

Baxi WM 51/3 RS

Baxi WM 38/3 RS

Baxi WM 30/3 RS

Baxi WM 20/3 RS

Central heating boilers

Cat. 1N

**Installation and
Servicing Instructions**

GC no 41 077 34

GC no 41 077 35

GC no 41 077 36

GC no 41 077 39

(respectively)

Baxi WM 51/3 RS — Baxi WM 38/3 RS — Baxi WM 30/3 RS — Baxi WM 20/3 RS

"These appliances are approved for safety/performance under the terms of the British Gas Corporation approval arrangements. The addition of flue dampers, economisers etc to the appliances without the express written approval of Baxi Heating will invalidate the normal appliance warranty. As a result the British Gas Corporation approval could be withdrawn and in certain cases infringement of the Gas Safety (Installation and Use) Regulations 1984 may result in legal action."

INTRODUCTION

The Baxi WM 51/3 RS is a wall mounted room sealed boiler, range rated between 7.3 and 14.9 kW (25,000 and 51,000 Btu/h) heat outputs.

The Baxi WM 38/3 RS is a wall mounted room sealed boiler, range rated between 5.86 and 11.1 kW (20,000 and 38,000 Btu/h) heat outputs.

The Baxi WM 30/3 RS is a wall mounted room sealed boiler, range rated between 4.4 and 8.8 kW (15,000 and 30,000 Btu/h) heat outputs.

The Baxi WM 20/3 RS is a wall mounted room sealed boiler, range rated between 4.4 kW and 5.9 kW (15,000 and 20,000 Btu/h) heat outputs.

All the appliances are designed for use on Natural Gas only. Each appliance consists essentially of four components, namely:

1. Wall mounting plate.
2. Combustion chamber with heat exchanger, burner and controls.
3. Outer case.
4. Balanced flue terminal assembly.

These appliances are preset at their maximum heat input rating.

BOILER INSTALLATION REQUIREMENTS

General:

The installation must be carried out by a competent installer and be in accordance with the relevant requirements of the GAS SAFETY (Installation and Use) REGULATIONS 1984, the Local Building Regulations, the I.E.E. Wiring Regulations and bye laws of the local water undertaking.

It should also be in accordance with the BS Codes of Practice, CP 331 – Part 3: BS 5376 Part 2: BS 5449 Part 1: BS 5546 and BS 5440 Parts 1 & 2.

Siting

The appliance must be fitted on a suitable outside wall with the flue discharging to atmosphere in a position permitting satisfactory removal of combustion products and an adequate air supply. The appliance should be fitted within the building unless otherwise protected by a suitable enclosure.

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 are given in BS 5376:2.

Clearances

A flat vertical area is required for each appliance with dimensions as follows:

(a) **For WM 51/3 RS** (Fig. 2): 510mm wide × 770mm high.

(b) **For WM 38/3 RS** (Fig. 3): **WM 30/3 RS** and **WM 20/3 RS** (Fig. 4): 410mm wide – 770mm high.

The above dimensions include the necessary clearances around the appliances for case removal, spanner access and for air movement.

The minimum clearances from the outer case are as follows:

Top: Minimum 50mm (Additional clearance may be required for the passage of pipes around local obstructions such as joists running parallel to the front face of the appliance. (See also figs 2, 3 and 4).

Bottom: Minimum 50mm.

Each side: Minimum 5mm.

Front: Suitable for servicing access.

The wall mounting plate is designed to be used as a template to determine the position of the appliance on the wall.

Ventilation

Detailed recommendations for air supply are given in BS 5440:2. The following notes are intended to give general guidance. The room in which a room sealed appliance is installed does not require a purpose provided air vent. Where a room sealed appliance is installed in a purpose made cupboard or compartment air vents are required (for cooling purposes) in the cupboard or compartment at high and low level which may communicate with a room or direct to outside air. The actual minimum effective area requirements of cupboard/compartment air vents for the respective appliances are shown in the table below.

Note: Both air vents must communicate with the same room or both must be on the same wall to outside air.

Flue arrangements

1. Detailed recommendations for flues are given in BS 5440: Part 1.
2. The standard flue terminal supplied with the appliance is suitable for use with wall thicknesses between 100mm to 330mm (4in to 13in).
3. A flue terminal extension duct is available as an optional extra for wall thicknesses between 330mm to 560mm (13in to 22in).
4. The balanced flue terminal is designed such that it is fitted from outside the building. The air inlet and products ducts must be horizontal and square with the wall face.
5. The following hole sizes are required through the wall for the appliances:
 - (a) WM 51/3 RS and WM 38/3 RS: 310mm wide × 265mm high (12¹/₄in × 10¹/₂in) (Fig 2 and Fig 3).
 - (b) WM 30/3 RS and WM 20/3 RS: 196mm wide × 220mm high (7³/₄in × 8³/₄in) (Fig. 4).

Balanced Flue Siting Requirements

The following guide lines indicate the general requirements for balanced flue terminals.

- (a) If the terminal is fitted within 850mm of a plastic gutter or within 450mm of painted eaves or a painted gutter an aluminium shield at least 750mm long should be fitted to the underside of the gutter or painted surface.

Position air vent	Air from room				Air direct from outside			
	WM 51/3 RS	WM 38/3 RS	WM 30/3 RS	WM 20/3 RS	WM 51/3 RS	WM 38/3 RS	WM 30/3 RS	WM 20/3 RS
High and Low level	175 cm ² (27in ²)	133 cm ² (21in ²)	102 cm ² (16in ²)	69 cm ² (11in ²)	87.5 cm ² (13.5in ²)	66.5 cm ² (10.5in ²)	51 cm ² (8in ²)	35 cm ² (5.5in ²)

- (b) If the outer surface of an outside wall is of combustible material it should be protected by fitting a non combustible plate so that it extends not less than 50mm (2in) around the terminal.

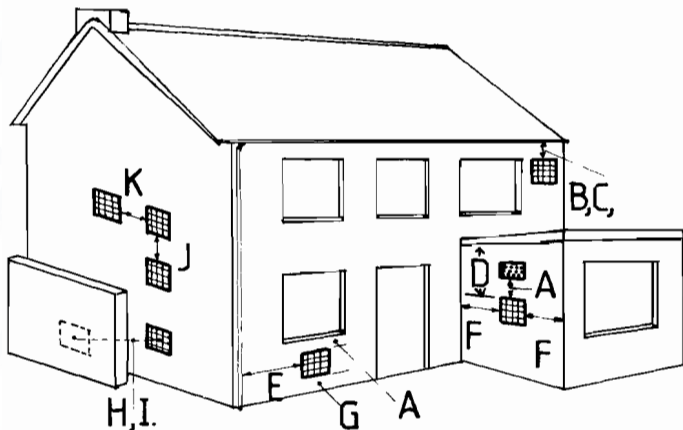
A terminal guard is available as an optional extra or may be obtained from:

South: Tower Flue Components Ltd.,
Morley Road, Deacon Trading Estate,
Tonbridge, Kent, TN9 1RA. Tel: 0732-351 555

or

North: Tower Flue Components Ltd.,
236 Lockwood Road, Lockwood,
Huddersfield, HD1 3TG. Tel: 0484-47916

When ordering a terminal guard quote the appliance name.



Position of Terminal	Minimum Distance mm
A: Directly below an openable window or other opening e.g. an air brick.	300
B: Below gutters, soil pipes or drain pipes.	300
C: Below Eaves.	300
D: Below Balconies.	600
E: From vertical drain pipes and soil pipes.	75
F: From internal or external corners.	600
G: Above ground or balcony level.	300
H: From a surface facing a terminal.	600
I: From a terminal facing a terminal.	600
J: Vertically from a terminal on the same wall.	1500
K: Horizontally from a terminal on the same wall.	300

Water Circulation Systems

The unit is suitable for use with fully pumped systems (small bore and micro-bore with open vents) and gravity domestic hot water with pumped central heating systems.

Sealed Systems

A kit incorporating an overheat cut-off device is available for use on sealed systems, or where additional control protection is required. This kit is only applicable to fully pumped systems.

WARNING: Under no circumstances should the boiler be used on a sealed system unless the overheat cut-off device is fitted to the appliance in accordance with the instructions supplied.

When the unit is to be installed to an existing or new gravity domestic hot water and pumped central heating system the following considerations should be given to the design of the gravity domestic hot water flow and return pipes.

- The minimum circulating head should not be less than 1m (3ft) with a maximum horizontal run of 3m (10ft) when using 28mm pipes. Smaller pipe sizes and longer horizontal runs are acceptable with suitably increased circulating heads.
- The system must be designed to prevent reverse circulation.
- Pipes should be laid to maximum fall avoiding points of possible air lock.

The following conditions should be observed on all types of system:

- THE WATER SPREADER ADAPTER MUST BE FITTED TO THE BOILER RETURN CONNECTION ON ALL SYSTEMS.**
- The static head must not exceed 30m (100ft) of water.
- The boiler must only be used with an indirect cylinder.
- Drain points should be fitted to the lowest points in the system.
- All electrical wiring, gas and water pipes must be installed in a way which would not restrict the servicing of the boiler.
- Arrangements must be made so that gravity circulation does not take place in the heating circuit when the pump is not in use.

Gas Supply

The gas installation should be in accordance with CP 331: Part 3.

The connection of the appliance is RC $\frac{1}{2}$ (1/2in BSPT internal) located at the bottom right hand side of the appliances.

Ensure that the pipework from the meter to the appliance is of adequate size. Do not use pipes of a smaller size than the appliance gas connection.

Electrical Supply

External wiring must be correctly earthed and polarised and in accordance with the I.E.E. Wiring Regulations.

For wiring instructions see 'ELECTRICAL CONNECTIONS'.

Appliance Details

	WM 51/3 RS	WM 38/3 RS WM 30/3 RS WM 20/3 RS
Height overall	670mm (26 $\frac{3}{8}$ in)	670mm (26 $\frac{3}{8}$ in)
Width	500mm (19 $\frac{3}{4}$ in)	400mm (15 $\frac{1}{2}$ in)
Forward projection from wall	330mm (13in)	330mm (13in)
Weight empty	61 Kg (135 lbs)	50 Kg (110 lbs)
Water content	2.7L (0.6 gals)	2.2L (0.48 gals)

Boiler tapings 3×RC 1 (1in BSPT internal)

Gas connection Rc $\frac{1}{2}$ (1/2in BSPT internal)

Electrical supply 240 volts A.C. 50 Hz
3 amp fuse

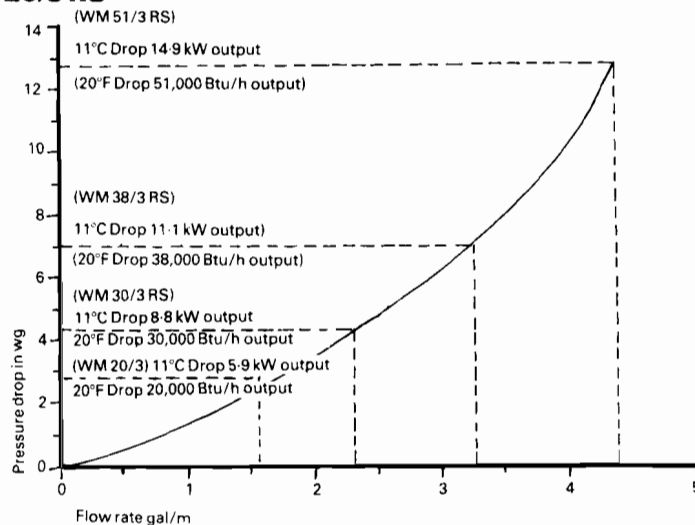
Maximum working head 30m (100ft)

Minimum working head 1m (3ft)

Thermocouple output 10–15 mv.

Hydraulic resistance chart

WM 51/3 RS, WM 38/3 RS, WM 30/3 RS, and WM 20/3 RS



Fitting the Appliance

1. Select the most suitable position for the boiler and use the wall mounting plate (packed with the boiler) as a template. If fitting the boiler between wall cupboards ensure that the minimum width available is not less than 510mm for WM 51/3 RS and 410mm for WM 38/3: 30/3 and 20/3 RS boilers.
 - (a) Mark off the appliance (outer case) centre line on the wall in the chosen position.
 - (b) If the bottom edge of the outer case is required to line up with the wall cupboards, the lower edge of the wall mounting plate should be positioned 63mm above the bottom edge of the wall cupboards.
 - (c) Position the centre line marking on the bottom edge of the wall mounting plate to correspond with the chosen centre position (see Figs. 2, 3 & 4).
 - (d) Check that the wall plate is level and square.
2.
 - (a)
 - (i) Mark off the position of the bottom and side edges of the flue opening (the sides are indicated by the marks on the top edges of the wall mounting plate. For WM 51/3 RS see Fig. 2, for WM 30/3 RS and WM 20/3 RS see Fig. 4.
 - (ii) For WM 38/3 RS mark off the position at the centre line of the flue and mark off 155mm at either side (the centre of the flue opening is indicated by a mark on the top edge of the wall mounting plate (see Fig. 3).
 - (b) Mark off the position of three sound anchorage points, two at the top and one at the centre bottom.
3.
 - (a) Remove the wall mounting plate.
 - (b) Complete the marking out of the hole for the flue ducting above the marked lines, and then cut out a neat hole (for sizes see Figs. 2, 3 & 4 respectively).
4. Drill the three anchorage holes 10mm diameter ($\frac{3}{8}$ in) 90mm (3.5in) in depth ensuring that the holes are not more than 1mm ($\frac{1}{32}$ in) oversize on diameter.
5. Secure the wall mounting plate to the wall with the three coach screws and plugs provided in the plastic bag in the boiler pack. Check that the wall mounting plate is level. Hang the boiler. (Figs. 7 & 9).
6. **Fitting and adjusting the flue terminal ducts** (Figs. 5a, 5b, 6)

Remove the terminal mesh assembly and air duct (C) from the carton.

 - (a) For wall thickness of between 100mm and 150mm (4in – 6in) Figs. 5a & 5b:-
 - (i) Shorten the flue duct (D) and plain end of air duct (C) by 135mm using tin snips (Fig. 5b).
 - (ii) Shorten air duct (A) on the combustion box by 35mm using tin snips (Fig. 5a).
 - (iii) Proceed to section (d).
 - (b) For wall thicknesses of between 150mm and 235mm (6in – 9in) Fig. 5b:-
 - (i) Shorten the flue duct (D) and plain end of air duct (C) by 85mm using tinsnips (Fig. 5b).
 - (ii) Proceed to section (d).
 - (c) For wall thickness between 235mm and 330mm ($9\frac{1}{4}$ in – 13in):-
 - (i) Use the flue terminal ducts as supplied.
 - (d)
 - (i) From outside the building pass the air duct (C) through the wall opening and slide over the boiler air duct (A) until the side brackets (Fig. 6) contact the wall surface. NOTE: side brackets should be positioned at the bottom.
 - (ii) Ensure that air duct (C) is horizontal and square to the wall face, then using the

aluminium sealing tape provided make good the joint between ducts A & C on the inside of the duct (Fig. 6).

- (e) For all flue duct installations:-
 - (i) Make good between the wall and ducts outside the building.
 - (ii) Locate the flue trim over the air duct protruding from the wall (Fig. 6).
 - (iii) Engage the terminal mesh assembly flue duct (D) ensure the rain trap to the top, on to the flue duct (B) on the back of the boiler (Figs. 5a & 5b). Push in and secure the flue trim and terminal mesh assembly with the four screws provided.
 - (iv) Make good any exposed holes in the wall around the flue duct inside the premises.

7. Installation of water circulation system (BS 5376:2, BS 5449:1)

(a) Boiler Connections

The boiler has three Rc1 (1in BSPT internal) tappings on the right hand side and is supplied with the following fittings which are packed in the plastic bag with the boiler pack:

1 off — 1in BSP plug: 2 off — 22mm street elbows:
2 off — 1in threaded by 22mm adaptors with compression nuts and olives.

NB. ONE ADAPTOR IS FITTED WITH A PLASTIC WATER SPREADER. THIS MUST BE FITTED TO THE BOTTOM RETURN CONNECTION ON ALL SYSTEMS. (Care should be taken to ensure that jointing material does not block the holes in the spreader).

Additional fittings are supplied for gravity domestic hot water.

1 off — injector tee: 1 off — 28mm street elbow:
1 off — 1in threaded $\times$ 28mm adaptor with compression nut and olive.

- (b) The adaptors can be fitted in the appropriate connection tappings — see Figs. 8 & 9 before **lifting the boiler into position on the wall**.
- (c) Before connecting any pipework fit the outer case top trim as shown in Fig. 7. This is located in the boiler pack.
- (d) Pipework can be routed over the top of the combustion box to a position anywhere across the width of the casing (see Fig. 7) and arranged to clear the ceiling joists at right angles to the front face of the appliance.
- (e) When installing the pipework ensure that:
 - (i) The supplied fittings are used at the first joint of all boiler connections.
 - (ii) The pipework will run through the cutouts provided in the case when it is fixed. The overall space available for pipes is given in Fig. 1.
 - (iii) Drain off points should be provided as appropriate.
 - (iv) Pipe sizes are suitable for the system design.

Pumped Domestic Hot Water and Pumped Central Heating System

The pipes should be connected in the following order: (see Fig. 8 for example).

- (a) Fit the adaptor with the plastic water spreader in the bottom return tapping on the boiler. Do not use excessive jointing compound which may obstruct the holes in the spreader.
- (b) Fit an adaptor 1in BSP $\times$ 22mm (supplied) in either of the flow tappings and plug the unrequired flow connection with the 1in BSP plug provided.
- (c) Connect the flow and return pipework using the 22mm street elbows, nuts and olives provided.

Gravity Domestic Hot Water and Pumped Central Heating System

The pipes should be connected in the following order, see Fig. 9 for example:

- Fit the adaptor with the plastic water spreader in the bottom return tapping. Do not use excessive jointing compound which may obstruct holes in the spreader.
- Fit the gravity injector tee provided to the return adaptor using a 22mm street elbow, nut and olive, **with the 28mm diameter spigot facing down and the 22mm brass spigot inserted in the street elbow** as shown in Fig. 9.
- Connect the gravity return pipework to the 28mm diameter spigot using a 28mm compression or Yorkshire fitting.
- Connect the pumped return pipework to the 22mm pipe supplied on the injector tee – see Fig. 9.
- Fit the 1in BSP×28mm adaptor provided into the top back tapping – Fig. 9 – and connect the gravity flow pipework using the 28mm street elbow, nut and olive.
- Fit the remaining 1in BSP×22mm adaptor into the top front tapping and using the 22mm street elbow nut and olive provided and complete the pumped flow pipework.

Pump (Fig. 7)

A suitable pump e.g. Grunfos type UPS15/50 Mk 2 or SMC Comet 2 with isolating valves may be fitted inside the outer case using standard fittings.

Accuracy is important to avoid the pump or pipework fouling the top panel of the outer case.

Gas Connections (Fig. 8)

The gas connection to the boiler is made via the internal ½in BSP thread on the union gas service cock.

To make good this connection either:

- Adapt the 15mm copper pipe gas supply within the outer casing using a ½ in BSP external×15mm capillary adaptor OR
- Tighten in the thread of the ½in BSP m.s. pipe direct.

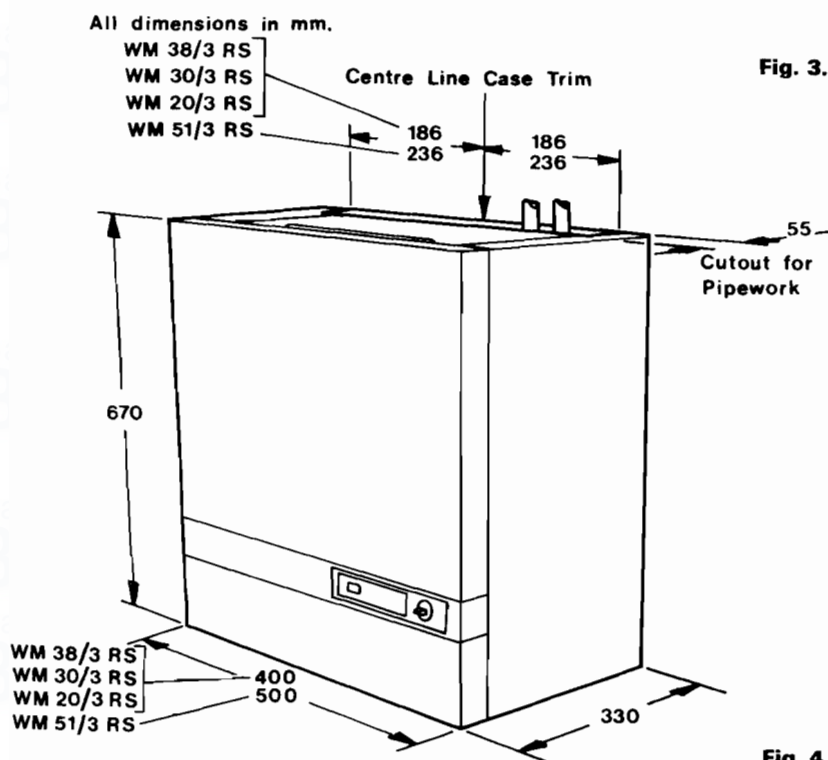


Fig. 1. The Unit

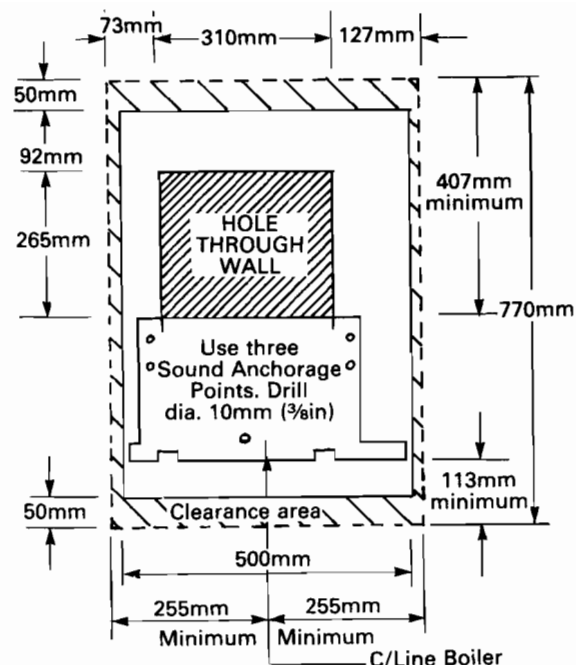


Fig. 2. Wall Mounting Plate Requirements WM 51/3RS

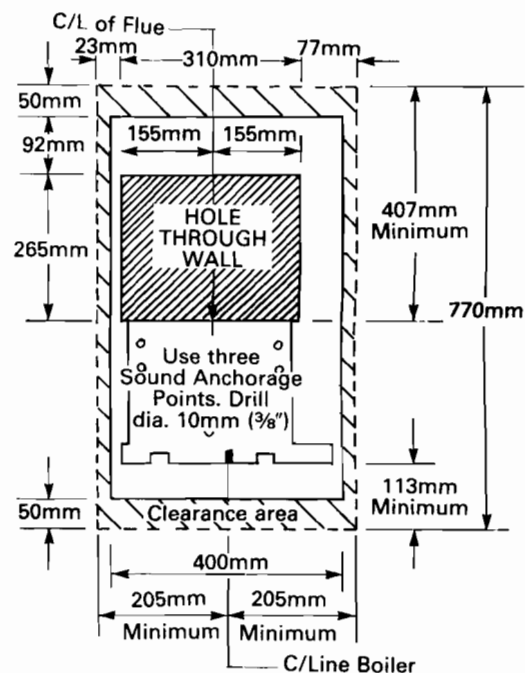


Fig. 3. Wall Mounting Plate Requirements WM 38/3 RS

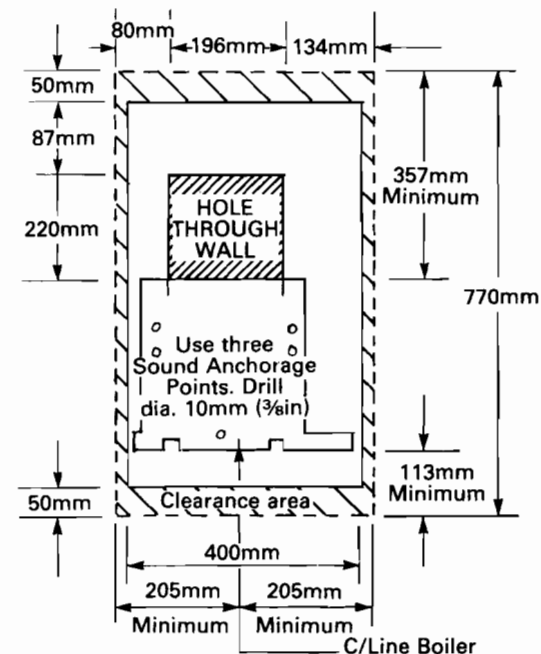


Fig. 4. Wall Mounting Plate Requirements WM 30/3 RS
WM 20/3 RS

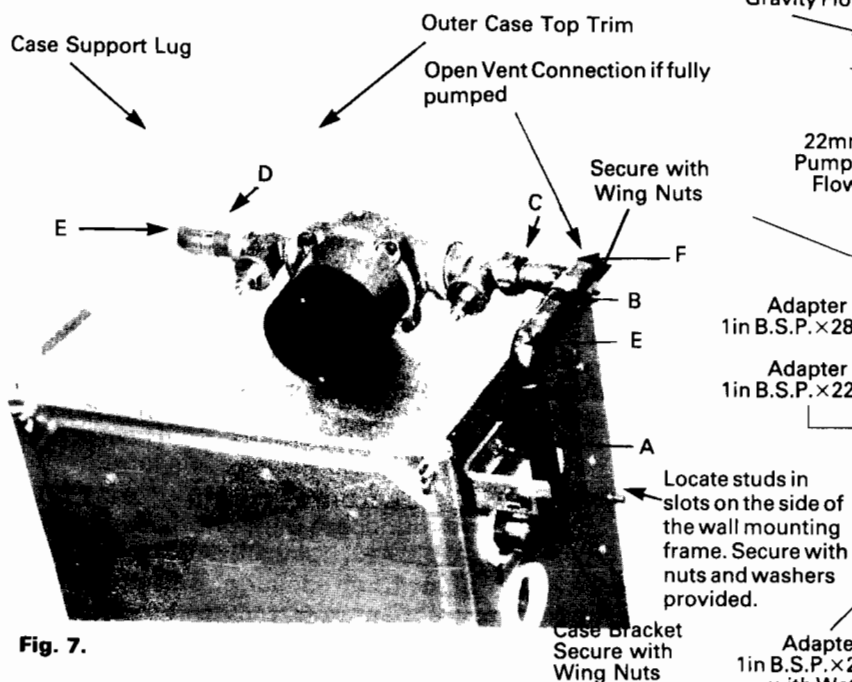


Fig. 7.

Boiler	Length of Pipe in mm				Fittings all boilers	
	A	B	C	D	E	F
WM 51/3 RS	134	63	45	45	22mm Yorkshire capillary elbow No. off 2	22mm Yorkshire capillary tee No. off 1
WM 38/3 RS						
WM 30/3 RS	139	63	45	45		
WM 20/3 RS						

Pump in Outer Case (Fig. 7).

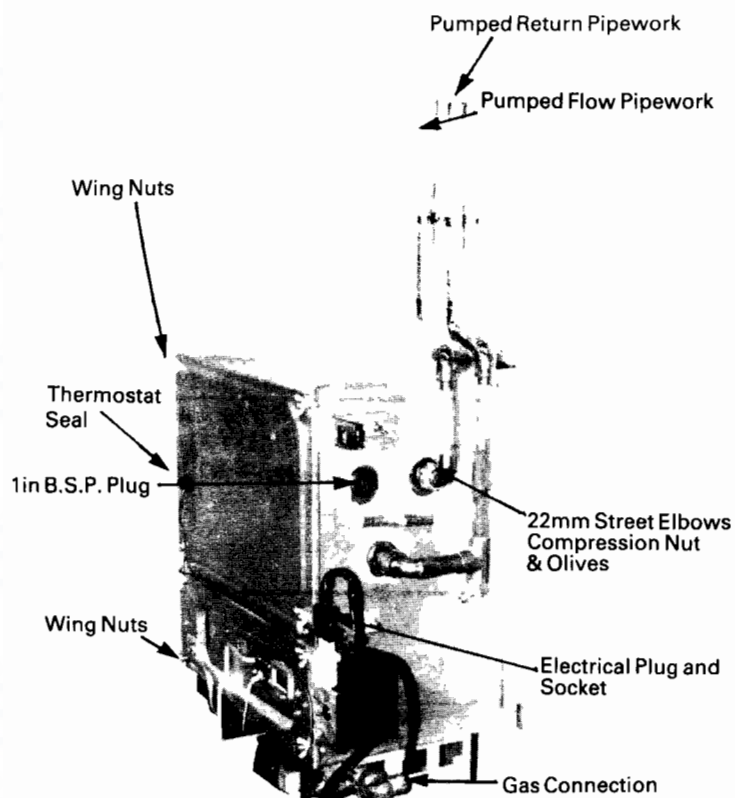


Fig. 8.

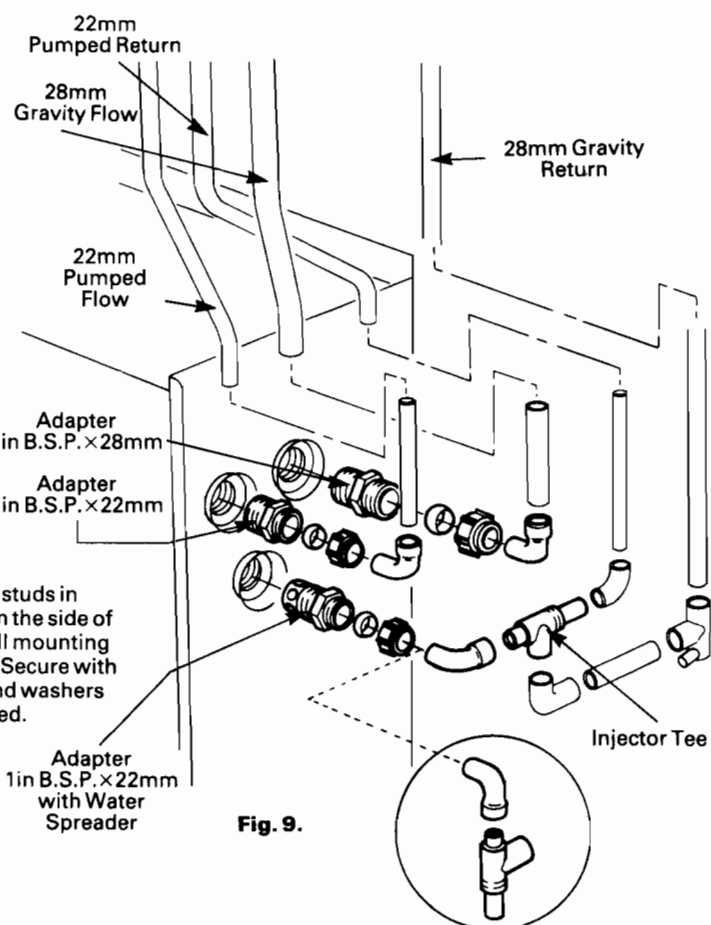


Fig. 9.

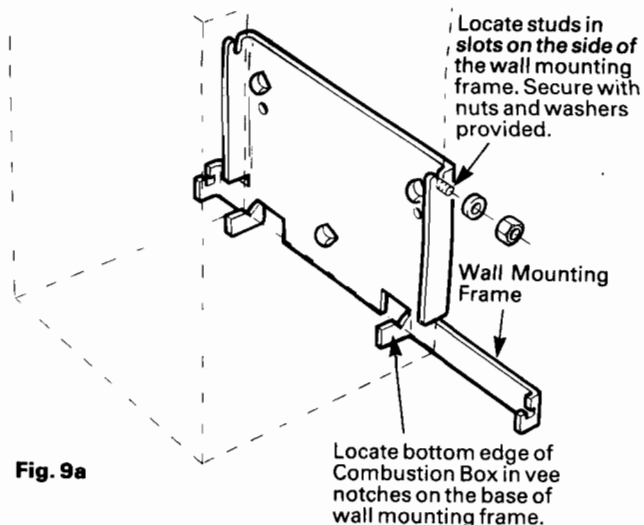


Fig. 9a

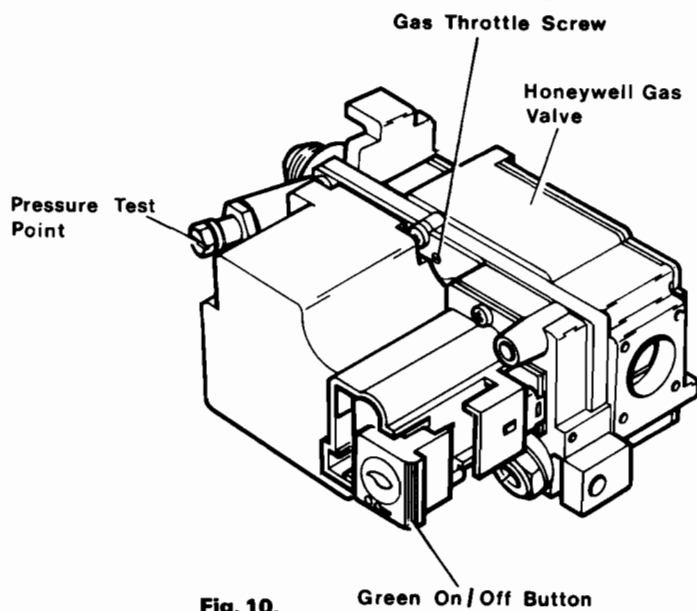


Fig. 10.

8. Electrical Connections

General

The mains supply required is 220/250 V 50 Hz fused at 3 amps. A double pole switch should be provided in the installation or an unswitched socket outlet should be used. NOTE: Where a double pole switch is used there must be a contact separation of at least 3mm in both poles.

All external wiring shall be correctly earthed and polarised and generally be in accordance with I.E.E. Wiring Regulations.

Electrical Supply to Controls

1. The recommended cable for connection to the appliance terminal strip is 0.75 sq mm 24/.20 PVC heat resistant grade to BS 6500.
2. To avoid contact with hot surfaces the input cable must be secured with the cable clips provided. These are located on the LH and RH boiler support feet attached to the underside of the appliance.
3. In the event of an electrical fault after installation of the appliance, preliminary electrical system checks shall be carried out i.e. earth continuity, polarity and resistance to earth.
4. Remove the plastic cover of the electrical junction box positioned at the bottom LH corner of the appliance.
5. Fit the input cable to the terminal strip and clamp using the cable grip provided.
6. The length of the supply conductors between the cable grip and the terminals must be such that the current carrying conductors become taut before the earthing conductor if the cable should slip out of the cable grip.
7. Clip the electrical input cable to the cable clips provided ensuring that the cable does not touch the underside of the combustion box.
8. Replace the plastic cover and secure with the retaining screw.

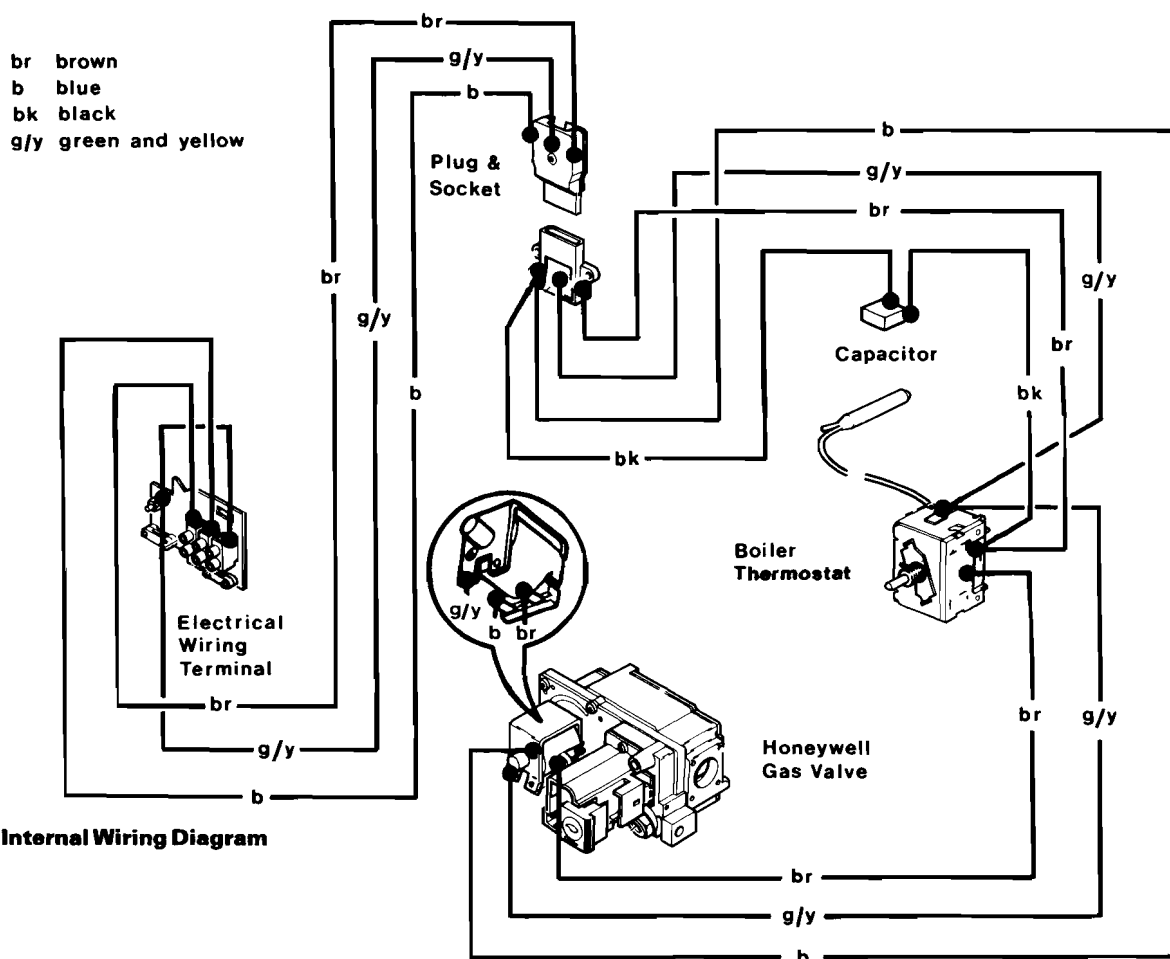


Fig. 25a. Internal Wiring Diagram

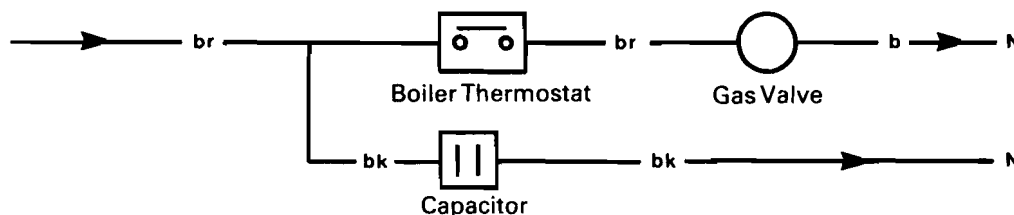


Fig. 25b. Flow Diagram

9. Commissioning the appliance

1. Flush the whole system with all valves open and without the pump in position. Refit the pump.
2. Fill the system with water. Vent the radiators and check to ensure there are no water leaks. (For sealed systems see items 19 to 21 inclusive).
3. Turn the gas service cock anti clockwise to the 'ON' position. Pressure test for gas soundness.
4. Purge the air from the supply pipe at the gas service cock. (CP 331 Part 3).
5. Ensure that all external controls e.g. room thermostat, timer etc. are calling for heat.

6. Fit the thermostat control knob (packed with boiler in plastic bag) and turn to the 'OFF' position fully anti clockwise.
7. Remove the burner pressure test point screw and connect a pressure gauge.
8. Hold in the green ON/OFF button on the gas control valve.
9. Press in the igniter button and release. Repeat until the pilot lights. Hold in the green ON/OFF button for approximately 15 seconds and then release. The pilot should then stay alight. If the pilot fails to remain alight then repeat the procedure from 8. The flame should be without a yellow tip and should extend past the pilot shroud by approximately 12mm (1/2in).
10. Turn on the mains electricity supply.
11. Operate the burner by turning the thermostat knob to the no. 6 setting – FULLY CLOCKWISE. Check the operation of the flame failure device, by pushing the green button to the off position (to the left). The burner and pilot should go out.
12. Turn the boiler thermostat to the off position and repeat the lighting procedure from para 8, to re-establish the pilot, turn the main burner on.
13. Adjust the appliance gas throttle – to give the correct pressure corresponding to the required input. Turn the gas throttle screw clockwise to decrease the burner pressure. See data badge or table below for hot setting pressure. Check this pressure after 10 minutes and adjust if necessary (Fig. 10).
14. Turn the boiler thermostat to the 'OFF' position and re-check the pilot flame length.
15. The system should be flushed again when hot, refilled, vented and checked for water soundness.
16. Refit the burner pressure test point screw and then turn the boiler thermostat to the required setting.
17. Make a final check for gas soundness. Set the pointer on the data badge to actual system design settings.
18. Turn off the electricity supply.

Sealed Systems – Filling Arrangements

19. After flushing the system, fill with water until a pressure of 1.5bar [21.5.lbf/in²] is registered and examine for water soundness. Raise the pressure until the safety valve operates. (pre-set at 3bar [45 lbf/in²]).
20. Charge the system to the initial design pressure by either adding or releasing water as necessary. Any set pointer on the pressure gauge should be set to coincide with the indicator. After commissioning the boiler, re-examine for water soundness and drain while still hot.
21. Refill and vent the system, adjust to initial design pressure and manually check for satisfactory operation of the safety valve.

Fig. 11. Outer Case

19. Assemble the outer case in the following manner:
 - (a) Fit the top RH side case bracket to the boiler and secure it with the two wing nuts provided. (packed with the boiler in a plastic bag) see Fig. 7 for details.
 - (b) Locate the LH side panel on the case support lugs on the top trim and wall mounting plate and press downwards to locate. Secure to the upper case fixing bracket see Fig. 11.
 - (c) Repeat (b) with the RH side panel.
 - (d) Position the top and bottom panels by locating the slots on the back edge of the panels over pegs on the side panels and secure each with the two screws provided. (Fig. 11).
 - (e) Fix a captive nut (supplied) to the RH side panel in the position shown in Fig. 11, with the flat face forwards.
 - (f) Fit the upper front panel by locating the two lugs at the top back edges into the slots on the top front face of the side panels. Secure the lower end of the panel, using the two screws provided (i) one through the hole in the LH side panel and into the captive nut on the bracket on the LH side of the combustion box, (ii) one into the captive nut on the RH side panel.
 - (g) The lower front panel has a location guide on each side which should be aligned with the bottom slots in each side panel. The lower front panel is held in position by magnetic catches.

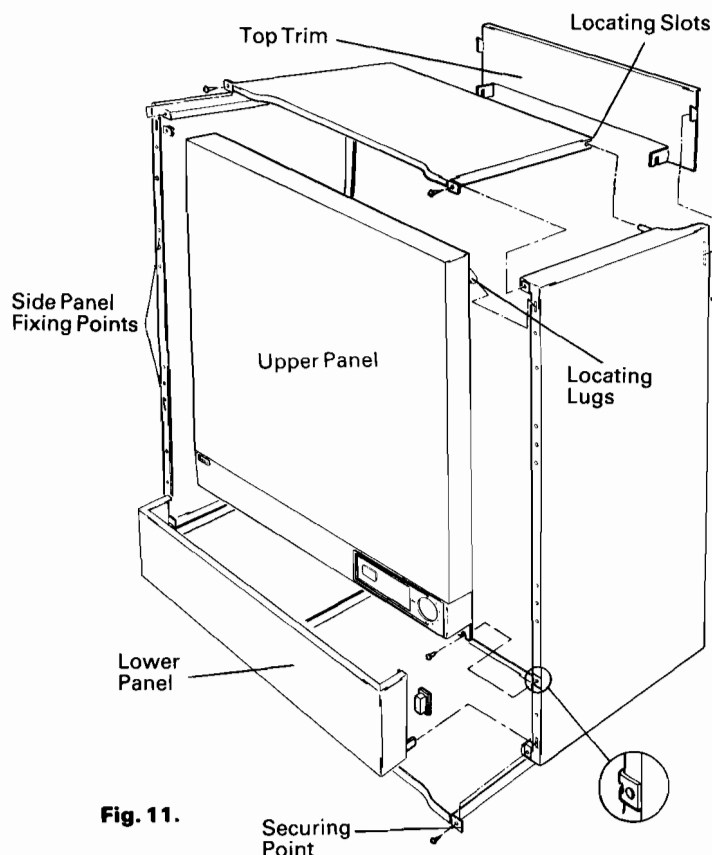


Fig. 11.

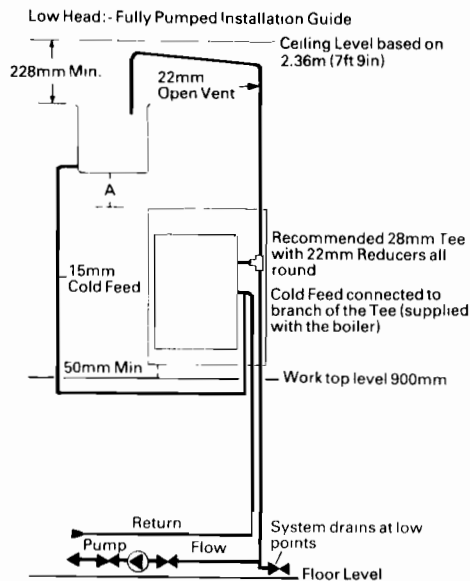
Appliance	Maximum Input	Setting Pressure	Intermediate Input	Setting Pressure	Minimum Input	Setting Pressure
WM 51/3 RS	19.4 kW 66,200 Btu/h	16.0 mbar 6.4 in wg	14.6 kW 49,800 Btu/h	9.0 mbar 3.6 in wg	9.73 kW 33,200 Btu/h	4.4mbar 1.8 in wg
WM 38/3 RS	14.65 kW 50,000 Btu/h	15.8 mbar 6.3 in wg	11.34 kW 38,700 Btu/h	10.0 mbar 4.0 in wg	7.92 kW 27,000 Btu/h	4.7 mbar 1.9 in wg
WM 30/3 RS	11.28 kW 38,500 Btu/h	16.8 mbar 6.75 in wg	8.5 kW 29,000 Btu/h	9.5 mbar 3.8 in wg	5.75 kW 19,600 Btu/h	4.5 mbar 1.8 in wg
WM 20/3 RS	7.62 kW 26,000 Btu/h	15.0 mbar 6.0 in wg			5.78 kW 19,700 Btu/h	8.6 mbar 3.4 in wg

System Design Notes for Guidance

1. Pipework

- The sizes of flow and return pipes from the boiler should be determined by normal methods according to the requirements of the system. An 11°C (20°F) drop across the system is recommended.
- For fuel economy and best boiler performance, the system should be designed so that gravity circulation does not take place in the heating system when the pump is not running.

See Figs. 12 i and 12 ii for typical examples of system arrangements, recommended by Baxi Heating.



Measurement A	Minimum
WM 51/3 RS	200mm
WM 38/3 RS	200mm
WM 30/3 RS	150mm
WM 20/3 RS	150mm

Subject to: Correct Gas Input.
Pump adjusted to give the designed flow rate (11°C drop).

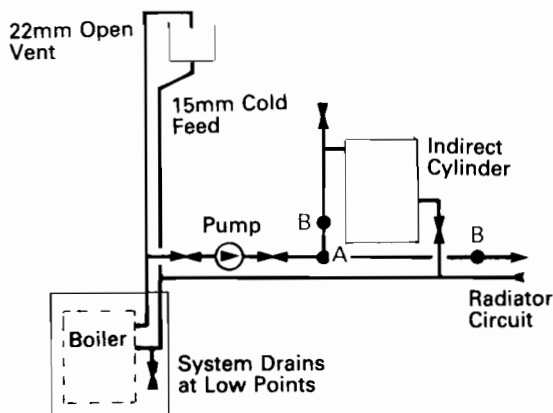


Fig. 12 (i) Rising Flow and Return Pipes

2. System Controls

When designing a control system for a central heating installation, better fuel economy is achieved by exercising control of the boiler from a room thermostat or cylinder thermostat as appropriate. Allowing the boiler to cycle under the control of the boiler thermostat does not produce the best results.

Schematic diagrams of some control systems in common use are given in Figs. 13, 14 & 15. Reference should also be made to wiring details supplied by control equipment manufacturers.

3. Sealed Systems

(a) The kit (BGC ref. no 364567: Baxi ref. no 100405) containing an overheat cut-off device must be fitted as described in the instructions supplied with the kit.

(b) All sealed systems must be fully pumped. Gravity primary circuits are not permissible.

(c) Safety Valve

A safety valve complying with the requirements of BS 759 must be fitted close to the boiler on the flow pipe by means of a horizontal or vertically upward connection with no intervening valve or restrictions and should be positioned to facilitate testing. The valve should be pre-set, non adjustable to operate at a pressure of 3bar (45 lbf/in²). It should be arranged to discharge any water or steam through a pipe to a safe outlet position.

(d) Pressure gauge

A pressure gauge of minimum range 0-4bar (0-60lbf/in²) with a fill pressure indicator must be fitted to the system, preferably at the same point as the expansion vessel in an easily visible position.

(e) Expansion Vessel

An expansion vessel complying with the requirements of BS 4814 must be fitted to the system by means of a connection close to the inlet side of the circulating pump in accordance with the manufacturer's instructions, the connecting pipe being unrestricted and not less than 15mm (1/2in) nominal size. The volume of the vessel should be suitable for the system water content and the nitrogen or air charge pressure should not be less than the system static head. (For further information see Appliance Details on Page 3 of this booklet). Some guidance on sizing the expansion

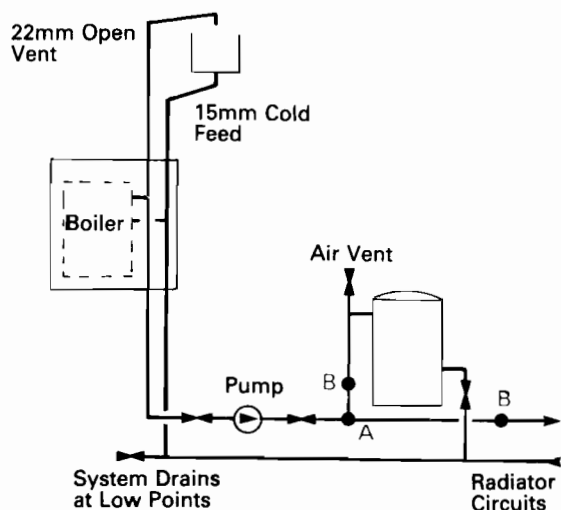


Fig. 12 (ii) Dropping Flow and Return Pipes

vessel is given in Fig. 12(iii). Further details of sealed system design can be obtained from BS 5449: Part 1 and the British Gas publication entitled 'Specifications for Domestic Wet Central Heating Systems'.

(f) Filling Point:

A filling point and an approved stop valve to BS 1010 must be fitted at low level and the method used for filling the system should be approved by the local water undertaking. (For further details see BS 5376 Part 2 App.A).

(g) Make up System:

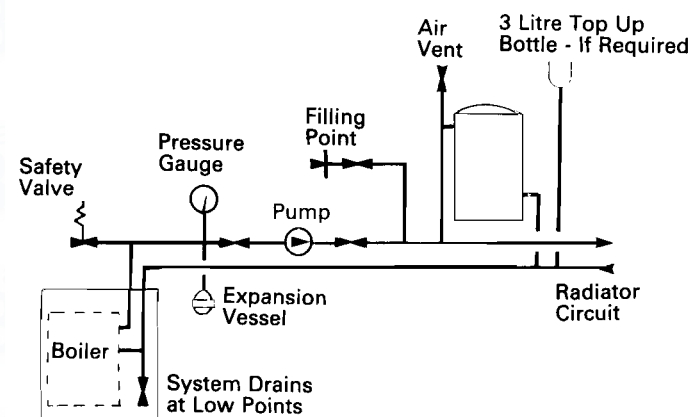
A method of replacing water lost from the system should be provided either by means of a make up vessel of not more than 3 litres (5 pints) capacity mounted above the highest point of the system or by pre-pressurisation of the system.

(h) Venting:

A method of venting the system during filling and commissioning must be provided by fitting automatic air vents or by venting manually.

(i) Hot Water Storage:

The hot water storage vessel must be of the indirect coil type. All components used in the system must be suitable for operation at 110°C (230°F) and at the pressure allowed by the safety valve.



Method of determining minimum value of expansion vessel volume for sealed systems using Baxi boilers.

Vessel charge pressure (bar)	0.5				1.0				1.5			
Initial system pressure (bar)	0.5	1.0	1.5	2.0	1.0	1.5	2.0	1.5	2.0	1.5	2.0	2.0
Multiply total water content of system (litres) by →	0.0666	0.112	0.207	0.441	0.087	0.152	0.33	0.125	0.265			

Example:- System volume = 75 litres

Vessel charge pressure = 1.0 bar

Initial system pressure = 1.5 bar

Then:- $75 \times 0.152 = 11.4$ litres Expansion vessel volume.

N.B. Where a vessel of the calculated size is not obtainable then the next available larger size should be used.

Fig. 12(iii)

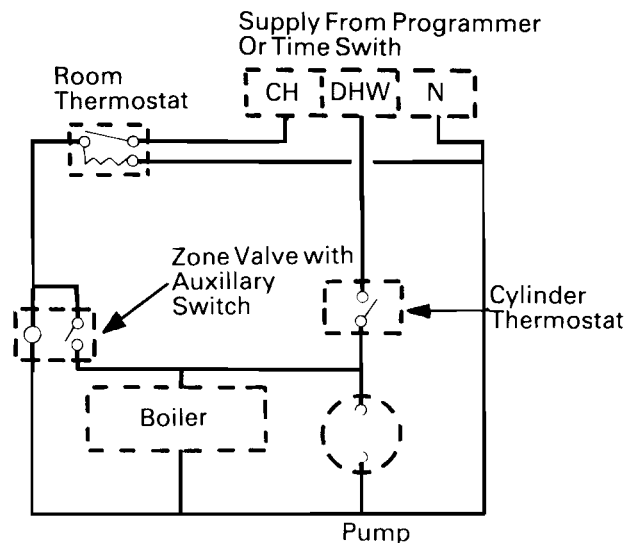


Fig. 13 Fully Pumped System – zone valve controlling heating

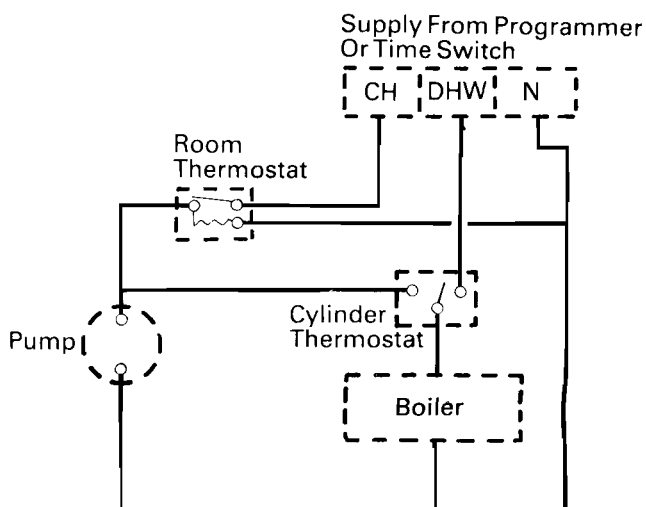


Fig. 14 Gravity Domestic Hot Water – Room Thermostat and Cylinder Thermostat.

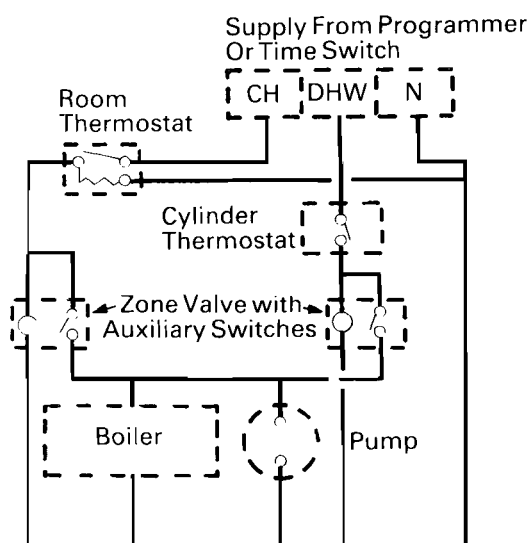


Fig. 15 Fully Pumped System – zone valves controlling Heating and Domestic Hot Water

Notes

- (1) *Fully pumped system – 3 port diverter valve*
Various proprietary control systems of this type are available and reference should be made to manufacturers' data for wiring details.
- (2) For the sake of clarity, earth connections have been omitted from the schematic wiring diagrams shown.

Servicing the Unit **(See also Servicing Guide on the Boiler)**

Instructions 1-25 are for routine maintenance to be carried out annually.

1. Isolate the electrical supply to the boiler.
2. Remove the outer case front panels in the following manner:
 - (a) Lower panel: Pull forward at the bottom edge to disengage the studs.
 - (b) Top panel: Pull forward on the bottom edge of the panel and lift upwards to disengage the lugs.
3. Turn off the gas supply at the service cock and disconnect the union.
4. Disconnect the electrical plug by pulling upwards (Fig. 8).
5. Release the silicon rubber plug at the thermostat entry seal and carefully remove the phial from the thermostat pocket (see Fig. 8).
6. Remove the controls assembly by removing four wing nuts (see Fig. 8).
7. Remove the upper combustion box door disengaging the four wing nuts (see Fig. 8).
8. Remove the baffles between and on top of the heat exchanger sections (Fig. 20).
9. Remove any dirt that has accumulated in the flue outlet duct.

10. Clean the boiler:

- (a) Clean the fins using a bristle brush from front to back. Start from the top working progressively downwards between and to the underside of the heat exchanger. Take care not to damage the insulation on the front, sides and rear of the combustion chamber.
- (b) Use a flat strip flexible scraper or steel rule to check that the spaces between the finned tubes are clear from end to end.
- (c) Brush out the bottom of the combustion chamber ensuring that the air opening at the rear is clear (Fig. 20).

Suitable brushes for cleaning the heat exchanger are:

50mm (2in) diameter × 150mm (6in) bristle brush
25mm (1in) diameter × 63mm (2½in) long bristle brush.

11. Clean the burner: (See Fig. 22)

- (a) Disconnect the locknut securing the burner injector elbow to the burner.
- (b) Remove one screw and one hexagon nut securing the burner to the support brackets. Unscrew two securing screws holding the LH support bracket in position, remove the support bracket and disengage the burner from the elbow.
- (c) Remove the injector from the burner elbow, clean carefully and replace. Ensure that the copper washer is replaced.
- (d) Remove the nut and washer securing the burner end plates and dismantle the burner. Clear away any lint or deposits that may have accumulated inside the burner. Replace the end plates nut and washer ensuring that the gaskets are not damaged and fit flush to their sealing faces. Replace if necessary.

12. Clean the pilot:

- (a) Disconnect the pilot supply at the tubing nuts at each end and remove the supply tube. Remove and clean the pilot injector and also clean the pilot shroud (Fig. 22).
Re-assemble the pilot components and then the burner in reverse order of dismantling ensuring

that the burner body is horizontal to the burner end plate. Replace the top and centre baffles to the heat exchanger.

- (b) If necessary clean the inlet screen and the pilot filter by removing the cover plate on the rear of the Honeywell gas control valve (Fig. 26).
 - (c) Inspect the thermocouple probe and clean if necessary.
 - (d) Check the electrode spark gap. (Should be 3.5mm to 4.5mm) (see Fig. 27).
13. Re-assemble the combustion box doors in the reverse order of dismantling. Replace seals if necessary. (Silicon adhesive supplied with seals).
- N.B. When replacing combustion box doors ensure that the thermostat capillary is not trapped.
14. Reconnect the gas union at the service cock. Turn on the gas supply and test for gas soundness, using a suitable leak detection fluid e.g. soap solution.
 15. Refit the electrical plug. Turn the thermostat knob fully anti clockwise to the OFF position.
 16. Re-engage the thermostat phial in its pocket and refit the silicon plug to the seal.
 17. Refit the outer case upper front panel.
 18. Hold in the green ON/OFF button on the gas control valve (Fig. 10).
 19. Press in the igniter button and release. Repeat until the pilot lights. Hold in the green ON/OFF button for approx 15 seconds and then release. The pilot should then stay alight. If the pilot fails to remain alight wait three minutes and start again from 18. The flame should be without a yellow tip and should extend past the pilot shield by approximately 12mm (½in).
 20. Turn on the electricity supply to the boiler.
 21. Remove the pressure test point screw, connect a pressure gauge and operate the burner by turning the thermostat knob to its highest setting (Fig. 17).
 22. Check that the burner setting pressure corresponds to the range rated output shown on the data badge. If necessary adjust the appliance gas rate throttle accordingly (Fig. 10). NB: Turn the screw anti clockwise to increase the pressure.
 23. Turn the boiler thermostat to the OFF position and replace the pressure test point sealing screw.
 24. Turn the boiler thermostat to its original setting and make a final check for gas soundness.
 25. Replace the lower outer case front panel.

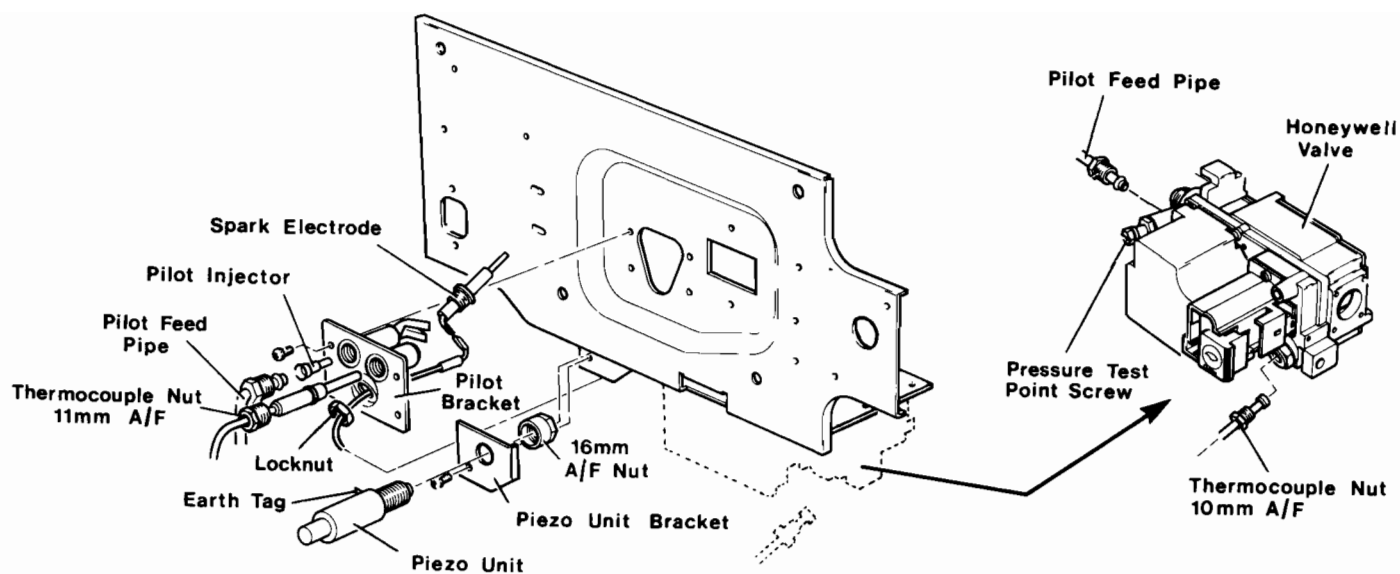


Fig. 17.

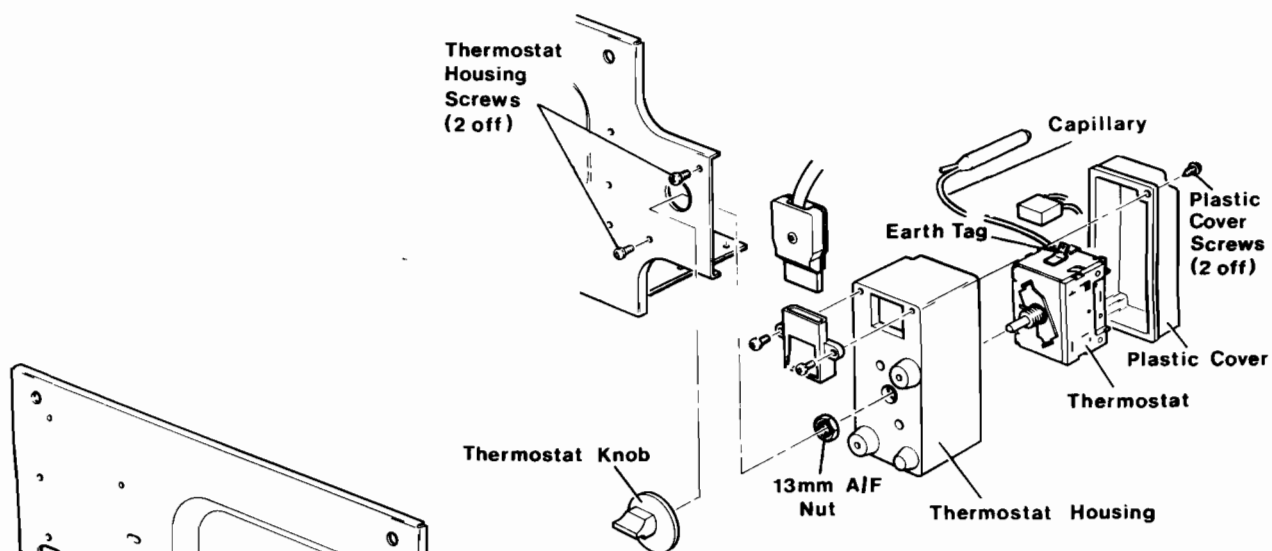


Fig. 18.

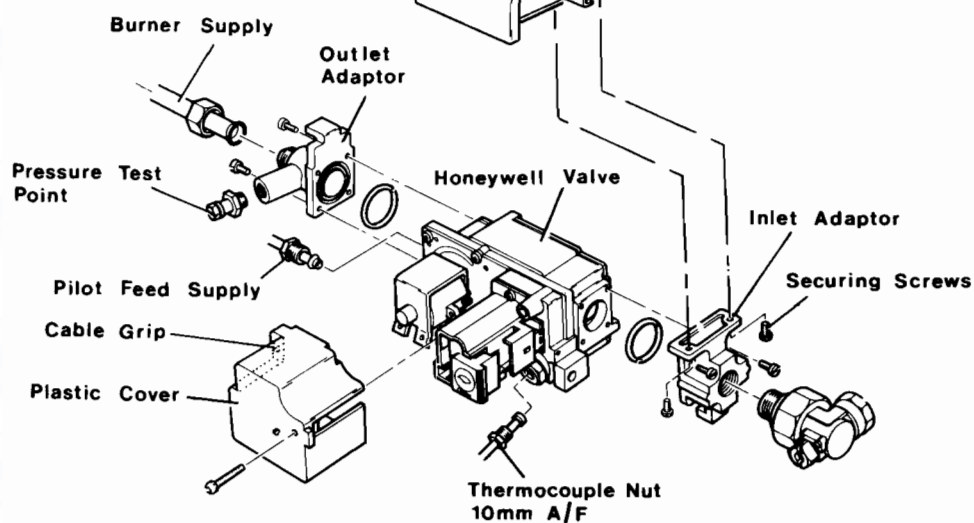


Fig. 19.

CHANGING COMPONENTS

Thermocouple (Fig. 17)

- (a) Remove the outer case panels as described in Servicing the Unit (Instruction 2).
- (b) Release the 10mm A/F thermocouple nut from underneath the gas valve.
- (c) Release the 11mm A/F nut at the pilot bracket – remove the thermocouple.
- (d) Re-assemble parts in reverse order of dismantling. NB: Only ¼ turn tightness beyond finger tight is necessary at the MFC connection.

Injector (Fig. 22)

- (a) Remove the controls assembly as described in Servicing the Unit Instructions 1-6 inclusive.
- (b) Remove the injector from the burner elbow.
- (c) Replace parts in reverse order of dismantling ensuring that the copper washer is replaced behind the injector.

Burner (Fig. 22)

- (a) Remove the controls assembly as described in Servicing the Unit instructions 1-6 inclusive.
- (b) Disconnect the burner as in Servicing the Unit instructions 11a and 11b.
- (c) Reconnect in reverse order of dismantling.

Boiler Thermostat (Fig. 18)

- (a) Isolate the electrical supply to the boiler and remove the controls assembly as described in the Servicing the Unit instructions 1-6 inclusive.
- (b) Remove the thermostat knob by pulling forwards.
- (c) Remove the plastic cover from the thermostat housing by removing two securing screws.
- (d) Disconnect the 3 electrical spade terminals.
- (e) Release the thermostat housing by removing two securing screws.
- (f) Remove the 13mm A/F nut securing the thermostat to the plastic housing. Unclip the capillary from the controls assembly and remove the thermostat.
- (g) Replace the new thermostat into the housing. Re-assemble in reverse order of dismantling ensuring that the green/yellow wires are fitted to the earth tag situated on top of the thermostat.

NB: Ensure that the thermostat phial is replaced in the heat exchanger.

Overheat Cut-Off Device (Fig. 21)

- (a) Remove outer case panels as described in the Servicing the unit instructions 2.
- (b) Disconnect the lead assembly from the overheat cut-off device by disconnecting the two push on tags.
- (c) Loosen the overheat cut-off device securing bracket by unscrewing the two securing screws by several anti-clockwise turns.
- (d) Slide out the overheat cut-off device from behind the securing bracket.
- (e) Fit the new overheat cut-off device in reverse order of dismantling, ensuring that the saddle portion of the overheat cut-off device is fitted snugly onto the flow pipe.

Honeywell Gas Valve (Fig. 19)

- (a) Isolate the electrical supply to the boiler and remove the controls assembly as described in the Servicing the Unit instructions 1-6 inclusive.
- (b) Release the 10mm A/F thermocouple nut from underneath the gas valve.
- (c) Release screw on plastic cover on gas valve. Remove cover disengaging the electrical cable from cable grip (Fig. 19).

- (d) Disconnect two electrical spade connections and release earth wire from solenoid. Take care not to lose the cupwasher.
- (e) If individual sub-components of this valve are to be replaced this can be achieved without removing the valve – refer to the control maker's instructions.
- (f) If the valve is to be replaced proceed as follows:
- (g) Disconnect the burner and pilot supply connections at the gas valve end.
- (h) Remove two screws securing the valve to the door panel: slide the valve to the right and disengage from the slot at the LH end.
- (j) Remove the inlet and outlet adaptors from each end of the valve, noting which way they are positioned before removal.
- (k) Re-assemble the new valve in reverse order of dismantling.
- (l) Check pilot flame and adjust the gas rate if necessary to give the correct burner pressure as shown on the data badge, and detailed by instructions 21-25 of Servicing the Unit.

Spark Electrode (Fig. 17)

- (a) Remove the outer case panels as described in Servicing the Unit instruction 2.
- (b) Disconnect the thermocouple nut 11mm A/F at the pilot bracket and remove the thermocouple.
- (c) Disconnect the spark electrode lead at the electrode.
- (d) Disconnect the pilot feed pipe at nuts on the pilot bracket and gas valve, remove the pipe completely. Take care not to lose the pilot injector (loose fit).
- (e) Release four screws securing the pilot bracket to the door panel.
- (f) Remove the locking nut securing the electrode to the bracket and withdraw the electrode.
- (g) Fit the new electrode checking that the spark gap is between 3.5 and 4.5mm (Fig. 27).
- (h) Re-assemble in reverse order of dismantling. Reconnect the electrode lead and check that the electrode is sparking correctly to the pilot shroud.

Piezo Unit (Fig. 17)

- (a) Remove the lower panels as described in Servicing the Unit instruction 2a.
- (b) Disconnect the spark electrode lead at the pilot bracket.
- (c) Remove one screw securing the piezo unit bracket to the underside of the controls assembly and withdraw complete.
- (d) Unscrew the 16mm A/F nut securing the igniter to the bracket.
- (e) Re-assemble in reverse order – ensure tag is positioned at nine o'clock when viewed from the front. Re-connect the lead and check that the electrode is sparking correctly at the pilot shroud.

Insulation in Combustion Chamber

- (a) Remove the controls assembly as described in Servicing the Unit instructions 1-6 inclusive.
- (b) *Side insulation:*
Remove two screws and washers securing the two side insulation pads. Remove carefully and assemble in reverse order of dismantling.
- (c) *Front strap insulation:*
Remove two screws securing the front insulation and assembly. Slide downwards from behind the combustion box strap and fit the replacement assembly.

(d) **Rear insulation:**

Remove the upper front cover, centre baffle and the two securing screws on the rear insulation assembly. Slide downwards and then pull outwards at the bottom edge. Re-assemble in the reverse order of dismantling.

(e) **Front insulation panel controls (Fig. 22)**

- (i) Remove the burner as described in Servicing the Unit 11a and 11b.
- (ii) Remove two screws securing insulation carrier to panel controls (Fig. 17).
- (iii) Slide out old insulation and replace with new.
- (iv) Assemble in reverse order.

(f) **Front insulation – upper panel door (Fig. 23)**

Remove two screws securing carrier to the upper panel door and fit the replacement assemblies.

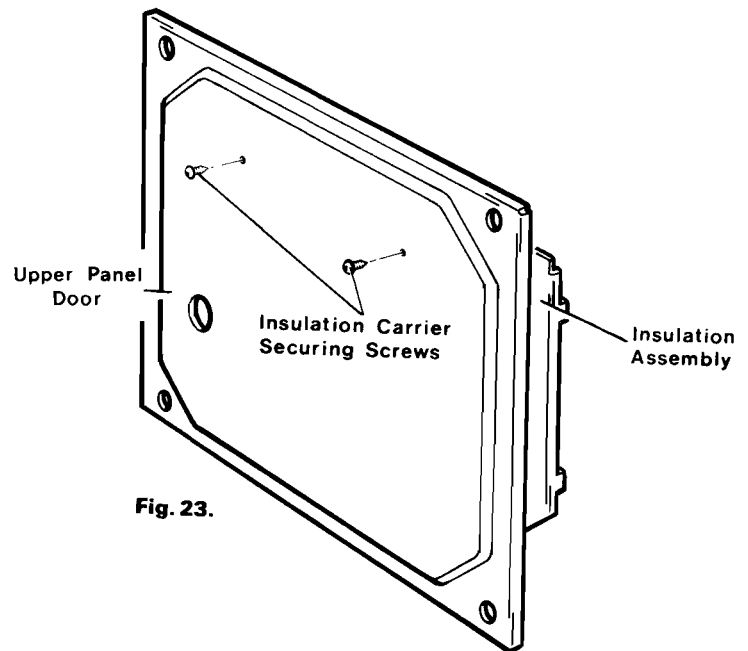


Fig. 23.

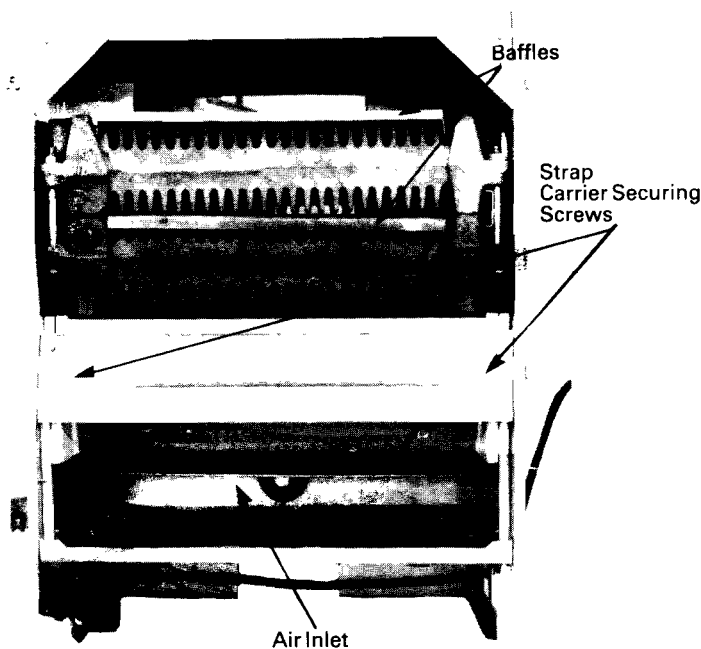


Fig. 20.

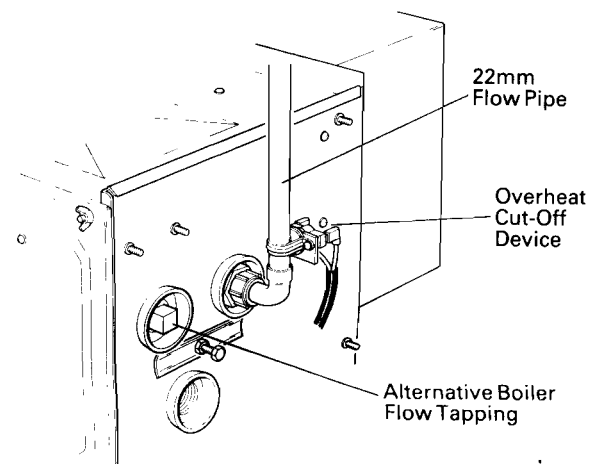


Fig. 21

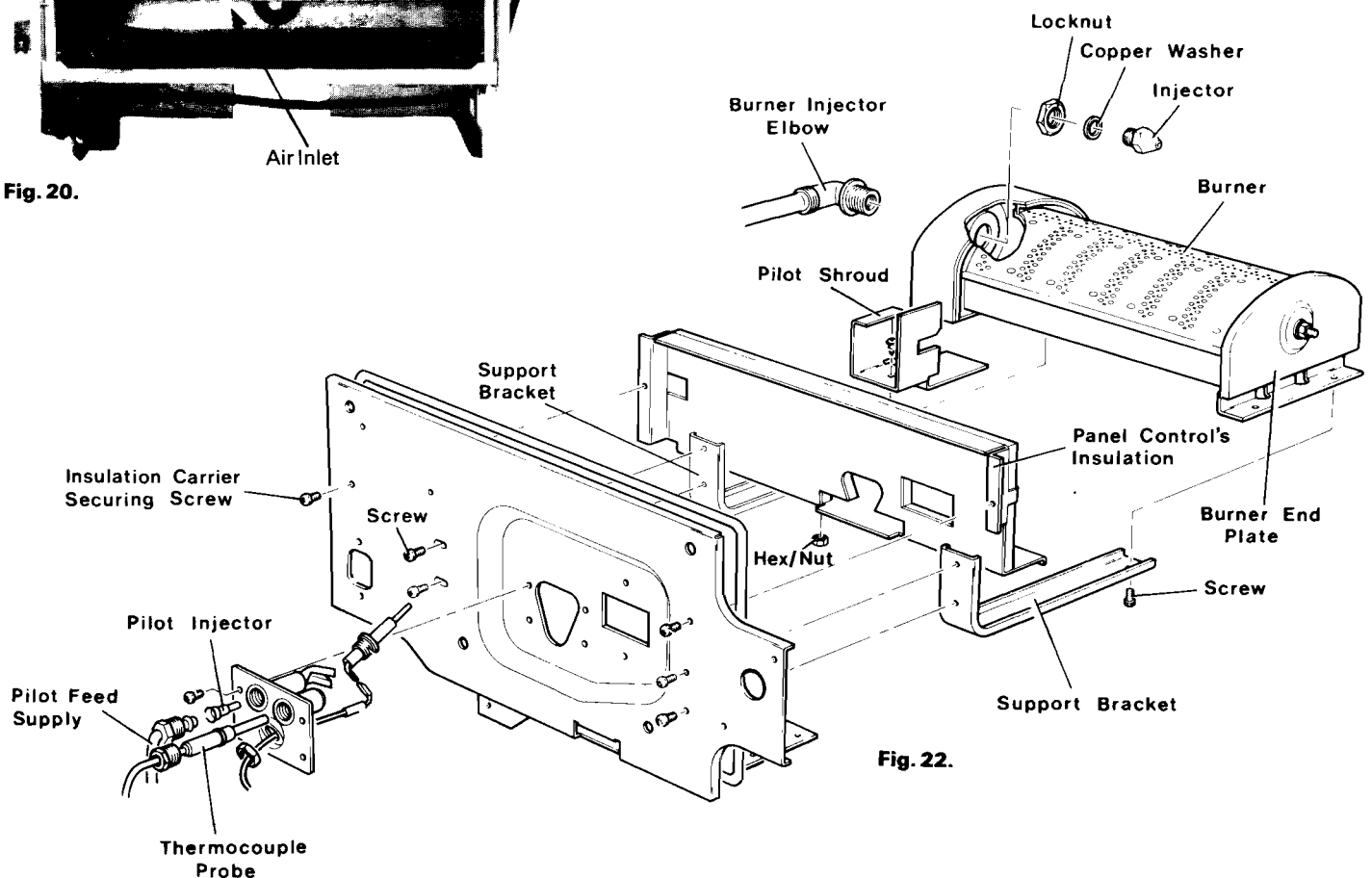


Fig. 22.

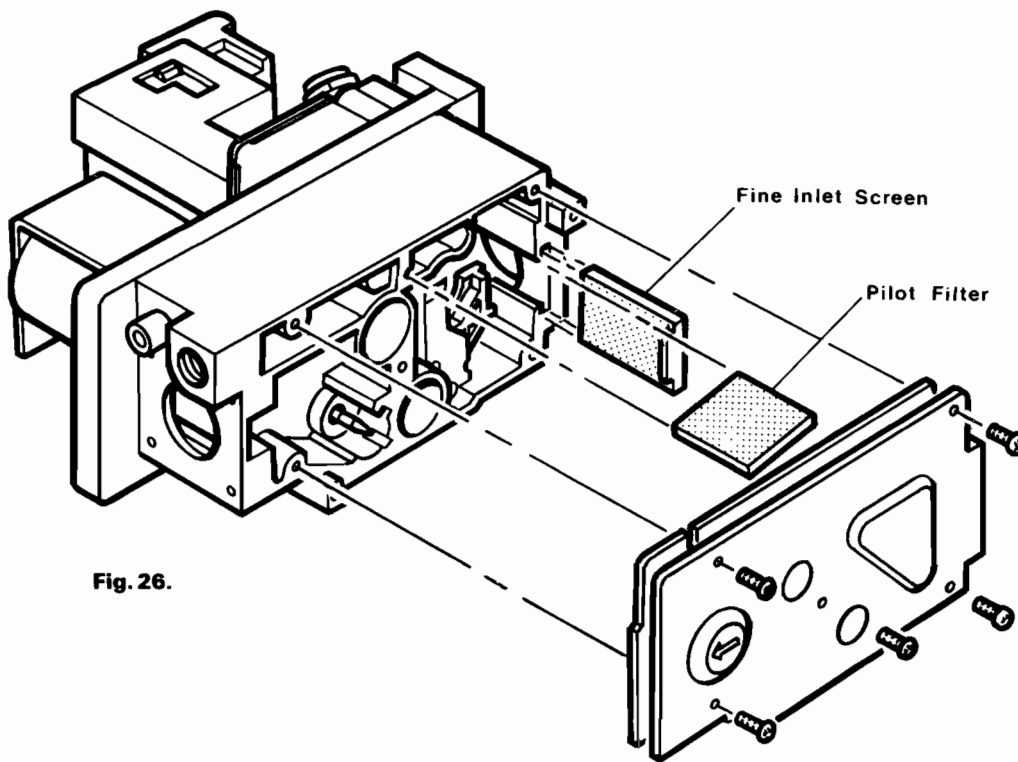


Fig. 26.

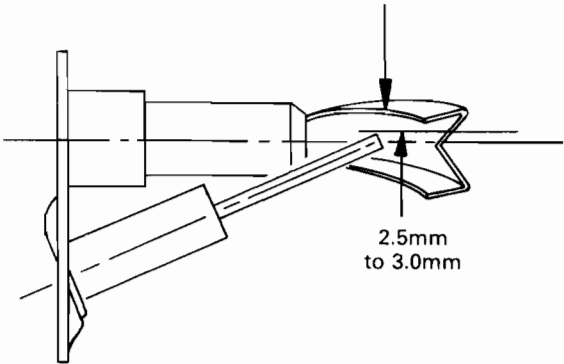
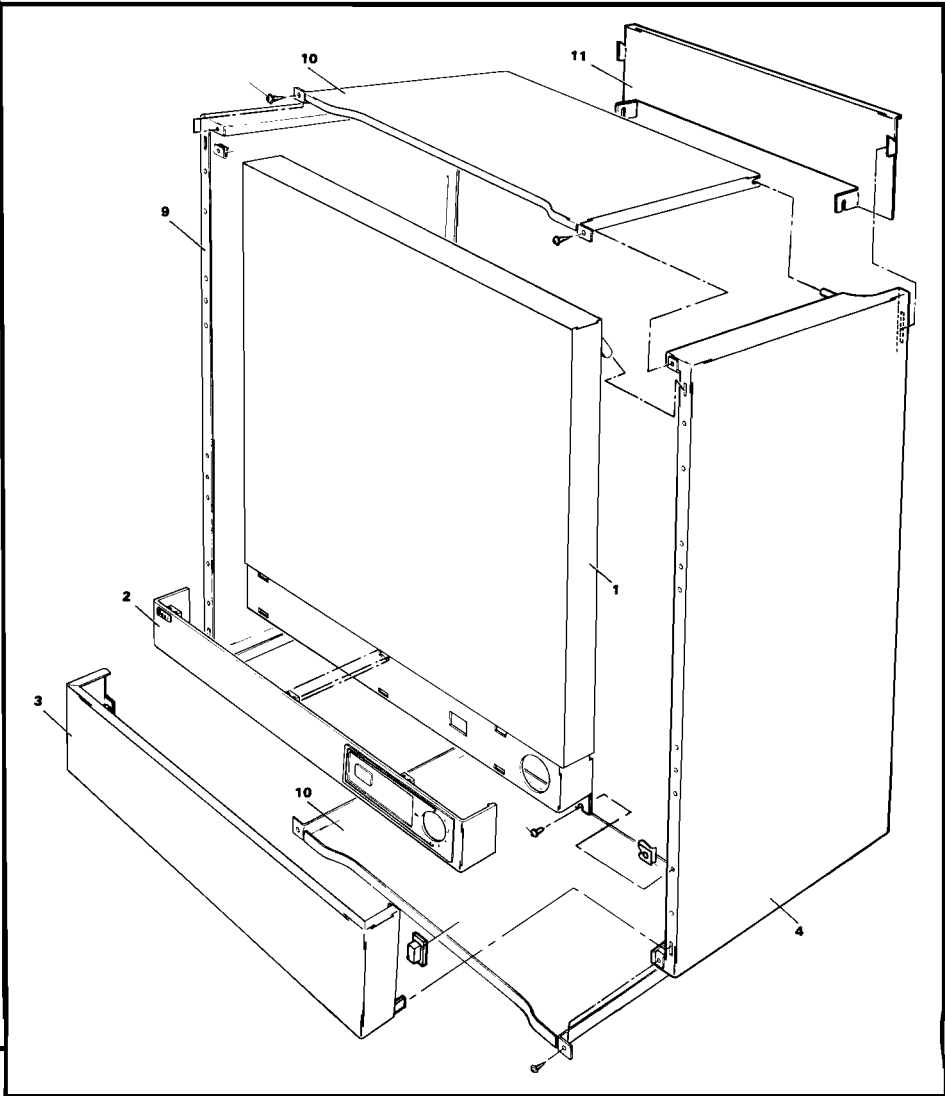
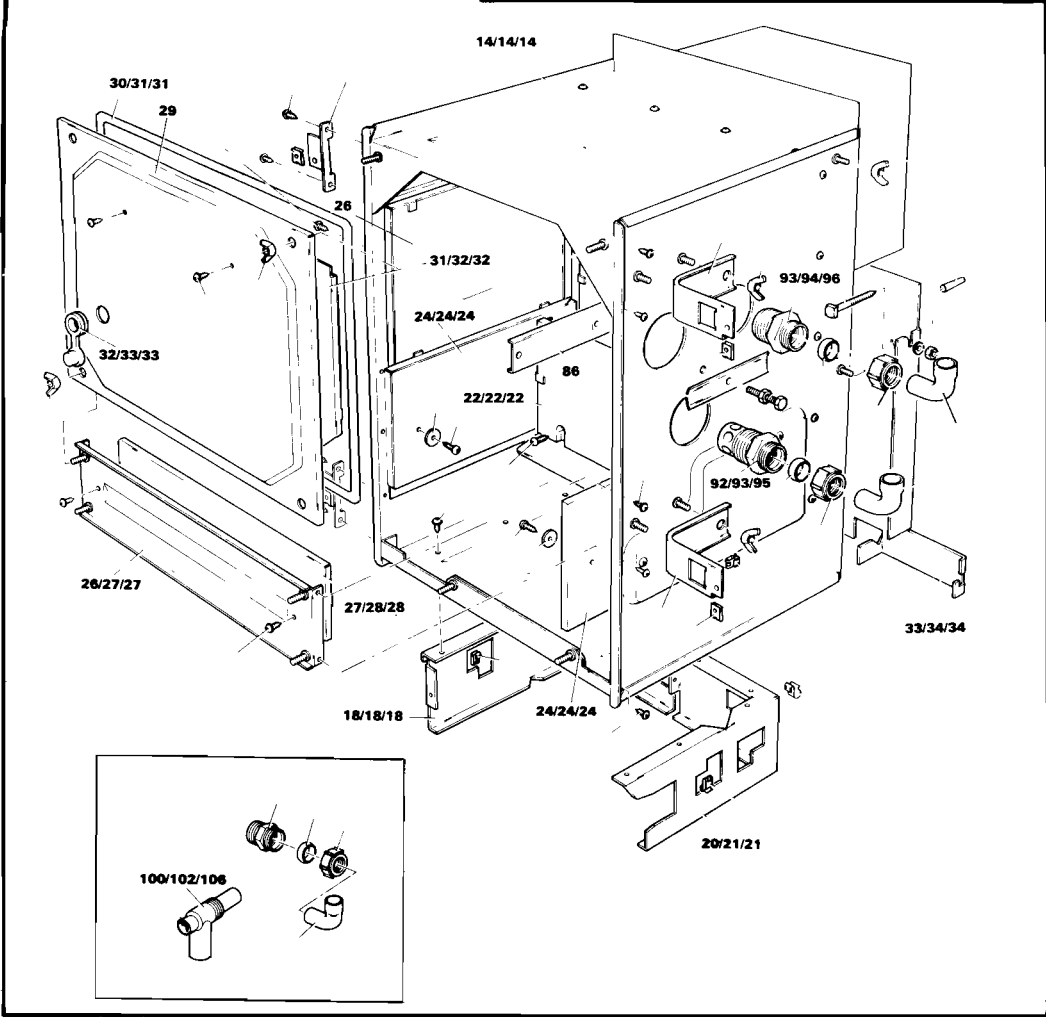


Fig. 27.

Exploded Diagrams

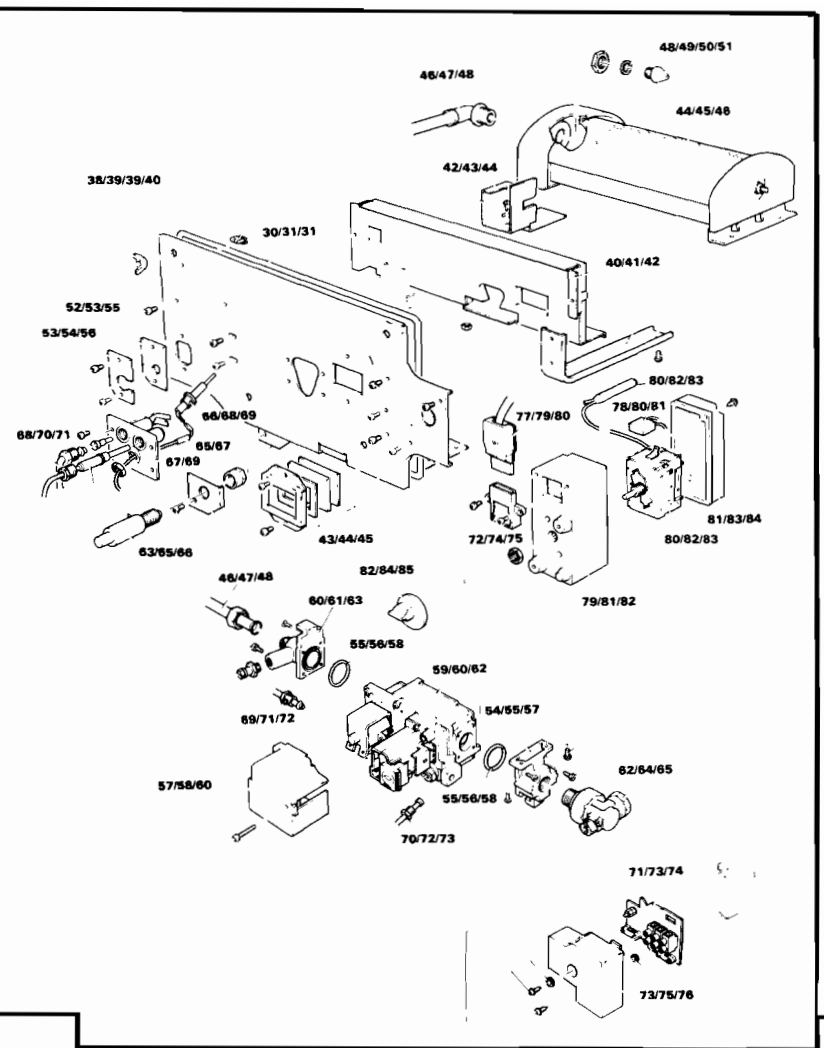


Outercase

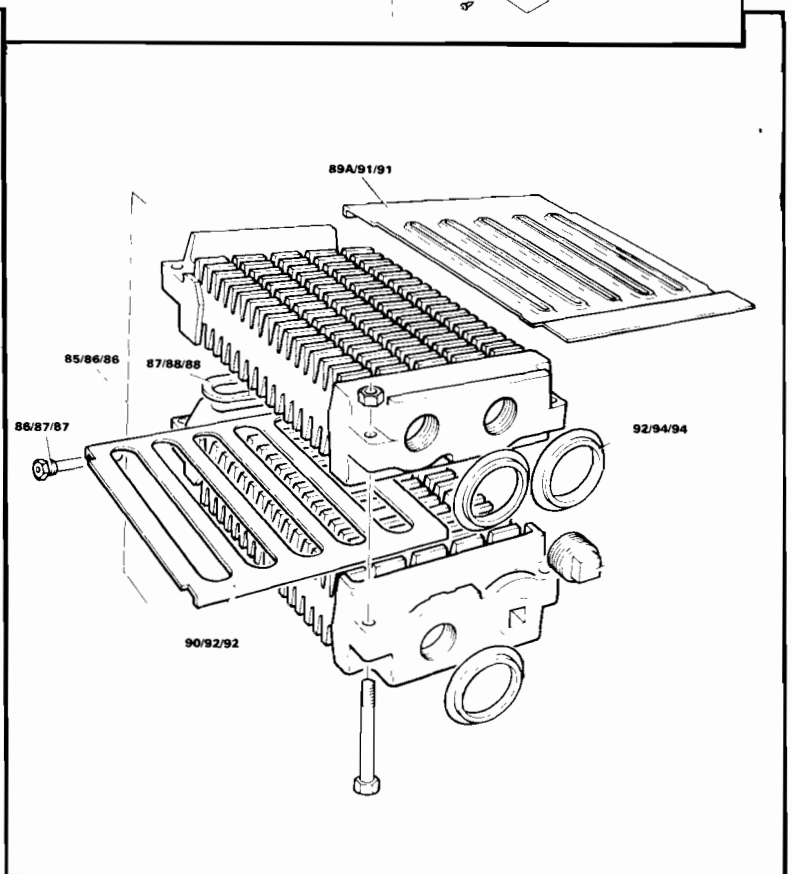
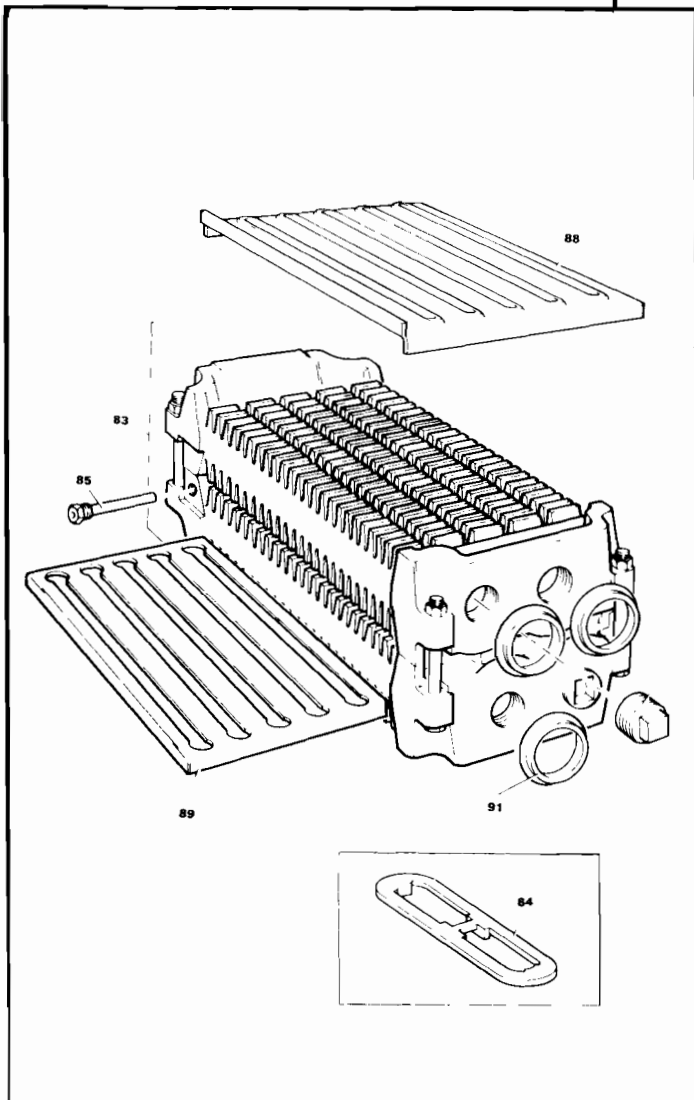


Combustion Box

Exploded Diagrams

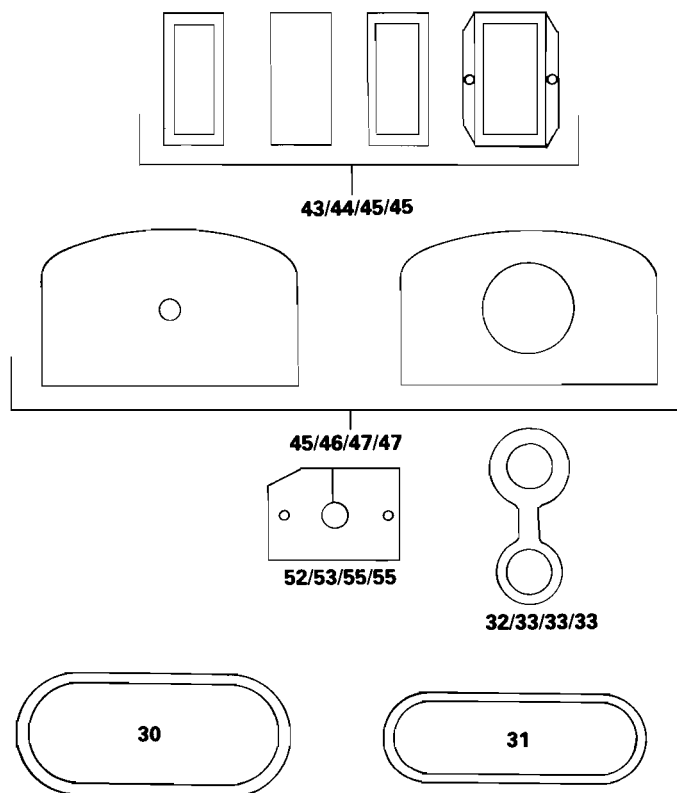
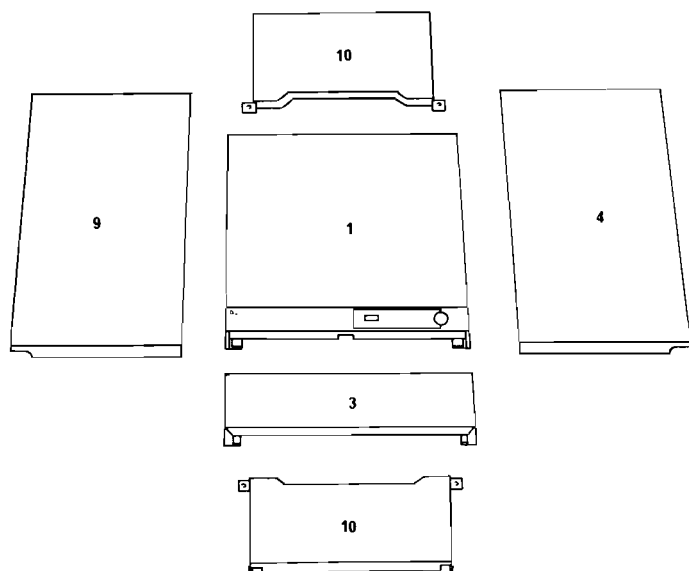


Controls



Boiler WM 38/3, 30/3, 20/3

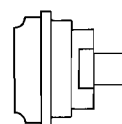
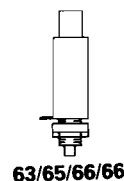
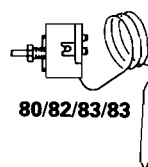
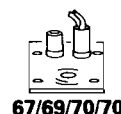
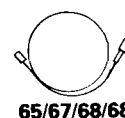
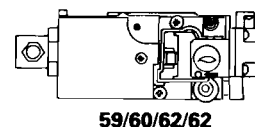
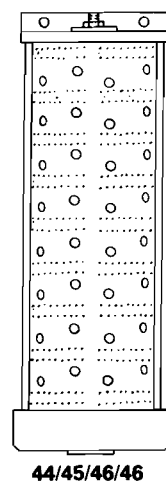
SHORT PARTS LIST



WM 51/3 RS G.C. No. 41 077 34
WM 38/3 RS G.C. No. 41 077 35
WM 30/3 RS G.C. No. 41 077 36
WM 20/3 RS G.C. No. 41 077 39

SHORT PARTS LIST

Key No.	G.C. Number	Description	Manufacturers Part No.
1	364 492	Panel Front WM 51/3	100304
1	364 426	Panel Front WM 38/3-30/3-20/3	100342
3	364 493	Panel Door WM 51/3	100305
3	364 428	Panel Door WM 38/3-30/3-20/3	100343
4	364 394	Kit Panel Side R/H — WM 51/3-38/3 30/3-20/3	100301
9	364 395	Kit Panel Side L/H — WM 51/3-38/3 30/3-20/3	100300
10	364 397	Panel Top and Bottom WM 51/3	100282
10	364 429	Panel Top and Bottom WM 38/3-30/3-20/3	100344
30	364 500	Kit — Seals — Combustion Box Door WM 51/3	100376
31	364 442	Kit — Seals — Combustion Box Door WM 38/3-30/3-20/3	100377
32/33/33/33	364 042	Seal — Thermostat Phial — WM 51/3-38/3 30/3-20/3	102028
43/44/45/45	364 451	Kit — Sight Window — WM 51/3-38/3 30/3-20/3	100329
44		Burner Boiler — WM 51/3	102252
45/46/46	364 478	Burner Boiler — WM 38/3-30/3-20/3	102262
45/46/47/47	364 145	Kit Gaskets Boiler Burner WM 51/3-38/3 WM 30/3-20/3	100133
48	364 506	Injector — Burner — WM 51/3	102230
49	364 483	Injector — Burner — WM 38/3	102263
50	395 775	Injector — Burner — WM 30/3	102266
51	395 776	Injector — Burner — WM 20/3	102270
52/53/55/55	364 455	Gasket — Burner Pipe WM 51/3-38/3 30/3-20/3	102250
59/60/62/62	395 812	Valve — Control — Honeywell WM 51/3 38/3-30/3-20/3	102235
63/65/66/66	183 963	Kit — Piezo Igniter — WM 51/3-38/3 30/3-20/3	040456
65/67/68/68	183 928	Lead — Electrode — WM 51/3-38/3 30/3-20/3	102143
66/68/69/69	387 852	Electrode — WM 51/3-38/3-30/3-20/3	102024
67/69/70/70	391 664	Burner — Pilot — WM 51/3-38/3-30/3 20/3	062638
68/70/71/71	364 282	Injector — Pilot — WM 51/3-38/3-30/3 20/3	112011
70/72/73/73	390 131	Thermocouple — WM 51/3-38/3-30/3 20/3	102005
80/82/83/83	384 166	Thermostat — WM 51/3-38/3-30/3-20/3	102027
82/84/85/85	364 470	Knob — Thermostat — WM 51/3-38/3 30/3-20/3	102243
107/109/113/113		Overheat Cut-Off Device WM 51/3 — 38/3 — 30/3 — 20/3 RS	102289



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Baxi WM 51/3RS

Central heating boiler
User's operating instructions

GC No. 41 077 34

WARNING: THIS APPLIANCE MUST BE EARTHED

Electricity supply

Connection should be made to a 240v 50Hz ~ supply. The appliance must be protected by a 3 amp fuse if a 13 amp (BS 1363) plug is used or if any other type of plug is used by a 5 amp fuse in the circuit.

To connect a plug

As the colour of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:-

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol $\perp$ or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

Your Baxi WM 51/3RS is a central heating boiler providing heat for the house and domestic hot water if required.

Installation must be undertaken by a competent person and in accordance with the installation instructions and Gas Safety (Installation and Use) Regulations 1984.

The gas burning section is completely sealed from the room in which the appliance is fitted.

It is connected to the stainless steel terminal fitted outside the building immediately behind the appliance.

This terminal not only provides an outlet for the flue gases but also an inlet for the air required to burn the

gas. It is therefore essential to keep the terminal free from obstruction as this would prevent the appliance working correctly.

The spaces above and below the outer case must never be obstructed in any way, in particular never hang clothes etc, over the appliance as this will cause overheating and possible damage.

Minimum clearances around the boiler

Top 50mm (2in), Bottom 50mm (2in), Sides 5mm (0.2in). If fitted in a compartment, the purpose provided ventilation openings **MUST NOT** be blocked, and should be checked periodically to ensure this. The compartment should not be used as a storage cupboard.

This appliance is normally controlled by an external programmer or clock control (see separate instructions with the controller used).

Operating the Unit

1. Turn on the main gas and electricity supplies external to the appliance.
2. Remove the bottom section of the front panel below the fascia by pulling forward at the bottom edge.
3. Turn the boiler thermostat to the 'OFF' position as indicated by the marker (Fig. 1).
4. **To light the pilot** — PRESS and hold in the green 'ON/OFF' button, and at the same time push in the igniter button until it clicks.
5. Press the igniter button repeatedly until you see the pilot flame alight through the viewing window. (Fig. 1).
6. Continue to hold in the green 'ON/OFF' button for another 15 seconds. Release slowly and the pilot should stay alight.

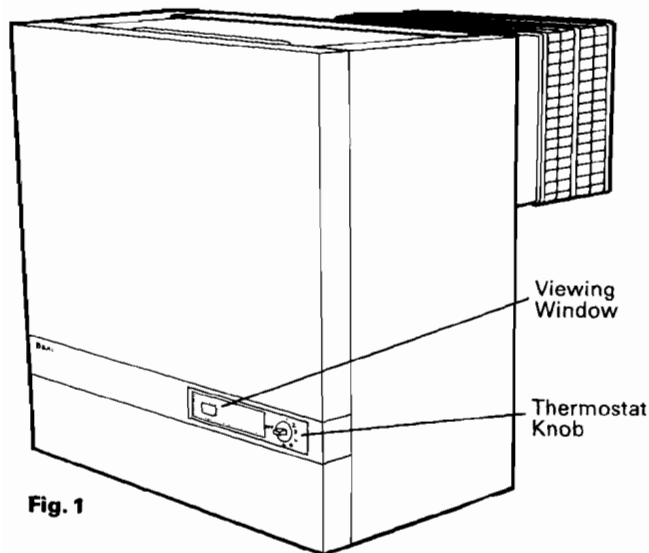


Fig. 1

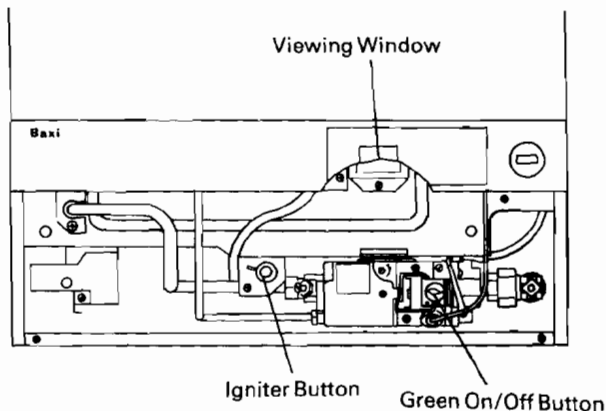


Fig. 2

CAUTION: If the pilot does not light or stay alight, push the green 'ON/OFF' button to the left and release, wait 3 minutes and start again from 4.

Once the pilot is alight it is left on permanently.

7. When lighting the boiler ensure that all external controls e.g. room thermostat, are set above room temperature and the timer is in an 'ON' position. It is recommended that the boiler thermostat is used at setting 6 in winter and a minimum setting of 2 in summer to ensure adequate hot water.

8. **To switch off the appliance for short periods** (pilot stays alight). Turn the boiler thermostat to the 'OFF' position.

9. **To switch off the appliance for long periods.** Push the green 'ON/OFF' button (marked ) fully to the left release and turn the boiler thermostat to the 'OFF' position. It is recommended that if the house is left for long periods during cold weather the whole heating system is drained in order to avoid frost damage. Your installer will advise you about draining the system.

Cleaning the Appliance Outer Case

The paint should be wiped with a damp cloth and then dried completely. Do not use abrasive cleaning agents.

Spare Parts

The unit is the responsibility of the installer for the first 12 months, after which time if spare parts are required they can be obtained through approved Baxi stockists or the local Gas Region or your installer. State that the appliance is a Baxi WM 51/3RS.

Servicing

It is recommended that the appliance is serviced annually. This may be arranged with your local Gas Region or a competent installer.