  |                  | <b>Ignition - HONEYWELL</b>   |
| Gas.....  | 22 mm copper     | <b>Ignition electrode - SAPCO, APCO</b>   |
| Heating flow (2).....   | 22 mm copper     | <b>Ignition probe - SAPCO, APCO</b>   |
| Heating return.....   | 22 mm copper     | <b>Boiler limit thermostat - ELMWOOD / TOKOSWITCH (85°C)</b>                    |
| Electrical supply 230 V ~ 50 Hz, fused at 3A (on command box) |                  | <b>Boiler regulation thermostat - IMIT</b>                                      |
| Electrical consumption.....                                   | 195 watts        | <b>Safety overheat thermostat ( ELMWOOD/TOKOSWITCH - (105°C) (manual reset)</b> |
| Internally fused, two at 2A (BS 4265)                         |                  | <b>Gas valve - HONEYWELL / SIT</b>  |
| Weight.....   | 42 kg 92.4 lb    | <b>Fan motor - SEL</b>  |
| Water capacity .....  | 4 litres 7 pints | <b>Pressure switch - DUNGS / TRIDELTA / HONEYWELL</b>                           |
|   |                  | <b>Pump head - GRUNDFOS UP 15/50</b>  |
|   |                  | <b>Expansion vessel initial charge pressure - 0.65 bar (9.6 psi)</b>            |
|   |                  | <b>Domestic expansion vessel initial charge pressure - 2 bar (30 psi)</b>       |

### 1.3 MINIMUM CLEARANCES AROUND BOILER

|                          |                |
|--------------------------|----------------|
| Top above air duct ..... | 50 mm (2 in)   |
| Bottom below case.....   | 150 mm (6 in)  |
| Sides.....               | 100 mm (4 in)  |
| Front.....               | 600 mm (24 in) |

### 1.4 WALL THICKNESSES

The standard flue assembly can accommodate the following thicknesses.

Rear : from 40 mm to 576 mm

Side : from 40 mm to 392 mm

(this allows for a minimum clearance of 100 mm between the appliance and the side wall. As this dimension increases, so the maximum side wall thickness available decreases).

Extension flue assemblies are available to accommodate wall thicknesses of :

Rear : from 577 mm to 2876 mm

Side : from 393 mm to 2692 mm

**IMPORTANT NOTE :** The extension ducts supplied, up to a maximum of 3, will in fact permit a greater length than indicated to be covered. The ducts **MUST** be cut so that the maximum length from the centre line of the flue turret to the outermost point of the air duct **DOES NOT EXCEED** 3 metres horizontal. Greater length must not be used.

See sections 1.4.1 1.4.2. 1.4.3.

### 1.4.1 REAR FLUE OUTLET HORIZONTAL

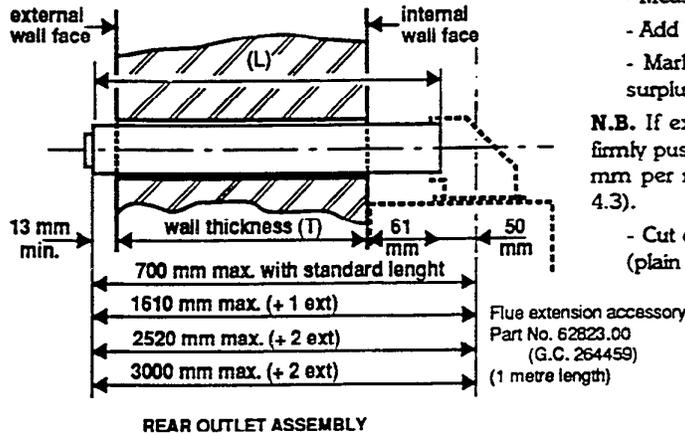


Fig. 2

#### To cut flue assembly to length

- Measure wall thickness (T).
- Add 74 mm. this will give required length (L).
- Mark plastic air duct for length (L) and cut off surplus (from plain end).

**N.B.** If extension sections are used ensure these are firmly pushed together, see figs. 3b and 3c and a fall of 5 mm per metre length should be provided (see section 4.3).

- Cut off same amount from aluminium flue duct (plain end).

### 1.4.2 SIDE FLUE OUTLET HORIZONTAL

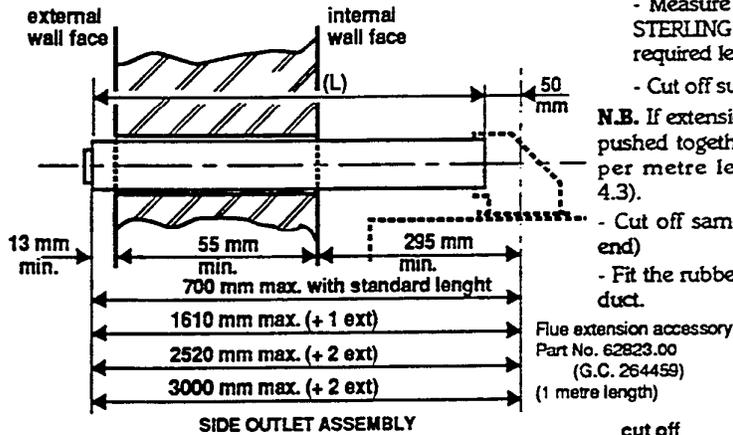


Fig. 2

#### To cut flue assembly to length

- Measure from external wall face to centre line of STERLING SB and subtract 37 mm (this will give required length (L)).
- Cut off surplus from plastic air duct (plain end).

**N.B.** If extension sections are used ensure these are firmly pushed together, see figs. 3b and 3c and a fall of 5 mm per metre length should be provided (see section 4.3).

- Cut off same amount from aluminium flue duct (plain end)
- Fit the rubber sleeve between the flue turret and the flue duct.

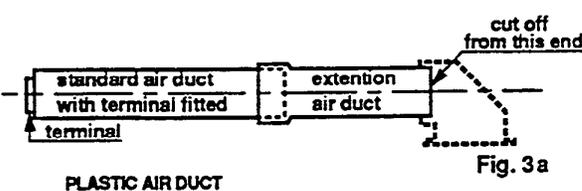


Fig. 3a

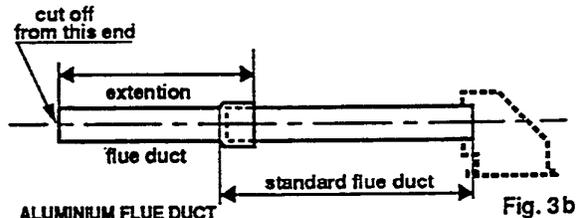


Fig. 3b

### 1.4.3 OTHER FLUE ARRANGEMENTS HORIZONTAL

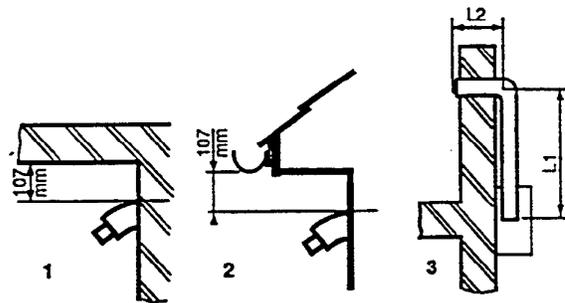


Fig. 3c

1. Distance from internal corner 300 mm without kit, 107 mm with kit No 76216 (GC No 264 833).
2. Distance below balconies or eaves 200 mm without kit, 107 mm with kit No 76216 (GC No 264 833).
3. Appliance is normally supplied packed with standard 650 mm straight flue section. Additional straight extension lengths of 1 metre, part No 62823 (GC No 264 459), can be use up to a total straight length of 3 metres. It is also possible to incorporate one bend in the flue using part No 65572 (GC No 264 835). In this case the length  $L1 + L2$  should not exceed 1.6 metres horizontally.

## 1.4.4 VERTICAL FLUE ARRANGEMENTS

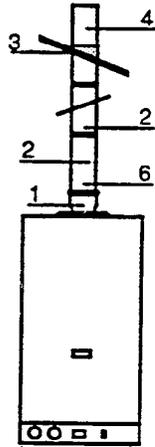


Fig. 3 d

### a) Straight flue (fig. 3 d)

- 1) Adaptor.
- 2) Extensions (9.5 m maximum).
- 3) Roof flashing.
- 4) Terminal.
- 6) Reducer.

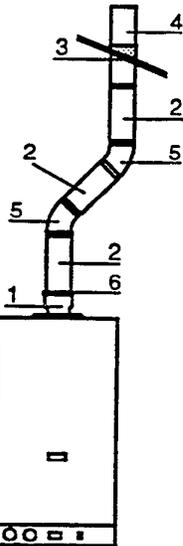


Fig. 3 e

### b) Flue with two 45° bends (fig. 3 e)

- 1) Adaptor.
- 2) Extensions (8 m maximum).
- 3) Roof flashing.
- 4) Terminal.
- 5) 45° bend.
- 6) Reducer.

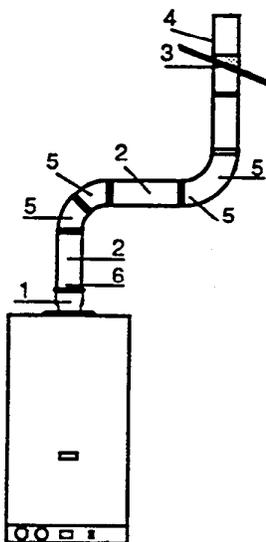


Fig. 3 f

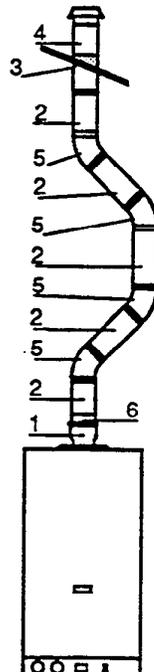


Fig. 3 g

### c) Flue with four 45° bends (fig. 3 f and 3 g)

- 1) Adaptor.
- 2) Extensions (6 m maximum) fig. 3 f and 3 g including horizontal (2 m maximum) fig. 3 f.
- 3) Roof flashing.
- 4) Terminal.
- 5) 45° bends (x 4 maximum) fig. 3 f and 3 g.
- 6) Reducer.

With the exception of (3) roof flashing and (4) terminal, all other fittings are designed for internal installation only.

N.B. In these two arrangements figs. 3 f and 3 g, the total length of straight extensions must not exceed 6 metre with a maximum of 4 x 45° bends or 2 x 90° bends.

Horizontal run must not exceed 2 meters.

Important : When the vertical flue exceeds 5 meters, provision will have to be made to drain the condensate.

## 1.5 DESCRIPTION OF COMPONENTS AND LOCATION

The appliance is mounted in a steel case which has a white epoxy resin paint finish.

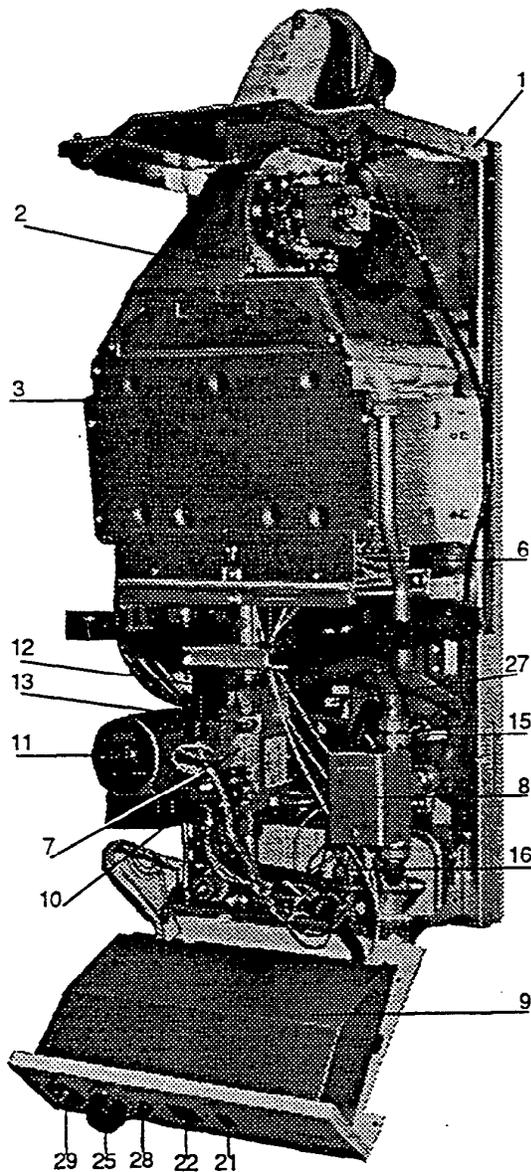


Fig. 4

### 1. Chassis :

The chassis is a rigid plated mild steel pressing on which all components are mounted.

### 2. Flue hood :

Is an aluminium alloy casting onto which the fan is mounted.

### 3. Combustion chamber :

This is assembled from a number of components mounted onto the chassis. The front panel is simply removed for servicing complete with the expansion vessel, a hook is fitted below the appliance to accept and retain the panel during servicing.

### 4. Expansion vessel : (not illustrated)

The expansion vessel has a capacity of 5.4 litres (1.19 gal) and is sized for a normal system water content where the load is equivalent to the maximum output of the boiler. The charge pressure is 0.65 bar.

### 5. Flame supervision device (not illustrated).

6. Multigas burner comprising : stainless steel blades (14) and a manifold with injectors (14).

7. Gas section including main solenoid valve and additional security solenoid valve.

### 8. Three ports mid position valve (Optional)

### 9. Electrical box containing :

- Mains connection
- Fuses
- Control box
- Connections for external controls
- Connections for fan and pressure switch
- Connections for pump
- Connections for optional three ports mid position valve and programmes

### 10. Connection for gas valve.

### 11. Grundfos pump motor 15/50

12. Air separator and vent directly connected to the pump inlet.

13. Regulation screw to adjust output to heating of boiler.

### 14. Heating body comprising :

Copper finned tube heat exchanger protected with silicone resin paint. Combustion chamber in aluminium coated steel. Combustion chamber lining - ceramic fibre panels.

15. High limit thermostat (manual reset).

16. Flow for hot water cylinder (optional).

18. Gas service tap (not illustrated).

21. Lock out indicator light.

22. Main ON/OFF switch.

25. Thermostat to regulate flow temperature.

27. Air pressure switch.

28. Fuse.

29. Pressure gauge.

30. Data badge position (on sealed cover).

## 1.6 DESCRIPTION OF OPERATION

The STERLING System Boiler provides central heating and hot water in conjunction with a fast recovery indirect cylinder. The selector switch can be set to hot water only when using the 3 way optional valve or to heating and hot water. If the valve is not fitted when the switch must be set to hot water and hertis.

### 1.6.1 CENTRAL HEATING (see fig. 5)

When external controls demand heat the boiler thermostat energises the central box and the fan operates to purge the combustion chamber.

High tension voltage is then applied to the ignition electrode and a stream of sparks pass from the electrode to the burner assembly. The gas valve then opens and allows 1/3 rd of the maximum gas to pass to the burner for ignition. Once the flame has been proven by the ionisation circuit, the gas rate increases to the adjusted set rate.

At the same time the pump circulates water around the heating system, which returns to the boiler via an air separator, an air purger, and an isolating valve containing a filter. It then passes through the heat exchanger where it is heated, and on to the radiator circuits via the 3 way valve if fitted.

There is a manually adjusted by-pass connected between the flow and return.

Temperature central is by means of a thermostat, between 50°C and 82°C.

Expansion Provision is available via an expansion vessel

connected to the return valve.

When The flow temperature reaches the set level. The boiler thermostat de energises the control box ad the burner is extinguished and the circulations Ponys contunues to operate. Of extemed controls are satisfied then the burner is extinguished ad the circulating pump stops.

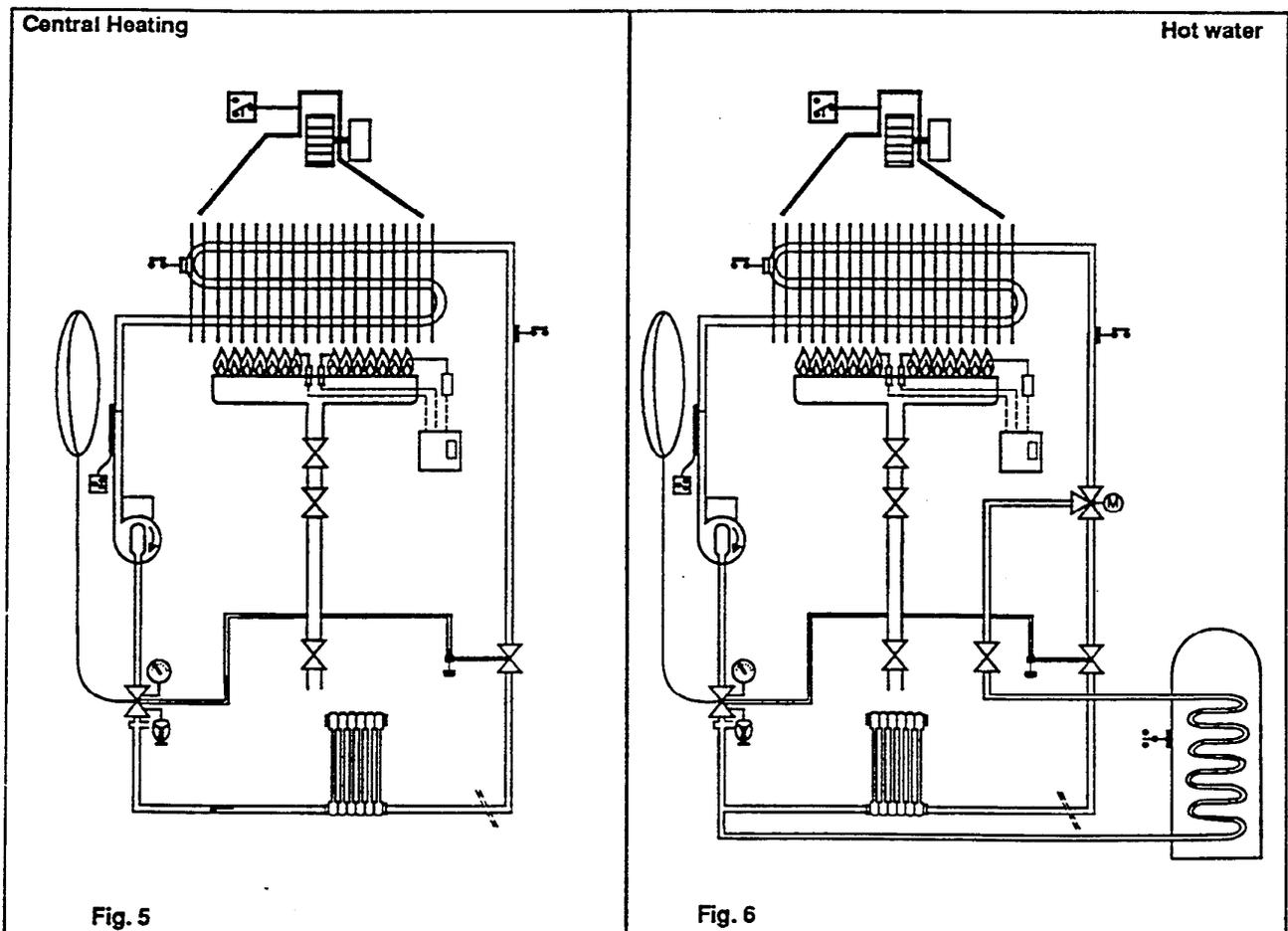
### 1.6.2 HOT WATER ( optional see fig. 6)

When external controls demande heat the boiler thermostat energises the control box and the fan operates to purge the combustion chamber. High tension voltage is then applied to the ignition electrode and a stream of sparks pass from the electrode to the burner assembly. The gas valve then opens and allows 1/3 rd of the maximum to pass to the burner for ignition. Once the flame has been proven by the ionisation circuit, the gas rate increases to the adjusted set rate. At the same time the pump circulates waters, around the primary circuit of the selected hot water cylinder, which returns to the boiler via an air separator, an air purger and an isolating valve containing a filter.

It then passes through the hect exchangeur where it is heated and on to the primary circuit of the selected hot water cylinder, via the 3 way valve. Temperature control is by means of a thermostat between 50°C and 82°C but an additional cylinder thermostat is recomended.

Expansion provision is available via an expansion vessel connected to the return valve.

When the flow temperature reaches the set level the boiler thermostat de energises the control box and the burner is extinguished and the circulating pump continues to operate. If the external controls are satisfied then the burner is ext inguished and the circulating pump stops.



### 1.6.3 GAS (see figs. 5 and 6)

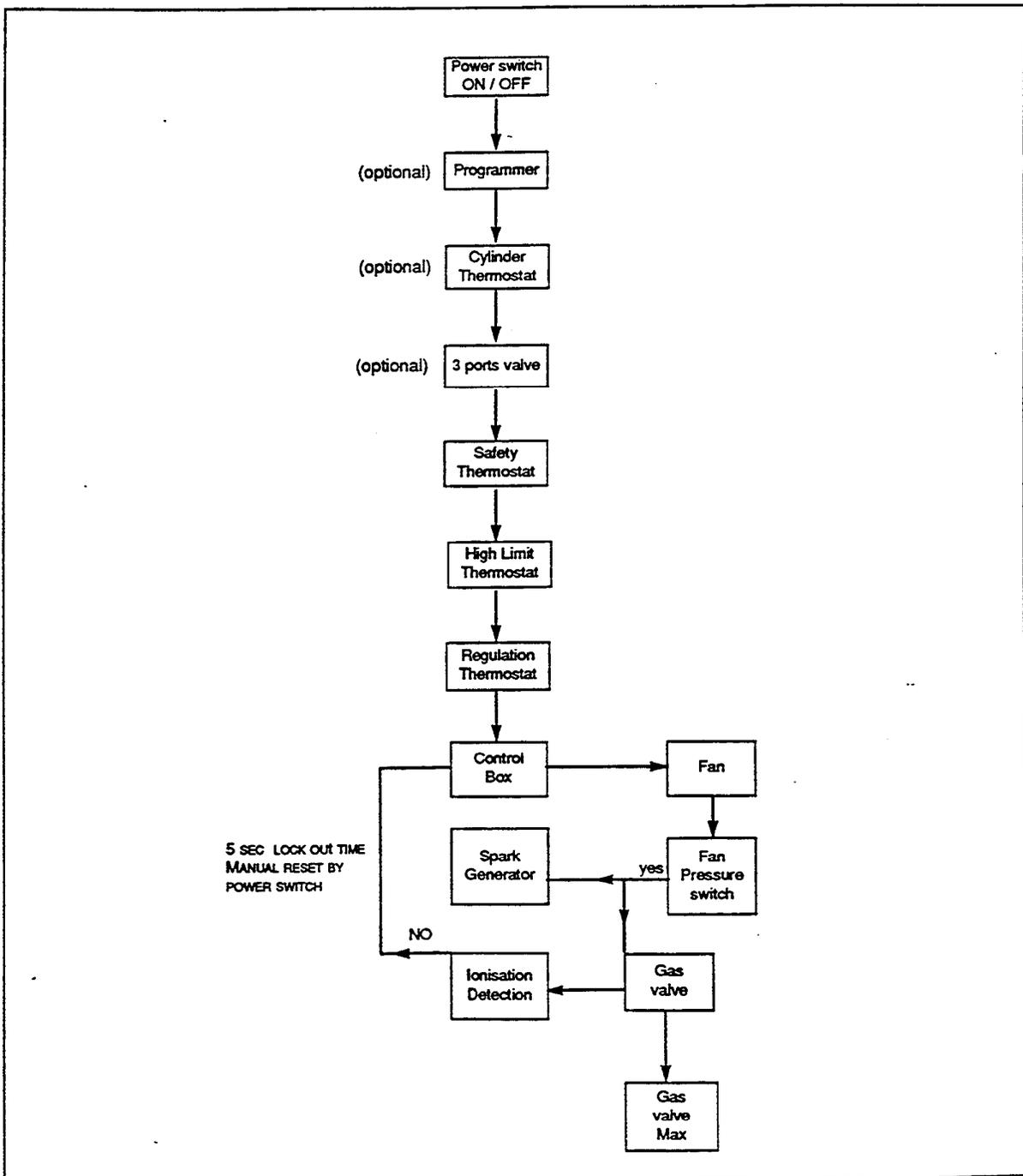
When the gas service is turned with a screw drive to the on position gas is admitted to the gas section.

When there is a demand for heating or hot water, the gas valve is energised and it allows gas to pass to the burner. Simultaneously the high tension voltage produces a stream of sparks between the two ignition electrode which ignites the gas, after few second the gas rate increases to the adjusted rate.

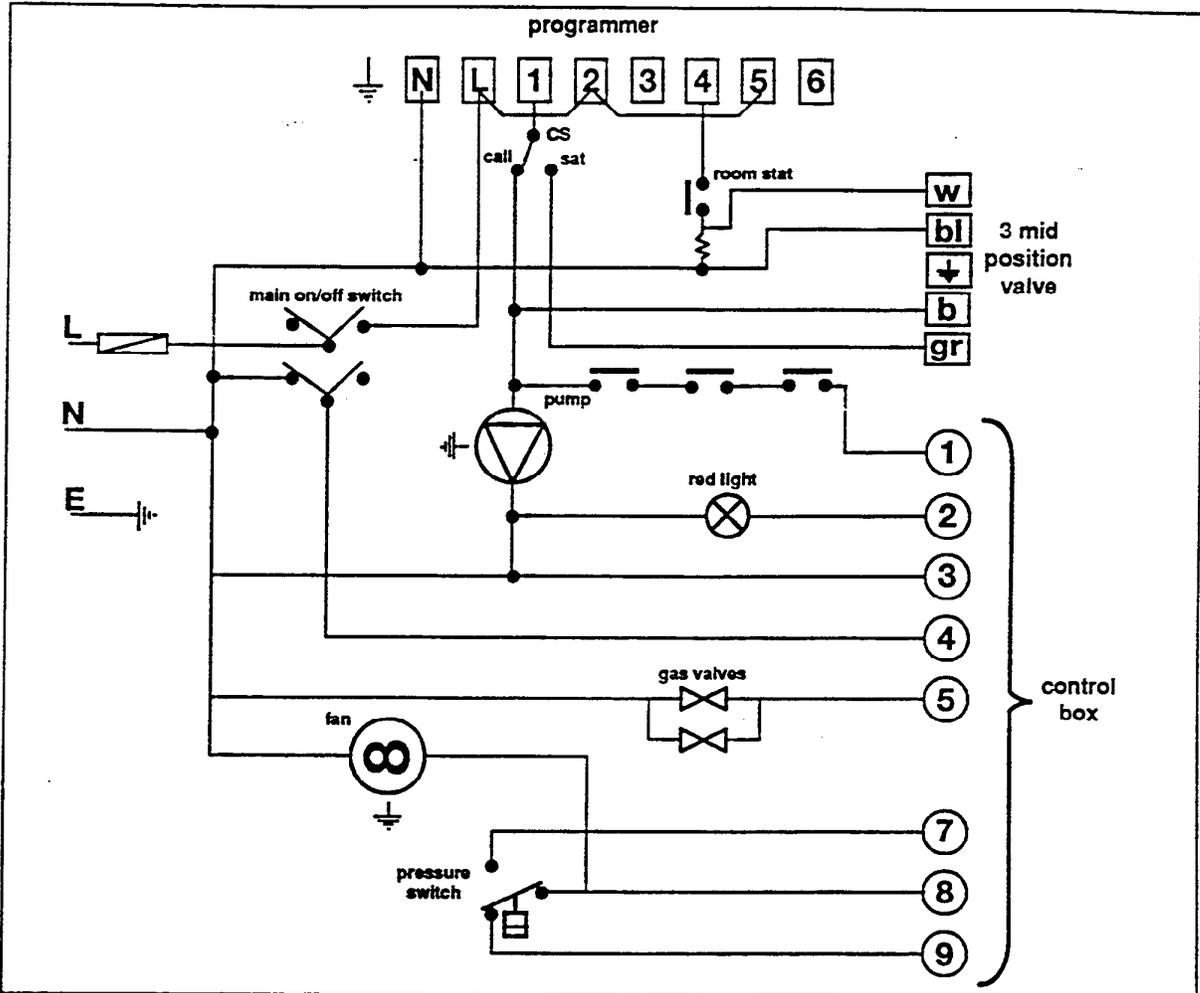
The flame supervision is controlled by an ionisation

circuit. If the main burner is not established after 5 seconds then the boiler fails safe to lockout and has to be reset manually by operating the main ON / OFF switch.

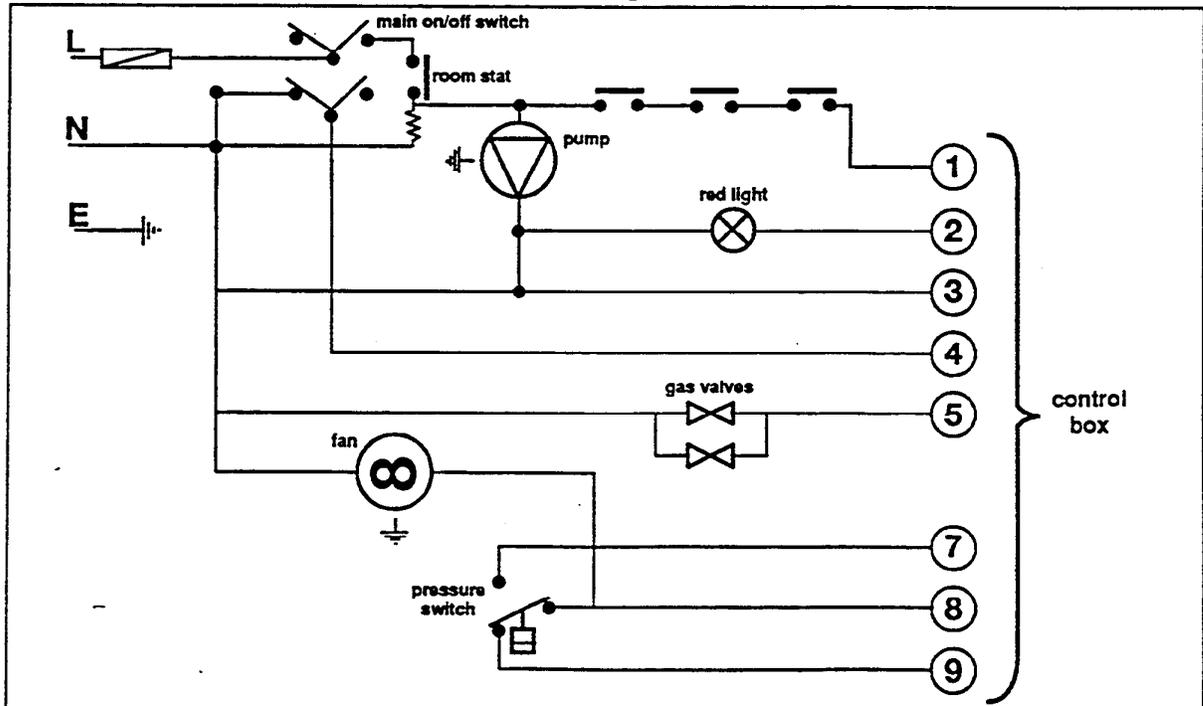
### 1.6.4 FUNCTIONAL DIAGRAM



**1.6.5 ELECTRICAL FUNCTION DIAGRAM with pack**



**1.6.6 ELECTRICAL FUNCTION DIAGRAM without pack**



### 1.6.7 ILLUSTRATED WIRING DIAGRAM

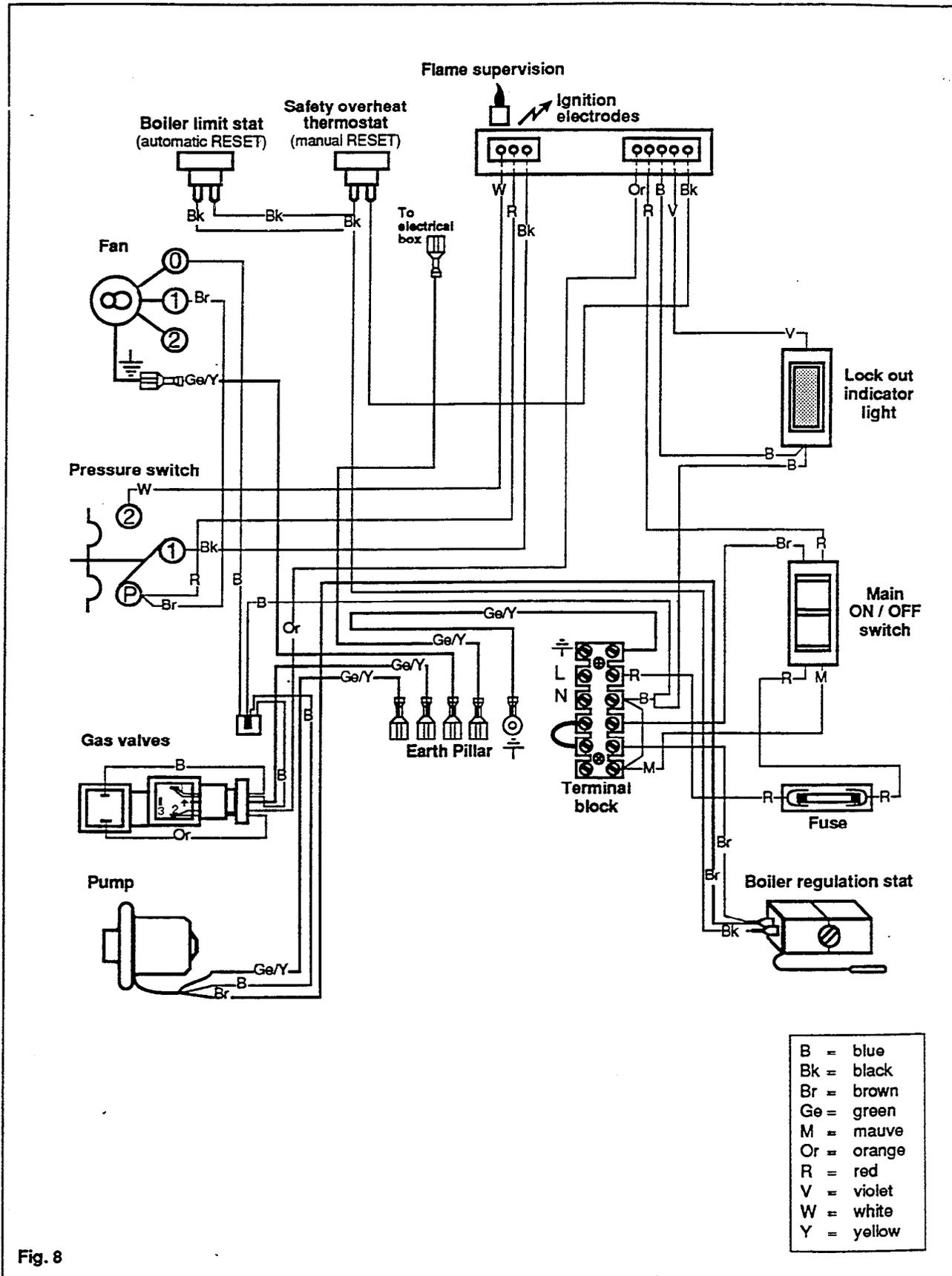


Fig. 8

## 2 INSTALLATION REQUIREMENTS

### 2.1 GENERAL

The installation of the boiler must be in accordance with Gas Safety (Installation and Use) Regulations, Building Regulations and current of the Local Water undertaking. It should be in accordance also with the current BS Codes of Practice and the British Gas Specifications for Domestic Wet Central Heating Systems and any relevant requirements of the local Gas Region and Local Authority Building Standards (Scotland) Regulations and the Safety document 635 the Electricity at Work Regulation.

Detailed recommendations are stated in the following British Standard Codes of Practice:

B.S. 6891, B.S. 6798, B.S. 5440 : 1 and 2, B.S. 5449: 1, B.S. 7593, BS 5546 B.G.DM2, B.S. 4814, B.S. 7074 1 e 2, B.S. 7671.

**Note :** Gas Safety Installation and Use Reg. It is the law that all gas appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest and that of safety to ensure compliance with the law.

### 2.2 LOCATION

The boiler is not suitable for external installation. The position chosen for the boiler must permit the provision of a satisfactory flue termination. The location must also permit adequate space for servicing and air circulation around the boiler. The surface on which the boiler is mounted must be of non combustible material.

The boiler may be installed in any room or internal space although particular attention is drawn to the requirements of the current B.S. 7671 and, in Scotland, the electrical provisions of the Building Regulations applicable to Scotland, with respect to the installation of a heater utilising mains electricity in a room or internal space containing a bath or shower.

Where the installation of the boiler will be in an unusual location special procedures may be necessary and BS 5546 gives detailed guidance on this aspect.

A compartment used to enclose the boiler must be designed and constructed specifically for this purpose. An existing cupboard or compartment may be used provided that it is modified for the purpose.

Details of essential features of cupboard/compartment design are given in BS 6798.

## 2.3 WATER CIRCULATION SYSTEM

The STERLING SB is suitable for SEALED SYSTEMS **ONLY** and should be installed in accordance with the relevant recommendations given in BS 6798, BS 5449:1 (for the smallbore or/and microbore systems) and the British Gas Specifications for Central Heating Systems.

### 2.4 SITING THE FLUE TERMINAL

Refer to section 1.4 for details of wall thicknesses which can be covered.

Detailed recommendations for flueing are given in BS 5440 Pt 1. The following notes are intended to give general guidance.

The boiler must be installed so that the flue terminal is exposed to external air. The boiler must NOT be installed so that the terminal discharges into another room or space e.g. outhouse or closed in lean-to. It is important that the position of the terminal allows a free passage of air across at all times. The minimum acceptable clearances from the terminal to obstructions and ventilation openings are specified below (fig. 10).

#### Horizontal Flue

| Terminal positions   | Min clearances |
|--|----------------|
| A - Directly below an opening, windowsetc or adjacent to an opening.....     | 300 mm         |
| B - Below gutters soil pipes or drain pipes ...                              | 75 mm          |
| C - Below eaves .....  | 200 mm*        |
| D - Below balconies or car port roof .....                                   | 200 mm*        |
| E - From a vertical drain pipe or soil pipe ....                             | 75 mm          |
| F - From an internal or external corner .....                                | 300 mm*        |
| G - Above ground roof or balcony level .....                                 | 300 mm         |
| H - From a surface facing the terminal.....                                  | 600 mm         |
| J - From an opening in the car port (e.g. door or window) into dwelling..... | 1200 mm        |
| K - Vertically from a terminal on the same wall.....                         | 1500 mm        |
| L - Horizontally from a terminal on the same wall .....                      | 300 mm         |

\* (107 mm) minimum clearance using kit No. 76216.00 (G.C. 264 833)(see section 14.3, fig. 3c)

#### Vertical Flue

| Terminal positions                     | Min clearances |
|--|----------------|
| M - Above intersection with Roof ..... | 150 mm         |

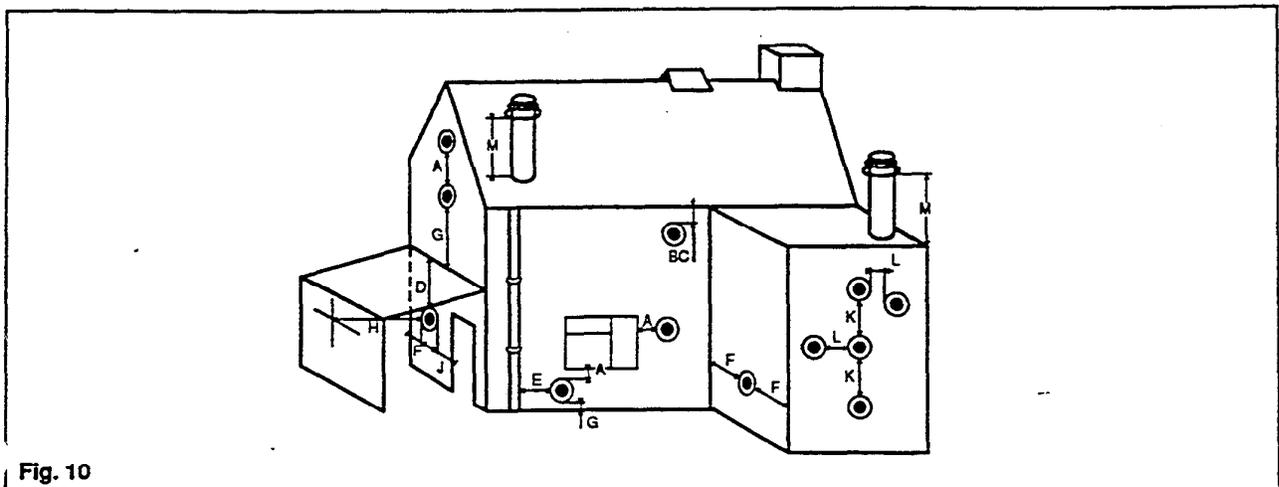


Fig. 10

BUILDING REGULATIONS excerpt.  
Approved document J Part B 1.4 (C) (D).

C) Protect with a terminal guard fitted centrally over the terminal if it could come in contact with people near the building or be subjected to damage.

D) Designed so as to prevent the entry of any matter which might restrict the flue.

(A terminal guard G.C. No 381 782 is available from).

Quinnel Barret & Quinnel Wireworks  
Old Kent Road  
London SE15 1NL Tel. 071-639-1357

The air inlet/outlet duct and the terminal of the appliance must not be closer than 25 mm (1 in) to any combustible material. Detailed recommendations on the protection of combustible material are given in BS 5440 Pt 1.

**IMPORTANT NOTICE : TIMBER FRAMED HOUSES**

IF THE APPLIANCE IS TO BE FITTED IN A TIMBER FRAMED BUILDING IT SHOULD BE FITTED IN ACCORDANCE WITH THE BRITISH GAS PUBLICATION - "GUIDE FOR GAS INSTALLATIONS IN TIMBER FRAMED HOUSING" reference DM2. IF IN DOUBT, ADVICE MUST BE SOUGHT FROM THE LOCAL REGION OF BRITISH GAS OR C.O.R.G.I.

**2.5 AIR SUPPLY**

The room in which the boiler is installed does not require a purpose provided air vent.

If the boiler 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 the outside air or to a room. Both high and low level air vents must communicate with the same space.

|       | Position of vents | Air from room       | Air direct from outside |
|-------|-------------------|---------------------|-------------------------|
| SB 80 | High level        | 240 cm <sup>2</sup> | 120 cm <sup>2</sup>     |
|       | Low level         | 240 cm <sup>2</sup> | 120 cm <sup>2</sup>     |
| SB 89 | High low          | 180 cm <sup>2</sup> | 90 cm <sup>2</sup>      |
|       | Low level         | 180 cm <sup>2</sup> | 90 cm <sup>2</sup>      |

**2.6 Electrical Supply**

- This appliance must be earthed.
- All wiring external to the appliance must conform to the current B.S. 7671.

- The STERLING SB requires a 230 V - 50 Hz supply.
- Connection of the appliance and any system controls to the mains supply must be through a common isolator and must be fused at 3A maximum.

This should preferably be an unswitched shuttered socket outlet and 3 pin plug to BS 1363. Alternatively, a double pole isolating switch may be used, provided it has a minimum contact separation of 3 mm in both poles. The isolator should be clearly marked showing its purpose, preferably positioned close to the appliance.

- Fuse the supply at 3A.

- The supply cord must be 0.75 mm<sup>2</sup> (24 x 0.2 mm) three core to BS 6500 Table 16.

**2.7 GAS SUPPLY**

The STERLING SB requires:

The meter and supply pipes should be capable of delivering this quantity of gas in addition to the demand from any other appliances in the house.

The complete Installation must be tested for soundness as described in BS 6891.

**3 SYSTEM GUIDANCE**

**3.1 GENERAL**

The low water content STERLING SB boiler includes an expansion vessel, safety overheat thermostat, safety valve, pressure

The flow temperature is adjustable and gives a nominal 82 °C (180° F) on its maximum setting.

Detailed recommendations for water circulation are given in BS 5546. When the boiler provide hot water, a fast recovery cylinder will be used, detailed recommendations of this application are given in sections. A cylinder thermostat is recommended.

Separate time and temperature control over hot water generated in this way can be achieved by the use of the optional three way valves in a conjunction with a cylinder thermostat and programmer.

When replacing an existing cylinder storage system with STERLING SB it is essential that all redundant pipework is removed and dead legs eliminated.

In properties where there are multiple draw-off Points on different levels consideration should be given to the use of non-return valves in the secondary hot water system to avoid active dead legs. No non-return valve should be less than 1 m (3 ft) above the top of the appliance and ideally should be as close as possible to the hot water outlet.

### 3.2 SYSTEM CONTROLS

The boiler is electrically controlled and is suitable for most control schemes currently available including thermostatic radiator valves and motorised valves.

When using motorised valves the controls should be arranged to switch off the boiler when circuits are satisfied. The boiler requires a minimum flow rate of 500 L/h (2.2 gal/min) and consequently, if thermostatic radiator valves are fitted to all radiators, adjustment must be made to the internal by-pass to ensure that the boiler operates correctly (see fig. 17).

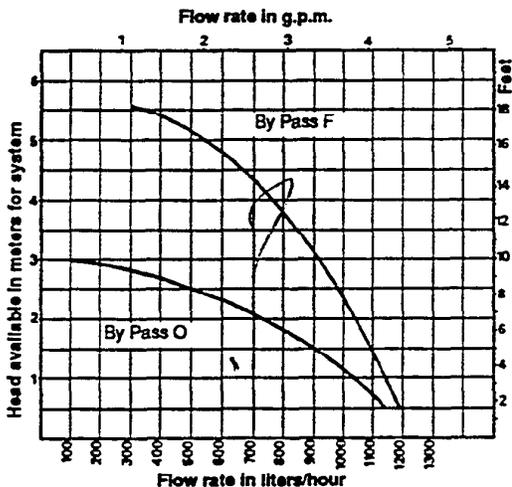
### 3.3 Pump

The boiler is fitted with a Grundfos UP.15/50 pump head. The graph (fig. 11) indicates the residual head available for the system.

Fig. 11

### 3.4 EXPANSION VESSEL

The expansion vessel which is fitted on the front of the combustion chamber accommodates system water



expansion. The vessel has a capacity of 5.4 litres (1.19 gals) and is charged to a pressure of 0.65 bar (9.7 p.s.i.).

**THE CONNECTION IN THE CENTRE OF THE EXPANSION VESSEL IS A CHARGING AND NOT A VENT POINT.**

At the design flow temperature and the initial system pressures quoted the maximum allowable system volume is 75 litres. The water volume is not known and cannot be accurately assessed from manufacturers data the following volumes may be

used to give a conservative estimate of the system volume.

|                             |  |
|-----------------------------|--|
| Boiler.....                 | 4 litres (0.8 gals)                        |
| Small bore pipework.....    | 0.3 litres (0.07 gals)                     |
|                             | per 0.292 kW                               |
| Microbore pipework.....     | 7 litres (1.5 gals)                        |
| Steel panel radiators ..... | 2.3 litres (0.5 gals)                      |
|                             | per 0.292 kW (1000 Btu/h) of system output |
| Hot water cylinder .....    | 2 litres (0.44 gals)                       |

If the volume exceeds 75 litres an additional vessel will be required fitted in the flow from the appliances. Refer to BS 7074 Pt. 1 or BS 5449 for details of sizing.

### 3.5 MAINS WATER CONNECTION

There shall be no permanent connection to the Heating System Pipework for filling or replenishing without the approval of the Local Water Authority (see Byelaw No.14 and figs. 12 and 13).

### 3.6 FILLING POINT

Filling and recharging can be done :

1) Through a temporary hose connection to mains water.

A stop-valve should be fitted to the service main outlet and a double check valve assembly and stop-valve should be fitted to the system side of the temporary hose (see fig. 12).

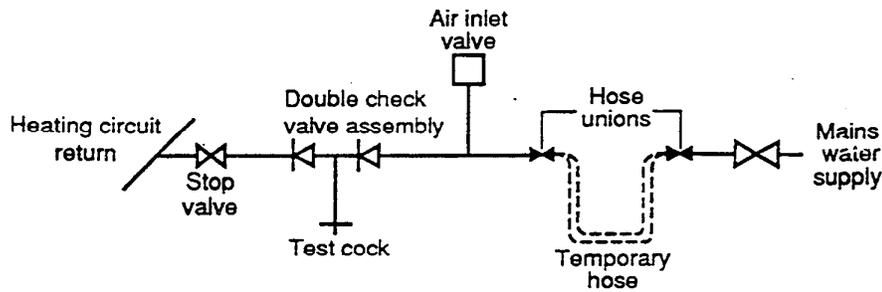
2) A cistern used for no other purpose connected to the mains water. The static head provided by the cistern must be sufficient to satisfy the designed initial system pressure. The supply pipe from the cistern should include the double check valve assembly and stopcock (see fig. 13).

### 3.7 MAKE UP SYSTEM

Provision must be made for replacing water lost from the system indicated by a reduction in pressure shown on the pressure gauge. Recharge through the filling point (see section 3.6).

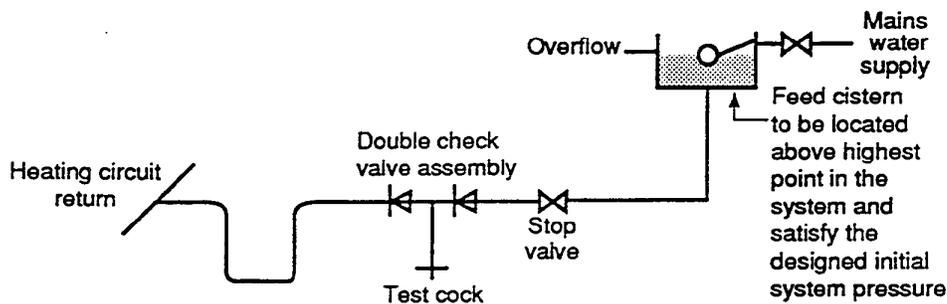
### 3.8 PIPEWORK

Pipework can be of copper or suitable plastic, small bore or microbore with capillary or compression jointing to a high standard. Leak sealant must not be used in the system.



(a) Non-automatic filling and make-up. Temporary hose filling loop available, Pt.No.CHL.112

Fig. 12



(b) Automatic filling and make-up.

Fig. 13

### 3.9.1 Boiler replacement (retrofit)

In an old system where the boiler is being replaced, we recommend the use of a strainer, fitted with a drain tap on the heating return, designed to retain scale particles and other solid debris. It is good practice to use a chemical cleaner with a flocculating agent, used as recommended by the cleanser manufacturer, to clean the system before the old boiler is removed. (see BS 7593).

### 3.9.2 Existing systems

Valves and joints should be carefully checked for leaks and the appropriate action should be taken either as a repair or replacement. The old open system has probably only been subjected to a pressure of 0.4 bar or less. When you change to a sealed system where the charge pressure will be 1.0 bar and the running pressure exceeding 1.5 bar, consideration should be given to the replacement of radiator valves with a pattern capable of sealing at the higher pressures.

### 3.10 Cylinder

Where a domestic hot water cylinder is used with the STERLING SB it must be of the indirect and fast recovery type to BS 1566 Pt 1 Single feed cylinders are not suitable for use with this appliance. Flow and return pipework to the cylinder should be in 22 mm pipe.

### 3.11 Inhibitors and water conditioners

(see BS 7593)

Chaffoteaux et Maury generally recommend the use

of inhibitors in systems using the STERLING SB boiler.

The following are the appliance manufacturer's recommendations :

1) Use only a British Gas or similar approved inhibitor. These manufacturers can assist with the selection.

Grace Dearborn Ltd, Widnes, Cheshire WAB 8 UD  
Tel: 051 424 5351.

Fernox Manufacturing Company Limited, Britannica Works, Clavering, Essex CB11 4QZ  
Tel: 0799 085811.

2) Use only the quantities specified by the inhibitor manufacturer.

3) Cleanse the system as required by the inhibitor manufacturer.

4) Add inhibitor only after flushing when finally re-filling the system.

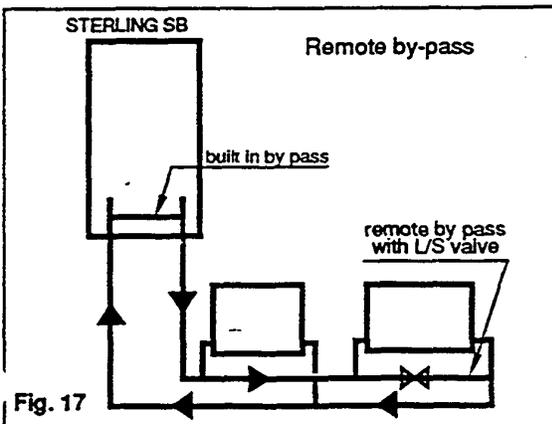
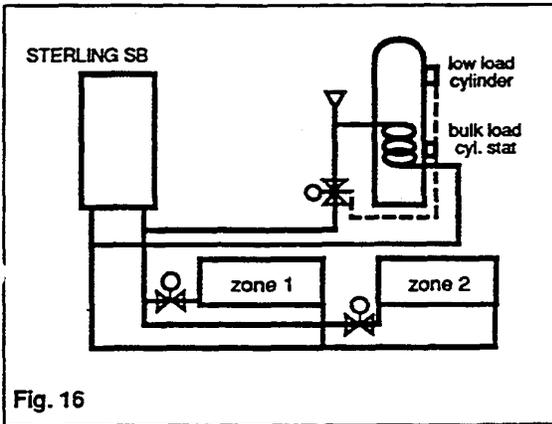
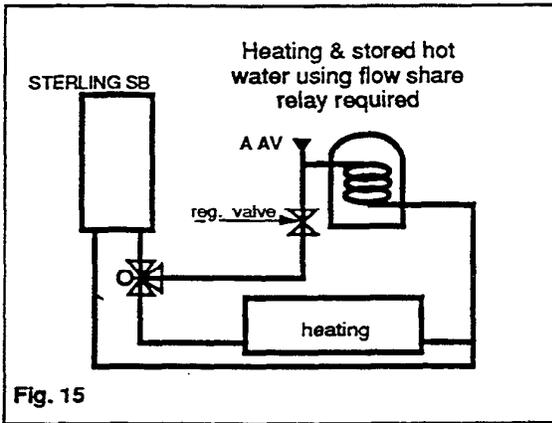
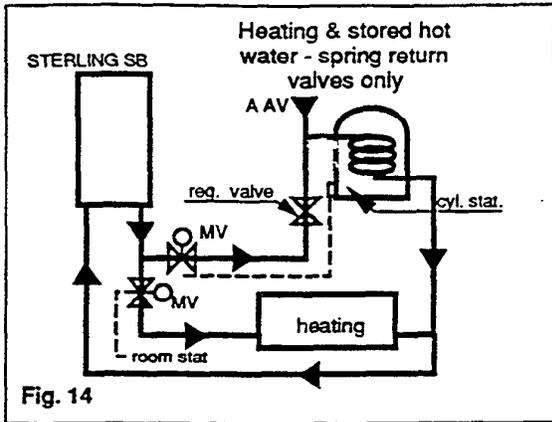
### 3.12 Add-on devices

It is important that no external control devices e.g. economisers be directly fitted to this appliance unless covered by these installation instructions or agreed with the manufacturer in writing. Any direct connection of a control device not approved by the manufacturer could make the guarantee void and also infringe the Gas Safety (Installation & Use) Regulations.

### 3.13 Heating and hot water systems

Figs. 14, 15, 16 and 17 indicate various layouts for the production of hot water. It is recommended that only a fast recovery indirect cylinder is used and circumstances may from time to time dictate that a special saturated heat exchanger in an indirect cylinder may be desirable.

When using thermostatic radiator valves, the minimum flow rate through the boiler must be maintained at all times. The build in by-pass is set in the closed position during manufacture and may require adjustment. Alternatively a remote by pass may be installed (fig.7).



## 4 INSTALLING THE BOILER

A vertical flat area is required for the boiler: 1122 mm high x 591 mm wide (44 in x 23.25 in). The surface on which the boiler is mounted must be of a non reverberating and of a non combustible material. The appliance is supplied in a two cartons which contain :

### 1) The boiler with all parts attached and fixing kit, comprising of :

- 1 - The chassis with all functional parts attached.
- 2 - Casing comprising : 2 side panels  
1 front panel  
1 control panel
- 3 - Top support plate :
- 4 - Box containing : water connections and washers  
gas connection and filter/washer  
control knob and gas service tap  
safety valve  
wall plugs  
screws and fixings.

### 2) The horizontal flue assembly comprising of :

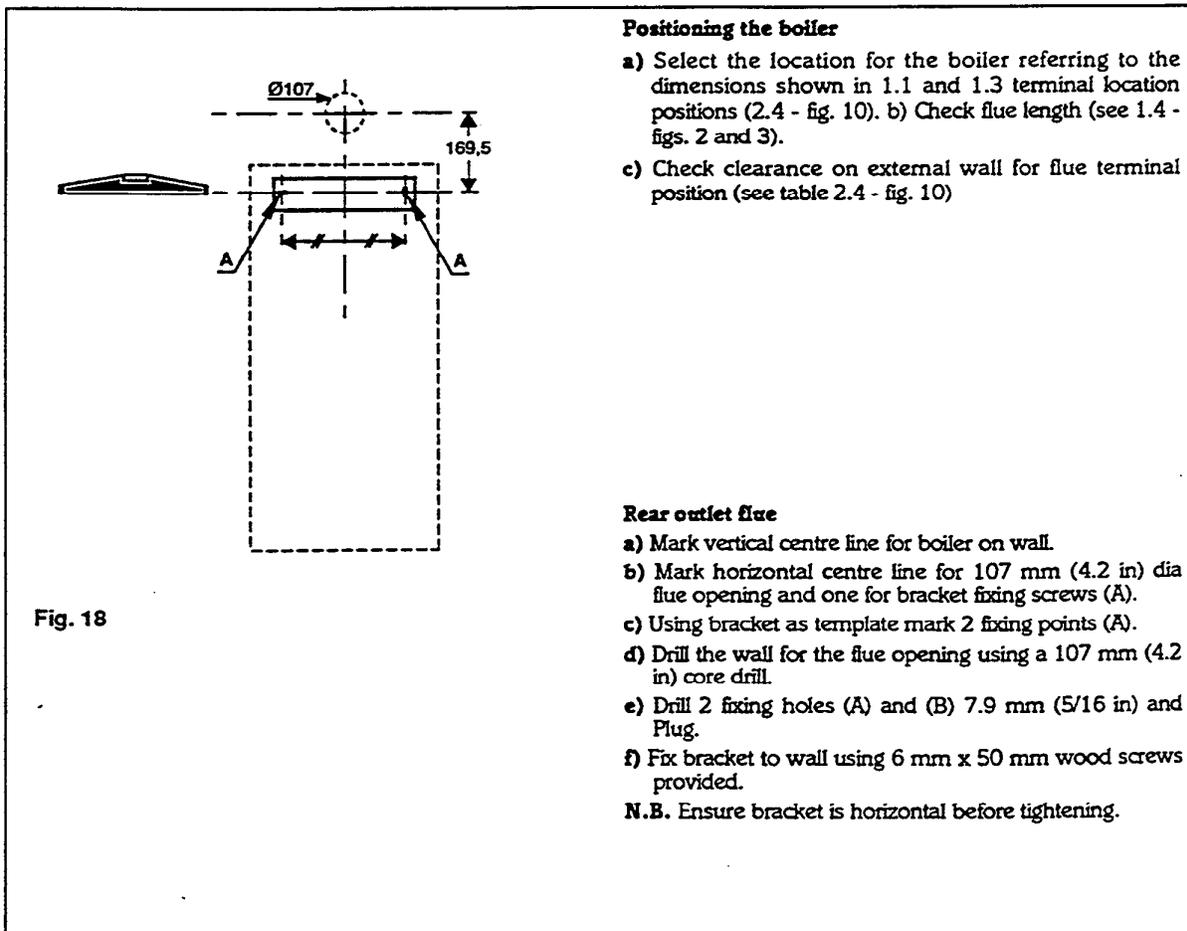
- 1 - Flue Turret and Flue duct section :
  - Plastic wall liner with terminal
  - Plastic turret cover ( garden)
- 2 - Plastic bag containing : flue locking ring
  - 'O' ring
  - 2 gaskets : one cork and one rubber
  - 4 mounting screws

### 3 - The vertical flue adaptor comprising

- adaptor assembly
- 2 gaskets : one cork and one rubber
- 4 mounting screws

N.B. (i) Flue accessories are not supplied as standard, and must be ordered to suit (see section 1.4)

4.1



4.2

#### 4.3

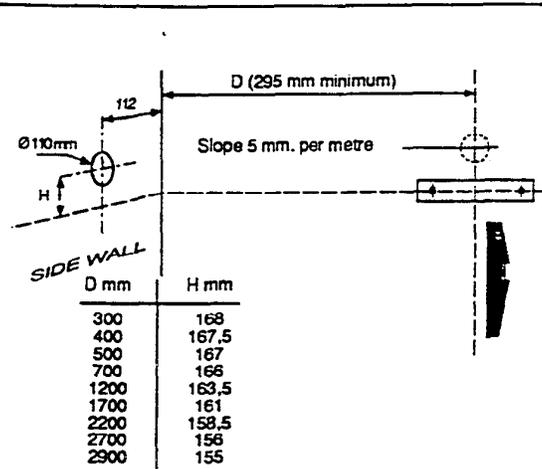


Fig. 19

#### Side outlet flue

- Mark vertical centre line for boiler on wall (see fig. 20)
  - Using support plate as a template mark 2 fixing slots (A).
  - Mark horizontal line through the fixing slots (A) and project to side wall.
  - Mark vertical axis of flue opening 112 mm (4.4 in) from corner of wall.
  - Mark wall for centre of flue opening (H) (see table fig. 20) the horizontal on side wall.
  - Drill the wall for the flue opening using a 107 mm (4.2 in) core drill.
  - Drill 2 fixing holes (for (H) top of slot)
  - Fix support plate to wall using 6 mm x 50 mm wood screws provided.
- N.B. Ensure support plate is horizontal before tightening.

N.B. Dimension (H) decreases as dimension (D) increases due to the required fall of flue of 5 mm per metre.

#### 4.4

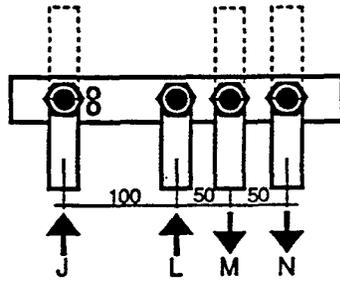


Fig. 20

#### Gas and water connections

#### Tube diameter

- |                                       |       |
|---------------------------------------|-------|
| J) Heating return                     | 22 mm |
| L) Gas inlet                          | 22 mm |
| M) Domestic hot water flow (optional) | 22 mm |
| N) Heating flow                       | 22 mm |

#### Pipework

- Copper tails are 22 mm to accept straight connectors.

#### 4.5

#### Water connections

- Make connections to copper tails using either solder capillary fittings or compression type.

#### 4.6

#### Gas connection

- The gas connection is 22 mm diameter.
  - Make the gas connection using solder capillary fittings.
- N.B. The gas supply pipe must not be less than 22 mm diameter

#### 4.7

#### Fitting the boiler

- hang boiler on mounting bracket ensure that it is properly located.
  - connect water unions using plain black 3/4" diameter graphited fibre washers, working from left to right.
  - Connect the gas union using the white 3/4" filter washer (either way round).
- N.B. Insert washer into union nut and offer assembly to boiler. Use the plain black 3/4 diameter graphited fibre washers for water unions, and gas ensuring that all connections are tight and sound.

## 4.8

### Fitting the safety valve

The safety valve is mounted below the heating return (J) (fig. 22) isolating valve.

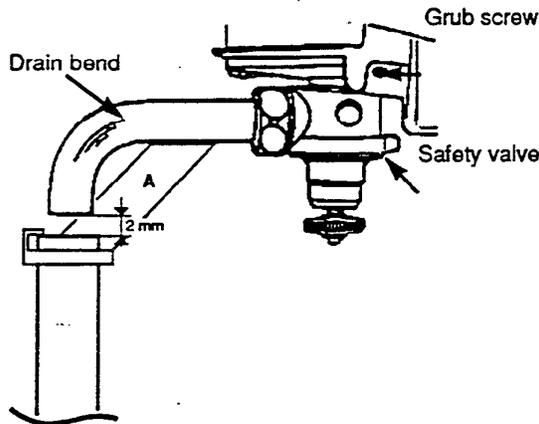


Fig. 21

- a) Ensure 'O' ring is in position within the socket from heating return isolating valve
- b) Fit safety valve and secure with grub screw provided.
- c) Fit support bracket (A). d) Fit 14 mm tail drain bend using washer provided.

**N.B.** The drain must be 22 mm and the 14 mm drain bend from the safety valve must be installed so that discharge of water is readily visible. A tundish arrangement is acceptable. The connection must NOT be made by a capillary or compression fitting directly between the 14 mm drain bend and the 22 mm discharge pipe without an 2 mm air gap. see fig. 24.

**THE 22 mm DISCHARGE PIPE MUST DISCHARGE TO THE OUTSIDE OF THE BUILDING WHERE POSSIBLE OVER A DRAIN. THE DISCHARGE MUST BE SUCH THAT IT WILL NOT BE HAZARDOUS TO OCCUPANTS OR CAUSE DAMAGE TO EXTERNAL ELECTRICAL COMPONENTS OR WIRING. THE PIPE SHOULD BE DIRECTED DOWNWARDS. IT MUST NOT DISCHARGE ABOVE AN ENTRANCE OR WINDOW OR ANY TYPE OF PUBLIC ACCESS AS THE TEMPERATURE OF THE WATER BEING DISCHARGED MAY REACH 100° C.**

## 4.9

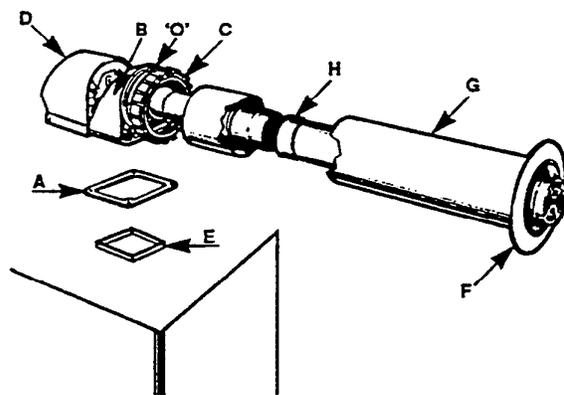


Fig. 22

### Fitting the flue up to 700 mm long

- a) Cut plastic duct (G) to length required, see fig. 2 or 3 dimension (L).
- b) Cut same amount from aluminium flue duct (H).

**N.B.** In very cold weather the plastic air duct becomes brittle, warm before cutting.

- c) Remove plastic turret cover (D) from flue turret (B) held by two screws.
  - d) Peel off protective paper from adhesive side of cork gasket (A) place on mating side of flue turret (B) lining up with four clearance holes, press together.
  - e) Slide locking ring (C) and 'O' ring over plastic air duct.
  - f) Slide air duct over flue duct, engage end of flue duct into terminal and locate air duct into turret (B).
  - g) Slide 'O' ring along air duct (C), to contact with the face of the turret (B). Locate lugs on locking ring (C) between lugs on flue turret (B). Push together and turn to lock.
  - h) Position square channelled rubber gasket (E) on the flue hood outlet of the boiler, channel facing downwards.
  - i) Pass the flue assembly through the wall and seat turret (B), onto the flue outlet, secure with 4 screws provided.
- N.B.** The terminal must extend 13 mm (0.5 in) past the surface of the external wall (see figs 2 and 3).
- j) Fit wall plate (F) provided with mastic sealing ring over air duct to structure.
  - k) Make good internal wall face where the air/flue duct assemblies exit the room.
  - l) Refit the plastic turret over.

## 4.10

### Fitting the flue over 700 mm long

- a) Assembly is precisely as detailed in section 4.10 using the requisite number of extension flue and air ducts. In particular note the following.
  - b) The standard flue duct is always used at the appliance end (uncut).
  - c) The standard air duct is always used at the terminal end (uncut).
  - d) When cutting, always cut one extension flue duct and the same amount from one extension air duct. Always cut the plain end NOT the socket end.
  - e) Full details of dimensions and assembly are given in figs. 2 or 3 as applicable.
  - f) If internal fixtures prevent the assembled ducts being passed through the wall from the inside, the ducts may be pushed through from outside (remove the locking ring (C) and O ring first).
- N.B.** see also section 4.3

## 4.11

### Making the electrical connection

#### 4.11.1 (Heating only without 3 ports mid position valve).

**N.B.** See Section 2.6 for electrical supply requirements THIS APPLIANCE MUST BE EARTHED.

- a) Remove the fixing screws (A) from the boiler base ; and hinge down the bottom panel (see fig. 27). Undo the three screws (D) and remove the metal cover (C) (see fig. 27).
- b) Remove plug (A) by pressing the security tag (B) and pulling carefully away (see 27 A).
- c) Remove plug cover by undoing the three screws and pulling it away from the plug base, cut away for cable access as required.

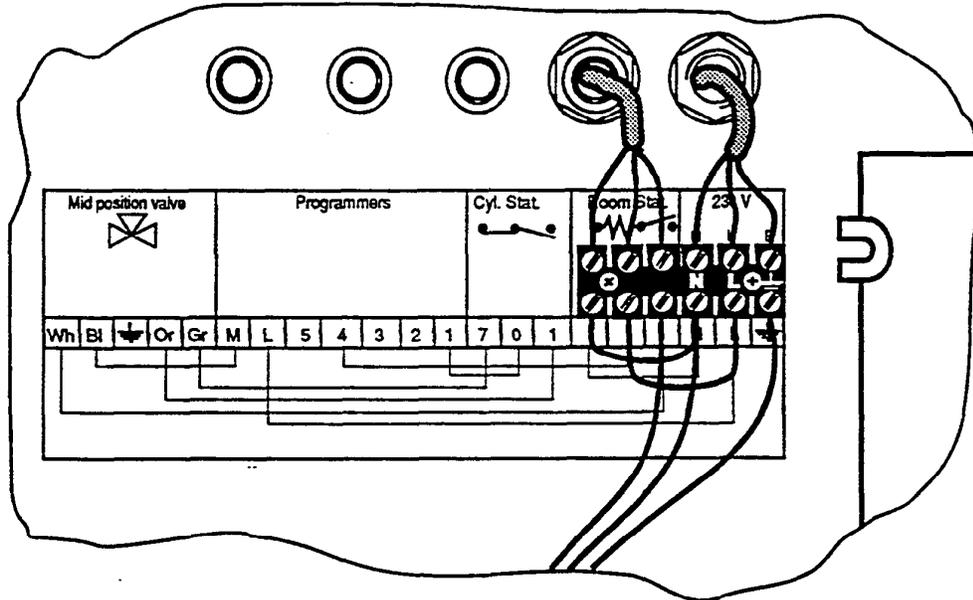


Fig. 23

- d) Connect permanent live to L terminal (1), earth to E terminal (2), neutral to N terminal (3). Make the earth conductor of A greater length than the current carrying conductors so that if the flex is strained then the earth would be the last to become disconnected.
- e) Remove link between terminals 4 and 5, and connect external controls to terminals 4, 5 and 6 (see fig. 27 b) and section 5.
- f) Ensure that the flex is located in the cable clamp and replace plug cover and relocate and tighten the three screws.
- g) Push plug (A) carefully into plug (C) locked on appliance base, making sure that it is fully home and that the security tag is engaged. (fig. 27 and 27 A).
- h) Ensure that all flexible cables enter the appliance via the slot and grommets provide in the bottom panel. Refit (pass fit) the metal cover (C) with the fixing screws (D) and hinge the bottom panel into original position. Refix the bottom panel with the screws (A) (see fig.27).

**KEEP CABLE AWAY FROM HOT SURFACES.**

#### 4.11.2

- a) Remove the fixing screws (A) from the boiler base ; and hinge down the bottom panel (see fig. 27). Undo the three screws (D) and remove the metal cover (C) (see fig. 27).
- b) Remove plug (A) by pressing the security tag (B) and pulling carefully away (see 27 A).
- c) Remove plug cover by undoing the three screws and pulling it away from the plug base, cut away for cable access as required.

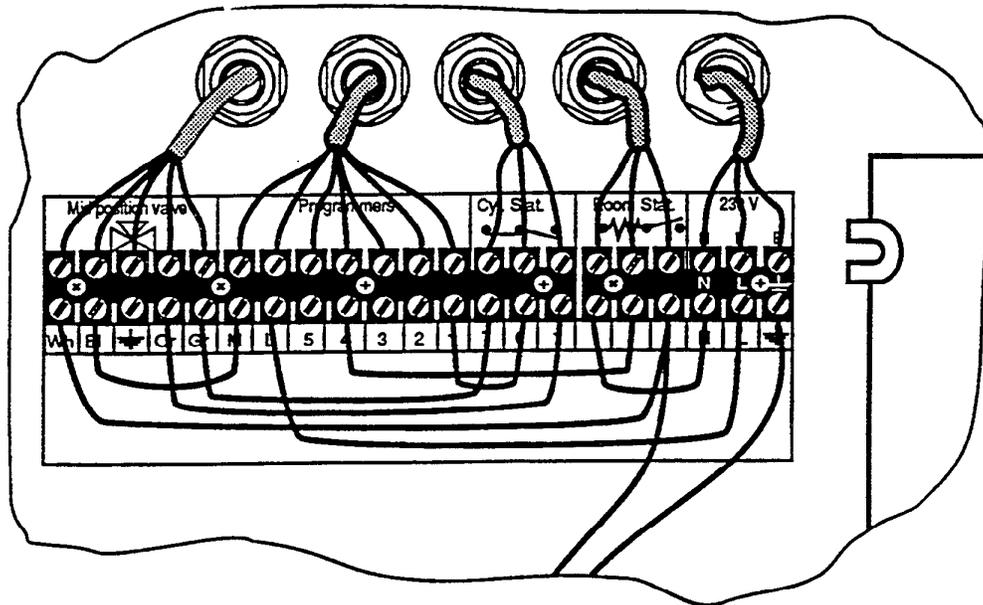


Fig. 24

- d) CONNECT PERMANENT LIVE TO L TERMINAL (1), EARTH TO E TERMINAL (2), NEUTRAL TO N TERMINAL (3). MAKE THE EARTH CONDUCTOR OF A GREATER LENGTH THAN THE CURRENT CARRYING CONDUCTORS SO THAT IF THE FLEX IS STRAINED THEN THE EARTH WOULD BE THE LAST TO BECOME DISCONNECTED.
- e) Remove link between terminals 4 and 5, and correct external controls to terminals 4, 5 and 6 (see fig. 27 b) and section 5.
- f) Ensure that the flex is located in the cable clamp and replace plug cover and relocate and tighten the three screws.
- g) Push plug (A) carefully into plug (C) locked on appliance base, making sure that it is fully home and that the security tag is engaged.( fig. 27 and 27 A).
- h) Remove small plug by pressing the security tag (B) and pulling carefully away (see fig.27 B).
- i) Remove play cover by undoing the two screws and pulling it away from the play base.
- j) Remove the link between terminals T1 and T2 and connect external controls to terminals T1, T2 and S3 (see fig. 27 B) and section.
- k) Ensure that the flex is located in the cable clamp and replace plug cover and relocate and tighten the two screws.
- l) Push plug (D) carefully into plug (E) located in the appliance space making sure that it is fully home and that the security tag is engaged.
- m) Remove socket from the plug on the conductors for the 3 port valve (this is found on rear chassis) connect the plug to the socket provide on the valve head (see fig. 27 C).
- n) Remove small plug by pressing the security tag (B) and pulling carefully away (see fig.27 B).

## 4.12 VERTICAL FLUE

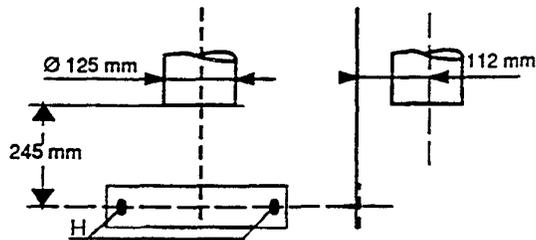


Fig. 25

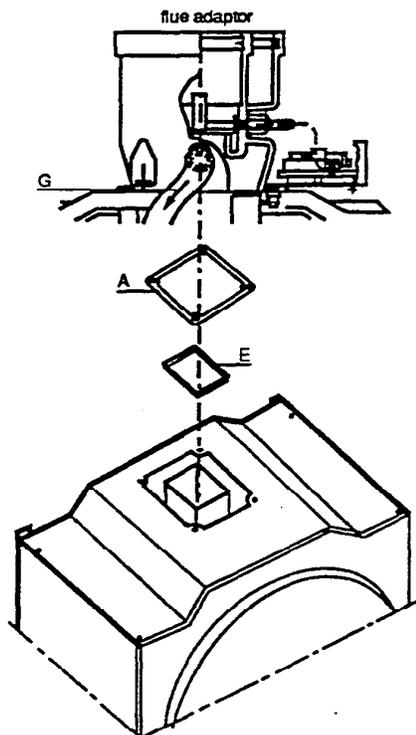


Fig. 26

### Positioning the boiler (see fig. 25)

- Select the location for the boiler referring to the dimensions shown in 1.1 and 1.3.
- Select the flue configuration (see section 1.44).
- Mark vertical centre line for boiler on wall.
- Mark horizontal line for top bracket fixing screws.
- Using bracket as template mark 2 fixing points (H).
- Drill 2 fixing holes (H) and plug.
- Fix bracket to wall using 6 mm x 50 mm wood screws provided (see fig. 25).

### Fitting the flue adaptor to the boiler (see fig. 26)

- Peel off protective paper from the adhesive side of the cork gasket (A) and place on the mating side of the flue adaptor.
- Position the square channelled rubber gasket (E) on the flue hood outlet of the boiler channel facing downwards into the boiler.
- Seat the flue adaptor on top of the boiler making sure that both gaskets are in place and secure the adaptor to the boiler by the 4 screws provided. Utilizing the 2 right hand screws to fix the pressure switch support (D).

### Installing the boiler

The connections are made in the usual manner, see sections 4.4 and 4.5 and the boiler can now be fitted, see section 4.8.

### N.B : Fitting the flue

The flue can now be fitted into the adaptor via the reducer, making sure that all sections are tightly secured by pushing them firmly into position. All sections must be supported to ensure stability and no excessive weight put on the boiler (see section 1.4.4).

### Important

The flue must rise vertically a minimum of .5 meters before a bend is fitted. It must only be installed in the manner shown in section 1.44.

Ensure that all joints are fitted with 'O' ring and lightly lubricated with silicone grease.

It is appreciated that in some instances it may be necessary to install the flue prior to the fitting of the boiler. If this is the case, it is important to remember that the measurement between the horizontal fixing line for the template to the start of the flue is 245 mm.

#### 4.13

Three port mid position valve (kit N°100976) to fit the valve :

1) Drain the boiler (if applicable (see section 6.2)).

2) Remove the casing (see section 7.1)

3) Remove pressure switch and bracket by carefully pulling it towards.

You disengaging the two spring clips. Carefully, place the bracket on to the top of the pump.

4) Remove the sealed chamber front panel (see section 7.2)

5) Remove right hand side panel by sliding it carefully towards you

6) Remove overheat thermostat (F) by removing the two fixing screws (A) (see fig. 29 A)

7) Disconnect and remove the flow tube (E) by undoing the unions (B) (see 29 A)

8) Fit the new flow tubes (C) and (D) and connect the port valve (see fig. 29 B) locate the two fixing screws (G) into the brass housing at the outlet of tube (D) (ensure that washes and nuts are in place and all joints are tight.

**N.B : IMPORTANT** ensure that the rubber gromet (H) is located correctly(see 29 B)

9) Refit the overheat thermostat (F)

10) Connect the electrical plug (see section 4.13 fig. 27 c)

11) Refill boiler and test for leaks (see section 6.2)

12) Refit sealed chamber panels and relocate pressure switch bracket (check to see that no damage has accrued or any connections broken.

13) Refit casing.

# Notes

