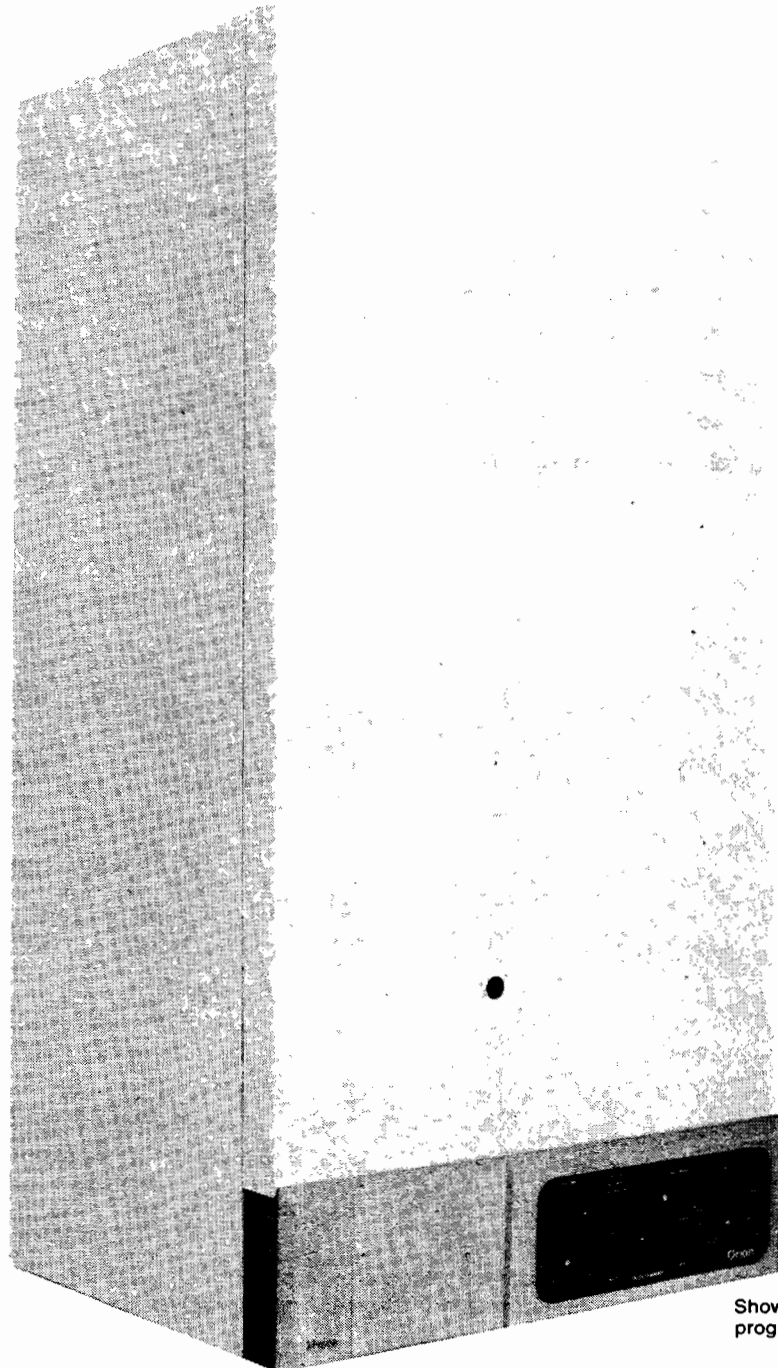


## Installation and Servicing Instructions

# Orion 30B, 40B, 50B and 60B wall mounted gas boilers

G.C. Appliance No's. Orion 30B 41 789 94, Orion 40B 41 789 95  
Orion 50B 41 789 96, Orion 60B 41 789 97



Shown with Orion  
programmer kit

**Read these instructions thoroughly before working on the boiler.  
For use with Natural Gas only. (Leave these instructions adjacent to the gas meter).**

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## 1. INTRODUCTION

These room-sealed wall mounted boilers are for use on natural gas only.  
The Orion boilers are range rated at the following outputs:

Orion 30B: 5.9 to 8.8 kW (20 000 to 30 000 Btu/h)  
Orion 40B: 8.8 to 11.7 kW (30 000 to 40 000 Btu/h)  
Orion 50B: 11.7 to 14.7 kW (40 000 to 50 000 Btu/h)  
Orion 60B: 14.7 to 17.6 kW (50 000 to 60 000 Btu/h)

All models are factory set to the maximum output.

The boilers are designed for use only on open vented systems with an indirect hot water cylinder. **THEY MUST NOT BE CONNECTED TO A DIRECT CYLINDER.**

## 2. TECHNICAL DATA

Boiler	Orion 30B	Orion 40B	Orion 50B	Orion 60B
Burner type	Furigas or Bray — 8 blades (short)		Furigas or Bray — 8 blades (long)	
Burner injector	108/750	300	16/1350	360
Pilot injector	38/36A			
Pilot flame	Approximately 20 mm long			
Electrode gap	3.0 to 4.0 mm			
Ignition	Piezo push button			
Weight (empty)	47.5 kg (104 <sup>3</sup> / <sub>4</sub> lb)		66.3 kg (146 <sup>1</sup> / <sub>4</sub> lb)	
Lifting weight (installing)	39.8 kg (87 <sup>3</sup> / <sub>4</sub> lb)		58.6 kg (129 <sup>3</sup> / <sub>4</sub> lb)	
Water content	4.6 litre (1.0 gal)		8 litre (1.75 gal)	
Maximum static head	30.5 m (100 ft)			
Minimum static head	150 mm (6 in) from top of white case			
*Head loss	0.18 m (7 in)	0.39 m (15 <sup>1</sup> / <sub>2</sub> in)	0.61 m (24 in)	0.89 m (35 in)
Maximum flow temperature	80° C			
Recommended flow through boiler	33 l/min (2.5 gpm)	44 l/min (3.3 gpm)	55 l/min (4.2 gpm)	66 l/min (5 gpm)
Design water temperature rise	11° C			
Clearance required for servicing	Top	150 mm (6 in)		
	Bottom	150 mm (6 in)		
	Front	310 mm (12 <sup>1</sup> / <sub>4</sub> in)		
	Sides	10 mm ( <sup>3</sup> / <sub>8</sub> in)		
Flue terminal size	300 mm high x 276 mm wide x 120 mm deep			
Water connections	Compression fittings to accept 22 mm and 28 mm copper tubing to BS2871			
Gas connection	Rp <sup>1</sup> / <sub>2</sub>			

\*Head loss is given between the 22 mm connections, for a temperature rise across the boiler of 11° C (20° F).

### NOMINAL BOILER RATINGS

Boiler	Output		Input		Burner setting pressure	
	kW	Btu/h	kW	Btu/h	mbar	in wg
Orion 30B	5.9	20 000	7.8	26 500	9.0	3.6
	8.8	30 000	11.6	39 500	19.0	7.6
Orion 40B	8.8	30 000	11.6	39 500	8.7	3.5
	11.7	40 000	15.4	52 500	14.6	5.8
Orion 50B	11.7	40 000	16.1	55 000	11.0	4.4
	14.7	50 000	19.8	67 500	16.0	6.4
Orion 60B	14.7	50 000	19.3	66 000	10.6	4.3
	17.6	60 000	23.1	79 000	15.2	6.1

## 3. GENERAL REQUIREMENTS

The boiler must be installed in accordance with: The Gas Safety (Installation and Use) Regulations 1984, Building Regulations, Building Standards (Scotland) Regulations, Local Building Regulations, Model and local Water Undertaking Byelaws and the IEE Wiring Regulations.

Detailed recommendations are stated in the following British Standard Codes of Practice: CP331:3:1974, BS5376:2:1976, BS5546:1979, BS5440:1:1978, BS5440:2:1976 and BS5449:1:1977.

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

#### 4. DELIVERY

The unit is delivered in two packages (1) the cased boiler and (2) the balanced flue terminal type A, B, C or D as required. A plug-in programmer kit is also available to fit inside the boiler casing. This programmer simplifies wiring and is suitable for use with all external control systems shown in the system wiring diagrams supplied with the boiler.

A telescopic pump housing kit is available, this is a case extension adjustable from 150 mm to 275 mm which allows the pump to be accommodated above the boiler where it is easily accessible.

#### 5. GAS SUPPLY

The natural gas requirements are as follows:

Orion 30B: 1.1 m<sup>3</sup>/h (37 ft<sup>3</sup>/h),      Orion 40B: 1.5m<sup>3</sup>/h (49 ft<sup>3</sup>/h)  
Orion 50B: 1.8 m<sup>3</sup>/h (66 ft<sup>3</sup>/h),      Orion 60B: 2.2 m<sup>3</sup>/h (74 ft<sup>3</sup>/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.

The complete installation must be tested for gas soundness and purged as described in CP331:3.

#### 6. ELECTRICITY SUPPLY

240 V ~ 50 Hz via a fused double pole switch with a contact separation of at least 3 mm in both poles or preferably a fused 3 pin plug and shuttered outlet socket, adjacent to the boiler.

Fuse the supply at 3 A. The minimum requirement for the power supply cable is that it should be a PVC sheathed flexible cord at least 0.75 mm<sup>2</sup> (24 x 0.2 mm) (code designation HO5 VV-For HO5 VVH2-F) as specified in table 16 of BS 6500:1975. Any wiring external to the boiler shall comply with the latest IEE Wiring Regulations, and any local regulations which apply.

**The appliance must be earthed.**

In the event of an electrical fault after installation of the appliance, preliminary electrical systems checks must be carried out as described in the British Gas multimeter instruction book.

#### 7. AIR SUPPLY

The room in which the boiler is installed does not require a purpose provided air vent. If the boiler is installed in a cupboard or compartment, permanent air vents are required in the cupboard or compartment, one at high level and one at low level, either direct to the outside air or to a room. Both high and low level air vents must communicate with the same room or must be on the same wall to outside air. Both the high level and low level vent must each have a free area as stated in the following table. The free area of each vent may be halved if the ventilation is provided directly from outside.

Orion 30B: 110 cm<sup>2</sup> (17 in<sup>2</sup>),      Orion 40B: 140 cm<sup>2</sup> (22 in<sup>2</sup>)  
Orion 50B: 180 cm<sup>2</sup> (28 in<sup>2</sup>),      Orion 60B: 210 cm<sup>2</sup> (32 in<sup>2</sup>)

#### 8. FLUE SYSTEM

Four telescopic terminal assemblies are available to fit the following wall thicknesses:

Size A: 100-150 mm

Size B: 150-230 mm

Size C: 230-380 mm

Size D: 380-610 mm

Unless otherwise specified the size C terminal will be supplied with the boiler.

#### 9. BOILER LOCATION

The boiler is not suitable for external installation.

The boiler must be mounted on a flat wall which is sufficiently robust to take the weight of the boiler.

The boiler is suitable for installation to a combustible wall e.g. wood cladding, provided that the flue duct is not closer than 25 mm (1 in) to combustible material. A metal sleeve should be installed to surround the flue duct to provide a 25 mm (1 in) annual space. Further guidance is given in BS5440:1:1978, sub-clause 20.1.

If the boiler is to be installed in a timber framed building it should be fitted in accordance with the British Gas publication — "Guide for Gas Installation in Timber Framed Housing" reference DM2. If in doubt advice must be sought from the local region of British Gas or from Myson Heating.

The appliance may be installed in any room, although particular attention is drawn to the requirements of the current IEE wiring regulations and, in Scotland, the electrical provisions of the Building Standards applicable in Scotland with respect to the installation of the appliance in a room containing a bath or shower.

Where a room sealed appliance is installed in a room containing a bath or shower, any electrical switch or appliance control, utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower. Where the installation of the boiler will be in an unusual position, special procedures may be necessary and BS5376:2 and BS5546 give detailed guidance on this aspect.

A cupboard or compartment used to enclose the boiler must be designed and constructed specifically for this purpose. An existing cupboard or compartment may be used provided that it is modified for the purpose. Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS5376:2 and BS5546 and should be complied with.

If the boiler is to be installed in a run of kitchen units it is recommended that the boiler is fitted first or the adjacent units removed.

The boiler must be installed so that the flue terminal is exposed to the external air. It is important that the position of the terminal allows the free passage of air across it at all times.

The minimum acceptable spacings from the terminal to obstructions, corners and ventilation openings are specified in the following table.

Terminal position	Minimum spacing
Directly below an openable window, or air vent or any other ventilation opening	300 mm (12 in)
Below gutters, soil pipes or drain pipes	300 mm (12 in)*
Below eaves	300 mm (12 in)*
Below balconies	600 mm (24 in)
Above adjacent ground or balcony level	300 mm (12 in)†
From vertical soil pipes or drain pipes	75 mm (3 in)
From an internal corner or external corner	600 mm (24 in)
From a surface facing the terminal	600 mm (24 in)
From a terminal facing the terminal	600 mm (24 in)
Vertically from a terminal on the same wall	1500 mm (60 in)
Horizontally from a terminal on the same wall	300 mm (12 in)
Adjacent to an opening window	150 mm (6 in)
From an opening in a car port i.e. door or window into the house	1200 mm (48 in)

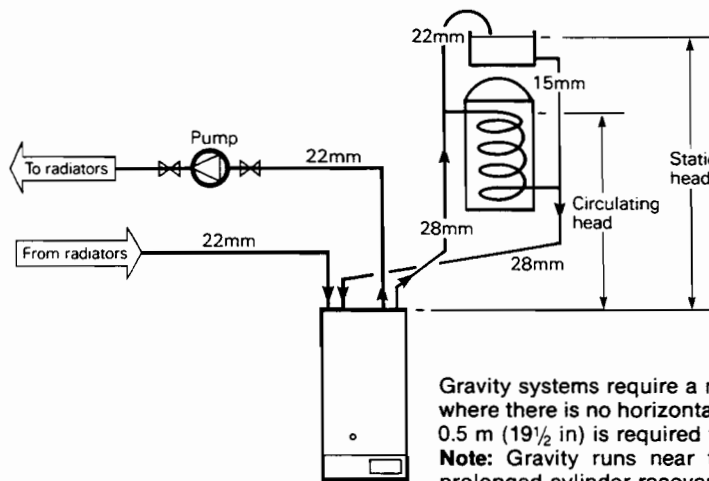
\*If the terminal is fitted within 850 mm (34 in) of a plastic or painted gutter/pipe or 450 mm (18 in) of painted eaves, an aluminium shield of at least 750 mm (30 in) in length should be fitted to the underside of the gutter/pipe or painted surface.

†If the terminal is fitted less than 2 m (6.6 ft) above a balcony, above ground or above a flat roof to which people have access then a suitable terminal guard must be provided and fitted.

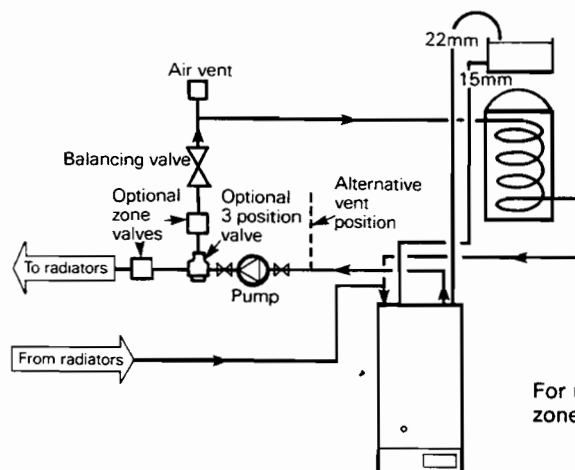
A type A protective guard is available from Tower Flue Components Ltd. at: Vale Rise, Tonbridge, Kent TW9 1TB. Tel: 0732 351555.

## 10. WATER SYSTEM SCHEMATICS AND WATER CONNECTIONS

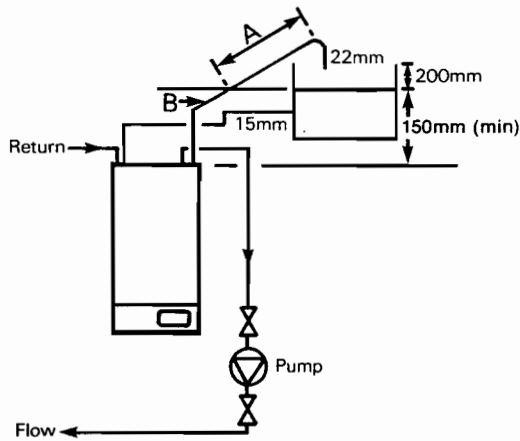
### a. Gravity domestic hot water with pumped heating



### b. Fully pumped system



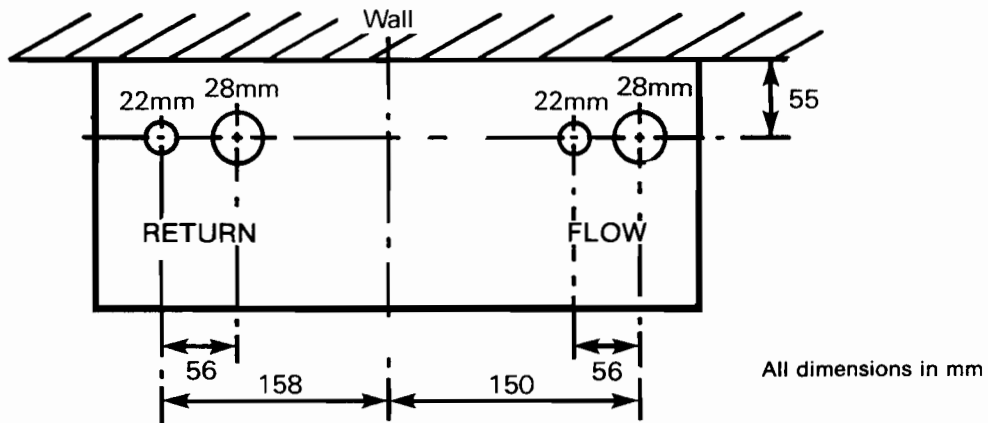
### c. Low head system



A — length of dry vent  
B — length of water filled vent

HEATING LOAD Btu/h	VENT LENGTH	
	A (mm)	B (mm)
60 000	520	400
50 000	420	330
40 000	330	290
30 000	230	260
20 000	140	200

### d. Water connections



Top view of boiler showing water connections

It is recommended that the outermost water connections are made first, this will ensure that access to all the fittings is available if the boiler is fitted in a corner or recess.  
Compression fittings are supplied loose with the boiler to accept 28 mm and 22 mm copper tubing to BS2871.  
Always ensure that the pump has sufficient static head. Check the pump manufacturer's minimum head.  
Fit one or more drain cocks to enable the water system to be fully drained.

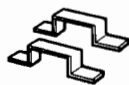
## 11. INSTALLATION PROCEDURE

### 1 UNPACK THE BOILER

Carefully unpack the boiler. Do not discard the packing until all the items are found.

28mm nuts and olives (2 off each)

22mm nuts and olives (2 off each)



Lifting handles (1 off 30 & 40) (2 off 50 & 60)

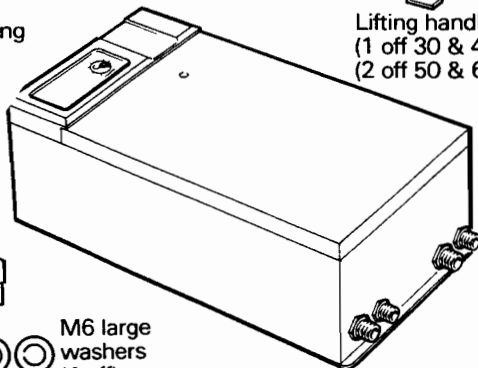
28mm blanking caps (2 off)



M6 boiler fixing nuts (4 off)



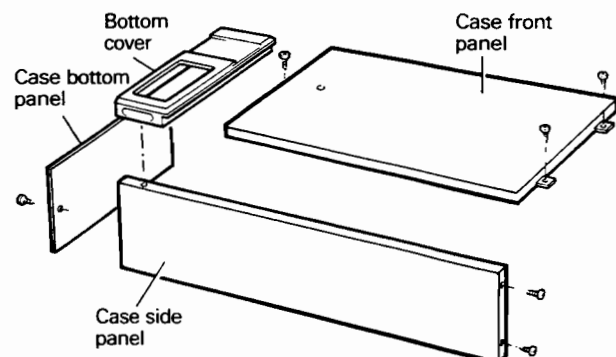
M6 large washers (4 off)



Find these parts in the pack

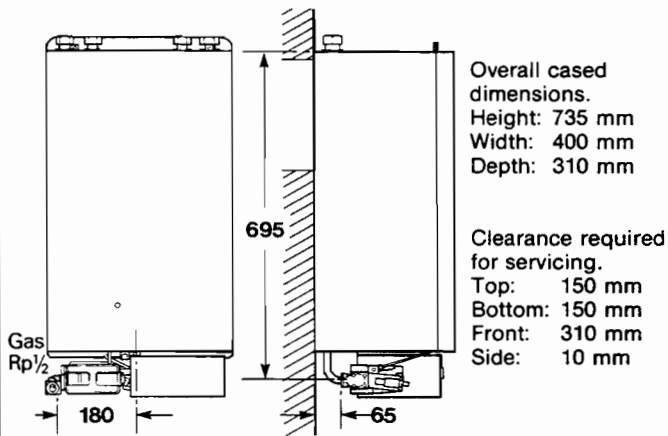
### 2 REMOVE THE BOILER CASE

Remove the bottom cover by pulling it forwards to disengage the fixing pins. Remove the two screws securing the case bottom panel to the side panels and slide out the bottom panel. Unscrew the three case front panel fixing screws (two at the top and one at the bottom) and lift off the front panel. Remove the two screws securing the side panel at the top and lift it off. Repeat for the other side. Keep all the panels in a safe place so as not to damage them before refitting.



### 3 BOILER DIMENSIONS AND GAS CONNECTION

All dimensions in mm

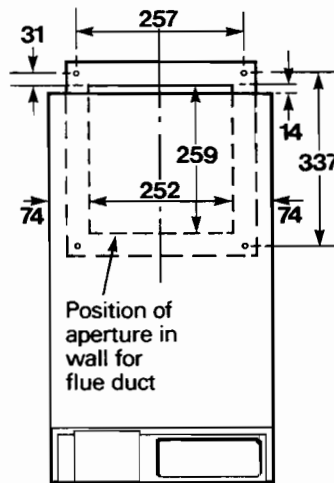


Overall cased dimensions.  
Height: 735 mm  
Width: 400 mm  
Depth: 310 mm

Clearance required for servicing.  
Top: 150 mm  
Bottom: 150 mm  
Front: 310 mm  
Side: 10 mm

**Note:** If the boiler is to be installed in a run of kitchen units it is recommended that the boiler is fitted first or the adjacent units removed.

### 4 PREPARE THE WALL

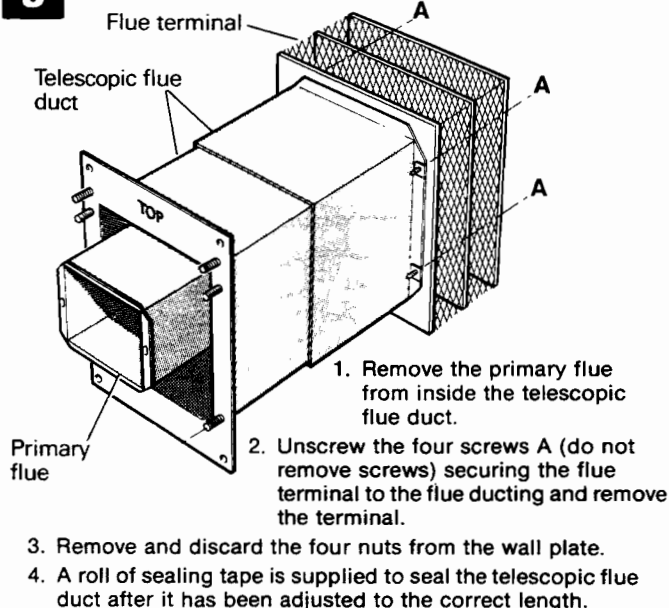


1. Decide upon the position of the boiler, ensuring that the flue terminal position will meet the requirements given on page 5.
2. Mark the position of the hole for the flue duct and the four fixing holes making sure that they are level.
3. Cut the hole in the wall for the flue duct.
4. Drill and plug the four fixing holes to accept 2½" lg. No. 12 woodscrews.

Flue terminal size:  
300 high x 276 wide x 120 deep

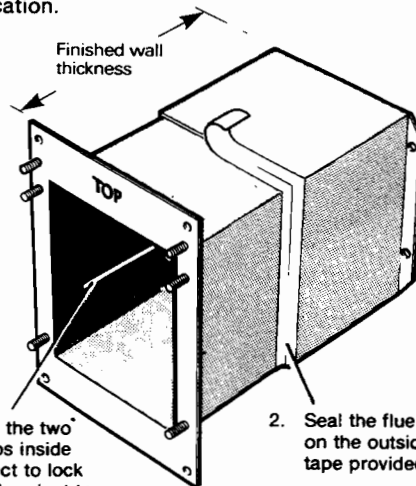
All dimensions in mm

### 5 UNPACK THE FLUE TERMINAL



### 6 ADJUST THE FLUE DUCT

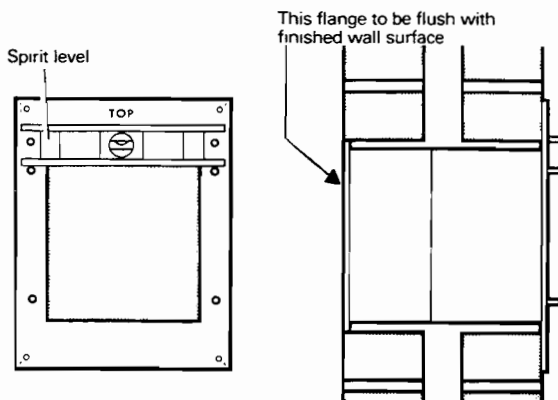
1. Adjust the telescopic flue duct to suit the finished wall thickness, ensuring that the metal straps are still within their location.



2. Seal the flue duct joint on the outside with the tape provided.
3. Bend back the two metal straps inside the flue duct to lock the outer flue duct to the inner flue duct.

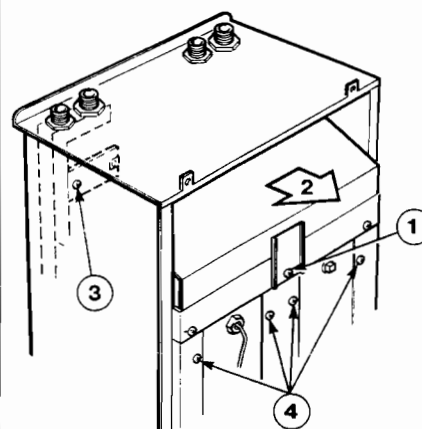
### 7 FIT THE TERMINAL WALL PLATE

1. Ensure the flue is the correct way up and insert it into the wall from inside the building.



2. Ensure that the wall plate is level and fasten to the wall with four 2½" lg No. 12 woodscrews (not supplied) into the holes previously drilled and plugged. If necessary make good around the hole inside.

### 8 PREPARE THE BOILER



1. Remove the screw securing the front of the flue hood to the heat exchanger top frame.
2. Slide out the flue hood.
3. 50B and 60B only—Remove the screws securing the primary flue mounting brackets to the manifolds and remove the brackets.
4. Remove the screws indicated (two for the 30 and 40 models and four for the 50 and 60).

5. Fit the lifting handle(s) supplied, to the front of the heat exchanger using the screws previously removed.

## 9 SECURE THE BOILER TO THE TERMINAL WALL PLATE

**Note:** 50 and 60 models — Due to the weight of the appliance it is recommended that two people lift it onto the wall plate.

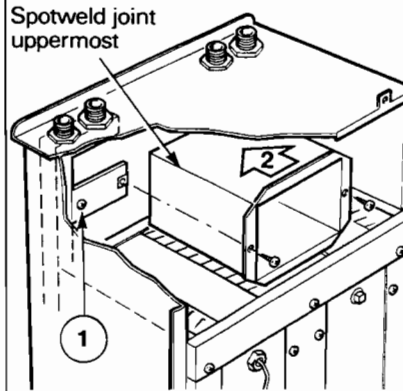
- Using the lifting handle(s) and the base of the heat exchanger as lifting points hang the boiler on the top two studs of the wall plate and lower it against the wall, ensuring that the other four studs are located in the chassis.
- Secure the boiler to the wall plate using the four large washers and M6 nuts, supplied with the boiler, to the four studs inside the chassis. Tighten to ensure a good seal is achieved.
- Remove and discard the lifting handle(s) and replace the screws.

**Note:** The lower fixing studs are positioned behind the heat exchanger top frame. Care should be taken not to drop the washer or nut when fitting.

ALL FOUR FIXINGS INSIDE THE CHASSIS MUST BE USED.

## 10 REASSEMBLE THE BOILER

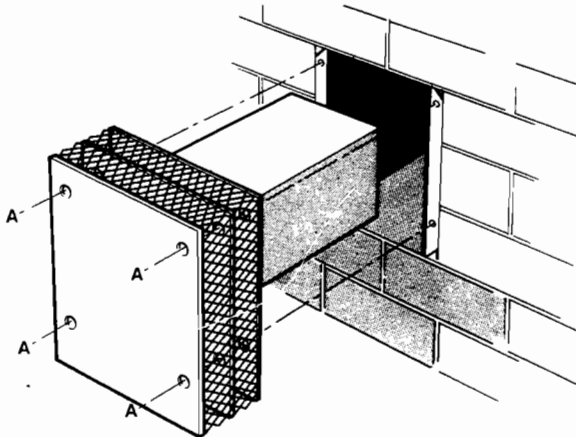
- Refit the two primary flue mounting brackets to the water manifolds 50B, 60B only and remove the two primary flue securing screws, parked in the mounting brackets.
- Push the primary flue into the opening. Refit the two fixing screws but do not fully tighten, the primary flue should be free to move up and down slightly.



- Refit the flue hood by sliding it under the returns on the sides of the heat exchanger top frame.
- Check that the flue hood spigot fits into the primary flue and push the flue hood fully home.
- Secure the flue hood to the heat exchanger top frame using the one screw at the front previously removed.

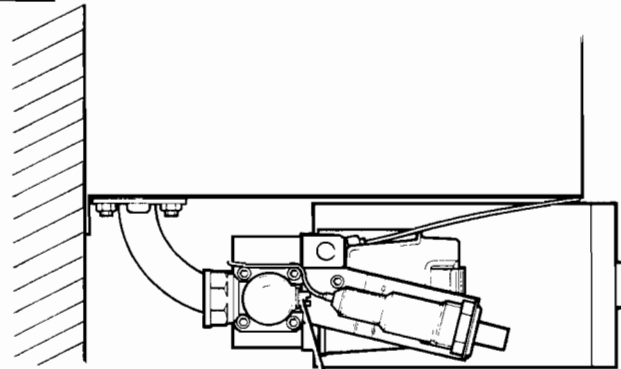
## 11 FIT THE TERMINAL

- Make good the outside wall around the flue duct.
- Fit the terminal into the flue duct and secure with four screws A.



- Seal the terminal to the wall using a suitable outdoor mastik or mortar.

## 12 CONNECT THE GAS SUPPLY



Gas service cock

Connect a 15 mm gas supply to the service cock.

**Note:** The gas supply must be directly out of the wall or from below as the case side panels extend below the service cock. See frame 3.

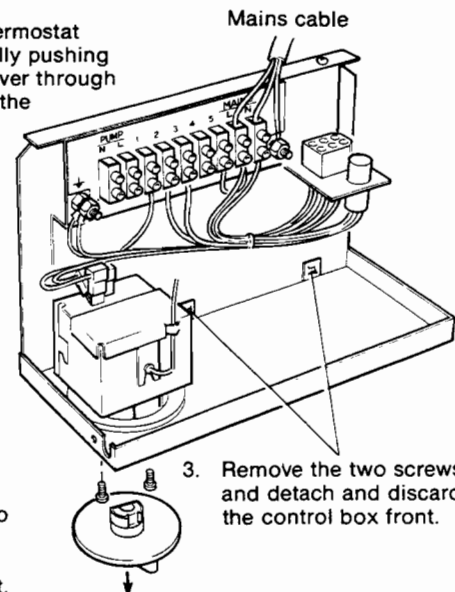
Pressure test the gas supply for soundness and purge the supply in accordance with CP331:3.

## 13 CONNECT THE ELECTRICITY SUPPLY

- Remove the three screws (one at the left hand side and two underneath) securing the control box front and pull it forward and lower.
- Slacken the two screws in the cable clamp from below the control box. Feed the mains lead through the large grommet in the back of the control box and under the clamp.
- Connect the wires, brown to L and blue to N on the terminal block and green and yellow to the earthing stud. See wiring diagram and frame 14.
- Keep the control box front in the open position, take up excess slack in the cables between the terminal block and the cable clamp, then tighten the cable clamp screws. Check that the control box front will open and close freely without straining the cables. **Note:** When connecting the mains lead to the terminal block and earthing stud, ensure that the length of the earth wire is such, that if the mains lead slips out of the cable clamp the live and neutral wires become taut before the earth wire.
- The pump lead and any external controls wiring should be passed through the large grommet and connected to the terminal block. See wiring diagram.
- If a room thermostat is to be fitted remove link Pump L-2 on the terminal block and connect the room thermostat in its place. See wiring diagram.
- Close the control box and secure with three screws if the programmer kit is not to be fitted.

## 14 FIT THE PROGRAMMER KIT

- Remove the thermostat knob by carefully pushing with a screwdriver through the cut outs in the back of the fascia panel.



- From the front of the fascia panel remove the two fixing screws and remove the thermostat.

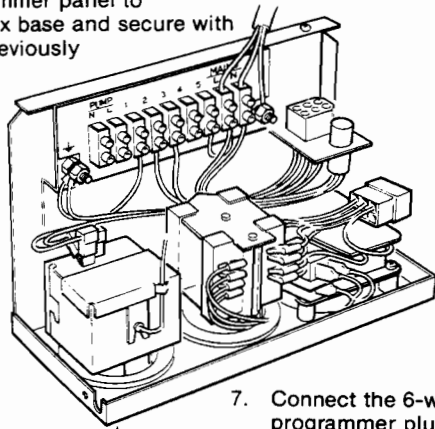
- Remove the two screws and detach and discard the control box front.



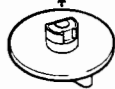
## 15 Programmer kit—continued

Fit the programmer panel to the control box base and secure with two screws previously removed.

5. Fit the thermostat to the programmer panel ensuring that the capillary is uppermost secure with two screws.



6. Replace the thermostat knob.



7. Connect the 6-way programmer plug and socket.  
 8. Remove links 5-4 and 4-2, see wiring diagram.  
 9. Close the control box and secure with three screws.

## 16 COMPLETE THE INSTALLATION

After connecting the water connections, see water system schematics, page 5 thoroughly flush the whole system without the pump in position. Ensure all valves are open. With the pump fitted, fill, vent and check for water soundness, rectifying where necessary.

Ensure the seal is intact around the case front panel. Place it in position over the boiler and secure with three screws. Tighten sufficiently to form a seal.

## 12. COMMISSIONING

### See below for boiler controls

1. Ensure that the electricity supply is OFF and the boiler thermostat set at O. Remove the screw securing the gas valve cover and lift off cover. Loosen the gas valve inlet pressure test point screw one turn. Turn on the gas supply and open the gas service cock (the cock is closed when the operating slot is vertical) to purge in accordance with CP331:3. Retighten the test point screw and test for gas soundness around the screw.

2. Fully depress the gas valve operating button and keep it pressed in. At the same time operate the igniter button to light the pilot, which can be seen through the inspection window. If the pilot does not light, operate the igniter repeatedly until it does. When the pilot lights, continue to hold the gas valve operating button in for a further 10 to 20 seconds, then release it slowly.

**Caution:** If the pilot does not stay alight, release the gas valve operating button and slide it in the direction of the arrow. Wait for 3 minutes and repeat operation 2 until the pilot is lit. Continue to hold the gas valve button in for 20 seconds, then release it slowly.

3. The pilot throttle is factory set fully open. Check that the pilot flame (approximately 20 mm long) envelops the thermocouple tip. Adjust if necessary. Minimum closed circuit 5 mV.

4. Turn on the electricity supply and set the programme selector switch to constant if a programmer is fitted. Check that all system controls are turned on. Set the boiler thermostat to 7 and check that the main burner lights smoothly from the pilot flame. With the main burner alight test the integral gas supplies and joints for soundness using a suitable detecting fluid.

5. Allow the burner to run for 10 minutes and check the setting pressure as follows:

- a. Set the boiler thermostat to O. Loosen the burner setting pressure test point screw one turn and connect a pressure gauge.
- b. Set the boiler thermostat to 7 and if necessary adjust the burner setting pressure to give the heat input required. Turn the adjusting screw clockwise to decrease the burner setting pressure.

**Note:** The main burner setting pressure is factory set to the maximum input. See Technical Data, page 3 for the boiler ratings and setting pressures.

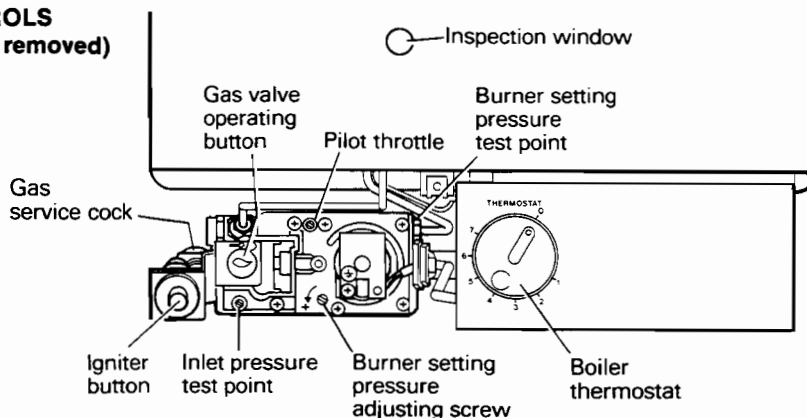
6. Set the boiler thermostat to O, disconnect the pressure gauge and retighten the test point screw and test for gas soundness around the screw.

7. Replace the gas valve plastic cover and secure with its screw. Ensure the cable clamp is located correctly in the cover.

8. Check that the arrow on the data label (on the case bottom panel) is against the correct boiler rating.

When the system has been tested, drain the water while it is still hot in order to complete the flushing process. Refill, vent and make a final check for water soundness.

## 13. BOILER CONTROLS (gas valve cover removed)



#### 14. FINAL ASSEMBLY AND HANDING OVER THE INSTALLATION

Place the side panels in position and secure to the chassis top with two screws previously removed.

Slide the bottom case panel into the returns on the side panels and secure to the side panels with two screws previously removed.

If a programmer is fitted, set the clock to the correct time (do not rotate the dial anti-clockwise) and the programme selector to the required setting. See User instructions.

Hand the User instructions to the User and instruct in the safe operation of the boiler and controls.

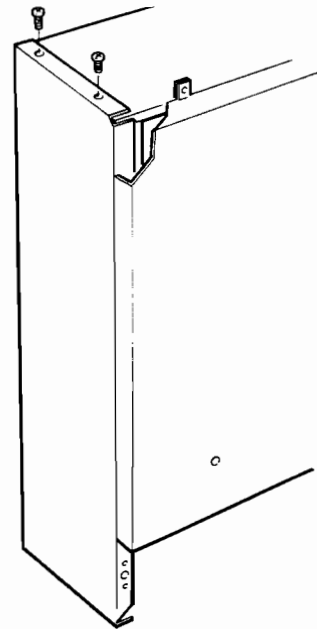
Place the bottom cover in position and push fully home to engage the fixing pins.

Advise the User of the precautions necessary to prevent damage to the system and to the building in the event of the system remaining inoperative during frost conditions.

Advise the User that for continued efficient and safe operation of the boiler it is important that adequate servicing is carried out at least once a year by a qualified service engineer or the local Gas Region.

Leave a permanent card attached to the boiler giving:

1. Name and address of installer.
2. Date of installation.
3. A wiring diagram of the system.



#### 15. ANNUAL SERVICING

The following aspects of the boiler and installation should be examined, and rectified as necessary.

1. Run the boiler and check the operation of its controls, observe the flame picture and ensure that the boiler responds to any switches and programmer.
2. Check the installation of the flue terminal and ensure it is not obstructed.
3. Remove the flue hood and check if the heat exchanger or burner requires cleaning.
4. Examine the main injector orifice and ensure it is clear and undamaged.
5. Remove any build up of carbon deposits from the thermocouple tip.
6. If a sufficiently large pilot flame cannot be achieved examine the pilot injector orifice to ensure it is clear and undamaged.
7. When refitting the case front panel check that the seal is in good condition and compresses satisfactorily.

On completion of the service run the boiler and ensure that it operates satisfactorily.

The boiler data label is positioned on the case bottom panel.

The procedure for Annual Servicing is given in frames 17 to 22.

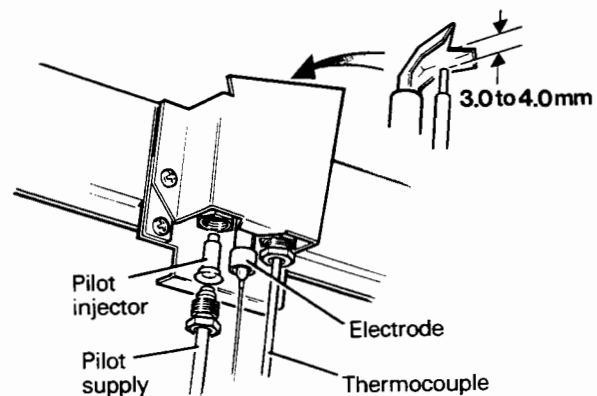
**WARNING:** Before commencing work set the boiler thermostat to O. Allow the boiler to cool and isolate the electricity supply. Pull the bottom cover forwards to disengage the fixing pins and turn off the gas supply at the gas service cock.

**IMPORTANT:** Always test for gas soundness after completing any servicing of gas carrying components and carry out functional checks of controls.

#### 17 DISMANTLING

1. Unscrew the three case front panel fixing screws (two at the top and one at the bottom) and lift off the case front.
2. Remove the two screws securing the case bottom panel to the side panels and slide out the bottom panel.
3. Place the case parts safely aside to avoid possible damage.
4. Remove the screw securing the front of the flue hood to the heat exchanger top frame and slide out the flue hood, see frame 8.
5. Remove the pilot supply and thermocouple clamping bracket from the bottom of the chassis.
6. Withdraw the electrode from the pilot assembly by pulling it downwards.
7. Undo the nut and disengage the thermocouple, see frame 18.

#### 18 Dismantling—continued



8. Undo the tubing nuts and disconnect the pilot supply from both the pilot assembly and gas valve.
9. Carefully remove and retain the pilot injector.

## 19 Dismantling—continued

10. From underneath the base of the chassis remove the two pozi screws securing the burner manifold and the one screw securing the front of the burner and withdraw the burner.
11. Remove the thermostat capillary clip from the bottom left hand corner of the heat exchanger.
12. Support the base of the heat exchanger side insulation tray. Remove the three screws securing the retaining angle to the heat exchanger and heat exchanger top frame. Remove the angle by lowering slightly and withdrawing it.
13. Remove the side insulation tray by sliding it down out of the heat exchanger top frame and withdrawing it forwards.
14. Repeat for the opposite side insulation tray.

## 20 CLEANING THE BOILER

1. Brush both sides and the centre section (50 & 60) of the heat exchanger using a suitable brush. Remove any fallen deposits from the boiler base.
2. Turn the burner upside down and tap gently to remove any debris.
3. Clean the pilot burner and electrode with a fine wire brush if necessary.
4. Unscrew the injector from the burner manifold, clean by blowing through or washing. Do **NOT** clear the injector with a pin or wire. Clean the pilot injector in a similar manner.
5. To clean or replace the pilot filter in the gas valve refer to frame 33.
6. Excessive build up of carbon on the thermocouple tip should be removed with a fine wire brush.
7. Examine the condition of the side insulation material and replace if necessary by sliding it out of the tray.

## 21 REASSEMBLY

1. Replace the burner injector using a small amount of jointing compound. **Note:** The 30B injector uses a sealing washer.
2. Replace the side insulation trays (slide in and up to engage them in the heat exchanger top frame) and retain with the retaining angles, one side at a time (the top of the retaining angles go under the heat exchanger top frame).
3. Locate the thermostat capillary clip previously removed.
4. Replace the burner assembly and secure with three screws previously removed.
5. Replace the pilot injector and reconnect the pilot supply to the gas valve and pilot assembly.
6. Re-engage the thermocouple and secure with nut.
7. Replace the electrode ensuring it is pushed fully home.
8. Replace the pilot supply and thermocouple clamping bracket.
9. Remove the two screws securing the pilot shield, lift off the pilot shield and check that the spark gap, see frame 18, is 3.0 to 4.0 mm. Replace the pilot shield.

## 22 Reassembly—continued

10. Refit the flue hood by sliding it under the returns on the sides of the heat exchanger top frame. Check that the flue spigot fits into the primary flue and push the flue hood fully home.
11. Secure the flue hood to the heat exchanger top frame using the one screw at the front previously removed.
12. Refer to the commissioning instructions, page 9. Check the pilot flame, test for gas soundness and check the burner setting pressure.
13. Ensure the seal is intact around the case front panel. Place it in position over the boiler and secure with three screws. Tighten sufficiently to form a seal.
14. Slide the bottom case panel into the returns on the side panels and secure to the side panels with two screws previously removed.
15. Place the bottom cover in position and push fully home to engage the fixing pins.
16. If a programmer is fitted, set the clock to the correct time and the selector switch to its previous setting.

## 16. REPLACEMENT OF PARTS

The procedure for the replacement of parts is given in frames 23 to 34.

**WARNING:** Before commencing work set the boiler thermostat to O. Allow the boiler to cool and isolate the electricity supply. Pull the bottom cover forwards to disengage the fixing pins and turn off the gas supply at the gas service cock.

**IMPORTANT:** Always test for gas soundness after completing any exchange of gas carrying components and carry out functional checks of controls.

## 23 TO REPLACE THE SPARK ELECTRODE, PILOT INJECTOR OR PILOT BURNER

Remove the case front panel, see frame 17.

### Spark electrode:

Disconnect the electrode lead from the spark electrode. Remove the electrode by pulling it downwards and withdrawing it from the pilot burner.

Insert a new electrode ensuring it is pushed fully home and reconnect the electrode lead.

Remove the two screws securing the pilot shield, lift off the pilot shield and check that the spark gap, see frame 18, is 3.0 to 4.0 mm. Replace the pilot shield.

### Pilot injector:

Remove the spark electrode, pilot supply and thermocouple clamping bracket and disconnect the pilot supply. Carefully remove the pilot injector, see frame 18. Fit a new injector, reconnect the pilot supply, replace the clamping bracket and spark electrode.

### Pilot burner:

Remove the spark electrode, pilot supply, injector and thermocouple. Remove the three screws securing the pilot shield and pilot burner. Fit a new pilot burner and secure with two screws. Replace the injector, pilot supply, thermocouple and electrode. Check that the spark gap, see frame 18, is 3.0 to 4.0 mm. Remove the uppermost screw securing the pilot burner and replace the pilot shield and two fixing screws.

### Reassemble:

Refer to the commissioning instructions, page 9. Check the pilot flame and test for gas soundness.

Replace the case front panel and bottom cover.

## 24 TO REPLACE THE BURNER

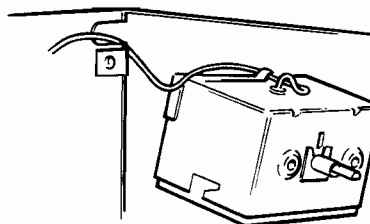
**NOTE:** The burner fitted may be either Furigas (silver) or Bray (blue), either may be used as a replacement for the other.

1. Remove the case front panel and bottom panel. See frame 17.
2. Remove the burner as described in frames 17, 18 and 19, paras 5 to 10.
3. Remove the pilot burner as described in frame 23 and fit to the new burner.
4. Fit the new burner and reassemble as described in frame 21 para's 4 to 9.
5. Refer to the commissioning instructions, page 9. Check the pilot flame and test for gas soundness.
6. Replace the case front panel, bottom panel and bottom cover.

## 25 TO REPLACE THE BOILER THERMOSTAT

1. Remove the case front panel and bottom panel. See frame 17.
2. Remove the pilot supply and thermocouple clamping bracket from the bottom of the chassis.
3. Remove the thermostat capillary clip from the bottom left hand corner of the heat exchanger.
4. Remove the thermostat phial fixing (screw or split pin) from the thermostat pocket in the heat exchanger and withdraw the phial from the pocket.
5. Remove the three screws (one at the left hand side and two underneath) securing the control box front. Pull it forward and lower.
6. Remove the thermostat knob by carefully pushing with a screwdriver through the cut outs in the back of the fascia panel.
7. Disconnect the leads from the thermostat, noting their position.
8. From the front of the fascia panel remove the two fixing screws and remove the thermostat.

## 26 Boiler thermostat—continued

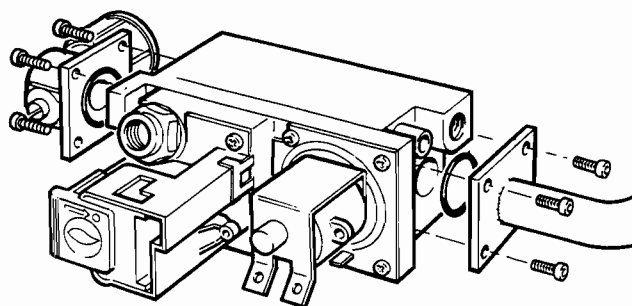


9. When fitting the new thermostat to the fascia panel ensure that the capillary is uppermost.
10. Reassemble in reverse order ensuring that the thermostat leads are correctly fitted, see wiring diagram and that the capillary follows the same route as the discarded one. **Note:** A cut out is provided in the control box side for the capillary.
11. Refer to the commissioning instructions, page 9 and light the boiler. Allow it to heat up and check that the thermostat will switch the boiler off when turned to a low setting.
12. Replace the case front panel, bottom panel and bottom cover.

## 27 TO REPLACE THE GAS VALVE ENSURE THAT THE GAS SUPPLY IS OFF

1. Remove the case front panel and bottom panel. See frame 17.
2. Remove the screw securing the gas valve plastic cover and lift off cover.
3. Disconnect the push-on terminals (the polarity of these wires is not important) and unscrew the earth terminal from the gas valve.
4. Remove the spark electrode from the pilot burner.
5. Disconnect the pilot supply and thermocouple from both the gas valve and pilot assembly.
6. Disconnect the electrode lead from the piezo unit. Remove the one 3 mm socket screw securing the piezo unit mounting bracket and remove bracket.
7. Remove the eight 3 mm socket screws securing the gas valve (four to the service cock and four to the burner manifold).
8. Withdraw the gas valve and discard the 'o' rings in the service cock and burner manifold flanges.
9. Using new 'o' rings in the service cock and burner manifold flanges (both 'o' rings are the same size) reassemble the new valve to the boiler in reverse order. Do not replace the plastic gas valve cover at this stage.

## 28 Gas valve—continued



10. Refer to the commissioning instructions, page 9. Check the pilot flame, test for gas soundness and check the burner setting pressure.
11. Replace the case front panel, bottom panel and bottom cover.

## 29 TO REPLACE THE BURNER INJECTOR

1. Remove the case front panel and bottom panel. See frame 17.
2. Remove the burner assembly as described in frames 17, 18 and 19, para's 5 to 10.
3. Unscrew the injector from the burner manifold.
4. Screw in a replacement injector, using a small amount of jointing compound. **Note:** The 30B injector uses a sealing washer.
5. Replace the burner as described in frame 21, para's 4 to 9.
6. Refer to the commissioning instructions, page 9. Check the pilot flame and test for gas soundness.
7. Replace the case front panel, bottom panel and bottom cover.

## 30 TO REPLACE THE PIEZO UNIT

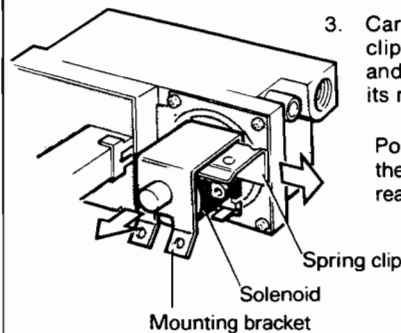
1. Disconnect the electrode lead from the piezo unit.
2. Undo the nut securing the piezo unit and remove unit.
3. Fit a new unit and reconnect the electrode lead. Check spark is present at pilot.
4. Replace the bottom cover.

## 31 TO REPLACE THE THERMOCOUPLE

1. Remove the case front panel. See frame 17.
2. Remove the screw securing the gas valve plastic cover and lift off cover.
3. Remove the pilot supply and thermocouple clamping bracket from the bottom of the chassis.
4. Remove the spark electrode by pulling it downwards and withdrawing it from the pilot burner.
5. Disconnect the thermocouple from both the pilot assembly and gas valve.
6. Carefully bend the replacement thermocouple to match the discarded one.
7. Connect the thermocouple to the gas valve and pilot assembly.
8. Replace the electrode ensuring it is pushed fully home.
9. Replace the pilot supply and thermocouple clamping bracket.
10. Replace the gas valve plastic cover and secure with its screw. Ensure that the cable clamp is located correctly on the right hand side.
11. Replace the case front panel.
12. Refer to the commissioning instructions, page 9. Light the pilot and check that the gas valve operating button may be released after 20 seconds with the pilot remaining alight.
13. Replace the bottom cover.

## 32 TO REPLACE THE GAS VALVE SOLENOID

1. Remove the screw securing the gas valve plastic cover and lift off cover.
2. Disconnect the push-on terminals (the polarity of these wires is not important) and unscrew the earth terminal from the gas valve.



3. Carefully prise out the retaining clip from behind the solenoid and lift off the solenoid and its mounting bracket.

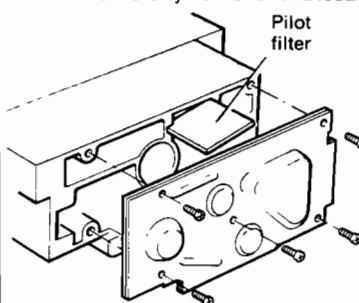
Position the new solenoid into the mounting bracket and reassemble in reverse order.

5. Refer to the commissioning instructions, page 9. Light the boiler to check the gas valve operation.
6. Replace the bottom cover.

## 33 TO REPLACE THE PILOT FILTER

**NOTE: It is extremely unlikely that the pilot filter will become blocked. If the pilot injector and pilot supply are clear and the filter is still suspect proceed as follows: Ensure the gas supply is OFF.**

1. Remove the gas valve as described in frame 27.
2. Remove the five screws securing the rear cover plate and carefully remove it. Discard the gasket.



3. Carefully remove the pilot filter and replace with a new one.
4. Replace the rear cover using a new gasket and secure by evenly tightening the five screws.
5. Replace the gas valve in reverse order to frame 27.

6. Refer to the commissioning instructions, page 9. Light the boiler and test for gas soundness.
7. Replace the case and bottom cover.

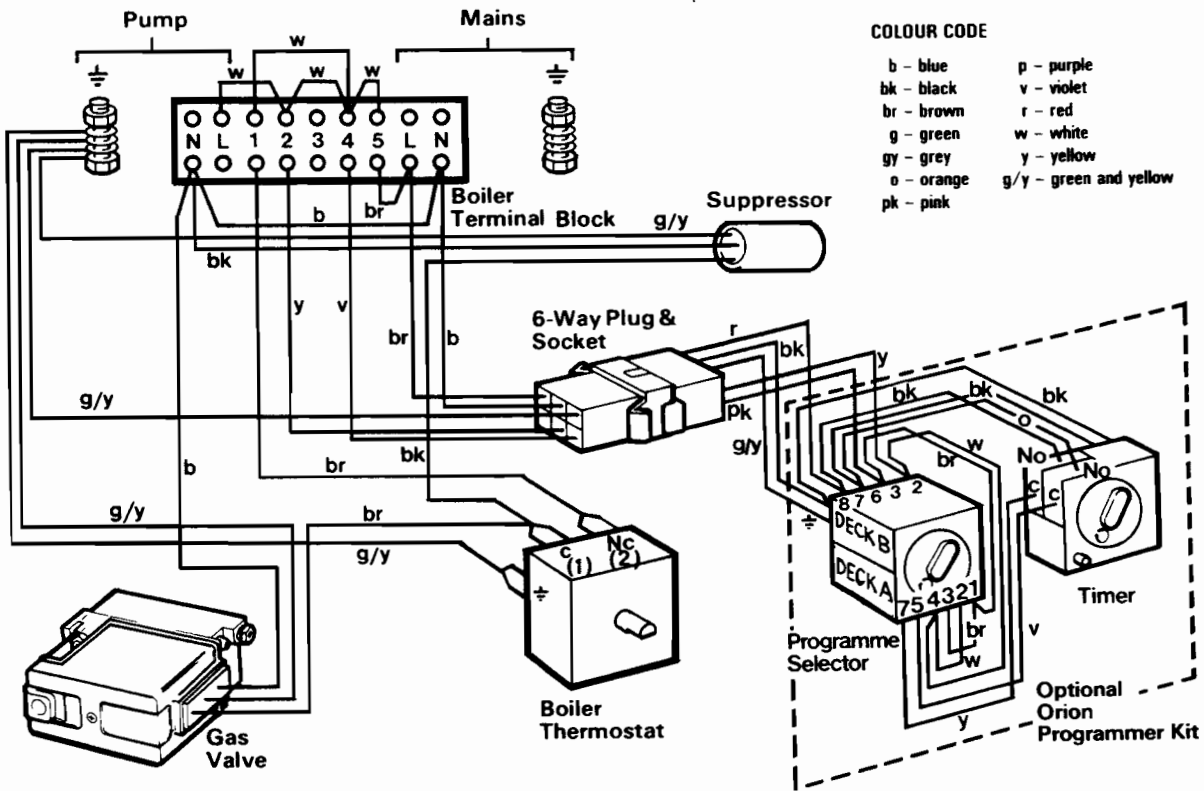
## 34 TO REPLACE THE PROGRAMMER (if fitted)

Refer to illustration in frame 15.

1. Remove the case bottom panel. See frame 17.
2. Remove the three screws (one at the left hand side and two underneath) securing the programmer and pull it forward and lower.
3. Remove the thermostat knob by carefully pushing with a screwdriver through the cut outs in the back of the fascia panel.
4. Disconnect the 6-way programmer plug and socket.
5. From the front of the fascia panel remove the two fixing screws and remove the thermostat.
6. Remove the two screws securing the programmer to the control box and remove the programmer.
7. Reassemble in reverse order using a new programmer. Ensure the thermostat capillary is uppermost when fitting it to the programmer.
8. Refer to the commissioning instructions, page 9. Light the boiler and check controls.
9. Set the programmer clock to the correct time and the selector switch to its previous setting.
10. Replace the case bottom panel and bottom cover.

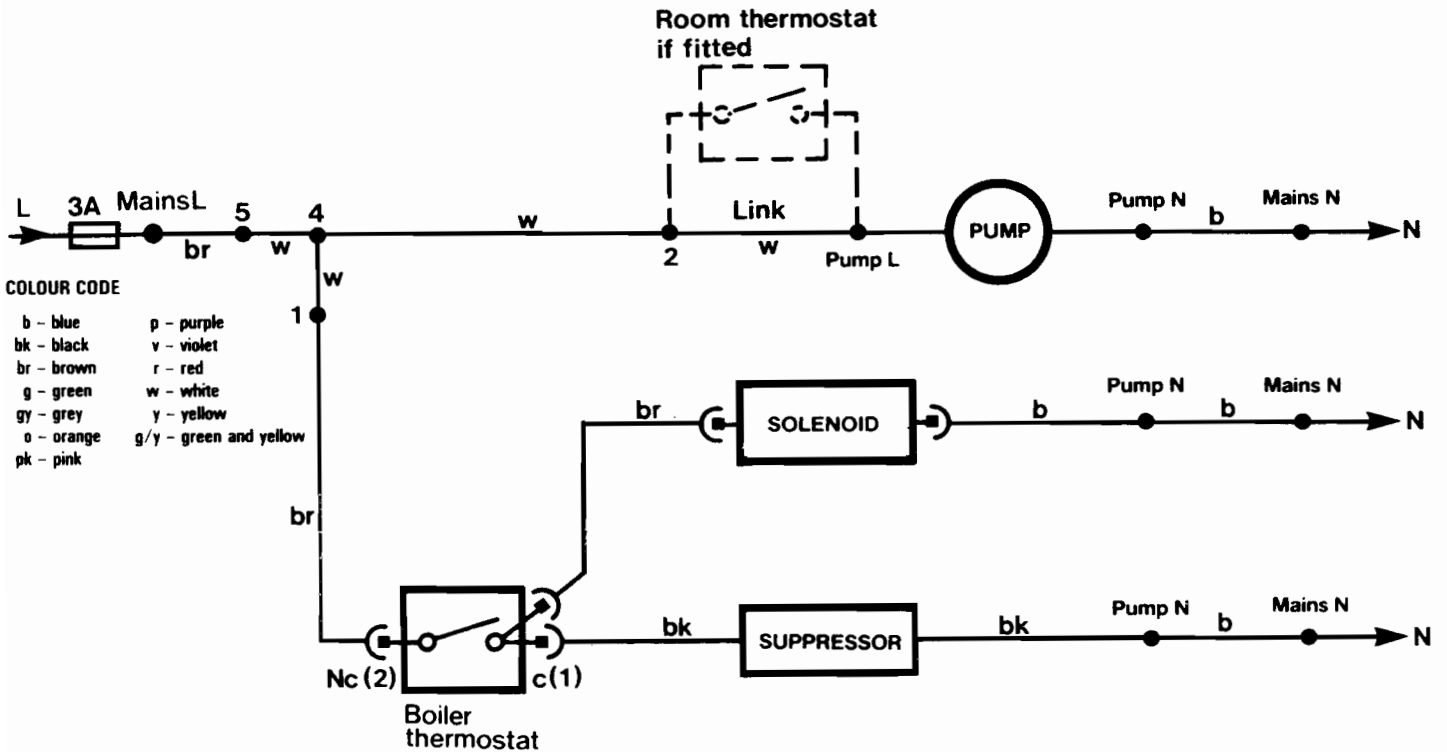
# 17. WIRING DIAGRAMS

## a. illustrated wiring diagram

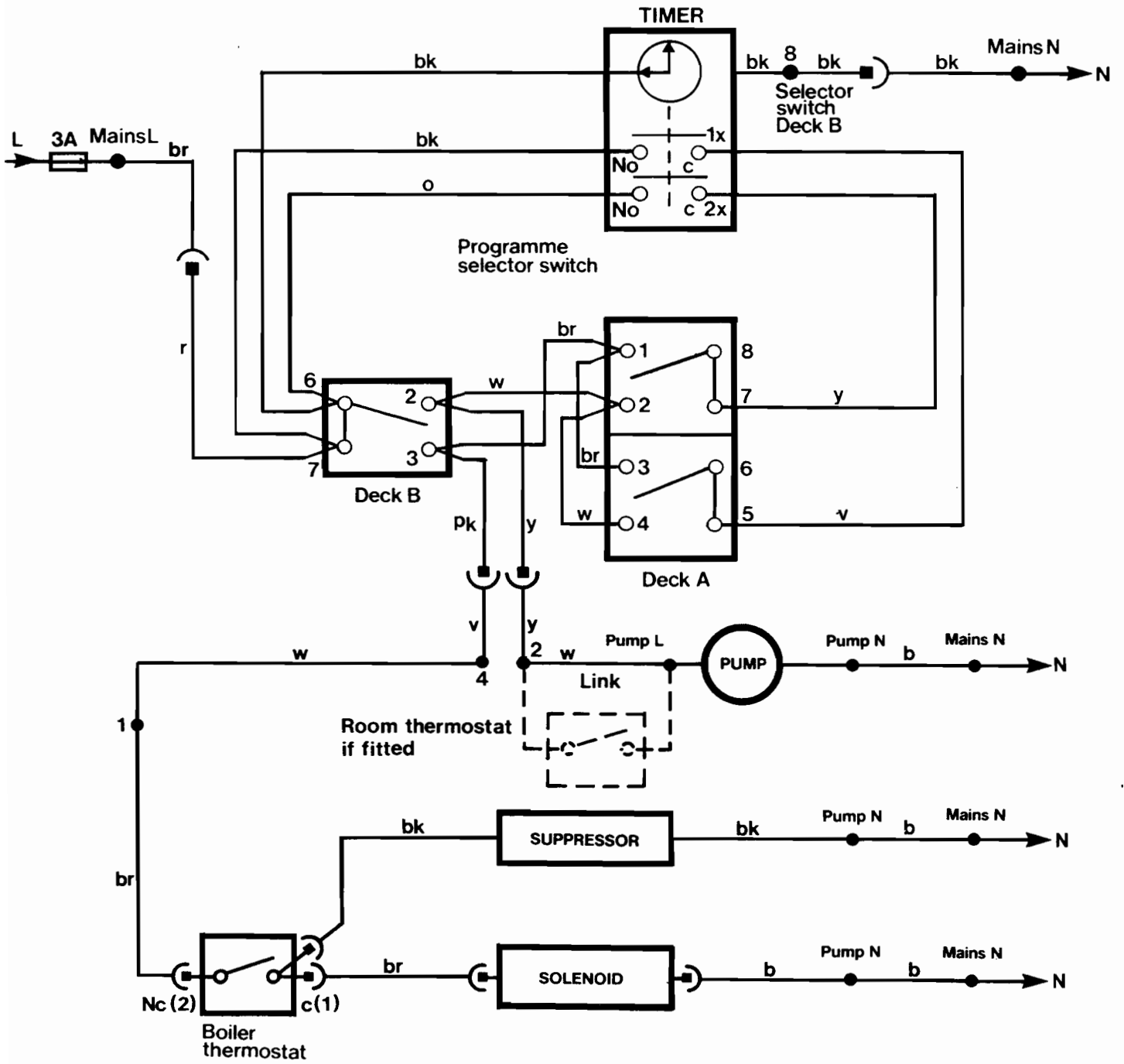


**Note:** If an Orion programmer is fitted remove links 5-4 and 4-2.  
 If a room thermostat is fitted remove link Pump L-2 and connect the room thermostat in its place

## b. Functional flow wiring diagram without programmer



c. Functional flow wiring diagram with Orion programmer



COLOUR CODE

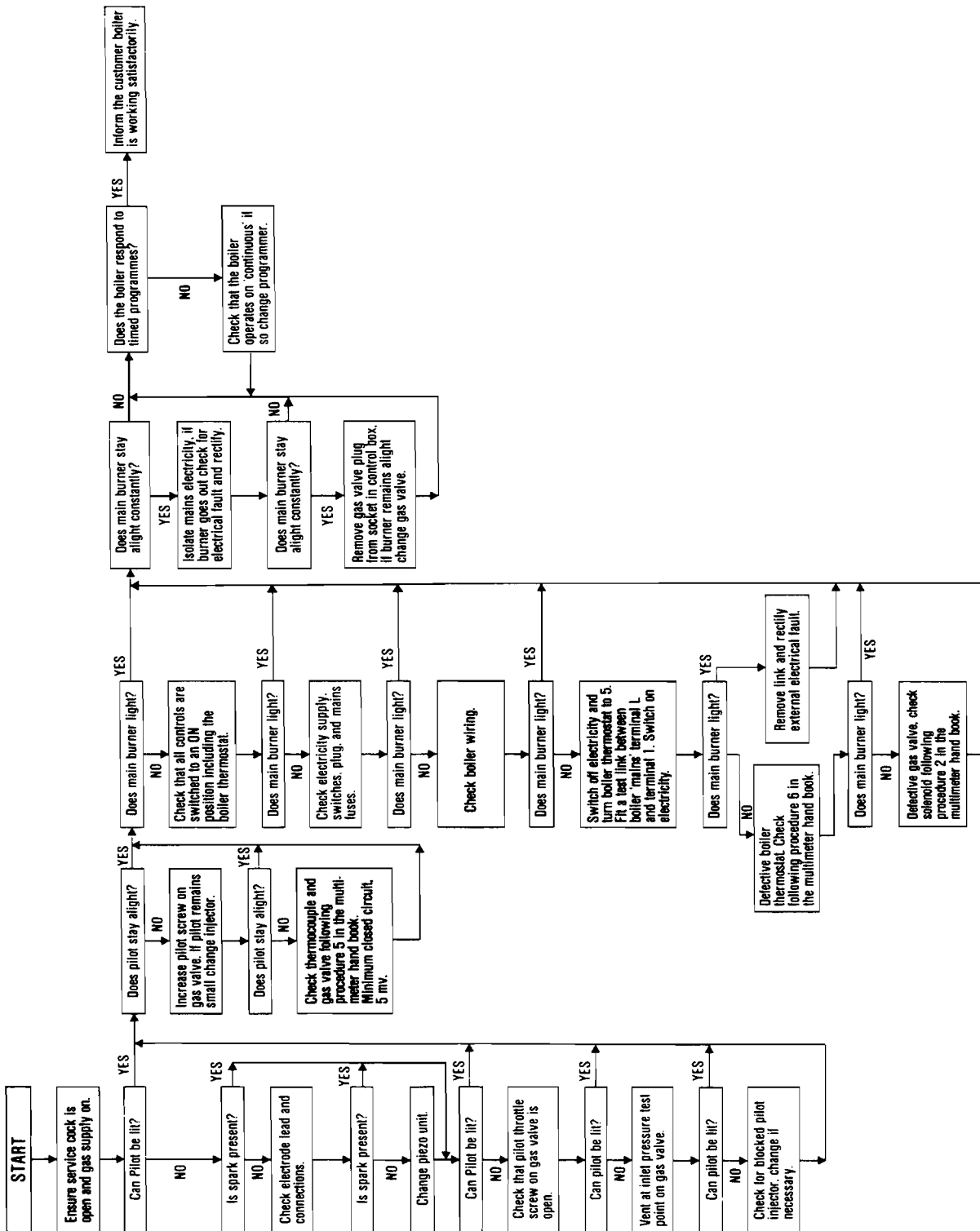
- b - blue
- bk - black
- br - brown
- g - green
- gy - grey
- o - orange
- pk - pink
- p - purple
- v - violet
- r - red
- w - white
- y - yellow
- g/y - green and yellow

SELECTOR SWITCH CLOSED

SERVICE	A1	A2	A3	A4	B2	B3
OFF						
CH OFF HW 2X						
CH OFF HW 1X						
CH + HW 2X						
CH + HW 1X						
CONTINUOUS						

## 18. FAULT FINDING GUIDE

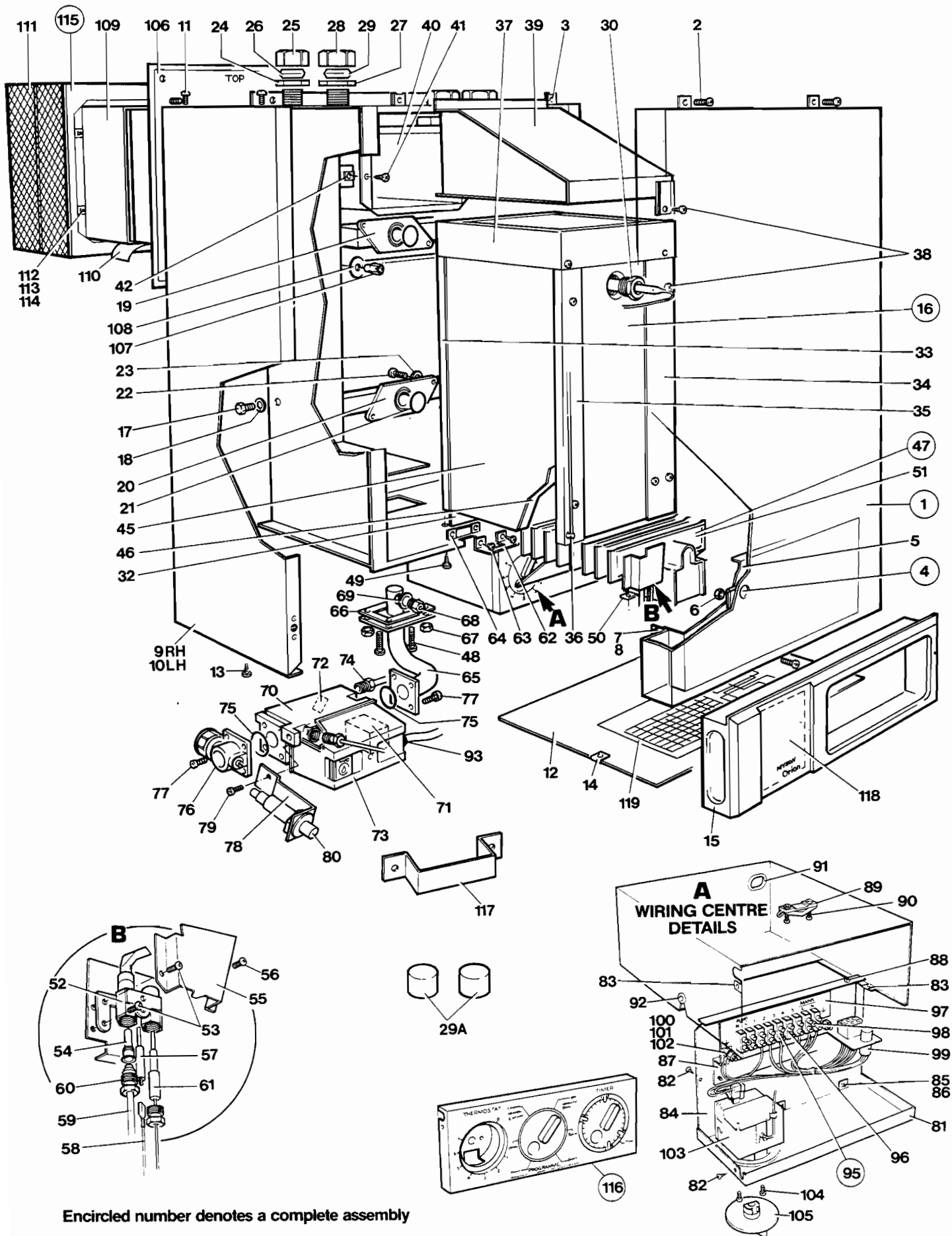
Preliminary electrical system checks as contained in the BGC multimeter instructions book are the first electrical checks to be carried out during a fault finding procedure. On completion of the service/fault finding task which has required the breaking and remaking of electrical connections, then the checks—A. Earth Continuity, C. Polarity and D. Resistance to Earth—must be repeated.





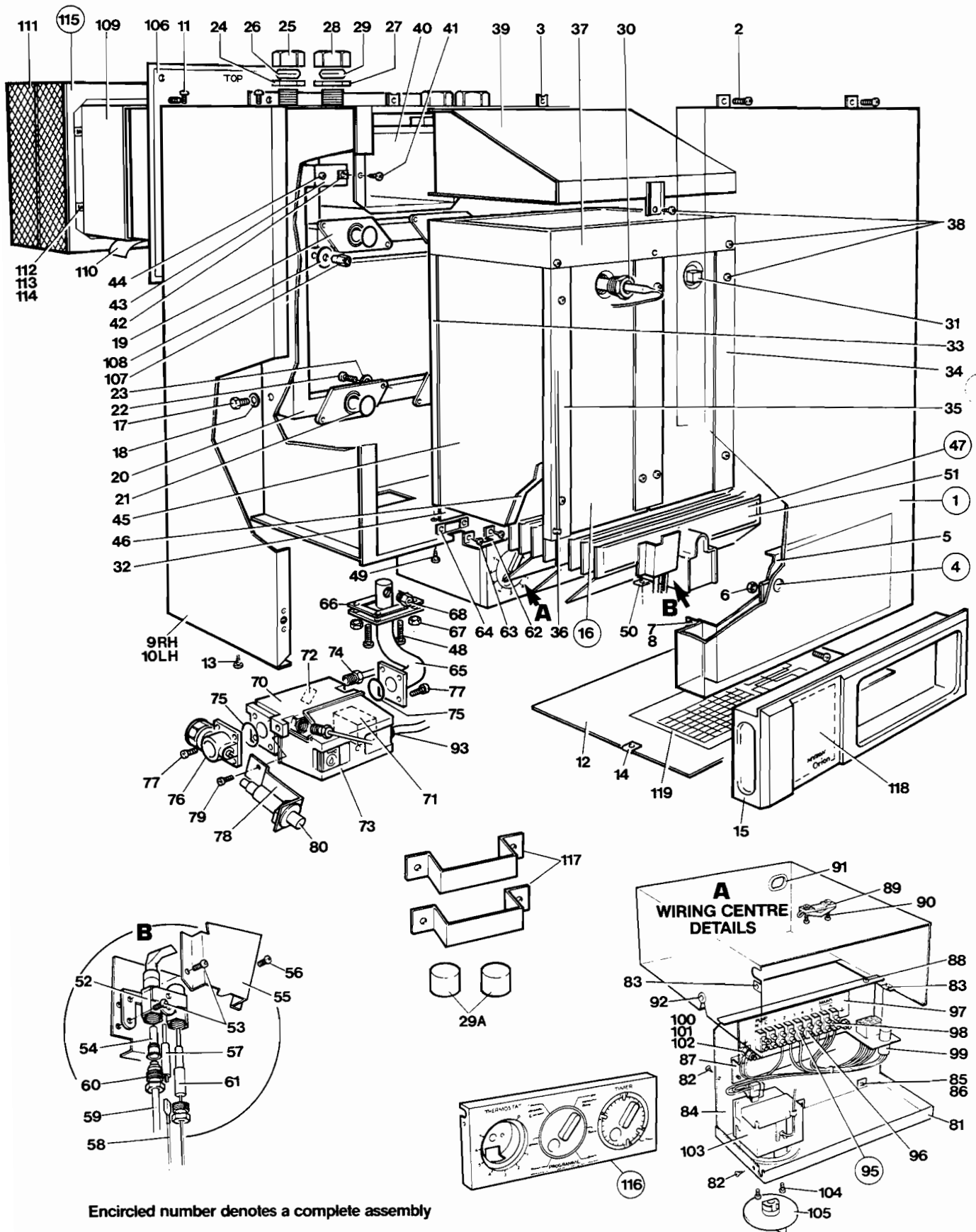
19. EXPLODED VIEWS

a. Orion 30B and 40B



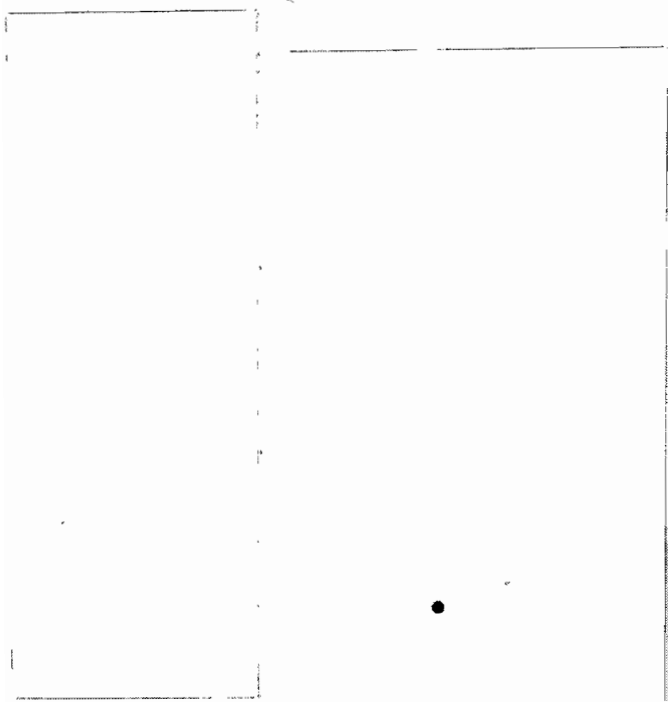
Encircled number denotes a complete assembly

b. Orion 50B and 60B



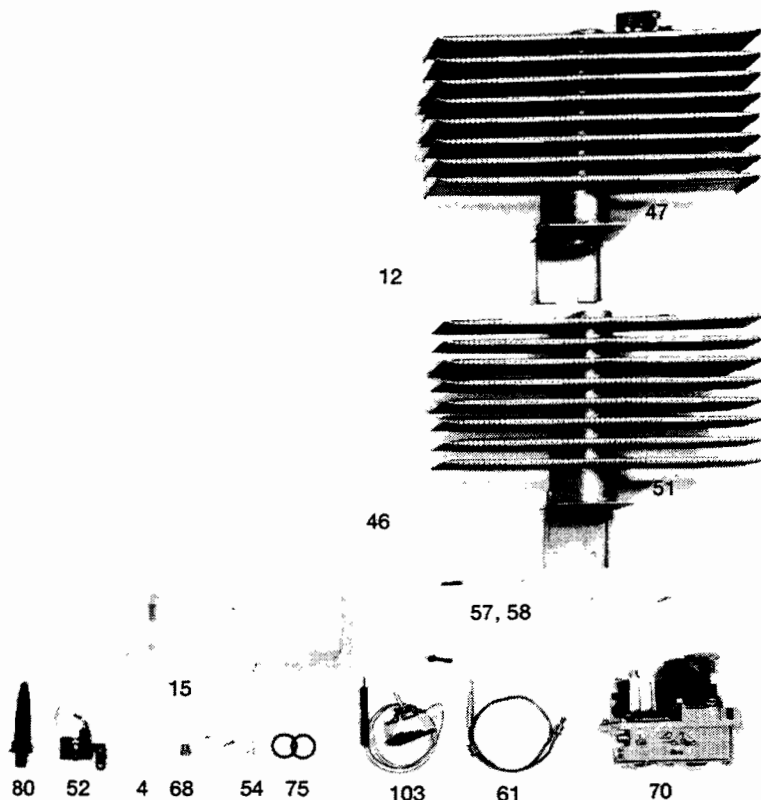
Encircled number denotes a complete assembly

20. SHORT LIST SPARE PARTS



9, 10

1



80

52

4

68

54

75

103

61

70

Key No.	GC No.	Description	Qty.	Part No.
1	332 633	Case front panel assembly	1	309A017
4	332 640	Window assembly	1	309A169
9	332 637	R/H side panel	1	309A245
10	332 638	L/H side panel	1	309A246
12	332 639	Bottom panel	1	309C102
15	332 641	Bottom cover	1	309A277
46	332 657	Insulation block	2	309C128
47	377 022	Burner and pilot assembly (30 and 40)	1	309A048
47	332 659	Burner and pilot assembly (50 and 60)	1	309A049
51	386 518	Burner (30 and 40)	1	309S219
51	381 950	Burner (50 and 60)	1	309S105
52	386 511	Pilot burner	1	Q385A1046
54	384 980	Pilot injector. 38/36A	1	45003508-001
57	386 512	Electrode	1	309S330
58	249 996	Electrode lead	1	212C054
61	390 131	Thermocouple	1	Q309A2721
68	398 716	Main injector. 108/750 (30)	1	309S190
68A	386 520	Main injector. 300 (40)	1	309S191
68	398 211	Main injector. 16/1350 (50)	1	309S192
68A	386 510	Main injector. 360 (60)	1	309S193
69	323 468	Main injector washer (30)	1	402C532
70	395 685	Gas valve	1	V4700E1007
75	359 211	Gas valve 'o' ring	2	400-0016-7-32
80	393 889	Piezo unit	1	402S083
103	381 677	Boiler thermostat	1	CL6P0143
105	332 666	Thermostat knob with clip	1	309S371

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Fax: 01926 882971

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**OMYSON**