



INSTALLATION AND SERVICING MANUAL

SOLAR 80E and 96E

**Wall Mounted Combination Boiler
providing
Central Heating and Mains Fed Domestic Hot Water**

**Solar 80E GC Appliance No. 47 015 01
Solar 96E GC Appliance No. 47 015 02**

**For use with Natural Gas (G20) - Natural Gas model only
or Propane (G31) - Propane model only**

EC Certificated for Safety and Performance



**It is important that the boiler is installed and serviced
as described in these instructions**

After installing the boiler leave these instructions with the User

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IMPORTANT

For information specific to Propane (G31) boilers refer to section 15 at the end of these instructions.

HEALTH AND SAFETY INFORMATION

Under the Consumer Protection Act 1987 and Section 6 of the Health & Safety at Work Act 1974, we are required to provide information on substances hazardous to health (COSHH Regulations 1988). Sealants and paints used in the manufacture of the product are cured and present no known hazards when used in the manner for which they are intended.

The following material is also present in the product:

Insulation material

Material Type: Ceramic fibre board.

Description: Rigid board.

Known Hazards: May cause temporary irritation or rash to skin. High dust levels may irritate eyes and upper respiratory system.

Precautions: Avoid unnecessary or rough handling, or harsh abrasion of boards. Normal handling and use of material should not produce high dust levels.

Avoid inhalation, and contact with skin and eyes.

After handling always follow normal good hygiene practices.

Protection: Use disposable gloves, face mask and eye protection.

First Aid: Eyes - If irritation occurs, wash eyes with copious amounts of water. If symptoms persist, seek immediate medical advice.

Skin - If irritation occurs, wash under running water before washing with soap and water.

Inhalation - Remove to fresh air, drink water to clear throat and blow nose to remove dust/fibres.

Ingestion - Drink plenty of water.

1 TECHNICAL INFORMATION

1.1 TECHNICAL DATA

Model	80E	96E
Min. domestic hot water flow rate	3.0 litres/min	
Design domestic hot water performance	9.5 litres/min raised 35°	11.6 litres/min raised 35° C
Max. mains water inlet pressure	6.0 bar	
Min. mains water inlet pressure	1.0 bar (remove flow restriction if < 1.5 bar- section 9.25)	
Mains water inlet flow restrictor	10 litres/ min	12 litres/min
Max. heating system water pressure	1.5 bar cold, 2.3 bar hot (set when cold)	
Min. heating system water pressure	0.8 bar	
Max. domestic hot water temperature	60°C+3°C	
Max. heating system water temperature	90°C +0-5°C	
Minimum heating system water temperature	35°C ± 2°C	
Max. heating system volume	90 litres (with expansion vessel provided)	
Heating expansion vessel size	7 litre pre- charged at 1 bar (max 1.5 bar)	
Burner injector (Natural gas), marked 125	13 injectors	15 injectors
Electrode gap	4 mm	
Type of ignition	Direct burner ignition	
Primary water content	2.8 litres	3.0 litres
Weight (installed and including water)	55.8 kg	58.5 kg
Lifting weight (installing)	53.0 kg	55.5 kg
Case height (excludes flue elbow)	720 mm	
Case width	450 mm	500 mm
Case depth	350 mm	
Clearances for installation and servicing		
Top (includes space for flue elbow)	300 mm	
Bottom	200 mm	
Front	600 mm	
Sides	5 mm	
Central heating flow and return connections	22 mm compression	
Cold water mains inlet connection	15 mm compression	
Safety valve discharge connection	½ in. BSP Female	
Domestic hot water outlet connection	15 mm open pipe	
Gas supply	15 mm compression	
Flue terminal size	88 mm diameter x 125 mm deep	
Flue restrictor diameter	44 mm co-axial & twin pipe	49 mm co-axial 45.5 mm twin pipe
Electricity supply	230V- 50 Hz Fused at 3A	
Power consumption	150 W	
Internal fuse on main driver board	2A (replaceable)	
Frost protection control on main driver board	Operates if primary water falls below 5°C	

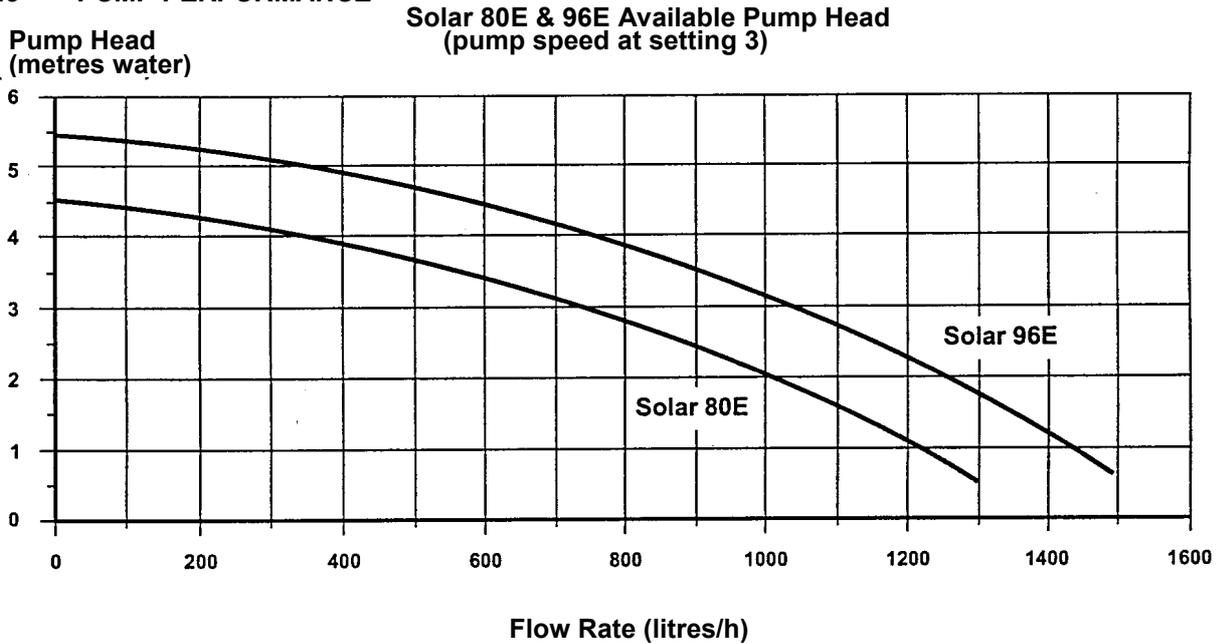
These boilers meet the requirements of IP20 for degree of protection against moisture.
The data label is positioned inside the control panel cover.

1 TECHNICAL INFORMATION

1.2 NOMINAL BOILER RATINGS - Natural gas (G20)

Model	Natural gas (G20) at 20 mbar						
	Heat Output		Heat Input		Burner pressure		Gas rate
	kW	Btu/h	kW	Btu/h	mbar	In wg	M ³ /h
Solar 80E	11.05	37 700	13.88	47 400	2.0	0.8	1.32
	15.00	51 200	18.84	64 300	4.0	1.6	1.80
	23.30	79 500	28.40	96 900	10.5	4.2	2.71
Solar 96E	12.21	41 650	15.55	53 050	2.0	0.8	1.48
	18.09	61 700	23.04	78 600	4.9	2.0	2.20
	28.40	96 900	34.32	117 100	11.9	4.8	3.27

1.3 PUMP PERFORMANCE



Model	Output		Pump head		Flow rate		T °C
	kW	Btu/h	metres	feet	Litres/h	Gal/h	
Solar 80E	11.05	37 700	2.60	8.53	864	190	11
	15.00	51 200	2.40	7.87	921	203	14
	23.30	79 500	2.05	6.72	1 002	221	20
Solar 96E	12.21	41 650	3.30	10.82	955	204	11
	18.09	61 700	2.60	8.53	1 111	244	14
	28.40	96 900	2.00	6.56	1 221	269	20

ΔT given above, is the temperature difference between the central heating flow and return connections. The recommended range of ΔT across the boiler is between 11 and 20°C.

The pump head given above is the residual pump head available for the heating system.

Note: When designing the heating system, especially at the higher outputs (23.3 to 28.4 kW) the pump head, expansion vessel size, radiator mean temperature, etc. must all be taken into account.

1.4 FLUE LIMITATIONS

Co-axial flue size.....	100/60 mm
Twin pipe flue size.....	80/80 mm
Co-axial flue maximum length.....	4 m (3 m with one elbow)
Reduction per elbow.....	0.8 m (45° and 90°)
Twin pipe maximum length.....	20 m (total air + fumes)
Reduction per 90° elbow (large radius).....	0.6 m (small radius)..... 3.0 m
Minimum pipe length.....	0.5 m
Flow rate.....	68 kg/h

2 GENERAL BOILER INFORMATION

2.1 BOILER DESCRIPTION

The Solar 80E and 96E are room-sealed combination boilers using a small multi-directional fan-assisted balanced flue. The boilers, providing both central heating and instantaneous domestic hot water at mains pressure, have been designed for use with a sealed water central heating system. See section 2.11. The pump, expansion vessel and safety devices are all fitted within the boiler. The 80E will suit central heating systems requiring upto 23.30 kW (79 500 Btu/h). The 96E will suit central heating systems requiring upto 28.40 kW (96 900 Btu/h). The boilers are factory set to outputs of 15.0 kW (80E) or 18.09 kW (96E) for central heating. The maximum domestic hot water output is fixed at 23.30 kW (79 500 Btu/h) for the 80E and 28.40 kW (96 900 Btu/h) for the 96E, capable of providing 9.5 litres/min (80E) or 11.6 litres/min (96E) with a temperature rise of 35°C. See section 2.12.

The temperature of both the central heating water and domestic hot water are User controllable. Central heating from 35 to 90°C and hot water up to 60°C ± 3°C. The domestic hot water temperature is dependant upon the temperature of the incoming mains cold water.

A built in timer allows the User to set the operating times for the central heating - domestic hot water is available continuously.

A 'Heating' switch is provided to allow the central heating to be turned off during the summer months, if required.

The boilers contain the following automatic safety features:

- An overheat safety thermostat which switches off the boiler if the heat exchanger exceeds 95°C.
- A domestic hot water flow switch which switches the boiler off if the hot water flow rate is below 3.0 litres/min.
- A flow switch which switches the boiler off if the flow in the primary circuit is below 7.5 litres/min.
- A safety valve which will automatically open at 3 bar to relieve excess pressure in the central heating system.
- A built in frost protection control that will switch the boiler on if the primary water temperature falls below 5°C.

2.2 REGULATIONS TO COMPLY WITH

It is the law that all gas appliances are installed by competent persons such as British Gas or other CORGI registered personnel in accordance with the following recommendations:

Gas Safety (Installation and Use) Regulations 1994 (as amended)

All relevant Building Regulations issued by the Department of the Environment

Building Standards (Scotland) (Consolidation) Regulations issued by the Scottish Development Department

Model and local Water Undertaking Byelaws

Current IEE Wiring Regulations and IEE Earthing Regulations

Health & Safety Document No. 635 The Electricity At Work Regulations 1989'

The installation should also be in accordance with the following British Standard Codes of Practice: BS

5440:1:1990 Flues

BS 5440:2:1989 Air supply

BS 5449:1990 Forced circulation hot water systems

BS 5546:1990 Installation of hot water supplies for domestic purposes

BS 6700:1987 Design, installation, testing and maintenance of services supplying water

BS 6798:1987 Installation of gas fired hot water boilers

BS 6891:1989 Gas installation

BS 7593:1992 Code of Practice for treatment of water in heating systems

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.

2.3 DELIVERY

The boiler is supplied in two packs, containing the following:

Pack 1 Oased boiler

Boiler fittings accessories - See section 14 for contents

Wall mounting bracket

Literature pack and Wall template

Flue restrictor

Pack 2 Standard flue assembly

Flue accessories - See section 14 for contents

If the boiler is not to be installed immediately, ensure the cartons are stored in a dry place where they will not be damaged.

2 GENERAL BOILER INFORMATION

2.4 NATURAL GAS (G20) SUPPLY - Refer to section 15 for Propane (G31)

The maximum natural gas requirement of the boiler is 3.27 m³/h.

The meter and supply pipes must be capable of delivering this quantity of gas in addition to the demand from any other appliances in the house. A 22 mm supply pipe will be necessary for the majority of installations, but reference should be made to either BS 6891:1988 for detailed guidance on gas pipe sizing.

The meter and governor should ensure a dynamic pressure of 20 mbar (natural gas) at the inlet of the gas valve in the boiler.

The complete installation, including the meter, must be tested for gas soundness and purged as described in BS 6891.

2.5 ELECTRICITY SUPPLY

- 1 A 230 V ~ 50 Hz mains supply is required. **The boiler must be earthed.**
- 2 The supply must be fused at 3 A and there must only be one common isolator for the boiler and control system, and it must provide complete electrical isolation.
- 3 One of the following methods should be used for the connection. A fused double pole switch with a contact separation of at least 3 mm in both poles or a fused three pin plug and unswitched shuttered socket outlet (both complying with BS 1363).
- 4 The boiler is supplied with a pre-wired power supply cable with fitted 3 A fused plug.
- 5 All wiring external to the boiler must be in accordance with the current IEE Wiring Regulations.
- 6 Any room thermostat or frost thermostat used must have a 'volt free' control circuit.
- 7 The boiler requires a permanent mains supply, do not interrupt it with any external time control.
- 8 In the event of an electrical fault after installation of the boiler, the following electrical system checks must be carried out:- Short circuit, Polarity, Earth continuity and Resistance to earth.

2.6 AIR SUPPLY

- 1 As the boiler is room-sealed, it does not require any combustion air vents.
- 2 If installed in a cupboard or compartment, permanent ventilation vents are required - one at high level and one at low level. The vents may be either direct to the outside air or to a room. Both air vents must be into the same room or be on the same wall to the outside air.
The minimum free area for each vent is 306 cm², this may be halved if the ventilation is directly to the outside air.
- 3 If installed in a cupboard or compartment with a door, allow at least 75 mm clearance between the front of the boiler and the door for air movement. 5 mm should be allowed at each side of the boiler.

2.7 FLUE SYSTEM

- 1 The boiler is normally supplied with a 1 metre horizontal co-axial flue assembly with a 100 mm diameter outer pipe (air duct) and a 60 mm inner pipe (flue duct) and a 90° offtake elbow for the top of the boiler.
- 2 The assembly may be modified and extended using 1 metre extensions, 45° and 90° elbows and a vertical offtake to a maximum equivalent length of 4 metres.
Note: Each 45° and 90° bend has an equivalent flue length of 0.8 metres.
- 3 A vertical roof outlet kit is also available which may be combined with the components mentioned above to a maximum length of 4.3 metres (from the top of the boiler to the top of the roof outlet).
- 4 A flue restrictor is provided with the boiler and must be used if the flue length is less than 1.5 metres (see section 3.5).
- 5 It is possible to use a 'Two Pipe system' to increase the flue length. Refer to our separate flue options brochure for further details. The diameter of the restrictor is different for this flue type (see section 1.1).
- 6 The flue must be installed in accordance with BS 5440:1.
- 7 During cold conditions there may be a tendency for steam to come from the terminal (this is quite normal for a high efficiency boiler). Do not position the terminal where this might cause a nuisance.
- 8 If the terminal is fitted within 850 mm of a plastic or painted gutter or within 450 mm of painted eaves, an aluminium shield at least 750 mm long should be fitted to the underside of the gutter or painted surface.
- 9 If the terminal is fitted less than 2 m above a surface to which people have access, the terminal must be protected by a guard. A suitable guard is available as an optional accessory.
The guard must be fitted centrally over the flue terminal and securely fixed to the wall.
- 10 The minimum dimensions for positioning the flue terminal are shown in Fig. 1.
- 11 Refer to section 1.4 for flue limitations.

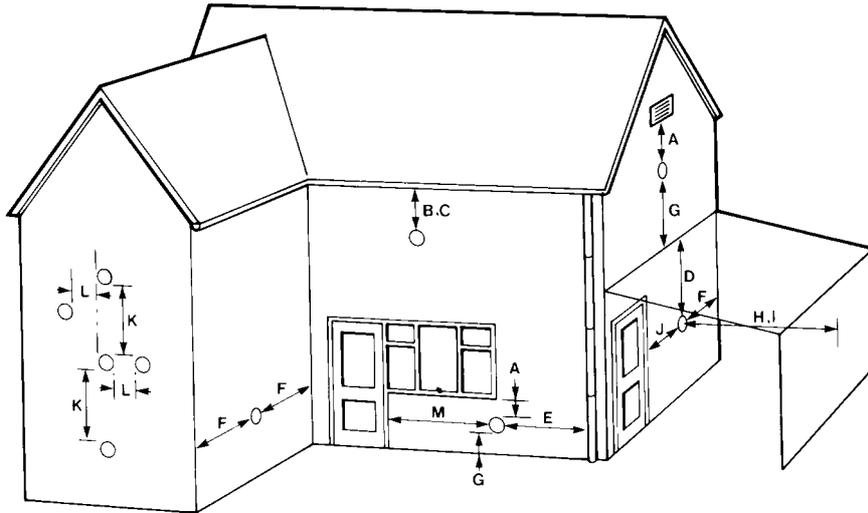


Fig. 1

Terminal position		Min. distance
A	Directly below an opening, air brick, window, etc.	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
I	From a terminal facing the terminal	1200 mm
J	From an opening in the car port (e.g. door, 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
M	Horizontally from a door, window or air vent	150 mm

2.8 BOILER LOCATION

- 1 The boiler are not suitable for external installation
- 2 The boiler must be mounted on a non-combustible flat wall sufficiently robust to take the weight of the boiler- see Technical Information, page 3. If the wall is of combustible material, it should be protected by a sheet of fireproof material.
- 3 If the boiler are to be installed in a timber framed building, refer to the British Gas publication 'Guide for Gas Installation in Timber Framed Housing' reference DM2.
- 4 Installation may be in any room, although particular attention is drawn to the requirements of the current IEE Wiring Regulations and, in Scotland, the electrical provision of the Building Regulations applicable in Scotland, with respect to the installation of a boiler in a room containing a bath or shower. Where a room sealed boiler is installed in a room containing a bath or shower, it must not be possible for a person entering or using the bath or shower to touch any electrical switch or boiler control using mains electricity.
- 5 The boiler may be installed in a cupboard or compartment to be used for airing clothes, provided it is correctly designed and ventilated for that purpose and that the requirements of BS 6798 and BS 5440:2 are complied with. It is important that the boiler is separated from the airing space by a suitable non-combustible rigid mesh, refer to BS 6798:1987. No combustible surface must be within 75 mm of the boiler case, this includes any cupboard door. The clearances required for servicing, as given in the Technical Information section on page 3, also apply to a cupboard installation.

2 GENERAL BOILER INFORMATION

2.9 WATER AND GAS CONNECTIONS (See Fig. 2)

The fittings pack includes three isolating valves and a gas service cock, together with all the necessary pipework and fittings to connect them. A 15 mm pipe stub is also supplied for the hot water outlet connection. The isolating valves (22 mm for central heating flow/return, 15 mm for mains water inlet and 15 mm for gas) come complete with nuts and olives to accept copper tubing to BS 2871.

The water connections have been temporarily sealed with plastic caps to prevent any residual water (from factory testing) leaking from the boiler during transit. **All** the plastic caps must be removed before connecting any fittings. Take care when removing the caps as the boiler may still contain a small amount of water.

Note: The descaling points at the front and rear have brass blanking caps and should not be confused with pipe connections.

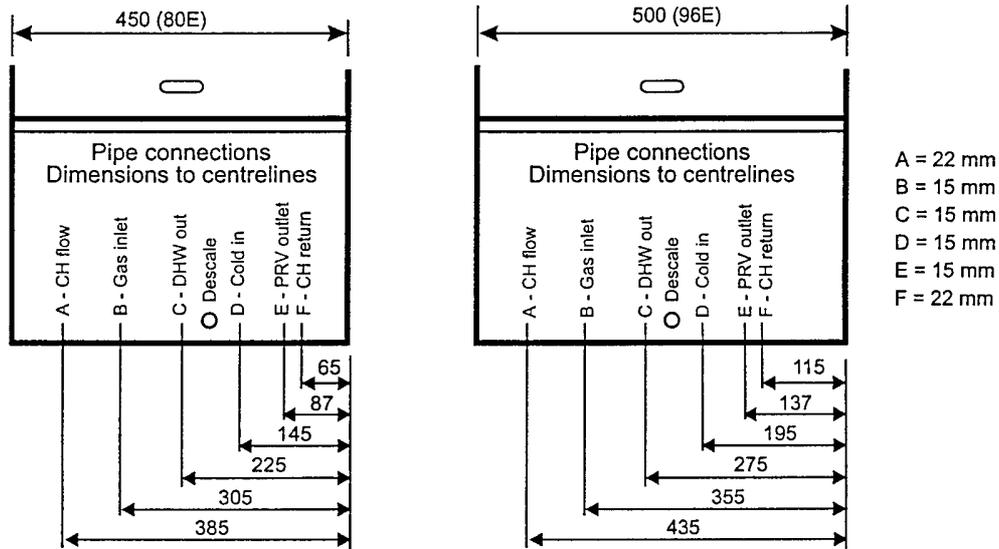


Fig. 2

2.10 BOILER DIMENSIONS (See Fig. 3)

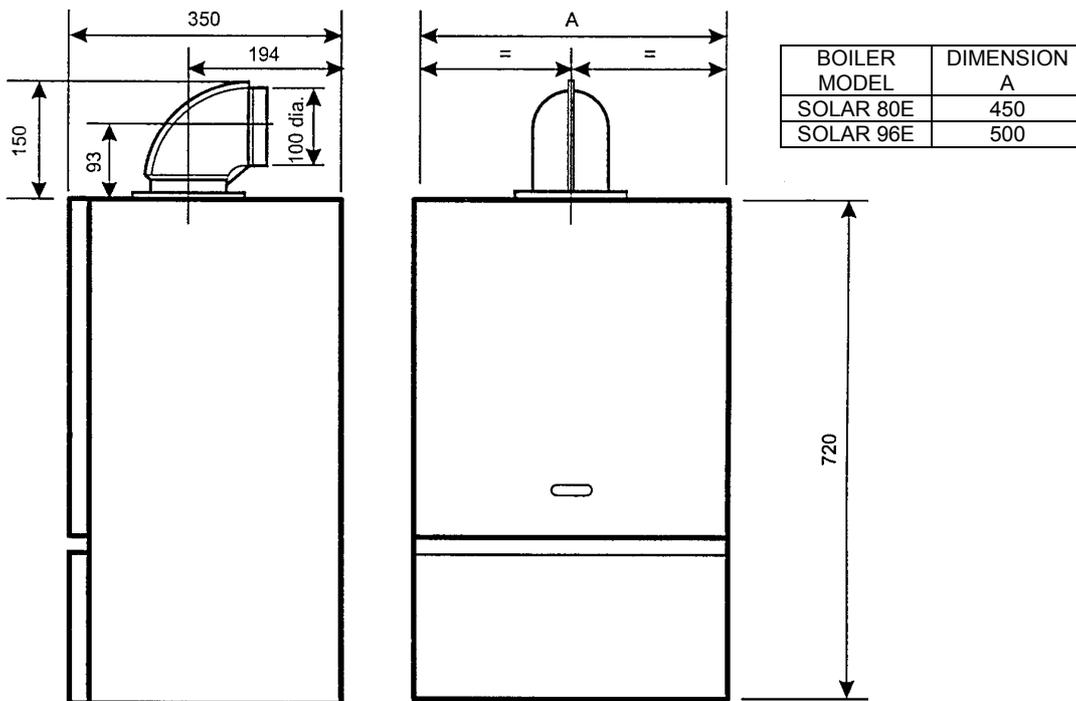


Fig. 3

2.11 CENTRAL HEATING SYSTEM - SEALED SYSTEMS ONLY (See Fig. 4)

- 1 The boiler is only suitable for use with a sealed system complying with the requirements of BS 5449 and BS 6798. The maximum temperature of the central heating water is $90 \pm 5^{\circ}\text{C}$.
Design notes - when designing the system, especially at the maximum output (23.3 to 28.4 kW) the pump head, expansion vessel size, radiator mean temperature, etc. must all be taken into account. Refer to the pump performance graph and the table in section 1.3 for guidelines.
- 2 The boiler are supplied with the following components built in:-
Safety valve - complying with BS 6759 and set to operate at 3 bar. The discharge pipe must be routed clear of the boiler to a drain, in such a manner that it can be seen, but cannot cause injury to persons or property.
Pressure gauge - to indicate the system pressure to be maintained.
Expansion vessel - conforming to BS 4814 with a capacity of 7 litres and pre-charged to a pressure of 1.0 bar.
By-pass - an automatic built-in by-pass ensures that the minimum necessary flow rate is always available, thereby protecting the heat exchanger. If the boiler is used on a small system (below 11.0 kW) and thermostatic radiator valves are used throughout, then an external by-pass is required.
Automatic air vent - an automatic air vent, fitted externally, allows the boiler to be installed and vented without disturbing the room-sealed inner case.
- 3 Using the expansion vessel as supplied and an initial system pressure (cold) of between 0.8 and 1.5 bar, a heating system volume of approximately 90 litres can be used. For further guidance refer to BS 7074:1.
Refer to section 4.1 for further details of the expansion vessel.
- 4 The system design pressure (cold) should be between 0.8 and 1.5 bar. This pressure is equivalent to the maximum available static head (see Fig. 4) in bar + 0.3 (1 bar = 10.2 metres of water).
- 5 Provision should be made to fill and replace water lost from the system. A double check valve assembly must be used, as shown in Fig. 5.
- 6 Filling of the system must be carried out in a manner approved by the local Water Undertaking. Where allowed, the system may be filled via a temporary connection as shown in Fig. 5.
- 7 All fittings used in the system must be able to withstand pressures up to 3 bar.
- 8 Radiator valves must comply with the requirements of BS 2767(10):1972.
- 9 One or more drain taps (to BS 2879) must be used to allow the system to be completely drained.

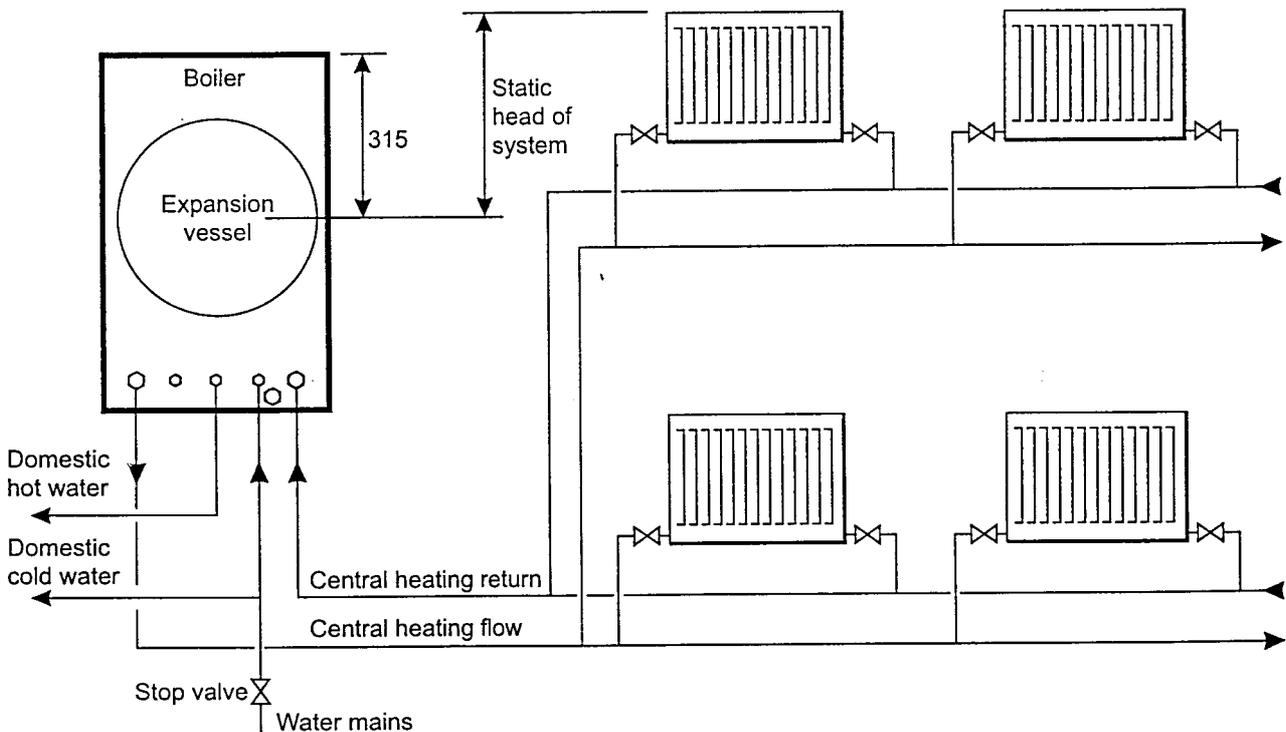
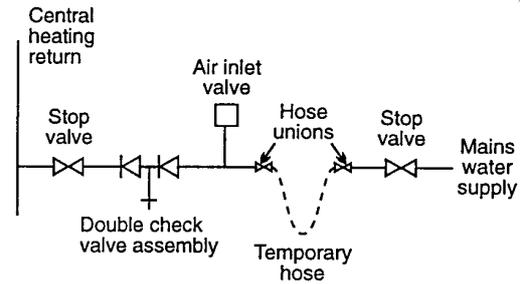


Fig. 4

2 GENERAL BOILER INFORMATION

- 10 To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly cleaned in accordance with the procedure given in BS 7593. This involves the use of a cleanser, circulating it around the system for the required time before flushing out. It is important to select a cleanser appropriate to the situation, i.e. for new installation, or for an existing system when the boiler is being replaced. In the case of boiler replacement the system should be cleaned prior to the installation of the new boiler.
- 11 It is a condition of the manufacturers warranty that a suitable inhibitor is added to the system after the final (hot) flushing and is maintained in service. For further information concerning inhibitors contact ICI Caldaie (UK) Limited.



**Manual filling and make-up
Fig. 5**

2.12 DOMESTIC HOT WATER SYSTEM

- 1 The boiler are set to provide nominal output of 23.30 kW (80E) and 28.40 kW (96E) for domestic hot water.
 - 2 The design hot water flow rate are 9.5 litres/min (80E) and 11.6 litres/min (96E) giving a temperature rise of 35°C. Higher flow not damage the boiler but may lower the water temperature below an acceptable level. The minimum flow rate needed for the flow switch and burner to operate is 3.0 litres/min.
 - 3 The incoming mains water pressure should be between 1 and 6 bar to ensure efficient operation. If the pressure is above 6 bar a pressure reducing valve must be fitted. The boiler will still operate down to a pressure of 0.5 bar but at a reduced efficiency. Below 0.5 bar there will not be sufficient flow to activate the hot water flow switch.
 - 4 A flow restrictor is fitted between the incoming mains and the diverter valve. This should be removed if the mains pressure is less than 1.5 bar (see section 9.25).
Note: 80E and 96E have different flow restrictors.
 - 5 To ensure economic use, the pipe runs between the boiler and taps should be in 15 mm copper pipe and be as short as possible. Where possible the pipework should be insulated to reduce heat loss.
 - 6 All taps and mixing valves used with the hot water system must be suitable for operating at a mains pressure of up to 6 bar.
 - 7 A shower may be used with the boilers if required. It is recommended that thermostatically controlled shower valve are used to protect against a flow of water at too high a temperature. If a fixed head type shower is used, no anti-syphonage devices are required. If a loose or flexible head type shower is used it must be arranged so that the heat cannot fall closer than 25 mm above the top of the bath, thereby preventing immersion in the bath water. If this is not practicable, an anti-syphonage device must be fitted at the point of the flexible hose connection.
 - 8 The supply of hot and cold mains water direct to a bidet is allowed (subject to local Water Undertaking requirements) provided that the bidet is of the over-rim flushing type. The outlets should be shrouded and unable to have a temporary hand held spray attached. Arrangements for anti-syphonage are not necessary.
 - 9 The boiler has been designed to overcome the formation of scale, however, in hard water areas the fitting of an in-line scale inhibitor is recommended. Consult the local Water Undertaking if in doubt.
 - 10 Before the mains water supply pipe is connected to the boiler, it should be thoroughly flushed out to avoid the danger of dirt or foreign matter entering the boiler.
 - 11 The feed to cold water outlets likely to be mixed with hot water, should be taken from the same point as the boiler supply.
 - 12 The mains water supply connection to the boiler should be the first connection from the mains supply.
 - 13 The boiler can be used to provide domestic hot water **only**, where the heating system is to be installed, or connected, at a later date.
- As water must be present in the primary (heating) circuit of the boiler for it to produce domestic hot water:
- I. Connect the heating flow and return together below the boiler, and incorporate a filling point in the connecting pipe.
 - II. Fill and vent the heating circuit of the boiler – refer to section 4.2.
 - III. Set and leave the 'Heating' switch to **Hot Water Only**.
 - IV. Set the room thermostat (if fitted) to its minimum setting.

2.13 METHOD OF OPERATION

The boiler operating mode is controlled by the 'Heating' switch on the control panel. When set to Hot Water Only, the boiler will only operate in the Domestic Hot Water mode. When set to Heating & Hot Water, it will operate in the Domestic Hot Water and Central Heating mode.

Note: The timer only controls the operating times of the central heating, not domestic hot water. This is available continuously.

Domestic hot water supply always takes priority over central heating. If a demand for hot water occurs during a central heating period, the boiler will automatically switch to the hot water mode until the demand ceases. This interruption in the central heating only lasts for as long as hot water is drawn off and should not be noticed by the User.

Central Heating Mode If there is a call for heat, i.e. the timer and room thermostat (if fitted) are calling for heat, the pump will start to circulate the central heating water, activating the flow switch to start the ignition sequence. After a few seconds the burner will light, **remaining on minimum output for 90 seconds** before gradually increasing to its preset maximum.

Water Schematic of boiler operating in Central Heating mode

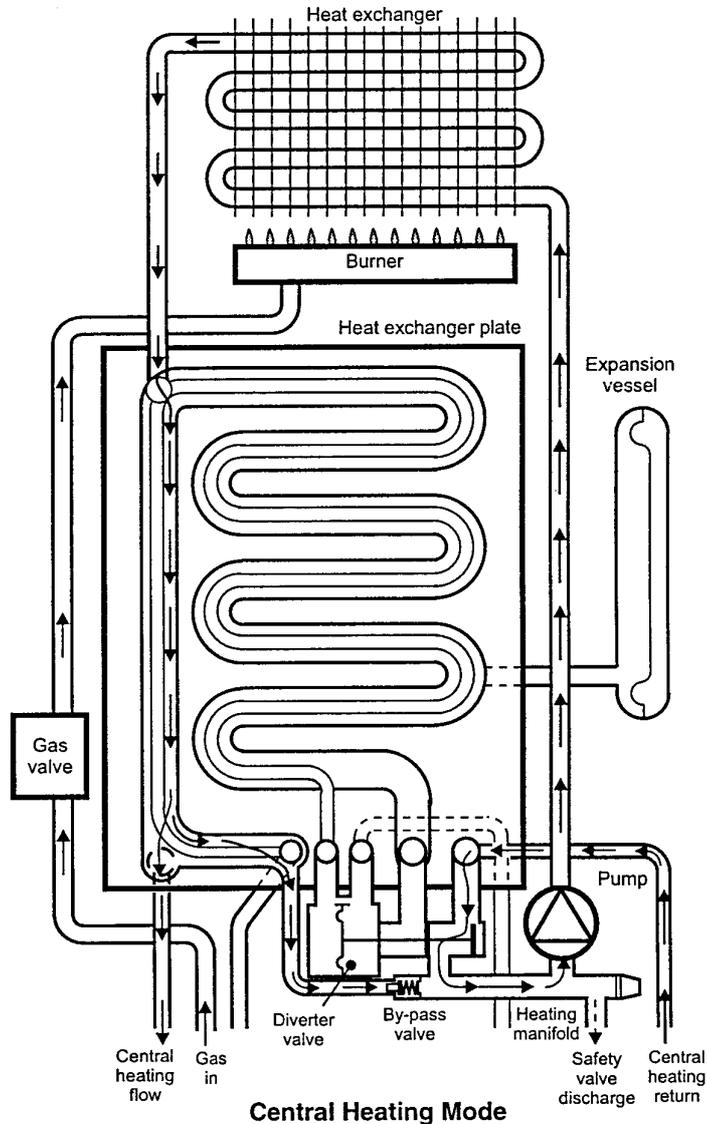


Fig. 6

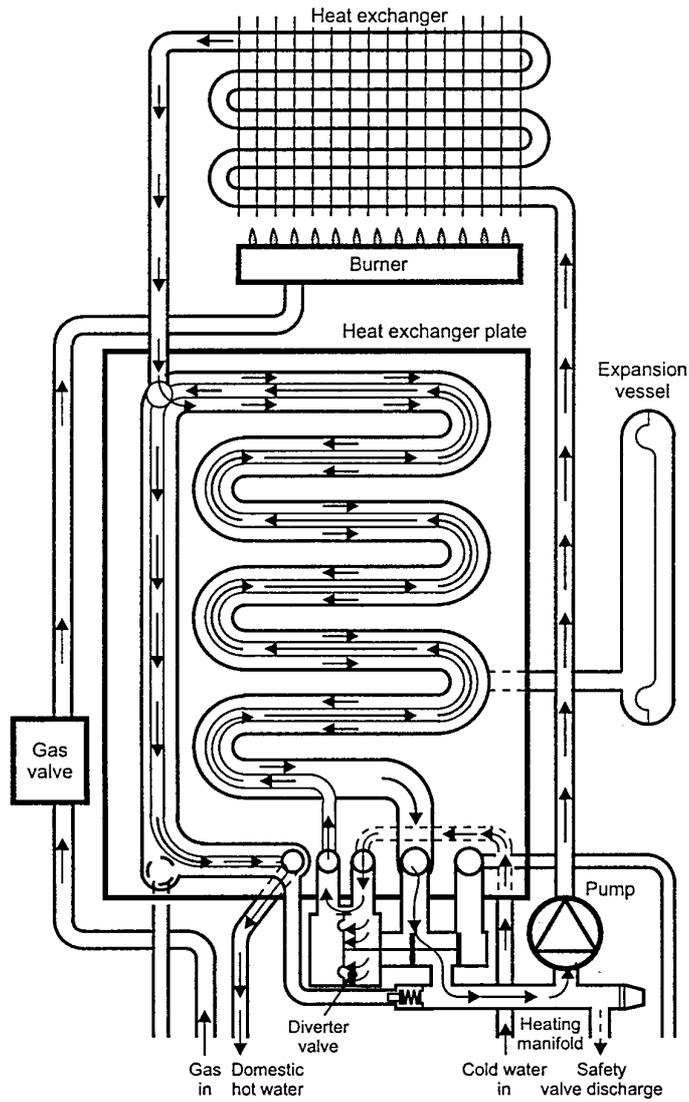
2 GENERAL BOILER INFORMATION

The burner output is then automatically adjusted to match the system demand. As the temperature in the boiler approaches that set by the adjustable temperature selector, the burner output is automatically reduced. When the set water temperature is reached, the burner is turned off. The pump continues to run, circulating water around the system, for as long as both the timer and room thermostat (if fitted) are calling for heat. As the heating system water cools, the temperature drop is detected by the control system and the burner is automatically restarted for the cycle to continue until either the timer or room thermostat stops calling for heat. The burner is then turned off (if it is operating at the time) and the pump runs on for approximately 2 1/2 minutes.

Anti Cycle Timer - The boiler control system includes an anti cycle device on the main PCB (see wiring diagram, section 10.2 and Fig. 15). The minimum anti cycle time is 2 1/2 minutes unless the flow temperature falls at least 12°C within 2 1/2 minutes, in which case the boiler will relight. In high resistance systems the 12°C setting may not be enough, in which case the installer can increase the setting of the anti cycle device potentiometer until cycling is reduced. The factory setting is at the 12 o'clock position.

Domestic Hot Water Mode - When a demand for hot water (by opening a hot tap, etc.) is sensed by the diverter valve switch, the pump starts and the burner lights, increasing to its maximum output. Water in the boiler is then diverted from the central heating system to the domestic hot water heat exchanger, heating the incoming mains water. The burner output is varied to maintain the temperature of the hot water at that set by the adjustable temperature selector. When the diverter valve switch senses that hot water is no longer required the burner is turned off and the pump stops. The boiler then returns to the central heating mode. In both modes the fan (single speed) starts before the burner lights and stops after the burner is turned off.

Water Schematic of boiler operating in Domestic Hot Water mode



Hot Water Mode
Fig. 7

3 BOILER INSTALLATION

3.1 UNPACK THE BOILER (See Fig. 8)

Open the top of the boiler carton and remove the following loose items:

1. Boiler fittings and accessories pack
Literature pack and Wall template
Wall mounting template
Flue restrictor

Check the contents of the pack against the packing list (see section 14).

2. Carefully break open the boiler carton.

Do not cut the carton open with a knife or you may damage the casing.

Ensure that the surface on which the carton is lying is suitably protected so as not to be scratched or otherwise

damaged when unpacking the boiler.

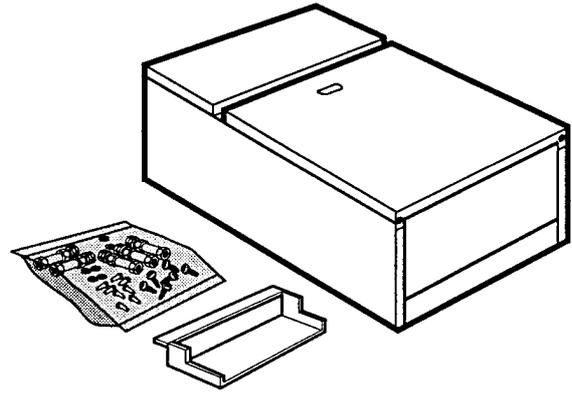


Fig. 8

3.2 PREPARE THE WALL (See Fig. 9)

1. Decide upon the position of the boiler using the template supplied. The overall size of the template is the same size as the boiler plus the necessary clearances required around it. **Note:** Take into account the flue terminal position when deciding on the boiler position. Refer to section 2.7.
2. Tape the template to the wall (ensure it is level) and mark the position of two holes for fixing the wall mounting bracket, two holes for the boiler top fixes and, if rear exit flue is used, the position of the hole for the flue. If side exit flue is to be used, continue the horizontal centre line of the flue across the wall to the side wall, then along the side wall 194 mm. This will give the position of the centre of the hole for the flue.
3. Cut the 105 mm diameter hole in the wall for the flue. ensure it is horizontal. Drill the four fixing holes to accept the No.10 plugs supplied. Fit the plugs.
4. Secure the wall mounting bracket to the wall using the two No. 10 x 2 1/2" countersunk head screws supplied. Ensure it is level and the right way up.

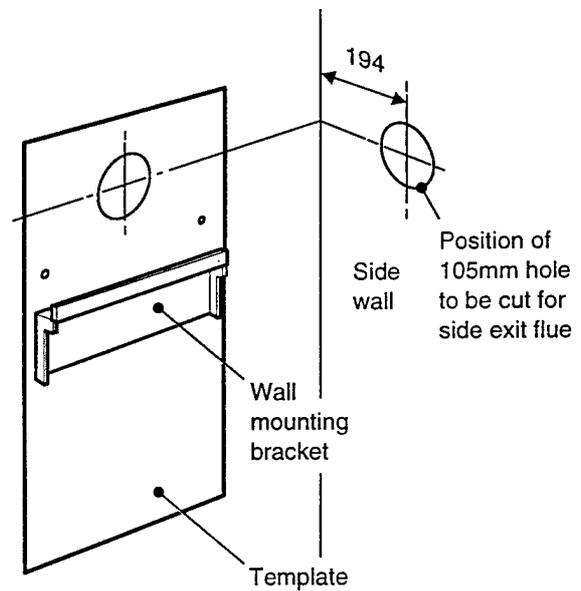


Fig. 9

3.3 FIT THE BOILER

The boiler has a flange on the rear of the back plate. This is to be hooked over the channel on the wall mounting bracket to take the weight of the boiler.

1. Lift the boiler and locate it on the wall mounting bracket.
Take care when lifting the boiler. Lift the boiler by the bottom of the chassis, steadying it at the top.
2. Adjust the position of the boiler, as necessary, to align the two top boiler fixing brackets with the plugs previously fitted. Loosely fit the two No. 10 x 2 1/2" round head screws and washers supplied into the top fixes, but do not fully tighten.
3. Two level adjustment screws are provided on top of the boiler, at the back, which screw down onto the wall mounting bracket. if necessary, use these two screws to level the boiler.
Slackening the right hand screw and tightening the left hand screw causes the right hand side of the boiler to rise and vice versa.
4. When you are satisfied that the boiler is level, fully tighten the two top fixing screws to secure it to the wall.

3.4 CONNECT THE PIPE WORK (See Fig. 2 and section 14)

Having ensured that all the water pipework has been thoroughly flushed and that the gas supply is clear, the pipework can now be connected to the boiler. ensure that all the plastic caps are removed from the boiler connections first. Take care when removing the plastic caps as the boiler may still contain a small amount of water.

3 BOILER INSTALLATION

- 1 Noting the pipe positions from the labels on the boiler, secure all the valves/fittings to the boiler with the operating spindles facing forward, then connect the pipework.
Use the fibre washers supplied when connecting the bent pipe connectors to the water connections on the boiler.
- 2 When tightening any fitting do not apply excessive force which might damage the pipework.
- 3 Secure the incoming pipework to the wall as necessary.
- 4 Do not forget that the safety valve discharge pipe must be routed clear of the boiler to a drain in such a manner that it may be seen, but cannot cause injury to persons or property. The discharge pipe should be connected in such a way to allow for easy disconnection/connection to permit removal of the bottom panel of the boiler.
- 5 Ensure that all the valves are **closed** and do not turn on the gas or water supplies at this stage.
The valves are **closed** when the slot in the operating spindle is horizontal.

3.5 FIT THE STANDARD HORIZONTAL FLUE (See Figs. 10 and 11)

Alternative flue options are described in our separate flue brochure.

Note: To avoid rain or possible condensation running into the boiler, the flue must not slope down towards the boiler. The following procedure applies to both rear or side exit flue. The only difference being the lengths to which the ducts are cut.

Rear flue Outer air duct length is finished wall thickness plus 120 mm.

Inner flue duct length is finished wall thickness plus 250 mm.

Side flue Outer air duct length is finished wall thickness plus the distance from the inside wall to the side of the casing plus 150 mm (80E) or 175 mm (96E).

Inner flue duct length is finished wall thickness plus the distance from the inside wall to the side of the case plus 280 mm (80E) or 305 mm (96E).

If the overall length of the inner duct is greater than 1005 mm then a flue extension is required. To fit an extension refer to section 3.5.1.

- 1 Open the flue carton and check the contents of the pack against the packing list (see section 14).
- 2 Withdraw the inner flue duct from the outer air duct.
- 3 Mark the outer air duct to match the length given above, measure from the swaged 'outer' end of the tube. See Fig. 10.
- 4 Mark the inner flue duct to match the length given above, measure from the outermost edge of the terminal. See Fig. 10. Push the spacing dip towards the terminal so that it will be about in the middle of the duct when it is cut to length. The dip can be removed on short flues, below 500 mm.
- 5 Double check the dimensions then cut both the inner and outer ducts to length. Ensure that they are cut square and are burr free.
- 6 Fit the outer sealing collar over the swaged end of the outer duct, ensuring it locates in the swage. See Fig. 10.
- 7 Insert the terminal end of the inner duct into the end of the outer duct just cut and push it fully home. If there is sufficient space around the boiler to fit the inner duct from inside the building, then do this in paragraph 8.
- 8 From outside the building insert the assembly (or outer duct only) into the wall and carefully push it towards the boiler.
- 9 If the inner duct has already been positioned inside the outer duct, withdraw it into the building sufficiently to fit the flue elbow.
- 10 Locate the sealing collar over the outer duct with the larger internal diameter towards the wall.

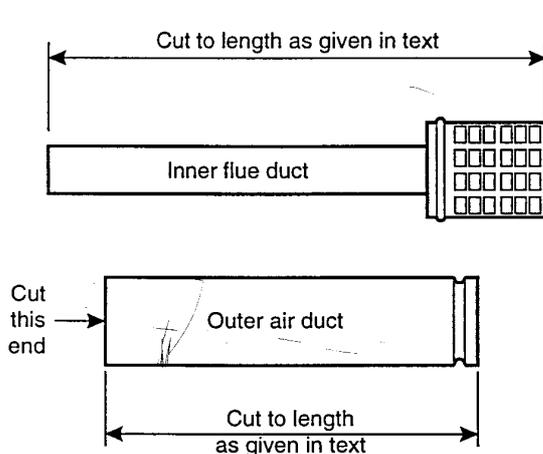


Fig. 10

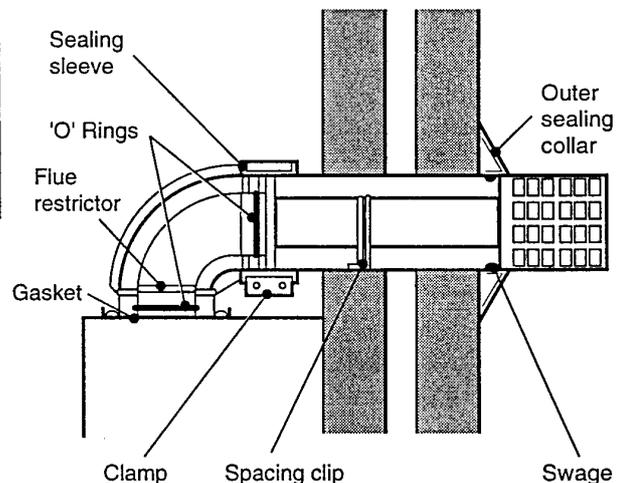


Fig. 11

3 BOILER INSTALLATION

- 11 Position the 'O' rings (supplied in the flue accessories pack) into the recesses at each end of the inner tube of the flue elbow.
Note: If the flue length is less than 1 m, fit the flue restrictor supplied into the inlet socket of the flue as shown in Fig. 11 - push the restrictor up into the socket as far as it will go.
- 12 Position the gasket (supplied in the flue accessories pack) over the fan spigot on top of the boiler, lining it up with the screw holes.
- 13 Lubricate the 'O' rings in the flue elbow with a soap solution to aid assembly, then insert the inner duct into the end of the elbow without the flange. If the spacing clip is fitted over the inner duct, ensure that the legs are facing downwards.
- 14 Push the elbow and inner duct assembly into the outer duct, raising the elbow above the fan spigot then lowering it into position over the spigot. Secure the elbow to the boiler with the four M4 screws supplied in the flue accessories pack.
- 15 Locate the sealing sleeve over the elbow as far as possible, then carefully withdraw the outer duct from the wall entering it into the sleeve as far as possible.
- 16 Open the clamp (supplied in the flue accessories pack) and locate it over the sealing sleeve. Fit the two No.8 self tapping screws (supplied in the flue accessories pack) to the clamp and tighten to secure the outer duct to the elbow.
- 17 Make good the inside wall and also the outside wall behind the outer sealing collar.
- 18 Fit a terminal guard if necessary. See section 2.7.

3.5.1 FIT A FLUE EXTENSION TO A HORIZONTAL FLUE (See Fig. 12)

- 1 Withdraw the inner flue duct from the outer air duct of the standard flue supplied with the boiler.
- 2 Position the flared end of the extension inner duct over the standard duct. Drill through the two pilot holes in the flared end of the extension into the standard duct using a 2.8 mm dia. drill. Secure the two ducts together using two of the screws supplied with the extension.
Leave the spacing clip in position on the standard duct.
- 3 Position the connecting sleeve (supplied with the extension) over the plain end of the standard outer duct, then slide in the outer duct of the extension. Secure the two together using the clamp and screws supplied with the extension.
- 4 Repeat with another extension if necessary.
- 5 Cut to length and fit the flue as described in the previous section (3.5). It is necessary to support the flue with a suitable bracket(s) when flue lengths approaching the maximum are used.

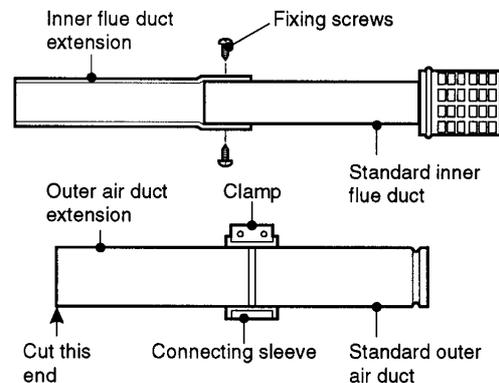


Fig. 12

3.5a FITTING THE ALTERNATIVE (PLASTIC) FLUE

IMPORTANT: The Plastic flue is a fixed unit – do not attempt to remove the outer pipe from the inner, read cutting instructions below.

Alternative flue options are described in our separate flue brochure.

Note: To avoid rain or possible condensation running into the boiler, the flue **must not** slope down towards the boiler.

The following procedure applies to both rear and side exit flue. The only difference being the length to which the pipe is cut.

Rear Flue Outer air duct length is finished wall thickness plus 115mm (inner is 20mm longer).

Side flue Outer air duct length is finished wall thickness plus the distance from the inside wall to the side of the casing plus 155 mm (S80E) or 180 mm (S96E) (inner is 20 mm longer).
If the overall length of the inner duct is greater than 1 metre then a flue extension is Required. To fit an extension refer to section 3.5.1a.

1. Open the carton and check the contents of the pack against the packing list.
2. Mark the outer air duct to match the length given above, measure from the 'outer' end of the tube (excluding cowl)
3. Double check the dimensions, then cut both the outer and inner ducts to length.
Ensure that the inner is 20mm longer and that they are cut square and are burr free.
4. Fit the outer sealing collar over the end of the outer duct, ensuring it locates correctly.
5. From outside the building, insert the assembly into the wall and carefully push through the wall and slide into the elbow connection.

3 BOILER INSTALLATION

6. Ensure the 'red' rubber seals are fitted.
7. Position the gasket (supplied with the accessories pack) over the fan spigot on top of the boiler, lining it up with the screw holes.
8. Lubricate the rubber seals in both ends of the elbow with soap/silicon solution to aid assembly.
9. Secure the elbow to the boiler (using the inner set of screw holes) with screws supplied in accessories pack.

Note: The bend section of the elbow will swivel to assist in positioning.

10. Make good the inside wall and the outside wall behind the outer sealing collar
11. Fit terminal guard if necessary. See section 2.7.

Notes: 1. When installing into flats or upstairs rooms the flue pipe with seal fitted can be fitted from inside the building. The hole in the wall should be cut to 115mm to allow passage of the outer sealing collar

2. If the flue length is less than 1.5 metres, fit the flue restrictor into the inlet socket of the flue as shown in Fig. 11 – push the restrictor up into the socket as far as it will go.

3.5.1a FITTING PLASTIC FLUE EXTENSIONS & ELBOWS (See Fig. 12a)

The extensions and elbows are all 'push fit' design and only require the rubber seals to be lubricated prior to connection. Support brackets should be fitted at intervals not less than 1 metre.

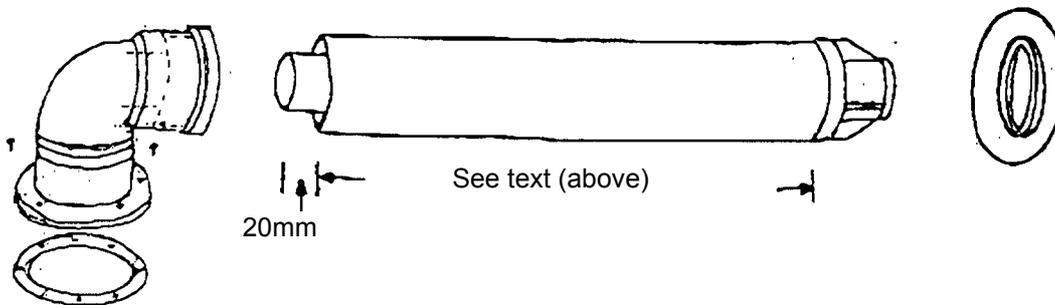


Fig. 12a

3.6 CONNECT THE POWER SUPPLY (See Fig. 13)

The boiler is supplied with a factory fitted power supply cable and 3 A fused 3-pin plug. Connect the supply cable to a suitable power supply - **ensure correct polarity**.

With the power supply to the boiler **OFF**.

1. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down to access the terminal block.
2. To connect a room thermostat proceed as follows: Pass the room thermostat leads through the hole in the boiler back panel (below the gas valve) and through the cable bush in the back of the control box. Remove the yellow link between terminals 1 and 2 on the main terminal block and connect the thermostat in its place.
3. Ensure that there is sufficient free supply cable and thermostat lead (if fitted) to allow the control box to be removed for access to the components behind it. The control box is secured by two screws at the top edge of the box.

Note: When replacing the control box take care not to trap any of the wiring.

4. Carry out electrical system checks - Short circuit, Polarity, Earth continuity and Resistance to earth.

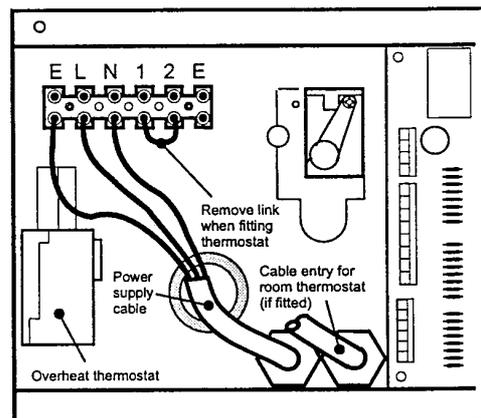


Fig. 13

Do not switch on the electricity supply at this stage.

4 FILL AND VENT THE SYSTEM

4.1 EXPANSION VESSEL PRESSURE

The expansion vessel fitted is supplied with a charge pressure of 1.0 bar (equivalent to a static head of 10.2 metres). The charge pressure must not be less than the static head at the point of connection (see Fig. 4). Do not pressurise the vessel above 1.5 bar.

The central heating system volume, using the expansion vessel as supplied, must not exceed 90 litres. If the system volume is greater than 90 litres, an extra expansion vessel (complying with BS 4841) must be fitted as close as possible to the central heating return connection on the boiler. The charge pressure of the extra vessel must be the same as the vessel fitted in the boiler. Refer to BS 7074:1 for further guidance.

A simple test to check if the expansion vessel size is adequate, is to fully heat the system and if the pressure rises to no more than 2.3 bar the vessel is adequate. A higher figure indicates that an extra vessel is required.

4.2 FILL THE SYSTEM

- 1 Check the pressure in the CH expansion vessel is 1 bar or as required.
- 2 The boiler is fitted with an automatic air vent (see Fig. 19) positioned down the back of the boiler on the left hand side. Check that the small cap on the top of the air vent is screwed on fully, then unscrew it one complete turn – the cap remains in this position from now on.
- 3 Open the central heating flow and return valves. See Fig. 14. Using a suitable screwdriver, turn the operating spindles fully anticlockwise ($\frac{1}{4}$ of a turn). The valves are open when the slot in the operating spindle is vertical. It is important that these valves are open before pressurising the system, the system could be over-pressurised as the safety valve is within the boiler and would not protect the system if the valves were closed. Gradually open the fill point valve in the heating system until water is heard to flow.
- 4 Vent each radiator in turn, starting with the lowest in the system, to remove the air.
- 5 It is important that the pump is properly vented to avoid it running dry and damaging its bearings. Unscrew and remove the plug from the centre of the pump. Insert a flat bladed screwdriver into the exposed hole and rotate the pump spindle to and from to ensure free movement (the pump may have dried out since factory testing), then replace the plug.
- 6 Check the operation of the pressure relief safety valve by turning the head anticlockwise until it clicks. The click is the safety valve lifting off its seat allowing excess primary water pressure to escape from the system. Check that this is actually happening.
- 7 Continue to fill the system until the pressure gauge indicates between 0.8 and 1.5 bar. Close the fill point valve and check the system for water soundness, rectifying where necessary. Once soundness is confirmed, partially drain the system and add the cleansing agent. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained.
- 8 The system design pressure (cold) should be between 0.8 and 1.5 bar. This pressure is equivalent to the maximum permitted static head in bar + 0.3 (1 bar = 10.2 metres of water). See Fig. 4.
- 9 Open the mains cold water inlet valve (see Fig. 14), using a suitable screwdriver, turn the operating spindles fully anticlockwise ($\frac{1}{4}$ of a turn). The valve is open when the slot in the operating spindle is vertical.

5 COMMISSIONING

Refer to Fig. 14

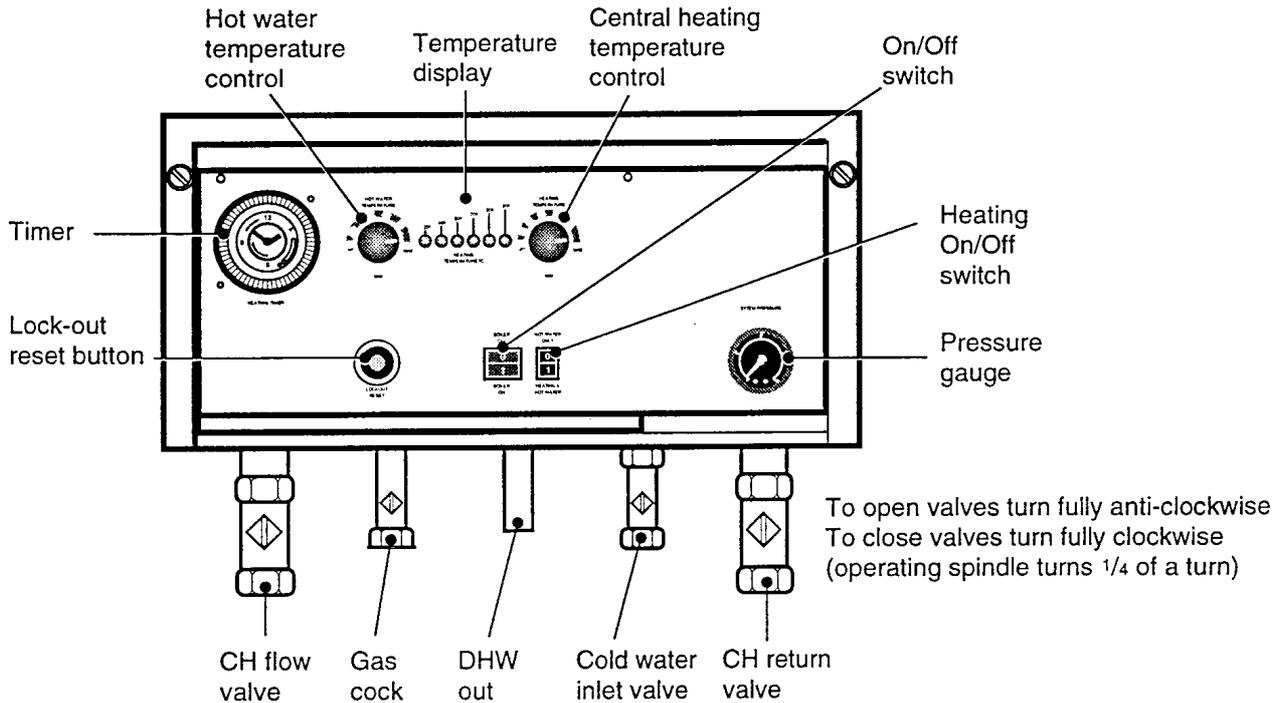


Fig. 14

5.1 TEST FOR GAS SOUNDNESS AND PURGE THE SUPPLY

- 1 With the boiler service cock (see Fig. 14) closed (slot in operating spindle horizontal), pressure test the gas supply and inlet pipework connection to the boiler service cock for soundness in accordance with BS 6891.
- 2 Remove the two screws securing the control box and carefully hinge it down to gain access to the gas inlet pressure test point on the gas valve behind the control box. Take care not to strain any wires.
- 3 Unscrew the gas inlet pressure test point screw. Ensure the gas supply is on and open the boiler service cock (slot in operating spindle vertical) to purge in accordance with BS 6891. Check that the static gas supply pressure is at least 20 mbar.
- 4 Tighten the test point screw and test for gas soundness. Close the boiler service cock.

5.2 FIRST LIGHTING

Ensure that the gas and electricity supplies to the boiler are off and that the mains cold water inlet valve and the central heating flow and return valves are open.

- 1 Replace the control box, securing it in position with the screws previously removed. Take care not to trap any of the wiring.
- 2 Switch on the electricity supply to the boiler and set the timer for continuous operation - refer to the Users Operating manual.
- 3 Set the hot water and central heating temperature selectors to maximum and if a room thermostat is fitted, set it to maximum.
- 4 Set the boiler On/Off switch to On (the red light indicates the switch is set to On) and the 'Heating' switch to Hot Water Only.
- 5 Fully open a hot tap and the boiler will attempt to light. As the gas supply is not yet turned on the boiler will 'lock-out' and the red button on the control panel will light.
- 6 The boiler pump will still be working. Allow the pump to continue to run for a few moments to vent the internal primary circuit. Set the 'Heating' switch to Heating & Hot Water and dose the hot tap. The boiler will now run in the central heating mode, but will still be at 'lock-out'. Allow the pump to run for a few more moments to circulate and vent air from the system.
- 7 Turn on the gas supply at the boiler service cock and press the lock-out reset button (press and release the button quickly - do not keep it pressed in). After a few seconds the boiler should light - the burner flames can be seen through the inspection window in the case. If the boiler does not light and goes to 'lock-out', set the On/Off switch to Off and check that the gas supply has been purged (section 5.1). If the boiler does not light after several attempts, contact IC! Caldaie (UK) Limited.

5.3 CHECK THE BURNER PRESSURES

1. With the boiler alight and operating in the central heating mode, allow it to run for 10 to 15 minutes.
2. Set the On/Off switch to Off to turn off the boiler.
3. Remove the two screws securing the top of the control panel fascia and carefully hinge it down to gain access to the burner setting pressure test point screw on the gas valve (accessible through the small hole in the rear of the control box). Loosen the test point screw and connect a pressure gauge.
4. **Hot water mode**
Set the 'Heating' switch to Hot Water Only and fully open a hot water tap.
Set the On/Off switch to On and after a few seconds the boiler will light at the minimum burner pressure and immediately increase to maximum pressure, as shown in section 1. These limits have been factory set and should not require adjusting, but should be checked at the time of installation. Refer to section 9.15.2, paragraphs 5 to 11, if any adjustment has to be made.
Gradually dose the hot tap and check that the burner pressure decreases. Fully open the tap and check that the burner pressure increases. Close the tap and check that the burner goes off.
Set the On/Off switch to Off.

5. **Central heating mode**
Set the Heating' switch to Heating & Hot Water.
Set the On/Off switch to On and after a few moments the boiler will light at maximum pressure and immediately fall to minimum pressure. It will remain at minimum pressure for approximately 90 seconds and then increase to the pre-set value.
If the heating load is between the factory set output of 15 kW (80E) or 18.09 kW (96E) and the maximum of 23.3 kW (80E) or 28.40 kW (96E) the boiler should be set to the maximum output with a maximum burner pressure as shown in section 1.2.
If the heating load is below 11.05 kW (80E) or 12.21 kW (96E) the boiler should be set to the minimum output with a minimum burner pressure as shown in section 1.2.
Due to the modulating effect of the controls it is not necessary to set the output between these three settings.

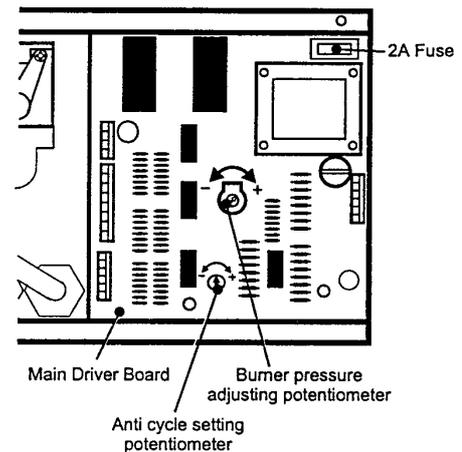


Fig. 15

Adjust the burner pressure by adjusting the potentiometer, on the main driver board (see Fig. 15), clockwise to increase. Use a small electrical screwdriver.

Note: The pressures stated can only be achieved if the burner pressure are correctly set in the hot water mode.

6. Set the On/Off switch to Off to turn off the boiler. Disconnect the pressure gauge and tighten the test point screw. Set the On/Off switch to On to light the boiler and test for gas soundness around the test point screw.
Note: When replacing the control box take care not to trap any of the wiring.

5.4 FINAL COMMISSIONING

1. Allow the heating system to heat up, then balance the system to achieve the necessary temperature difference across the heating flow and return pipes at the boiler. see Technical information, page 2.
2. If the boiler seems to switch on and off at short intervals (less than 2 1/2 minutes) when the heating system has reached its operating temperature, the anti cycle timer on the main PCB may need adjusting. See Anti Cycle Timer section on page 12.
3. Set the On/Off switch to Off and turn off the electricity supply to the boiler.
4. Drain the heating system, while it is still not, as described in section 8 in order to complete the flushing process.
5. Refill, vent and re-pressurise the system as described in section 4.2, adding a suitable inhibitor. For further information concerning inhibitors contact 101 Caldaie (UK) Limited.

5.5 FINAL ASSEMBLY

1. Secure the control panel in position.
2. If the boiler is to be left in service with the User, set the controls, timer (see Users Operating manual and room thermostat (if fitted) to the User's requirements then refer to section 6.
3. If the boiler is not to be handed over immediately, dose the control panel cover, dose the boiler gas service cock and switch off the electricity supply.
If there is any possibility of the boiler being left during frost conditions, then the boiler and system should be drained refer to section 8.

6 INFORMATION FOR THE USER

The User must be advised (and demonstrated if necessary) of the following important points:-

- 1 How to light and turn off the boiler and how to operate the system controls.
- 2 The precautions necessary to prevent damage to the central heating system and to the building, in the event of the boiler not being used during frost conditions.
Explain that the boiler has a built-in frost protection control and that the boiler must be left switched on for this to operate.
- 3 The importance of annual servicing of the boiler to ensure safe and efficient operation.
- 4 That any servicing or replacement of parts must only be carried out by CORGI registered personnel.
- 5 Ensure that the boiler controls and room thermostat (if fitted) are set to the User's requirements.
- 6 Tell the User the sealed system pressure.
- 7 Show the User the position of the safety valve discharge pipe and tundish.
- 8 Explain to the User that if the boiler should ever 'lock-out' the reset button should be pressed in and released quickly and that if it cannot be reset a Service Engineer is required.
- 9 The importance of maintaining the strength of the anti corrosion solution in the sealed primary system.

Hand the Users Operating manual to the User.

Leave this Installation and Servicing manual with the User for use on future calls.

IMPORTANT: It is a condition of the manufacturers guarantee that:

- 1 The boiler is protected by a suitable anti corrosion inhibitor.
- 2 The installation is checked on completion by a CORGI registered installer.

7 BOILER SERVICING

To ensure efficient operation of the boiler 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 per year should be adequate. It is the law that any service work must be carried out by CORGI registered personnel.

7.1 IMPORTANT NOTES PRIOR TO SERVICING

- 1 Check the flue terminal outside and ensure it is not blocked.
- 2 Run the boiler and check the operation of its controls.
- 3 Ensure that all system connections and fittings are sound. Remake any joints and check the tightness of any fittings that may be leaking. Refill, vent and re-pressurise the system as necessary. See section 4.2.
- 4 If the boiler is in a cupboard or compartment, ensure that the ventilation openings are adequate and are clear. See section 2.6.

Warning: Before servicing the boiler press in the on/off switch (see Fig. 14) to switch off the boiler (green light off), isolate the electricity supply and close the boiler gas service cock (see Fig. 2). Allow the boiler to cool.

The data label is positioned inside the upper front panel.

Always test for gas soundness after servicing any gas carrying components.

7.2 DISMANTLING PRIOR TO SERVICING (See Fig. 16)

- 1 Open the control panel cover (hinges down).
- 2 Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
- 3 Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
- 4 Remove the six screws securing the combustion chamber cover and remove the cover.
- 5 Remove the upper burner fixing screws and withdraw the air deflector plates. Remove the tower burner fixing screws, raise the front of the burner slightly so that the electrodes will clear the bottom of the inner case and withdraw the burner (it may require moving to the left slightly, to miss the water pipework, as it is withdrawn).
Take care not to damage the side insulation panels.
- 6 Disconnect the electrode leads.

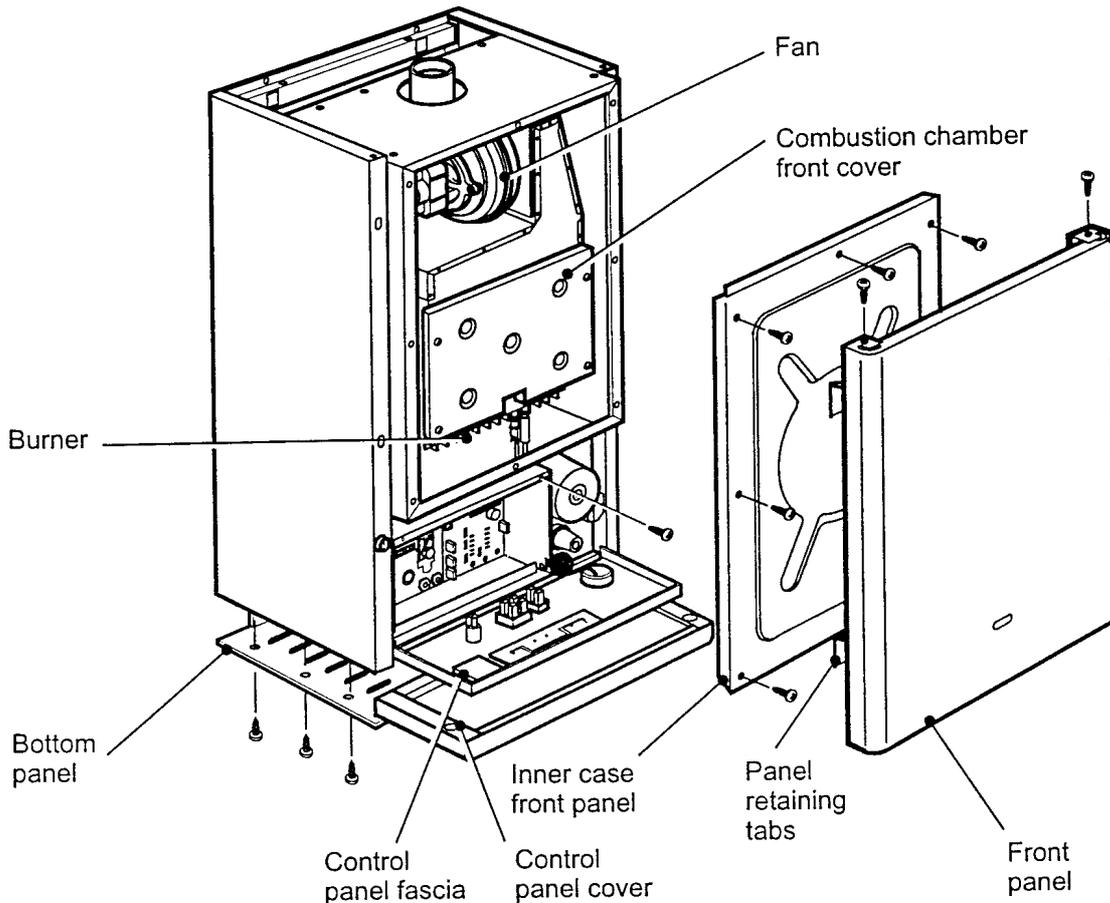


Fig.16

7.3 CLEANING THE BOILER

- 1 Check the condition of the bottom of the heat exchanger, if it requires cleaning the flue hood should be removed as described in section 9.26, paragraphs 6 to 10. If the flue hood is removed, it is advisable that the fan is also removed and the condition of the impellor checked (clean carefully with a soft brush). If the heat exchanger requires cleaning, clean it from above and below using a suitable soft brush. Brush front to back NOT sideways.
- 2 Check the condition of the combustion chamber insulation panels (see Health and Safety Information on page 2), dampen the panels before carrying out any work on them. Any damaged panels must be replaced - refer to section 9.27. Remove any fallen deposits from the base of the sealed chamber.
- 3 Check the condition of the burner injectors on the manifold, carefully clean them with a soft brush if necessary. Do not use a wire brush as this might damage the injectors. Unscrew and replace (using a new sealing washer) any injector that appears damaged.
- 4 Brush the top of the burner with a soft brush and check that the flame ports are clear. Any blockage may be removed with a stiffer brush.

7 BOILER SERVICING

- 5 Check the condition of the electrodes, clean with a soft brush if necessary.
Replace any cracked or damaged electrodes - refer to section 9.4.
Check the electrode gaps and positions (see Fig. 17) ensuring that the ignition electrode tips are:-
 - i Directly over a flame port.
 - ii 4 mm apart.
 - iii 5 mm above the burner blade.Check that the flame sensing electrode tip is 6 mm above the burner blade.
- 6 Check the condition of the various sealing grommets and replace if necessary.
- 7 Turn the burner open end down and gently tap to remove any debris from the venturis.

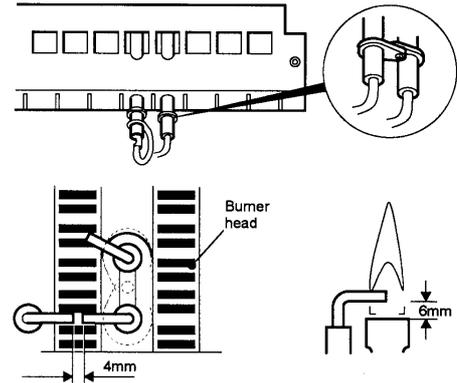


Fig. 17

7.4 RE-ASSEMBLE THE BOILER

1. Reconnect the electrode leads: White to the front ignition electrode Blue to the rear flame sensing electrode. Ensure that the insulation sleeves are in position over the connections.
2. Replace the burner, securing it in position with the four screws previously removed. Use the outer holes.
Note: Ensure the air deflector plates are fitted correctly using the upper burner fixing screws. See Fig. 18.
3. If the flue hood assembly was removed, replace it, the sealed chamber top, flue elbow and reconnect the flue. **Note:** When reconnecting the air pressure switch sensing tubes to the fan connect the transparent sensing tube to the upper connector (nearest the fan outlet) and the pink tube to the lower connector.
4. Replace the combustion chamber cover, securing it in position with the six screws previously removed. Ensure that the top side returns are located over the heat exchanger.
5. Ensure that the inner case front panel gasket is intact and in position, replace the panel (inspection window at the bottom) and secure it in position with the eight screws previously removed.
6. Position the outer case over the boiler with its fixings in line with the openings in the side panels, engage the fixings and lower the panel into position. Secure the top of the panel to the boiler using the two screws previously removed.

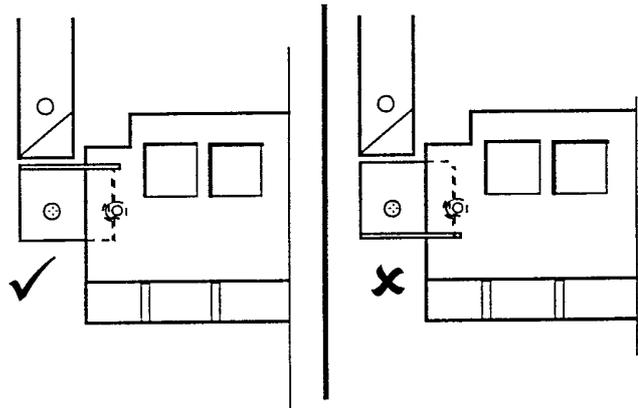


Fig. 18

7.5 TEST THE BOILER

- 1 Perform Earth Continuity test and Resistance to Earth test.
- 2 Turn on electricity and gas supplies to the boiler.
- 3 Check the general operation of boiler and controls.
- 4 Lower the system pressure and check/reset the pressure in the primary water expansion vessel as necessary. Reset the system pressure.
- 5 Check and adjust gas settings (hot water minimum/maximum and heating maximum).
- 6 Carry out hot water performance test (flow rate and temperature rise).
- 7 Evaluate condition of primary water and presence of anti corrosion protection and inform boiler operator.
- 8 Re-assemble and clean boiler.

Refer to Figs. 14 and 19

Set the On/Off switch to Off and isolate the electricity supply.

Central heating circuit

- 1 Make a note of the system pressure, then dose the central heating flow and return valves. See Fig. 14. Using a suitable screwdriver, turn the operating spindles fully clockwise (3/4 of a turn).
- 2 Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
- 3 Operate the safety valve by turning the head anticlockwise until it clicks. This will release the pressure and allow water to be drained direct to outside. Continue turning the valve head until water ceases to drain.

Note: When refilling the system ensure it is adequately protected by a suitable anti-corrosion inhibitor.

Hot water circuit

- 1 Close the cold water mains inlet valve. See Fig. 14. Using a suitable screwdriver, turn the operating spindle fully clockwise (1/4 of a turn).
- 2 Open any hot tap below the level of the boiler to allow as much draining as possible.

Note: Some water will remain in the components and care must be taken when removing them.

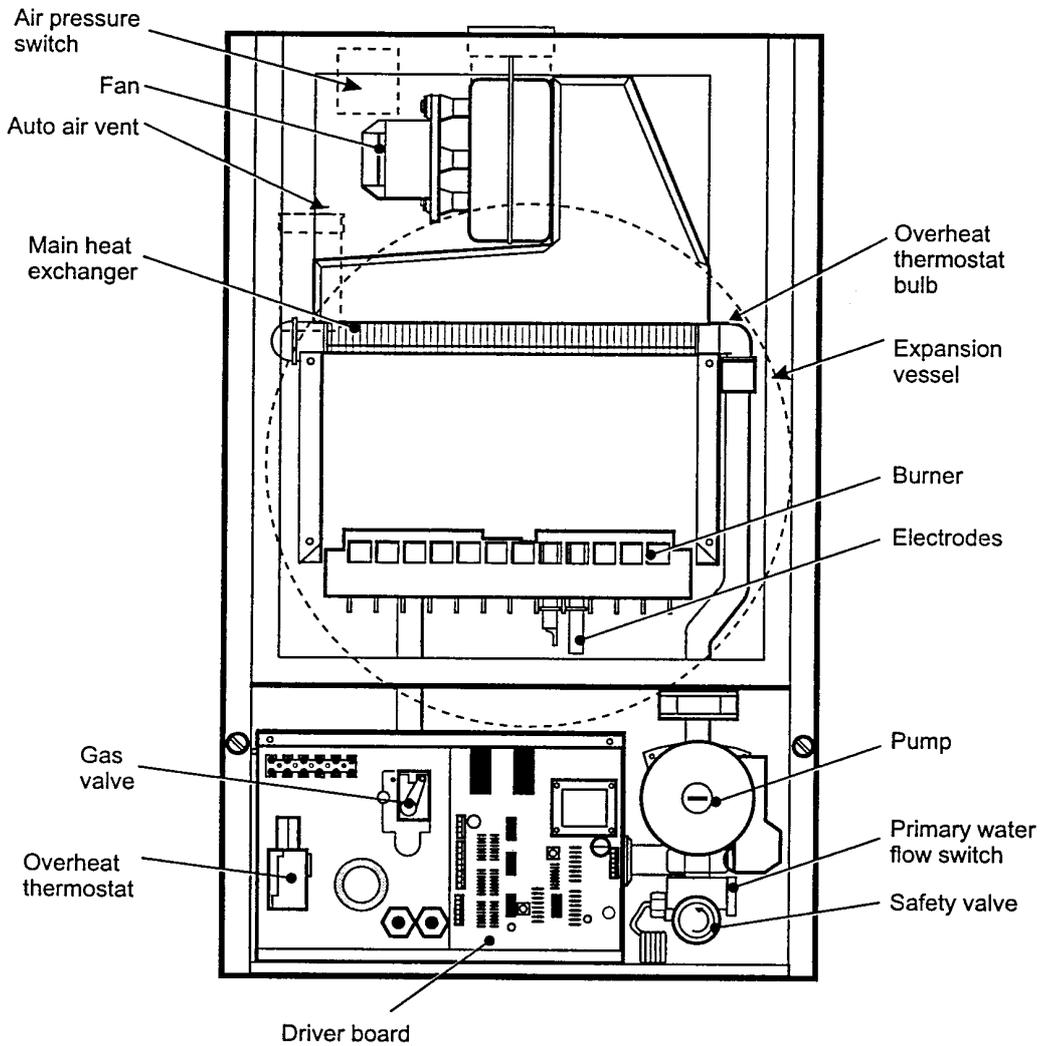


Fig. 19

9 REPLACEMENT OF COMPONENTS

It is the law that any service work must be carried out by CORGI registered personnel.

Warning: Before replacing any boiler components, set the On/Off switch to Off, isolate the electricity supply and close the boiler gas service cock (see Fig. 14). Allow the boiler to cool.

Important notes when removing or replacing components:

- 1 Always test for gas soundness after replacing any gas carrying components or disturbing any gas connections.
- 2 Always check the condition of the sealed chamber seals when removing/replacing the top or front panels. Replace if necessary.
- 3 Always check the condition of sealing washers and 'O' rings. Replace if necessary.
- 4 Check the operation of the boiler, refer to section 2.13 if necessary.
- 5 Ensure that all the controls are returned to their original settings.

To replace any components in sections 9.1 to 9.16 does not require any draining of the boiler.

Refer to Fig. 19 for the position of the components.

The domestic hot water heat exchanger is a large flat panel covering nearly all of the back of the boiler. Various components are secured to this panel using 'O' rings and clamp screws. Always ensure that the 'O' rings are in good condition if refitting the component (replace the 'O' ring if in doubt) and always use a new 'O' ring when replacing a component with a new one. Push the component fully home before securing it in position, this will ensure that the clamp screw does not damage the 'O' ring.

9.1 BURNER

- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the burner as described in section 7.2, paragraphs 1 to 6.
- 3 From underneath the burner, remove the screws securing the electrodes and withdraw them. Transfer them to the new burner. Ensure that the earth lead is connected and that the ignition electrodes are positioned before fitting the flame sensing electrode. Check the electrode gaps. See Fig. 17.
- 4 Fit the burner, re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.2 BURNER INJECTORS

- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the burner as described in section 7.2, paragraphs 1 to 6.
- 3 Unscrew the damaged injector and screw in a replacement using a new sealing washer.
- 4 Replace the burner, re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.3 FAN

- 1 Ensure that the electricity supply has been isolated.
- 2 Gain access to the fan as described in section 9.27, paragraphs 3 to 8.
- 3 Remove the four fixing screws securing the fan to the flue hood. Withdraw the assembly and disconnect the electrical leads from the fan motor, noting their position.
Note: It may be necessary to disconnect the electrical leads from the central heating sensor, when reconnecting the polarity is not important.
- 4 Connect the electrical leads to the new fan and secure it to the flue hood using the four screws previously removed. Reconnect the sensor electrical leads if they were removed. Connect the sensing tubes to the fan .left
(transparent) one to top connection, right (pink) one to bottom connection.
Note: Left and right refer to view when facing front of boiler.
- 5 Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.4 ELECTRODES

- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the burner as described in section 7.2, paragraphs 1 to 6.
- 3 From underneath the burner, remove the screws securing the electrodes and remove from the burner.
- 4 When refitting the electrodes, the earth electrode is at the left and the ignition electrode/flame sensing electrodes are at the right, secure in position with the screws previously removed. See Fig. 17. Ensure the earth lead is connected by the L/H electrode fixing screw, the R/H ignition electrode bracket is positioned first (white lead) then the flame sensing electrode (blue lead) bracket is positioned on top before securing in position.
- 5 Check the electrode gaps and positions (see Fig. 17) ensuring that the ignition electrode tips are:
a) Directly over a flame port, b) 4 mm apart, c) 5 mm above the burner blade.
Check that the flame sensing electrode tip is 6 mm above the burner blade.
- 6 Replace the burner, re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9 REPLACEMENT OF COMPONENTS

9.5 ELECTRODE LEAD(S)

- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
- 3 Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
- 4 Remove the six screws securing the combustion chamber cover and remove the cover.
- 5 Open the control panel cover (hinges down).
- 6 Remove the two screws securing the control box and lift the box from its hinges to gain access to the ignition control.
- 7 Disconnect the electrode lead from the electrode (White ignition, Blue flame sensing) and the ignition control unit. Withdraw the old lead and replace with a new one. Check the condition of the grommet (replace if necessary) and ensure it is correctly fitted in the base of the sealed chamber.
- 8 Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.6 AIR PRESSURE SWITCH

The air pressure switch is positioned on the back of the boiler at the top and is accessible without removing the case.

- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the screw securing the mounting bracket to the top of the boiler and lift up the pressure switch. Unscrew and remove the plastic cover and disconnect the electrical leads.
- 3 Disconnect the two sensing tubes and the electrical leads from the pressure switch. Check the condition of the grommets (replace if necessary).
- 4 Remove the mounting bracket from the switch and fit it to the new one in the same position.
- 5 Connect the electrical leads as follows:
 - Blue - Terminal C
 - Black - Terminal Nc (1)
 - Brown - Terminal No (2)
- 6 Connect the left (transparent) sensing tube to the connector marked - / L and the right (pink) tube to the other connector marked + / H.
Note: Left and right refer to view when facing front of boiler.
- 7 Fit the plastic cover and mounting bracket to the new switch and secure the mounting bracket to the top of the boiler.
- 8 Turn on the electricity supply to the boiler, then set the On/Off switch to On and the boiler is ready to light when required.
- 9 Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.7 DHW FLOW SWITCH ASSEMBLY (See Fig. 20)

- 1 Ensure that the electricity supply has been isolated.
- 2 Open the control panel cover (hinges down), then from underneath the boiler remove the six screws securing the bottom panel.
Note: Depending upon the arrangement of the safety valve discharge pipe, it may be possible to lower the panel down over the pipe to provide access. If this is not possible, the discharge pipe should be disconnected from the safety valve and the bottom panel assembly removed.
- 3 From underneath the boiler, withdraw the circlip securing the flow switch assembly to the end of the 3-way valve. See Fig. 20.
- 4 Slide the switch to the left away from the valve and withdraw out of the boiler.
Take care not to lose the plastic cap on the end of the 3-way valve.
- 5 Remove the plastic cover and disconnect the electrical leads from the switch.
- 6 Connect the electrical leads to the new switch as below and replace the switch in reverse order.

C	Black
No	Red
Nc	Not used

Note: Two switches are fitted but only one is used. The leads must be connected to same switch, with the polarity as given above.

- 7 Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

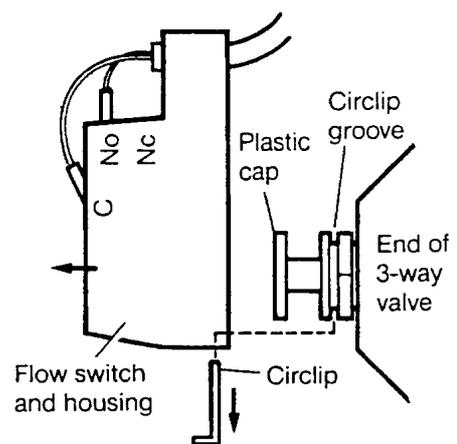


Fig. 20

9 REPLACEMENT OF COMPONENTS

9.8 T1MER

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
3. Remove the two screws securing the timer to the control panel fascia.
4. Lift the timer out of the back of the fascia and disconnect the electrical leads, noting their position.
5. Re-assemble in reverse order using a new timer .refer to the wiring diagram, page 33, for electrical connections.
6. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.9 TEMPERATURE CONTROL POTENTIOMETERS/TEMPERATURE DISPLAY BOARD

The heating and hot water temperature control potentiometers form part of the temperature display board located on the back of the control panel fascia.

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
3. Pull the control knobs off the potentiometer spindles.
4. Remove the wiring connectors and carefully separate the board from the back of the fascia by pulling it off the two mounting pins.

Note: The new board is supplied with a set of mounting pins.

5. Fit the wiring connectors to the new board and fit the board onto the two mounting pins on the rear of the fascia. Replace the control knobs (the knobs can only be fitted in one position).
6. Close the control panel fascia and secure in position.
7. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.10 SWITCHES

The same procedure applies to both the On/Off and 'Heating switches.

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
3. Disconnect the electrical leads from the back of the switch, noting their position.
4. Note which way round the switch is fitted, then squeeze together the locating tabs on the back and push it out of the control panel
5. Push in a replacement switch from the front, ensuring it is the correct way round and connect the electrical leads .refer to the wiring diagram, page 32, for electrical connections.
6. Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.11 LOCK-OUT RESET SWITCH

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
3. Disconnect the leads from the reset switch.
4. Squeeze together the locating tabs around the back and push it out of the control panel.
5. Push in a replacement switch from the front, ensuring it is located correctly in the control panel.
6. Connect the electrical leads to the new switch as below
White - Terminal 1 Green - Terminal 2 Blue - Terminal 3
7. Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.12 IGNITION CONTROL UNIT

The ignition control unit is mounted on the right hand side of the gas valve (see Fig. 21) and is connected directly to the valve via a 5-way plug. There are no servicable parts inside the plastic enclosure.

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down).
3. Remove the two screws securing the control box and lift the box from its hinges.
4. Remove the single screw securing the ignition board enclosure to the gas valve. Unclip and remove the top cover from the ignition board housing.
5. Remove the two securing screws and remove the cable clamp.
6. Disconnect the two plugs from the 1 2-way connector.
7. Disconnect the ignition lead (white) and the flame detection lead (blue) from the ignition board.
8. Unplug the ignition board from the gas valve and remove.
9. Fit the replacement ignition board onto the gas valve and re-assemble in reverse order.
10. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.13 MAIN DRIVER BOARD

The main driver board is positioned in the control box at the back R/H side.

- 1 Ensure that the electricity supply has been isolated.
- 2 Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
- 3 Unplug all the wiring connections from the circuit board.
- 4 Carefully lift the board off its mounting pillars (one each corner).
- 5 Re-assemble in reverse order using a new board. Refer to the wiring diagram, page 33, for electrical connections. Do not use excessive force when re-making the board connections and ensure all plugs are correctly connected.

Note: The burner pressure (in the central heating mode) will have to be reset as described in section 5.2. Also ensure the anti cycle timer setting is adequate for the system (see section 5.4) and the NG/LPG jumper on the main PCB is correctly set (see wiring diagram in section 10.2).

- 6 Test the boiler as described in section 7.5, paragraphs 1, 2 and 3.

9.14 INSPECTION WINDOW

- 1 Ensure that the electricity supply has been isolated.
- 2 Open the control panel cover (hinges down).
- 3 Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
- 4 Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
- 5 Cut away the silicone mounting with a sharp tool and remove the damaged window. Fit a new window using a suitable heatproof silicone and allow to dry as per the manufacturer's instructions.
- 6 Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1, 2 and 3.

9.15 GAS VALVE (See Fig. 21)

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down), then from underneath the boiler remove the six screws securing the bottom panel. **Note:** Depending upon the arrangement of the safety valve discharge pipe, it may be possible to lower the panel down over the pipe sufficiently to allow the control box to be hinged down. If this is not possible, the discharge pipe should be disconnected from the safety valve and the bottom panel assembly removed.
3. From underneath the boiler, undo the gas inlet manifold union nut.
4. Remove the two screws securing the control box and hinge down the box.
5. Disconnect the gas valve Modureg coil leads. Remove the screw securing the ignition control unit on the gas valve and disconnect the ignition control from the gas valve.
6. Undo the outlet manifold union (just below the sealed chamber) and withdraw the gas valve assembly out of the boiler.
7. Unscrew and remove the inlet and outlet manifolds and transfer them to the new gas valve, using new gaskets.
8. Re-assemble in reverse order. **Note:** The 'earth' tag is not used.
9. **Check the Softlite setting** (see Fig. 21) arrow up for Propane and Natural gas.
10. Refer to section 9.15.2 to test for gas soundness and set the burner pressures.

9.15.1 MODUREG HEAD ONLY (See Fig. 21)

1. Ensure that the electricity and gas supplies have been isolated.
2. Open the control panel cover (hinges down), then from underneath the boiler remove the six screws securing the bottom panel.
Note: Depending upon the arrangement of the safety valve discharge pipe, it may be possible to lower the panel down over the pipe sufficiently to allow the control box to be hinged down. If this is not possible, the discharge pipe should be disconnected from the safety valve and the bottom panel assembly removed.
3. Remove the two screws securing the control box and hinge down the box.
4. Disconnect the electrical leads from the Modureg head.
5. Remove the two screws securing the Modureg head to the gas valve and carefully lift off the complete Modureg assembly.
6. Fit the new assembly, ensuring that the gasket is in position and secure in position using the two screws previously removed.
7. Reconnect the electrical leads (polarity not important).
8. Refer to section 9.15.2 to test for gas soundness and set the burner pressures.

9.15.2 SET THE BURNER PRESSURES

After replacing the gas valve or Modureg head, first test for gas soundness then set the burner pressures as follow:

1. Open the boiler gas service cock and test the union and inlet manifold connection to the gas valve for gas soundness.
2. Turn on the electricity supply and set the On/Off switch to On.
3. Fully open a hot water tap to light the boiler. Test the Modureg head connection and manifold connections at the gas valve for gas soundness. Close the hot water tap and set the On/Off switch to Off.
4. Loosen the burner setting pressure test point screw (see Fig. 14) on the gas valve and connect a pressure gauge.
5. Isolate the electricity supply to the boiler.
6. Remove the screw securing the Modureg head cover and lift off the cover. Remove the connector from the driver PCB (see section 10.2) or disconnect one of the electrical leads from the Modureg head.
7. Turn on the electricity supply and set the On/Off switch to On. Fully open a hot water tap and the burner will light and remain at its minimum rate. Turn the minimum burner pressure adjustment nut (see Fig. 21) to obtain the required burner pressure. Refer to section 1.2. Turn the nut clockwise to increase the pressure and then anticlockwise until the correct pressure is reached.
Note: Always set the minimum pressure first.
8. Close the hot water tap, isolate the electricity supply and replace the driver PCB connector or reconnect the electrical lead to the Modureg head.
9. Fully open a hot water tap and the burner will light, quickly increasing to its maximum rate. Turn the maximum burner pressure adjustment nut (see Fig. 21) to obtain the required maximum pressure. Refer to section 1.2. turn the nut clockwise to increase the pressure and then anticlockwise until required pressure is reached.
Note: Ensure that the minimum pressure adjustment nut does not turn when adjusting the maximum nut.
10. Close the hot water tap and set the On/Off switch to Off.
Disconnect the pressure gauge and retighten the test point screw.
11. Set the On/Off switch to On, fully open a hot water tap to light the boiler and test for gas soundness around the test point screw. Close the hot water tap.
12. Ensure the control box is secured then replace the control panel cover and bottom panel (if removed).
13. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

The burner pressure in the central heating mode (as set by the potentiometer .see section 5.3, paragraph 5) should not require adjusting after the gas valve or Modureg head have been replaced and the minimum and maximum burner pressures set.

9.16 OVERHEAT THERMOSTAT

The overheat thermostat bulb is clipped on the right hand side to the rear of the main heat exchanger, with the

thermostat body located inside the boiler control box on the left hand side.

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
3. Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
4. Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
5. Unclip the thermostat bulb from the heat exchanger.
6. Disconnect the electrical leads from the thermostat and remove the two screws securing it to the side of the control box.
7. Remove the thermostat from the control box withdrawing the capillary through the grommets in the back of the box and the bottom of the sealed chamber.
8. Carefully pass the new thermostat bulb through the grommet in the back of the control box, through the grommet in the bottom of the sealed chamber and secure it to the heat exchanger using the dip previously removed. Secure the new thermostat to the control box and reconnect the electrical leads to terminals C and 1 (the polarity is not important). Ensure the earth wire is also connected.
9. Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9 REPLACEMENT OF COMPONENTS

9.17 PUMP - a replacement pump must be set at setting 3

- 1 Ensure that the electricity supply has been isolated.
- 2 Drain the central heating circuit of the boiler as described in section 8.
- 3 Open the control panel cover (hinges down). Remove the two screws securing the control panel fascia and hinge down the fascia.
- 4 Remove the cover from the wiring connector and disconnect the three wires from the pump.
- 5 Undo the pipe unions from the pump and withdraw the pump.
- 6 Re-assemble in reverse order using a new pump with new seals.
Ensure the pump is fitted the correct way up the direction of flow is upwards.
- 7 Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
- 8 Replace the control panel fascia.
- 9 Re-assemble in reverse order and test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.18 3-WAY VALVE (See Fig. 22)

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down), then from underneath the boiler remove the six screws securing the bottom panel. Disconnect the safety valve discharge pipe and remove the bottom panel assembly.
3. Remove the two screws securing the control box and hinge down the box.
4. Remove the DHW flow switch from the 3-way valve as described in section 9.7, paragraphs 2 to 4.
5. Drain the hot water and central heating circuits as described in section 8, and undo the lower pump union.
6. Disconnect the electrical leads from the DHW temperature sensor on the valve and remove the union securing the pressure gauge sensor to the valve.
7. From underneath the boiler loosen the three clamp screws securing the valve to the water connections.
8. Withdraw the valve assembly forward to disengage it from the water connections. Take care as a small amount of water may be left in the boiler.

Important: Be careful not to lose the spring and valve from the by-pass connection when removing the valve (see Fig. 22).

9. Remove the plastic cover from primary water flow switch and disconnect the electrical leads. When connecting the electrical leads to the new switch polarity is not important, but use only the outer terminals.
10. Remove the DHW temperature sensor from the valve and fit to the new valve using a small amount of thread sealant.
11. Re-assemble in reverse order using new 'O' rings. Ensure that the by-pass valve and spring are in position.
12. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8, then open the cold water mains inlet valve.
13. Replace the control box, bottom panel assembly and reconnect the safety valve discharge pipe.
14. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

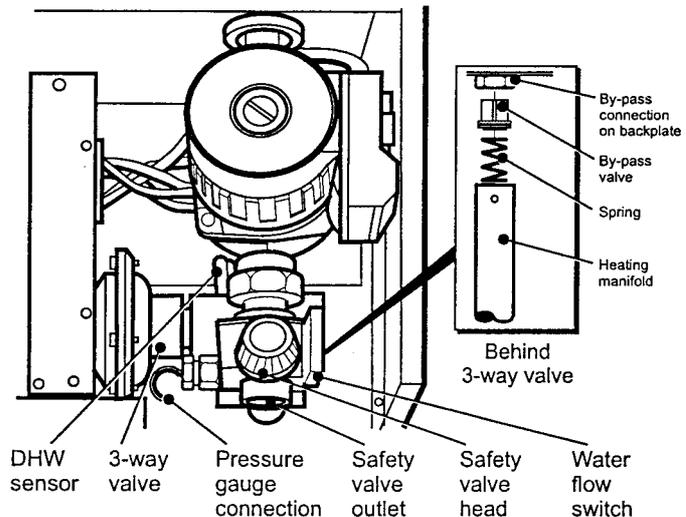


Fig. 22

9.19 TEMPERATURE SENSORS

The DHW temperature sensor is positioned on the top of the 3-way valve. The CH temperature sensor is positioned on the main heat exchanger outlet at the left hand side towards the back of the boiler. Both sensors are the same.

DHW sensor (see Fig. 22)

1. Ensure that the electricity supply has been isolated.
2. Drain the hot water circuit as described in section 8.
3. Open the control panel cover (hinges down), then from underneath the boiler remove the six screws securing the bottom panel.

Note: Depending upon the arrangement of the safety valve discharge pipe, it may be possible to lower the panel down over the pipe sufficiently to allow the control box to be hinged down. If this is not possible, the discharge pipe should be disconnected from the safety valve and the bottom panel assembly removed.

9 REPLACEMENT OF COMPONENTS

4. Disconnect the electrical leads from the DHW sensor.
5. Unscrew the sensor and fit a replacement, using a small amount of thread sealant. Take care removing the sensor as the 3-way valve might still contain a small amount of water.
Reconnect the electrical leads (polarity is not important) and re-assemble in reverse order.
6. Open the cold water mains inlet valve.
7. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

CH sensor

1. Ensure that the electricity supply has been isolated.
2. Drain the central heating circuit of the boiler as described in section 8.
3. Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
4. Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
5. Disconnect the electrical leads from the CH sensor.
6. Unscrew the sensor and fit a replacement, using a small amount of thread sealant.
Reconnect the electrical leads (polarity is not important) and re-assemble in reverse order.
7. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
8. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.20 PRIMARY WATER FLOW SWITCH

The primary water flow switch is positioned on the heating manifold immediately below the pump connection.

1. Ensure that the electricity supply has been isolated.
2. Open the control panel cover (hinges down).
3. Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
4. Remove the screws securing the bottom panel to the right hand side panel and remove the screw securing the bottom of the side panel to the chassis. Slide the panel up slightly and remove it from the boiler.
5. Remove the two screws securing the control panel fascia and hinge down the fascia.
6. Remove the plastic cover from the water flow switch and slide the microswitch from its housing pins.
Disconnect the electrical leads and connect to the new switch (polarity is not important, but use only the two outer terminals).
7. Carefully move the operating lever away to allow the microswitch to locate on its housing pins.
8. Re-assemble in reverse order.
9. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8, then open the cold water mains inlet valve.
10. Replace the control panel.
11. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.21 PRESSURE GAUGE

1. Ensure that the electricity supply has been isolated.
2. Drain the central heating circuit of the boiler as described in section 8.
3. Remove the two screws securing the control panel fascia and hinge down the fascia.
4. Remove the union nut securing the pressure gauge sensor to the heating manifold, just to the left of the safety valve and withdraw the sensor.
5. Squeeze together the locating tabs on the back of the gauge and push the gauge out of the control panel fascia.
6. Push in a replacement gauge, ensuring it is the correct way round and replace the sensor securing it in place with union.
7. Replace the control panel.
8. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
9. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.22 SAFETY VALVE

1. Ensure that the electricity supply has been isolated.
2. Disconnect the discharge pipe from the safety valve.
3. Unscrew the safety valve from the 3-way valve.
4. Re-assemble in reverse order using a new valve.
5. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8. Turn the safety valve knob a couple of times to check that it re-seats properly without leaking. Re-pressurise the system if necessary.
6. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9 REPLACEMENT OF COMPONENTS

9.23 AUTOMATIC AIR VENT

The automatic air vent is positioned at the back of the boiler on the upper left hand side and is accessible without removing the case.

- 1 Ensure that the electricity supply has been isolated.
- 2 Drain the central heating circuit of the boiler as described in section 8.
- 3 Unscrew the automatic air vent from the fitting and replace with a new one using a new 'O' ring. Check that the small cap in the top of the air vent is screwed in fully, then unscrew it one complete turn - the cap remains in this position from now on.
- 4 Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
- 5 Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.24 COLD WATER INLET FILTER & FLOW RESTRICTOR (see Fig. 23)

A mesh filter is fitted in the mains cold water connection to the boiler. A flow restrictor is fitted in the same connection, but inside the boiler and is accessible only after removing the 3-way valve.

Ensure that the electricity supply has been isolated

To replace or clean the filter

1. Close the mains cold water inlet valve and drain the hot water circuit by opening a hot tap.
2. Disconnect the unions securing the cold water inlet valve pipe connector to the boiler and the valve. Remove the pipe, taking care as some water will still be in the pipework
3. Carefully remove the filter from fitting in the base of the boiler.
Clean or replace and re-assemble in reverse order.

Note: The filter must be fitted with the closed end facing into the connector on the boiler backplate.

4. Open the valve to fill the boiler.

To replace or clean the flow restrictor

1. Remove the 3-way valve as described in section 9.18, paragraphs 2 to 7.
2. Remove the restrictor by **carefully** prising it out using a small screwdriver from the front of the fitting. Clean or replace and re-assemble in reverse order.

Note: The restrictor must be fitted with the inner section facing into the connector on the boiler backplate.

3. Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
4. Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.25 EXPANSION VESSEL

The expansion vessel is positioned on the back of the boiler and is accessible from the top. At least 300 mm clearance is required above the boiler to remove the vessel. If this space is not available and you do not wish to remove the boiler from the wall, an additional vessel (7 litres capacity, pre-charged to 1.0 bar) should be connected outside the boiler in the central heating return pipe, as close to the boiler as possible.

- 1 Ensure that the electricity supply has been isolated.
- 2 If rear exit flue is used, disconnect the flue elbow from the flue and remove it from the top of the boiler.
- 3 Drain the central heating circuit of the boiler as described in section 8.
- 4 Unscrew and remove the automatic air vent.
- 5 Remove the screw securing the air pressure switch and carefully move the assembly aside.
- 6 Remove the one screw securing the expansion vessel retaining channel and withdraw the channel.
- 7 The expansion vessel is a push fit into its bottom fitting, remove by lifting the vessel up and out of the boiler.
- 8 Re-assemble in reverse order, using a new 'O' ring on the expansion vessel connection. The bottom connection of the expansion vessel should be towards the front of the boiler when fitting it.

Note: Ensure the expansion vessel is correctly located in the bottom fitting and that it is secured by the fixing channel.

- 9 Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
- 10 Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

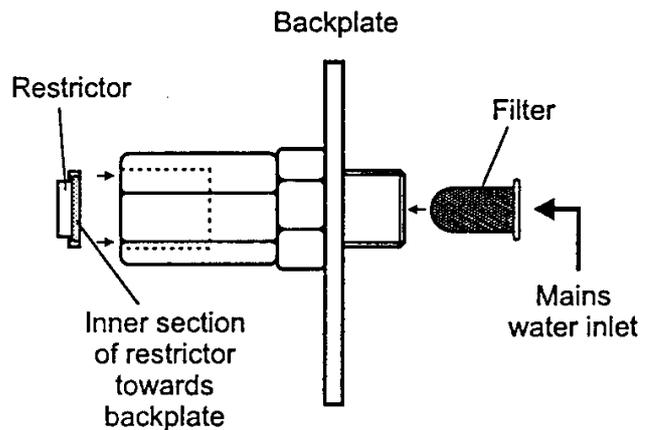


Fig. 23

9 REPLACEMENT OF COMPONENTS

9.26 MAIN HEAT EXCHANGER

Take care when handling the new heat exchanger not to damage the fins.

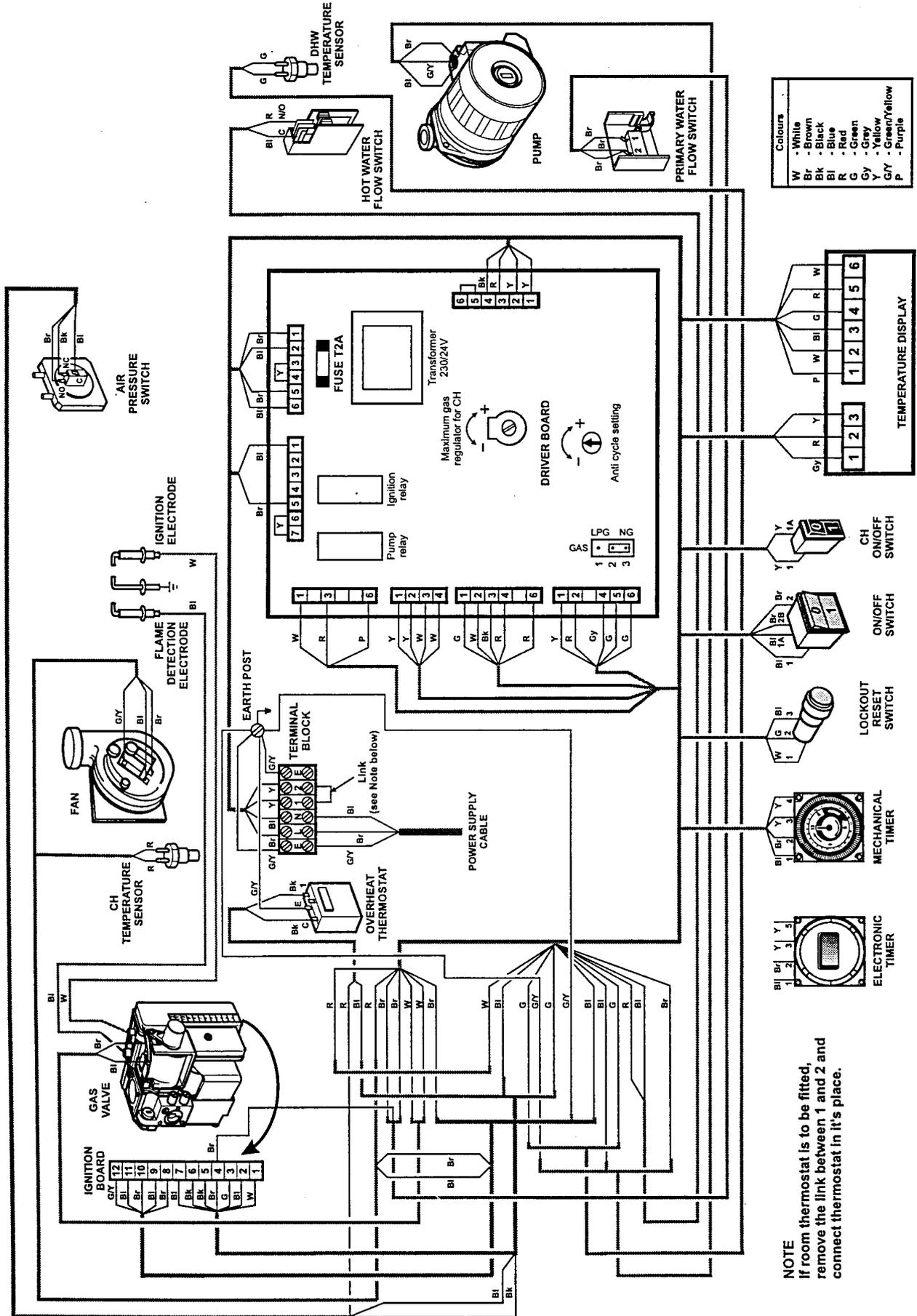
- 1 Ensure that the electricity supply has been isolated.
- 2 Drain the central heating circuit of the boiler as described in section 8.
- 3 Remove the two screws at the top of the case front panel securing it to the boiler. Slide the panel up as far as possible (25 mm) and withdraw it forwards away from the boiler.
- 4 Remove the eight screws securing the inner case front panel and remove the panel, take care not to damage the gasket.
- 5 Remove the six screws securing the combustion chamber front cover and remove the cover.
- 6 Disconnect the flue elbow from the flue and remove it from the top of the boiler
- 7 Remove the six screws securing the top of the sealed chamber and remove, take care not to damage the gasket.
- 8 Disconnect the air pressure switch sensing tubes from the fan noting their position.
- 9 Disconnect the electrical leads from the fan motor, noting their position.
- 10 Remove the remaining two screws (behind the flue hood) securing the flue hood to the combustion chamber. Lift up the fan and flue hood assembly to clear the heat exchanger and remove from the boiler.
- 11 Disconnect the electrical leads from the central heating thermostat (left hand side of the heat exchanger) and unclip the overheat thermostat bulb (on the right hand side of the heat exchanger).
- 12 Undo the small socket head grub screws, securing the heat exchanger to the inlet/outlet pipes, by about 3 turns.
- 13 Lift the right hand side of the heat exchanger up to clear the inlet pipe then withdraw it from the outlet pipe.
- 14 Transfer the central heating sensor and overheat thermostat bulb dip from the old heat exchanger to the new one.
- 15 Re-assemble in reverse order using new 'O' rings on the heat exchanger connections, ensuring the grub screws are correctly located and not over tightened. Also replace the flue seals and the seals to the boiler top cover if necessary.
Note: When reconnecting the air pressure switch sensing tubes to the fan connect the left (transparent) sensing tube to the upper connector (nearest the fan outlet) and the right (pink) tube to the lower connector.
- 16 Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
- 17 Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

9.27 COMBUSTION CHAMBER INSULATION PANELS

Refer to Health and Safety Information on page 2 and dampen the panels before carrying out any work on them.

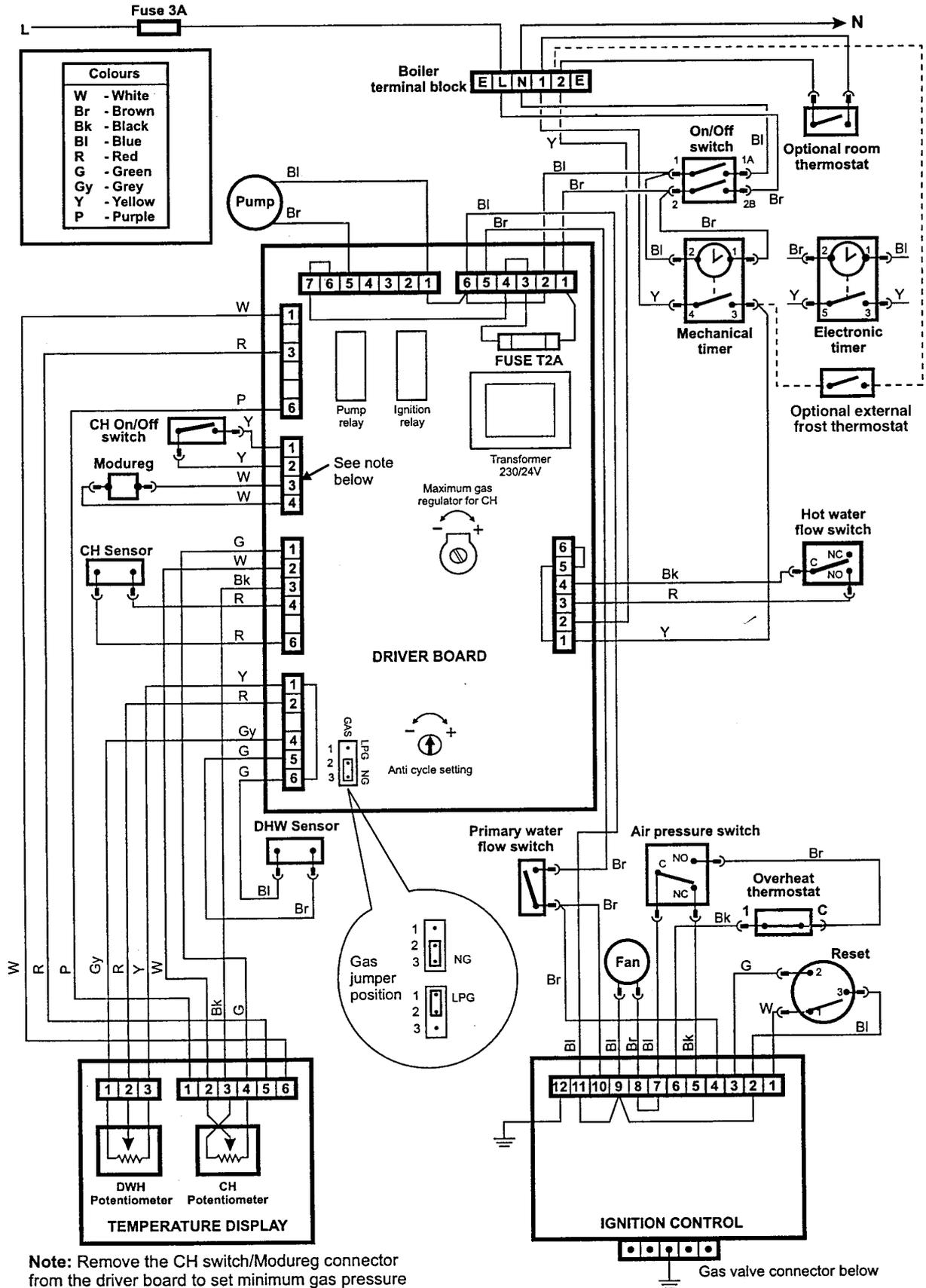
- 1 Ensure that the electricity supply has been isolated.
- 2 Remove the main heat exchanger as described in section 9.27, paragraphs 2 to 13.
- 3 Remove the rear panel by carefully pulling it out at the top and lifting out.
Remove the front and side panels in a similar way.
- 4 Insert the new panels bottom first then push back into position.
- 5 Re-assemble in reverse order, ensuring the heat exchanger grub screws are correctly located and not over tightened.
Note: When reconnecting the air pressure switch sensing tubes to the fan connect the left (transparent) sensing tube to the upper connector (nearest the fan outlet) and the right (pink) tube to the lower connector.
- 6 Fill the boiler and re-pressurise the system to between 0.8 and 1.5 bar (to match the original system pressure) as described in section 4.2, paragraphs 3 to 8.
- 7 Test the boiler as described in section 7.5, paragraphs 1,2 and 3.

10.1 ILLUSTRATED WIRING DIAGRAM

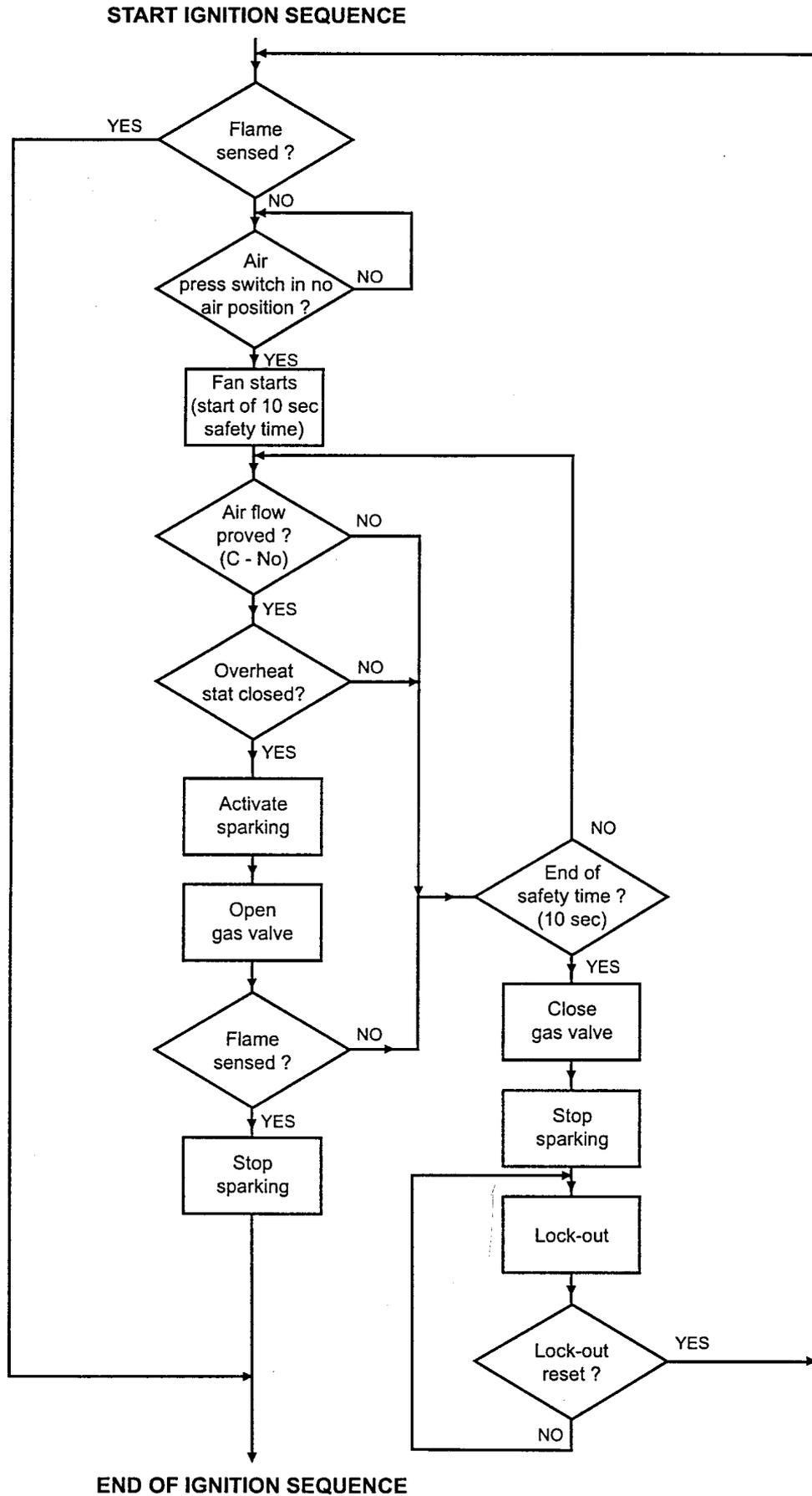


NOTE
If room thermostat is to be fitted, remove the link between 1 and 2 and connect thermostat in it's place.

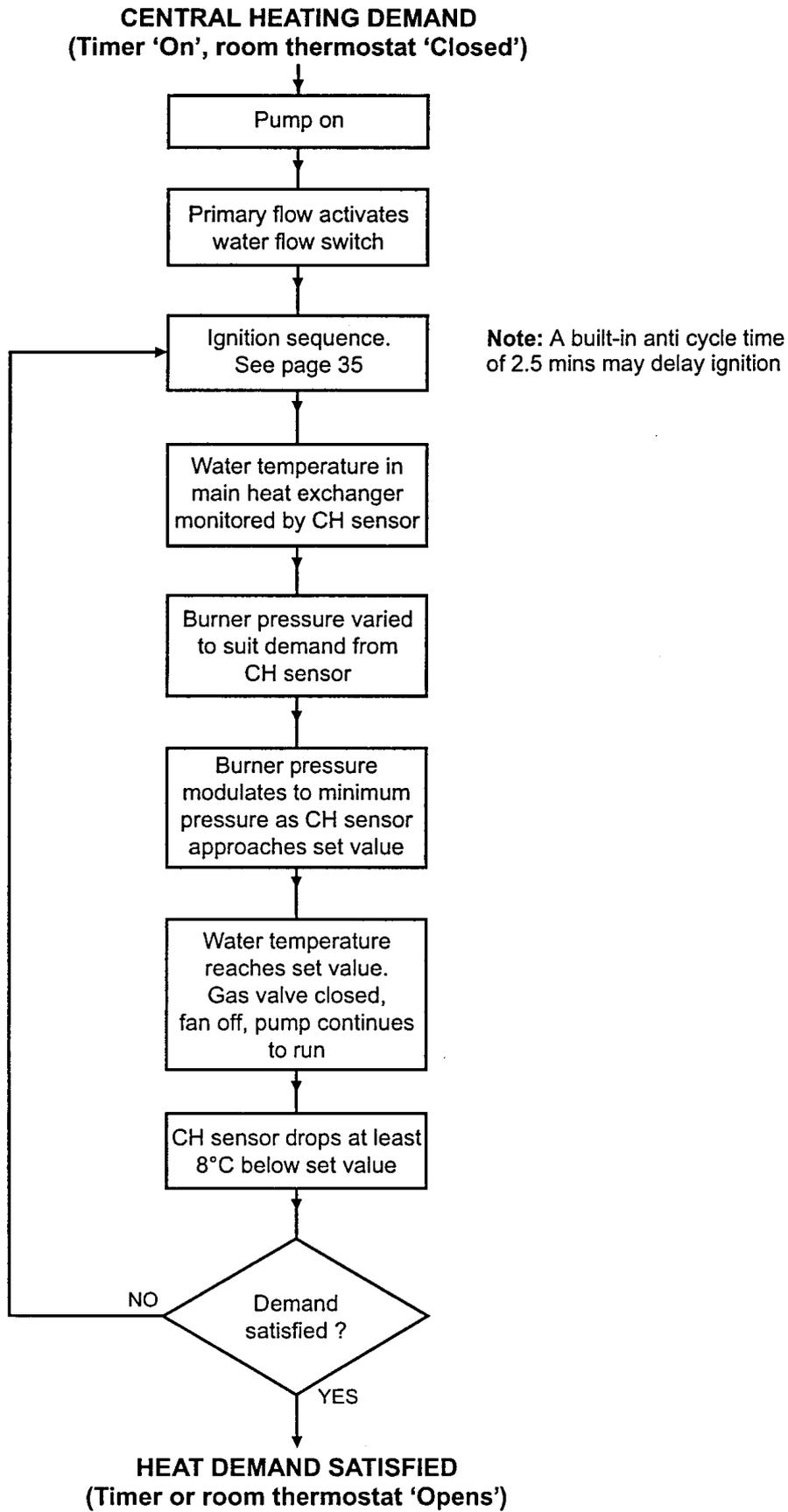
10.2 FUNCTIONAL FLOW WIRING DIAGRAM



11.1 AUTOMATIC IGNITION SEQUENCE

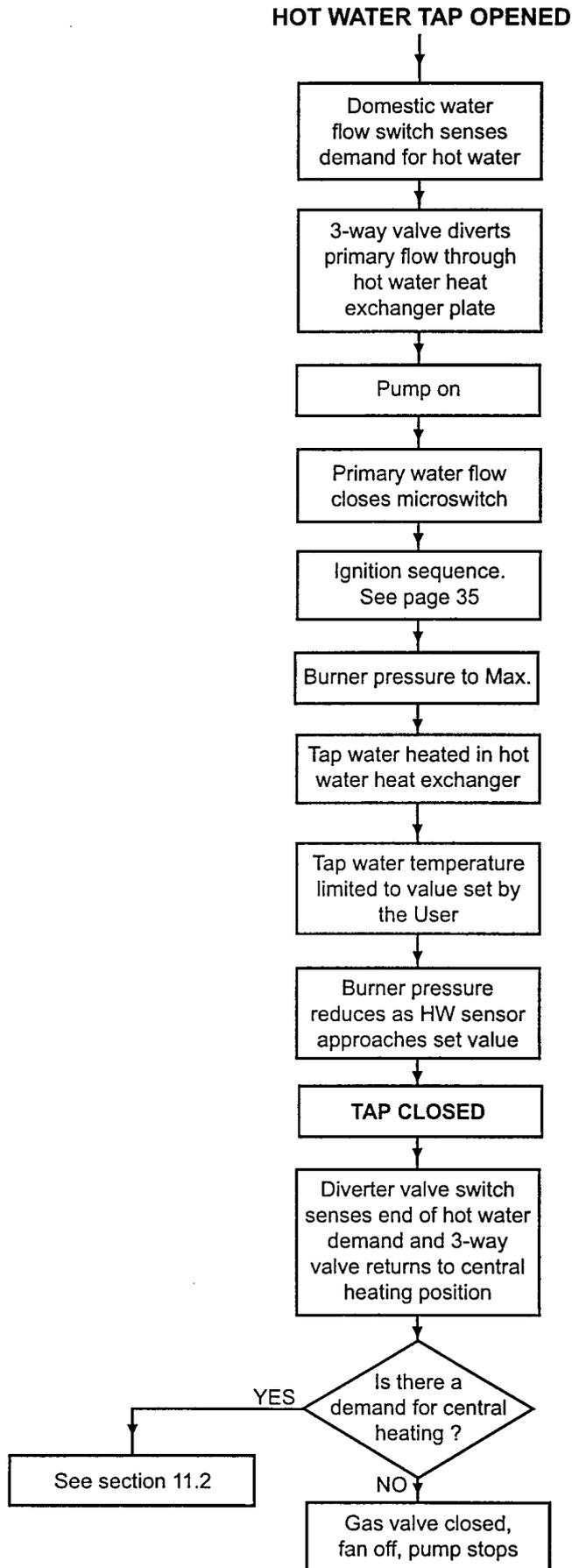


11.2 OPERATION IN CENTRAL HEATING MODE



Note: Pump overrun is 2.5 mins when heat demand is satisfied

11.3 OPERATION IN DOMESTIC HOT WATER MODE



12 FAULT FINDING

During the fault finding procedure the first electrical checks to be carried out are:- Short circuit, Polarity, Earth continuity and Resistance to earth. After completing a service or fault finding task which has required the breaking and remaking of electrical connections, the electrical checks must be repeated.

Preliminary check of mains voltage and switches – ensure timer is in an ‘on’ position and room thermostat (if fitted) is calling for heat.

BURNER WILL NOT LIGHT

Pump and fan not operating (but no lock-out)

Possible cause

Blown fuse on driver board

Seized pump

Airlock in pump/boiler

No power to pump

Faulty pump

Faulty driver board

Remedy

Check fuse, replace if necessary (green 20° LED flashes if fuse OK)

Check pump, free rotor or replace if necessary

Vent pump and boiler

Check electrical connections

Check 230V at pump, replace if necessary

Check 230V at board, replace if necessary

Pump operating, fan not operating (but no lock-out)

Possible cause

No power to ignition control board

Primary water flow switch not activated

Primary water flow switch faulty

No power to fan

Fan faulty

Air pressure switch faulty

Ignition control PCB faulty

Remedy

Check 230V output from driver board (pins 5 & 6 near fuse)

Check connections from driver board

Check operation of primary flow switch

Check switch continuity, replace if necessary

Check 230V output from ignition board (pins 8 & 9 on ignition PCB)

Check electrical connections to fan

Check continuity of wiring to fan

Check 230V at fan, replace fan if necessary

Check electrical connections to switch

Check continuity (N/C contact), replace if necessary

Check control, replace if necessary

Pump and fan operating followed by boiler lock-out

Possible cause

Air pressure switch faulty

Blocked air pressure switch tubes

Air switch tubes incorrectly connected

Flue system blocked or obstructed

Fan Venturi blocked

Overheat thermostat contacts open

No gas at burner

No electrical supply to gas valve

Gas valve faulty

No spark at electrode (but gas valve heard to operate)

Ignition control PCB faulty

Remedy

Check electrical connections to switch

Check continuity (N/O contact), replace if necessary

Check and rectify as necessary

If boiler is hot, allow to cool and re-check

Check switch continuity, replace if necessary

Check gas service cock is open

Check cock at meter is open

Check for gas pressure at burner test point

Check ignition control is correctly fitted on gas valve

Check valve, replace if necessary

Check ignition lead connections, rectify as necessary

Check ignition lead continuity, replace if necessary

Check electrode setting and rectify as necessary

Check earthing electrode and rectify as necessary

Check control, replace if necessary

12 FAULT FINDING

BURNER LIGHTS AND THEN GOES TO LOCK-OUT

Possible cause	Remedy
Flame not detected	Check position of electrode and adjust as necessary Check sensing lead connections, rectify as necessary Check sensing lead continuity, replace if necessary Ignition module faulty - replace
Polarity of electrical supply reversed	Check and rectify as necessary

BURNER WILL NOT LIGHT FOR HOT WATER

Possible cause	Remedy
Insufficient water flow	Fully open hot tap and check operation Check water inlet isolating valve is fully open Check mains stop cock is fully open
Cold inlet filter blocked	Remove filter to check and clean as necessary
Low water supply pressure (less than 1 bar)	Remove water flow restrictor
Diverter valve microswitch not activated	Check plastic cap is present on valve push rod
Diverter valve seized or diaphragm failed	Check valve, rectify or replace as necessary
Diverter valve microswitch faulty	Check electrical connections, rectify as necessary Check switch continuity, replace if necessary
Heating on/off switch faulty	Check continuity (HW position), replace if necessary
Hot water sensor faulty	Check electrical connections, rectify as necessary Check sensor (see note below), replace if necessary
Driver board faulty	Check board, replace if necessary

BURNER WILL NOT LIGHT FOR HEATING

Possible cause	Remedy
Heating on/off switch set to 'Hot water only'	Check switch and reset as necessary
Heating on/off switch faulty	Check electrical connections, rectify as necessary Check continuity, replace if necessary
Heating timer not set to 'On'	Check timer setting and reset as necessary
Heating timer faulty	Check electrical connections, rectify as necessary Check switch continuity, replace if necessary
Room thermostat not set to 'On'	Check setting of thermostat and reset as necessary
Room thermostat faulty	Check wiring and connections, rectify as necessary Check switch continuity, replace if necessary
Link 1-2 not fitted (when no start fitted)	Check and rectify as necessary
Heating sensor faulty	Check electrical connections, rectify as necessary Check sensor (see note below), replace if necessary
Driver board faulty	Check board, replace if necessary

NOTE: Temperature sensor resistance - 10 kohms at 20°C

If sensor is short circuited red temperature LED indicator on the control panel blinks continuously

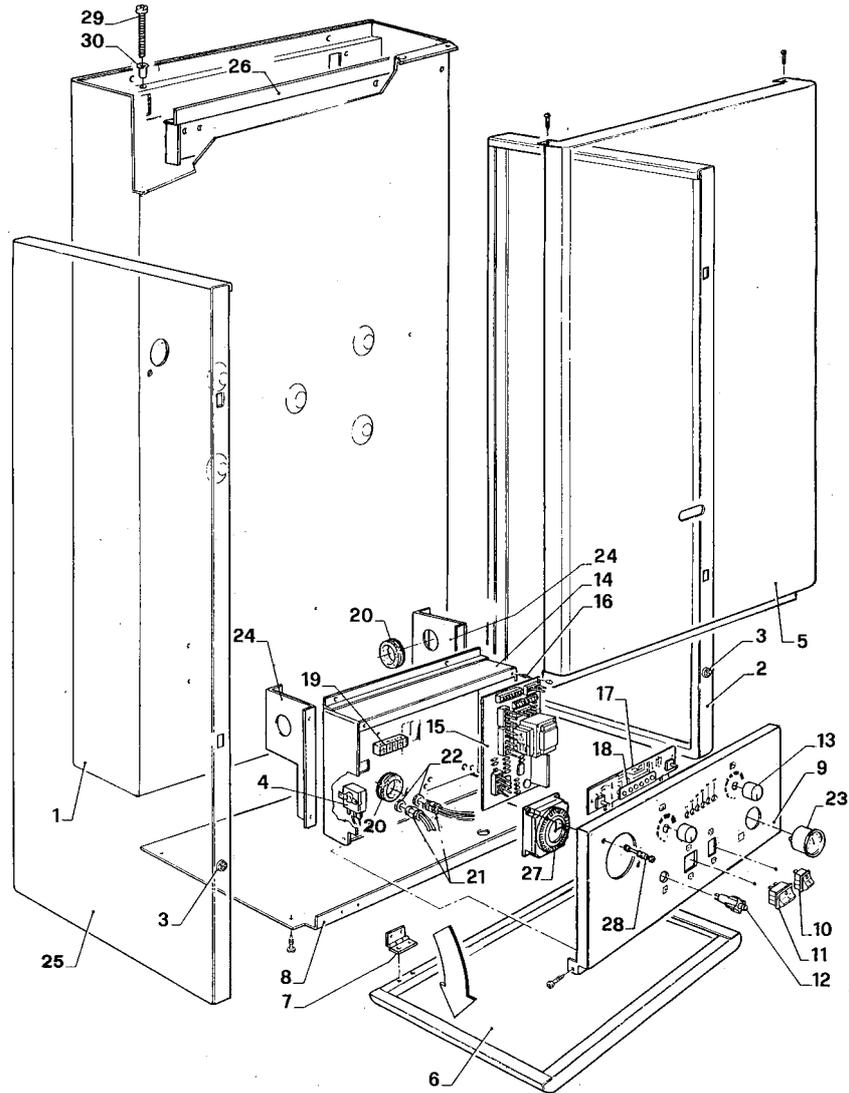
If sensor is open circuit green temperature LED indicator on the control panel blinks continuously
(green LED also blinks when boiler is cold, i.e. water temperature is less than 20°C)

DOMESTIC HOT WATER NOT HOT ENOUGH

Possible cause	Remedy
Hot water temperature control set too low	Check control setting and adjust as necessary
Water flow too great	Check flow regulator is fitted, fit it necessary Reduce flow at cold water inlet valve
Insufficient gas supply	Check inlet/outlet gas pressure with boiler running NB: Refer to section 1 for gas rates and pressures Check gas pipe size/length, rectify as necessary Check meter outlet pressure, rectify as necessary
Diverter valve 'letting by'	Check valve, rectify or replace as necessary
By-pass valve open	Check valve, rectify or replace as necessary

13 EXPLODED VIEWS AND PARTS LISTS

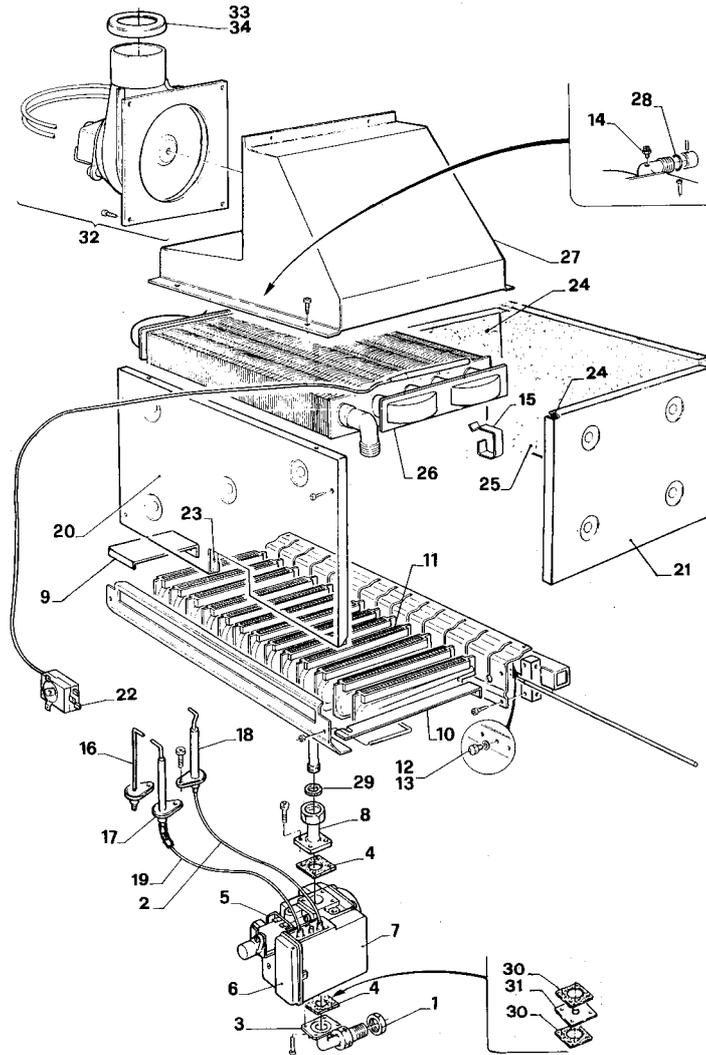
13.1 CASING AND ELECTRICS



No.	P. No. 80E	P. No. 96E	Q.ty	Description
1	50000553	51000554	1	CHASSIS
2	50000472		1	SIDE PANEL-RH
3	50000270		2	MAGNETIC CATCH
4	50000895		1	OVERHEAT THERMOSTAT
5	50000483	51000484	1	CASE UPPER FRONT PANEL
6	50000600	51000601	1	CASE LOWER FRONT PANEL
7	50000400		2	LOWER FRONT PANEL HINGE
8	50000063	51000064	1	CASE BOTTOM PANEL
9	50000655	51000656	1	FASCIA PANEL
10	14000501		1	HW ONLY/HEATING & HOT WATER SWITCH
11	14000502		1	ON/OFF SWITCH
12	18022103		1	LOCK-OUT RESET SWITCH
13	50000915		2	CONTROL KNOB
14	50000560		1	CONTROL BOX BODY
15	50000910		1	MAIN DRIVER BOARD
16	40000455		4	PCB MOUNTING PILLAR
17	50000920		1	CONTROL POTENTIOMETER BOARD/TEMP. DISPLAY
18	50000415		6	LCD SURROUND/RETAINER
19	50000930		1	TERMINAL BLOCK
20	20000210		3	GROMMET Ø 40
21	50000330		2	CABLE GLAND
22	50000340		2	NUT FOR CABLE GLAND
23	40000390		1	PRESSURE GAUGE
24	50000660		2	CONTROL BOX SUPPORT BRACKET.
25	50000473		1	SIDE PANEL-LH
26	50000975		1	WALL BRACKET
27	50000520		1	TIMER (MECHANICAL)
27	50000525		1	TIMER (ELECTRONIC)
28	50000805		2	TIMER FIXING
29	10070560		2	SCREW PAN HD POZI M5x60
30	10050520		2	TAPPED BUSH

13 EXPLODED VIEWS AND PARTS LISTS

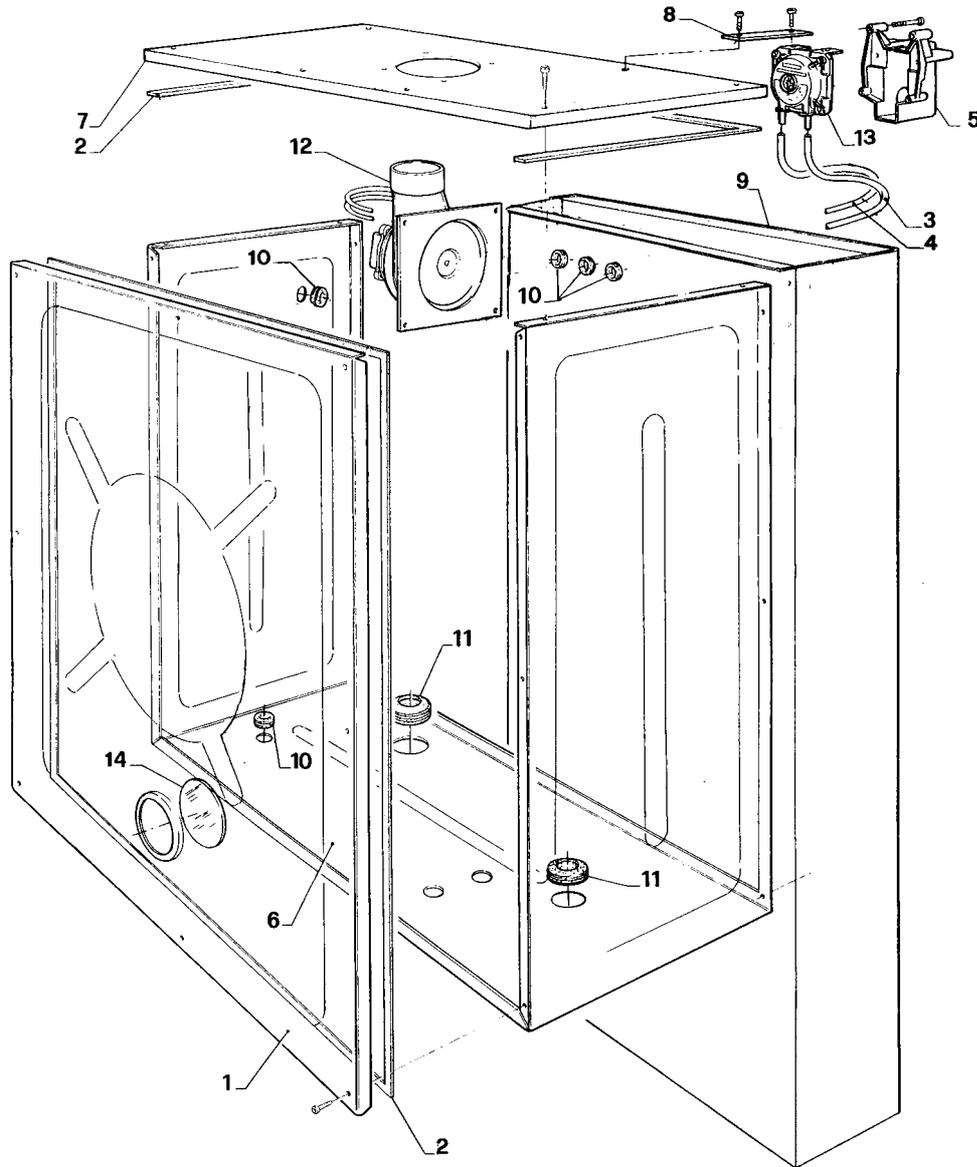
13.2 GAS COMPONENTS



No.	P. No. 80E	P. No. 96E	Q.ty	Description
1	18030310		1	LOCKING NUT 3/4" BSP
2	18022084		1	FLAME DETECTION ELECTRODE LEAD
3	50000613		1	GAS VALVE INLET MANIFOLD
4	50000630		2	GAS VALVE MANIFOLD GASKET (NG)
5	50000730		1	GAS VALVE NG/LPG
6	50000940		1	IGNITION CONTROL UNIT COVER
7	50000870		1	IGNITION CONTROL UNIT
8	50000623		1	GAS VALVE OUTLET MANIFOLD
9	51000446		1	BURNER CLOSURE PANEL - LH
10	50000670		1	BURNER CLOSURE PANEL - RH
11	50000577	51000578	1	BURNER
12	18011216		13/15	BURNER INJECTOR (NG) 125
13	18011102		13/15	BURNER INJECTOR (LPG) 75
14	50000160		1	CH/HW TEMPERATURE SENSOR
15	50000705		1	THERMOSTAT PHIAL RETAINING CLIP
16	18011515		1	IGNITION EARTH ELECTRODE
17	18011511		1	ELECTRODE IGNITION SPARK
18	18011510		1	ELECTRODE-FLAME DETECTOR
19	18022083		1	IGNITION ELECTRODE LEAD (WHITE)
20	50000703	51000704	1	COMBUSTION CHAMBER PANEL - FRONT
21	50000535	51000536	1	COMBUSTION CHAMBER PANEL - SIDE/REAR
22	50000895		1	OVERHEAT THERMOSTAT
23	50000173	51000172	1	INSULATION PANEL - FRONT
24	50000181		2	INSULATION PANEL - SIDE
25	50000178	51000177	1	INSULATION PANEL - REAR
26	50000105	51000106	1	MAIN HEAT EXCHANGER
27	50000740	51000028	1	FLUE HOOD
28	40000095		2	O-RING (3081)
29	18050045		1	GAS VALVE INLET MANIFOLD GASKET (LPG) 18,5x11,5x2
30	40000980		2	GASKET (LPG)
31	50000773	40000965	1	ORIFICE PLATE (LPG)
32	40000920	41000921	1	FAN ASSEMBLY
33	50000755	-	1	RESTRICTOR - ALL FLUE
34	-	51000756	1	RESTRICTOR - COAXIAL FLUE

13 EXPLODED VIEWS AND PARTS LISTS

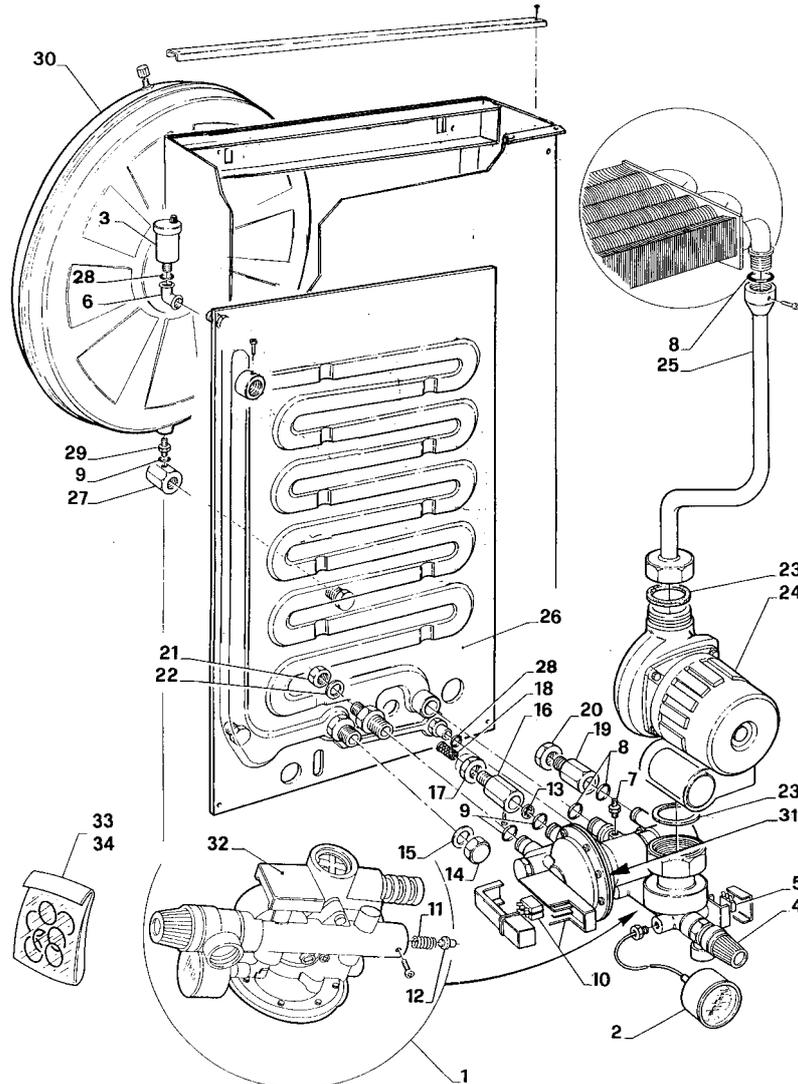
13.3 SEALED COMBUSTION CHAMBER



No.	P. No. 80E	P. No. 96E	Q.ty	Description
1	50000045	51000046	1	SEALED CHAMBER FRONT COVER
2	18010225		mt.	SEALED CHAMBER SEAL 4x6
3	40000960		1	PRESSURE SWITCH SENSING TUBE (CLEAR) 4x8 L=240
4	40000963		1	PRESSURE SWITCH SENSING TUBE (RED) 4x8 L=240
5	40000923		1	PRESSURE SWITCH COVER
6	50000030	51000031	1	SEALED CHAMBER BASE/SIDES
7	50000035	51000036	1	SEALED CHAMBER TOP PANEL
8	50000518		1	PRESSURE SWITCH MOUNTING BRACKET
9	50000553	51000554	1	CHASSIS
10	18052115		5	GROMMET (SMALL)
11	18052119		2	GROMMET (LARGE)
12	40000920	41000921	1	FAN ASSEMBLY
13	40000925	41000926	1	PRESSURE SWITCH
14	18010712		1	VIEWING WINDOW

13 EXPLODED VIEWS AND PARTS LISTS

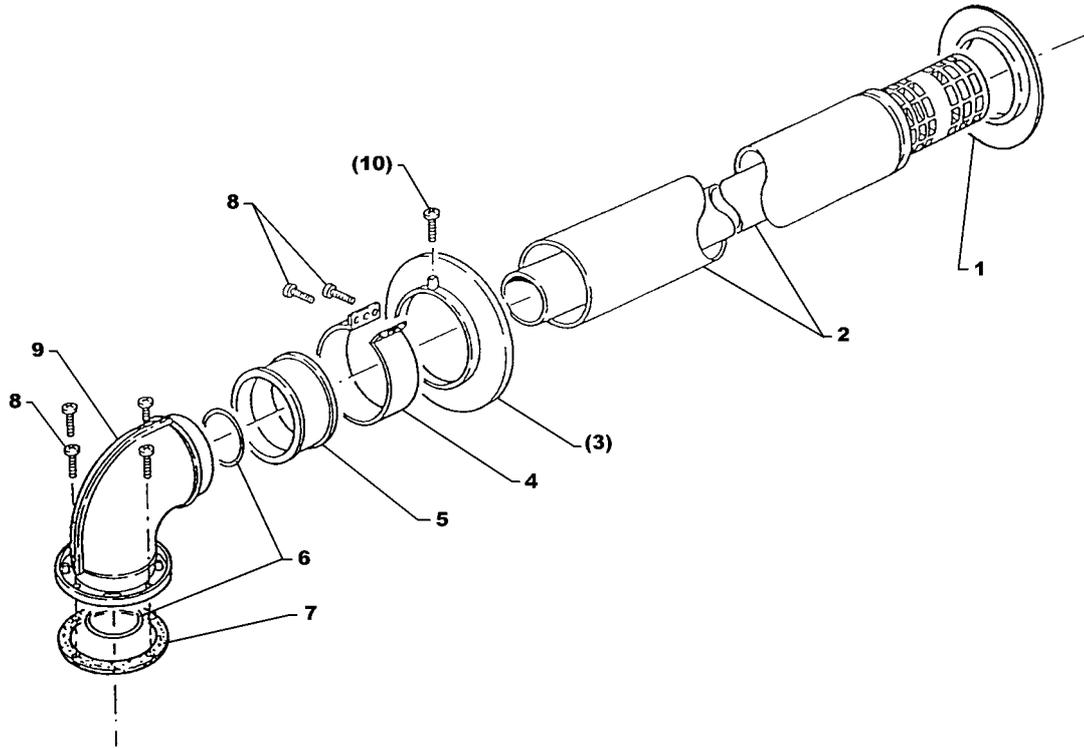
13.4 WATER COMPONENTS



No.	P. No. 80E	P. No. 96E	Q.ty	Description
1	50000119		1	DIVERTER VALVE ASSEMBLY
2	40000390		1	PRESSURE GAUGE
3	18020150		1	AUTOMATIC AIR VENT 3/8"
4	18020200		1	SAFETY VALVE 1/2" 3 bar
5	18021033		1	PRIMARY WATER FLOW MICROSWITCH
6	40000410		1	ELBOW
7	50000160		1	CH/HW TEMPERATURE SENSOR
8	40000095		3	O-RING (3081)
9	50000385		3	O-RING (3043)
10	50000425		1	DOMESTIC WATER FLOW MICROSWITCH
11	10020015		1	BY-PASS SPRING
12	18020130		1	BY-PASS VALVE
13	50000190	18020500	1	FLOW RESTRICTOR
14	50000370		1	BLANKING CAP 1/2" BSP
15	18050045		1	FIBRE WASHER 1/2"
16	50000080		1	COLD WATER INLET CONNECTOR 1/2" BSP
17	18030320		1	LOCKING NUT 1/2" BSP
18	50000185		1	COLD WATER INLET FILTER
19	50000075		1	CH RETURN CONNECTOR 3/4" BSP
20	18030310		1	LOCKING NUT 3/4" BSP
21	50000365		1	BLANKING CAP 3/8" BSP
22	50000465		2	FIBRE WASHER 3/8"
23	18050120		2	PUMP SEALING WASHER 1"
24	50000355		1	PUMP
25	50000100	51000101	1	PIPE - PUMP TO MAIN HEAT EXCHANGER
26	50000110		1	DHW HEAT EXCHANGER
27	50000090		1	EXPANSION VESSEL CONNECTOR
28	40000090		2	O-RING (3050)
29	50000098		1	EXPANSION VESSEL CONNECTOR ADAPTOR
30	50000205		1	EXPANSION VESSEL 7 LITRES
31	18020054		1	DIVERTER VALVE DIAPHRAGM
32	18010999		1	FLOW MICROSWITCH BOX
33	18020055		1	DIVERTER VALVE PACK
34	90020018		1	O-RINGS PACK

13 EXPLODED VIEWS AND PARTS LISTS

13.5 HORIZONTAL FLUE (CO-AXIAL)



N.	P.No.	Q	Description
1	FH004	1	Outer wall seal
2	FH002	1	Concentric flue pipe 100/80 mm
3	FHV005	1	Inner wall seal (optional)
4	FHV008	1	Flue clamp - Elbow to pipe
5	FHV009	1	Stepped flue seal - elbow to pipe
6	FHV007	2	'O' ring 80 mm - inner flue seal
7	FHV006	1	Gasket - flue elbow to boiler
8	FHV010	6	Screw pan hd pozi No.8 x 11
9	FH003	1	90° flue elbow
10	FHV031	1	Screw pan hd pozi M3 x 10 (optional)

14 PACKING LISTS

14.1 BOILER PACK

Containing:	Qty.	Part No.
Boiler complete with timer	1	-
Installation and Servicing manual	1	18000050
Users Operating manual	1	18000060
Guarantee card	1	18000110
Wall mounting template	1	50000925
Wall mounting bracket	1	50000975
Flue restrictor (standard co-axial flue) 80E	1	50000755
Flue restrictor (standard co-axial flue) 96E	1	51000756

14.2 BOILER FITTINGS PACK

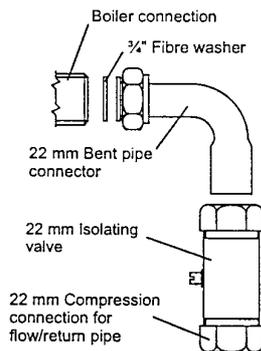
Containing:-	Qty.	Part No.
Gas cock	1	50000955
Flow/return valve	2	50000935
Cold water inlet valve	1	50000945
22 mm pipe connector flow/return (see below)	2	90020057
15 mm pipe connector for cold and hot water (see below)	2	90020058
15 mm pipe connector for gas (see below)	1	90020059
3/4 in. fibre washer (flow/return connections)	2	18050020
1/2 in. fibre washer (hot/cold water connections)	3	18050045
No.10 x2½ in.csk hd screw (wall bracket fixing)	2	10040910
No.10 x2½ in.csk md screw (wall bracket fixing)	2	10040920
No.10 wall plug	4	10040930
Metal washer for No.10 screw	2	10050025

14.3 STANDARD FLUE KIT

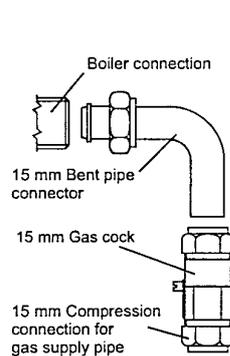
Containing:	Qty.	Part No.
1 metre horizontal flue pipe assembly	1	FH002
90° flue elbow	1	FHV003
Gasket (elbow to boiler)	1	FHV006
Inner 'O' ring (red)	2	FHV007
Flue clamp	1	FHV008
Sealing sleeve (elbow to pipe)	1	FHV009
Outer wall sleeve	1	FH004
No.8 x 1/2 in. pan hd pozi screw	6	FHV010

GAS AND WATER PIPE CONNECTIONS

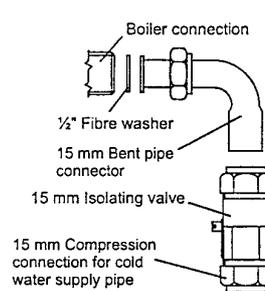
Heating flow and return



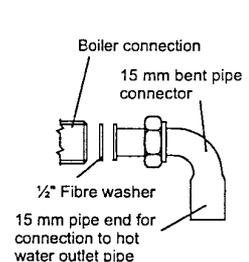
Gas inlet



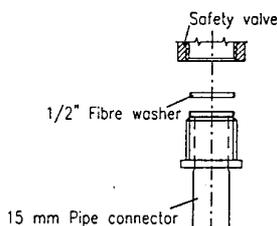
Cold water inlet



Hot water outlet



Safety valve exhaust



15 INFORMATION FOR PROPANE (G31) BOILERS

The following instructions, specific to Propane boilers, **must** be read in conjunction with the standard Installation and Servicing instructions in this manual.

15.1 NOMINAL BOILER RATINGS - Propane (G31)

Model	Heat Output		Heat input		Burner pressure		Gas rate
	kW	Btu/h	kW	Btu/h	mbar	in wg	m ³ /h
Solar 80E	11.05	37 700	13.59	46 350	8.0	3.2	0.51
	15.00	51 200	18.44	62 900	14.0	5.6	0.69
	23.30	79 500	27.80	94 850	29.0	11.7	1.04
Solar 96E	12.21	41 650	15.22	51 900	7.7	3.1	0.57
	18.09	61 700	23.55	76 950	15.5	6.2	0.85
	28.40	96 900	33.59	114 000	35.6	14.3	1.26

Gas rate based on a gross calorific value of 95.79 MJ/m³(G31)

15.2 REGULATIONS TO COMPLY WITH

As section 2.2 with the following addition:

BS 5482:1:1994 Domestic propane gas burning installations at permanent dwellings

15.3 GAS SUPPLY

The maximum propane requirements of the boilers are as follows:

Solar 80E 1.04 m³/h, Solar 96E 1.26 m³/h

The gas storage vessel and supply pipes must be capable of delivering this quantity of gas in addition to the demand from any other appliances in the house. A 22 mm supply pipe will be necessary for the majority of installations, but reference should be made to BS 5482:1994 for detailed guidance on gas pipe sizing.

The regulator should ensure a dynamic pressure of 37 mbar at the inlet of the gas valve in the boiler. The complete installation must be tested for gas soundness and purged as described in BS 5482.

All screwed gas fittings must be made using an approved propane sealant.

15.4 BOILER LOCATION

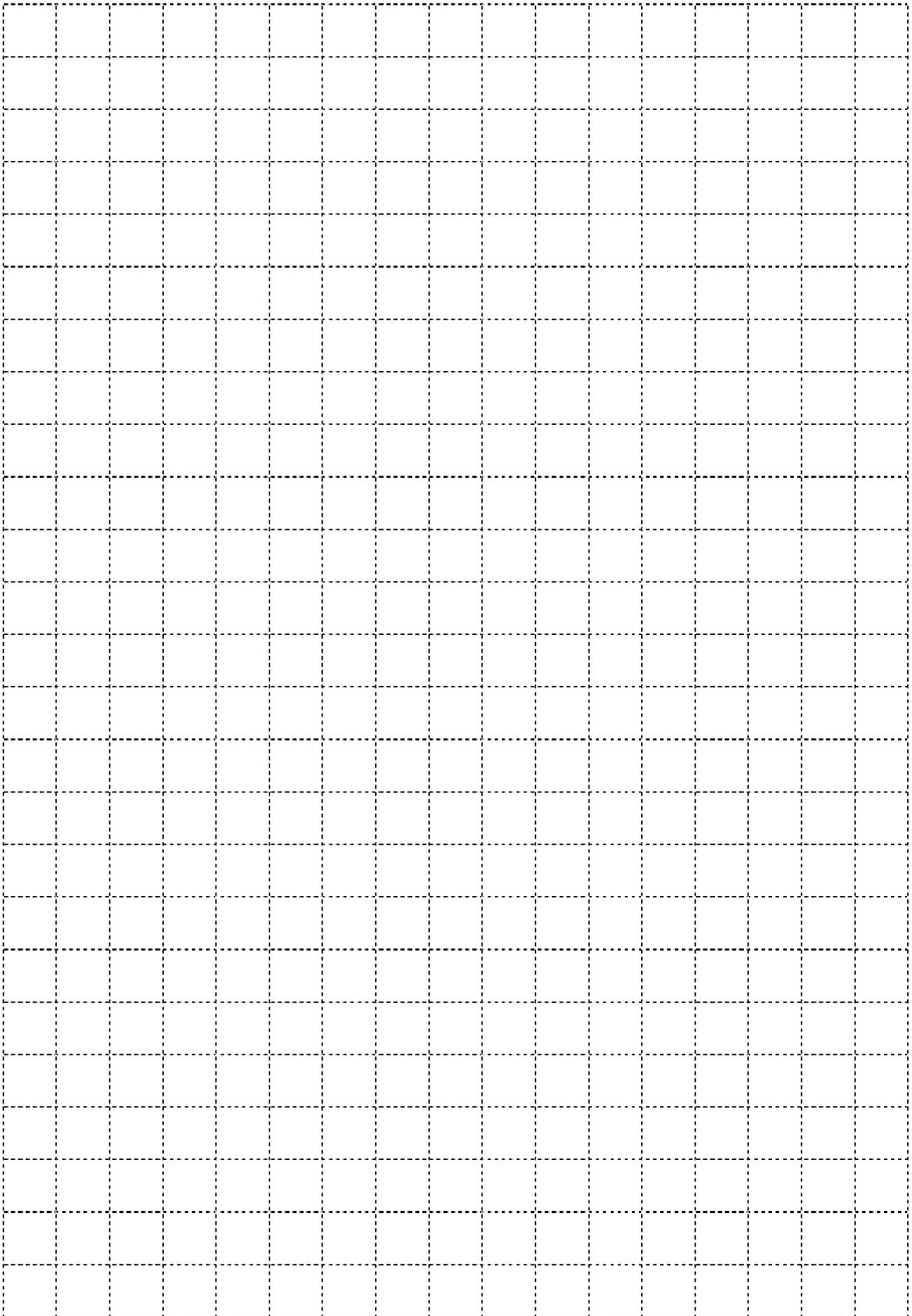
Boilers using propane **must not** be installed in basements or cellars.

15.5 REPLACEMENT OF PARTS

When replacing the main driver board set the gas jumper to position 1 and 2, see wiring diagram section 10.2.

The Solar 80E and 96E burner injectors are size 75, (13 off for 80E, 15 off for 96E), part no.18011102.

NOTE



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