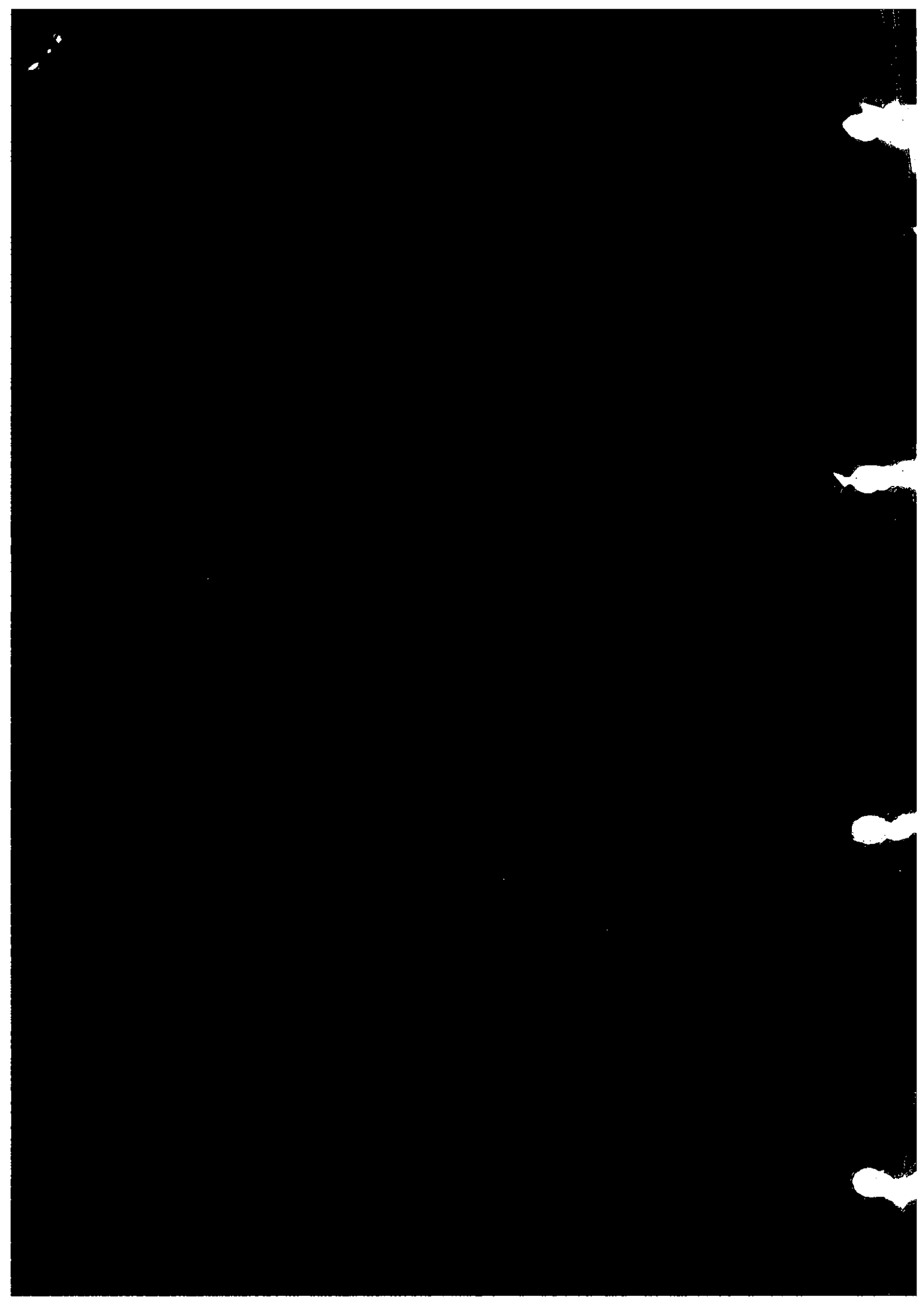
HAMWORTHY

UR 355 and UR 425 Gas Fired Atmospheric Hot Water Boilers



Installation and Servicing Instructions

HAMWORTHY

HAMWORTHY ENGINEERING LIMITED
COMBUSTION DIVISION

Section 1
Introduction

The "Hamworthy" boiler is a cast iron gas fired natural draught boiler with an open flue suitable for central heating and direct hot water supply. It is for use with natural gas only. The boiler is fitted with atmospheric burners, with a permanent pilot and multifunctional control valve. The down draught diverter is integral with the flue hood and situated at the rear of the boiler.

The boiler sections are insulated with aluminium faced mineral wool blankets and the whole encased in an enamelled steel jacket. The controls are located within the jacket, behind a lift-off front panel.

The boiler should be installed on a pumped water circulation system and the pump should run the whole of the time the boiler is operating.

Section 2
Technical Data

TABLE 1

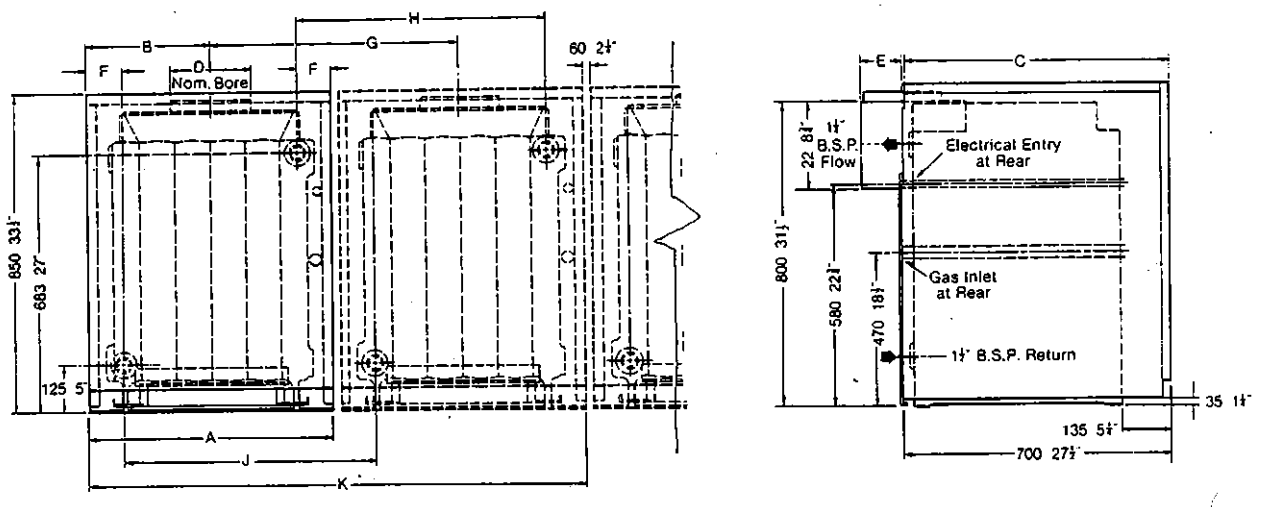
Model	No. of Sections	Heat Input		Heat Output		Connection Size			Injectors		Burner Pressure		Hydraulic (11°C. (20°F.)*	
						Gas B.S.P.	Flue (Nom. Bore)							
		kW	Btu./h.	kW	Btu./h		mm.	in.	No.	Dia. mm.	mbar	ins. WG	Head m.	Head ft.
UR355	7	100·8	343,950	79·1	270,000	1"	200	8	6	3·5	10·2	4·1	0·45	1·4
UR425	8	117·6	401,270	92·3	315,000	1"	200	8	7	3·5	10·2	4·1	0·6	2·0

*At a temperature difference of 11°C (20°F) between flow and return.

Maximum working pressure 50 p.s.i. (3.5 bar).

TABLE 2

Model	No. of Sections	Weight (Empty)		Water Content		Ventilation			
						Low Level		High Level	
		kg.	lbs.	litres	gallons	cm.²	in.²	cm.²	in.²
UR355	7	323·5	713	61·5	13·5	870	135	435	68
UR425	8	364·0	803	69·5	15·3	1020	158	510	79



Outline Dimensions

Single Units

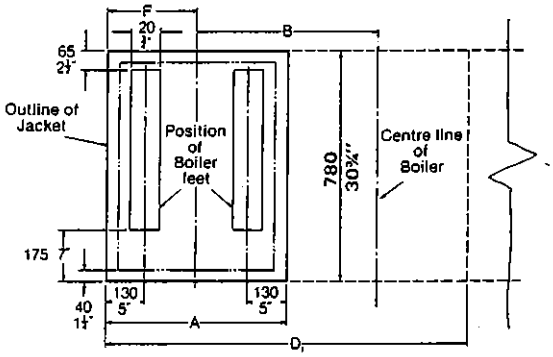
Model	Sects.	A mm.	A in.	B mm.	B in.	C mm.	C in.	D mm.	D in.	E mm.	E in.	F mm	F in.	G mm.	G in.	H mm.	H in.	J mm.	J in.	K mm.	K in.	Flue Gas Volume* @ STP m³/sec.	Flue Gas Volume* @ STP ft³/min.
UR355	7	732	28¾	366	14½	717	28¼	200	8	143	5⅝	90	3½	792	31¼	792	31¼	792	31¼	1524	60	0·0400	85
UR425	8	824	32½	412	16¼	717	28¼	200	8	143	5⅝	90	3½	884	34¾	884	34¾	884	34¾	1704	67	0·0467	99

*e Diverter — Undiluted.

Multiple Units

Select from the following multiples, boilers to achieve your total output requirements, or any combination of single units to match your load pattern.

MULTIPLE BOILERS	TOTAL OUTPUT kW	TOTAL OUTPUT Btu./h. x 1,000	DRY WEIGHT kg	DRY WEIGHT lbs.	WATER CONTENT litres	WATER CONTENT gallons	GAS CONN. ins. B.S.P.	INPUT kW	INPUT Btu./h.	GAS CONSUMPTION m³/h.	GAS CONSUMPTION ft³/h.
2 x UR355	158·2	540	647	1426	123	27	2 x ¾	201·6	687,900	19·48	658
2 x UR425	184·6	630	728	1606	139	30·6	2 x ¾	235·2	802,540	22·72	802
3 x UR355	237·3	810	970·5	2139	184·5	40·5	3 x ¾	302·4	1,031,850	29·32	1032
3 x UR425	276·9	945	1092	2409	208·5	45·9	3 x ¾	352·8	1,203,810	34·08	1203
4 x UR355	316·4	1080	1294	2852	246	54	4 x ¾	403·2	1,375,800	38·96	1376
4 x UR425	369·2	1260	1456	3212	278	61·2	4 x ¾	470·4	1,605,080	45·44	1604
5 x UR355	395·5	1350	1617·5	3565	307·5	67·5	5 x ¾	504·0	1,719,750	48·70	1720
5 x UR425	461·5	1575	1820	4015	347·5	76·5	5 x ¾	588·0	2,006,350	56·80	2005
6 x UR355	474·6	1620	1941	4278	369	81	6 x ¾	604·8	2,063,700	58·44	2064
6 x UR425	553·8	1890	2184	4818	417	91·8	6 x ¾	705·6	2,407.620	68·16	2406



Model	Sects.	A mm.	A in.	B mm.	B in.	C mm.	C in.	D mm.	D in.
UR 355	7	800	31½	792	31¼	400	15¾	1592	62¾
UR 425	8	890	35	884	34¾	445	17½	1774	70

Foundation Details

The boiler(s) should be positioned on a level foundation of non-combustible material such as brick and concrete capable of supporting the weight of the boiler(s) when filled.

Section 3
Installation Requirements

3.1 **General**

The installation of the boiler must be in accordance with the Gas Safety Regulations, Building Regulations, I.E.E. Regulations and the Bye-Laws of the local Water Undertaking.

The installation should also be in accordance with any relevant requirements of the local Gas Region and Local Authority, and the relevant recommendations of the following documents:

B.S. Codes of Practice:

C.P.331:3	Installation of pipes and meters for towns gas low pressure installation pipes.
C.P.332:3	Selection and installation of boilers of 150,000 Btu/h (44kW) to 2,000,000 Btu/h (586kW) output.
C.P.341	300-307. Central heating by low pressure hot water.
C.P.342	1 and 2. Centralised hot water supply.
B.S.5376	Boilers of rated input not exceeding 60kW.
B.S.5449	Forced circulation hot water systems.
B.S.5546	Installation of gas hot water supplies for domestic purposes (2nd family gases).
B.S.5440:1	Flues for gas appliances not exceeding 60kW input.
B.S.5440:2	Air supply for gas appliances not exceeding 60kW input.

British Gas Publications:
"Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters".
"Combustion and Ventilation Air — Guidance Notes for Boiler Installations in excess of 2,000,000 Btu/h (586kW) output.

3.2 **Location**

The boiler should be installed on a level, non combustible surface (see 4.2 Foundation) and positioned to allow a minimum of 250mm (10") on the left and 450mm (18") on the right of the jacket, and 500mm (20") in front for assembly and maintenance. (635mm in front of the boiler body).

3.3 **Gas Supply**

The Local Gas Region should be consulted at the installation planning stage to establish that an adequate supply is available.

An existing service pipe must not be used without prior consultation with the Local Gas Region.

A meter of suitable capacity must be connected.

Installation of pipes should be in accordance with C.P.331:3. The complete installation must be tested for soundness as described in the above Code.

3.4 **Flue System**

The flue system should be in accordance with C.P.332:3 or B.S.5440:1 as applicable and with British Gas Publication "Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters".

The nominal flue size should be not less than that of the boiler flue connection (see Section 2. Table 1) and must be at least equivalent to a vertical height above the boiler outlet of 1m (3' 3"), due allowance being made for any horizontal or inclined length, and consideration being given to the position of the outlet.

The boiler flue hood is not load bearing, and the flue must be supported independently.

On multi-boiler installations a common flue system may be installed, always provided that the cross sectional area of the common flue is at least equal to the sum of the cross sectional areas of all boiler outlets connected to it.

3.5 **Air Supply**

It is important that there are sufficient areas of air inlet and ventilation provided to the boiler room, at least in accordance with C.P.332:3 or B.S.5440:2 as applicable.

For multi-boiler installations in excess of 2,000,000 Btu/h (586kW) output reference should be made to British Gas publication "Combustion and Ventilation Air — Guidance Notes for Boiler Installations in excess of 2,000,000 Btu/h (586kW) output".

The areas given in Section 2 (Table 2) are for sin boilers of the sizes indicated.

3.6 **Water Circulation System**

The water circulation system should be installed in accordance with C.P.332:3 and C.P.342

The flow and return connections must be made to the boiler only at the 1½" BSP tappings provided. No other tappings should be used for this purpose.

The circulation system should be pumped and the pump should run the whole time the boiler is operating. It is recommended that if a time switch is installed to switch off both boiler and pump that provision is made, by means of a time delay or return water thermostat, to run the pump for a period after the burner is switched off.

If three-way mixing or diverting valves are installed in the system they should not be of such a type that the flow through the boiler is totally closed. If such valves are used, a by-pass should be fitted. It is generally recommended that the minimum flow through the boiler is at least 10% of the flow at boiler rating with 11K (20°F) temperature difference.

The minimum imposed head, including the effe the circulating pump should not be less than 2m

3.7 **Electrical Supply**

Wiring external to the boiler must be installed in accordance with I.E.E. Regulations and any local regulations that apply.

The electrical supply should be 220/250V 50Hz and fused at 5amps. A suitable independent fused switch should be installed in a readily accessible position adjacent to each boiler. Single boiler load 15VA (0·06amps).

Further details regarding connection to the electricity supply are given in C.P.332:2.

For wiring instructions see 4.6 Page 9, and wiring diagram (Fig. 4).

Section 4
Installation of Boiler

4.1 **General**
Boilers are normally despatched with the boiler body ready assembled.
The boiler body will be despatched on a wooden pallet with burner assembly attached. A carton will contain the Jacket and Insulation panels, control box and all screws and fixings for assembly. The contents should be checked against the packing list enclosed.
Cut free all strapping holding boiler and burner to the pallet and withdraw the burner assembly before lifting the boiler off the pallet, by releasing the two M6 screws in the burner tray locating brackets.

4.2 **Foundation**
The boiler should be positioned on a level foundation of non-combustible material such as brick or concrete. This should be capable of supporting the weight of the boiler when filled (see Section 2. Table 2). If a raised plinth is provided this should be built to the dimensions given in Section 2.

4.3 **Boiler Connections and Mountings**

4.3.1 Flow and return connections are screwed 1½" B.S.P. The flow connection is at the top rear of the right-hand section (1) and the return connection to the bottom rear of the left-hand section (2). Flow and return connections should only be made to these tappings to ensure the correct water flow through the boiler.

4.3.2 Safety valve and open vent should be connected into the flow pipe close to the boiler, and no valve should be fitted between the boiler and these connections.

4.3.3 Make the ½" B.S.P. M and F elbow (3) into the bottom side tapping of the R.H. end section (1). (A 1¼" x ½" reducing bush (4) is fitted in both side tappings of this section). Face the elbow horizontally to the rear and to this fit the draw-off cock (5).
Screw the thermostat pocket (6) into the top side tapping of the R.H. end section (1) using jointing compound. (The pocket is despatched protecting the thermostat bulbs attached to the control box).

4.3.4 Temporarily plug the flow, return and safety valve tappings. Fill the boiler through the draw-off cock or vent tapping, ensuring the boiler is completely filled. Plug vent tapping and pressurise through draw-off cock to test boiler. Test pressure should be 1½ times working pressure. After testing, drain boiler and remove plugs. Thoroughly flush the boiler before connecting to the system.

4.3.5 Make the flow and return connections to the system. After connecting to the system, thoroughly flush the system and boiler.

4.4 **Assembly Procedure**

4.4.1 Remove the top flue cover (7) from the boiler and check that a flue-way baffle plate (8) is correctly positioned in each flueway.
To remove the top cover (7) release the two M6 screws(9) at each side and the centre screw at the rear in front of the flue outlet. (The side screws need not be removed entirely). Lift cover (7) at the front and pull forwards, taking care not to damage the front sealing gasket (10). When replacing the cover (7) ensure that the side screws engage in the holes in the casting (11).

4.4.2 Position the four insulation panels (12) around the boiler with the aluminium facing outside. The top edge of the front and side panels should be approximately in line with the top of the boiler flue cover. Ensure that the bottom of the side panels do not obscure the side vents in the boiler casting. The bottom of the back panel should be approximately in line with the lower rear tie rods.
Retain the panels in position by passing the larger plastic coated expanding wire (13) around the boiler just above the lower front tie rod and hooking the two ends together.

4.4.3 Position the back jacket panel (14) in position with the flanges towards the boiler. Hook the shorter plastic coated expending wire (15) into the small hole (16) at the top L.H. side of the back panel (14) and pass it round the boiler to retain the insulating panels (12) and hook the other end into the two holes (17) in the R.H. side of the back panel (14).

4.4.4 Screw an M12 (18) nut well down on each end of each front tie rod (19 and 20). Fit the jacket support brackets (21 and 22) on to the tie rods (19 and 20) and secure with a second M12 (23) nut on each rod.
The bracket (21) with the captive nuts (24) should be fitted to the R.H. side. (The brackets should be fitted with the outer flanges pointing upwards). Using the nuts on the tie rods adjust to obtain the correct distance between the outer flanges of the brackets at top and bottom.
The correct distance is 2mm less than the width of the jacket front panel.
Secure the brackets in position by tightening the nuts.

4.4.5 Fit the control box (25), attaching the mounting bracket (26) to the top pair of captive nuts in the R.H. jacket support bracket (21) with M5 set screws (27).
Fit piezo-electric igniter (28) (if supplied) to underside of control box with M5 screws.
Carefully uncoil the capillaries of the two thermostats (29).
Insert the two thermostat bulbs into the thermostat pocket (6), making certain that the steel spring is positioned in the pocket to ensure contact of the bulbs with the pocket wall.
Ensure the bulbs are pushed fully home in the pocket and retain with the spring clip (30) over the capillaries.
Fit the length of 20mm conduit (31) through the control box mounting bracket and the back panel (14) and fit a brass bush (32) each end.

4.4.6 Slide the burner assembly (33) into position, and retain it by tightening the M6 screws (34) in the locating brackets each side. Fit the ¾" gas inlet pipe (35), locating the rear end in the cut out (36) in the back panel (14) and attaching the front end to the R.H. jacket support bracket (21) with the pipe saddle (37) and M5 screws (38). Connect the inlet pipe to the burner assembly at the union (39) and tighten. Plug the lead (40) from the multifunctional control valve (41) into the side of the control box (25). Plug the lead from the ignition electrode (42) (if fitted) into the rear of the piezo-electric igniter (28).

4.4.7 Fit the E.C.O. unit (attached to the control box by two white cables) into the slot of the thermo-couple fitting on the gas control, and retain in position with the thermocouple lead screwed into the fitting.

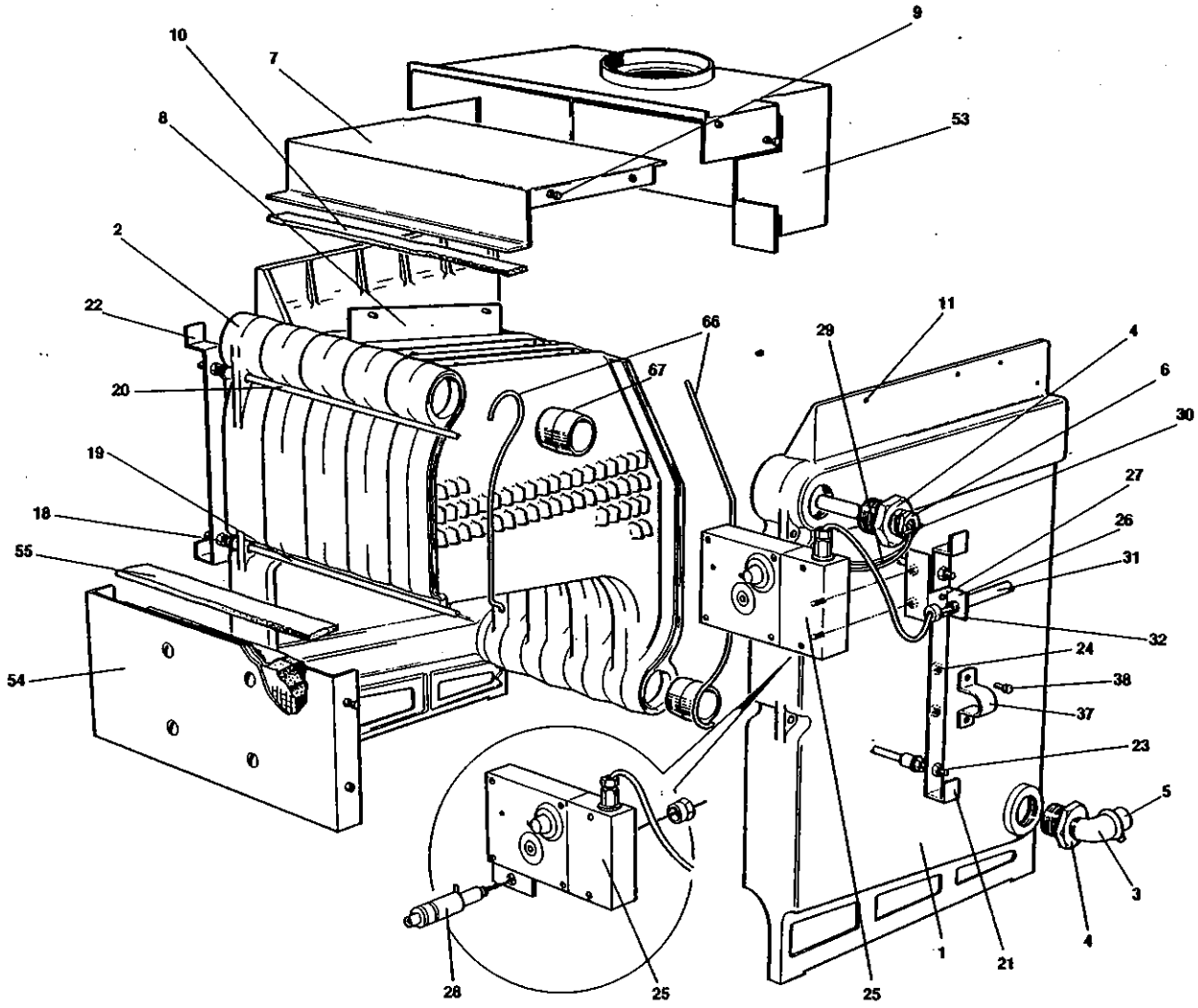


FIG. 1

BOILER ASSEMBLY

Key

No. Description

1. End Section R.H.
2. End Section L.H.
3. ¼" B.S.P. M. & F. Elbow.
4. 1¼" x ¼" B.S.P. Bush.
5. Draw-off Cock.
6. Thermostat Pocket.
7. Top Flue Cover.
8. Baffle.
9. M6 x 20 Screw.
10. Top Cover Seal.
   Locating Holes.
   M12 Nut.
19. Lower Front Tie Bar.
20. Upper Front Tie Bar.
21. Jacket Support Bracket R.H.
22. Jacket Support Bracket L.H.
23. M12 Nut.
24. M5 Captive Nut.
25. Control Box.
26. Control Box Bracket.
27. M5 x 10 Screw.
28. Piezo-Ele[illegible] Ingniter.
29. Thermos[illegible]apillaries.
30. Capillary Clip.
31. Conduit.
32. Conduit Bush.
37. Pipe Saddle.
38. M5 x 10 Screw
53. Diverter.
54. Insulated Front Plate.
55. Front Plate Seal.
66. Sealing Strip.
67. Steel Nipple.

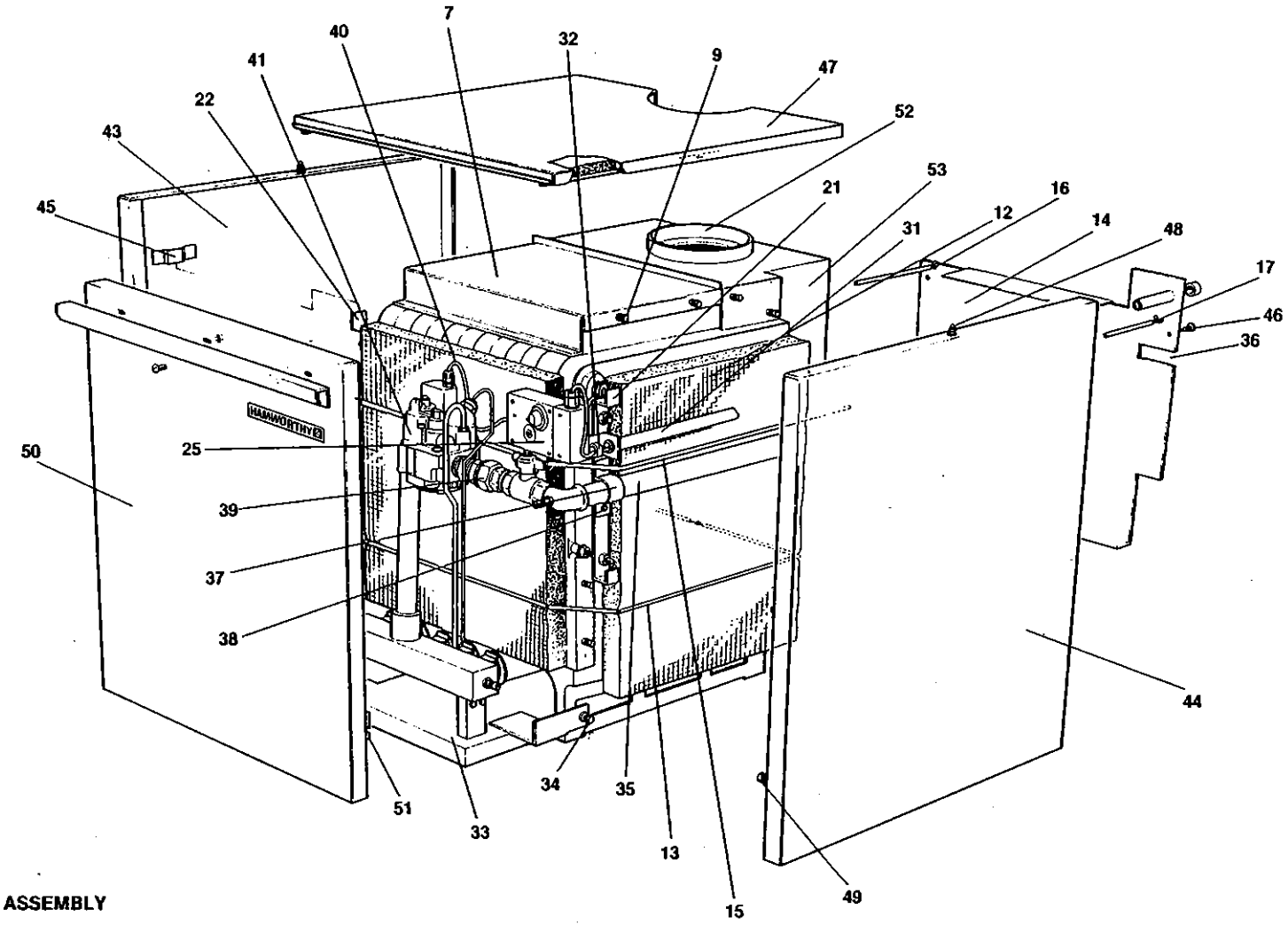


FIG. 2

JACKET & INSULATION ASSEMBLY

Key

No. Description

7. Top Flue Cover.
9. M6 x 20 Screw.
12. Insulation Panel.
13. Lower Insulation Wire.
14. Back Panel.
15. Top Insulation Wire.
16. Top Wire Attachment L.H.
17. Top Wire Attachment R.H.
21. Jacket Support Bracket R.H.
22. Jacket Support Bracket L.H.
25. Control Box.
31. Conduit.
32. Conduit Bush.
33. Burner Assembly.
34. M6 x 20 Screw.
35. Inlet Gas Pipe.
36. Cut-out for Gas Pipe.
37. Pipe Saddle.
38. M5 x 10 Screw.
39. Union.
40. Plug-in Control Cable.
41. Multifunctional Control Valve.
43. Side Panel L.H.
44. Side Panel R.H.
45. Side Panel Clip.
46. S/T. Screw.
47. Top Panel.
48. Plastic Clip.
49. M6 x 20 Screw.
50. Front Panel.
51. Front Panel Clip.
52. Flue Socket.
53. Diverter.

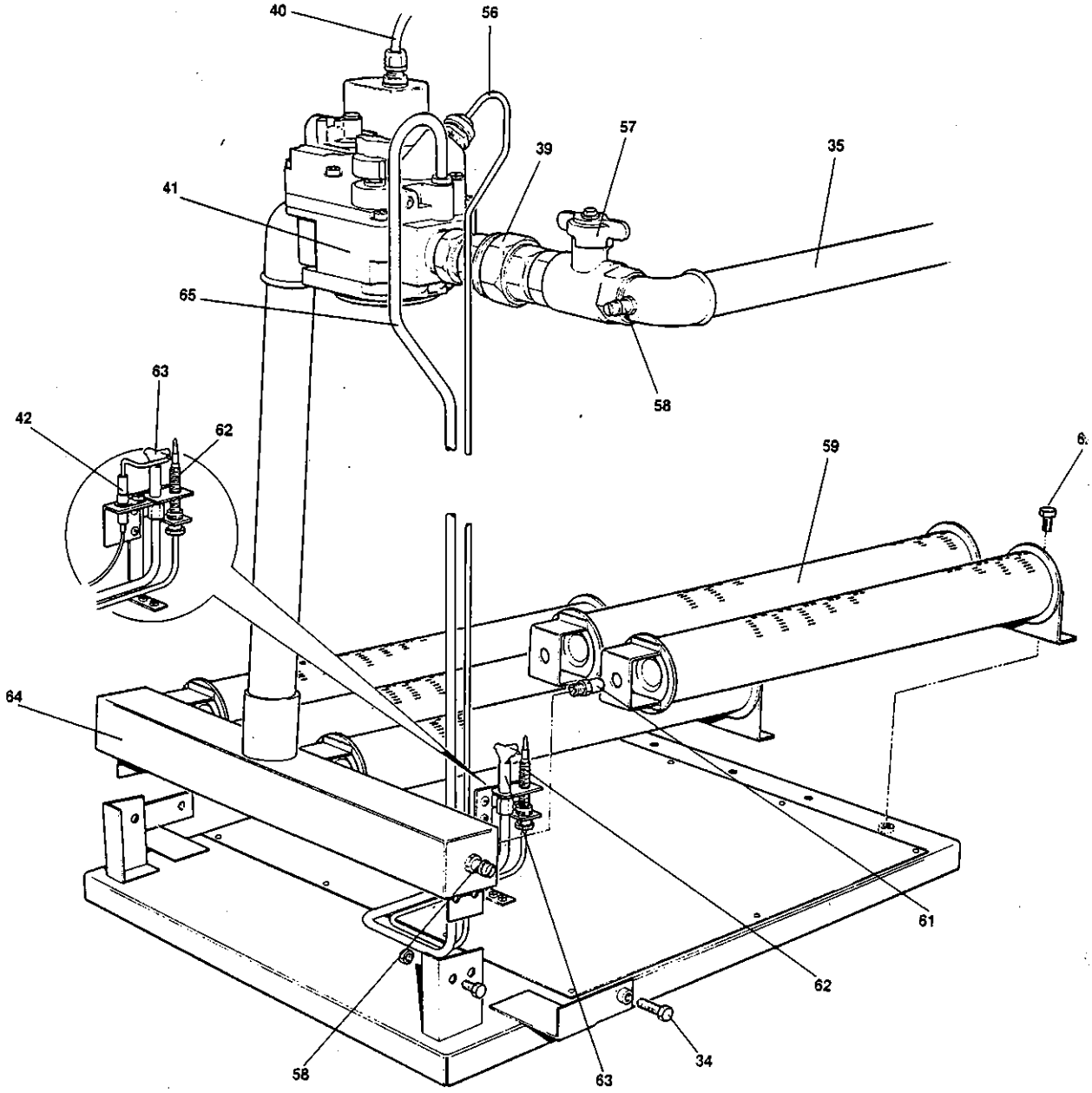


FIG. 3

BURNER ASSEMBLY

Key

No.	*Description*		
34.	M6 x 20 Screw.	58.	Pressure Test Nipple.
35.	Inlet Gas Pipe.	59.	Burner Bar.
39.	Union.	60.	M5 x 10 Screw.
40.	Plug-in Control Cable.	61.	Injector.
41.	Multifunctional Control Valve.	62.	Thermocouple.
42.	Ignition Electrode.	63.	Pilot Burner.
56.	Thermocouple Lead.	64.	Manifold.
57.	Gas Cock.	65.	Pilot Gas Pipe.

4.4.7 Fit the jacket side panels (43 and 44), engaging the clips (45) over the support brackets (21 and 22). Attach the back panel (14) to the rear flange of the side panels (43 and 44) with self-tapping screws (46). Fit the top panel (47) in position, locating it on the plastic clips (48) in the side panel top flanges. Screw an M6 x 20 hex. head screw (49) into the captive nut in the front flange of each side panel (43 and 44). Leave the screw projecting approximately 16mm (⅝"). Fit a nut to the screw inside the flange and lock in position.
Fit the jacket front panel (50), locating the lower brackets (51) over the screws (49) in the side panel and hooking the top edge over the lip on the top panel (47).

4.5 **Flue Connection (see also 3.4)**
The boiler flue outlet (52) is sized to accept heavy gauge asbestos flue piping, as indicated in Table 1. The outlet will also accept sheet metal flue pipe if required.
The draught diverter (53) is integral with the boiler, and no additional diverter is required.
The flue pipe should be sealed to the boiler outlet using a suitable caulking string and caulking compound.
The boiler flue outlet is not load bearing and the flue pipe should be independently supported.

4.6 **Electrical Connections — (Wiring Diagram)**
The mains electrical supply should be taken from a fused switch (fused at 5amps) through the 20mm conduit (31) and connected to the terminals (L.N. and earth) in the control box (25) within the jacket. Any additional controls (i.e. time switch, room thermostat, etc.) may be connected in the incoming line between the fused switch and the boiler control box terminals.
The length of the conductors between the cable anchorage and the terminals must be such that the current-carrying conductors become taut before the earthing conductor if the cable slips out of the anchorage.
The control box must be effectively earthed.
All external wiring must be installed in accordance with I.E.E. Regulations.
Incoming cables should be suitable for a service temperature of 70°C. and 6amp load and not less than 0·75mm² cross sectional area.

4.7 **Gas Connection**
The size of the gas supply must be at least ¾" N.B. and due consideration should be made to the length of pipe run from the meter and the gas consumption of the boiler in determining the size.
For correct operation of the boiler a minimum gas pressure of 17·5 mbar (7·0" w.g.) should be available at the appliance inlet with the boiler (or with all boilers, if more than one) in operation.
All dirt, swarf, etc., should be removed from the gas supply lines before the final connection is made.
The gas line should be purged of air, and tested for soundness as described in C.P.331:3.

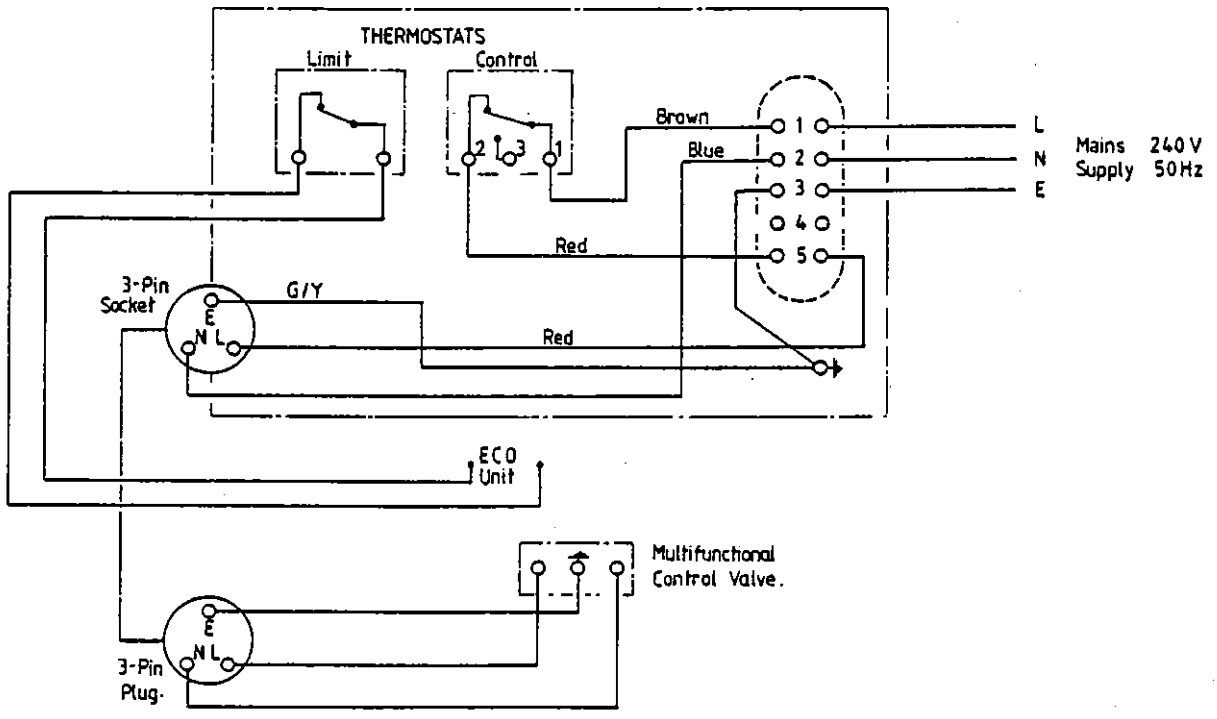


Fig. 4

Section 5
Commissioning and Testing

Note: Before attempting to commission the boiler, CHECK THE FOLLOWING:

5.1 **Electrical**
Electrical supply is switched off.
All electrical connections are sound and correctly made.
Electrical system is correctly earthed.

5.2 **Gas Supply**
Gas supply is purged of air and tested for soundness as described in C.P.331:3.
Appliance gas cock and cock on gas control are turned off.
Gas supply is turned on at meter.

5.3 **Water**
Boiler and system have been flushed through and are filled and circulating pumps operating.
Flow and return valves are open.

5.4 **To Light Boiler**

5.4.1 Turn on main gas cock.

5.4.2 Turn knob on gas control to PILOT Position (marked ★).

5.4.3
(a) **Manual Ignition**
Apply a lighted taper to the pilot burner, and push down the knob on gas control. Keep knob fully pushed down for about 20 seconds after the pilot lights, then release knob and check that the pilot remains alight. If the pilot flame goes out, push in the knob slightly and turn clockwise to the OFF Position (marked ●). Wait 3 minutes and repeat from 5.4.2.

(b) **Piezo-Electric Ignition**
Push down the knob on gas control, and with knob held down, press in and release igniter button (grey) two or three times. Check if pilot is alight and keep knob on gas control fully pushed down for about 20 seconds after pilot lights, then release knob and check that the pilot remains alight. If the pilot flame goes out, push in knob slightly and turn clockwise to OFF Position (marked ●).
Wait 3 minutes and repeat from 5.4.2.

5.4.4 When pilot is established, set thermostat to required temperature and depress reset button on the control box to ensure overheat cut-off device is "made".

5.4.5 Connect pressure gauge to manifold test point.

5.4.6 Turn knob on gas control anti-clockwise to the ON Position (marked ◊).

5.4.7 Switch on electricity supply and main burners will light.
The gas control is fitted with a slow opening valve and may take several seconds to fully open. Check that this is so.

5.4.8 Check main burner pressure. Correct setting is 10·2mbar (4·1" w.g.).
Adjust pressure on gas control if necessary.
(Adjusting screw is under screw cap to left of control knob).
Burner pressure should be rechecked after about 30 mins. operation and re-adjusted if necessary.

5.4.9 Switch off electricity supply. Check that main burners are extinguished. Remove pressure gauge and replace sealing screw in test point.

5.5 **Relight main burners and check the following:**

5.5.1 Test for gas soundness around components using soap solution.

5.5.2 Check that there is no spillage of products of combustion from draught diverter. A suitable test is detailed in B.S.5440 Pt.1 Appendix B.

5.5.3 Check appearance of flames to ensure there is adequate air for combustion. (This check should be made after at least 30 mins. operation).
Flames should be stable, not lifting off the burners, and mainly blue with only slight yellow tips.

5.5.4 Check boiler thermostat for correct operation.

Section 6
Servicing

Before servicing the boiler, switch off electricity supply, push in the gas control knob and turn clockwise to the OFF position. Turn off main gas cock.

6.1 **To withdraw Burner Assembly**

6.1.1 Remove jacket front panel.

6.1.2 Slacken off M6 screws retaining burner assembly at each side of burner base.

6.1.3 Unplug lead from gas control at control box, and lead from igniter (if fitted). Disconnect thermocouple lead and remove E.C.O. from gas control.

6.1.4 Disconnect main gas line at union.

6.1.5 Withdraw burner assembly.

6.2 **To clean boiler**

6.2.1 Withdraw Burner as in 6.1.

6.2.2 Remove jacket top panel.

6.2.3 Remove top flue cover by releasing the two M6 screws each side and the top centre M6 screw at the rear in front of the flue outlet. Lift front and pull forwards, taking care not to damage the front sealing gasket. When replacing the cover, ensure that the side screws engage in the holes in the casting.

6.2.4 Lift out flue way baffles.

6.2.5 Clean boiler flueways from top with 1" flue brush. After cleaning, sweep all debris from under boiler.

6.3 **To clean Main and Pilot Burners**

6.3.1 Withdraw burner assembly as in 6.1.

6.3.2 Release M5 screws holding burners to base tray and withdraw burners off injectors.

6.3.3 Clean burners by brushing down with a stiff bristle brush.
Check each burner to ensure that all the flame ports are clean and free of any deposits.

6.3.4 Check all main burner injectors and clean if necessary.

6.3.5 Remove pilot burner assembly complete by releasing two M5 screws holding it to the base tray.

6.3.6 Unscrew the compression union connecting the aluminium gas line to the pilot burner, taking care not to lose the pilot injector which is retained in position by the compression union.

6.3.7 Clean the pilot burner and thermocouple with a soft lint-free rag. Ensure that the hole in the injector is clear. Replace injector if damaged (see 7.3).

6.3.8 Examine the thermocouple tip, and if shows signs of deterioration it should be replaced (see 7.3)

6.3.9 Examine the ignition electrode (if fitted). Carefully clean the electrode and ceramic insulator. If this shows signs of deterioration it should be replaced (see 7.3).
Check electrode spark gap (see Fig. 5).

6.4 **Reassembly**
Reassembly is a reversal of the above procedures. Care should be taken to ensure the following:

(a) Pilot injector is inserted in pilot burner.
(b) Thermocouple connection to control valve is tight.
(c) All main burners are correctly located on the injectors and secured in position.
(d) Burner assembly is pushed fully into position, and retaining screws tightened.
(e) All flueway baffles are in position.
(f) When replacing top cover, that the side screws engage in the casting.
(g) That all gas connections are tight.

6.5 **Recommission** boiler as described in Section 5.

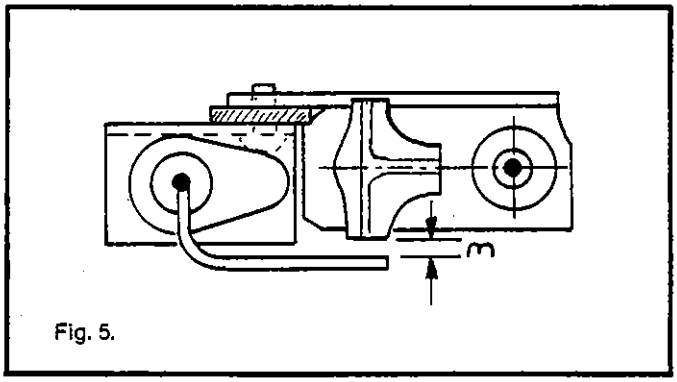


Fig. 5.

Section 7
Component Replacement

7.1 **To replace Gas Control Valve**

7.1.1 Withdraw burner assembly as described in 6.1.

7.1.2 Disconnect pilot line from gas control valve.

7.1.3 Disconnect thermocouple lead from gas control valve.

7.1.4 Remove terminal cover from gas control valve and disconnect cables.

7.1.5 Unscrew gas control valve from outlet elbow.

7.1.6 Unscrew union from gas control valve inlet.

7.1.7 Fit union to new gas control valve, using suitable jointing compound.

7.1.8 Fit gas control valve to outlet elbow, using suitable jointing compound.

7.1.9 Connect pilot line and thermocouple lead to new gas control valve.

7.1.10 Reconnect wiring to new gas control valve and refit terminal cover.

7.1.11 Refit burner assembly in boiler.

7.1.12 Recommission as described in Section 5.

7.2 **To replace a Main Burner**

7.2.1 Withdraw burner assembly as described in 6.1.

7.2.2 Release M5 screw holding burner to base tray, and withdraw off injector.

7.2.3 Fit new burner and secure with M5 screw.

7.2.4 Refit burner assembly in boiler.

7.2.5 Recommission as described in Section 5.

7.3 **To replace Pilot Burner, Thermocouple or Electrode**

7.3.1 Withdraw burner assembly as described in 6.1

7.3.2 Remove main burners either side of pilot burner and release pilot burner as described in 6.3.1 to 6.3.6.

7.3.3 Release thermocouple from pilot burner, and disconnect lead from electrode (if fitted). Unscrew two 2BA screws retaining pilot burner to bracket. This will also release the electrode bracket (if fitted).

Note: If only thermocouple or electrode is to be replaced the pilot burner need not be released from the bracket. Unscrew M4 screw holding electrode to bracket if necessary.

7.3.4 Fit new pilot burner, thermocouple or electrode as required.

7.3.5 Reassemble, ensuring that pilot injector is in position and that compression union is tight. Reconnect lead to electrode (if fitted).

7.3.6 Recommission as described in Section 5.

7.4 **To replace Control Box**

7.4.1 Ensure electricity supply is off and withdraw fuse.

7.4.2 Remove top and front panels.

7.4.3 Unplug lead from gas control at control, and lead to igniter (if fitted).

7.4.4 Remove R.H. jacket side panel by releasing the two screws from the jacket back panel at rear and lifting panel off support bracket.

7.4.5 Remove small cover from control box, disconnect and withdraw incoming leads.

7.4.6 Remove capillary clip and withdraw thermostat bulbs from pocket.

7.4.7 Release two M5 screws holding control box to bracket.

7.4.8 Fit new control box and re-assemble reversing the above procedure.

7.4.9 Refit fuse and recommission as described in Section 5.

7.5 **To replace Thermostat**

7.5.1 Remove control box as in 7.4.

7.5.2 Remove large cover carrying thermostats from control box. Disconnect push-on terminals from thermostats. Withdraw capillaries through base of control box.

7.5.3 Release thermostat to be replaced from control box cover as follows:

(a) Boiler Thermostat: Release screw in centre of knob. Remove knob taking care not to loose the coil spring under knob. Remove bezel and release the two M3 screws in control box cover.

(b) Overheat cut-off device: Release two M3 screws in control box cover.

7.5.4 Fit replacement thermostat as necessary.

7.5.5 Reassemble, reversing the above procedure.

7.5.6 Recommission as described in Section 5.

7.6 **To replace Piezo-Electric Igniter (if fitted)**

7.6.1 Release two screws retaining igniter to underside of control Box.

7.6.2 Disconnect lead from rear of igniter.

7.6.3 Fit lead to new igniter and attach igniter to underside of control Box.

Section 8
Fault Finding

	Fault	Possible Cause
8.1	Pilot will not light.	*(a)* Gas control valve not turned to (pilot). *(b)* Air in gas line. *(c)* Faulty gas control valve.
8.2	Pilot does not remain alight when knob is released.	*(a)* Loose thermocouple connection. *(b)* Faulty thermocouple lead. *(c)* Faulty gas control valve. *(d)* Overheat cut-off device trapped.
8.3	Pilot established. Main burners will not light.	*(a)* No electrical supply to boiler. *(b)* Boiler thermostat set too low. *(c)* Faulty thermostat or connnections. *(d)* Gas control valve set at (pilot). *(e)* Faulty gas control valve.
8.4	Main burners remain alight when thermostat is satisfied.	*(a)* Faulty thermostat. *(b)* Faulty gas control valve.
8.5	Main burners remain alight when main supply is off.	*(a)* Faulty gas control valve.

Section 9
Spare Parts List

MR. Sands (9.15)

Item	Maker's Designation	Part No.
Multifunctional Control Valve	Robertshaw Unitrol 7000 Type BER-S7CL ¾"	747814132
Main Burner	Robinson 50mm dia. 350/100	333302100
Main Burner Injection	Robinson 3·5mm dia.	331101876
Pilot Burner c/w Injector 5	Robertshaw 4 CN 10 × £2.98.	331150154
Thermocouple Lead 10	Robertshaw T46 × £3.55. ea ✓	747439872
Boiler Thermostat	Landis & Gyr RAK 20-6-025 or alternative	747433271
Overheat Cut Off Device	Landis & Gyr RAK 21-4-125 or alternative	747433289
Spark Generator	Vernitron 60080/001 or Honeywell 9635A 1010	747701727
Ignition Lead	7/·02 PTFE Type C	747701925
Ignition Electrode 5	Royal Worcester Type 7125 BR or alternative	333801358
Flue Cover Gasket	Litaflex Foam KG25 x 15mm	331213879
Multifunctional Control Valve — AK8/92 only	Robertshaw Unitrol 7000 Type ERHC	747814140

5·25
£1.50

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