

Highflow 3.5 RSF

ROOM SEALED FANNED FLUE MODEL

FLOOR STANDING COMBINATION BOILER FOR CENTRAL HEATING AND MAINS FED DOMESTIC HOT WATER

INSTALLATION AND SERVICING INSTRUCTIONS



GC NUMBER 41 311 40

BOILER OUTPUT

To Hot Water Maximum 23.4 kW (80,000 Btu/h)

To Central Heating Minimum 8.8 kW (30,000 Btu/h) Maximum 23.4 kW (80,000 Btu/h)

IMPORTANT: THIS APPLIANCE IS FOR USE WITH NATURAL GAS ONLY

THESE INSTRUCTIONS APPLY IN THE UK ONLY

THESE INSTRUCTIONS ARE TO BE LEFT WITH THE USER OR AT THE GAS METER

WORCESTER

Bosch Group

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INSTALLATION REGULATIONS

The installation of this appliance must be in accordance with the relevant requirements of the Gas Safety (Installation and Use) Regulations, local Building Regulations, Building Standards (Scotland) (Consolidation), current IEE wiring regulations and bye laws of the local water undertaking. It should be in accordance with the relevant recommendations of the following British Standards and Codes of Practice: BS 6798:1987, BS 5449:1:1990, BS 5546:1:1990, BS 5440:1:1990, BS 540:1990, BS 540:1900, BS

Gas Safety (Installation and Use) Regulations 1984: It is the law that all gas appliances are installed by a competent person, in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your interest, and that of safety to ensure compliance with the law.

The manufacturers notes must not be taken, in any way, as overriding statutory obligations.

TECHNICAL DATA

NOTE: THE DATA PLATE IS POSITIONED INSIDE THE APPLIANCE AT THE FRONT LEFT HAND SIDE.

Table 1

		NOMINA	L BOILER R	ATINGS (10 mi	nutes after l	ighting)		
MODE	OU	TPUT	IN	PUT	BURNER	SETTING	GAS RATE	
	kW	(Btu/h)	kW	(Btu/h)	m bar	(in. wg)	m³/h	(ft³/h)
	8.79	(30000)	12.0	(40955)	2.2	(0.88)	1.11	(39.4)
	11.0	(37545)	14.7	(50170)	3.2	(1.28)	1.36	(48.3)
HEATING RANGE	13.0	(44370)	17.1	(58360)	4.4	(1.76)	1.59	(56.2)
	15.0	(51195)	19.6	(66555)	5.8	(2.32)	1.81	(64.0)
	17.0	(58020)	21.9	(74745)	7.3	(2.92)	2.03	(71.9)
r	19.0	(64845)	24.2	(82595)	9.1	(3.64)	2.25	(79.5)
	23.44	(80000)	29.3	(100000)	14.3	(5.72)	2.72	(96.2)
DOMESTIC HOT WATER	23.44	(80000)	29.3	(100000)	14.3	(5.72)	2.72	(96.2)

Note: The pressure test point is located on the gas valve (See fig. 31a).

Table 2

SPECIFICATIONS				
HEATING FLOW	28mm COPPER TUBE			
HEATING RETURN	28mm COPPER TUBE			
SAFETY VALVE	22mm COPPER TUBE			
COLD FEED	22mm COPPER TUBE			
COLD WATER MAINS IN	15mm COMPRESSION - SUPPLIED			
DOMESTIC WATER OUT	22mm COPPER TUBE			
GAS INLET	22mm COPPER TUBE			
HEIGHT	860mm (33.9in)			
WIDTH	550mm (21.6in)			
DEPTH	600mm (23.6in)			
WEIGHT	95kg (210lb) empty - 147kg (324lb) full			
PRIMARY CAPACITY	48 litres (10.6 gal)			
*MAXIMUM STATIC HEAD	25 m (81 ft.)			
*MINIMUM STATIC HEAD	1000mm (39in)			
CIRCULATING PUMP	Grundfos 15-60			
EXPANSION VESSEL	12 litres charged 0.5 bar			
OUTPUT TO HEATING MAXIMUM	23.4kW (80,000 Btu/h)			
OUTPUT TO DOMESTIC HOT WATER	23.4kW (80,000 Btu/h)			
CH CONTROL THERMOSTAT - MAX. TEMPERATURE	Nominally 82°C (180°F)			
DOMESTIC HOT WATER FLOW RATE (35°C RISE)	Nominally 9.6 litres/min \pm 15% (2.1 gal/min)			
MAXIMUM DOMESTIC HOT WATER FLOW RATE	Nominally 15 litres/min (3.3 gal/min) $\pm 15\%$			

* Appliance static heads are measured from the top of the casing to the highest point of the system (See Figs. 24, and 25)

Table 3

FLUE DETAILS – See Notes Below	HORIZONTAL REAR FLUE	VERTICAL PRIMARY FLUE
WALL OR CEILING - HOLE DIAMETER FOR AIR DUCT	125mm (5in)	125mm (5in)
WALL HOLE DIAMETER FOR SEALING RING	150mm (6in)	
MINIMUM FLUE LENGTH – STANDARD FLUE KIT	100mm (4in)	1557mm (61.3in)
MAXIMUM FLUE LENGTH – STANDARD FLUE KIT	1000mm (39in)	2000mm (73in)
FLUE LENGTHS WITH EXTENSION KIT	1001 to 2000mm	2001 to 3000mm
	(39 to 73in)	(79 to 118in)

If a flue extension is required (See Section 9) it may be obtained from Worcester Heat Systems Ltd. ONE EXTENSION FLUE KIT ONLY MAY BE USED PER APPLIANCE. Part No. ZAGAS066

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	AVAILABLE PUMP HEADS					
HEATIN	G OUTPUT	HEA	٩D	MIN. FLC	W RATE	OPTIMUM
kW	Btu/h	METRES	FEET	LITRES/MIN.	GALL/MIN.	TEMPERATURE RISE
8.8	(30,000)	5.1	16.6	8.41	1.89	
11	(37,500)	4.7	15.5	10.51	2.36	
13	(44,350)	4.3	14.1	12.42	2.79	15°C between
15	(51,200)	3.8	12.6	14.33	3.22	heating flow and return
17	(58,000)	3.3	10.9	16.24	3.65	
19	(64,800)	2.2	7.2	18.15	4.08	
23.4	(80,000)	1.5	5.0	22.35	5.02	

1. GENERAL INFORMATION

IMPORTANT: Although the appliance includes the facility to instal a sealed primary water system and feed the secondary system via the mains supply, only one of these can be used, i.e. the system arrangement must be one of the following:

- (i) Sealed primary and open vented (i.e. cistern feed) secondary (Section 10) or
- (ii) Open vented primary and mains feed secondary (Section 11) or
- (iii) Open vented primary and open vented (i.e. cistern feed) secondary.

FOR FURTHER ADVICE CONTACT WORCESTER HEAT SYSTEMS LTD.

- 1. HIGHFLOW 3.5 RSF INCORPORATES
- (a) An induced draught fan, a low thermal capacity heat exchanger having a maximum heat output of 23.4kW (80000 Btu/h).
- (b) Either a horizontal (rear outlet) or vertical fanned flue system to order.
- (c) A standard duct kit for horizontal flue lengths from 100mm (4in) to 1000mm (39in). (An extension duct kit from 1001mm (39in) to 2000mm (79in) maximum length is available as an option).

A standard duct kit for vertical flues, complete with diverter intended for installation within a roof space. The kit will enable the diverter to be installed between 1557 (61.3in) and 2000mm (79in) above the appliance top outlet. (An extension duct kit from 2001mm (59in) to 3000mm (118in) is available as an option).

- (d) A heatbank having a nominal capacity of 45 litres (10 gallons) of circulating primary hot water positioned inside the appliance. A copper finned water to water heat-exchanger is fitted into the heatbank. Secondary supply domestic hot water passes through the heat exchanger.
- (e) A diverter valve to direct the boiler output either to domestic hot water or central heating as required.
- (f) A circulating pump.
- (g) A multifunctional HIGH/LOW gas valve and electronic control system to control individually the domestic hot water and central heating. The system provides automatic ignition.
- (h) Boiler and hot water temperature control thermostats providing control for central heating and domestic hot water.
- A User/s Operating Switch for selection of water only or heating and water. A programmer kit is available as an optional extra.
- (k) An expansion vessel, pressure gauge, pressure relief valve and auto air vent to enable the primary circuit to be connected to a sealed water system.
- An electronic pump delay control board which enables the pump to run on for a period of about 5 minutes after each operating cycle.

2. INSTALLATION WARNING:

GREAT CARE MUST BE TAKEN TO ENSURE THAT NO FOREIGN MATTER IS LEFT IN THE WATER SYSTEM. THIS COULD CAUSE DAMAGE TO THE APPLIANCE.

3. NATURAL GAS SUPPLY

The boiler requires 2.72m³/h (96.2ft³/h) of gas. 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 meter outlet governor must ensure a nominal pressure of 20 mbar (8in wg) at the appliance, equivalent to a pressure of about 18.5-19 mbar at the gas valve. The complete installation, including the meter, should be inspected and tested for soundness and purged in accordance with the recommendations of BS 6891.

4. ELECTRICAL SUPPLY

Mains supply 240 V, \sim 50 Hz, 160 watts fused at 3A. See Section 13. The length of supply cable provided with the appliance is rated at a temperature of 80°C continuous.

5. OPEN VENTED SYSTEM

The appliance is supplied ready for connection to a sealed water system. An open vented system can be used by carefully removing the safety valve and sealing its connection. See Section 11. Care should be taken not to distort the pipe.

6. CONTROLS

All controls included with the appliance are specified in the 'Short List of Parts' included in this leaflet. There is provision for a room thermostat and frost thermostat to be fitted to the appliance. See Section 13.

Thermostatic radiator valves can be used in the system; however, a suitable by-pass is essential with this type of control. See Section 15.

7. DRAINAGE

A drain cock is fitted in the pipe connecting the primary heat bank to the sealed system expansion vessel to drain water from the boiler and the heat bank. (Fig. 46)

8. PACKAGING

The appliance is despatched in one package. A separate package contains either the standard horizontal or vertical flue kit. Each kit includes either a balanced flue terminal (horizontal flue) or diverter (vertical flue) together with the necessary duct work, sealing materials, etc.

2. SITING THE APPLIANCE

(Refer also to sections 5, 6, 7 and 8).

- 1. The appliance is floor standing and the floor must be firm and level.
- 2. The following clearances must be left to allow for servicing and ventilation:
- (a) Above the appliance: Servicing 450 mm (18 in.) Ventilation 5 mm (0.2 in.)
 (b) In front of the appliance: Servicing 600 mm (24 in.) Ventilation 75 mm (3 in.)
 (c) Left and right-hand side: Servicing 20 mm (0.8 in.) Ventilation 20 mm (0.8 in.)

NOTE: Care must be taken to ensure adequate space is available at either side for installing the boiler. See Section 9.

- The chosen position must allow the provision of a satisfactory balanced flue termination. See Section 6, if a horizontal flue system is to be used OR
- 4. The chosen position must allow the provision of a satisfactory secondary flue terminal discharge in a down draught free zone. See Section 8, if a vertical flue system is to be used.

NOTE: If the appliance is to be fitted in a timber framed building it should be fitted in accordance with the British Gas publication "Guide for Gas - Installation in Timber Framed Housing" Ref DM2. If in doubt advice must be sought from the local Region of British Gas.

3. REMOVAL OF FACIA PANEL AND CABINET

See Fig. 1.

NOTE: It is necessary to remove the cabinet top cover, front cover, and may be necessary to remove the facia panel, left and right hand side panels and lower grille to aid installation.



- (a) Remove the cabinet front cover by pulling firmly at the base and lifting upwards and outwards.
 Remove the cabinet top cover by slackening completely the bolt 'B' retaining the front of the top cover. See Fig. 1.
- (b) Pull up the front edge of the cover sharply to disengage the fasteners. Draw the cover forward enough to disengage it at the rear and lift clear.
- (c) Undo the five screws 'K' holding the lower front grille kick strip.
- (d) Pull off the two thermostat knobs and remove the five screws 'C'; two securing the ends of the facia to the side panels and three underneath the facia, fixing it to the base of the control panel. Pull the facia forward until it clears the side panels. The facia will come away complete with three position switch or programmer, if fitted. Support the facia having drawn it forward enough to gain access to the plug in terminal rail positioned behind and to the right of the heating thermostat. The terminal rail is numbered 14 to 17 inclusive. Separate the two halves of the terminal rail, enabling the facia to be removed completely. (Fig. 37)
- (e) Remove the two remaining posidrive screws 'C' retaining the top of the left hand side panel and the two M5 slotted head screws and single posidrive screw retaining the top of the right hand side panel 'J'. Draw the side panels forward and lift out.

NOTE: The control panel is supported in position by a single posidrive screw 'F'. (See Fig. 1). This is intended to hold the panel during installation only and no undue strain should be placed on the panel.

4. SYSTEM CONSIDERATIONS

(a) The appliance includes a pump and no other circulating pump is required. When fitting a room or frost thermostat, refer to Section 13, Electrical. The appliance will operate satisfactorily on a two pipe small bore or micro-bore system.

(b) The heatbank contains a finned copper heat exchanger which provides domestic hot water. A control system is incorporated that gives priority to the domestic hot water and the central heating will be turned off when a demand for hot water is made. For large quantities of hot water the control thermostat should be set at maximum and after use, a few minutes may be required to re-heat the heatbank. The central heating will remain off during this period.

IT IS ESSENTIAL TO FIT A BYPASS TO ALL SYSTEMS.

5. AIR SUPPLY HORIZONTAL FLUE

- 1. The room in which the appliance is installed does not require a purpose air vent.
- 2. If the appliance 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 outside air or to a room. Both high and low level air vents must communicate with the same room or must both be on the same wall to outside air. The minimum effective areas required are given in Table 5.

Table 5 COOLING AIR REQUIREMENTS

HORIZONTAL AND VERTICAL FLUE SYSTEMS				
Position of Air from Air direc Air Vents room from outsi				
High Level	264cm² (41in²)	132cm ² (20.5in ²)		
Low Level	264cm² (41in²)	132cm ² (20.5in ²)		

6. FLUE TERMINAL POSITION -HORIZONTAL FLUE

IMPORTANT

- 1. Flue length. See note in Section 1, General Information, regarding standard flue assembly and extension flue.
- 2. The flue must be installed in accordance with the recommendations of BS 5440:Part 1.

Minimum siting dimensions for positioning the balanced flue terminal:

ר	ERMINAL POSITION (See Fig. 2)	MIN DISTANCE
Α-	Directly below an openable window or other opening, e.g. air brick	300mm (12in)
В-	Below gutters, soil pipes or	00000000 (1200)
	drain pipes	75mm (3in)
C -	Below eaves	200mm (8in)
D -	Below balconies or car port roof	200mm (8in)
Ë-	From vertical drain pipes and	
	soil pipes	75mm (3in)
F -	From internal or external corners	300mm (12in)
G -	Above ground, roof or balcony	
	level	300mm (12in)
Η-	From a surface facing a terminal	600mm (24in)
1 -	From a terminal facing a terminal	1200mm (47in)
J -	From an opening in a car port	
	(e.g. door, window) into dwelling	1200mm (47in)
K -	Vertically from a terminal on	
	the same wall	1500mm (59in)
L -	Horizontally from a terminal on	
	the same wall	300mm (12in)

GENERAL NOTES

- 1. The terminal must be positioned such that the combustion products can disperse freely at all times.
- In certain weather conditions a terminal may steam and positions where this could cause a nuisance should be avoided.
- If the terminal is fitted within 850mm of a plastic gutter or within 450mm of painted eaves, an aluminium shield of at least 750mm long should be fitted to the underside of the gutter or painted surface (Dimensions B and C in Fig. 2).
- 4, If a terminal is fitted less than 2 metres (78.6in) above a surface to which people have access then a suitable guard must be provided. A terminal protective guard is available from: Tower Flue Components Limited, vale Rise, Tonbridge, TN9 1TB. Terminal Guard Reference: GC 393 553 Type K2. The terminal guard must be securely fixed to the wall

using the three brackets provided, suitable plugs and corrosion resistant screws. The guard must be symmetrically positioned about the terminal assembly and spaced such that there is a gap of 50mm minimum between the end of the terminal and the guard.

 The air inlet/products outlet duct and the terminal of the boiler must not be closer than 50mm (2 in) to combustible material. Detail recommendations on protection of combustible material are given in BS 5440:1 1990, sub-section 3.3

IMPORTANT

It is absolutely ESSENTIAL to ensure, in practice, products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration or forced ventilation/air conditioning. If this eventuality should occur, the appliance MUST be turned off immediately and the problem rectified.

7. AIR SUPPLY VERTICAL FLUES

- 1. The room in which the appliance is installed does not require a purpose air vent.
- 2. If the appliance 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 outside air or to a room. Both high and low level air vents must communicate with the same room or must both be on the same wall to outside air. The minimum effective areas required are given in Table 5, COOLING AIR REQUIREMENTS, Section 5.
- ALL installations must be provided with purpose designed air vents in the roof space, communicating direct with outside air. THE MINIMUM EFFECTIVE AREA REQUIRED FOR AIR VENTS WITHIN A ROOF SPACE IS 516cm² (80in²).
- 4. The roof space containing the diverter must be sealed off completely from:-

(a) the room, cupboard or compartment in which the appliance is installed and

(b) any other room.

8. CONNECTION OF PRIMARY AND SECONDARY VERTICAL FLUES

The components up to and including the draught diverter are supplied and these must be installed vertically above the top boiler flue outlet, in accordance with the dimensions shown in Fig. 3. Note that the draught diverter must be positioned such that it will not be obstructed by such as loft insulation.

A secondary flue must be fitted to the top of the draught diverter. This component will accept flue pipe to BS 715 size 125mm (5in). If flue pipe to BS 4543 is used, then an adaptor will need to be fitted, but the nominal internal diameter must not be decreased. The installation of the complete flue system must be in accordance with BS 5440:1.

The secondary flue system must be adequately supported and the exit from the roof space water proofed. Horizontal runs and bends should ideally be avoided, but at least minimised, and a spillage test must be carried out in accordance with BS 5440:1. Fig. 3 shows an appropriate point at which to apply the test.

No part of the flue system shall be within 25mm (1.0in) of combustible material.

Table 7

Max. secondary flue length if set to minimum CH input	Max secondary flue lengtl if set to maximum CH inpu		
6m (20ft)	10m (33ft)		

The flue lengths recommended above are intended to ensure that condensate does not form in the secondary flue system when the appliance operates under all approved operating conditions.

NOTE: The permanent, purpose designed ventilation openings required within the roof space, the openings within the diverter and any compartment ventilation - if applicable - MUST NOT BECOME BLOCKED.

The user MUST be instructed not to store items within the roof space which may cause an obstruction, or in the compartment - if applicable.

A space of at least 250mm (10in) radius shall be provided around the draught diverter with no obstructions (Fig. 3).





9.0 INSTALLING THE APPLIANCE GENERAL

If a HORIZONTAL FLUE is to be installed refer to Sections 2, 5, 6, 9.1 and 9.3: also Figs. 2 and 4.

If a VERTICAL FLUE is to be installed refer to Sections 2, 7, 8, 9.2 and 9.3; also Fig. 3.

NOTE: MORE THAN ONE PERSON MAY BE REQUIRED TO INSTAL THE APPLIANCE.

The space required for installation is 50mm (2in) at the left hand side and 150mm (6in) at the right hand side.

A description given in Section 9.3 covers one method of installation. If connections are made in a different way then the space required for installation may be greater.

In some circumstances when installing the appliance, particularly where minimum clearances for access and servicing have been used, it may be found necessary to pre-plumb the appliance and fit unions and stub pipes, (Fig 5) to the boiler pipework before moving it into position. If so refer to Section 9.3 and make the connections before assembling the flue system. Check to determine whether or not an extension kit is required. Refer to Section 1(c) and Section 2.

A knock-out panel is provided in the cabinet top panel to facilitate vertical pipe connections.

Compression fittings may be used on all water connections to allow for the fitting of the boiler and servicing.

- 1. Unpack the appliance.
- Unpack the standard flue kit and flue extension kit (if required) and check the contents against the enclosed check list. Ensure all cardboard packing in the standard flue assembly and flue extension is removed.
- 3. Remove the top cover and the front panel from the cabinet as described in Section 3.
- 4. The boiler is supplied suitable for a horizontal rear flue outlet configuration; the vertical outlets being sealed off with blanking plates. If a vertical flue is required refer to Figs 6 and 7.

To gain access to the top flue outlet cover, first remove the access cover. Fig. 6.

- (a) Remove the top air duct and flue duct blanking plates.
- (b) Run a bead of silicone sealant around the inside of the rear flue duct and air duct sockets.
- (c) Fit the blanking plate into the rear flue outlet socket, push fully home and tighten the clamping screw, working through the top air duct socket opening.
- (d) Fit the rear air duct socket blanking plate, push it fully into the socket and tighten the clamping screw.

NOTE: THE ACCESS PANEL MUST BE REPLACED WHEN THE FLUE SYSTEM IS FITTED.

REFER TO SECTION 9.2a (STANDARD FLUE KIT) OR 9.2b (EXTENSION KIT) Subsection 3(a).

9.1. REAR HORIZONTAL FLUE

1. Take account of the requirements under Section 2 - Siting the appliance.

Refer to page 1 and Fig 4. Mark the flue position required on the wall. Cut a hole in the wall 125mm (5in) diameter.

NOTE: If a core boring tool is not used and the hole is made oversize, it must be reduced to 130mm maximum diameter and the inner skin of the brickwork made good before the appliance is installed (Sections 9.1a; 9.1b; 9.1c).

 Determine the flue length by referring to the appropriate section below, which details the correct flue/ boiler assembly procedure.

Section	Length L
9.1a.	100mm-1000mm (4in-39.4in)
9.1b.	1001mm-1200mm (39.4in-47.2in)
9.1c.	1201mm-2000mm (47.2in-78.7in)

NOTE: REFER TO SECTION 9.3. COMPLETE THIS PART OF THE INSTALLATION AS NECESSARY BEFORE ASSEMBLING THE REQUIRED FLUE ARRANGEMENT.





9.1a BOILER FLUE ASSEMBLY REAR OUTLET 100mm-1000mm (4in-39.4in)

NOTE: An extension kit is NOT required.

- 1. Cut the air duct to length as follows:-
- (a) Measure the wall thickness L and add 28mm (1.1in).
 (Fig 4, 8 and 15). This is the overall length of 110mm (4.5in) diameter air duct required.
- (b) Reduce the air duct 'A' to L + 28mm (1.1in). Note. that one end of the duct has two holes drilled. DO NOT CUT FROM THIS END OF THE DUCT.
- 2. Cut the flue duct to length as follows:-
- (a) Take wall thickness L and add 51mm (2.0in). This is the overall length of 60mm diameter (2.38in) flue duct required.
- (b) Reduce the flue duct to 'C' to L + 51mm (2.0in) by cutting from either end. (Fig 9).
- Refer to Figs 6 & 7. Slacken the vertical air duct clamping screw sufficient to allow the air duct blanking plate to be pulled out of its socket. This will facilitate access to the rear flue duct clamping screw.
 Depending on wall thickness and space available the

flue duct only should either:-

- (a) Be passed through the wall from outside and then fixed into the socket at the rear of the flue duct housing (Fig 8) or
- (b) If the flue duct is relatively short e.g. less than 400mm (16in) it may be fixed directly to the flue duct housing prior to moving the boiler into position in front of the inner wall face. (Fig 8).
- Remove the backing paper from the square sealing gasket provided. Position the gasket as shown, then press the adhesive backed side firmly against the back panel, around the rear flue outlet (Fig 8).
 Fither
- (a) Apply a bead of silicone sealant around the inside of the rear flue duct socket and around the inside of the rear air duct socket. Move the appliance into position, square to the wall face, standing centrally in front of the hole in the wall. Position the back panel 40mm (1.6in) in front of the wall face. Pass the flue duct through the wall and push the end fully home into the rear flue duct socket. Working through the top air duct socket tighten the rear flue duct clamping screw. Make sure the flue duct is positioned concentrically within the rear air duct socket and the hole in the wall.

or

(b) Push one end of the flue duct fully home into the rear flue duct socket. Working through the top air duct socket tighten the rear flue duct clamping screw. Make sure the flue duct is positioned concentrically within the rear air duct socket.
 Move the appliance into position, square to the wall face, with the back panel about 40mm (1.6in) in

front of the wall. Allow the flue duct to pass into the hole and check the duct is positioned concentrically. Fit the flue terminal into the end of the air duct with

- 5. Fit the flue terminal into the end of the air duct with holes. Slide the flue terminal into the air duct up to the rolled stop channel. Using the holes in the air duct as a guide drill through the flue terminal with the 3mm drill supplied. Screw the assembly together with two No 6 x 10mm self-tapping screws provided. (Fig 10).
- RECHECK THAT ANY STUB PIPE CONNECTIONS RE-QUIRED HAVE BEEN MADE. (SECTION 9.3).
- 7. Working from outside pass the air duct and terminal assembly through the hole. A flue expansion joint of about 100mm (4in) is allowed for. The short section of flue duct inside the terminal will engage and push over the section of flue duct connected to the boiler, provided the air and flue duct have been cut accurately.



- 8. Move the appliance into its final position. The air duct should be pushed fully home into the air duct socket. The back of the socket should be flush with the wall face, compressing the sealing gasket (Fig 8). Tighten the air duct clamping screw.
- 9. Run a bead of silicone sealant around the inside of the top air duct socket. Refit the blanking plate, pushing it down until it is fully home. Tighten the top air duct clamping screw. REFER TO SECTION 9.3.

Note. The rubber sealing ring only may be used with the terminal fitted to this appliance to provide a wall seal.See Fig.8a



9.1b BOILER FLUE ASSEMBLY REAR 1001mm - 1200mm (39.5in - 47.2in)

NOTE: Use the standard flue kit and extension flue kit.

- 1. Cut the air duct to length as follows:
- (a) Measure the wall thickness L. and add 28mm (1.1in). This is the overall length of 110mm (4.5in) diameter air duct required.
- (b) Reduce the length of the extension air duct 'B' to 900mm (35.4in). Cut surplus from plain end ONLY. (Fig. 11)
- (c) Fully engage the end of air duct 'A' (without holes) into the expanded end of air duct 'B' (Fig. 11)
- (d) Reduce the length of the standard air duct 'A' by cutting from the end WITHOUT holes to the required overall length (Fig.11)
- (e) Using the two holes in the expanded end of air duct 'B' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the air ducts and apply a smear of silicone sealant around the outside of the previously engaged end of air duct 'A'. Reassemble and secure with two self-tapping screws supplied. (Figs 11 & 12).
- Slide the flue terminal into the open end of air duct 'A', to the rolled stop channel. Using the holes at the end of air duct 'A' as a guide, drill through the flue terminal with the 3mm drill supplied. Secure the assembly together with two No.6 x 10mm self-tapping screws. (Figs. 11 & 12).
- 3. Cut and assemble the flue duct as follows:
- (a) Take the wall thickness L and add 51mm (2.0in); This is the overall depth of 60mm (2.38in) diameter flue duct required.
- (b) Reduce the length of the standard flue duct 'C' to 900mm (35.4in) by cutting from either end. (Fig. 11).
- (c) Fully engage either end of flue duct 'C' into the expanded end of flue duct 'D' (Fig. 11).
- (d) Reduce the length of the extension flue duct 'D' by cutting from the plain end, to the required overall length. (Fig. 11).
- (e) Using the two holes in the expanded end of flue duct 'D' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the flue ducts and apply a smear of silicone sealant around the previously engaged end of flue duct 'C'. Reassemble and secure with two self-tapping screws supplied (Figs. 11 & 12).
- (f) Refer to Figs 6 and 7. Slacken the vertical air duct clamping screw sufficient to allow the air duct blanking plate to be pulled out of its socket. This will facilitate access to the rear flue duct clamping screw. Run a bead of silicone sealant round the inside of the rear air duct socket.

NOTE: If the fully assembled flue and air ducts are to be passed through the hole in the wall as described below (9.1b.4 and 9.1b.6) there MUST be sufficient access. If access is insufficient it may be possible to assemble the duct work piecemeal, passing it through the hole as each section is added.

 Remove the backing paper from the square sealing gasket provided. Position the gasket as shown, then press the adhesive backed side firmly against the back panel, around the rear flue outlet (Fig. 8).

Apply a bead of silicone sealant around the inside of the flue duct and air duct sockets.

Move the appliance into position, square to the wall face, standing centrally in front of the hole in the wall. Position the back panel about 40mm (1.6) in front of the wall face. Pass the flue duct through the wall and push the end fully home into the rear flue duct socket. Working through the top air duct socket tighten the rear flue duct clamping screw. Make sure the flue duct is positioned concentrically within the rear air duct socket and the hole in the wall.

- 5. RECHECK THAT ANY STUB PIPE CONNECTIONS REQUIRED HAVE BEEN MADE. (SECTION 9.3)
- 6. Working from outside pass the air duct and terminal assembly through the hole. A flue expansion joint of about 100mm (4in) is allowed for. The short section of flue duct inside the terminal will engage and push over the section of flue duct connected to the boiler, provided the air and flue ducts have been cut accurately.
- 7. Move the appliance into its final position. The air duct should be pushed fully home into the air duct socket. The back of the socket should be flush with the wall face. Tighten the air duct clamping screw.
- Run a bead of silicone sealant around the inside of the top air duct socket. Refit the blanking plate pushing it down until it is fully home. Tighten the top air duct clamping screw.
 REFER TO SECTION 9.3

9.1c BOILER FLUE ASSEMBLY REAR

1201mm - 2000mm (47.3in - 78.7in)

NOTE: Use the standard flue kit and the extension flue kit.

- 1. Cut the air duct to length as follows:
- (a) Measure the wall thickness L and add 28mm (1.1in). This is the overall length of 110mm (4.5in) diameter air duct required. (Figs. 4, 8 and 16)
- (b) Do not reduce the length of the extension air duct 'B'. (Fig. 13).
- (c) Fully engage the end of air duct 'A' (without holes) into the expanded end of air duct 'B'.
- (d) Reduce the length of the standard air duct 'A' by cutting from the end without holes to the required overall length. (Fig. 13)
- (e) Using the two holes in the expanded end of air duct 'B' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the air ducts and apply a smear of silicone sealant around the outside of the previously engaged end of air duct 'A'. Reassemble and secure with the two self-tapping screws supplied. (Figs. 13 & 14)
- Slide the flue terminal into the open end of air duct 'A', to the rolled stop channel. Using the holes at the end of air duct 'A' as a guide, drill through the flue terminal with the 3mm drill supplied. Secure the assembly together with the two No.6 x 10mm self-tapping screws. (Figs. 13 & 14)
- **3.** Cut and assemble the flue duct as follows:
- (a) Do not reduce the length of the standard flue duct 'C'. (Fig. 13)
- (b) Take the wall thickness L and add 51mm (2.0in).
- (c) Fully engage either end of flue duct 'C' into the expanded end of flue duct 'D'. (Fig. 13)
- (d) Reduce the length of the extension flue duct 'D' by cutting from the plain end, until the required overall length, after engagement of the two ducts, is obtained. (Fig.13)
- (e) Using the two holes in the expanded end of duct 'D' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the flue ducts and apply a smear of silicone sealant around the previously engaged end of flue duct 'C'. Reassemble and secure with the two self tapping screws supplied. (Figs 13 & 14)

(f) Refer to Figs. 6 and 7. Slacken the vertical air duct clamping screw sufficient to allow the air duct blanking plate to be pulled out of its socket. This will facilitate access to the rear flue duct clamping screw.

NOTE: If the fully assembled flue and air ducts are to be passed through the hole in the wall as described below (9.1c.4 and 9.1c.6) there MUST be sufficient access. If access is insufficient, it may be possible to assemble the duct work piecemeal, passing it through the hole as each section is added.



Fig. 12 Rear flue duct assembly FOR WALL THICKNESSES/FLUE LENGTHS 1001mm to 1200mm (39.4in to 47.0in) USE THE STANDARD FLUE KIT AND THE EXTENSION FLUE KIT **IMPORTANT: REFER TO INSTRUCTIONS IN SECTION 9.1b BEFORE ASSEMBLY** A FLUE DUCT EXPANSION JOINT OF APPROXIMATELY 100mm (4in) OVERLAP IS ALLOWED FOR PROVIDING THE AIR AND FLUE DUCTS ARE ACCURATELY CUT TO THE REQUIRED LENGTH STANDARD FLUE DUCT STANDARD AIR DUCT EXTENSION AIR DUCT FLUE DUCT EXTENSION 7 **B**.F ÷ * OVERALL LENGTH = L PLUS 51mm (2.0in) пI 9 SUPPORT SPIDER 23mm * OVERALL LENGTH = L PLUS 28mm (1.1in) -ROLLED STOP FLUE (0.9in) CHANNEL TERMINAL FIT FLUE TERMINAL INTO END OF AIR DUCT EXTENSION UP TO THE ROLLED STOP CHANNEL. USING THE HOLES IN THE AIR DUCT EXTENSION AS A GUIDE DRILL TWO 3mm DIAMETER HOLES THROUGH THE FLUE TERMINAL WITH THE DRILL SUPPLIED. SECURE ASSEMBLY TOGETHER WITH TWO SELF-TAPPING SCREWS SUPPLIED.





* OVERALL LENGTH = L PLUS 28mm (1.1in) -

23mm

(0.9in)

-

FLUE DUCT

EXTENSION

TH H

FLUE

TERMINAL

ЪП

ROLLED STOP

À

- 4. Remove the backing paper from the square sealing gasket provided. Position the gasket as shown, then press the adhesive backed side firmly against the back panel around the rear flue outlet. (Fig. 8). Apply a bead of silicone sealant around the inside of the flue duct and air duct sockets. Move the appliance into position, square to the wall face, standing centrally in front of the hole in the wall. Position the back panel about 40mm (1.6in) in front of the wall face. Pass the flue duct through the wall and push the end fully home into the rear flue duct socket tighten the rear flue duct clamping screw. Make sure the flue duct is positioned concentrically within the rear air duct socket and the hole in the wall.
- 5. RECHECK THAT ANY STUB PIPE CONNECTIONS REQUIRED HAVE BEEN MADE. (SECTION 9.3).
- 6. Working from outside pass the air duct and terminal assembly through the hole. A flue expansion joint of about 100mm (4in) is allowed for. The short section of flue duct inside the terminal will engage and push over the section of flue duct connected to the boiler, provided the air and flue ducts have been cut accurately.
- 7. Move the appliance into its final position. The air duct should be pushed fully home into the air duct socket. The back of the socket should be flush with the wall face. Tighten the air duct clamping screw.
- 8. Run a bead of silicone sealant around the inside of the top air duct socket. Refit the blanking plate pushing it down until it is fully home. Tighten the top air duct clamping screw. REFER TO SECTION 9.3.





9.2 VERTICAL FLUE SYSTEMS

- Refer to Fig 3 and take account of the requirements of Section 2 - Siting the Appliance, and Section 18 -Connection of primary and secondary vertical flues.
- 2. Determine the FINAL installed position of the boiler and mark on the ceiling, directly above the appliance, the centre of the vertical air duct socket. Refer to page 1 and Fig 4 for dimensional details. Cut a hole 125mm (5in) diameter accurately through the ceiling. Offer up the ceiling plate, and position it so that it is possible to drill through the plate and provide four fixing hole positions for the No. 8 x 30mm wood screws provided, fixed either into the existing joists or into reinforcement nogs, which may be fixed to the joists. Refer to Fig. 19. Alternatively, the plate may be fixed to the ceiling using plasterboard toggle screws. A minimum of four fixing positions is required. Leave plate loose for now.

Seal any air gap between the back of the plate and the ceiling with silicone sealant applied prior to screwing the plate in final position.

3. Determine the overall length H of vertical primary air duct required.

H = the vertical distance measured from the bottom of the air duct socket on top of the appliance to the top of the air duct socket on the underside of the diverter (Fig 17).

The bottom of the diverter must be situated no less than 250mm (10in) above the ceiling joists or any roof space insulation installed on top of the joists.

NOTE: When the minimum diverter height of 250mm (10in) above joists is used the STANDARD vertical flue kit will accommodate the installation of the appliance under ceilings of nominal height between 1980mm (78in) and 2424mm (95.4in) when the overall thickness of joists, plaster and any insulation in the roof space is 150mm (5.9in), Fig 17.

When an extension duct kit is used, ceiling heights up to a nominal maximum of 3424mm (134.8in) may be used (Fig 17).

4. Determine the vertical flue length H by refering to the appropriate section below, which details the correct flue boiler assembly procedure.

Section	Overall length of vertical flue duct/air duct H
9.2a	1557mm-2000mm (61.3in-78.7in)
9.2b	2001mm-3000mm (78.8in-118.1in)

9.2a BOILER FLUE ASSEMBLY -VERTICAL (1557mm-2000mm) (61.3in-78.7in)

For overall flue height H between 1587mm-2000mm (61.3in-78.7in) use the standard flue kit only.

- 1. Cut and assemble the air duct as follows (Fig 20):
- (a) The overall length H. (Figs 17 and 20). This is the overall length of 110mm (4.3m) diameter air duct required.
- (b) Do not reduce the length of air duct 'A' (Fig. 20).
- (c) Fully engage one end of air duct 'B' into the expanded end of air duct 'A'.

- (d) Reduce the length of the duct with plain ends, air duct 'B' to the required overall length.
- (e) Using the two holes in the expanded end of air duct 'A' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the air ducts and apply a smear of silicone sealant around the outside of the previously inserted end of air duct 'B'. Reassemble and secure with two self-tapping screws supplied.



- 2. Cut and assemble the flue duct as follows:
- (a) Fully engage the plain end of flue duct 'D' into the expanded end of flue duct 'E' (Fig 20).
- (b) Reduce the flue length to the same length H used for the air ducts. (Fig. 20). This is the overall length of 60mm (2.38in) diameter flue duct required.
- (c) Do not reduce the length of flue duct 'D'. (Fig. 20).
- (d) Reduce the length of flue duct 'E' by cutting from the plain end only (Fig 20).
- (e) Using the two holes in the expanded end of flue duct
 'E' as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the ducts.
 Engage one end of the flue stub duct into the expan-

ded end of flue duct at 'D' (Fig 20). Using the two holes in the socket end as a guide, drill two 3mm diameter holes using the drill supplied. Disengage the two ducts.

Apply a smear of silicone sealant around the outside of the plain end of flue duct 'D'. Engage it with the expanded end of flue duct 'E' and fix with the two self-tapping screws provided (Fig 20).



3.

(a) Apply a bead of silicone sealant around the inside of the top flue outlet socket. Insert the end of the stub duct without holes fully into the socket. (Fig 18). Working through the access hole in the upper front panel of the casing, tighten the top flue outlet clamping screw. (Figs 6 and 7).

Ensure the stub duct is positioned concentrically within the air duct socket.

REPLACE THE ACCESS COVER.

(b) Partly assemble the flue/air duct system as follows. Slide the support spider over the end of the flue duct to be inserted into the diverter socket (Fig 20). Push it down the duct to the expanded end. Slide the flue duct inside the air duct. Ensure both ducts are the correct way round. The air duct socket in the centre of the duct should be positioned upwards and the socket in the centre of the flue duct positioned downwards.

Slide the sealing plate over the top end of the air duct before commencing to position the assembly. Ensure the socket on the sealing plate is looking DOWN.

- (c) Before positioning the boiler, push the top of the flue assembly through the hole in the ceiling. Lift the assembly far enough into the roof space to allow the bottom of the flue duct to be supported, using a wooden batten between 950mm-1000mm (37.5in-39in) long, off the ground. Ensure the supported assembly is vertical.
- (d) Refer to Fig 19. Lift the sealing plate up to the underside of the ceiling and fix as described under Section 9.2.2.
- (e) Lift the AIR duct assembly into the roof space sufficient to allow the appliance to be positioned under it and the flue duct supported as described in Section 9.2a.4.

Retain the AIR duct in position by tightening the sealing plate clamping screw (Fig 19). Ensure the assembly is vertical.

 (a) RECHECK TO ENSURE THAT ANY STUB PIPE CON-NECTIONS REQUIRED HAVE BEEN MADE

Refer to Section 9.3.

Move the appliance into position, just in front of the supported vertical flue. Position the centre of the top flue outlet socket in line with the supported flue assembly.

Run a bead of silicone sealant around the inside of the top air duct socket and around the open end of the flue stub duct.

- (b) Lift the vertical flue system assembly and remove the wooden batten. Support the assembly by hand whilst moving the appliance into its final position. Keeping the outer air duct raised, lower the inner flue duct sliding the socket end over the flue stub duct. Secure with the two self-tapping screws provided (Fig 20).
- (c) Slacken the sealing plate clamping screw and lower the outer air duct, sliding the end into the top air duct socket.
- (d) Working within the roof space, fit the diverter to the top of the flue system as follows:-
 - Apply a bead of silicone sealant around the inside of the air duct socket at the bottom of the diverter.
 - (ii) Apply a smear of silicone sealant around the outside of the flue duct at the top of the flue system.
 - (iii) Slide the air duct and flue duct sockets at the bottom of the diverter over the end of the air and flue ducts.

5.

(a) Ensure the flue system is vertical. If necessary move the appliance slightly to achieve this. When the flue system is vertical check that the air duct and flue ducts are fully home in their respective sockets at the top and bottom of the vertical ducts, then tighten the clamping screws.

Now install the secondary flue in accordance with Section 8. Refer to Section 9.3.





9.2b BOILER FLUE ASSEMBLY -VERTICAL 2001-3000mm (78.8in-118.1in)

For overall flue lengths between 2001mm and 3000mm (78.8in and 118.1in) use the standard flue kit plus ONE extension flue kit only.

IMPORTANT NOTE: Where the ceiling height from appliance floor level is below 2935mm (83in), nominal, it will be necessary to reduce the lengths of the air ducts 'A' and 'C', and the flue ducts 'D' and 'E' (Fig 21b) to avoid the expanded end of air duct 'C' fouling the sealing plate socket (Fig 19).

See Section 9.2b.1 - otherwise proceed to Section 9.2b.2.

 Overall flue lengths between (2001-2519)mm (78.8-99in).
 These flue lengths correspond to a nominal ceiling height between (2416-2934mm) (95-115.5in) when

the diverter is fitted as shown in Fig 17. (a) Cut the air ducts 'A' and 'C' and flue ducts 'D' and 'E' as follows:-

Determine the overall length 'H', Figs 17, 21a, 21b, 22. This is the overall length of 110mm (4.3in) diameter air duct required.

(b) Measure the ceiling height 'x' from appliance floor level (Fig 21a).



To determine the amount to be cut from air ducts 'A' and 'C' and flue ducts 'D' and 'E' SUBTRACT HALF THE DIS-TANCE 'X' FROM 1468mm (57.8in) (Fig 21a), CUT THE SURPLUS FROM THE PLAIN END OF THE DUCTS. Proceed to Section 9.2b.2a.

2. Overall flue lengths between (2520-3000mm) (99.1-118.1in).

- (a) Determine the overall lengths H. Figs 17, 21b, 22. This is the overall length of 110mm (4.3in) diameter air duct required.
- (b) Assemble the air ducts as shown in Fib 21b. Reduce the length of duct 'B' by cutting from the end with holes until the required overall length, after engagement with the other two ducts is obtained (Fig 21b). Using the two holes pre drilled in each of the three socket ends as a guide, drill two 3mm diameter holes through the ducts, using the drill provided. Disengage the air ducts and apply a smear of silicone sealant around the outside of the plain ends of the ducts. Reassemble and secure with four self tapping screws provided.
- 3. Cut and assemble the flue duct as follows:-
- (a) Reduce the flue length to that used for the air ducts i.e. H (Fig 21). This is the overall length of 60mm (2.4in) diameter flue duct required.
- (b) Assemble the flue ducts 'D' and 'E' and 'F' (Fig 21b).
- (c) Reduce the length of the flue duct 'F' only by cutting from the plain end.
- (d) Attach the stub duct, using the two holes pre drilled in each of the three socket ends as a guide, drill two 3mm diameter holes through the ducts, using the drill provided.

Disengage the flue ducts and fit the two support spiders (Fig 22).

Apply a smear of silicone sealant around the outside of the plain ends of the flue ducts 'E' and 'F'.

Reassemble the flue ducts D, E and F and secure with the self tapping screws provided (Fig 21).

- (a) Apply a bead of silicone sealant around the inside of the top flue outlet socket. Insert the end of the stub duct without holes fully into the socket. Working through the access hole in the upper front panel of the casing, tighten the top flue outlet clamping screw. (Figs 6 and 7). REPLACE THE ACCESS COVER.
- (b) Partly assemble the flue air duct system as follows (Fig 22). Slide the flue duct inside the air duct. When positioned vertically for fitment as described under 3.c below the air duct sockets should be upward and the flue duct sockets downward. The support spiders should be positioned above the flue duct sockets. Slide the sealing plate over the top end of the air duct, before commencing to position the flue assembly. Ensure the socket on the sealing plate is looking down.
- (c) Before positioning the boiler, push the top of the flue assembly through the hole in the ceiling. Lift the assembly far enough into the roof space to allow the bottom of the flue duct to be supported, using a wooden batten between 950mm-1000mm (37.5in-39in) long, off the ground. Ensure the supported assembly is vertical.
- (d) Refer to Fig 19. Lift the sealing plate up to the underside of the ceiling and fix as described under Section 9.2.2.
- (e) Lift the air duct assembly into the roof space, sufficient to allow the appliance to be positioned under it and the flue duct supported as described in Section 9.2b.4.

Retain the air duct in position by tightening the sealing plate clamping screw (Fig 19).

- 5. Ensure the assembly is vertical.
- (a) RECHECK TO ENSURE THAT ANY STUB PIPE CON-NECTIONS REQUIRED HAVE BEEN MADE (Section 9.3).

Move the appliance into position, just in front of the supported vertical flue. Position the centre of the top flue outlet socket in line with the supported flue assembly.

Run a bead of silicone sealant around the inside of the top air duct socket and around the open end of the flue stub duct.

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- (b) Lift the vertical flue system assembly and remove the wooden batten. Support the assembly by hand whilst moving the appliance into its final position. Keeping the outer air duct raised, lower the inner flue duct sliding the socket end over the flue stub duct. Secure with the two self-tapping screws provided (Fig 22).
- (c) Slacken the sealing plate clamping screw and lower the outer air duct, sliding the end into the top air duct socket.
- (d) Working within the roof space fit the diverter to the top of the flue system as follows:-
 - Apply a bead of silicone sealant around the inside of the air duct socket at the bottom of the diverter.

- (ii) Apply a smear of silicone sealant around the inside of the air duct socket at the bottom of the diverter.
- (iii) Slide the air duct and flue duct sockets at the bottom of the diverter over the end of the air and flue ducts.

6.

(a) Ensure the flue system is vertical. If necessary move the appliance slightly to achieve this. When the flue system is vertical check that the air duct and flue ducts are fully home in their respective sockets at the top and bottom of the vertical ducts, then tighten the clamping screws.

Now instal the secondary flue in accordance with Section 8. Refer to Section 9.3.





9.3 COMPLETION OF APPLIANCE INSTALLATION AND/OR PRE-PLUMBING OF APPLIANCE

All installations.

Refer to Figs 1, 2, 3, 4, 5. Remove all plastic caps.

It is most important the pipework is routed so as not to obstruct access to the circulating pump, dhw filter or flow regulator.

- Check that the proposed position of the boiler is firm and level. No special floor protection is required.
- 2. Prepare the connections working from the centre out.
- (a) Remove the central heating flow tee connection by disconnecting the tee at the smaller pump isolation valve union and at the entry to the heat bank (Fig 47).
- (b) Remove the central heating return pipe by disconnecting the top union above the diverter valve (Fig 45).
 Remove the primary expansion feed pipe (complete with safety valve) by disconnecting the union (Fig 47).
- (c) Make any required alteration to the gas supply pipe.
- (d) Sealed Systems Only: Cap off the open end of the loose combined feed/expansion pipe (22mm copper). (On open vent systems attach a compression or capillary elbow to the loose feed/expansion pipe, direction up).
- (e) Remove the union (complete with filter and gasket) from the hot water cold inlet of the boiler. This will expose the plastic flow regulator.

Cistern feed hot water supply systems only:-

Prise out the regulator from the inlet pipe and discard it.

- (f) Fit the Rc½ (½in BSP) x 15mm COMPRESSION ELBOW SUPPLIED to the dhw cold inlet, direction up. Replace the union. Do not omit the filter and washer.
- (g) Attach a capillary or compression elbow to the dhw flow pipe (22mm copper), direction up.
- (h) Attach a capillary or compression elbow to the loose central heating flow tee, direction up or to the left. Refit the tee.
- (j) Attach a capillary or compression elbow to the loose central heating return pipe (28mm copper) direction up or to the left.

Refit the pipe, including the washer at the diverter valve.

(k) Sealed Systems Only: Fit a 22mm pipe to the outlet from the tundish pipe.

(On open vent systems the safety valve should be removed and the connection capped).

Refit the 22mm primary expansion/feed pipe.

- Tighten any unions.
- (I) Safety Valve Discharge Pipe: The discharge pipe from the tundish must be continued in 22 mm copper pipe, and laid to a continuous fall to avoid the retention of any discharge water within the pipework. A fall in excess of 1 in 200 will be satisfactory.

The pipework should have a resistance to flow of water not greater than that of a straight pipe 9 metres long.

The termination of the discharge pipe must be visible, but in a location not readily accessible to persons.

Discharges at low level are acceptable providing that a wire cage or similar is positioned to prevent contact, while maintaining visibility.

IMPORTANT: The operation of the safety valve MUST be checked during the initial commissioning of the appliance and any subsequent commissioning following servicing of the appliance.

Note: The period between services should NOT EXCEED TWELVE MONTHS.

- **3.** Depending on the particular type of flue system fitted, either horizontal or vertical, complete the flue installation and connection to the appliance in accordance with Section 9.1 and 9.2.
- Connect the gas pipe to the gas inlet connection previously under 2 above. Check the gas pipework up to the gas service cock for gas soundness in accordance with BS 6891: 1988.
- 5. Thoroughly flush the whole of the water system with cold water.
- 6. Connect the water system pipes at the rear of the appliance. Fill the system venting as required. Check for water soundness.
- 7. Connect the mains lead as described in Section 13, Electrical. For frost and room thermostat connections refer also to Section 13.
- 8. Reassemble the appliance leaving off the cabinet front cover until the commissioning (see Section 14) has taken place.
- 9. For horizontal flue systems.

Make good the external brickwork or wall rendering. The inside edge of the rolled channel fixed to the flue terminal will protrude approximately 10mm (0.4in) from the wall.

If necessary, fit a terminal guard as specified under Section 6.5 - HORIZONTAL FLUE TERMINAL POSITION.

10. SEALED PRIMARY SYSTEM CISTERN FEED - SECONDARY SYSTEM

See Figs 23 and 24.

THE INSTALLATION MUST COMPLY WITH THE RE-QUIREMENTS OF BS 6798 and BS 5449:1.

The open end of the combined feed and expansion pipe must be sealed.

- 1. For sizes of flow and return pipework refer to Technical Data and Fig 5.
- 2. THE EXPANSION VESSEL CHARGE PRESSURE

The expansion vessel is charged to 0.5 bar (7 psi). The charge pressure must not be less than the static head of the system measured from the top of the appliance to the highest point of the system. The vessel as supplied is therefore suitable for systems with a static head of 0.5 bar (17ft).

The expansion vessel is charged with air and fitted with a schraider tyre type valve. The charge pressure is therefore adjustable by using a tyre pump and pressure gauge, and should be increased if required.



3. SYSTEM FILLING AND MAKE-UP

A system should be incorporated for filling a sealed system that is acceptable to the local Water Company and connected as close to the central heating return connection as possible.

A system in common use is as follows:-

(a) A temporary hose connection is made from a distribution pipe or from a service pipe under mains pressure. The connection should incorporate a stop cock to BS 1010, a test cock, an approved type vacuum breaker and an approved non-return valve (See Fig. 23b).

With this method, water make-up is achieved by prepressurisation of the system to a cold pressure above that of the expansion vessel charge pressure, (0.5 bar as supplied). An increase of 0.5 bar would be suitable, alternatively a make-up vessel can be connected as described below. (b) CONNECTION OF A MAKE-UP VESSEL (See Fig. 24) In systems where the initial system design pressure is equal to the static head a manually filled container should be used. Position at least 1m (39in) above the highest point of the system and containing not more than 3 litres (5.3 pints) of water. The connection should be made as close to the central heating return as possible and include a non-return valve, stop cock and automatic air vent.

4. SYSTEM VOLUME

The expansion vessel fitted to the appliance will accommodate differing system volumes depending upon the initial charge pressure and prepressurisation pressure of the system if any. Reference should be made to Table 8 to establish the system volume that can be accommodated under different conditions with the standard expansion vessel. If it is found that the system volume is in excess of that catered for by the expansion vessel provided, then an extra vessel can be added as close to the return connection of the appliance as possible so that the total expansion vessel volume is adequate. Refer to BS 5449:1 and BS 6798 for further information.

NOTE: If the pressure indicated on the pressure gauge fitted to the appliance exceeds 2.6bar when operating on maximum temperature, an extra expansion vessel should be fitted to the system in the heating system (primary) return as close to the boiler as possible. **Table 8**

Total System Volur	ne - Litres	(gallons)		
Initial System pressure - Bar	Vessel charge pressure - Bar			
	0.5	1.0	1.5	
0.5	156 (35)	-	-	
1.0	96 (21)	122.5 (27)	-	
1.5	51.5 (11.5)	69.5 (15.5)	85 (18.5)	
2.0	24 (5.5)	32.5 (7)	39.5 (9)	



5. VENTING

The automatic air vent fitted to the appliance (See Fig. 24) is fitted with a protective black plastic screw cap this should be removed and discarded, air will now automatically be vented from this point during filling.

The heating system should be fitted with manual air vents at all high points.

6. SYSTEM BY-PASS

(See Table 4). A suitable by-pass designed to give the minimum flow rate indicated in Table 4 corresponding to the heating output used must be fitted.

A suitable position for the by-pass is shown in Fig. 24. The by-pass should be connected in 22mm diameter pipe at least 2m (7ft) from the appliance and fitted with a suitable valve to provide adjustment.

To adjust the by-pass, the boiler should be operated on central heating with the system by-pass and radiator valves set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system and restrict the by-pass by the minimum amount necessary to give a temperature rise across the flow and return pipe of $15^{\circ}C$ ($27^{\circ}F$).

7. PUMP

The pump has been set at MAXIMUM and should not be reduced.

8. DOMESTIC HOT WATER COLD FEED CISTERN

The feed pipe should be 15mm dia. rising continuously from the appliance to the cistern. The use of long horizontal runs should be avoided. The cistern should be positioned to provide a MINIMUM STATIC HEAD OF 4.6m (15ft) above the appliance casing (Fig 24).

9. PRESSURE RELIEF VALVE

A spring loaded pressure relief valve set to operate at 3bar (45lbs.f/in²) is fitted within the boiler. It discharges into a tundish, fitted directly below the safety valve. A discharge pipe should be fitted to the pipe. The point of discharge from the pipe must be visible, and positioned or protected to present the minimum hazard to the occupants and surrounding materials.

11. OPEN VENT PRIMARY SYSTEM MAINS FEED SECONDARY SYSTEM

(See Fig. 25)

 For sizes of flow and return pipework refer to Technical Data and Fig. 5.

2. FEED AND EXPANSION CISTERN

The feed and expansion pipe should be 22mm diameter rising continuously from the appliance to the feed and expansion cistern. The use of long horizontal runs should be avoided.

The feed and expansion cistern should be arranged so that it provides a minimum static head of 1 metre (3ft) above the top of the appliance or above the highest point in the heating circuit, whichever is the highest.

3. PRESSURE RELIEF VALVE

A pressure relief valve is not required on an open vented system. It must be removed from the appliance and the tapping blanked off.

4. FILLING AND VENTING

An automatic air vent is fitted to the top of the insulated heat exchanger adjacent to the boiler. Remove the black plastic screw cap. (See Fig. 24.) Air will be released as necessary from this point during filling. Any other air within the appliance will be expelled via the feed and expansion connection or dissipated into the rest of the system. The heating system should be fitted with manual air vents at any high point.

5. SYSTEM BY-PASS (See Table 4)

A suitable by-pass designed to give the minimum flow rate indicated in Table 4 corresponding to the heating output used, must be fitted. A suitable position for the by-pass is shown in Fig. 25. The by-pass should be connected in 22mm diameter pipe at least 2m (7ft) from the appliance and fitted with a suitable valve to provide adjustment.





To adjust the by-pass, the boiler should be operated on central heating with the by-pass and radiator valves set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system and restrict the by-pass by the minimum amount necessary to give a temperature rise across the flow and return pipes of $15^{\circ}C$ ($27^{\circ}F$).

6. PUMP

The pump has been set at maximum and should not be reduced.

12. MAINS FEED SECONDARY DOMESTIC HOT WATER SUPPLY

NOTE: The following instructions are general installation recommendations and reference should be made to the local Water Company before fitting any of these appliances.

In the event of difficulty please contact the manufacturer.

1. COLD SUPPLY

There should be no device capable of preventing the flow of expansion water unless separate arrangements for expansion water are made. The final 600mm mains cold water connection to the unit should be made in copper only.

2. HOT SUPPLY AND FLOW REGULATING

The appliance is fitted with a water flow regulator. The maximum flow of domestic hot water available through the appliance is limited to 15 litres/min. (3.3 gall./min.).

NOTE: The flow regulator contained within the flow regulator housing is plastic. Do not heat the housing during soldering operations on adjacent joints.

3. TAPS AND VALVES

Hot and cold taps and mixing valves used must be suitable for operating at mains pressure.

SHOWERS (FIXED HEAD TYPE) No anti-syphonage arrangements are necessary.

5. SHOWERS (LOOSE OR FLEXIBLE HEAD TYPE)

If a loose head shower with flexible hose is to be used over a bath, the hose must be fixed so that the head cannot fall closer than 25mm (1.0 in) above the top edge of the bath in order that the head is prevented from being immersed in bath water, or the shower must incorporate or be fitted with an antisyphonage device at the point of flexible hose connection.

6. BIDETS

The supply of hot and cold mains water direct to a bidet is permitted provided that the bidet is of the over-rim flushing type. The outlet(s) should be shrouded and unable to have any temporary hand held spray attached. No anti-syphonage arrangements are necessary.

7. USE IN HARD WATER AREAS

If the appliance is used in any area where the temporary hardness exceeds 200 ppm a 'Worcester In-Line' scale inhibitor (available from Worcester Heat Systems Ltd.) should be fitted into the cold supply to the appliance. The water hardness may be determined using a standard test paper or by reference to the Local Water Company.

Installation should be strictly in accordance with the requirements of the local Water Company. An isolating valve to facilitate servicing may be incorporated.

13. ELECTRICAL See Figs. 27, 28 and 29

In order to gain access to the electrical terminal strips refer to Section 3 - Page 4, Removal of Cabinet. Remove the appliance top cover and facia.

ROOM AND FROST THERMOSTATS

If a room or frost thermostat is to be fitted, it should be wired into the appliance terminal strip as shown in Fig. 26. One or both of the blanking plugs should be removed from the electrical cover and the cable passed through the hole.



A Heyco cord strain relief bush, packed separately with these instructions, should be used to retain the cables at this point. The cables should then be clipped into the cable retaining clip fixed to the left hand side panel. Care should be taken that the cables are clipped neatly into place.

MAINS WIRING

The method of connection to the appliance must facilitate the complete isolation of the appliance, preferably via a 3 amp fused three-pin plug and unswitched shuttered socket outlet, both complying with the requirements of BS 1363. Alternatively connection may be made via a double pole isolator with a contact separation of 3mm in all poles and supplying the boiler and system controls only.

Mains Cable: 0.75mm² (24 x 0.20mm) to BS 6500 (80°C). Should the factory fitted mains cable need to be replaced then the new cable should be connected into the terminals marked Live, Neutral and Earth at the left hand side of the appliance terminal strip. The cable should then be passed through the cable clamp located in the left hand side of the electrical cover and clipped into the two cable retaining clips fixed to the left hand side panel. Care should be taken that the cable is clipped neatly into place. The external wiring between the appliance and the electrical supply shall comply with IEE Wiring Regulations, and any local regulations which apply. The appliance must be earthed.

14. COMMISSIONING THE APPLIANCE

- 1. **Primary installation**: Before connecting the appliance to the primary system it must be flushed through with clean water.
- 2. Gas Installation: The whole of the gas installation including the meter shall be inspected and tested for soundness and purged in accordance with the recommendations of BS 6891.

When purging the gas pipework and checking for gas soundness:-

EXTINGUISH ALL NAKED LIGHTS - DO NOT SMOKE - DO NOT OPERATE MACHINERY OR ELECTRICAL EQUIPMENT - FULLY OPEN ALL DOORS AND WINDOWS.







Purge pipework of air by loosening the gas valve inlet union and purging until gas is smelt. Refer to Fig. 31. Tighten the union and check for gas soundness.

- 3. Check that the gas service cock is off and the electrical supply is off. Turn both the appliance thermostat knobs clockwise to maximum and ensure the system controls are calling for heat.
- 4. Open all radiator valves and fill the system, venting as necessary. The appliance is fitted with an automatic air vent on the top of the insulated heat exchanger. Refer to Fig. 24 and Fig. 25. Also sections 10.3 and 11.4. Check for water soundness.
- 5. Drain the heating system and boiler completely and refill the system venting as detailed in Sections 10.3 and 11.4.

NOTE: If the electrical supply to the boiler is interrupted at the isolation switch or a power failure occurs whilst the burners are firing, the boiler will normally re-light automatically when power is restored. However, depending on circumstances, it may be necessary to re-set the overheat thermostat before the boiler will operate. Press the overheat thermostat re-set button (Fig 30).



 Switch electrical supply on at mains socket.
 NOTE: Immediately mains electricity is applied to the boiler the pump delay timer is energised causing the pump to run for about 5 minutes, this occurs whether or not the controls are calling for heat. The pump will subsequently only run in the course of the normal operation of the boiler.



- Position the user's operating switch to HEATING AND WATER. If a programmer is fitted, switch to the 24 HRS programmes. Leave the system to work in a cold state for about 20 minutes, venting as necessary.
- 8. Position the User's Operating Switch to OFF. If a programmer is fitted, switch both hot water and heating selector switches to OFF. Switch the electrical supply off.

- 9. Turn the domestic hot water thermostat to OFF. Turn ON the gas at the gas service cock and switch on the electricity supply.
- Position the users operating switch to HEATING AND WATER or if a programmer is fitted position the two programmes selector switches to 24 hrs setting. Turn the room thermostat if fitted to maximum.

NOTE: A spark will occur until the pilot is alight and sensed by the electronic circuit. The main burner should light automatically and smoothly. Check the pilot shape and size. Refer to item 11 for sizes and method of adjustment. If the pilot and burner will not light contact Worcester Heat Systems Ltd. Service Department.

- 11.
- (a) Check the pilot pipe for gas soundness at the adaptor and gas valve connections using leakage detection fluid.
- (b) Observe the pilot flame. It should be between 20mm and 25mm (0.75in and 1.0in) long and envelope the tip of the spark electrode.



- (c) Position the Users Operating Switch to OFF or if a programmer is fitted, position the two programme selector switches to OFF. Isolate the electrical supply at the mains.
- (d) Loosen the pressure test point screw (Refer to Fig. 31) two turns, and connect a pressure gauge.
- Turn on the electrical supply.
 Position the User Operating switch to HEATING AND HOT WATER, or if a programme is fitted, position selector switches to 24hr setting.
- 13. When switched to **HEATING** and **HOT WATER** the appliance gives priority to HOT WATER SERVICE. The **HOT WATER** service gas pressure is pre-set at 14.3 mbar (5.72in wg) and will not normally require adjustment. The CH service gas pressure is pre-set at 5.8mbar (2.3in wg).

Check the **HEATING** service gas pressure is correct for the heating requirements. Refer to Page 2 - TECHNICAL DATA - Table 1.

Both **HOT WATER** and **HEATING** service gas pressures may be checked and if necessary adjusted using the procedure detailed below. However, the following points should be noted before commencing to adjust pressures.

- (a) The grey plastic cover over the pressure adjustment screws must be removed. Refer to Fig. 31. Place a small screwdriver in one of the slots and lift cap carefully.
- (b) DHW service (HIGH) gas pressure must be adjusted first, to ensure stable ignition of the burner, then HEATING SERVICE (LOW) can be adjusted. Any adjustment of the HIGH pressure setting influences the LOW pressure setting.
- (c) Allow sufficient time between adjustments for pressure to stabilise.

- (d) Never adjust the LOW pressure setting above 14.3mbar (5.72in wg).
- (e) Operate the HIGH/LOW solenoid several times to ensure correct final pressure settings by switching from **HEATING** to **HOT WATER** and back. For programmer models use the ON/OFF thermostats.

14. ADJUSTING DHW (HIGH) GAS PRESSURE Refer to Fig. 31.

- (a) Allow the boiler to fire for at least 10 minutes before making any adjustments.
- (b) Turn the DHW thermostat to maximum. Turn the **HEATING** thermostat **OFF**.
- (c) If DHW service gas pressure needs adjustment refer to TECHNICAL DATA - Page 2 - Table 1. Using a 10mm blade width screwdriver, turn the screw 'A' clockwise to increase and counter-clockwise to decrease pressure until the desired setting is achieved.
- (d) Check several times if main burner ignites smoothly, by operating the DHW thermostat, before proceeding to check the HEATING (LOW) gas pressure.
- 15. ADJUSTMENT OF HEATING (LOW) GAS PRESSURE Refer to Fig. 31.
- (a) Turn the DHW thermostat to **OFF**. Set the **HEATING** thermostat to maximum.
- (b) If the **HEATING** gas pressure requires adjustment refer to TECHNICAL DATA Table 1.
- (c) Using a small screwdriver turn the screw 'B' clockwise to increase and counter-clockwise to decrease pressure until the desired setting is achieved.
- (d) Operate the HEATING thermostat several times to ensure the main burner ignites smoothly before checking that gas valve switches from HIGH to LOW correctly.
- (e) Using the DHW and HEATING control thermostats switch the boiler from HIGH to LOW and back several times to ensure correct gas pressures. Replace the plastic cap 'C'.
- 16. Position the Users' Operating switch to OFF. If a programmer is fitted switch both HOT WATER and HEATING selector switches to OFF. Switch OFF the electrical supply. Turn both appliance thermostats OFF.
- 17. If the HEATING GAS PRESSURE has been changed set the indicator arrow on the data plate to the new setting.
- Disconnect the pressure gauge and tighten the test point screw. Test for gas soundness around the screw when the appliance is re-ignited.
- 19.
- (a) Switch on the electricity supply and position the User's Operating switch to HEATING and HOT WATER. If a programmer is fitted set the selector switches to 24hr setting.
- (b) Set the HOT WATER thermostat to MAXIMUM. The pilot should ignite the main burners smoothly and the boiler should commence to heat the water stored in the heat bank. Once the heat bank has been satisfied the appliance will switch off.
- (c) Turn on any domestic hot water tap to maximum. After a short period the burners will re-ignite. If hot water has not yet reached the tap, wait until it does so, then turn off the tap. The boiler will fire until the heat bank has reheated and switch off.
- (d) Position the User's Operating switch to **HOT WATER**. If a programmer is fitted position the selector switches to **HOT WATER 24hr - HEATING OFF**. Repeat item 19.c. above.
- (e) Position the User's Operating switch to **HEATING** and **HOT WATER**. If a programmer is fitted position the selector switches to 24hr setting.

Set both appliance thermostats to maximum. The boiler will fire and commence to heat up the radiators. Allow to operate for 45 minutes, venting as necessary. Check for water leaks.

IMPORTANT: The complete appliance must be checked for water leaks. Should any leaks be found they must be rectified before proceeding further.

- 20. Position the User's Operating switch to OFF, or if a programmer is fitted switch to OFF. Switch electrical supply off at mains. Set both appliance thermostats to OFF. Drain water from the appliance and the system from the drain points while the water is still hot.
- 21. Refill the appliance and system. Repeat Items 3 and 4 above. Turn **ON** the gas service cock. Repeat Item 19 above.
- 22. Check for correct operation of the User's Controls including the room thermostat (if fitted) and leave set to the customers requirements.

15. SYSTEM GUIDANCE AND BY-PASS ADJUSTMENT

When thermostatic radiator valves are used throughout a system it is possible that on some occasions, flow through the central heating circulating pump will stop, in these cases it is advisable to fit a system by-pass.

A suitable position for the by-pass is shown in Figs. 24 and 25. The by-pass should be connected in 22mm diameter pipe and fitted with a suitable valve to provide adjustment.

To adjust the by-pass the boiler should be operated on hot water and central heating with the thermostatic radiator valves and system by-pass set fully open for at least 45 minutes. With the aid of a contact thermometer, balance the heating system and restrict the by-pass by the minimum amount necessary to give a temperature rise across the flow and return pipes of $15^{\circ}C$ ($27^{\circ}F$).

Alternatively the heating system **must** include one uncontrolled radiator having a minimum heat loss of 0.9kW (3000 Btu/h) under design conditions. The radiators **must** be fitted with two lockshield valves both of which **must** be at least partly open at all times.

16. USER'S INSTRUCTIONS

Hand the users instructions to the user or purchaser for retention and instruct in the efficient and satisfactory operation of the boiler and heating/hot water system.

Advise the user or purchaser of the precautions necessary to prevent damage to the heating/hot water system and to the building in the event of the heating system remaining inoperative during frost conditions.

Finally advise the user or purchaser that for continued efficient and safe operation of the boiler it is important that adequate servicing is carried out at intervals recommended by the Local Gas Region.

Worcester Heat Systems Ltd. will be pleased to discuss and offer a comprehensive maintenance contract.

17. ROUTINE CLEANING AND INSPECTION

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

- 1.
- (a) Carry out a pre-service check and note any operational faults.
- (b) Clean the burner, if necessary.
- (c) Clean the fan, if necessary.
- (d) Clean the heat exchanger, if necessary.
- (e) Clean the burner and pilot injectors, if necessary.
- (f) Check the condition of the spark electrode.
- (g) Check the condition of the combustion chamber insulation and the insulation on the inner face of the baffle behind the control panel.
- (h) HORIZONTAL FLUE SYSTEMS Check the flue terminal is unobstructed and the flue system, including the appliance flue hood and internal connections to the air and flue ducts are sound.
- (j) VERTICAL FLUE SYSTEMS

Check the diverter within the roof space is unobstructed and the flue system, including the appliance flue hood and internal connection to the air and flue ducts are sound and undamaged. Ensure roof space ventilators are unobstructed.

(k) If the appliance has been installed in a compartment check that all ventilators are unobstructed.

IF NECESSARY BRING TO THE USER'S ATTENTION THE NEED TO KEEP ALL VENTILATORS ENTIRELY FREE FROM OBSTRUCTION.

2. PRE SERVICE CHECK

SOME OF THE SERVICING POINTS ARE COVERED MORE FULLY IN THE FOLLOWING INSTRUCTIONS:-

- (a) Operate the appliance and system, noting any faults which may need to be rectified during the service.
 For sealed systems check the operation of the safety valve (pressure relief valve) with the appliance COLD,
 - as follows:-(i) Isolate the electrical supply to the appliance.
 - (ii) Refer to Section 3, Page 4. Remove the appliance front panel and top cover.
 - (iii) Test the valve by grasping and turning clockwise for half a turn, then releasing.
 - (iv) The valve should discharge and then reseat itself without leaking.

If necessary replace the valve as detailed under Section 18 - Replacement of Parts.

NOTE: If the appliance is fitted with a VERTICAL FLUE system undertake a spillage test, at diverter (Fig 3) in accordance with BS 5440:1, upon completion.

CHECK THE EXPANSION VESSEL INITIAL SETTING PRESSURE (COLD) AND ADJUST IF NECESSARY, AS DESCRIBED IN SECTION 10.

(b) WARNING: Disconnect the electrical supply before commencing any servicing. Turn off the gas at the gas service cock.

3. REMOVE BURNER AND PILOT ASSEMBLY

- (a) Remove the front panel by pulling forward at the base and lift up.
- (b) Remove the inner casing by releasing the four M5 screws. (Fig 32b).
- (c) Remove the combustion chamber front cover by releasing the four M5 screws. (Fig 32c).
- (d) Pull the lead off the terminal connector at the pilot electrode. (Fig 32a).
- (e) Disconnect the pilot pipe within the combustion chamber at the adaptor. (Fig 32a).
- (f) Release the two M5 screws securing the burner manifold block. (Fig 32a).
- (g) Push the left hand wall of the combustion chamber to the left slightly and remove carefully the burner and pilot assembly.

NOTE: An 'O' ring seal is recessed into the underside of the manifold block. Replace or renew if damaged on reassembly.







4. SERVICING THE BURNER

(See Fig. 32a)

- (a) Brush the burner top and check the flame ports are clear. Any blockages may be removed using a suitable brush.
- (b) Disconnect the pilot pipe at the underside of the pilot burner bracket (Fig. 36a). Remove the pilot injector. Clean any deposits from the pilot injector by rinsing in warm water or using a suitable brush.
- (c) Clean the pilot shield and pilot burner. (Fig 36a).
 Remove the pilot shield by unscrewing the two M4 screws and nuts. Clean if necessary. Remove the pilot bracket and electrode by unscrewing the remaining M4 screw and nut. Clean if necessary.
- (d) Remove the burner injector. Clean any deposits from the injector and from the burner venturi using a suitable brush. (Fig 35).

NOTE: Do not use a wire brush or any other implement likely to cause damage.

- 5. REMOVE FAN AND FLUE COLLECTOR HOOD ASSEMBLY Refer to Fig. 33.
- (a) Disconnect the fan supply leads at the fan by pulling off the LIVE and NEUTRAL connectors. Polarity is not important.

Disconnect the EARTH lead from the earthing stud on the fan housing by removing the M5 nut.

- (b) Disconnect the two fan sensing tubes from the brass connectors; RHS of the fan scroll outlet and at the left hand side of the flue collector hood.
- (c) Remove the two M5 hexagon head screws and washers at the left and right hand sides of the collector hood back panel.
- (d) Remove the screw and nut attaching the bottom of the baffle behind the control panel to the top of the boiler body. (Fig 32a). Remove the fan sensing tubes and the DHW limit thermostat cable from the clips on the back of the baffle. Lift the baffle up and out of the top of the appliance.



(e) Slacken the four M5 slotted head screws (X) attaching the collector hood to the top of the combustion chamber sufficiently for the hood to be drawn forward about 10mm. (Fig 33)

When the screw heads are at the back of the keyhole slots, lift the rear of the fan/collector hood assembly up first. Rotate the assembly forwards and upwards, clear of the appliance.

6. CLEANING THE FAN

Inspect the fan motor and fan impellor for cleanliness. Any accumulation of dust or fluff should be carefully removed using a soft brush or by blowing. No sharp instruments to be used which may damage the fan motor or fan wheel.

7. CLEANING THE HEAT EXCHANGER

Examine heat exchanger fins from the top and underside. If necessary remove any deposits using the following procedure. Refer to Fig. 34.

- (a) Cover the pilot gas inlet adaptor and the main gas inlet within the combustion chamber.
- (b) Using a suitable brush, clean the inside surface of the heat exchanger and the fins.
- (c) Remove any deposits which fall to the bottom of the combustion chamber.

8. COMBUSTION CHAMBER INSULATION

Examine the combustion chamber insulation. Do not omit the combustion chamber front panel. If damaged replace as instructed under Section 18 - RE-PLACEMENT OF PARTS - Page

9. RE-ASSEMBLY

Re-assemble the boiler as follows:-

- (a) Check the collector hood/fan assembly seals around the fan outlet and the area of contact with the top of the combustion chamber. If necessary replace them.
- (b) Refit the assembly to the top of the combustion chamber. Ensure the four M5 fixing screws are located positively within the keyhole slots.
- (c) Fit loosely the two M5 hex. head screws and washers at the left and right hand sides of the collector hood back panel.

Push the collector hood back until the screws fixing the collector hood to the top of the combustion chamber are engaged in their slots and the fan sealing gasket compressed. Tighten the two H5 hex head screws sufficiently to hold the collector hood in position.



DO NOT OVER-TIGHTEN. Tighten the front M5 fixing screws attaching the collector hood to the top of the combustion chamber.

- (d) Refit the fan sensing tubes and the electrical leads to the fan. DO NOT OMIT THE EARTH CONNECTION TO THE STUD PROVIDED.
- (e) Refit the baffle plate behind the control panel. Check the sensing tubes and dhw limit thermostat cable are routed correctly using the clips fixed to the back of the baffle plate.
- (f) Refit the burner injector to the burner.
- (g) If removed refit the pilot bracket and shield.
- Refit the pilot injector and the pilot supply pipe to the pilot burner assembly making sure that the pilot injector is clean and not blocked. The spark electrode should be replaced if it shows signs of damage or erosion. (See Section 18 - Replacement of Parts).
- (h) Inspect the 'O' ring seal, if there is any sign of damage or deterioriation it must be replaced.
- (j) Refit the 'O' ring seal and the burner into position under the combustion chamber. Ensure the burner is fitted correctly in the rear location, the 'O' ring seal is not displaced and the pilot tubing is not damaged. Secure the burner at the manifold block.
- (k) Reconnect the pilot pipe at the adaptor. Check for tightness at the adaptor and pilot burner connections.
- (I) Refit the ignitor lead to the electrode.
- (m) Replace the combustion chamber front cover and boiler front cover.
- **10. TEST APPLIANCE AND INSTALLATION**
- (a) Turn on the gas supply at the gas service cock and reconnect the electrical supply. Set the three position switch, or programmer, if fitted, to HEATING & WATER or CONTINUOUS.
- (b) Refer to the lighting instructions on the jacket front panel and light the boiler.
- (c) Check for gas soundness and check main burner ignition through the viewing window.
- (d) With the central heating off, check that the domestic hot water operates correctly. When the priority thermostat is satisfied, switch the central heating on and check that the diverter valve operates and supplies hot water to the central heating circuit.

- (e) Set the three position switch or programmer if fitted to OFF.
- (f) Refer to Section 14 COMMISSIONING THE APPLI-ANCE. Follow the procedures required under instructions 11 to 22.
- (g) Before leaving the site the service engineer should ensure no flammable material has been left inside the appliance casing.

18. REPLACEMENT OF PARTS

Refer to Section 3 - REMOVAL OF CABINET and Section 17 - ROUTINE CLEANING AND INSPECTION before proceeding.

WARNING: Disconnect the electrical supply at the mains and turn off the gas at the gas service cock before commencing any further work.

- 1. TO REPLACE BURNER
 - Refer to Fig. 32a, Fig 32b, Fib 32c.
- (a) Remove the front cover, inner front cover and combustion chamber front cover.
- (b) Pull the lead off the push on connector at the pilot electrode.
- (c) Disconnect the pilot pipe within the combustion chamber at the adaptor.
- (d) Release the two M5 screws securing the burner manifold block.
- (e) Push the left hand wall of the combustion chamber to the left slightly and remove carefully the burner and pilot assembly.

Note the 'O' ring seal recessed into the underside of the manifold block. Replace, or renew if damaged, on reassembly.

(f) Remove the main injector (Section 18.2), pilot pipe, pilot injector and complete pilot assembly (Section 17.4) and fit these components to the new burner and re-assemble in reverse order.

2. TO REPLACE THE MAIN INJECTOR

- (a) Remove the burner assembly as described in Section 1.
- (b) Remove the main injector from the burner (Fig 35).
- (c) Reassemble the main burner and injector using new or existing components as necessary. Use a little jointing compound.



3. TO REPLACE THE PILOT BURNER, PILOT SHIELD, SPARK ELECTRODE AND/OR PILOT INJECTOR (Fig 36a)

(a) Remove the burner assembly as described in Section 1.

(b) Disconnect the pilot pipe from the pilot burner and remove. The pilot injector may now be removed, it may be necessary to carefully ease the injector free.

- (c) Reassemble using new or existing components as necessary.
- (d) Release the hexagon nut securing the spark electrode to the pilot assembly and remove.
- (e) Reassemble using new or existing components as necessary. Check that the spark gap is 2.0-2.5mm (0.08-0.1in) (Section 14.11b).
- (f) Remove the two M4 screws and nuts securing the pilot shield to the pilot bracket.
- (g) Reassemble using a new or existing component as necessary.



- 4. TO REPLACE THE ELECTRODE LEAD Refer to Figs. 32a, Fig 36a, Fig 37.
- (a) Remove the appliance front cover top cover and inner front cover.
- (b) Pull the lead off the terminal connector at the spark electrode. (Fig 32a).
 Pull the lead off the terminal connector at the sequence control board (Fig 37).
- (c) Remove the sealing cover, one M5 hex headscrew (Fig 32a).
- (d) Remove the two re-usable plastic cable clamps attaching the electrode lead to the pilot pipe. Remove the lead from the boiler by passing one end through the sealing cover and the other through the plastic grommet in the control panel base.
- (e) Fit a replacement lead and reassemble in reverse order.

Ensure the lead is correctly routed, clamped to the pilot pipe and not twisted.

5. TO REPLACE THE FAN

Refer to Fig. 33

- (a) Remove the fan and collector hood assembly by following the procedure under Section 17 - Routine Cleaning and Inspection, Subsection 5. Remove the fan sealing gasket (Fig 36b).
- (b) Slacken the screw (A) at the top of the fan outlet, fixing it to the collector hood back panel. (Fig 33).
- (c) Remove the three slotted head screws fixing the fan housing to the top of the collector hood. The screws are positioned on the underside of the top panel. (Fig 36b).
- (d) Fit a new fan and reassemble in reverse order. Refer to Section 17 - Subsections 9a to 9e.
- TO REPLACE THE SEQUENCE CONTROL BOARD Refer to Fig. 37.
- (a) Remove the appliance front cover, top cover and facia (Section 3).



- (b) Pull the spark electrode cable off the electrical connection, at the top right hand corner of the sequence control board.
- (c) Disconnect the four Molex plugs.
- (d) Release the plastic catch on the end of each mounting post pulling the printed circuit board forward approximately 3mm to prevent the plastic catch from returning.
- (e) Pull the board off the remainder of the mounting plate until it is free.
- (f) Locate the new board over the four mounting posts and push back squarely until the plastic catch on the end of each post clicks into place.
- (g) Reassemble in the reverse order and ensure:
 - (i) The spark electrode is connected to the terminal at the top right hand corner of the sequence control board.
 - (ii) The Molex plugs are fitted to the correct terminals. Plugs are not interchangeable and will only fit the socket they were removed from.



7. TO REPLACE THE FAN PRESSURE SWITCH Refer to Fig. 37.

(a) Remove the appliance front panel, top cover and facia.

Pull off the two flexible tubes from the top (Section 3) of pressure switch.

 $\ensuremath{\mathsf{Pull}}$ off the three electrical connections from the bottom of the pressure switch.

Remove two M5 screws holding the pressure switch to the control panel and remove the switch.

Replace the new fan pressure switch in the reverse order and ensure:

- (i) The three electrical connections are made to the correct terminals (Fig 28).
- (ii) The flexible tube ends are marked + and and must be connected to the correct pressure points on the pressure switch (+ to rear).

8. TO REPLACE THE CENTRAL HEATING OVERHEAT THERMOSTAT

- (a) Remove the appliance front panel, top cover, inner casing and facia. (Section 3) (Fig 32c).
- (b) Remove the hex head screw, attaching the bottom of the baffle plate behind the control panel to the top of the boiler. (Fig 32a). Remove the fan sensing tubes and dhw limit thermostat cable from the clips behind the plate. Lift the plate up and out of the top of the appliance.
- (c) Remove the split pin from the end of the overheat thermostat phial pocket. (Fig 34).
- (d) Remove the sealing cover through which the thermostat capillary tube passes by unscrewing the M5 hexagon head retaining screw. (Fig 34).
- (e) Remove the thermostat phial from its pocket and feed it out of the exposed hole at the top right hand side of the boiler casing.
- (f) Pull off the two electrical connectors at the thermostat. Polarity is not important. (Fig 37).
- (g) Remove the thermostat centre post fixing nut and washer situated under the control panel.

Ease the thermostat out of its locating hole.

- (h) Disconnect the electrode lead from the terminal at the top right hand side of the sequence control board. Withdraw the lead through the plastic grommet in the bottom of the control panel. (Fig. 37).
- (j) Pass the capillary tube and thermostat phial up through the grommet. The thermostat can then be removed and renewed.
- (k) Replace with a new thermostat in reverse order, ensuring:-
 - (i) The split pin is replaced.
 - (ii) The sealing cover is correctly replaced.
 - (iii) Any surplus capillary tube is coiled neatly, OUT-SIDE the control panel and combustion chamber, ie in the space below the control panel.
 - (iv) The electrode lead is reconnected.

NOTE: During manufacture thermal grease is smeared inside the thermostat phial pocket and may be left.

9. TO REPLACE THE THREE POSITION SWITCH OR PROGRAMMER

Remove the appliance front panel, top cover and facia. (Section 3).

Separate the push-on connections from the rear of the switch/programmer.

3-POSITION SWITCH (Fig 38)

- (i) Squeeze together the two plastic retaining lugs and remove the switch from the front of the facia.
- (ii) Snap in the replacement switch and with the aid of the wiring diagram (Fig 29) connect the push-on connections. Refit the facia and cabinet panels.





THE PROGRAMMER (Fig. 39)

- Remove the four M4 pozidrive screws holding the programmer retaining brackets to the facia and remove the programmer.
- (ii) Refit the replacement programmer and reassemble in reverse order.

10. TO REPLACE THE SUPPRESSOR

Refer to Fig 40.

- (a) Remove the appliance front panel top cover and facia. (Section 3).
- (b) Remove the two M5 hex. head screws, positioned under the LHS of the control panel, which fix the thermostat mounting plate in position. Lift the plate gain access to the suppressor.
- (c) The suppressor is located below the terminal strips and is held by a 'P' clip secured by a screw. Loosen the screw and ease the suppressor clear of the 'P' clip.



- (d) Disconnect the suppressor leads from the terminals N2 and 7 on the terminal strip and remove.
- (e) Replace with a new suppressor and reassemble in the reverse order. Refer to wiring diagram (Fig 28).

11. TO REPLACE THE DHW OVERHEAT THERMOSTAT Refer to Fig. 33.

- (a) Remove appliance front panel and top cover. (Section 3).
- (b) Disconnect the thermostat leads at the terminal strip in the left hand side of the control panel (4 and 5). Refer to the wiring diagram (Fig. 28) to ensure that the correct leads are disconnected. Do not leave any leads loose in the control box.
- (c) Release the strain relief bush by compressing the loose section of the bush and carefully withdraw the leads from the control box.
- (d) Remove the dhw overheat thermostat and fan sensing tubes from the from the support clips on the back of the baffle plate behind the control panel.
- (e) Remove the two M3 taptite screws holding the overheat thermostat to the flow pipe.
- (f) Fit a new thermostat and reconnect ensuring that the strain relief bush has been replaced. Refer to the electrical wiring diagram (Fig. 29) to ensure the correct connections are made.
- (g) Ensure the thermostat cable and fan sensing tubes are clipped correctly to the back of the baffle plate.

NOTE: When fitting a replacement thermostat it is important to ensure that no foreign matter is present on the contact surfaces of both the thermostat and the mounting bracket. During manufacture thermal grease is smeared on the surfaces and may be left.



12. TO REPLACE THE DHW CONTROL THERMOSTAT

- (a) Remove the appliance front panel, top cover and facia. (Section 3).
- (b) Using a pair of long nose pliers pull the retaining clip from the thermostat pocket adjacent to the DHW inlet pipe on the top of the heat bank at the rear and remove the thermostat phial. (Fig 44).
- (c) Remove the two M5 hex head screws, positioned under the LHS of the control panel, which fix the thermostats mounting plate in position. Draw the plate forward as far as possible. (Fig 40) (Fig 41).
- (d) Remove the central clamping nut and washer.

- (e) Prise off the two electrical connections from the rear of the thermostat.
- (f) Push the thermostat body back to disengage the spindle from the mounting bracket.
- (g) Withdraw the thermostat threading the capillary through the plastic grommet in the rear of the electrical control box.
- (h) Fit the new thermostat and reassemble in the reverse order. The capillary of the replacement thermostat must be positioned at the top (Fig 41) and must be uncoiled to assist its passage through the control box opening. With the thermostat in position the excess capillary must be recoiled, without tight bends, and positioned so that it is behind the control panel but not in contact with any hot surface. Ensure that the retaining clip is replaced into the thermostat pocket.
- (j) Refit the two push on electrical connectors at the rear of the thermostat. Polarity is not important.

NOTE: During manufacture thermal grease is smeared inside the thermostat phial socket and may be left.

13. TO REPLACE THE CENTRAL HEATING CONTROL THERMOSTAT

- (a) Remove the appliance front panel, top cover and facia. (Section 3).
- (b) Using a pair of long nose pliers pull the retaining clip from the thermostat pocket situated in the flow pipe and remove the thermostat phial. (Fig 42).
- (c) Remove the two M5 hex. head screws positioned under the LHS of the control panel which fix the thermostats mounting plate in position. Draw the plate forward as far as possible. (Fig 40) (Fig 41).
- (d) Remove the thermostat central clamping nut and washer.
- (e) Remove the two electrical connections from the rear of the thermostat.
- (f) Push the thermostat body back to disengage the spindle from the mounting bracket.
- (g) Withdraw the thermostat threading the capillary through the plastic grommet in the rear of the electrical control box.
- (h) Fit the new thermostat and reassemble in the reverse order. The capillary of the replacement thermostat must be positioned at the top (Fig 41) and must be uncoiled to assist its passage through the control box opening. With the thermostat in position the excess capillary must be recoiled, without tight bends, and positioned so that it is behind the control panel but not in contact with any hot surface. Ensure that the retaining clip is replaced into the thermostat pocket.



(j) Refit the two push on electrical connectors at the rear of the thermostat. Polarity is not important.

NOTE: During manufacture thermal grease is smeared inside the thermostat phial pocket and may be left.

- 14. TO REPLACE THE RELAY Refer to Fig. 37
- (a) Remove the appliance front panel, top cover and facia. (Section 3).
- (b) Ease the relay from the base by pulling to the right horizontally.
- (d) The new relay will fit in one direction only. Push the relay into the base until fully located. Do not force it into place. Reassemble in reverse order.
- 15. TO REPLACE THE PUMP DELAY TIMER BOARD Refer to Fig. 40 and Fig 41.
- (a) Remove the appliance front panel, top cover and facia. (Section 3).
- (b) Remove the two M5 hex. head screws positioned under the LHS of the control panel, which fix the thermostat's mounting plate in position. Move the plate forward to facilitate access.
- (c) Release the plastic catch on the end of each mounting post pulling the printed circuit board back approximately 3mm each time to prevent the plastic catch from returning. It may be necessary to use an electrical screw driver to assist in releasing the catches.
- (d) Pull the board off the mounting posts.
- (e) Disconnect the electrical connections at the terminal strip.
- (f) Locate the replacement board, with the leads at the top, over the four mounting posts and push back squarely until the plastic catch on the end of each post clicks into place.
- (g) Reconnect the leads with the aid of the wiring diagram (Fig. 28). It is important to reconnect the leads correctly.

Reassemble in reverse order.

16. TO REPLACE THE GAS VALVE Refer to Fig. 31 and Fig. 43.

- (a) Remove the appliance front panel. Remove the kick strip below the door by releasing the five screws (Section 3) (Fig 32b).
- (b) Remove the two plastic clips attaching the electrode leade to the pilot pipe.
 Disconnect the pilot pipe at the adapter and gas

Disconnect the pilot pipe at the adapter and gas valve. (Fig 43).

(c) Unscrew the retaining screws from the solenoid electrical connection plugs then pull each plug off of its respective set of terminals.

NOTE: the plugs are dissimilar and therefore not interconnectable.

- (d) Release the inlet gas union connection at the gas service cock. (Fig. 43).
- (e) Remove the four M5 hex. head screws securing the right hand gas line flange connection and withdraw the valve out of the front of the appliance. (Fig. 43).
 - Remove the flange sealing washer. Renew on assembly.
- (f) Remove the female half of the brass union connector from the iron male/female elbow fixed to the gas valve inlet tapping.
- (g) Using an approved jointing compound complying with BS 5292 fit the female half of the brass union to the male/ female elbow supplied and fitted to the replacement gas valve inlet tapping.
- (h) Fit the new gas valve and reassemble in reverse order, taking care to renew the flange washer.
- Turn on the gas supply at the gas service cock. Check for gas soundness and undertake the commissioning procedure in accordance with Section 14.

17. TO REPLACE THE CIRCULATING PUMP

- (a) Remove the appliance front panel and top cover. (Section 3).
- (b) Turn off the isolating valves mounted on the inlet and outlet of the pump. Refer to Fig 44.
- (c) Undo the two union nuts and remove the pump from between the pipework.

NOTE: A residue of water will remain in the pump.

(d) Remove the two screws holding the electrical cover on the pump and disconnect the electrical leads. Refer to diagram below.

(e) Install a replacement circulating pump with new sealing washers.

NOTE: The direction flow indicator on the circulating pump should point towards the rear of the boiler. The replacement pump, should be set at maximum speed if an adjuster is fitted.

18. TO REPLACE THE DIVERTER VALVE

Follow the procedure to remove the heat exchanger (Section 21) up to and including item 21(h).

NOTE: A residue of water will remain in the boiler pipework.

- (a) Refer to the appliance wiring diagram. Fig 28.
- Disconnect the diverter valve leads at the terminal strip. Release the cable restraining bush and care-fully withdraw the lead from the control box.
- (b) Undo the three union connections at the valve and the top return pipe union above the valve (Fig 45).
- (c) Remove the return pipe union elbow on top of the valve, before removing the valve.
 - **NOTE**: Some manipulation may be necessary to free the valve from the remaining union stub connections.

- (d) Fit the replacement diverter valve with the manual override lever underneath.
 Refit the top union elbow, the top union and the union at the bottom of the valve body.
 Leave all unions slack at this stage.
- (e) Refit the heat exchanger using new union washers.

- (f) Refit the union at the RHS of the diverter valve and tighten all unions securely.
- (g) Open all radiator valves and fill the system venting as necessary. The appliance is fitted with an automatic air vent on the heat bank. (See Fig 44). (Sections 10 and 11).
- (h) Reconnect the leads at the terminal strip, ensuring that the cable restraining bush has been replaced. When making the electrical connections refer to the wiring diagram. (Fig 28).
- (j) Reassemble the appliance and check the appliance and system operate satisfactorily.

19. TO REPLACE THE DOMESTIC HOT WATER FILTER OR FLOW REGULATOR

NOTE: A flow regulator is not required on a cistern fed hot water supply system. If fitted remove and discard. The filter and sealing washer must be retained.

(a) If the dhw cold supply is direct from the mains turn off the supply to the appliance and release any pressure by opening a dhw tap.

If the supply is from a cistern, turn off the supply to the cistern and drain it down at a dhw tap.

- (b) Remove the front panel and top cover (Section 3). To remove filter or regulator, it is necessary to gain access to the union at the dhw cold inlet of the appliance (Figs 23a and 47) and release it.
- (c) Depending upon the type of system used:-
 - (i) If the central heating is open vented and the safety valve plugged, drain down the central heating system and remove the plug for access.
 - (ii) If the central heating is open vented and the safety valve not fitted access is available.
 - (iii) If the CH system is sealed the primary expansion pipe will be capped. In this case drain down the central heating system. (Drain cock Fig 43). Disconnect the union where the safety valve discharge pipe is attached to the safety valve (Fig 23a) and at the internal expansion feed pipe union (Fig 47). Remove the pipework assembly. Access is now available.
- (d) Disconnect the 15mm union at the $Rc\frac{1}{2}$ ($\frac{1}{2}$ in BSP) compression union elbow fitted to the dhw cold inlet union.
- (e) Disconnect the cold inlet union. Remove the sealing washer, wire filter and plastic flow regulator. It may be necessary to prise the regulator from its housing.
- (f) Fit a new filter/regulator small diameter section first, and reassemble in the reverse order, replacing the fibre sealing washer. No sealing compound should be used.

TO REPLACE THE AUTOMATIC AIR VENT

Refer to Fig 44.

- (a) Drain down the heating and domestic hot water systems. (Drain cock Fig 43).
- (b) Remove the appliance front panel and top cover.
- (c) Working in the space behind the control panel remove the auto air vent using a pair of gland nut pliers through the slot in the bulkhead.
- (d) Fit the replacement air vent using an approved jointing compound.
- (e) Open all radiator valves and re-fill the system, venting as necessary.
- (f) Check that the system operates satisfactorily.

20. THE HEAT BANK

Should the heat bank fail or the domestic hot water heat exchanger within it become scaled up due to its use in a hard water area without suitable water treatment, then Worcester Heat Systems Ltd. Service Department should be contacted who will advise on suitable remedial action.

21. TO REPLACE THE HEAT EXCHANGER

- (a) Remove kickstrip, front panel and top cover.
- (b) Drain down the heating and hot water system. (Drain cock Fig 43).
- (c) Remove the inner casing by releasing the four M5 hex head screws.
- (d) Cover the burner and pilot assembly.
- (e) Slacken the two pozidrive screws retaining the seal at the point where the flow pipe passes through the top of the boiler. (Fig 33).
- (f) Slacken the union at the right hand side of the diverter valve. (Fig 45).

- (g) Release the two heat exchanger union connections (Fig 34). Ease back the pipework and allow the front of the heat exchanger to drop slightly.
- (h) Remove the heat exchanger through the front of the appliance.
- (j) Fit a new heat exchanger and reassemble in the reverse order ensuring that it is correctly seated in its mountings. Do not forget to fit new union washers.
- (k) Open all radiator valves and re-fill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank. (Fig 44) (Sections 10 and 11). Check that the cap is loose.
- Reassemble the appliance. Check that the appliance and system operates satisfactorily.

22. TO REPLACE THE COMBUSTION CHAMBER INSULATION

- (a) Remove the heat exchanger as described under sub-Section 21 above.
- (b) Remove the old insulation pads and replace them, not forgetting the pad fitted inside the combustion chamber front cover.
- (c) Refit the heat exchanger and reassemble in the reverse order ensuring that it is correctly seated in its mountings. Do not forget to fit new washers.
- (d) Open all radiator valves and re-fill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank. See Fig 44. Check that the cap is loose.
- (e) Reassemble the appliance. Check that the appliance and system operates satisfactorily.
- 23. TO REPLACE THE BOILER FRONT COVER INNER CASING SEAL.
- (a) Remove the front panel.
- (b) Remove the inner casing front cover by releasing the four M5 hex head screws. (Fig 32b).
- (c) Remove the damaged sealing strip and fit the replacement strip using silicone adhesive. Check that the strip passes completely around the edge of the inner casing and across the centre with no gaps.
- (d) Refit the inner casing, tightening the screws evenly. Operate the appliance to ensure there are no leaks (inward) around the inner casing seal.
- (e) Refit the front panel.
- 24. TO REPLACE THE SEAL BETWEEN THE COLLECTOR HOOD AND BOILER TOP
- (a) Remove the combined fan and flue collector hood assembly as detailed under Section 17 - Routine Cleaning and Inspection - sub-section 5.
- (b) Remove the damaged sealing strip and fit the replacement strip. Check that the new strip is pressed home evenly around all four sides of the collector hood. Ensure there is no gap where the ends of the seal touch.

Reassemble the appliance in reverse order.

25. TO REPLACE THE FAN OUTLET SEALING GASKET

- (a) Remove the combined fan and collector hood assembly as detailed under Section 17 - Routine Cleaning and Inspection - sub-section 5.
- (b) Remove the damaged seal and fit a replacement seal. Check that the seal is positioned evenly around all four sides of the flue outlet.

26. TO REPLACE THE PRESSURE GAUGE

- (a) Drain down the heating and hot water system. (Drain cock Fig 43).
- (b) Remove the appliance front panel.
- (c) Unscrew the pressure gauge from the heat bank using a 15mm open ended spanner.
- (d) Fit a new pressure gauge. Use a small quantity of jointing compound.
- (e) Open all radiator valves and fill the system, venting as necessary.

27. TO REPLACE THE SEALED SYSTEM PRESSURE VESSEL

- (a) Remove the kick strip by releasing the five screws (Fig 1).
- (b) Remove the front panel.
- (c) Drain down the heating and hot water system. (Drain cock Fig 43).
- (d) Remove the inner casing by releasing the four M5 hex head screws. (Fig 32b).
- (e) Disconnect the pilot pipe at the adaptor and gas valve. (Fig 43).
- (f) Release the two M5 screws securing the burner manifold block. (Fig 32a).
- (g) Release the gas line union connection at the gas service cock. (Fig 43).
- (h) Remove the four M5 screws securing the burner manifold flange to the underside of the burner manifold block. (Fig 43).
- (j) Withdraw the valve, with cables and gas line attached out of the front of the appliance.
 Replace or renew, if damaged, the burner manifold flange gasket on reassembly.
- (k) Release the union connections at the pressure vessel and the heat bank. Remove the short connector pipe complete with drain cock. (Fig 46).
 Remove the remaining half of the ¾R (¾in BSP) x 22mm connector from the base of the heat bank.
- (m) Reassemble the appliance in reverse order. Re-fill the system and check for water and gas soundness. Ensure the appliance and controls operate correctly.

NOTE: An 'O' ring seal is recessed into the underside of the burner manifold block. Replace or renew if damaged.

28. TO REPLACE PILOT VIEWING WINDOW

The pilot viewing window (Fig 32b) is not a serviceable item. If a viewing window needs replacing a complete inner casing front cover can be obtained and fitted.

Refer to Section 19 - Short Parts List.

- (a) Remove the inner casing front cover by releasing the four M5 screws. (Fig 32b).
- (b) Fit a new inner casing front cover.
- (c) Refit the front panel.
- 29. TO REPLACE THE SAFETY VALVE
- (a) Remove the top cover (Section 3(a)).
- (b) Drain down the heating and hot water systems (Drain cock Fig 43).
- (c) Unscrew the safety valve from the connection on the internal expansion/cold feed pipe (Fig 47).
- (d) Fit a new safety valve. In both instances use a small amount of jointing compound.
- (e) Make sure the valve discharges into the tundish below.
- (f) Open all radiators and fill the system, venting as necessary. The appliance is fitted with an automatic air vent on the heat bank. Check that the cap is loose.
- **30. TO REPLACE THE DHW HIGH LIMIT THERMOSTAT** Refer to Figs 30 and 40.
- (a) Remove the appliance front door, top cover, boiler front cover and facia.
- (b) Remove the pozidrive screw, attaching the bottom of the baffle plate behind the control panel to the top of the boiler.

Remove the two M5 hex. head screws behind the baffle plate. Lift the plate up and out of the top of the appliance.

- (c) Remove the clip from the end of the overheat thermostat phial pocket.
- (d) Remove the thermostat phial from its socket and feed it out of the exposed hole at the left-hand side of the electrical box.
- (e) Pull off the two electrical connectors at the thermostat. Polarity is not important.

Remove the thermostat centre post fixing nut situated under the control panel.

Ease the thermostat out of its locating hole.

Fig. 46

- (f) Replace with a new thermostat in reverse order, ensuring:-
 - (i) The split pin is replaced.
 - (ii) Any surplus capillary tube is coiled neatly, OUTSIDE the control panel, in the space below the control panel.

Key No.	GC No.	Description	Manufacturer's Reference	Qty	WHS Part No.
30	382849	Main Burner	Furigas 156.500.003	1	ZAGAS069
32	382851	Main Burner Injector	Furigas 515.001.000.4.5	1	ZAGAS076
31	378742	Gas Valve	Honeywell VR4601 PA2004	1	ZAGAS133
33	324984	Pilot Burner	Honeywell Q389 Type 27	1	ZBGAS040
34	381702	Pilot Injector	Honeywell Ref. 45.004.108.005	1	ZBGAS045
35	382448	Spark Electrode	Honeywell Ref. 45.003.939.001	1	ZBGAS050
36	324982	Electrode Lead	Vernitron 1100 mm	1	ZBGAS033
166	378034	Pump	Grundfos 15-60	1	ZAMAJ198
106	382854	Diverter Valve	ACL 6798	1	ZAMAJ116
103	395958	Heating Control Thermostat	Ranco CL6 PO128	1	ZAGAS008
102		DHW Control Thermostat	Ranco CL6 PO147	1	ZAGAS207
100		DHW Overheat Thermostat	Elmwood 2455RBU	1	ZAMAJ223
101	385482	High Limit Thermostat	Ranco LM7 P8503	1	ZAMAJ132
109	384542	Suppressor	ITT TS121P	1	ZDELE061
110	386778	3 Position Switch	Arrow 2004E	1	ZDELE237
131	371531	Programmer (Optional)	Worcester Heat Systems	1	ZAMAJ163
104	371402	Pump Delay Timer Board	Pactrol 408401	1	ZAGAS080
105	368289	Relay	Omron MY4	1	ZDELE183
107	324978	Electronic Sequence Board	Vernitron 22507/005	1	ZAGAS055
24	385883	Fan	Sifan Ref. UP114741	1	ZAMAJ047
108	394279	Fan Pressure Switch	Dungs LGW.3A1	1	ZAGAS060
52	382897	Flow Regulator Type E.Lime	Drg. No. 3/5211	1	ZBUNC125
51	324822	Flow Filter		1	ZBUNC230
54	324917	Auto Air Vent		1	ZMMIS055
55	371376	Pressure Gauge	Wika, 0-4 bar, 0-60 psi	1	ZBUNC145
174	386789	Safety Valve	Caleffi 3141	1	ZCVLV018
172	382883	Expansion Vessel	Zilmet Type 541	1	ZMMIS084
16-19	371350-2	Insullation Combustion Chamber		4	ZEINS055-7
23	324949	Collector Hood Seal		1	ZBUNC191
22	371470	Fan Sealing Gasket		1	ZEGAS170
3		Inner Casing Front Cover		1	SSA6252
43	371472	Heat Exchanger Union Washers	Supplied with items 106, 16-19 and 25	2	ZGWSH118
25	371355	Heat Exchanger		1	ZAGAS019
38	368144	Flange Sealing Washer		1	ZEGAS010
39	371473	Burner Manifold Flange Gasket		1	ZEGAS140
37	324883	Burner Manifold 'O' Ring Seal		1	ZDELE241
50	324820	Flow Regulator Union Washer		1	ZGWSH106
	1	DHW High Limit Thermostat	Ranco LM7 P5065	1	ZAMAJ134

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Fig. 48 Short Parts List

NOTE:

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; B: SHORT CIRCUIT; C: POLARITY; D: RESISTANCE TO EARTH - MUST be repeated. ALWAYS check wiring continuity between components before replacing them.

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Worcester Heat Systems Limited, Cotswold Way, Warndon, Worcester WR4 9SW. Telephone: (0905) 754624 Fax: (0905) 754619 Telex: 337193

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PUBLICATION ZKLIT824, ISSUE 2 - JANUARY 1994