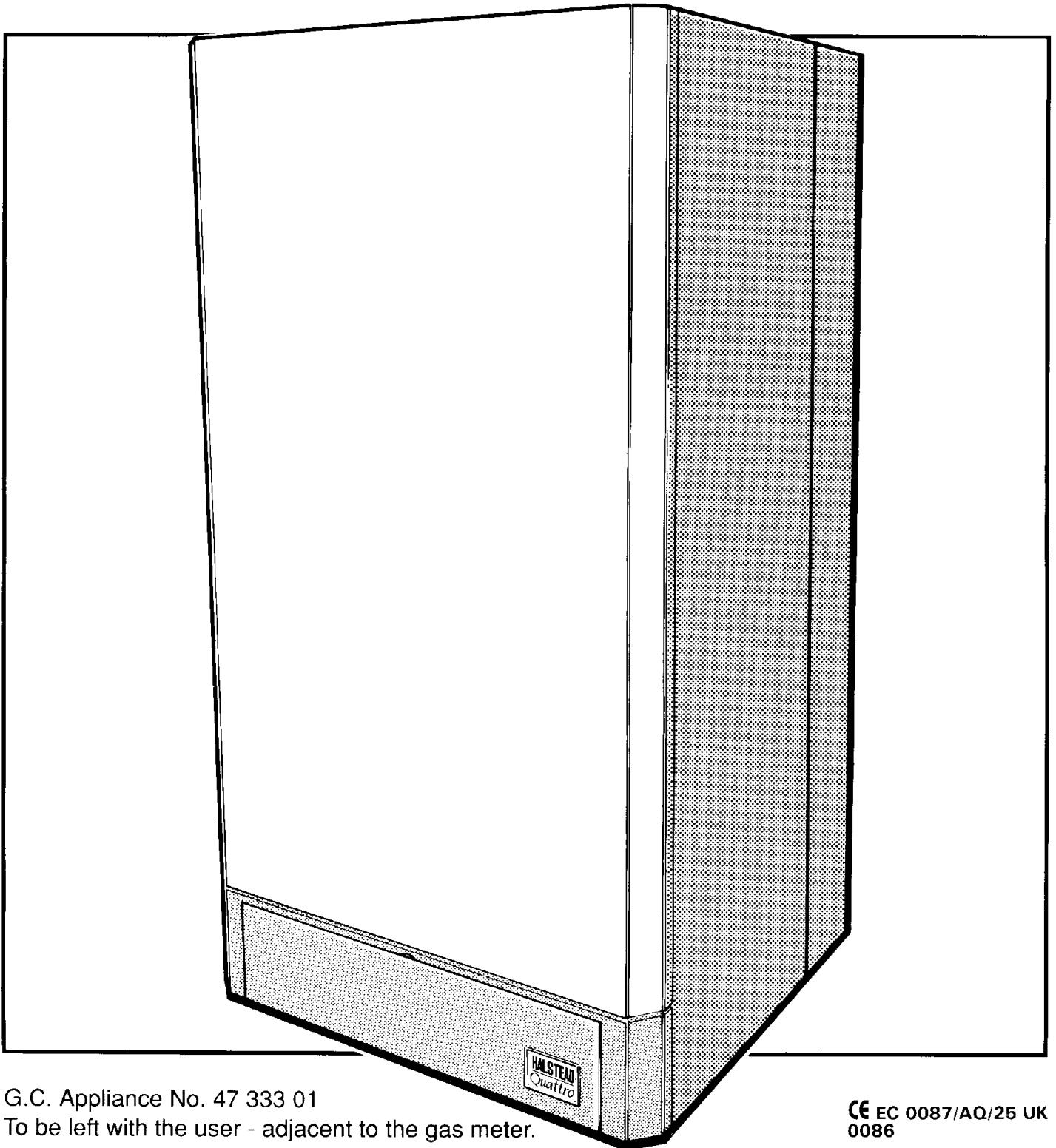


# INSTALLATION AND SERVICING INSTRUCTIONS

**HALSTEAD *Quattro***  
**FULLY AUTOMATIC FAN ASSISTED  
BALANCED FLUE COMBINATION BOILER  
FOR USE WITH NATURAL GAS ONLY**



G.C. Appliance No. 47 333 01  
To be left with the user - adjacent to the gas meter.

CE EC 0087/AQ/25 UK  
0086

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# 1 INTRODUCTION

The Quattro is a fully automatic, wall mounted, fan assisted balanced flue gas combination boiler for use on natural gas only. The appliance incorporates automatic direct burner ignition and a fully modulating gas control. The Quattro features an attractive white enamelled casing with an inset control panel situated behind a plastic cover.

The appliance provides central heating at outputs between 8.8kW (30,000Btu/h) and 23.4kW (80,000Btu/h) with instantaneous domestic hot water at outputs between 8.8kW (30,000Btu/h) and 26.4kW (90,000 Btu/h). Heat output is controlled according to demand on both domestic hot water and central heating by the modulating gas control. The appliance always gives priority to domestic hot water supply.

The boiler is supplied with a standard concentric air and flue duct suitable for flue lengths of up to 750mm (29½in). The duct assembly is connected to the boiler via a turret which can exit the boiler in any horizontal direction. Additional flue kits are available to extend the flue length up to a maximum of 3.0m (117in), and further kits are available to provide up to two bends in the flue, although the maximum length must be reduced (as detailed in these instructions) to accommodate extra bends. A vertical outlet kit is also available for installations where an outside wall is not accessible and it is desired to fit the duct 'through the roof'. Installation using the standard flue kit (with or without straight extensions) is described in the main text of these instructions and appendices at the rear of this booklet describe installations involving raised flue systems, extra bends, and the vertical outlet kit.

The appliance can be installed from inside the room without access to the external wall providing that a wall liner is fitted and the wall thickness is less than 0.5m (19in). The wall liner is available as an optional extra. See section 4 for further details. (Note: If the vertical outlet kit is to be used, access to the roof is necessary.)

The boiler is designed for use with sealed primary water systems and incorporates a circulation pump, diverter valve, pressure gauge, safety valve and CH expansion vessel. Provision is made for expansion of DHW and therefore a separate DHW expansion vessel is not required. Isolation valves are fitted to service connections, and an automatic heating bypass is fitted to maintain an adequate flow rate through the boiler.

If thermostatic radiator valves are installed we recommend that one radiator is fitted with lockshield valves (normally in the bathroom).

A frost thermostat and a time clock (with override switch) are fitted as standard equipment, and the boiler may be used with any certified mains voltage room thermostat.

# 2 TECHNICAL SPECIFICATIONS

## 2.1 PERFORMANCE DATA

Mode	Output kw (Btu/h)	Input kw (Btu/h)	Burner Pressure mbar (inwg)
Central Heating Min	8.8 (30,000)	12.2 (41,600)	1.6 (0.6)
Central Heating Max	23.4 (80,000)	29.3 (100,000)	10.5 (4.2)
DHW Min	8.8 (30,000)	12.2 (41,600)	1.6 (0.6)
DHW Only Max	26.4 (90,000)	32.5 (111,000)	13.2 (5.3)

### DOMESTIC HOT WATER (DHW) PERFORMANCE

DHW flow rate for 35°C temperature rise*	= 10.8 l/min (2.4gpm)
Max. (continuous)DHW outlet temperature	= 60°C (140°F)
Max. DHW temperature at nominal gas rate	= 50°C (122°F)
Min. DHW inlet pressure for boiler operation	= 0.5 bar (7 psi)
Min. DHW inlet pressure for nominal gas rate	= 1.5 bar (22 psi)
Max. DHW inlet pressure	= 10 bar (140 psi)

\* Above incoming cold water temperature (assuming that the cold inlet temperature is below 15°C).

## 2.2 MINIMUM CLEARANCES

The following minimum clearances must be maintained for installing and servicing the appliance.

Above the appliance casing	200 mm	8 in
At the R.H.S	5 mm	¼ in
At the L.H.S	5 mm	¼ in
Below the appliance casing	200 mm	8 in
In front of the appliance.	450 mm	18 in

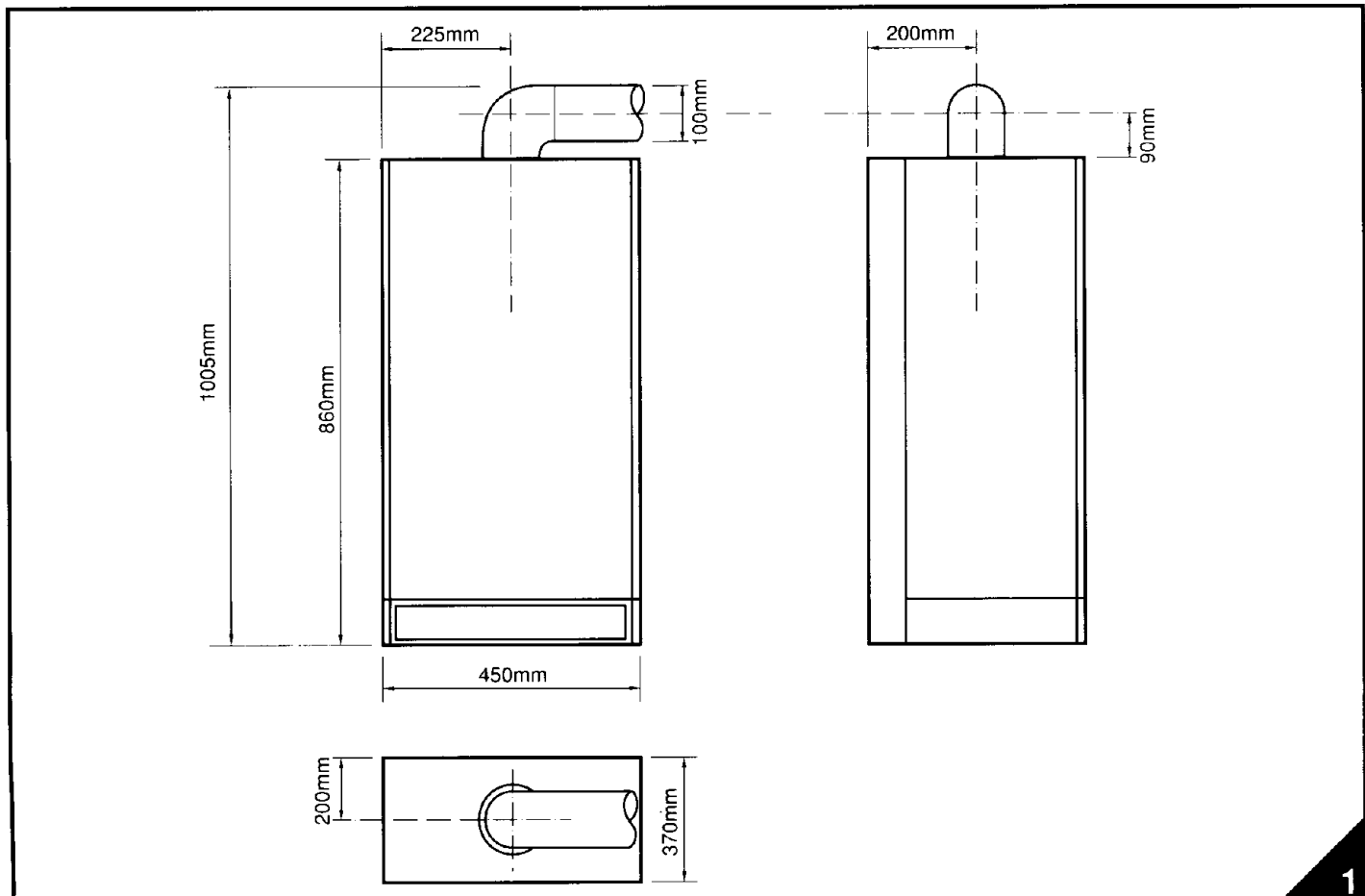
## 2.3 GENERAL SPECIFICATIONS

Main burner injectors	1.25mm diameter 14 off
Total water capacity	1.9 l (0.4 gals)
Minimum CH water flow	22 l/min (4.9 gpm)
Minimum DHW water flow	2.8 l/min (0.6 gpm)
Minimum static head	0.5 bar (7.3 psi)
Maximum static head	2.5 bar (36.5 psi)
Empty weight	48 kg (106 lb)
Max lift weight	45 kg (99 lb)
Total weight (Full)	50 kg (110 lb)
Electrical Supply	220 - 240 Volts 50 Hz, Fused at 3A.
Internal Fuses	2A & 315mA.
Max Power Consumption	160 Watts
Max Gas Consumption DHW	3.5 m <sup>3</sup> /h (109 ft <sup>3</sup> /h)
Max Gas Consumption CH	2.8 m <sup>3</sup> /h (96 ft <sup>3</sup> /h)
Max CH Temperature Approx	85°C (185 F)
Integral expansion vessel	8 ltr. capacity

### CONNECTION SIZES

Gas Connection	Rc ½
Central Heating Flow	22 mm Compression
Central Heating Return	22 mm Compression
Domestic Water Inlet	15 mm Compression
Domestic Water Outlet	15 mm Compression
Pressure Relief Valve Outlet	15 mm Compression

## 2.4 OVERALL APPLIANCE DIMENSIONS



## 2.5 AIR/FLUE DUCT SPECIFICATIONS

### 2.5.1 AIR/FLUE DUCT DESIGN INSTALLATION OPTIONS

The appliance is supplied complete with a standard 750mm air/flue duct terminal assembly.

The following additional flue kits are available as optional extras:

**Flue Extension:** (Extends the flue length by up to 750mm)

**90° Flue Extension Elbow\*:** (Allows an additional bend in the flue and has an equivalent length of 750mm)

**45° Flue Extension Bend\*:** (Allows an additional bend in the flue and has an equivalent length of 375mm)

**Vertical Flue Extension Duct:** (flanged) necessary for connection to boiler, can be cut to a minimum of 100mm or 4"

**Vertical Flue Socket:** 140mm long (necessary for connection of vertical flue extension to standard flue, when fitting a straight vertical flue)

**Vertical Outlet Cowl:** (necessary for all vertical flue installations)

**Vertical Flue Components are available as a Vertical Flue Kit: Quote Part No. 951005.**

**Note:** A 100mm (4") roof weathering slate is required (not supplied) with any vertical flue outlet.

\*These elbow's are mechanically different from the flanged elbow supplied as standard with the appliance, but has the

same equivalent resistance of 750mm 90°, and 375mm 45°.

These optional kits may be used with the standard terminal assembly to produce an extensive range of flue options. Examples are illustrated in Fig. 2. Variations upon these illustrations may be used providing that the following rules are strictly obeyed:

**RULE 1:** The maximum permissible equivalent length of the flue system is 3750mm except for vertical flue at 3800mm. (This includes the appliance outlet elbow for example in Fig. 3.b the equivalent length is  $4 \times 750$  ducts + the flanged elbow.  $3000 + 750 = 3750$ mm)

**RULE 2:** The terminal must always be fitted horizontally unless the vertical outlet kit is fitted.

**RULE 3:** There must not be any downward runs in the flue pipe. (The direction of flow of flue products may be horizontal or vertically upwards only)

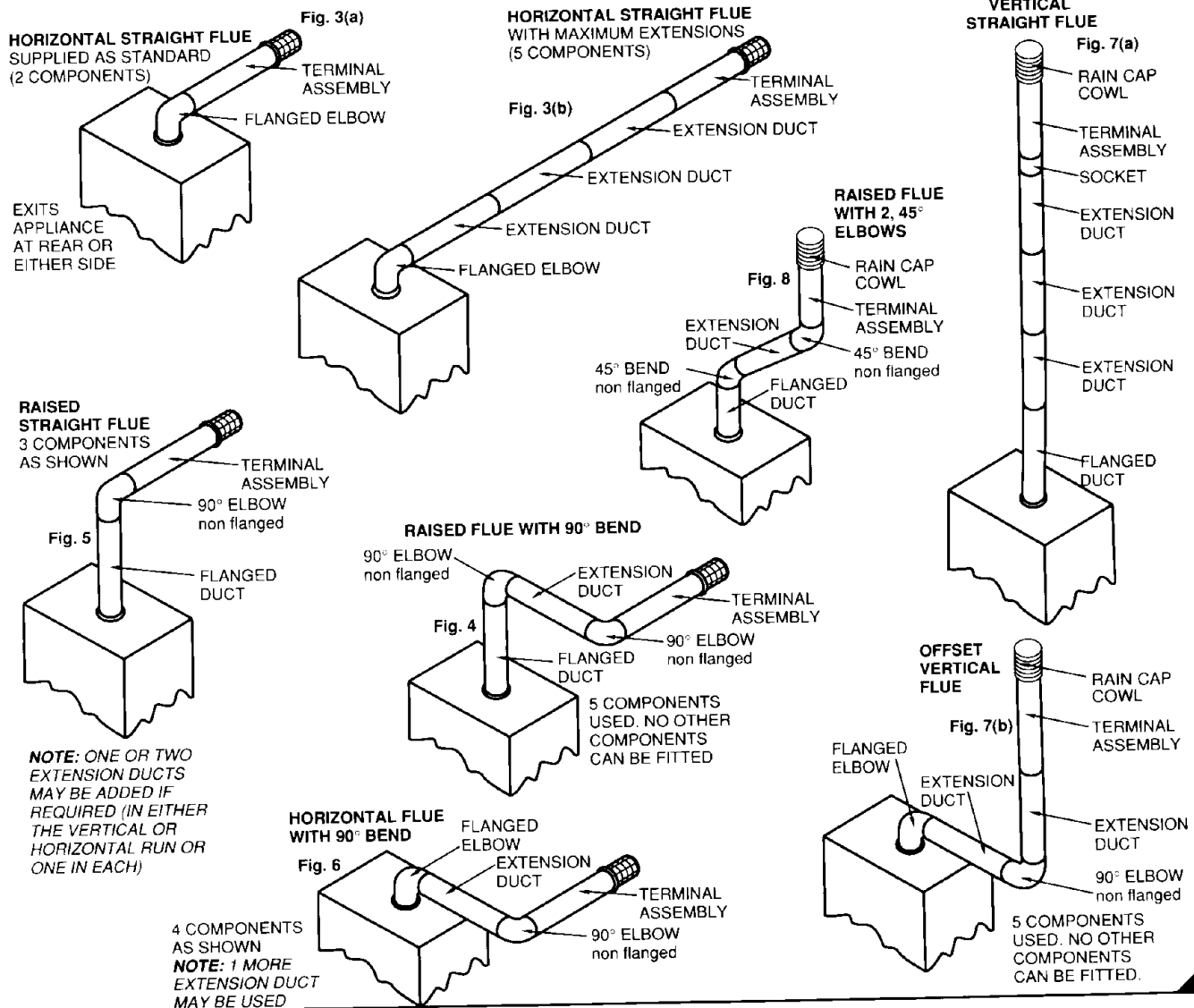
**RULE 4:** The flue system must use either a flanged elbow or a flanged duct at the entry/exit to the appliance.

**RULE 5:** All joints must be correctly made and secured in accordance with the installation instructions.

### 2.5.2 FLUE SYSTEM DIMENSIONS

Refer to Figs. 3 to 7 to determine which option kits are required before commencing the installation.

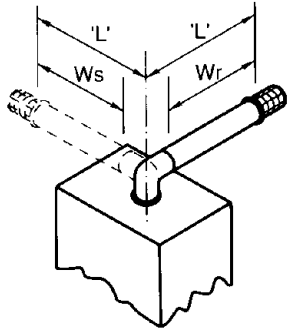
#### EXAMPLES OF ALTERNATIVE FLUE SYSTEMS



# AIR/FLUE DUCT SPECIFICATIONS

## SPECIFICATIONS FOR STANDARD AND EXTENDED STRAIGHT FLUES

Fig. 3(a)

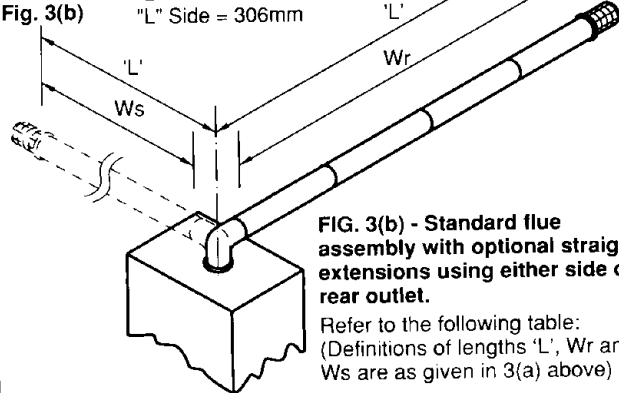


**FIG. 3(a) - Standard flue assembly using either side or rear outlet.**

Flue length 'L' (measured from the boiler outlet centre line to the outside wall face) = 750mm  
 Maximum wall thickness  $W_r$  (Rear outlet) = 560mm  
 Maximum wall thickness  $W_s$  (Either side outlet) = 520mm. (Allowing for minimum clearance of 6mm)

$W_r$  &  $W_s$  minimum = 100mm  
 "L" Rear = 244mm  
 "L" Side = 306mm

Fig. 3(b)



**FIG. 3(b) - Standard flue assembly with optional straight extensions using either side or rear outlet.**

Refer to the following table:  
 (Definitions of lengths 'L',  $W_r$  and  $W_s$  are as given in 3(a) above)

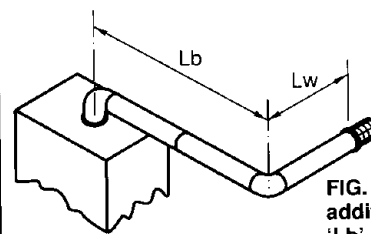
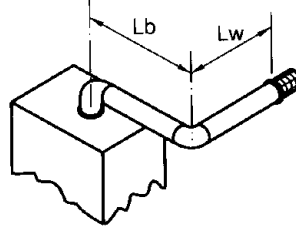
NUMBER OF EXTENSION KITS	LENGTH 'L'	$W_r$ (REAR)	$W_s$ (SIDE)
ONE	1500	1300	1270
TWO	2250	2050	2020
THREE	3000	2800	2770

3

## SPECIFICATIONS FOR FLUE SYSTEM WITH AN EXTRA 90° FLOW

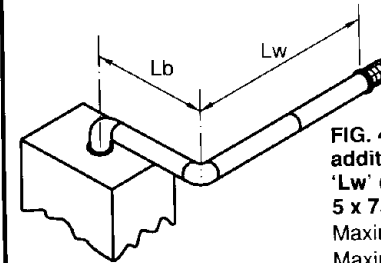
**FIG. 4(a) - Use of the flanged elbow, one extension kit, 90° elbow, and terminal assembly. (Equivalent length  $4 \times 750 = 3000\text{mm}$ ).**

Maximum length 'Lb' (measured from the boiler outlet centre line to the centre line of the extra elbow) = 910mm  
 Maximum length 'Lw' (measured from the centre line of the extra elbow to the outside wall face) = 750mm



**FIG. 4(b) - As 4(a) but with one additional extension in length 'Lb' (Equivalent length  $5 \times 750 = 3750\text{mm}$ ).**

Maximum length 'Lb' = 1600mm  
 Maximum length 'Lw' = 750mm



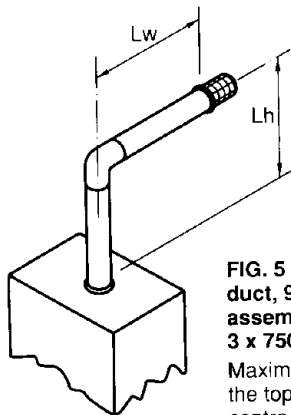
**FIG. 4(c) - As 4(a) but with one additional extension in length 'Lw' (Equivalent length  $5 \times 750 = 3750\text{mm}$ ).**

Maximum length 'Lb' = 910mm  
 Maximum length 'Lw' = 1500mm

**NOTE:** 45° bend has half the resistance of a 90° elbow and therefore two 45° bends equals 1 90° elbow (750mm)

4

## SPECIFICATIONS FOR FLUE SYSTEMS WITH AN ELEVATED FLUE SYSTEM



**FIG. 5 - Use of the flanged duct, 90° elbow and terminal assembly. (Equivalent length  $3 \times 750 = 2250\text{mm}$ ).**

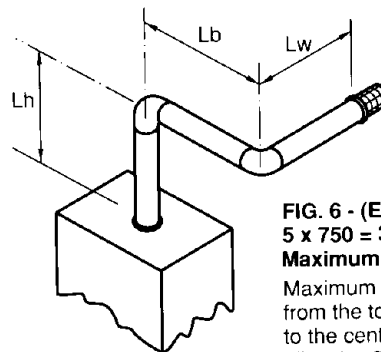
Maximum length 'Lh' (measured from the top of the boiler casing to the centre line of the extra elbow) = 830mm

Maximum length 'Lw' (measured from the centre line of the extra elbow to the outside wall face) = 750mm

**NOTE:** Up to two more extension kits may be used in either length  $L_h$  or  $L_w$ . (Add 750 or 1500mm) to further extend the maximum length shown above.

5

## SPECIFICATIONS FOR FLUE SYSTEMS WITH AN ELEVATED FLUE SYSTEM INCORPORATING BENDS



**FIG. 6 - (Equivalent length  $5 \times 750 = 3750\text{mm}$  Maximum allowed).**

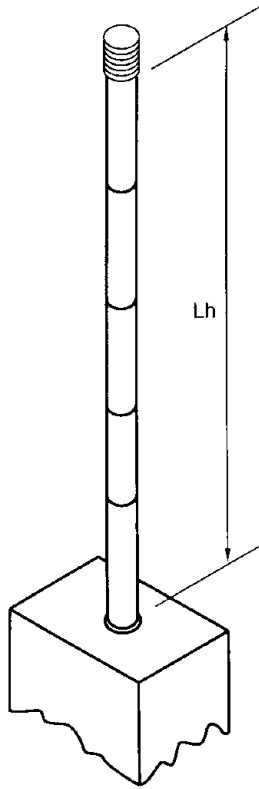
Maximum length 'Lh' (measured from the top of the boiler casing to the centre line of the extra elbow) = 830mm

Maximum length 'Lb' (measured from the centre line of the extra elbow to the outside wall face) = 910mm

Maximum length 'Lw' (measured from the centre line of the extra elbow to the outside wall face) = 750mm

6

**SPECIFICATIONS FOR VERTICAL FLUE SYSTEMS**



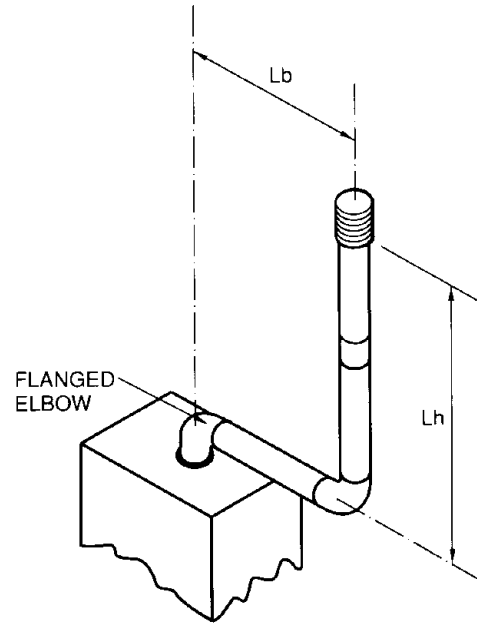
**FIG. 7(a). Vertical extensions only:**  
Terminal assembly + vertical outlet kit +  
flanged duct. Dimensions as follows:

**Maximum length 'Lh'**  
measure from the top of the appliance  
to the centre of the swaged groove.

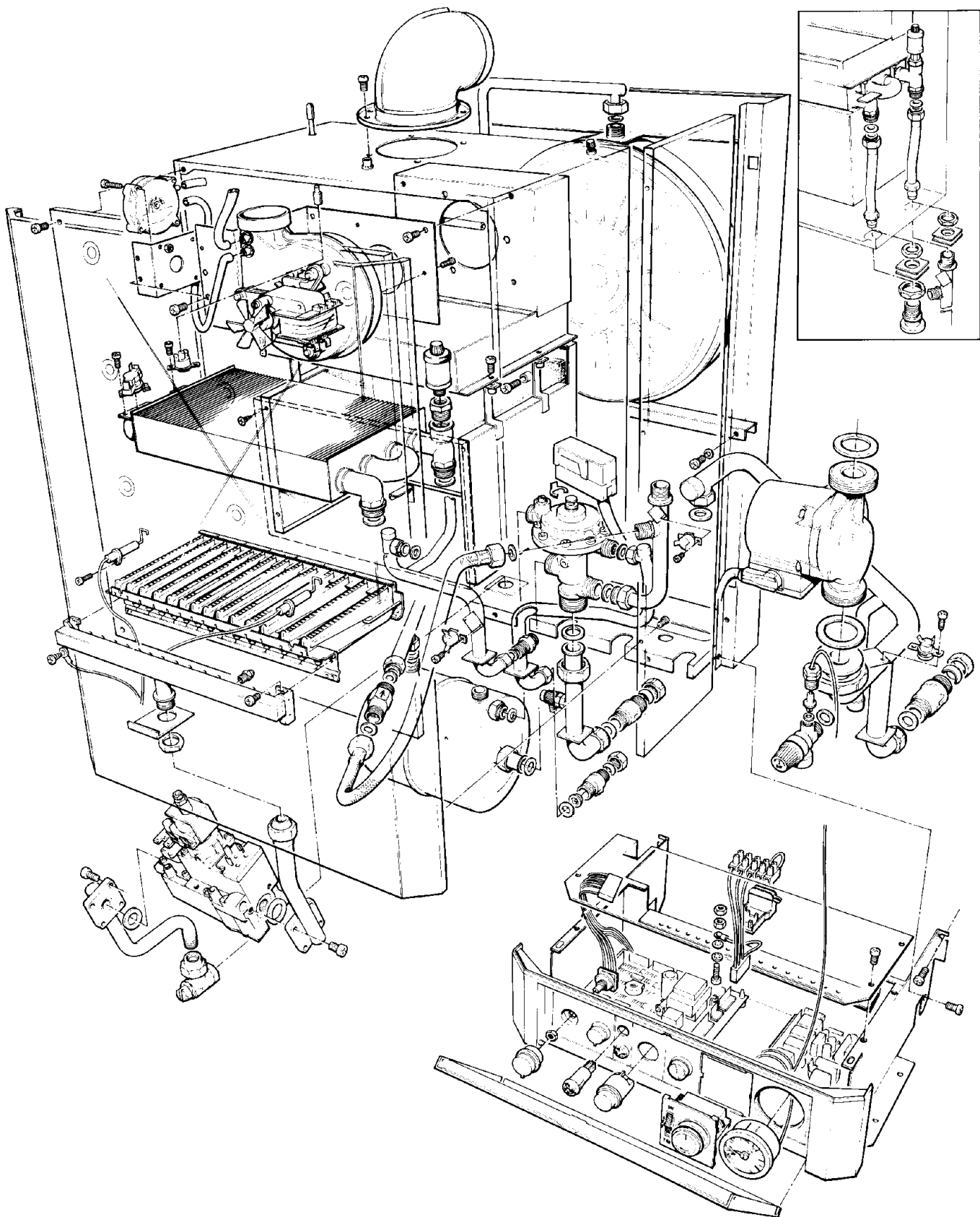
NUMBER OF EXTENSION 'L' KITS	LENGTH Lh
NONE	1550
ONE	2300
TWO	3050
THREE	3800

**Socket**  
effective length 140mm  
(may be used as shown in fig. A3)

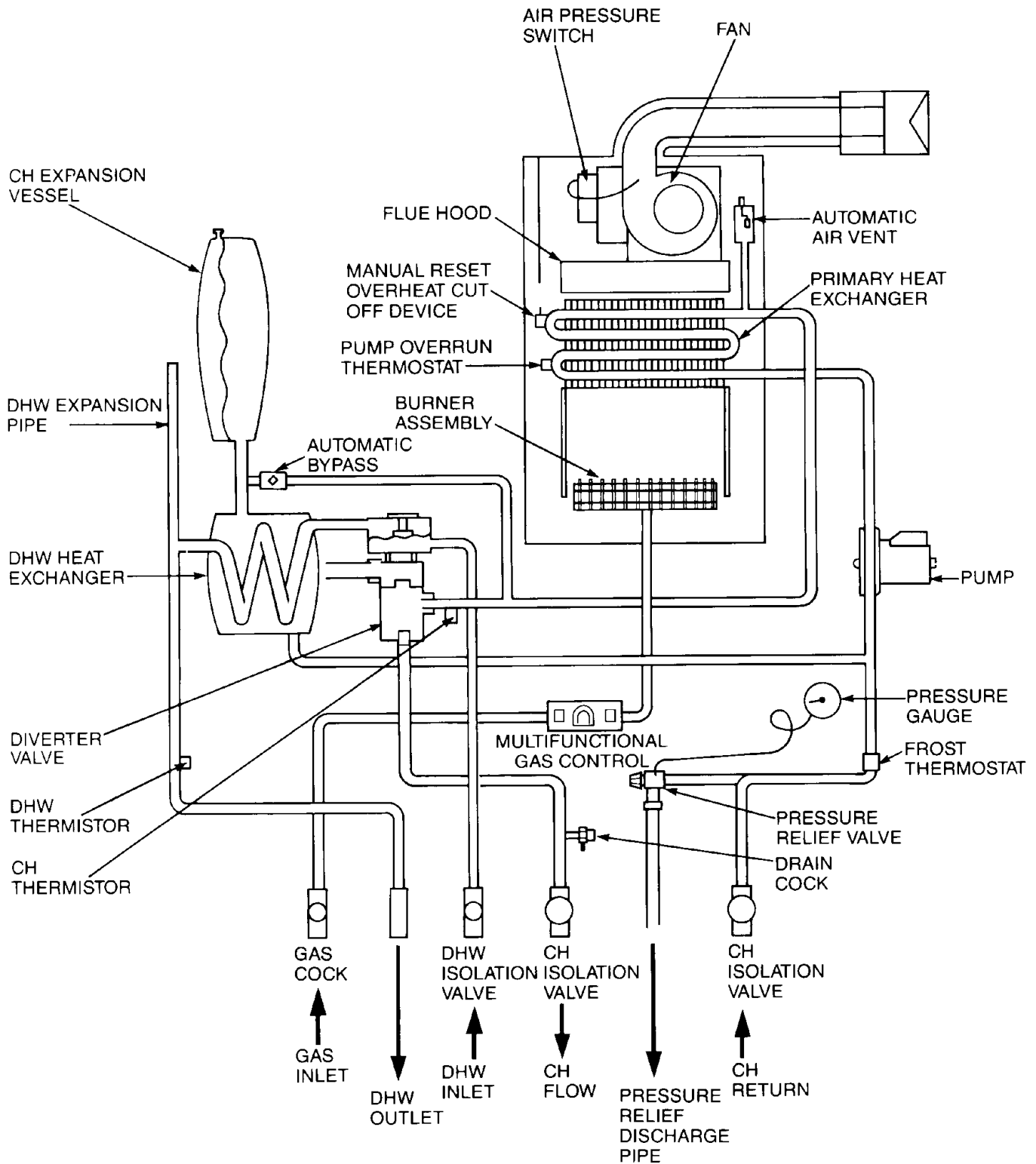
**FIG. 7(b) - Offset vertical flue**  
(Equivalent length = 3750mm)  
Maximum length 'Lb' (measured from the  
boiler outlet centre line to the centre line of  
the extra elbow) = 910mm  
Maximum length 'Lh' (measured from the  
centre line of the extra elbow to the centre of  
swaged groove) = 1620mm



Installation instructions for installing the appliance with a standard flue and straight extensions (Fig. 3) are included in the main text of these instructions (sections 4.4 and 4.5). Additional instructions for flue systems incorporating an additional elbow (Fig. 4), raised flue (Fig. 5), both an additional elbow with a raised flue (Fig. 6) and vertical outlet (Fig. 7) are given in the appendices at the rear of this booklet.



# HYDRAULIC CIRCUIT





# 3 INSTALLATION REQUIREMENTS

## 3.1 STATUTORY REQUIREMENTS

GAS SAFETY (INSTALLATION AND USE) REGULATIONS 1984 (AS AMENDED).

It is the law that all gas appliances are installed by a registered person, 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 that the law is complied with.

In addition to the above regulations, this appliance must be installed in accordance with the current IEE Wiring Regulations for electrical installation, local building regulations, the Building Standards (Scotland) (Consolidation) Regulations, bye laws of the local water undertaking and Health and Safety Document No. 635 'The Electricity at Work Regulations 1989'.

It should also be in accordance with the relevant recommendations in the current editions of the following British Standards and Codes of Practice: BS5449, BS5546, BS5440:1, BS5440:2, BS6798, BS6891, and BG.DM2

**IMPORTANT NOTE:** Manufacturer's instructions must NOT be taken in any way as over-riding statutory obligations.

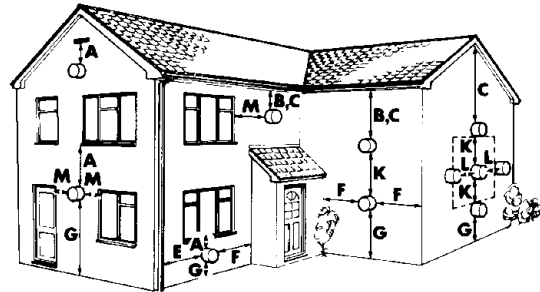
## 3.2 BOILER POSITION

The following limitations **MUST** be observed when siting the boiler:

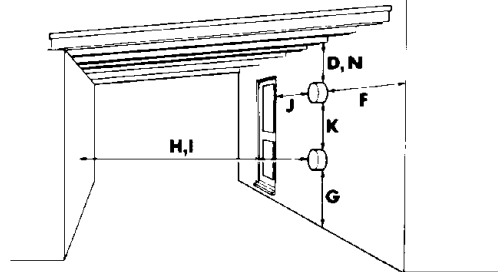
- The boiler is not suitable for external installation. The position selected for installation should be within the building, unless otherwise protected by a suitable enclosure, and **MUST** allow adequate space for installation, servicing, and operation of the appliance, and for air circulation around it. (Section 2.4 and 3.4)
- This position **MUST** allow for a suitable flue system and terminal position. (Section 2.5 and 3.3) The combination boiler must be installed on a flat vertical wall which is capable of supporting the weight of the appliance and any ancillary equipment.
- If the combination boiler 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 Frame Housing', Reference DM2. If in doubt, advice must be sought from the Local Gas Region.
- If the appliance is to be installed in a room containing a bath or a shower, any electrical switch or control utilising mains electricity must be so situated that it cannot be touched by a person using the bath or shower. Attention is drawn to the requirements of the current I.E.E. Wiring Regulations, and in Scotland the electrical provisions of the Building Regulations applicable in Scotland.
- A compartment used to enclose the appliance **MUST** be designed and constructed specifically for this purpose. An existing cupboard, or compartment, may be used provided it is modified accordingly. BS 5376:2 gives details of the essential features of cupboard / compartment design, including airing cupboards.
- Where installation will be in an unusual location, special procedures may be necessary. BS 6798 gives detailed guidance on this aspect.

## 3.3 FLUE TERMINAL POSITION

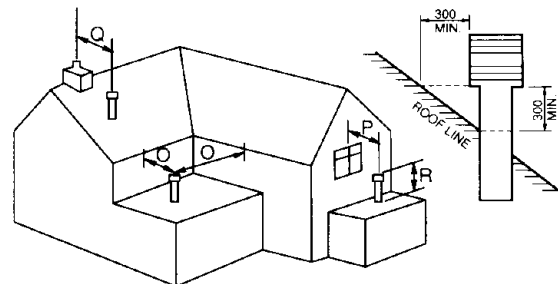
### FLUE TERMINAL POSITIONS



### UNDER CARPORT WITH OPEN SIDES



### SPECIAL REQUIREMENTS FOR VERTICAL BALANCED FLUE



Position	Minimum spacing
A Directly below an openable window, air vent, or any other ventilation opening	300mm 12in
B Below gutter, drain/soil pipe	75mm 3in
C Below eaves	200mm 8in
D Below a balcony	200mm 8in
E From vertical drain pipes and soil pipes	75mm 3in
F From internal or external corners	300mm 12in
G Above adjacent ground or balcony level	300mm 12in
H From a surface facing the terminal	600mm 24in
I Facing terminals	1200mm 48in
J From opening (door/window) in carport into dwelling	1200mm 48in
K Vertically from a terminal on the same wall	1500mm 60in
L Horizontally from a terminal on the same wall	300mm 12in
M Adjacent to opening	300mm 12in
N Below carport	600mm 24in
O From adjacent wall	300mm 12in
P From adjacent opening window	1000mm 40in
Q From another terminal	600mm 24in
R Minimum height	300mm 12in

### 3.3 FLUE TERMINAL POSITION

Detailed recommendations for flue installation are given in BS 5440:1. The following notes are for general guidance.

- The boiler MUST be installed so that the terminal is exposed to the external air.
- It is important that the position of the terminal allows free passage of air across it at all times.
- It is **ESSENTIAL TO ENSURE** that products of combustion discharging from the terminal cannot re-enter the building, or any other adjacent building, through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation / air conditioning.
- The minimum acceptable dimensions from the terminal to obstructions and ventilation openings are specified in Fig. 10.
- If the terminal discharges into a pathway or passageway check that combustion products will not cause nuisance and that the terminal will not obstruct the passageway.
- Where the lowest part of the terminal is fitted less than 2m (78ins) above ground, above a balcony or above a flat roof to which people have access, the terminal MUST be protected by a purpose designed guard. (Available as an optional extra)
- Where the terminal is fitted within 850mm (34in) of a plastic or painted gutter, or 450mm (18in) of painted eaves, an aluminium shield at least 750mm long must be fitted to the underside of the painted surface.
- The air inlet / flue outlet duct MUST NOT be closer than 25mm (1in) to combustible material.
- In certain weather conditions the terminal may emit a plume of steam. This is normal but positions where this would cause a nuisance should be avoided.

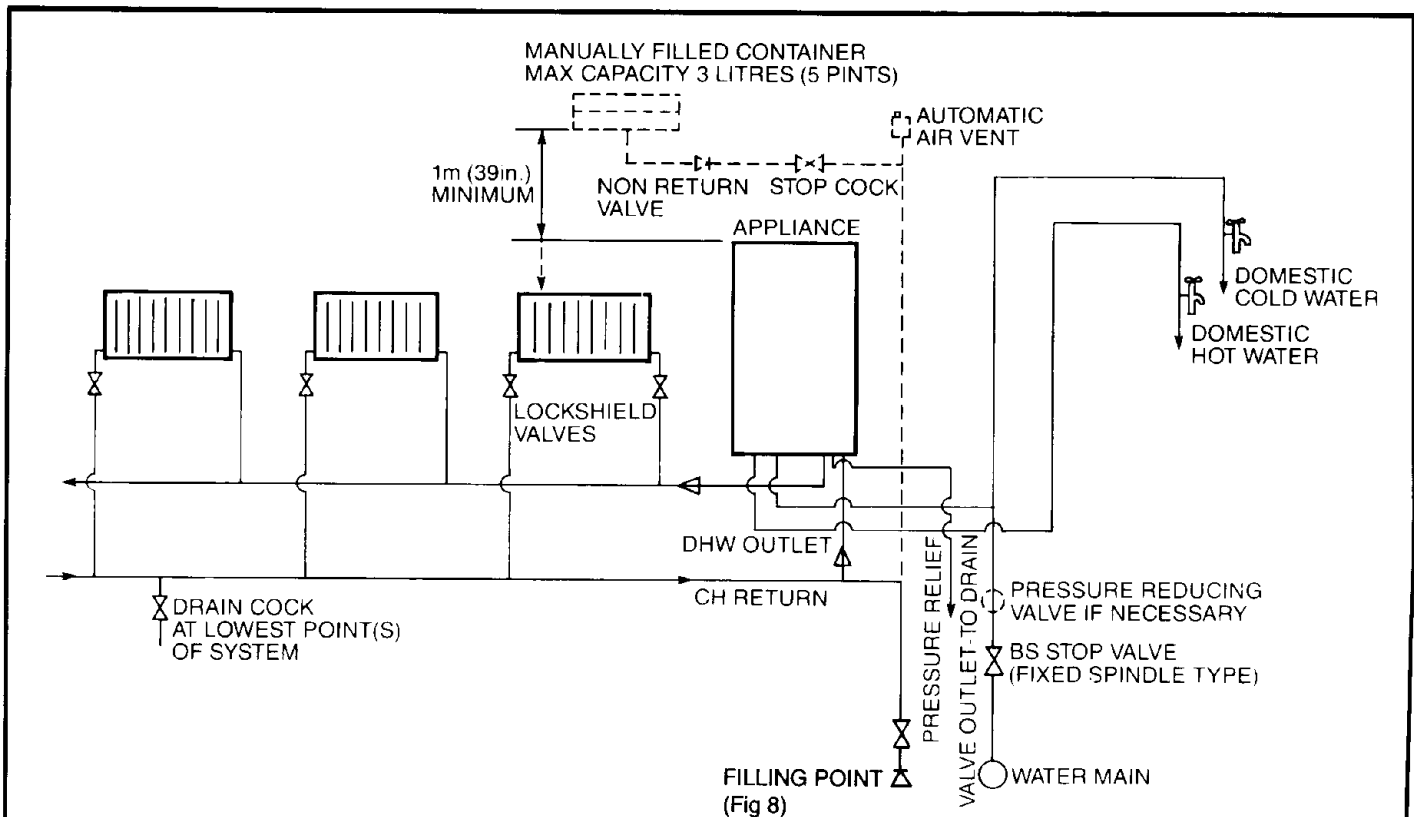
### 3.4 VENTILATION REQUIREMENTS

Detailed recommendations for air supply are given in BS 5440:2. The following notes are for general guidance.

- It is not necessary to have a purpose provided air vent in the room or internal space in which the appliance is installed.
- If the boiler is to be installed in a cupboard or compartment, permanent air vents are required for cooling purposes in the cupboard or compartment at both high and low levels. Both air vents must communicate with either the same internal room / space or be on the same wall to external air. Each air vent communicating with another room or internal space must have a minimum effective area of 316cm<sup>2</sup> (51 in<sup>2</sup>). If the ventilation is direct to air from outside the building, the necessary areas quoted above may be halved.

### 3.5 GAS SUPPLY

- The Local Gas Region should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas.
- An existing service pipe MUST NOT be used without prior consultation with the Local Gas Region.
- A gas meter can only be connected by the Local Gas Region or by a Local Gas Region Contractor.
- An existing meter should be of sufficient size to carry the maximum boiler input plus the demand of any other installed appliance. (BS 6891: 1988). The gas required for the Quattro is 3.1m<sup>3</sup> / h (88 ft<sup>3</sup> / h). A minimum of 22mm dia. pipework to within 1 metre of the appliance gas cock.
- The governor at the meter must give a constant outlet pressure of 20 mbar (8 in.wg) when the appliance is running.
- The gas supply line should be purged. **WARNING:** Before purging open all doors and windows, also extinguish any cigarettes, pipes, and any other naked lights.
- The complete installation must be tested for gas soundness.

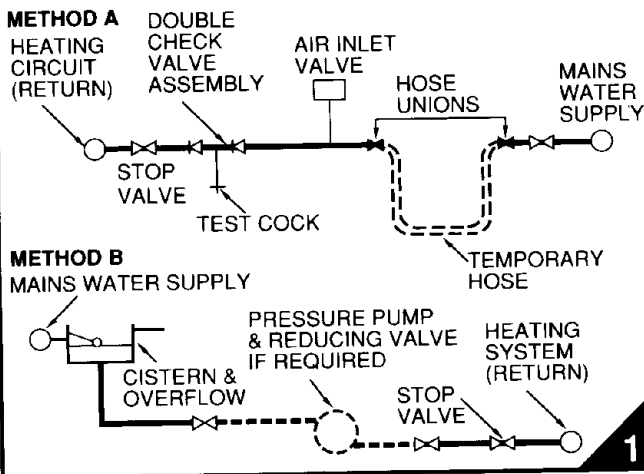


**NOTE:** The boiler incorporates an automatic bypass, hence no other system bypass is necessary. **However at least one radiator (preferable in the bathroom) must be permanently open, ie. fitted with two lockshield valves.**

### 3.6 SEALED WATER SYSTEMS - CENTRAL HEATING

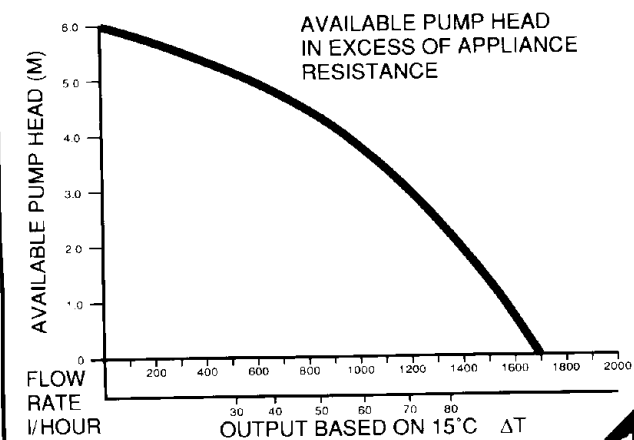
- This appliance is designed for connection to sealed central heating water systems. Refer to Fig. 11 for a typical system design.
- A sealed system must only be filled by a competent person using one of the approved methods shown in Fig. 12. The system design should incorporate the connections appropriate to one of these methods.
- The available pump head is given in Fig. 13.
- A minimum flow rate corresponding to a heating differential of 15°C must be obtained at all times.
- An automatic heating by-pass is fitted within the appliance.
- The following paragraphs outline the specifications of the items fitted to the boiler.

#### ALTERNATIVE METHODS OF FILLING A SEALED SYSTEM



12

#### AVAILABLE PUMP HEAD



13

#### PUMP

The available head shown in Fig. 13 is that in excess of the appliance hydraulic resistance, i.e. that available for the system.

#### EXPANSION VESSEL

Fig. 14 shows the maximum system volume that the integral expansion vessel can sustain under different charge pressure conditions. If the system volume exceeds that shown, an additional expansion vessel must be fitted and connected to the heating system primary return pipe as close as possible to the appliance. If an extra vessel is required, ensure that the total capacity of both vessels is adequate. Further details are available in the current issues of BS5449 and BS6798.

**NOTE:** If the pressure gauge indicates 2.65 bar or greater when the appliance is at maximum temperature with all radiators in circulation an extra expansion vessel is required.

#### PRESSURE GAUGE

A pressure gauge is situated on the appliance control panel. This can be viewed by lowering the plastic panel cover.

#### PRESSURE RELIEF VALVE

A pressure relief valve set at 3 bar (43.5 psi) is supplied with the appliance.

#### EXPANSION VESSEL REQUIREMENTS

Vessel charge and initial system pressure	bar	0.5	1.0	1.5
	psi	7.3	14.5	21.8
Total water content of system using 8ltr. (1.76 gal.) capacity expansion vessel supplied with appliance		96ltr.	73ltr.	50ltr.
		21 gal	16 gal	11 gal
For systems having a larger capacity multiply the total system capacity in litres (gallons) by the factor to obtain the total minimum expansion vessel capacity required litres (gallons).		0.0833	0.109	0.156

14

### 3.7 DOMESTIC HOT WATER SYSTEMS

- Check that the mains water pressure is sufficient to produce the required DHW flow rate, but does not exceed the maximum DHW pressure (10 bar). If necessary, a pressure reducing valve must be fitted to the mains supply before the DHW inlet connection.
- The final 600mm (24in) of the mains supply pipe to the boiler must be copper.
- A restrictor is fitted within the appliance inlet valve to restrict the maximum water flow to a rate of 13 l/min (2.8 gpm). (Higher flow rates would not damage the appliance but would lower the water temperature rise below an acceptable level.
- If the appliance is installed in an area where the temporary hardness of the water supply is high, say over 150ppm, the fitting of an in line scale inhibitor may be an advantage. Consult the Local Water Undertaking if in doubt.
- For specific information relating to fittings (eg. Showers, washing machines etc) suitable for connection in the DHW circuit, consult the Local Water Undertaking. However the following information is given for guidance:

**DOMESTIC HOT/COLD WATER SUPPLY TAPS AND MIXING TAPS.** All equipment designed for use at mains water pressure is suitable.

**SHOWERS & BIDETS.** Any mains pressure shower or bidet complying with the Local Water Undertaking byelaws is suitable.

### 3.8 ELECTRICITY SUPPLY (240V 50Hz) Fuse 3A

- Wiring external to the appliance must be in accordance with the current I.E.E. Wiring Regulations for electrical installation and any local regulations which apply.
- The mains cable must be at least 0.75mm<sup>2</sup> (24/0.2mm) PVC Insulated to BS6500 table 16.)
- THIS APPLIANCE MUST BE EARTHED.** (Failure to provide a satisfactory Earth connection may result in appliance malfunction)
- The method of connection to the mains supply must facilitate complete electrical isolation of the appliance. Either a 3A Fused three pin plug and unswitched shuttered socket outlet, both complying with BS1363, or a 3A fused double pole switch having a 3mm contact separation in both poles and serving only the boiler (and its external controls) may be used.

### 3.9 EXTERNAL CONTROLS

The appliance may be used with any certificated mains voltage room thermostat as described in section 4.

# 4 INSTALLING THE APPLIANCE

## 4.1 UNPACKING THE APPLIANCE

The appliance with standard flue kit is supplied in a single cardboard carton. In addition various optional flue kits are available as described in section 2.5. If the appliance is to be installed without access to the outside wall, a wall liner kit is also required.

Open the carton and remove the casing panels. Unpack the boiler, flue pack, and any option kits and check the contents against the following lists.

### BOILER PACKAGE:

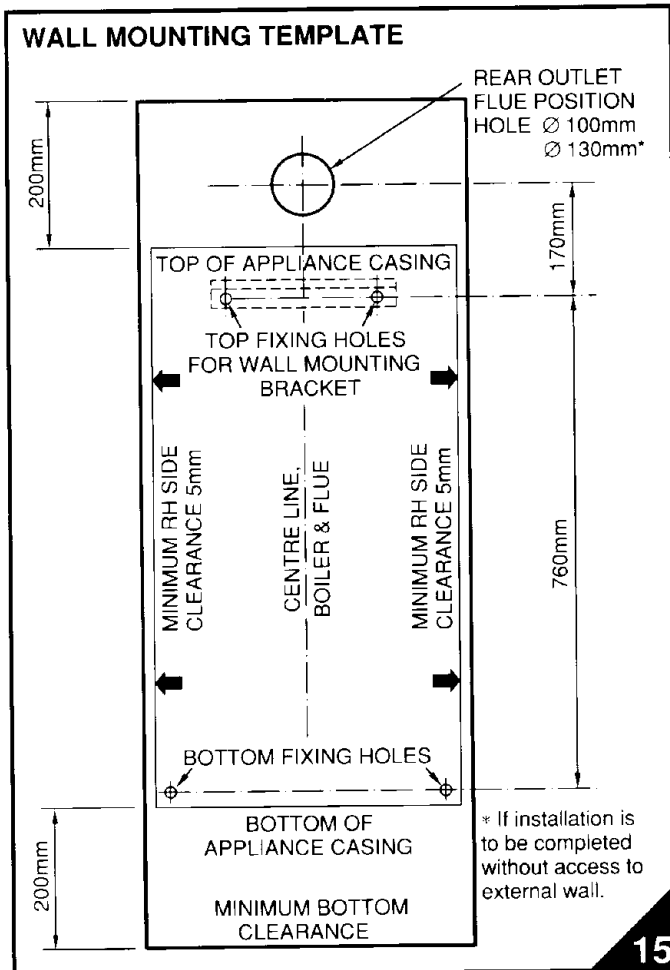
- Boiler (Assembled.)
- Boiler casing - front and both side panels
- Installation, Servicing, and Users instructions.
- Wall mounting template (Paper)
- Wall mounting bracket & fixing screws with wall plugs
- Plastic bags containing:
  - Aluminium wall sealing ring
  - Fixing screws
  - Gaskets

### FLUE PACK (Packed inside the boiler package):

- Inner duct (flue) c/w flue terminal and location springs.
- Outer duct (air)
- Silicon rubber seal
- Flue elbow
- Protective sleeve

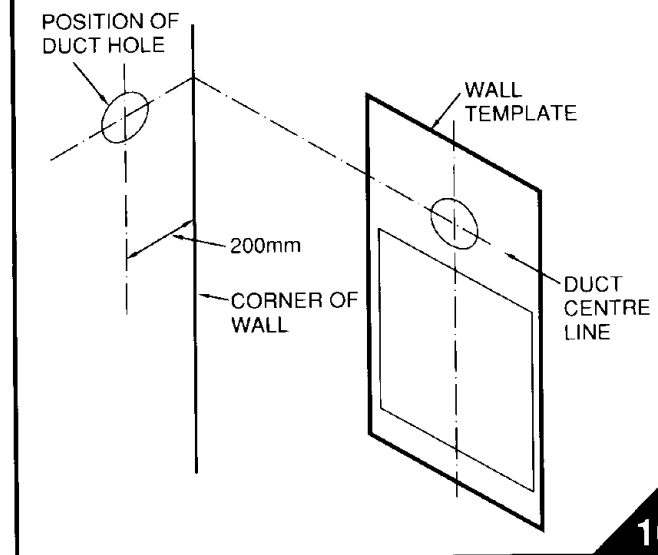
## 4.2 PREPARING THE WALL

Before installing the appliance ensure that the chosen location is suitable (Section 3.2) and that the requirements for flue position, (Section 3.3), & minimum clearances, (Section 2.4) are satisfied. These minimum clearances are essential to provide access for servicing, and are included on the wall mounting template.



- Open the paper template (Fig. 15) and tape the template onto the wall in the desired position. (Ensuring that the centre line is level).
- Mark the position of the two wall mounting bracket fixing holes and the two lower fixing holes.
- REAR OUTLET ONLY:** If the installation is to use a rear outlet, mark the position of the air/flue duct hole (from the paper template) onto the rear wall.
- SIDE OUTLET ONLY:** If the installation is to use a LH or RH side outlet, mark the position of the centre line of the air/flue duct hole (from the paper template) onto the rear wall. Extend this mark horizontally until reaching the side wall face, then draw the position of the air/flue duct hole as detailed in Fig. 16.
- If the air/flue duct length is to be greater than 2.25m (88 in) it is necessary to fit at least one support in the middle of the duct. A support bracket kit is available as an optional extra. Follow the fitting instructions provided with the bracket before proceeding further.
- Remove the paper template and check the dimensions between the centre lines of the flue and fixing holes shown in Fig. 15. Drill the top two fixing holes using a 10mm masonry drill and the bottom two fixing holes using a 6mm masonry drill. Fit the plastic plugs provided.

## MARKING THE POSITION OF A SIDE FLUE

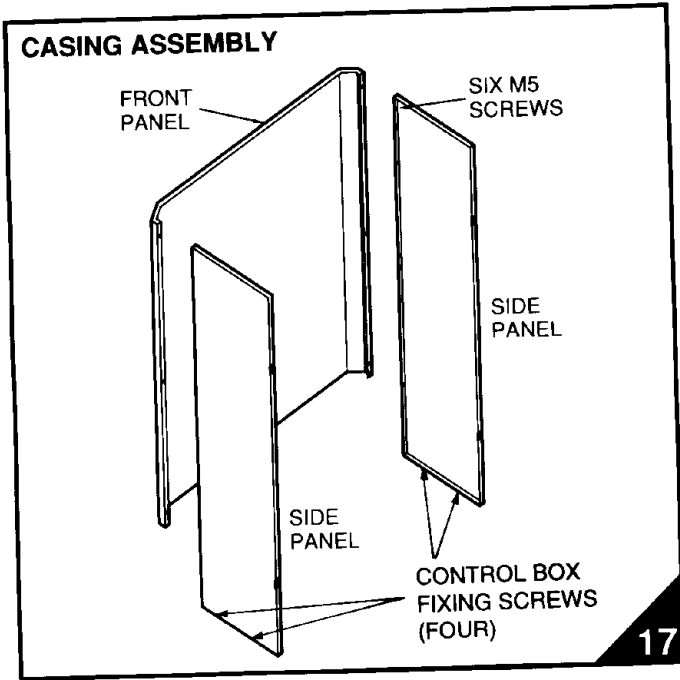


- Cut the hole in the wall for the flue / air duct. The diameter should not be less than 100mm (4in) and must be horizontal. If the hole is not accessible from the outside of the building, its minimum diameter should be sufficient to allow the insertion of the wall liner (130mm (5¼in) diameter) which will be sealed with mortar. Refer to Fig. 22 (The wall liner is available as an optional extra.)
- Accurately measure the wall thickness, and note this dimension for use later.
- Secure the wall mounting bracket in position using the screws provided. Ensure that the bracket is the correct way up (screws at the bottom)

## 4.3 MOUNTING THE BOILER

- Lift the boiler into position. The upper cross member locates onto the wall mounting bracket. Slide the appliance sideways (if necessary) until the lower frame fixing holes line up with the wall plugs. Fit the two lower fixing screws to prevent any further movement.

- b) Assemble the boiler casing panels with reference to Fig. 17, then move the casing to a safe place away from the boiler. (The casing should not be fitted to the boiler until the installation is complete and the boiler has been commissioned).

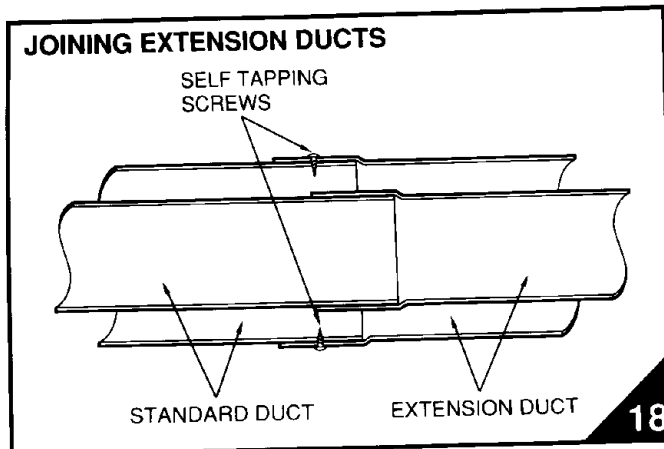


#### 4.4 FLUE/AIR DUCT AND TERMINAL PREPARATION

If the wall thickness is less than 0.5m (19in) the flue/air duct may be fitted without access to the outside wall providing that the optional wall liner kit is used. (This consists of a pipe, 0.5m long and 129mm outside diameter with a 1mm wall thickness.)

##### 4.4.1 FLUE/AIR DUCT LENGTHS

- Refer to section 2.5 and determine whether any optional flue kits are required. Installations using only the standard ducts and straight extensions are described in this section, other installations are described in appendices at the rear of this booklet.
- If no extension ducts are required, proceed to 4.4.2.
- If an extension duct or ducts is/are to be used, the flue and air ducts must be joined to each other and to the standard ducts using the following procedure before proceeding to the next section. (Fig. 18):
- For both the flue and air duct in turn, push the plain ends into the swaged end of the extension duct(s).

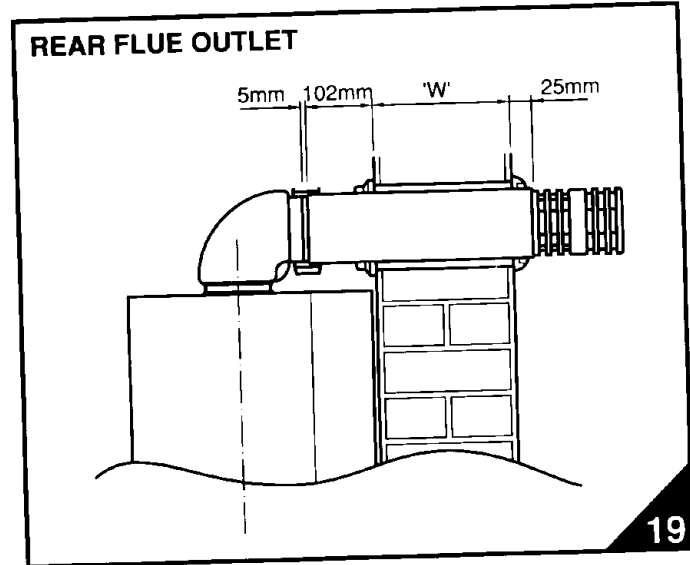


- Drill two 3.3mm diameter holes in the air duct (larger duct) as shown in Fig. 18. Screw the two self tapping screws provided with each kit into the holes to secure the joint.

##### 4.4.2 CUTTING THE FLUE/AIR DUCT TO THE CORRECT LENGTH

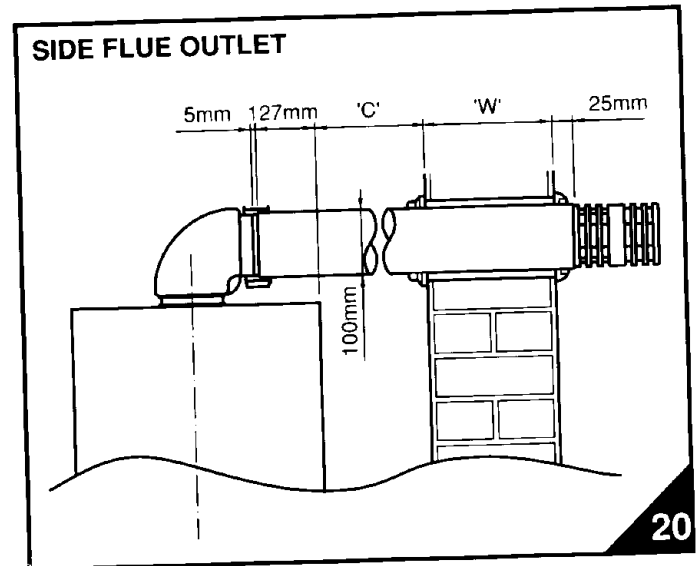
###### (A) REAR FLUE OUTLET ONLY. (Fig 19)

- Select the air duct (larger duct) and starting at the formed end, 'mark off' the length to be cut which is:  
 $102\text{mm} + \text{Wall thickness 'W'} + 25\text{mm}$   
 $(4\text{in} + \text{Wall thickness 'W'} + 1\text{in})$



###### (B) SIDE FLUE OUTLET ONLY. (Fig 20)

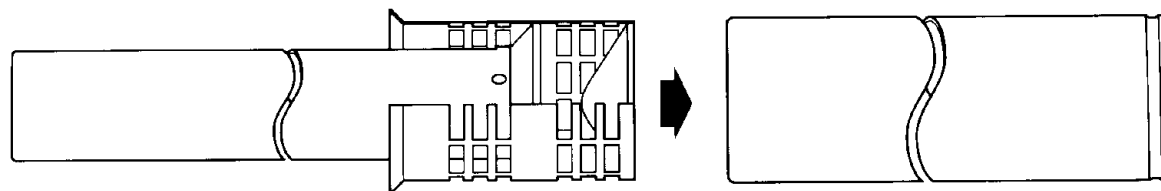
- Select the air duct (larger duct) and starting at the formed end, 'mark off' the length to be cut which is:  
 $127\text{mm} + \text{Clearance 'C'} + \text{Wall thickness 'W'} + 25\text{mm}$   
 $(5\text{in} + \text{Clearance 'C'} + \text{Wall thickness 'W'} + 1\text{in})$



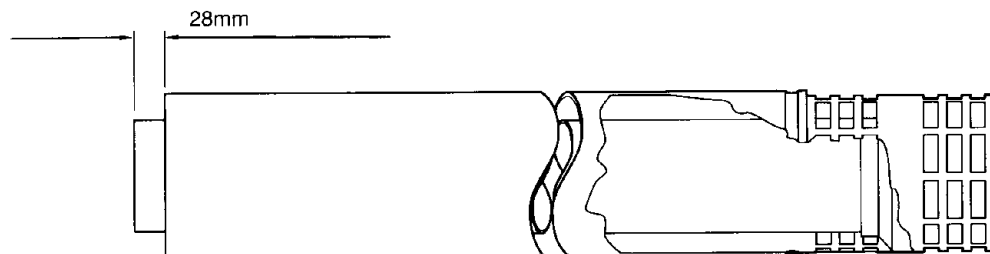
##### ALL INSTALLATIONS

- Cut the air duct square to the mark and remove all burrs and sharp edges.
- Refer to Fig. 21. Hold the air duct at the plain end, and slide the flue duct (small duct) inside the air duct (terminal first) until the external swage of the terminal stops against the internal swage of the air duct, then mark off the length to be cut which leaves 28mm protruding flue duct.
- Remove and cut the flue duct square to the mark and remove all burrs and sharp edges.

## DUCT ASSEMBLY PROCEDURE



INSERT FLUE DUCT & TERMINAL  
INTO AIR DUCT IN DIRECTION OF ARROW



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## 4.5 FLUE AND AIR DUCT INSTALLATION

### 4.5.1 INSTALLATIONS FROM INSIDE THE ROOM

(Wall thicknesses up to 0.5m (19¾ in) only). Hole diameter to accept wall liner must be 130mm (5¼ in) Fig. 22.

- A wall liner, 127mm (5 in) internal diameter, 500mm (19¾ in) long is available as an optional extra for use when fitting the flue/air duct from inside the building, (or where it is required to seal the hole through a cavity wall). Cut the liner to the wall thickness, insert into the hole, and seal with mortar at inner and outer wall faces. Access to the outside can be made by inserting one's hand through the liner.
- Refer to Fig. 21. Push the flue duct assembly into the air duct in the direction shown in Fig. 21 until the external swaged ring on the flue terminal stops against the internal swage on the air duct.
- From inside the building slide the duct assembly into the wall liner until the sealing ring passes completely through the wall, then pull the air duct back until the ring is pulled up to the wall surface. (Fig. 22)
- Proceed to section 4.5.3.

### 4.5.2 INSTALLATIONS FROM OUTSIDE THE BUILDING. (Hole diameter 100mm (4in))

- Refer to Fig. 21. Push the flue duct assembly into the air duct in the direction shown in Fig. 21 until the external swaged ring on the flue terminal stops against the internal swage on the air duct.
- From inside or outside the building, slide the duct assembly into the wall until the sealing ring forms a good seal against the outside wall.

### 4.5.3 CONNECTING THE DUCT ASSEMBLY ALL INSTALLATIONS

- With reference to Fig. 22, slide on the white rubber seal, check that the rubber sealing ring (F) is pulled up to the wall and that the duct assembly is horizontal.
- Push the thinner section of the rubber sleeve (B) over the air duct as shown in Fig. 22.

- Push the elbow socket onto the flue duct.

**NOTE:** There will be a gap of approximately 5mm (1/4in) between the end of the AIR duct and the elbow. This can be seen in Fig. 22 and will be sealed by steps (f) and (g).

- Fit the elbow onto the top of the appliance, taking care to ensure that the fan outlet and flue duct are correctly engaged into the flue elbow.
- Secure the elbow to the top of the appliance using the four screws provided.
- Check that the rubber sleeve is over the flue elbow as shown in Fig. 22 and ensure that it forms a satisfactory seal.
- Fit the protective collar over the rubber sleeve and tighten the securing screws.
- Where necessary (see section 3.3 (f)) fix the terminal guard centrally over the terminal.

## 4.6 GAS CONNECTIONS

Connect the gas supply to the gas service cock using a suitable jointing compound.

## 4.7 WATER CONNECTIONS

- Connect the central heating pipework to the flow and return connections (Fig. 25).
- Connect the DHW supply and outlet to the appropriate connections (Fig. 25).

## 4.8 PRESSURE RELIEF VALVE CONNECTION

Connect a suitable discharge pipe from the pressure relief valve. The discharge pipe should be a minimum of 15mm copper, and should avoid sharp corners or upward pipe runs where water may be retained. The discharge pipe must terminate in an area where any discharge will not cause a hazard but will be noticed.

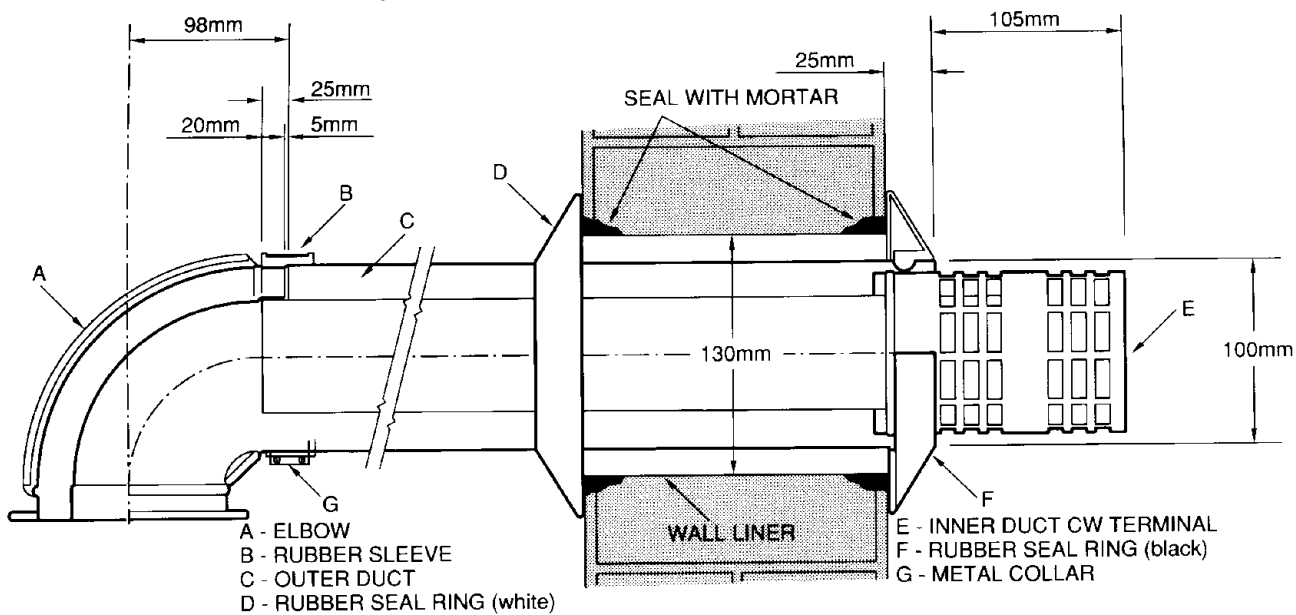
## 4.9 WIRING INSTRUCTIONS

(Refer to Section 3.8/3.9)

The external wiring is connected to the boiler via a terminal block on the top of the control box.

1 metre of cable is supplied pre-wired to the boiler. If a longer length is required then follow the procedure on page 14.

## FLUE & AIR DUCT ASSEMBLY (SECTIONAL VIEW)



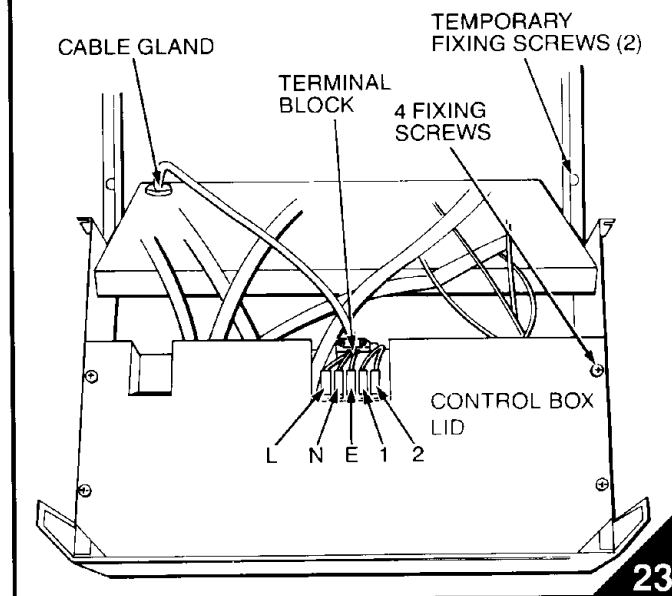
22

- Lower the control box to an angle of approximately 45° by removing the two temporary screws (Fig. 23).
- Pass the supply cable through the strain relief clamp in the connection plate at the bottom of the boiler on the LHS and connect to the terminals marked L, N, and  $\perp$  on the terminal block (Fig. 23). ENSURE that the earth conductor length is such that if pulled from its anchorage the current carrying conductors become taut before the earth conductor. All cables must be secured in the anchorage.
- If a room thermostat is to be used, remove the link between terminals 1 and 2 and connect the switching conductors in their place. If the room thermostat requires a neutral supply, connect this to the N terminal.

**NOTE:** no other connections should be made to the mains supply terminals.

- Connect the mains plug. (Brown wire to L, Blue wire to N, and Green/yellow wire to Earth terminal).
- Carry out electrical systems checks with a suitable test meter:- Earth continuity, polarity, resistance to earth, and short circuit.

## ELECTRICAL CONNECTIONS



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# 5 COMMISSIONING & TESTING

Before commissioning the appliance, the whole gas installation including the meter **MUST** be purged and tested for gas soundness in accordance with BS 6891:1988.

**IMPORTANT:** Open all doors and windows, extinguish naked lights, and **DO NOT SMOKE** whilst purging the gas line.

Before commencing the commissioning procedure, ensure that the gas service cock is turned on, the electricity supply is isolated, and that the DHW and CH isolation valves are in the closed position.

## 5.1 FILLING THE WATER SYSTEM

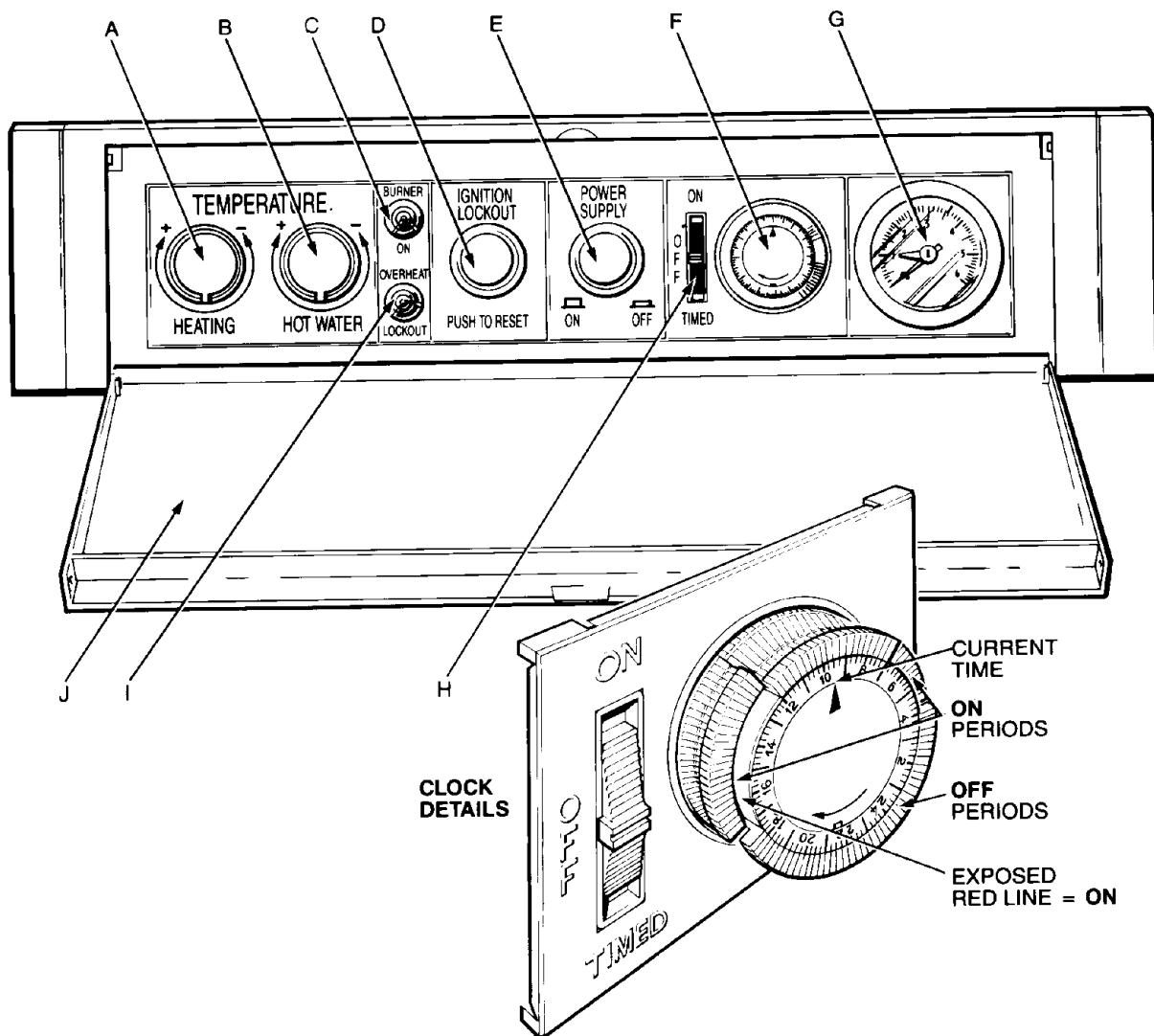
- Open the CH flow and CH return valves. Items 'E' and 'G', Fig. 25.
- Remove the sealed chamber front panel (4 screws - Fig. 26) on page 18. **Loosen the automatic air vent cap on the flow pipe near the heat exchanger.**
- Fill the system with water using one of the approved methods described in section 3.6 to about 2.0 bar. Vent the system via the radiator valves and system air vents in accordance with normal practice. Ensure that all system air vents are closed.

- Check the system for water soundness and refit the sealed chamber front panel.
- Check the operation of the pressure relief valve (Fig. 9) by rotating the plastic head anti-clockwise 1/4 of a turn and checking that water is discharged. Ensure that the valve seats correctly and does not leak. If the valve leaks or is stuck closed, replace it.

## f) IMPORTANT

- Completely drain the appliance and heating system, thoroughly flush the system, and refill as in (c) to the system design pressure (between 0.5 and 1.5 bar). Follow the commissioning procedure described below, then repeat this instruction with the system hot. It is recommended that the system is cleaned with a recognised system cleaner such as Fernox or Sentinel.
- Open the DHW inlet valve (Item 'D' Fig. 25), open and close each hot tap in turn and clear air bubbles.
- Remove the pump end cap and using a screwdriver rotate the rotor, replace cap.**
- Prior to firing up the boiler the system should be checked for circulation by running the boiler and pump with the gas turned off.

## FASCIA PANELS & CONTROLS





## 5.2 COMMISSIONING THE BOILER

- Loosen the screw and connect a pressure gauge to the burner pressure test point on the gas valve. (Fig. 28) on page 25.
- Ensure that the clock override switch on the fascia panel ('H', Fig. 24) is set to the 'OFF' position (hot water only), then turn the hot water thermostat ('B' Fig. 24) to maximum (fully clockwise). Turn on the electrical supply and press the power supply button ('E', Fig. 24). Fully open any DHW tap and the burner will light.

**If the burner fails to light after 10 seconds the ignition lock-out will operate. Wait 15 seconds and press ignition reset button.**

- Allow the boiler to run for at least 10 minutes and check that the burner pressure is 13.2 mbar (5.3 inwg) +/- 10%. The DHW burner pressure is factory set and should not require adjusting. If the burner pressure is low, check that the appliance has not started to modulate (This will occur if the DHW flow rate is low. If modulation is suspected, open all DHW taps to maximise flow and re-check burner pressure.)

If it is necessary to adjust the DHW burner pressure the method is described in section 9.6 - Gas valve replacement.

- Close the DHW tap and ensure that the 'burner on' neon ('C', Fig. 24) goes off, burner goes out, and pump stops.
- Ensure that the room thermostat (if fitted) is calling for heat. Turn the heating thermostat knob ('A' Fig. 24) to maximum (fully clockwise), then turn the clock override switch ('H' Fig. 24) to the 'ON' position. The burner will light.

**NOTE:** that the central heating burner pressure is factory set at approx. 10.5 mbar. If adjustment is necessary refer to section 9.11.3 page 26

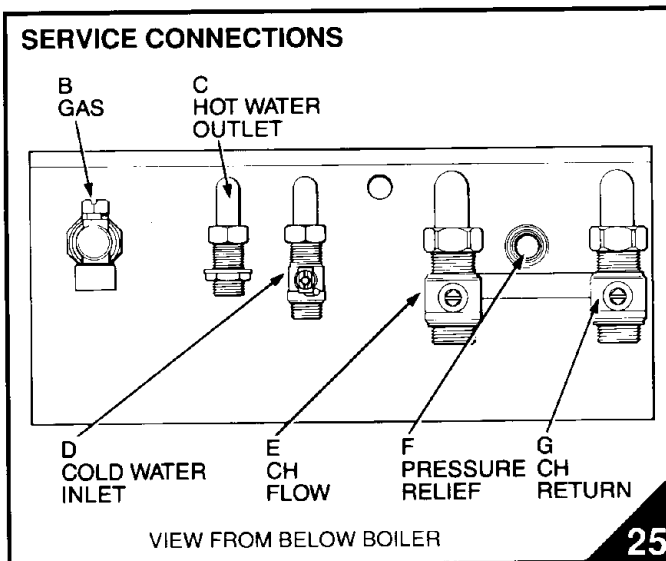
- Slide the clock override switch to the 'timed' position and check the operation of the clock and room thermostat (if fitted).
- SETTING THE CLOCK.

To set the time clock proceed as follows:

Push the tabs on the clock fascia downwards to expose the red colour at the times corresponding to when the heating is desired on. (See Fig. 24). Set the clock to the correct time by rotating the dial clockwise until the arrow at the top corresponds to the current time.

## 5.3 DOMESTIC HOT WATER FLOWRATE

A flow restrictor is supplied fitted to the appliance to ensure that no adjustment is necessary. However if the temperature of the hot water is too low it is possible to reduce the flow rate by adjusting the flow restrictor situated on the diverter valve.



Should the mains flow rate be below the minimum required it is possible to remove the flow regulator from the DHW inlet cock.

## 5.4 FINAL CHECKS

- Remove pressure gauge and tighten burner pressure test point screw. Relight burner and test for gas soundness.
- Fit the boiler casing as described: Leave the control box at a 45° angle as described in section 4.9(a). Lift the casing into position from in front of the boiler and slide it slightly downwards until the tabs on the side panels locate in the slots in the frame. Lift the control box back into position and secure it to the casing using the four fixing screws underneath as shown in Fig. 25. (Note that the temporary screws holding the control box in position (Fig. 23) should be discarded)
- Set the heating and hot water thermostats to the required settings. Ensure that the clock override switch is in the timed position, and check that the time clock is set at the desired time periods. Set the room thermostat (if fitted) to the required setting.

## 5.5 IGNITION LOCK-OUT

In the event of an ignition failure, wait 15 seconds, then press the ignition re-set button ('D' Fig. 24) once to re-set the ignition system. (Failure to wait 15 seconds causes a further delay).

## 5.6 OVERHEAT THERMOSTAT

- This appliance is fitted with an overheat thermostat. In the event of overheating, the appliance will shut down and the 'overheat' neon will light. If an overheat condition occurs allow the appliance to cool, then press the overheat re-set button once (situated on the top of the appliance, LHS - Fig. 26).

## 5.7 FROST THERMOSTAT

- This appliance is fitted with a frost thermostat. In the event of very cold conditions (when the internal pipework temperature falls below 5°C) the boiler will light for a few minutes to protect the appliance and system from potential frost damage.

## 5.8 USER'S INSTRUCTIONS

Upon completion of commissioning and testing the system, the installer should hand over to the user, with reference to the following.

- Give the 'Users Instructions' to the householder and emphasise their responsibilities under the 'Gas Safety (Installation and Use) Regulations 1984' (as amended).
- Explain and demonstrate the lighting and shutdown procedures.
- Advise the householder on the efficient use of the system, including the use and adjustment of all system controls for both DHW and CH.
- Advise the user of the precautions necessary to prevent damage to the system, and to the building, in the event of the system remaining inoperative during frost conditions.
- Explain the function of the boiler over-heat thermostat, and how to reset it. Emphasise that if cut-out persists, the boiler should be turned off and the installer or service engineer consulted.
- Stress the importance of an annual service by a registered heating engineer.

# 6 ROUTINE SERVICING

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

The boiler incorporates a flue sampling point on the top panel in front of the flue outlet. If the service engineer has a suitable equipment to analyse the flue gas, the plastic cap may be removed and a 6mm inside diameter sample tube fitted. Do not forget to replace the plastic cap after use.

Before commencing any service operation, ISOLATE the mains electrical supply, and TURN OFF the gas supply at the main service cock.

Service the appliance by following the full procedure detailed below, :

## a) MAIN BURNER ASSEMBLY

(Refer to figure 26 except where stated)

- 1 Remove the outer casing as follows: (Refer to Fig. 17) Remove the four control box fixing screws and lower the control box to an angle of approximately 45°. Slightly lift both casing side panels and then lift the whole casing clear of the appliance.
- 2 Remove the sealed chamber front panel (4 screws)
- 3 Unscrew the 4 screws securing the combustion chamber front panel and remove the panel, taking care not to damage the insulation.
- 4 Unscrew the small screw retaining the ignition electrode (identified by a red dot on base of electrode) at LHS of burner and withdraw the electrode from the burner. Repeat this for the detection electrode at the RHS, and the burner earth wire.
- 5 Unscrew the burner manifold union and the manifold locking nut. Disengage the burner location bracket. Take care to support the multifunctional control to prevent strain on the gas supply fittings.
- 6 Lift the front of the burner sufficiently to disengage the manifold thread. Carefully withdraw the burner.
- 7 Remove the burner manifold by disconnecting the four posi-head screws.
- 8 Inspect and, if necessary, clean the injectors.
- 9 Inspect and, if necessary, clean the main burner bars.

## b) IGNITION AND DETECTION ELECTRODES

- 10 Inspect the ignition and detection electrodes. Clean if necessary. If either electrode shows signs of damage or wear, replace it.

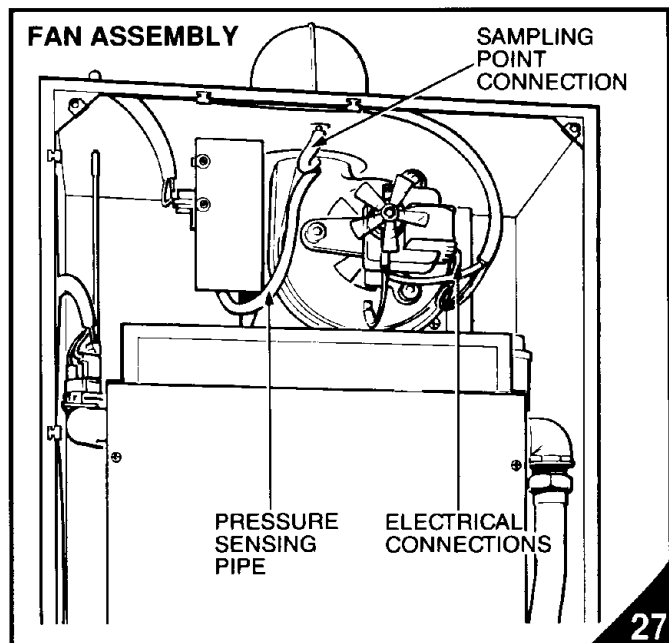
## c) FAN ASSEMBLY

- 11 Disconnect the electrical connections to the fan.
- 12 Pull off the pressure sensing tube and the sampling tube near the fan scroll (Fig. 27).
- 13 Remove the two screws securing the pressure switch bracket and lower pressure switch.

- 14 Remove the four screws securing the fan assembly base plate. (Fig. 26) and remove the fan assembly by tilting.
- 15 Inspect the fan assembly (especially the impeller) for dirt, deposits, or debris by looking through the air intake. If necessary remove the three screws retaining the fan base plate and clean the fan impeller. Disconnect the remaining pressure switch sampling tube and place the unit on the LHS near the heat exchanger.

## d) HEAT EXCHANGER

- 16 Remove the four collector hood fixing screws, lift the collector hood assembly, then tilt and remove the collector hood.
- 17 Inspect the heat exchanger from both above and below the fins. If necessary clean the fins with a suitable soft, non metallic brush.



## e) RE-ASSEMBLY AND RE-COMMISSIONING

- 18 Re-assemble all components in reverse order except the outer casing which should not be re-fitted until the sealed system checks in (f) have been completed. Ensure that all joints and seals are correctly fitted. (Polarity is immaterial on the fan L and N connections). When re-fitting the burner assembly, push the burner assembly backwards until the burner location bracket return stops against the casing return edge as shown in Fig. 26. The ignition electrode (red dot on base) must be at the LHS of the burner.
- 19 Unscrew and connect a pressure gauge to the burner pressure test point on the multifunctional control. (Fig. 28). Turn on the gas and electricity supply and light the appliance as described in section 5.
- 20 Check the operation of the appliance in both central heating and DHW modes and ensure that the burner pressure after at least 10 minutes running is as stated on the data plate or in section 2.1. Adjust if necessary as described in section 5.
- 21 Remove the pressure gauge and tighten the sealing screw. Re-light the appliance and test for gas soundness.

## f) SEALED WATER SYSTEM

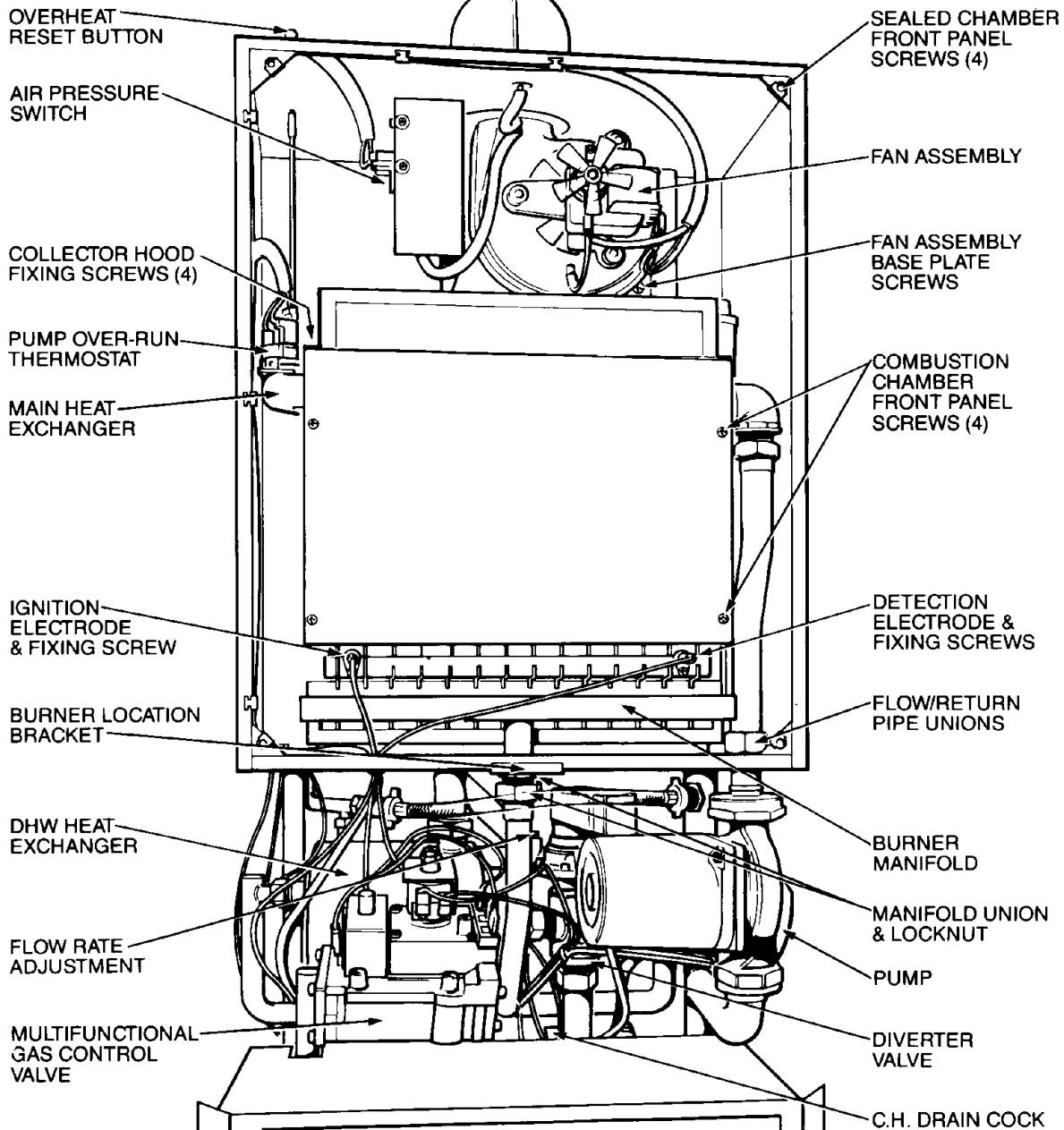
- 22 Check the operation of the pressure relief valve as described in section 5.1 (e).
- 23 Check the correct operation of the pressure gauge by noting the reading and check that the pressure increases when the boiler is hot. Replace the gauge if the readings are suspect.
- 24 Check that the sealed system is at its original (hot) design pressure. (Indicated by the pointer on the pressure gauge)

If not, re-pressurise the system as described in section 5. Search for and rectify any leaks causing loss of water.

## g) FINAL CHECKS

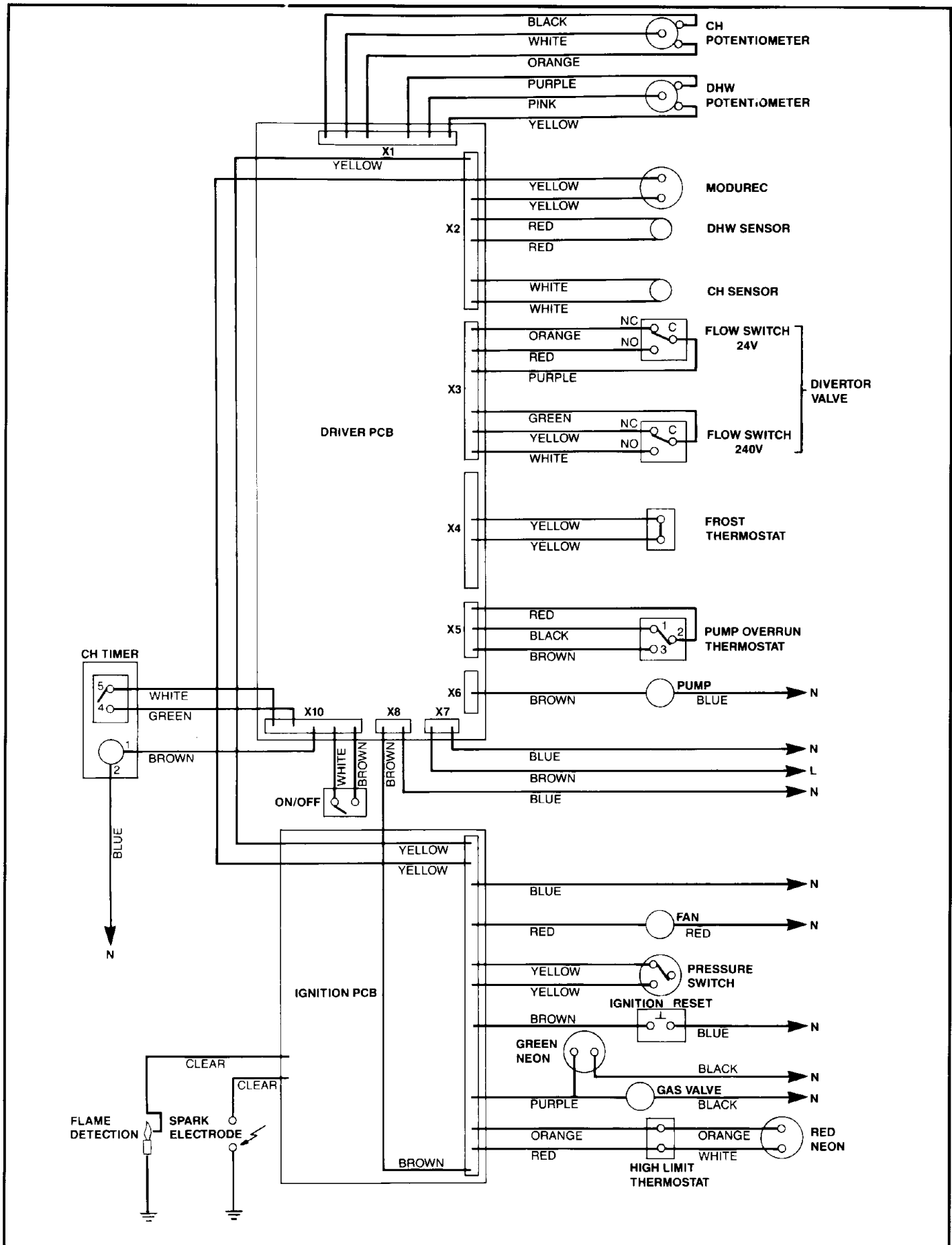
- 25 Refit the outer casing.
- 26 Return all appliance and external controls to their original settings.

### LOCATION OF SERVICEABLE COMPONENTS

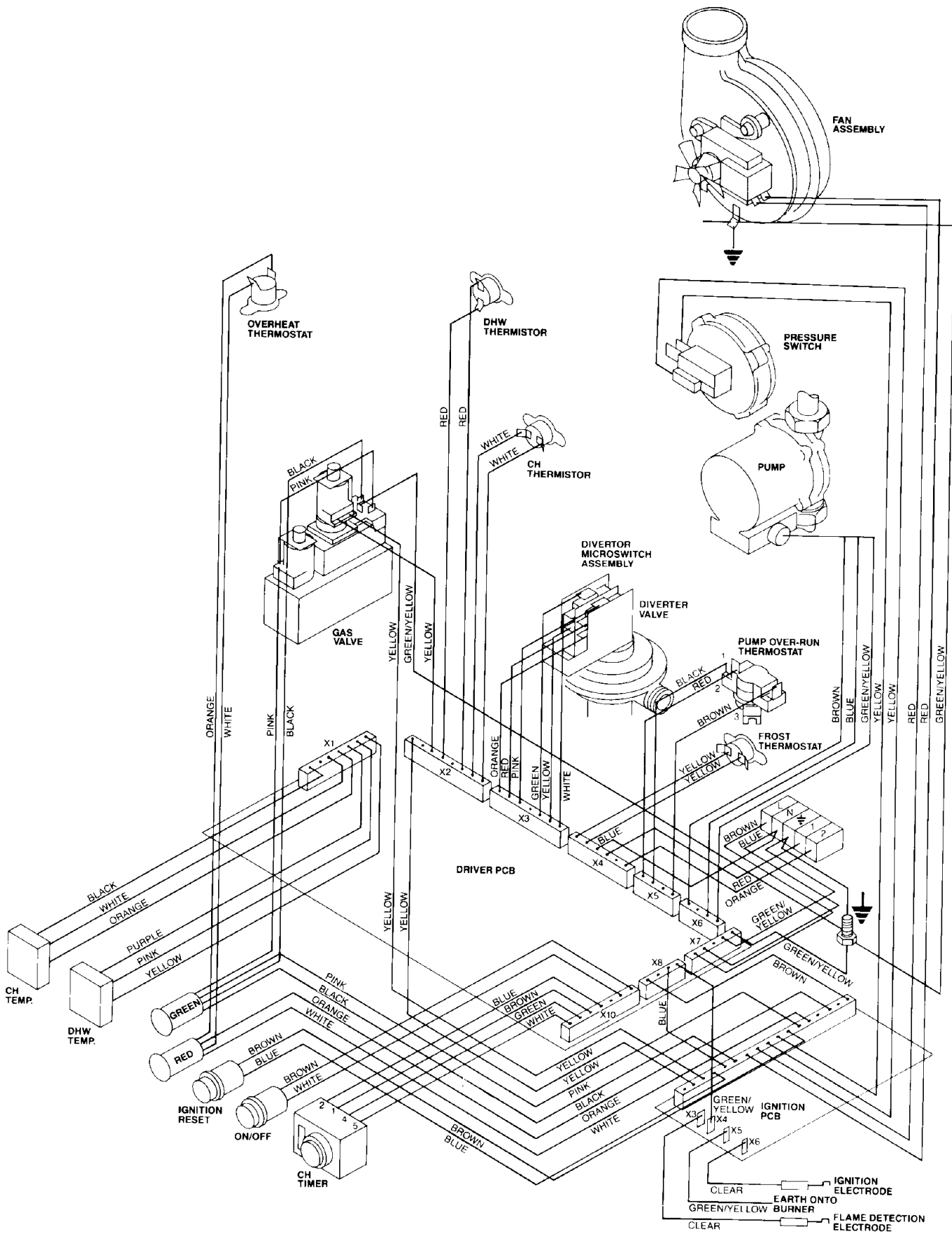


# 7 INTERNAL WIRING DIAGRAMS

## 7.1 FUNCTIONAL FLOW WIRING DIAGRAM



# 7.2 ILLUSTRATED WIRING DIAGRAM

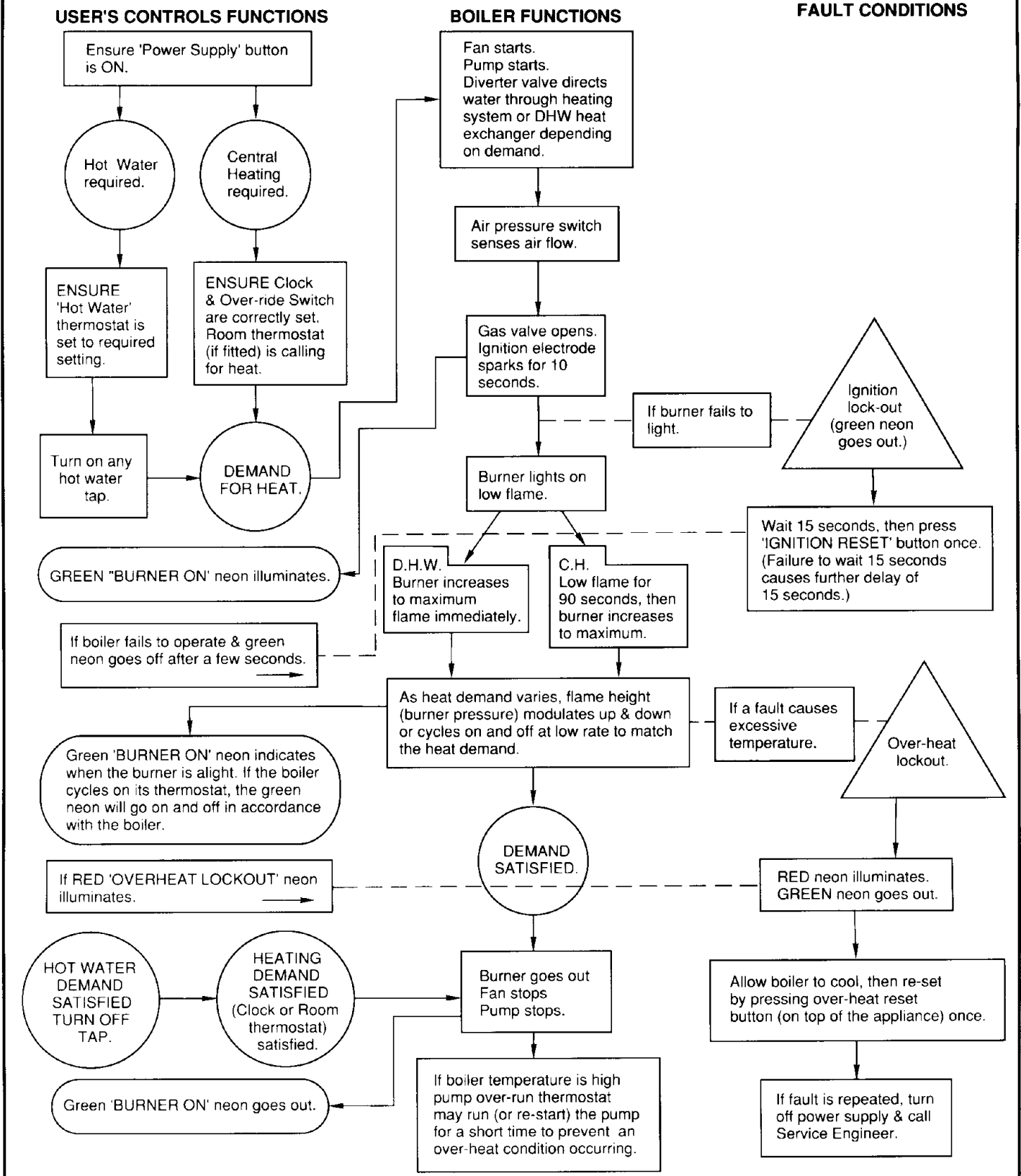


# 8 FAULT FINDING

## 8.1 GENERAL

Use the following flow chart to identify basic faults  
 If the fault cannot be identified, continue with the  
 flow charts in sections 8.2 and 8.3.  
 Before looking for a fault condition, always check that:  
 The mains electrical supply is turned ON.  
 The clock and any room thermostat are calling for heat.

The gas service cock is open.  
 The heating system is at its initial design pressure.  
 The DHW and CH isolation cocks are open.  
 Always conduct the preliminary electrical system checks,  
 i.e. earth continuity, short circuit, polarity, and resistance  
 to earth before attempting any electrical fault finding.



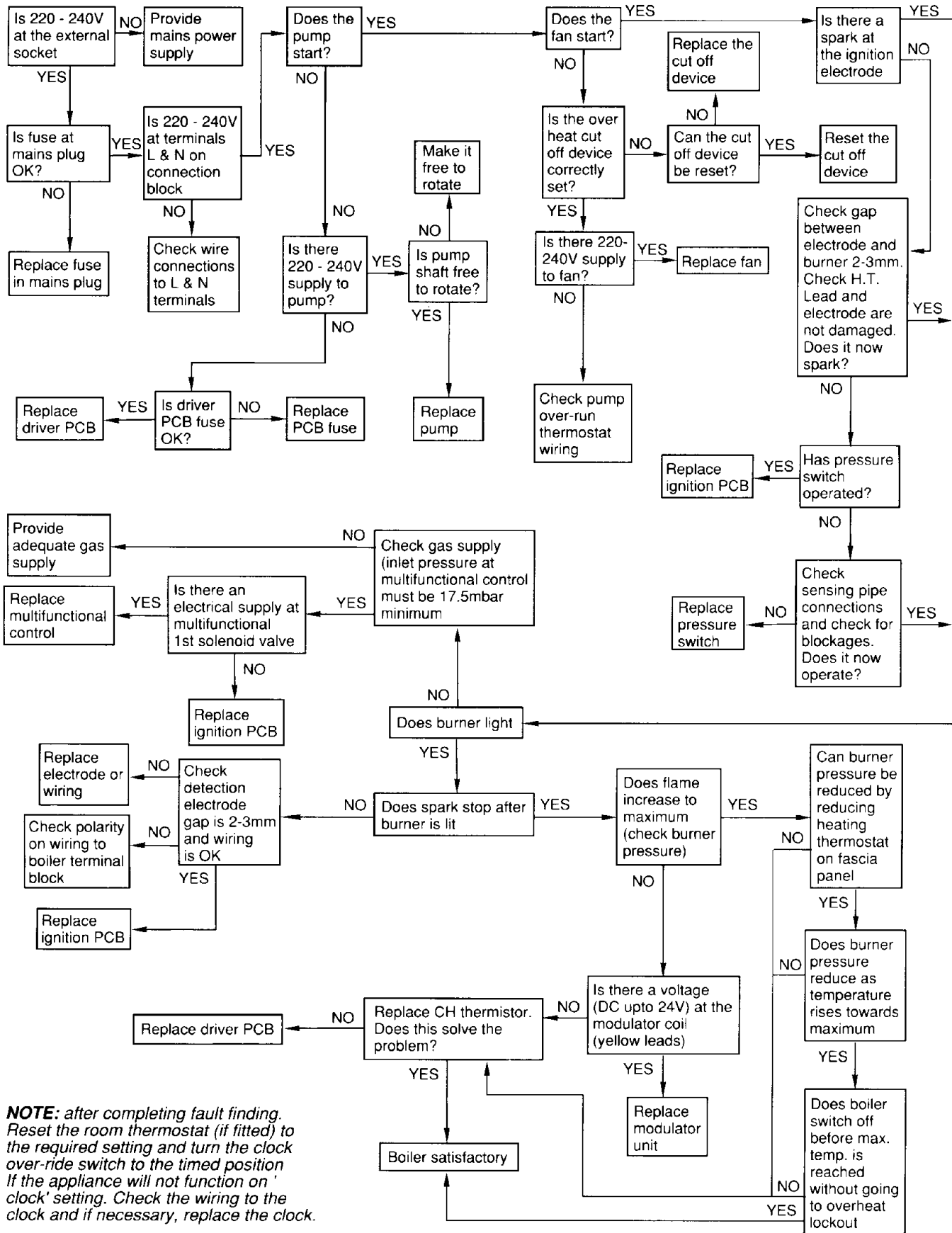
## 8.2 FAULT FINDING - CENTRAL HEATING MODE

Start with the appliance in a cold condition.  
Check that:-

The power switch is 'ON' and the clock is set to the 'ON' position.

The room thermostat (if fitted) is calling for heat and no DHW taps are on.

The heating thermostat is set to maximum.



### 8.3 FAULT FINDING - DOMESTIC HOT WATER MODE

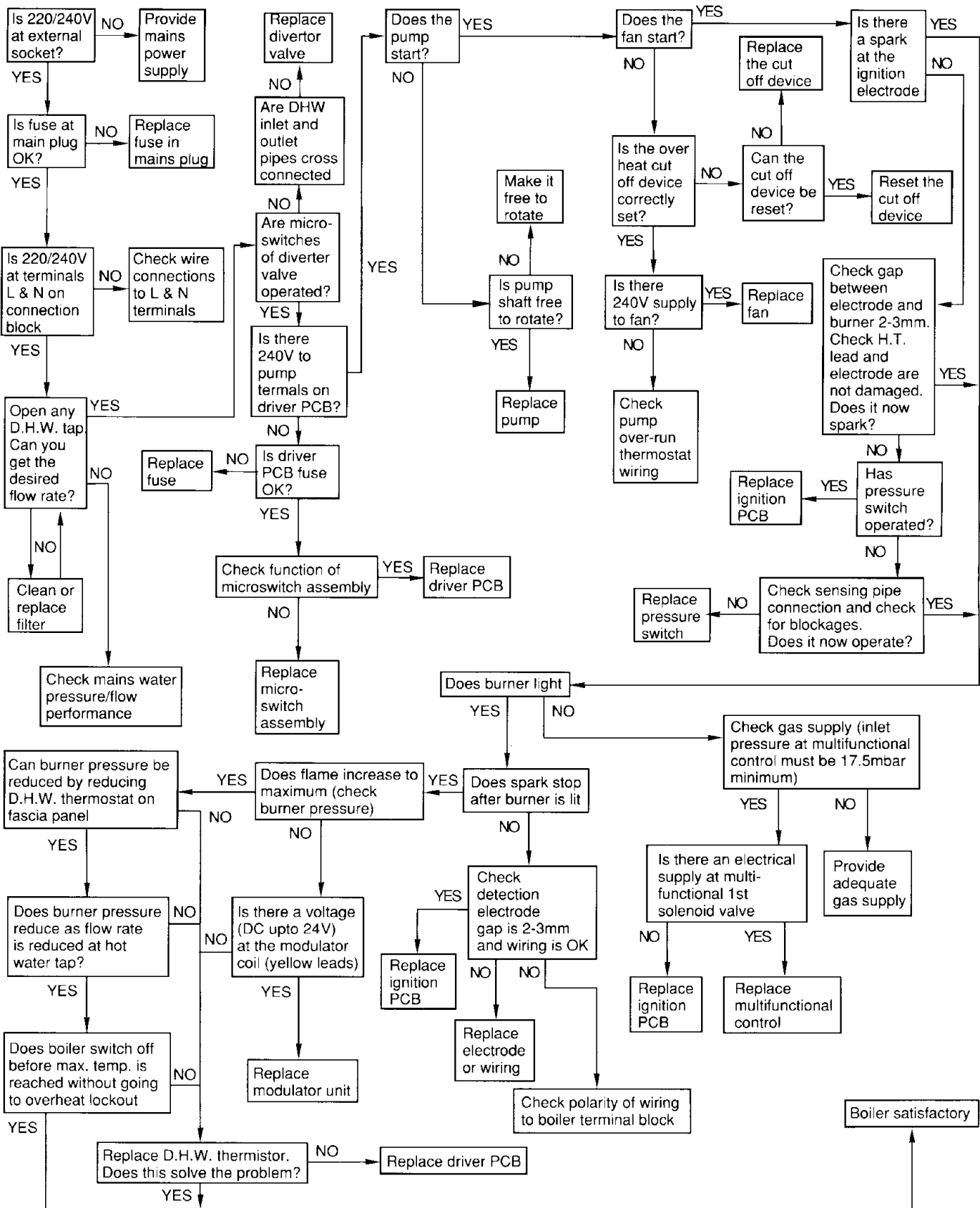
Start with the appliance in a cold condition.

Check that:-

The power switch is 'ON' and the clock is set to the 'OFF' position.

No DHW taps are running.

The 'hot water' thermostat is set to maximum.





# 9 REPLACEMENT OF PARTS

Before commencing any service operation, ISOLATE the mains electrical supply, and TURN OFF the gas supply at the main service cock.

It is the law that any service work must be carried out by a registered person.

## 9.1 HEAT EXCHANGER

- a) Remove the outer casing as follows: (Refer to Fig. 17) Remove the four control box fixing screws and lower the control box to an angle of approximately 45°. Slightly lift both casing side panels and then lift the whole casing clear of the appliance.
- b) Remove the sealed chamber front panel (4 screws).
- c) Unscrew the small screw retaining the ignition electrode (identified by a red dot on base of electrode) at LHS of burner and withdraw the electrode from the burner. Repeat this for the detection electrode at the RHS of the burner and the burner earth wire.
- d) Unscrew the small screw retaining the ignition electrode and withdraw the electrode from the burner. Repeat this for the detection electrode.
- e) Unscrew the burner manifold union and the manifold locking nut. Disengage the burner location bracket.
- f) Lift the front of the burner sufficiently to disengage the manifold thread. Carefully withdraw the burner.
- g) Disconnect the electrical connections to the fan.
- h) Pull off the pressure sensing tube and the sampling tube near the fan scroll. Remove the two screws securing the pressure switch bracket and lower the pressure switch.
- i) Remove the four screws securing the fan assembly base plate (Fig. 27) and remove the fan assembly by tilting the assembly.
- j) Remove the overheat thermostat and pump delay thermostat (Fig. 26) without disconnecting the wires to each of them.
- k) Remove the four collector hood fixing screws (Fig. 26), lift the collector hood assembly, then tilt and remove the collector hood.
- l) Isolate the CH flow and return valves. ('E' & 'G'. Fig. 25)
- m) Drain the heat exchanger using the drain cock on the return pipe. (Fig. 26)
- n) Unscrew the two flow and return pipe unions inside the base of the combustion chamber (Fig. 26), then lift and slide out the heat exchanger complete with the flow & return pipe stubs.
- o) Transfer the flow pipe, return pipe, and automatic air vent, onto the new heat exchanger, then re-assemble all components in reverse order. Ensure that all joints and seals are correctly fitted. (Polarity is immaterial on the fan connections but very important on the pump delay thermostat and air pressure switch - refer to the wiring diagrams in section 7).

## 9.2 COMBUSTION CHAMBER INSULATION

The design of this appliance is such that the combustion chamber insulation should not require replacement unless mechanically damaged. To replace the insulation front panel, proceed as follows:

- a) Remove the combustion chamber front panel as described in section 9.1 steps a,b and c.

- b) Replace the front insulation panel. Re-assemble in reverse order.

Should the rear or side panels become damaged, replace them as follows.

- a) Remove the heat exchanger as described in section 9.1, steps a to n.
- b) Remove the side insulation panels followed by the rear panel.
- c) Re-assemble in reverse order, refill, and re-commission the system as described in section 5.

## 9.3 FAN ASSEMBLY

- a) Remove the outer casing and the sealed chamber front panel as described in section 9.1, steps a and b.
- b) Disconnect the electrical connections to the fan.
- c) Pull off the pressure sensing tube and sampling tube near the fan scroll. Remove the two screws securing the pressure switch bracket and lower the pressure switch. (Fig. 27)
- d) Remove the four screws securing the fan assembly mounting plate (Fig. 27) and remove the fan assembly by tilting the assembly forwards.
- e) Remove the three screws securing the fan plate.
- f) Replace the fan, and re-assemble all components in reverse order. Ensure that all joints and seals are correctly fitted. (Polarity is immaterial on the fan L and N connections.)

## 9.4 MAIN BURNER

- a) Remove the main burner by following section 9.1, steps a to f.
- b) Replace the burner and re-assemble all components in reverse order. Ensure that all joints and seals are correctly fitted.

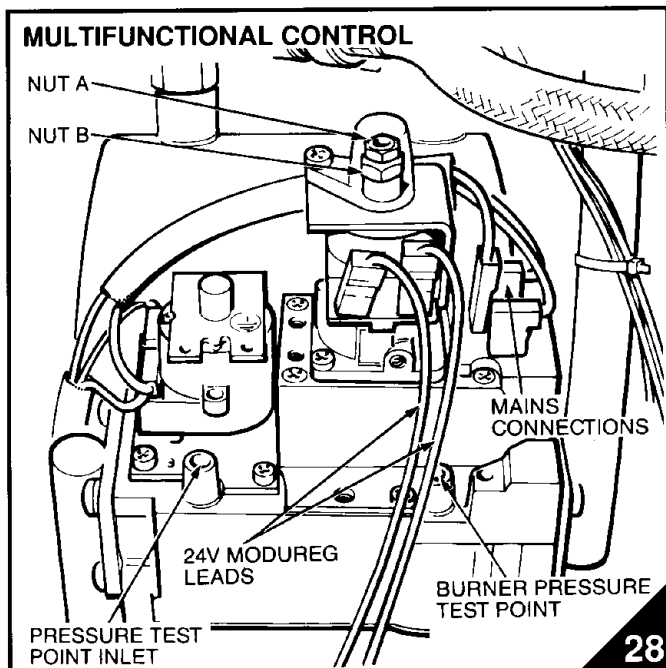
## 9.5 IGNITION AND DETECTION ELECTRODES

- a) Remove the required electrode as described in section 9.1 steps a to d.
- b) Replace the electrode(s) and re-assemble all components in reverse order. Ensure that all joints and seals are correctly fitted. The ignition electrode must be at the LHS of the burner.

## 9.6 MULTIFUNCTIONAL GAS CONTROL

- a) Remove the outer casing as described in section 9.1 (a).
- b) Disconnect the electrical connections to the multifunctional gas control, consisting of two push on 24V connectors, four mains connections, and an earth.
- c) Unscrew the burner manifold union.
- d) Unscrew the four pozi-head screws securing the multifunctional gas control inlet pipe, and remove the multifunctional gas control complete with the outlet pipe.

- e) Transfer the outlet pipe onto the new multifunctional gas control, using a new gasket. (Supplied with the control.)
- f) Fit the new assembly into the appliance using the other new gasket supplied on the control inlet, and re-assemble in reverse order.
- g) Re-light the appliance, check for gas soundness, and re-commission in accordance with section 5, 5.1 & 5.2. In addition it will be necessary to set the DHW heat inputs, as follows:
- h) **SET THE DHW INPUT AS FOLLOWS:**
  - i) Remove the sealing cap of the proportioning unit (Fig. 28) (Single fixing screw).
  - ii) Using a 9 mm spanner, turn brass nut 'B' to attain the required DHW max burner pressure of 13.2 mbar. Turn the nut clockwise to increase the pressure or anti-clockwise to decrease it.



- iii) Check that the maximum pressure is correctly set by turning on and off the DHW inlet valve several times and ensuring that the pressure returns to that previously adjusted.
- iv) Isolate the mains electricity supply and disconnect (pull off) the two 24V modulation leads (Fig. 28). Restore the mains supply. The appliance will light on minimum input only.
- v) Set the minimum pressure of 1.5 mbar by holding nut 'B' in position with a 9 mm spanner and rotating the plastic nut 'A' with a 7mm spanner until the correct pressure is obtained. Turn the nut clockwise to increase the pressure or anti-clockwise to decrease it.

It is essential that the max pressure has been set prior to adjusting the minimum pressure.

Check that the minimum pressure is correctly set by turning on and off the DHW inlet valve several times and ensuring that the pressure returns to that previously adjusted.

- vi) Isolate the mains electricity supply and re-connect (push on) the two 24V modulation leads (Polarity is immaterial). Restore the mains supply.

The appliance will light and achieve maximum input. Check that the burner pressure is 13.2mbar. (If it has changed repeat from step (i)).

- vii) Refit the proportioning unit sealing cap.
- viii) Reduce the DHW draw off rate to the minimum necessary to maintain the burner alight by carefully adjusting the DHW Inlet valve and check that the burner pressure decreases in response to DHW temperature rise. Fully open the inlet valve.
- ix) Close the DHW tap and ensure that the burner is extinguished and the pump stops.
- i) Re-fit the casing and set the boiler controls as required.

## 9.7 PRESSURE SWITCH

- a) Remove the outer casing and the sealed chamber front panel as described in section 9.1, steps a and b.
- b) Remove the 2 screws securing the pressure switch to its mounting bracket.
- c) Disconnect the short pressure sensing tube from the rear of the pressure switch and the long securing tube from the far screw.
- d) Remove the switch from the bracket (two screws) and fit the new one.
- e) Transfer the electrical connections to the new switch.
- f) Fit the new switch and re-assemble in reverse order referring to the wiring diagrams (Section 7) if necessary.

## 9.8 OVERHEAT CUT OFF DEVICE

- a) Remove the outer casing and the sealed chamber front panel as described in section 9.1 step 1.
- b) Pull the re-set button extension rod upwards to disconnect it from the thermostat.
- c) Without disconnecting the wires, unscrew the two overheat cut off device fixing screws and lift the unit and fixing screws out using the wires.
- d) Transfer the wires onto the new thermostat and re-assemble in reverse order. Ensure that the extension rod is correctly located.

## 9.9 THERMISTOR - CH or DHW

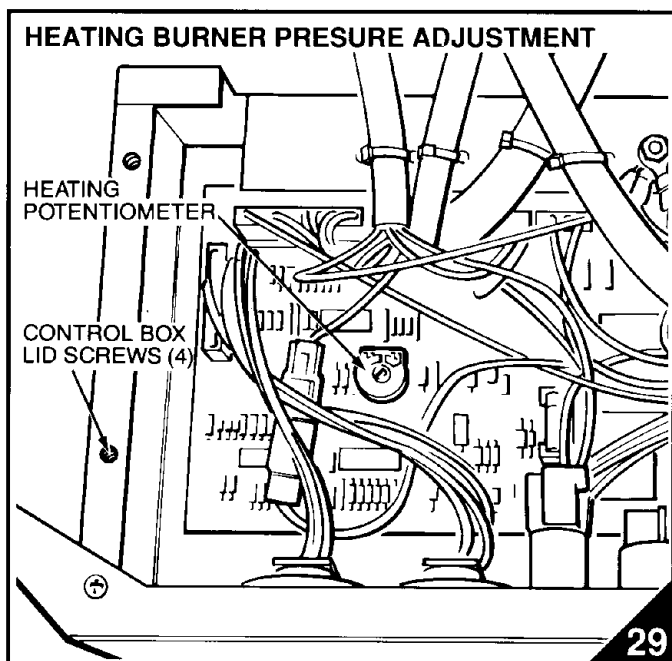
- a) The thermistors are screwed to flanges on the flow pipe (CH) and DHW outlet pipe (DHW). The thermistors do not enter the waterways, therefore it is not necessary to drain the appliance.
- b) Remove the outer casing as described in section 9.1 step a.
- c) Pull off both electrical connections from the faulty thermistor, and remove the thermistor (2 screws). Note that the polarity of the thermistor connections is immaterial. Re-assemble in reverse order.

## 9.10 IGNITION PCB

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the control box cover (4 screws).
- c) Pull off all of the connections from the ignition PCB (Smallest PCB situated on the RHS of the control box.)
- d) Replace the PCB and re-assemble in reverse order.

## 9.11 DRIVER CONTROL PCB

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the control box cover (4 screws).
- c) Pull off all of the connections from the control PCB (largest PCB situated on the LHS of the control box) and detach from its fixings. Loosen neon lights on the fascia panel and remove the PCB from the LHS of the box.
- d) Replace the PCB and re-assemble in reverse order.
- e) Check (and adjust if necessary) the heating burner pressure as follows:
  - i) Ensure that the room thermostat (If fitted) is calling for heat. Turn the heating thermostat knob ('A' Fig. 24) to maximum (fully clockwise) and the burner will light.
  - ii) Allow the boiler to run for at least 10 minutes and check that the burner pressure is as stated in section 2.1. If the burner pressure is low, check that the appliance has not started to modulate (This will occur if heating system is almost up to temperature.) If it is necessary to adjust the CH burner pressure this can be done by carefully adjusting the heating potentiometer which is accessed by removing the control box lid (Fig. 29). Operate the power on/off switch a few times to check that the correct pressure is maintained.
- f) Re-assemble in reverse order.



## 9.12 PUMP (OR PUMP HEAD)

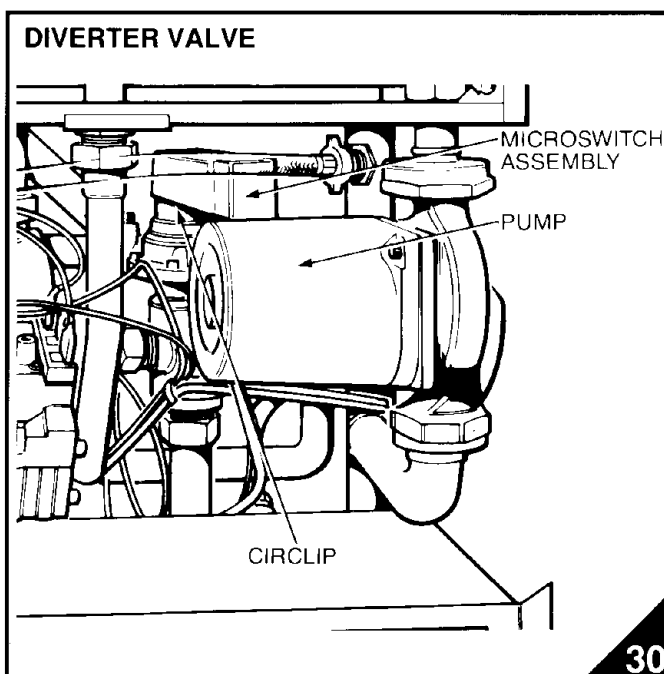
- a) Remove the outer casing as described in section 9.1 step a.
- b) Isolate the CH flow and return valves ('E' & 'G' Fig. 25), and drain the appliance through the drain plug on the return pipe. (Fig. 26)
- c) If replacing only the pump head, unscrew the four hexagonal screws in the flange. If replacing the full pump, support the pump and unscrew both union connections.
- d) Transfer the electrical connections onto the new pump, (or pump head) and re-assemble in reverse order. Refill and recommission the system as described in section 5.1.

## 9.13 DHW HEAT EXCHANGER

- a) Remove the outer casing as described in section 9.1 step a and the multifunctional control as stated in section 9.6.
- b) Isolate the CH flow and return valves ('E' & 'G' Fig. 25), and drain the appliance through the drain plug on the return pipe.
- c) Isolate the DHW inlet valve ('D', Fig. 25), and drain the DHW circuit by opening all DHW taps.
- d) Disconnect all union connections to the DHW heat exchanger and remove the heat exchanger.
- e) Fit new heat exchanger and re-assemble in reverse order using the new gaskets supplied with the heat exchanger. Refill and re-commission the system as described in section 5.1.

## 9.14 DIVERTER VALVE - COMPLETE

- a) Remove the outer casing as described in section 9.1 step a and pump as stated in section 9.12.
- b) Isolate the CH flow and return valves ('E' & 'G' Fig. 25), and drain the appliance through the drain plug on the return pipe.
- c) Isolate the DHW inlet valve ('D', Fig. 25), and drain the DHW circuit by opening all DHW taps.



- d) Pull out the circlip (Fig. 30) and lift off the microswitch assembly. Disconnect all union connections to the diverter valve and remove the diverter valve.
- e) Fit new diverter valve and re-assemble in reverse order using the new gaskets supplied. Refill and re-commission the system as described in section 5.1.

## 9.15 DIVERTER VALVE - MICROSWITCH ASSEMBLY

- a) Remove the outer casing as described in section 9.1 step a.
- b) Pull out the microswitch circlip, (Fig. 30) and lift off the microswitch assembly.
- c) Transfer the electrical connections onto the new microswitch assembly. Refer to the wiring diagrams in section 7.
- d) Re-fit the outer casing.

## 9.16 C.H. EXPANSION VESSEL

In the unlikely event of failure of the expansion vessel diaphragm it is acceptable to leave the vessel in position and to fit a replacement vessel (of similar or greater capacity) external to the appliance but as close as possible to the CH return.

It is necessary to remove the appliance from the wall in order to replace the expansion vessel. Remove the expansion vessel by unscrewing top union and cross member support screws. Then pull cross member downwards to release expansion vessel.

## 9.17 AUTOMATIC BYPASS VALVE

- a) Remove the outer casing as described in section 9.1 step a.
- b) Isolate the CH flow and return valves ('E' & 'G', Fig. 25), and drain the appliance through the drain plug on the return pipe.
- c) Disconnect the union connections on either end of the bypass valve and replace the valve, ensure that the arrow points towards the back of the appliance.
- d) Re-assemble in reverse order, refill and re-commission the system as described in section 5.1

## 9.18 CONTROL BOX SWITCHES OR NEONS

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the control box cover (4 screws).
- c) Squeeze the switch (or neon) to depress the retaining clips, then withdraw the switch forwards.
- d) Pull off the connections to the switch.
- e) Fit the new switch and re-assemble in reverse order, with reference to the wiring diagrams in section 7.

## 9.19 PRESSURE GAUGE

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the control box cover (4 screws).
- c) Isolate the CH flow and return valves ('E' & 'G', Fig. 25).
- d) Squeeze the gauge to depress the retaining clips, then ease the gauge forwards.
- e) Unscrew the pressure sensor from the top of the safety valve and cover the tapping to minimise water loss. Screw in the new pressure gauge sensor after first threading it through the fascia panel.
- f) Re-assemble in reverse order. Refill and re-commission the system as described in section 5.1

## 9.20 PRESSURE RELIEF VALVE

- a) Remove the outer casing as described in section 9.1 step a.

- b) Isolate the CH flow and return valves ('E' & 'G', Fig. 25), and drain the appliance through the drain plug on the return pipe.
- c) Unscrew the pressure sensor from the top of the pressure relief valve.
- d) Unscrew the union supporting the outlet pipe from the valve, and remove the valve by unscrewing the union. (Spanner access is available from underneath the boiler.)
- e) Fit the new pressure relief valve using a suitable jointing compound and re-assemble in reverse order. Refill and re-commission the system as described in section 5.1

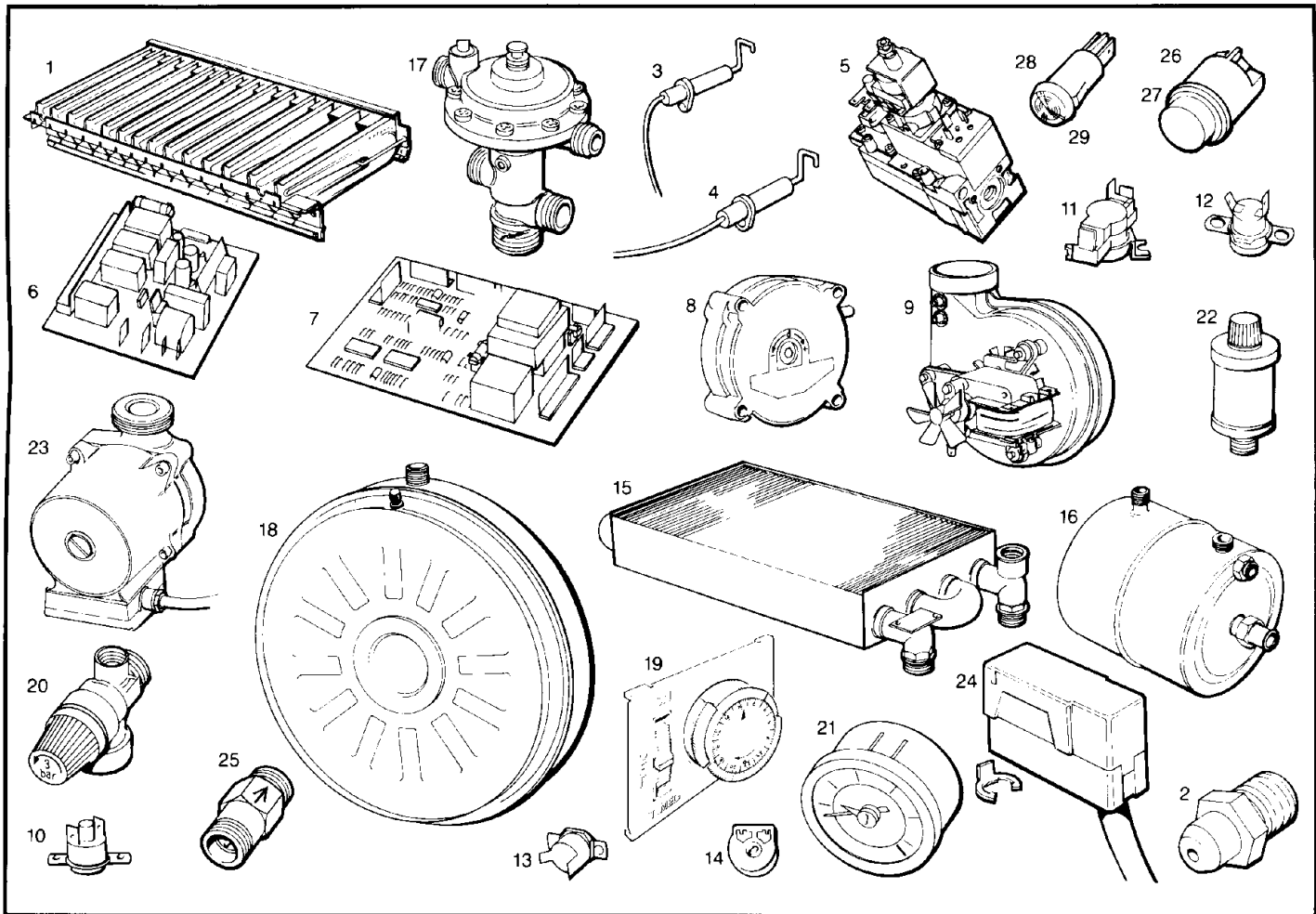
## 9.21 AUTOMATIC AIR VENT

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the collector hood as described in section 9.1 steps g to k (except j).
- c) Isolate the CH flow and return valves ('E' & 'G', Fig. 25), and drain the appliance through the drain plug on the return pipe.
- d) Replace the automatic air vent and re-assemble in reverse order and re-fill and re-commission the system as described in section 5.1.

## 9.22 TIME CLOCK

- a) Remove the outer casing as described in section 9.1 step a.
- b) Remove the control box cover (4 screws).
- c) Push out the plastic panel incorporating the clock, from behind the panel.
- d) Replace the clock assembly (including a new panel) and transfer the connections one at a time to the new clock. Replace, and re-assemble in reverse order, with reference to the wiring diagrams in section 7.

# 10 SHORT PARTS LIST



KEY	G.C. PART NO.	DESCRIPTION	NO OFF	MAKER'S PT. NO.
1	181 000	MAIN BURNER Polidoro 401-0181-02	1	700515
2	378 172	INJECTOR NP	14	701512
3	379 259	ELECTRODE (IGNITION)	1	500565
4	379 258	ELECTRODE (DETECTION)	1	500566
5	379 260	GAS CONTROL Honeywell VR4605M 3008	1	500561
6	379 262	IGNITION PCB Honeywell 54561D 1001	1	500562
7	379 261	CONTROL PCB Honeywell W4115B	1	500563
8	379 263	AIR PRESSURE SWITCH EACO6	1	550510
9	181 001	FAN ASSEMBLY Sifan 1701-019	1	601003
10	379 267	OVERHEAT THERMOSTAT 36 TXE26	1	550517
11	379 264	LIMIT THERMOSTAT 60T23	1	550515
12	379 266	FROST THERMOSTAT 26TXE21	1	550516
13	379 265	THERMISTOR 6655RN-428-3	2	550513
14	000 000	POTENTIOMETER 16 PESA 103MC16	2	550518
15	181 002	HEAT EXCHANGER Giannoni PR20/323	1	450904
16	379 268	CALORIFIER Giannoni B26	1	450903
17	181 003	DIVERTER VALVE Giannoni V35	1	550567
18	386 720	EXPANSION VESSEL Zilmet 531/T8L	1	450905
19	000 000	TIME CLOCK Diehl F13511	1	600510
20	397 677	PRESSURE RELIEF VALVE 3141 3bar	1	862009
21	379 272	PRESSURE GAUGE IMIT	1	550514
22	379 079	AUTOMATIC AIR VENT 5020	1	450908
23	383 722	PUMP Grundfos 15-60	1	851088
24	181 004	DIVERTER MICROSWITCH ASSEMBLY	1	988209
25	181 005	AUTOMATIC BYPASS VALVE	1	450909
26	379 270	POWER SWITCH	1	300637
27	379 271	RESET BUTTON	1	300638
28	379 273	GREEN NEON	1	300640
29	379 274	RED NEON	1	300639

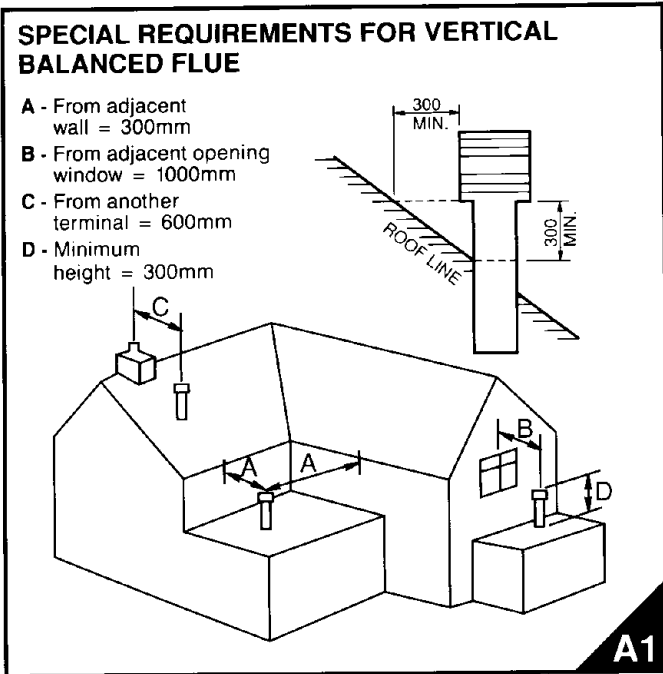
# APPENDIX I

## SUPPLEMENTARY INSTRUCTIONS FOR FLUE SYSTEMS WITH A VERTICAL OUTLET. (FIG. 7)

- Read the installation requirements and flue specifications described in the main section of the installation and servicing instructions, but refer to Fig. A1 below instead of Fig. 10 in section 3.3.
- Follow the installation procedure described in the main section of the installation instructions up to section 4.2

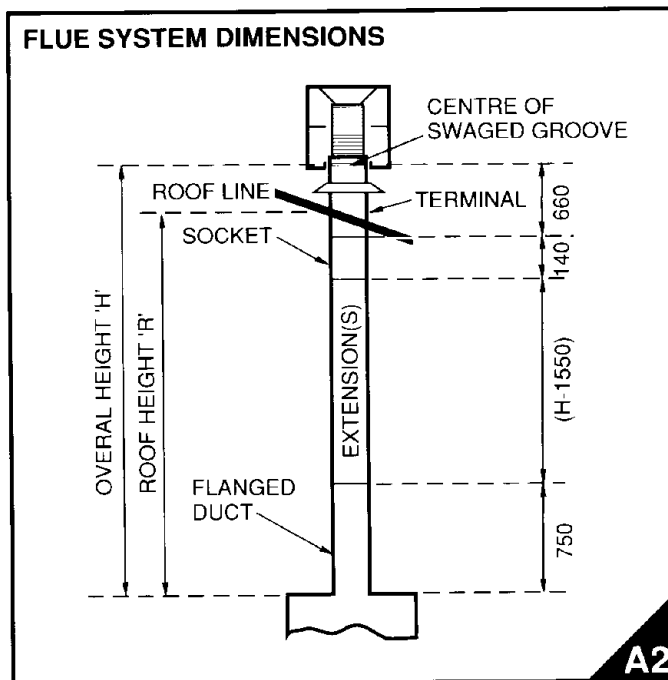
### SPECIAL REQUIREMENTS FOR VERTICAL BALANCED FLUE

- From adjacent wall = 300mm
- From adjacent opening window = 1000mm
- From another terminal = 600mm
- Minimum height = 300mm



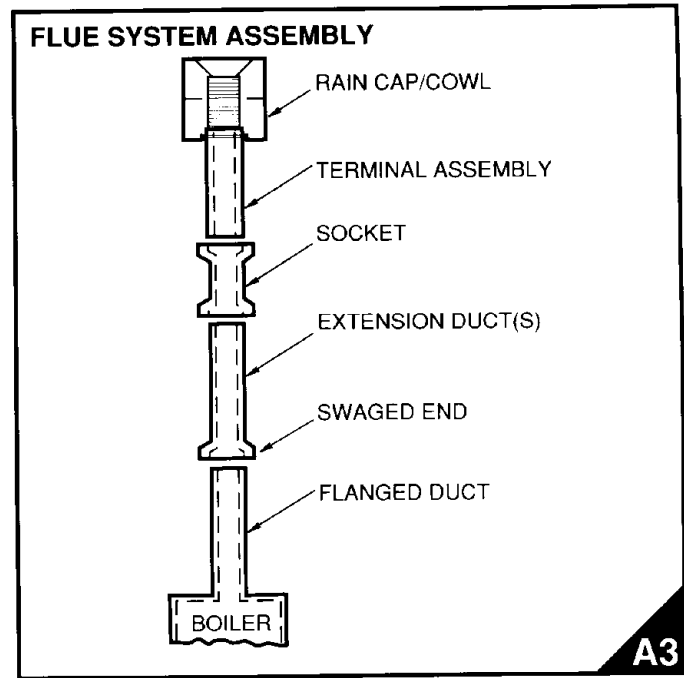
- Using the wall mounting template and the dimensional information given in section 2.4 and 2.5 (Fig. 7), work out where the boiler and flue are to be positioned and make the necessary hole(s) in the ceiling/roof.

### FLUE SYSTEM DIMENSIONS



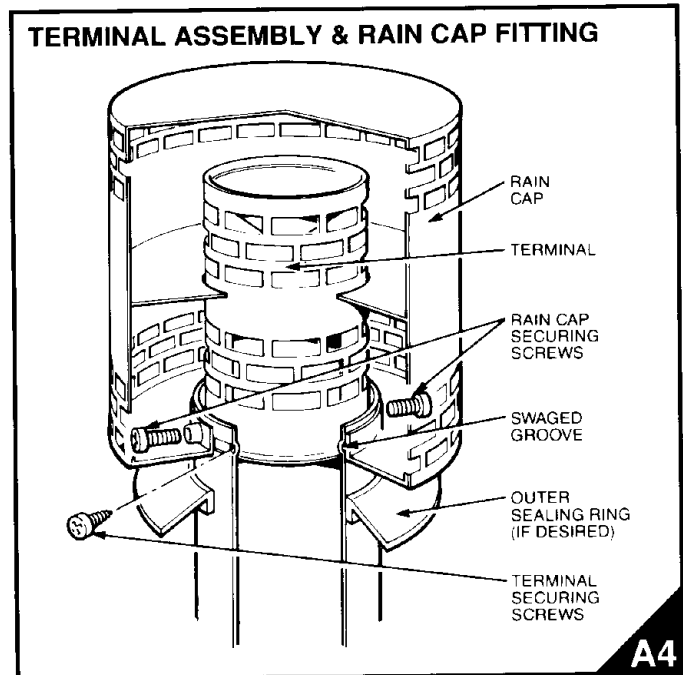
- Fix the boiler to the wall as described in section 4.2 and 4.3.
- Measure the vertical distance from the top of the appliance casing to the roof level - distance 'R' Fig. A2.

### FLUE SYSTEM ASSEMBLY



- Slide the rubber sealing ring down the air duct to expose the swaged groove as shown in Fig. A4.
- Add 300 to distance 'R' to arrive at the overall height 'H'. This is the minimum required distance between the flange on the flanged duct and the centre of the swaged groove on the terminal air duct.
- Referring to figures A2 and A3, calculate the required length of the extension ducts to achieve the overall height 'H'. Remember to allow for the overlap at each extension duct joint. (The dimensions given in figure A2 are assembled lengths.)

### TERMINAL ASSEMBLY & RAIN CAP FITTING



**NOTES:**

- i) If the required height 'H' does not require the use of extension ducts, it is necessary to cut either the terminal duct and/or the flanged duct
- ii) If an offset vertical flue is to be used (Figure 7b), it is first necessary to calculate the position of the 90° elbow, (Appendix B) then carry out instruction (f) measuring from 20mm below the top of the elbow instead of the boiler casing. The socket is not required with an offset vertical flue providing the extension duct is cut to length at the end without a flange.
- g) Cut all ducts to the required lengths and remove any burrs. Cut the terminal assembly flue duct to the same length as the corresponding air duct. (The flue duct is supplied slightly longer for use horizontally)
- h) Fit the flanged air duct to the boiler using the 4 screws provided. Slide in the flue duct and ensure both ducts are flush (Fig. A3).

**NOTE:** the flanged elbow is not required and must be discarded.

- i) Decide where the sealing plate is to be fitted and slide it over the relevant air duct. (This is to make good the hole inside the ceiling for aesthetic purposes)
- j) Fit any extension duct(s) as shown in Fig. A3 and secure with the self tapping screws provided as described in section 4.4.1(e).
- k) Fit the socket as shown in Fig. A3. Drill and secure with the self tapping screws provided as above.
- l) Assemble the flue terminal assembly as shown in Fig. 21.
- m) Refer to figure A4. Locate the hole in the flue terminal base and screw the self tapping screw provided through the hole in the swaged groove. This prevents the terminal from slipping down the air duct.
- n) If desired, slide the rubber seal ring over the terminal and below the groove. (This can be used as an extra seal above the flashing)
- o) Slide the rain cap over the terminal as shown in Fig. A4 and screw the two securing screws firmly into the swaged groove to support the cap.
- p) From outside the building, slide the terminal assembly through the hole in the roof until the plain ends locate in the sockets. From inside the building drill and secure the air duct into the socket with the two remaining self tapping screws.
- q) Make good the seal around the air duct using a suitable flashing.
- r) Complete the installation as described in section 4.6 onwards.

**WARNING:-**

All joints **MUST** be secured with the self tapping screws provided.

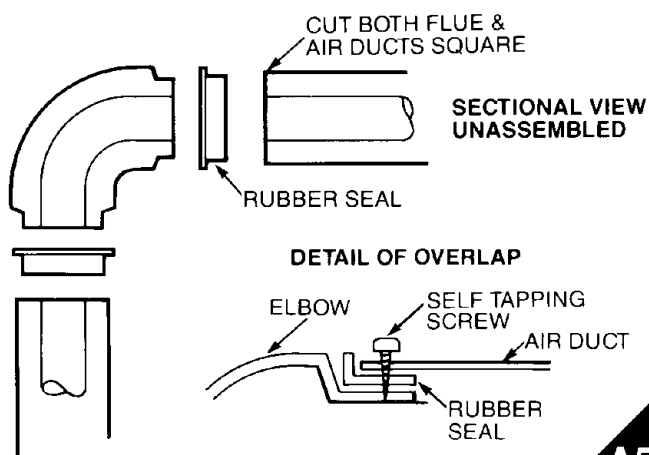
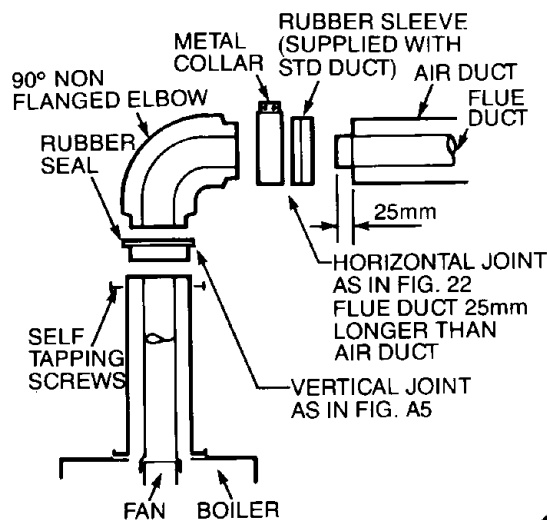
The air/flue system **MUST** be adequately supported.

The 5 rules given in section 2.5 must be strictly adhered to.

# APPENDIX II

**SUPPLEMENTARY INSTRUCTIONS FOR FLUE SYSTEMS INCORPORATING AN ADDITIONAL 90° ELBOW AND / OR A FLANGED DUCT WITH ELBOW.**

- a) Read and follow the installation procedure described in the main section of the installation instructions up to section 4.2(a)
- b) Using the wall mounting template and the dimensional information given in the main literature, work out where the boiler and flue are to be positioned and make the necessary hole in the wall(s) for the air/flue duct as described in section 4.2 & 4.3.
- c) Fix the boiler to the wall as described in section 4.2 and 4.3.
- d) Using the information in Fig. A5 and A6, together with the dimensions given in section 2.5, calculate the required lengths for each duct.
- e) Cut each duct to length, ensuring that each cut is square and free from burrs, then assemble the ducts starting at the terminal end (shown in Figs. 21 and 22) and working backwards towards the boiler.

**FITTING AN ADDITIONAL 90° NON FLANGED ELBOW****A5****FITTING A FLANGED DUCT AND ELBOW****A6**