

Ideal-Standard Concord 450-1450 gas boilers (for natural gas only) installation and servicing instructions

SfB (56)

UDC 697.326

September 1974

G.C. APPLIANCE NUMBERS

Concord	450	41	399	69	Concord	950	41	399	74
Concord	550	41	399	70	Concord	1050	41	399	75
Concord	650	41	399	71	Concord	1150	41	399	76
Concord	750	41	399	72	Concord	1250	41	399	77
Concord	850	41	399	73	Concord	1350	41	399	78
					Concord	1450	41	399	79

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GENERAL DESCRIPTION

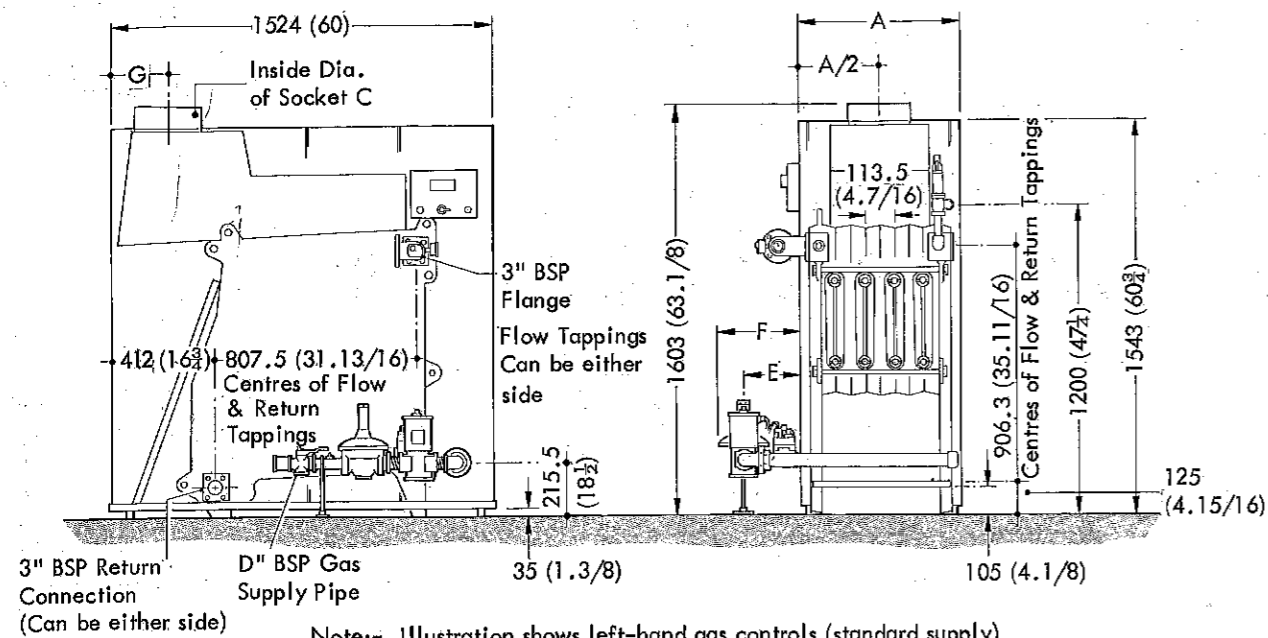
Tables 1-3 and the descriptive notes following contain all essential data likely to be required by the installer. The boilers conform with BS 779 and have been approved by the British Gas Corporation. They are supplied for use only with natural gas. The boilers are suitable for central heating and indirect hot water supply at working heads up to 140 feet (4.2 bar gauge). They must not be used for direct hot water supply. The boilers are specifically designed for fully pumped systems. However, 450-850 size boilers ONLY may also be used with gravity or combined pumped and gravity systems under special circumstances; advice on such systems should be sought from Ideal-Standard before work commences. Safety is assured by the use of a thermocouple proved permanent pilot burner which ignites an intermittent pilot burner bar. This pilot burner bar, the ignition of which is monitored by a sequenced ignition, flame rectification operated control box, ignites the main burner bars. The gas supply to the main burner bars and the intermittent pilot bar is controlled by separate solenoid valves operated by the boiler and system controls. In the event of flame failure the main burner and intermittent pilot burner gas supply is shut off in less than one second by the operation of these solenoid valves and the very small flow of gas to the permanent pilot, controlled by the thermocouple gas control, is cut off a few seconds later.

The boiler control wiring harnesses have been specifically designed for ease of connection.

Ancillary external controls (e.g. time switches, room and frost thermostats, etc.) must be suitable for mains voltage and are connected externally in the live mains lead to the boiler. The boilers are supplied complete with main and pilot gas cocks and governors. A 240 volt, 50 hertz AC supply is required for the controls. The boiler must not be connected to a DC supply. The lower front panels of the jacket lift off to provide ready access to the boiler for flue cleaning and general maintenance.

Figures 1A and 1B show the positions of the flow and return tapplings, gas inlet and flue outlet connections.

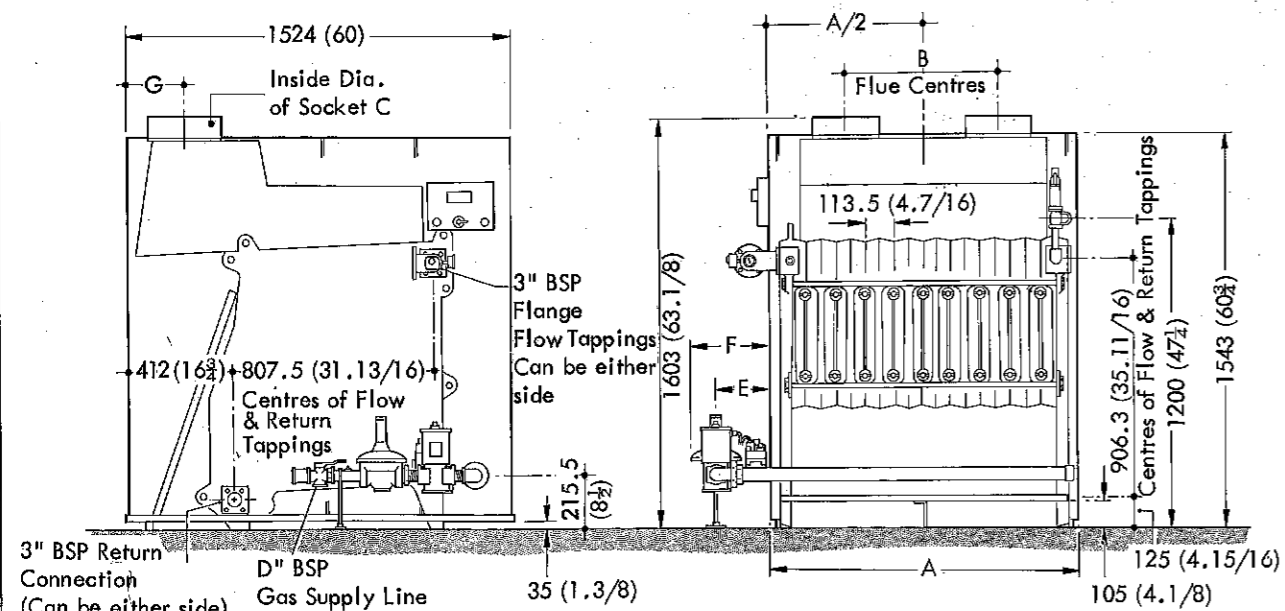
Figure 1A



Note:- Illustration shows left-hand gas controls (standard supply)
Right-hand controls available to special order

Boiler Size	Number of Sections	A	C	D	E	F	G
450	5	773 (30.7/16)	292 (11 1/2)	1"	209 (8 1/4)	295 (11.5/8)	222 (8 3/4)
550	6	874 (34.7/16)	350 (13 3/4)	1 1/2"	216 (8 1/2)	302 (11.7/8)	251 (9.7/8)
650	7	991 (39)	400 (15 3/4)	1 1/2"	214 (8.7/16)	300 (11.13/16)	251 (9.7/8)
750	8	1105 (43 1/2)	450 (17 3/4)	1 1/2"	214 (8.7/16)	300 (11.13/16)	276 (10.7/8)
850	9	1217 (47.15/16)	450 (17 3/4)	1 1/2"	214 (8.7/16)	300 (11.13/16)	276 (10.7/8)

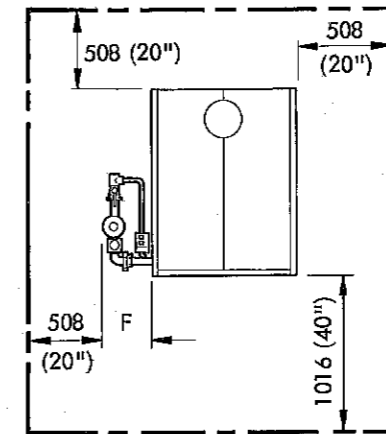
Figure 1B



Note:- Illustration shows left-hand gas controls (standard supply) Right-hand controls available to special order

Boiler Size	Number of Sections	A	B	C	D	E	F	G
950	10	1331 (52.13/32)	557 (21.15/16)	292 (11 1/2)	1 1/2"	214 (8.7/16)	300 (11.13/16)	251 (9.7/8)
1050	11	1435 (56.15/32)	557 (21.15/16)	292 (11 1/2)	1 1/2"	219 (8.5/8)	305 (12)	251 (9.7/8)
1150	12	1549 (61)	557 (21.15/16)	350 (13 3/4)	1 1/2"	219 (8.5/8)	305 (12)	251 (9.7/8)
1250	13	1672 (65.13/16)	794 (31 1/4)	350 (13 3/4)	2"	214 (8.7/16)	321 (12.5/8)	251 (9.7/8)
1350	14	1786 (66.15/16)	794 (31 1/4)	400 (15 3/4)	2"	214 (8.7/16)	321 (12.5/8)	251 (9.7/8)
1450	15	1900 (74.13/16)	794 (31 1/4)	400 (15 3/4)	2"	214 (8.7/16)	321 (12.5/8)	251 (9.7/8)

Figure 2



Plan view of boiler showing minimum clearance required between boiler and adjacent walls.

Note:- Gas controls may be fitted on either side of boiler.
Boiler dimensions and dimension "F" are shown in the tables accompanying Figures 1A & 1B.

TABLE 1 BOILER DATA

Boiler Size	Input kW (MJ/h) (Btu/h)	Rated Output kW (MJ/h) (Btu/h)	Gas Rate m ³ /h (ft ³ /h)	Primary Flue Gas Volume (8-8.5% CO ₂ and 204°C/400°F) m ³ /h (ft ³ /h)	Secondary Flue Gas Volume (3.5% CO ₂ and 99°C (210°F)) m ³ /h (ft ³ /h)	Approximate Weight (Dry) kg (lb)	Water Content Litres (Gallons)
450	171.2 (616.2) (584,000)	131.9 (474.8) (450,000)	16.54 (584)	374 (13,200)	651 (23,000)	820 (1806)	160 (35.25)
550	209.9 (755.5) (716,000)	162.7 (585.6) (555,000)	20.27 (716)	453 (16,000)	792 (28,000)	950 (2105)	190 (42.0)
650	245.6 (884.2) (838,000)	190.5 (685.9) (650,000)	23.72 (838)	538 (19,000)	933 (33,000)	1080 (2381)	220 (48.5)
750	283.4 (1020.3) (967,000)	219.8 (791.4) (750,000)	27.37 (967)	619 (21,850)	1076 (38,000)	1200 (2645)	250 (55)
850	319.5 (1150.1) (1,090,000)	247.7 (891.6) (845,000)	30.88 (1090)	698 (24,650)	1212 (42,800)	1320 (2907)	280 (61.5)
950	354.7 (1276.7) (1,210,000)	277 (997.1) (945,000)	34.28 (1210)	772 (27,250)	1348 (47,600)	1440 (3170)	310 (68)
1050	397.2 (1429.7) (1,355,000)	309.2 (1113.2) (1,055,000)	38.38 (1355)	871 (30,750)	1507 (53,200)	1560 (3445)	34 (74.5)
1150	435.3 (1566.9) (1,485,000)	340.0 (1224) (1,160,000)	42.05 (1485)	967 (34,150)	1655 (58,400)	1700 (3750)	370 (81)
1250	473.4 (1704.1) (1,615,000)	370.8 (1334.8) (1,265,000)	45.75 (1615)	1052 (37,150)	1800 (63,500)	1820 (4000)	400 (88)
1350	511.5 (1841.3) (1,745,000)	401.6 (1445.6) (1,370,000)	49.40 (1745)	1137 (40,150)	1943 (68,600)	1940 (4270)	430 (95)
1450	534.3 (1923.6) (1,823,000)	422.1 (1519.4) (1,440,000)	51.60 (1823)	1244 (43,900)	2030 (71,700)	2060 (4530)	460 (102)

* The gas rates quoted are for NATURAL gas only and assume a C.V. of 37.26 MJ/m³ (1000 Btu/ft³). The gas rate at calorific values differing from this may be calculated by dividing the calorific value of the gas into the figure given in the "INPUT" column above. Example:- the correct gas rate for a Concord 450 boiler using gas with a C.V. of 1016 Btu/h would be $\frac{584,000}{1016} = 575$ ft³/hour.

TABLE 2

	Boiler Size										
	450	550	650	750	850	950	1050	1150	1250	1350	1450
Flow and Return Tappings (" BSP)	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"	3"
Hydraulic Resistance	See Graph Following										
Gas Inlet Connection (" BSP)	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"
Gas Governor (Donkin 226)	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"
Main Gas Shut-Off Valve	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"
(Alcon Type MNA) (" BSP)	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"
Number of Burner Bars (Furigas Type 706)											
Main	3	4	5	6	7	8	9	10	11	12	13
Intermittent Pilot	1	1	1	1	1	1	1	1	1	1	1
Nominal Flue size											
mm	254	305	356	406	406	2x254	2x254	2x305	2x305	2x356	2x356
inches	10	12	14	16	16	2x10	2x10	2x12	2x12	2x14	2x14
Diverter Flue Outlet Socket -											
Internal Diameter											
mm	292	350	400	450	450	2x292	2x292	2x350	2x350	2x400	2x400
inches	11½	13¾	15¾	17¾	17¾	11½	11½	13¾	13¾	15¾	15¾
Gas Injector Sizes	5.0 mm (0.19685")										
Intermittent Pilot Burner & Main Burners	Honeywell BCR 18										
Permanent Pilot Burner	240 Volt AC Single Phase 50 Hz										
Electricity Supply	3 amp										
External Fuse Rating	70 Watts										
Electricity Consumption	Honeywell V4400 A1009 - 240 Volt ¾" BSP										
Pilot Gas Control	Honeywell Q314 A4834										
Permanent Pilot Burner	Honeywell Q309A (48")										
Permanent Pilot Thermocouple	ENFM Schiedam 17036-90-45										
Combined Thermometer/Pressure Gauge	Satchwell TKD-3502/12 stem										
Combined Boiler Thermostat/Limitstat	Landis & Gyr LFC1 or Satronic TF1 735										
Control Box	42.7 metres water, 420 kPa, 4.2 bar (gauge); 140 feet water, 60.5 lb/sq. inch										
Maximum Hydraulic Operating Pressure	Ideal AI										
Safety Valve	Lodge 1 EG/14, 3"										
Flame Detection Probe											

TABLE 3 GAS OPERATING PRESSURES AT RATED OUTPUTS

Boiler Size	Pressure at Manifold and Intermittent Pilot Burner Bar Pressure Test Nipples		Gas Rate *	
	mbar (gauge)	" W. G.	m ³ /h	Ft ³ /h
450	16.4	6.6	16.54	584
550	15.9	6.4	20.27	716
650	15.2	6.1	23.72	838
750	14.8	5.95	27.37	967
850	14.4	5.8	30.88	1090
950	14.2	5.7	34.28	1210
1050	14.2	5.7	38.38	1355
1150	14.2	5.7	42.05	1485
1250	14.2	5.7	45.75	1615
1350	14.2	5.7	49.40	1745
1450	13.5	5.4	51.60	1823

* NATURAL gas only.

IMPORTANT

When setting operating pressures:-

1. Light boiler and adjust pressures to appropriate value shown in table.
2. Fire boiler for 15 minutes to allow burners to attain stable operating temperature. (Commence with cold system on full load and boiler thermostat adjusted to maximum temperature to avoid shut down).
3. Check pressures and re-adjust as necessary.
4. Check gas consumption at meter with watch (ensure that any other appliances fed through same meter are turned off).
5. Make final pressure trimming adjustment if necessary to correct observed consumption to within ±2% of quoted gas rate.

INSTALLATION**SITE AND SYSTEM REQUIREMENTS****Installation - general**

The installation should comply with relevant British Standard Specifications, Codes of Practice and Building Regulations together with any special regional requirements of the Local Authority, British Gas Region, Water Supply Undertaking, Fire Service and Insurance Company. Electrical work must conform to the rules of the Institution of Electrical Engineers.

Position of boiler

Figure 2 shows the minimum recommended clearances required between the boiler and adjacent walls or other fixtures to allow access for installation, cleaning and maintenance. Overall boiler dimensions are shown in Figures 1A & 1B. When determining the headroom required, add the vertical height of the flue connection plus a working clearance and, if used, the height of the plinth, to the overall height shown in Figures 1A & 1B.

Foundation

The boiler must stand on an incombustible floor (i.e. concrete or brick) of adequate load bearing capacity. Heat shields are provided to protect the floor area beneath the combustion chamber.

Flow and Return Tappings

Each boiler is supplied with a flanged return tapping and a flanged flow elbow tapping used as a housing for the thermostat and gauge pockets. When connected to an exclusively pumped system, flow and return connections may be made to the same side (either side) or diagonally. For use with a combined pumped and gravity system (suitable for 450-850 size boilers only) an additional tapped flow flange and a tapped return flange are available as optional extras to special order. When using such systems advice should be sought from Ideal-Standard before work commences. With such systems the combined boiler and limitstat **MUST ALWAYS BE LOCATED IN THE PUMPED CIRCULATION FLOW ELBOW AND THE INTERNAL DISTRIBUTOR TUBE MUST NOT BE FITTED.**

IMPORTANT

As previously explained under "General Description", 950-1450 size boilers are only suitable for use with **FULLY PUMPED SYSTEMS.**

Gas supply

A minimum dynamic gas pressure of 20.0 mbar (gauge) (8.0" w.g.) must at all times be available at the boiler inlet connection when operating at the rated heat input. If in any doubt regarding the capacity of the gas meter, the

available gas pressure, the adequacy of the existing gas service pipes or the required size of new gas pipes, seek the advice of the Gas Authority at the design stage.

Electricity supply

A 3 amp three-pin fused unswitched mains outlet socket should be provided conveniently near to the boiler. Wiring must conform to the rules of the Institution of Electrical Engineers.

Air supply and ventilation

Efficient, safe and trouble-free operation of any conventionally flued gas boiler is vitally dependent on provision for an adequate supply of fresh air into the room in which the appliance is installed. For detailed recommendations refer to the latest BS Code of Practice CP332, Part 3. The extracted figures quoted beneath are intended only to give general guidance. Ventilation (communicating directly with the outside air) should be provided to the following minimum scales for natural ventilation:-

At low level -

1100 mm² of free opening per 1.0 kW of boiler output. (1 inch² per 2,000 Btu/h of boiler output).

PLUS**At high level -**

Half the above area.

Site ventilation grilles to avoid the risk of accidental obstruction.

Where mechanical ventilation is used, the recommended figure is for 1 m³/s per 620 kW of boiler output (1000 ft³/min per 1 x 10⁶ Btu/h of boiler output).

Mechanical ventilation should be by mechanical inlet with natural or mechanical extraction. Mechanical extract ventilation with natural inlet is not recommended. If mechanical inlet and extract ventilation is employed, the extraction rate should not exceed one third of the inlet rate. A control automatically cutting off the gas supply to the boiler in the event of failure of air flow in either inlet or extract systems should be provided.

Chimney

To ensure satisfactory operation, any conventionally flued gas boiler must be connected to a chimney capable at all times of adequately evacuating the combustion products; the importance of this requirement cannot be emphasised too strongly.

The flue design recommendations in CP332 Part 3 should be strictly observed.**Fan diluted flue systems**

Fan diluted flues may be used if desired and can be extremely useful where site conditions make difficult or impossible the provision of a satisfactory

conventional chimney. An air proving switch must be used and this is easily wired into the control system. The Gas Authority will be able to offer advice and they should be approached at the chimney design stage. It is recommended that the fan motor should be controlled by the boiler time switch and NOT BY SYSTEM TEMPERATURE CONTROLS (i.e. the fan will run continuously when the time switch is on 'ON'). In those cases where it is considered essential that the fan should switch 'on' and 'off' in sympathy with system temperature controls, the proposed wiring arrangements should be sent to our Technical Service Department for checking before proceeding, as unsuitable wiring can in some circumstances result in unsafe operation of the boiler.

Shared flue systems

When the boiler is fitted on a shared flue installation a manual reset pressure switch **MUST** be wired to interrupt the live supply to the boiler if the mains inlet gas pressure falls below 14.9 mbar (gauge) (6" w.g.). The gas connection to the switch must be made to the gas supply immediately before the main gas connection to the boiler.

ASSEMBLY

Check that all packages have been delivered at the assembly site. The boiler sections are supplied either loose or assembled, as specified at the time of ordering. The table shows the number of sections for each size of boiler when supplied unassembled.

Boiler Size	Side Sections	Intermediate Sections
450	2	3
550	2	4
650	2	5
750	2	6
850	2	7
950	2	8
1050	2	9
1150	2	10
1250	2	11
1350	2	12
1450	2	13

The other components are shipped in three packages comprising:-

1. Jacket panels, framework and fastenings.
2. All remaining loose boiler parts except the safety-valve. For site assembled boilers, this package will include the assembly rods and assembly gear.
3. Safety valve and, if ordered, the drain cock and fittings.

NOTE: IF INSTALLING A BOILER DELIVERED WITH WORKS ASSEMBLED BODY, IGNORE THE SECTIONS DEALING WITH THE ASSEMBLY OF THE BOILER SECTIONS AND FITTING THE FLUE CLEANOUT COVERS.

Tools and Materials required

For assembly of sections only:-

- Heavy Mallet
- Two Boiler Wrenches 5/8" x 3/4"
- Cotton Waste
- Machine Oil
- Paraffin

For other work:-

- Large shifting spanner
- Pozidrive screwdriver
- Two x M5, M6, M8 and M16 spanners
- Pipe-fitting tools.

Preparation of sections and nipples

Thoroughly clean all nipples and nipple ports in sections with paraffin to remove the protective grease. Apply red mastic to the ground edges of sections (as shown by the shading in Figure 3) and smear all nipples and nipple ports with oil before assembling. Red lead or other compound must not be used on nipples or nipple ports as a metal to metal joint is secured.

Assembling Sections

Place a right or left hand side section in position, resting it against a wooden prop. Then smear the nipple ports and nipples with machine oil and drive the nipples into position with the mallet taking care to avoid tilting or bruising the nipples. To assist this operation, nipple gauges are provided with each boiler. The nipples should be driven into the ports until a clearance of approximately 2 mm (1/16") exists between the nipple rim and the gauge, which should be tried both vertically and horizontally. Use of the gauge is illustrated in Figure 4. Careful preparation and positioning of the nipples as described will greatly facilitate assembly and save labour and wear in pulling up by the assembly rods, the threads of which should be frequently oiled. Apply red mastic to ground edges of side section as described previously. Bring up an intermediate section after cleaning and lubricating the nipple ports and apply red mastic. Manoeuvre the intermediate section into position, carefully supporting it in some suitable manner. Then slide the section forward until it engages the nipples projecting from the side section. Insert the long threaded ends of the two notched

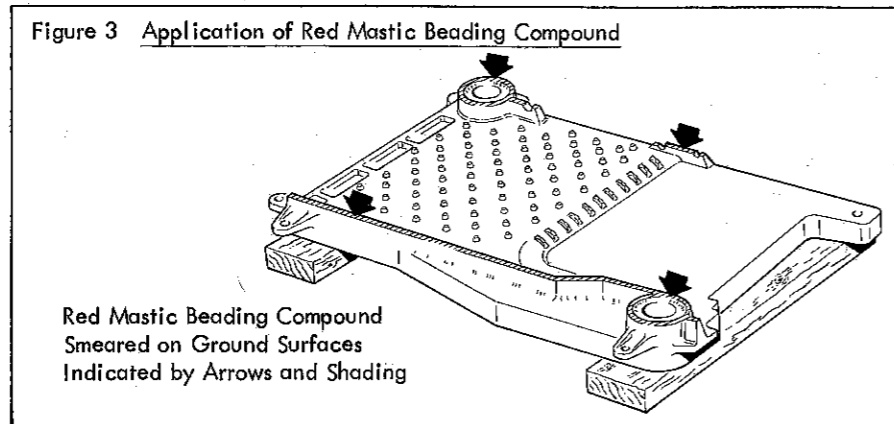


Figure 3 Application of Red Mastic Beading Compound

Red Mastic Beading Compound
Smear on Ground Surfaces
Indicated by Arrows and Shading

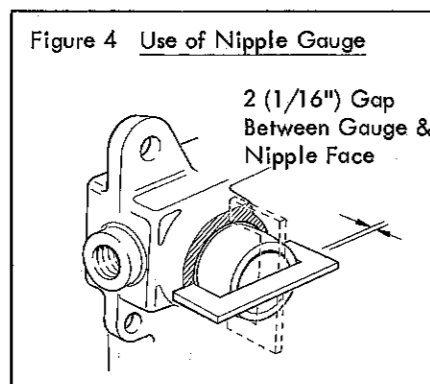


Figure 4 Use of Nipple Gauge

2 (1/16") Gap
Between Gauge &
Nipple Face

rods the assembling washers, with the beadings cast on their flat faces toward the nipple ports and follow these up with the collars, which should be fixed against the intermediate boiler section by engaging the set screws in the notches in the rods (Figure 5). After having checked that the nipples are in the correct position and well centred, the sections should be uniformly drawn together by tightening the nuts on the assembly rods (giving each a turn one after the other) until the ground edges of the sections touch. The assembling

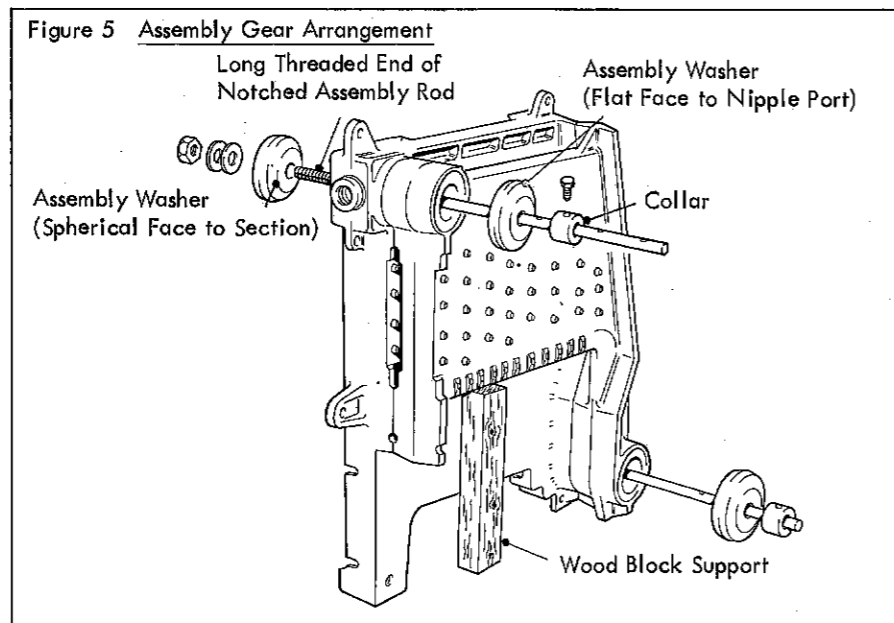
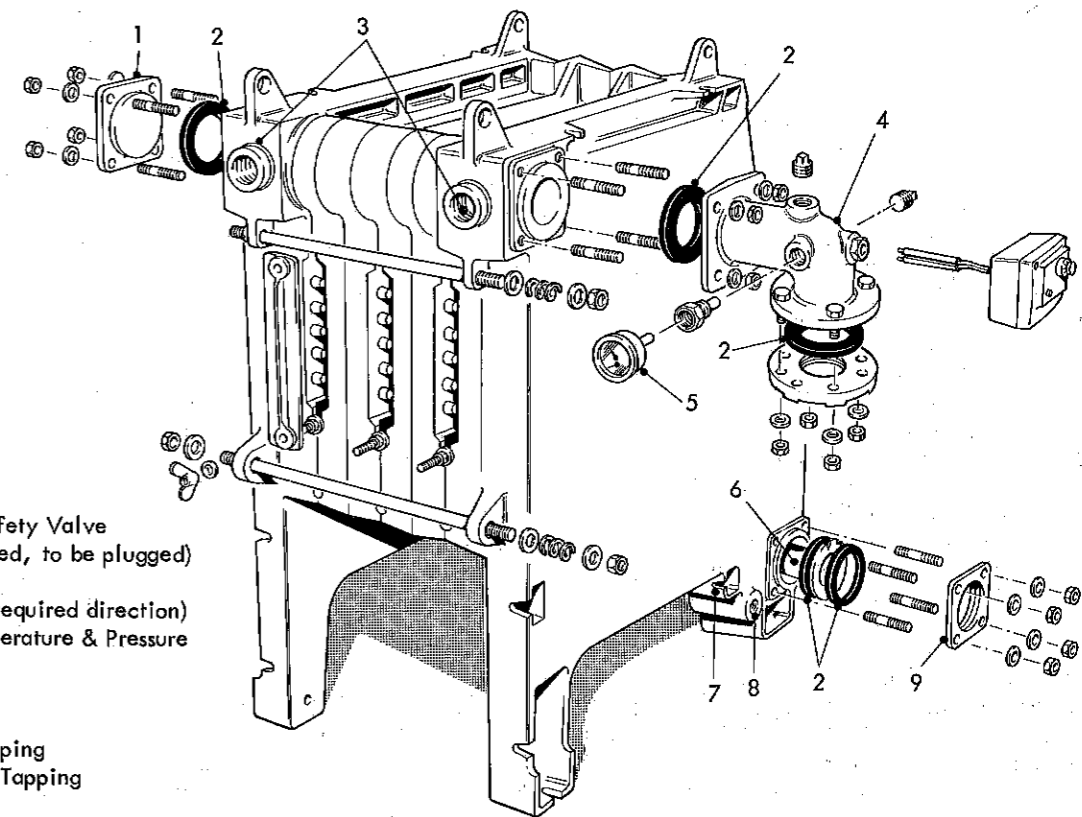


Figure 5 Assembly Gear Arrangement

assembly rods through the nipples. Pass an assembling washer over the long threaded end of each assembly rod with its spherical side facing towards the outside of the side section and follow with a thin flat washer and nut. Pass over the other ends of the two assembly

rods will be helped by using a heavy wooden mallet, taking care to strike the beaded edge adjacent to the nipple ports and not the flat part of the section.

Figure 6



- 1 Flange
- 2 Rubber Gasket
- 3 Tappings for Safety Valve (Tapping not used, to be plugged)
- 4 Flow Elbow (Rotate to suit required direction)
- 5 Combined Temperature & Pressure Gauge
- 6 Distributor
- 7 Burner Lug
- 8 Drain Cock Tapping
- 9 Flanged Return Tapping

When the second section is in position, release set screws, remove collars and washers and withdraw the assembly rods sufficiently to permit placing the nipples and next section in position; then replace rods, relocate nuts on long threads and reset the collars and washers one notch further along. Now draw the sections together as described previously. To ensure safe assembly the last assembled intermediate section must always be provided with temporary support until the next intermediate section has been added; this support should be then transferred to the next section etc. Repeat the above procedure until all the intermediate sections have been assembled. When the final intermediate section has been assembled, remove the two assembly rods, enter the last two nipples and manoeuvre the side section into position. Pass the complete set of four assembly rods through the lugs at the sides of the side sections and complete section assembly by tightening the nuts uniformly on the four assembly rods (Figure 6).

Note The top lugs on each side section are for lifting purposes only.
APPLICABLE TO SITE AND WORKS ASSEMBLED BOILERS. Remove assembly rod nuts and place one flat washer over each rod end, followed by a spring and

flat washer at one end of each rod, thus all the springs are on the same side of the boiler. Replace the nuts and tighten up uniformly, taking care not to compress the springs more than 5 mm (3/16"). The springs are provided to allow for expansion of the boiler body when heated thus it is very important that they are fitted exactly as directed.

Assembling Draughthood

First fasten the jacket side panel securing brackets, supplied loose packed with the draughthood (two per side, see Figure 7) to the draughthood with self-tapping screws. Generously cover the bottom flange faces of the draughthood that contact the top of the boiler sections with putty. Place the draughthood in position on the top face of the boiler sections and clamp with bolts, washers and nuts through the four lugs on the draughthood and boiler end sections (Figure 7). After final tightening of the securing nuts, complete the seal with more putty round the flange to ensure a perfectly flue gas-tight joint between the draughthood and boiler sections.

Flue Clean-out Covers

Pass M8 x 45 Hex. Head screws from the interior of the combustion chamber through the holes formed at the top and bottom of the openings between boiler sections. Secure them in position with

a washer and nut on the outside to form a stud. Fit the flue clean-out covers over the studs (asbestos face against the sections) and fasten in position tightly with a washer and wing nut.

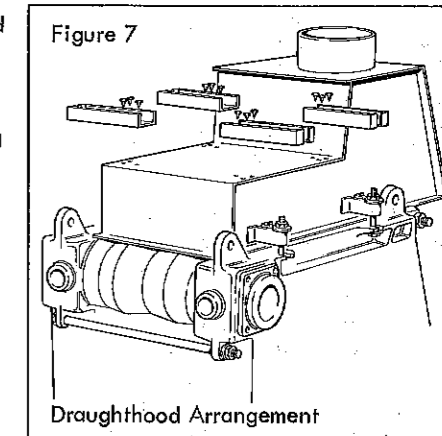


Figure 7

Draughthood Arrangement

Burner Assembly

(see Figures 8, 9 and 15)

Position the burner rear support between the lugs near the rear feet of the boiler side sections. Fasten in position with the M8 x 25 Hex. Head screws, nuts and washers provided.

Place the floor heat shields in the combustion chamber (foil face up and the short sides at the front and rear of the boiler). Push fully back. Lay the burner manifold assembly on the floor across the front of the boiler WITH THE OPEN END OF THE MANIFOLD AT THE SIDE ON WHICH THE GAS CONTROLS ARE REQUIRED. The support brackets on the manifold are fastened to the boiler side sections with M8 x 60 long screws at the top and M8 x 25 long screws at the bottom. The screws, with a washer behind the head, are passed from the rear through the slots in the boiler side sections and the holes in the support brackets and then secured with a washer and nut.

IMPORTANT The long (60 mm) screws MUST BE USED IN THE UPPER HOLES. Note that the bracket at the open end of the manifold is fixed and the bracket at the opposite end is free to move. Fit the upper screw of the fixed bracket first and leave the securing nut loose (engage 2/3 threads only). Next align the drillings in the loose bracket at the opposite end of the manifold with the slots in the boiler section and fit the screws, nuts and washers to secure the bracket to the boiler. Finally, fit the lower screw, washers and nut to the fixed bracket and tighten all four securing nuts.

THE NEXT INSTRUCTION DOES NOT APPLY TO 450 SIZE BOILERS

Fit the combustion chamber upper front cover (Figure 15) (return edge at the top and facing outward) over the studs formed by the projecting threads of the manifold support bracket upper securing screws. Mark through onto the boiler body the position(s) of the additional central drilling(s) in the upper front cover. Now remove the front cover and fit M8 x 60 long screws to form at the marked position(s) projecting studs through the holes cast in the joints between the sections. To do so, pass from the interior of the combustion chamber a screw with washer behind the head through the formed hole, place another washer and nut on the screw and tighten the nut.

THE INSTRUCTIONS FOLLOWING APPLY TO ALL BOILERS

The burner bars should now be fitted to the boiler. First distinguish and put to

Figure 8 Burner Assembly (Concord 550 boiler shown)

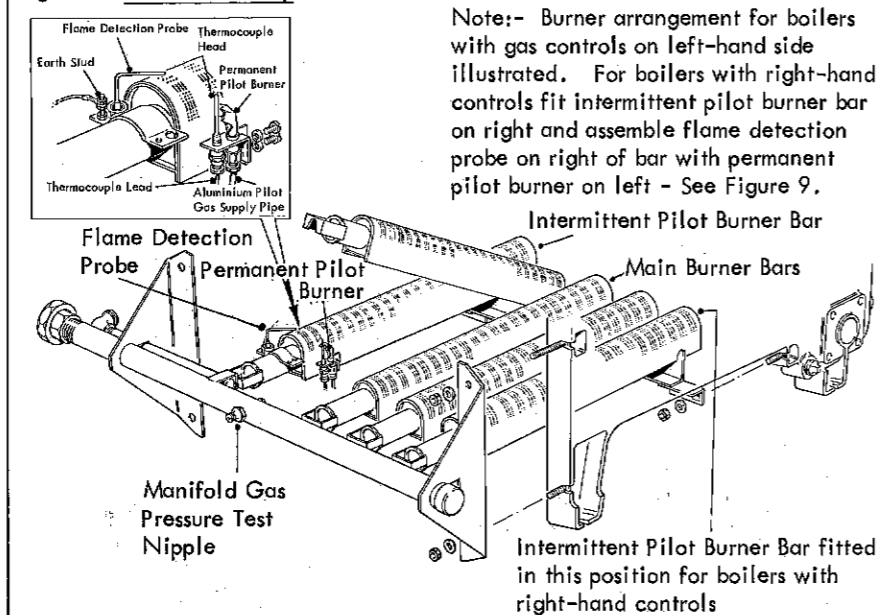
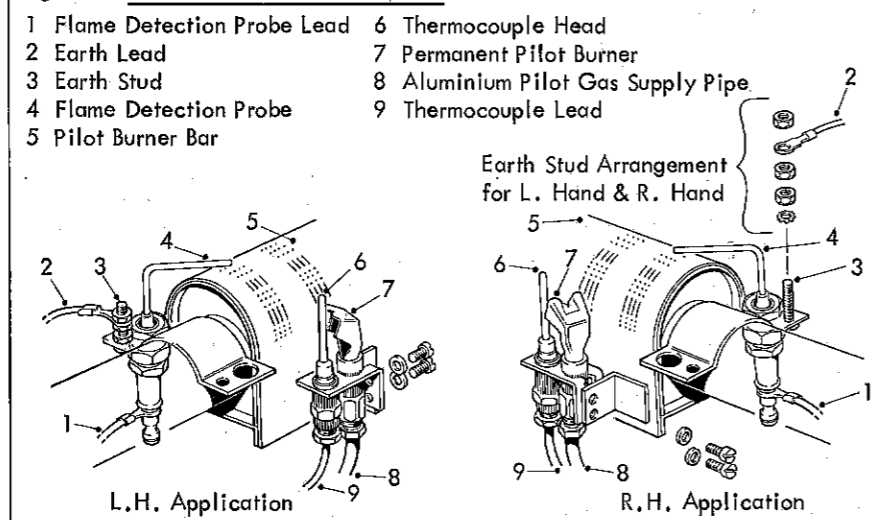


Figure 9 Detail of Pilot Burner & Probe



one side the special intermittent pilot burner bar, one of which is supplied with each boiler. This bar is easily recognised as it is the only one fitted with brackets for attaching the flame detection probe and permanent pilot burner. Fit (a) the flame detection probe (b) the brass earthing stud and (c) the Honeywell pilot burner to the brackets on this bar. The large scale inset included in Figure 8 shows the arrangement in detail. Note carefully that the arrangement for boilers with gas controls fitted on the left differs from that for boilers with gas controls on the right. See Figure 8 for details.

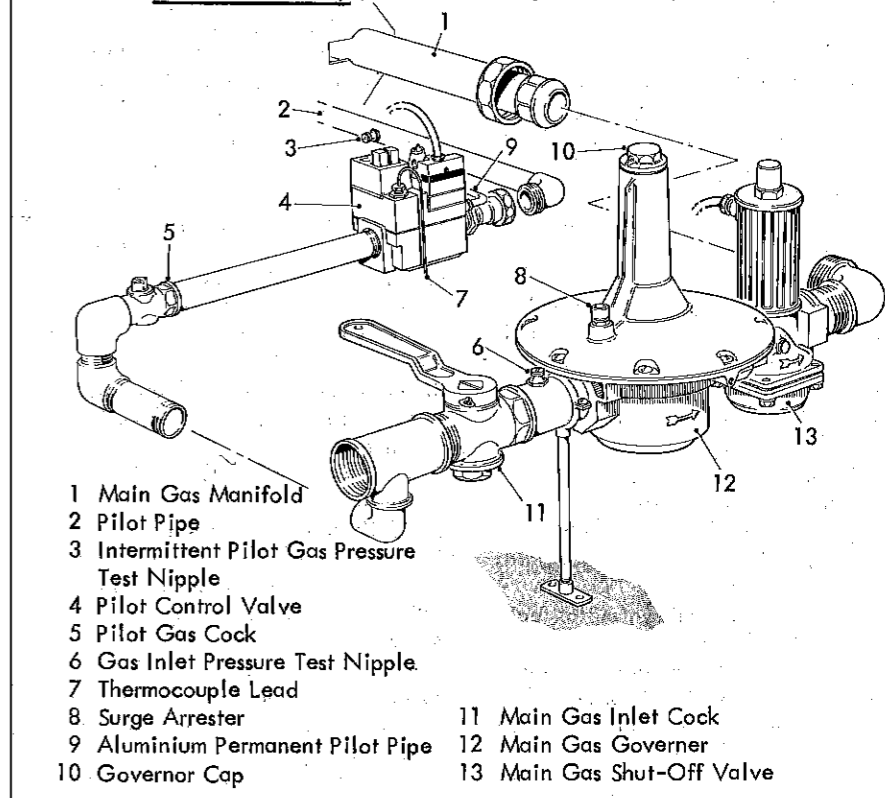
ENSURE THAT THE CORRECT ARRANGEMENT IS SELECTED TO SUIT THE BOILER BEING ASSEMBLED. The angle between the burner bar and the flame detection probe electrode must be 60° and this angle is obtained by engaging the appropriate flat of the hexagon on the probe body with the side of the burner bar venturi tube. Secure the probe in this position with the brass hexagon nut provided. Fasten the permanent pilot burner to its bracket with two 2 BA x 6 mm cheese-head screws and washers. Follow the instructions for fitting these two components with care; TROUBLE-FREE AND SAFE OPERATION OF THE BOILER IS VITALLY DEPENDENT ON CORRECT ASSEMBLY OF THESE PARTS. Place the intermittent pilot burner bar in the boiler, POSITIONING IT ON THE EXTREME LEFT-HAND SIDE OF THE COMBUSTION CHAMBER (VIEWED FROM FRONT OF BOILER) FOR BOILERS WITH LEFT-HAND GAS CONTROL LINE OR ON THE EXTREME RIGHT-HAND SIDE FOR BOILERS WITH RIGHT-HAND GAS CONTROL LINE. Fit all the remaining (plain) burner bars EXCEPT the bar next to the intermittent pilot burner bar. This is done to facilitate access when fitting the thermocouple and pilot gas pipe to the Honeywell pilot burner. All the plain burner bars are identical and their positions on the manifold are therefore interchangeable. When fitting burner bars, rest the rear (closed end) of the bar in the cradle in the support at the back of the combustion chamber and then lower the front end of the bar to engage the locating slot in the saddle bracket behind the shoulder of the gas injector on the manifold. Make quite certain that each bar is correctly seated.

Gas Control Line

The gas control line (Figure 10) is sent completely assembled and ready for connecting at the unions provided to the gas manifold and intermittent pilot burner feed pipe. Place the assembly on the ground parallel to the left or right-hand side of the boiler as appropriate. Fit the pipe support stand as shown in the illustration. Connect and tighten the elbow unions at the manifold and intermittent pilot burner feed pipe. Adjust the height of the pipe support as necessary to ensure that the gas control line is level and firmly supported.

Flow and Return Tappings (Figures 6 and 15)
Screw securing studs into the four blind tappings at each port in the end sections. NOTE Twelve short (M16 x 56) and four long (M16 x 75) studs are provided. The

Figure 10 Gas Line Assembly (Left-hand arrangement shown)



four long studs MUST be fitted at the port to be used for the 3" BSP return tapping flange. If two tapped return flanges (available to special order) have been ordered, eight long studs will be supplied. Fit the gasket to the flange on the internal water distributor tube and insert into the return tapping required WITH THE CORRECT INDICATOR NOTCH AT THE TOP DEAD CENTRE POSITION. USE THE U SHAPED NOTCH WHEN THE DISTRIBUTOR IS FITTED ON THE LEFT-HAND SIDE OF THE BOILER AND THE V SHAPED NOTCH WHEN THE DISTRIBUTOR IS FITTED ON THE RIGHT-HAND SIDE.

Distributor tubes supplied with 650-1450 size boilers can be dismantled into short lengths to facilitate entry into the boiler when working in a confined space. **IMPORTANT - 450-850 SIZE BOILERS ONLY DO NOT FIT** the distributor tube if the boiler is to be connected to a gravity or combined pumped and gravity system. When using such systems advice should be sought from Ideal-Standard before work commences. 950-1450 size boilers are not suitable for use with gravity or combined systems. Fit the flow elbow and the other tapped and blank flanges in the required positions, using the gaskets provided. Where two flows (gravity and pumped) are used THE FLOW ELBOW MUST

Combined Boiler Limitstat

Remove the sheath from the combined boiler thermostat and limitstat after slackening the retaining setscrew. Screw the sheath into the end $\frac{1}{2}$ " BSP tapping in the flow elbow, using jointing compound to ensure a water-tight joint. Push the stem of the instrument fully into the sheath, rotate the instrument into the upright position and tighten the retaining screw on the sheath.

Safety Valve

A $\frac{1}{2}$ " BSP tapping is provided on both side sections for the safety valve which may be fitted at either side to choice. Plug the unused tapping.

Assemble into the selected tapping in the following order:-

1. $1" \times 66 \text{ mm } (2\frac{5}{8}')$ space nipple.
 2. $1"$ internal thread elbow.
 3. $1" \times 114 \text{ mm } (4\frac{1}{2}')$ space nipple.
 4. Safety Valve (outlet facing towards rear side of boiler).
 5. $1"$ BSP M and F elbow (outlet facing towards rear of boiler).
 6. $1250 \text{ mm } (49\frac{1}{4}')$ length of $1"$ pipe (running parallel with side of boiler).
- The arrangement is illustrated in Figure 15.

Drain Cock

A drain cock kit consisting of a $\frac{3}{4}"$ drain cock with loose handle, $\frac{3}{4}"$ double female elbow and a $152 \text{ mm } (6")$ length of threaded $\frac{3}{4}"$ pipe is available as an optional extra. $\frac{3}{4}"$ BSP tappings for a drain cock connection are located in both side sections, adjacent to the return tappings. When fitting the kit, remove the plug from the tapping at the side required. Screw the $152 \text{ mm } (6")$ length of pipe into the tapping, then screw the elbow onto the free end of the pipe and tighten with the open end facing toward the front of the boiler. Finally, screw the drain cock into the elbow and tighten with the spindle vertically uppermost.

Combination Pressure Gauge/ Thermometer

Carefully screw this instrument into the $\frac{1}{2}"$ BSP tapping at the front of the flow elbow. Plug the two un-used tappings.

SERVICE CONNECTIONS

Water

Complete the system flow and return connections to the boiler. Fill the system with water and check the boiler body and all pipe connections for

soundness. Remember to vent the system as necessary when filling. Make good any leaks before proceeding further.

Gas

Connect the boiler inlet to the gas supply pipe with a union.

Flue

Make the flue connection now. Use boiler putty between the flue pipe and the boiler outlet socket to ensure a gas-tight joint.

JACKET ASSEMBLY (Figure 11)

The jacket components comprising the panels, framework and a pack of fittings and screws are packed together in one crate.

All sizes of boiler have three left and three right side panels (1A, 1B and 1C, 2A, 2B and 2C), one upper front and one upper rear panel (3 and 4), one left and one right side channel member (B and C) and one front and one rear channel member (D and E) together with a pack (not illustrated) of fittings and fastenings. Finally, 450-850 size boilers have two lower front panels (5), two lower rear panels (6) and two top panels (7); 950-1450 size boilers have

three of each of these panels.

All the above items are identified in Figure 11 by the numbers (panels) or letters (frame members) quoted in brackets. To assist further in identification, numbers are stamped on the frame members as listed in Table 4. Bolt a bracket (A) to each boiler foot, using the M8 x 80 Hex. Head bolts, nuts and washers supplied. Figure 11 includes a large scale inset drawing of the arrangement.

With the open ends of the channels positioned at the front of the boiler, bolt the left and right side channels (B and C) to the brackets (A). Locate the washers and nuts on the underside of the channels but do not tighten the nuts. Fit a locating pin through the hole near the

front end of each channel (see Figure 11). Bolt the front and rear channels (D and E) to the side channels (B and C) with countersunk screws, locating the washers and nuts on the inner side. Tighten all nuts securing the side, front and rear members to centralise the lower frame to the boiler body. Correctly identify the left and right side panels (1A, 1B, 1C and 2A, 2B, 2C) and punch out the knock-out panels as necessary to suit the gas, water, drain cock (if fitted) and control positions required for the installation. Drop the side panels into the channel members, making sure the lugs on the inner vertical flanges also drop into the slots of the brackets attached to the draughthood.

Fit the upper front panel (B) to the side panels by engaging the slots into the lugs on the side panels. This is done by pushing the panel in from the front over the lugs and then letting the panel drop down to lock in position. Similarly fit the upper rear panel (4). Place the top panels (7) in position resting on the flanges of the front and rear panels and clipping into the lugs on the side panels. Fit the handles to the lower front panels and rear panels. Drop the rear panels into the rear channel member and lean them to rest the top edges of the panels against the boiler sections. Do not fit the front panels at this stage.

TABLE 4 JACKET FRAME IDENTIFICATION NUMBERS

Boiler Size	Left Side Channel Member (B)	Right Side Channel Member (C)	Front (D) and Rear (E) Channel Members
450	B991	B990	B202
550	B991	B990	B203
650	B991	B990	B204
750	B991	B990	B205
850	B991	B990	B206
950	B991	B990	B207
1050	B991	B990	B208
1150	B991	B990	B209
1250	B991	B990	B210
1350	B991	B990	B211
1450	B991	B990	B212

PILOT GAS AND THERMOCOUPLE CONNECTIONS TO PILOT GAS CONTROL (Figure 9)

The pilot gas pipe and thermocouple lead connecting the permanent pilot burner and the pilot gas control are routed into the boiler through the opening in the jacket used also for the gas manifold.

Aluminium Pilot Pipe

Fit the pre-formed pilot gas pipe between the pilot gas connection on the front of the Honeywell gas control and the permanent pilot burner inlet using the compression unions and olives supplied with these components. When fitting the pipe to the burner, do not completely unscrew the union fitting out of the burner as it retains in position the gas injector which might then fall out by gravity and be lost. Instead, unscrew the union fitting two turns and push the pipe end through the nut until it seats. Hold the pipe securely in position and tighten the union nut.

Thermocouple Lead

IMPORTANT Do not kink the thermocouple lead; avoid sharp bends when routing the lead but use gentle radii (25 (1") minimum). Do not tighten the screw connector at the gas control more than

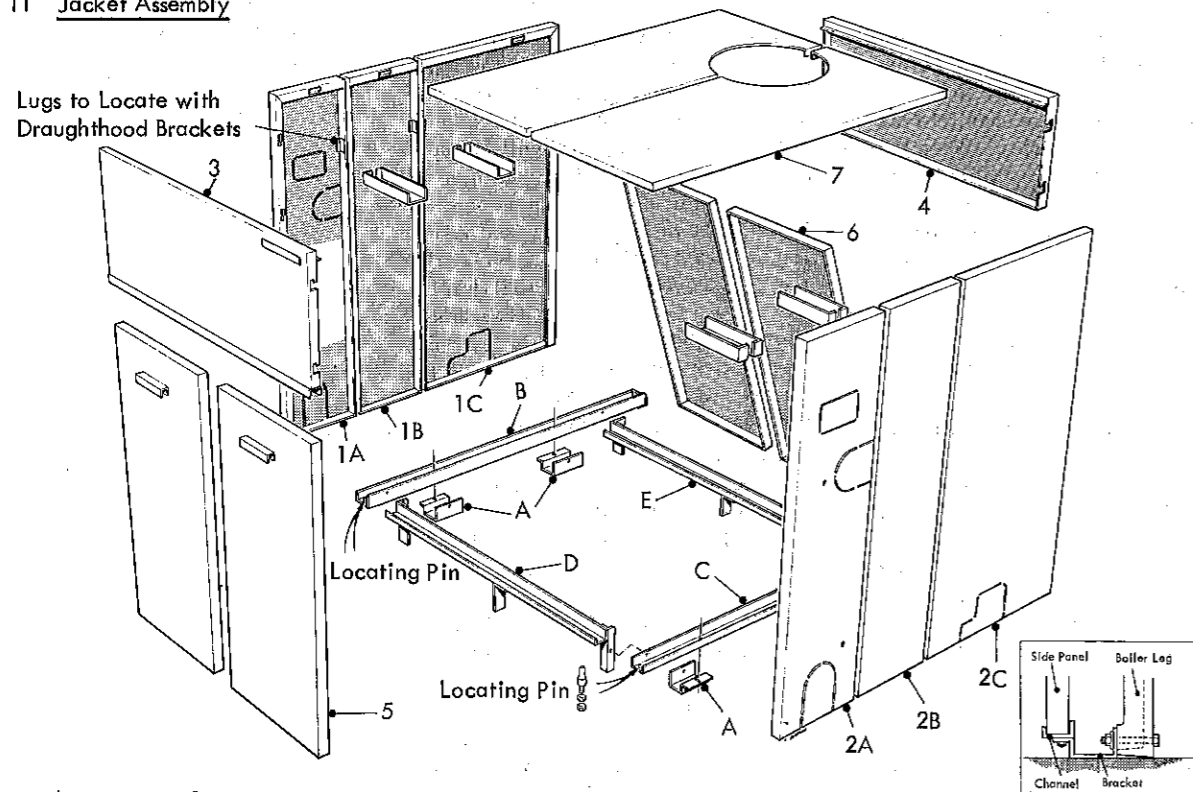
one-eighth turn beyond finger tight. Pass the head end of the thermocouple lead through the jacket opening. Push the head of the thermocouple into the opening in the pilot burner assembly fully upward until it seats and then secure by tightening the retaining nut. Bend the lead to follow the route of the aluminium pilot gas pipe, to which it should be secured with the three aluminium clips supplied. Fit the screw connector to the terminal on the top of the pilot gas control.

FITTING AND WIRING ELECTRICAL CONTROLS (Figures 12A & 12B)

IMPORTANT

Safe and reliable operation of the boiler is vitally dependent on correct wiring of the connections between the boiler controls. After this work has been completed as instructed below, RECHECK the wiring paying great attention to colour coding and terminal numbers.

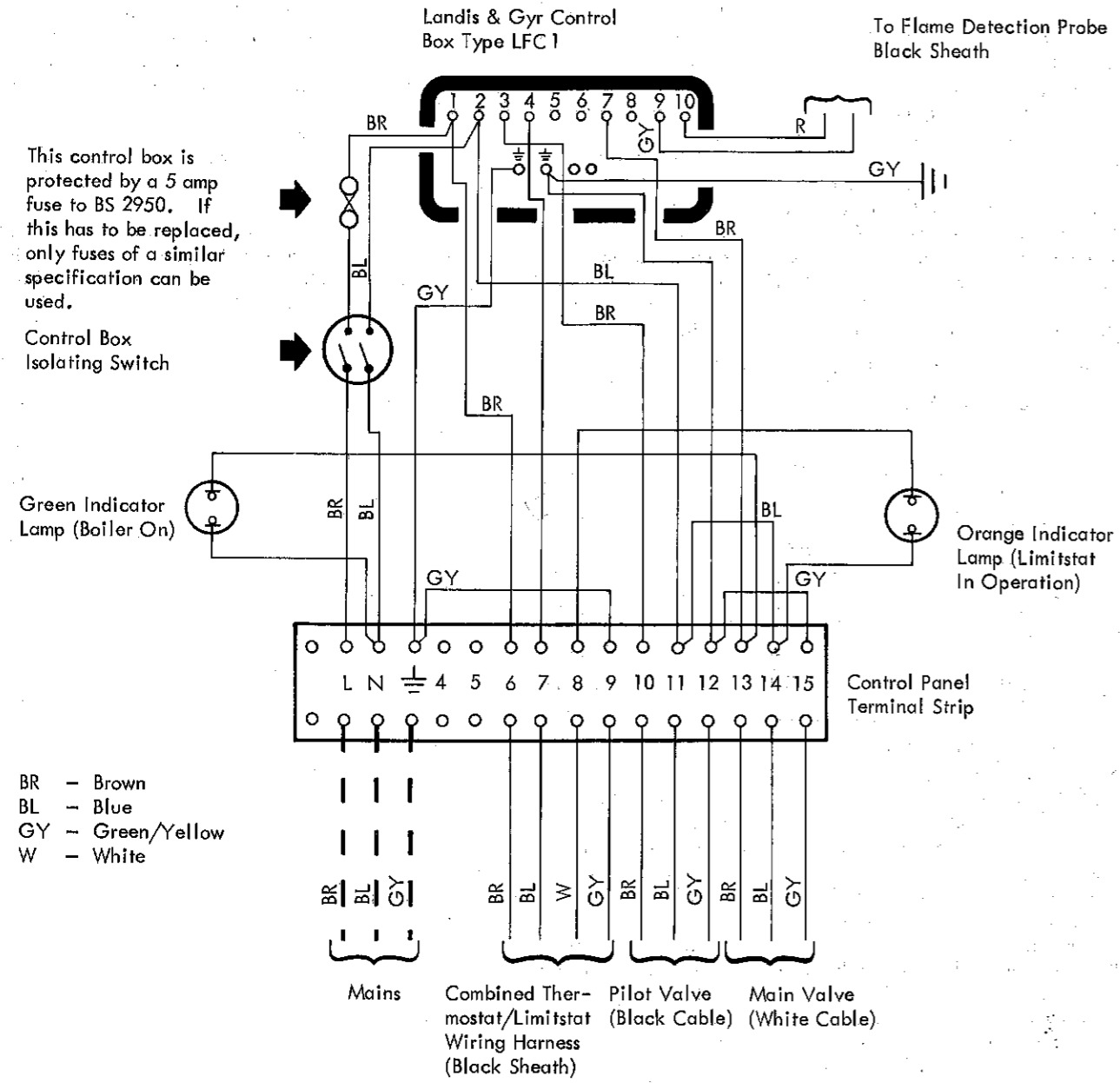
Figure 11 Jacket Assembly



Note:- Arrangement for Concord 450-850 size boilers illustrated. Concord 950-1450 size boilers have treble top panels and treble lower front and rear panels.

Detail View Showing Fixture of Boiler to Side Panel Brackets

Figure 12(A)

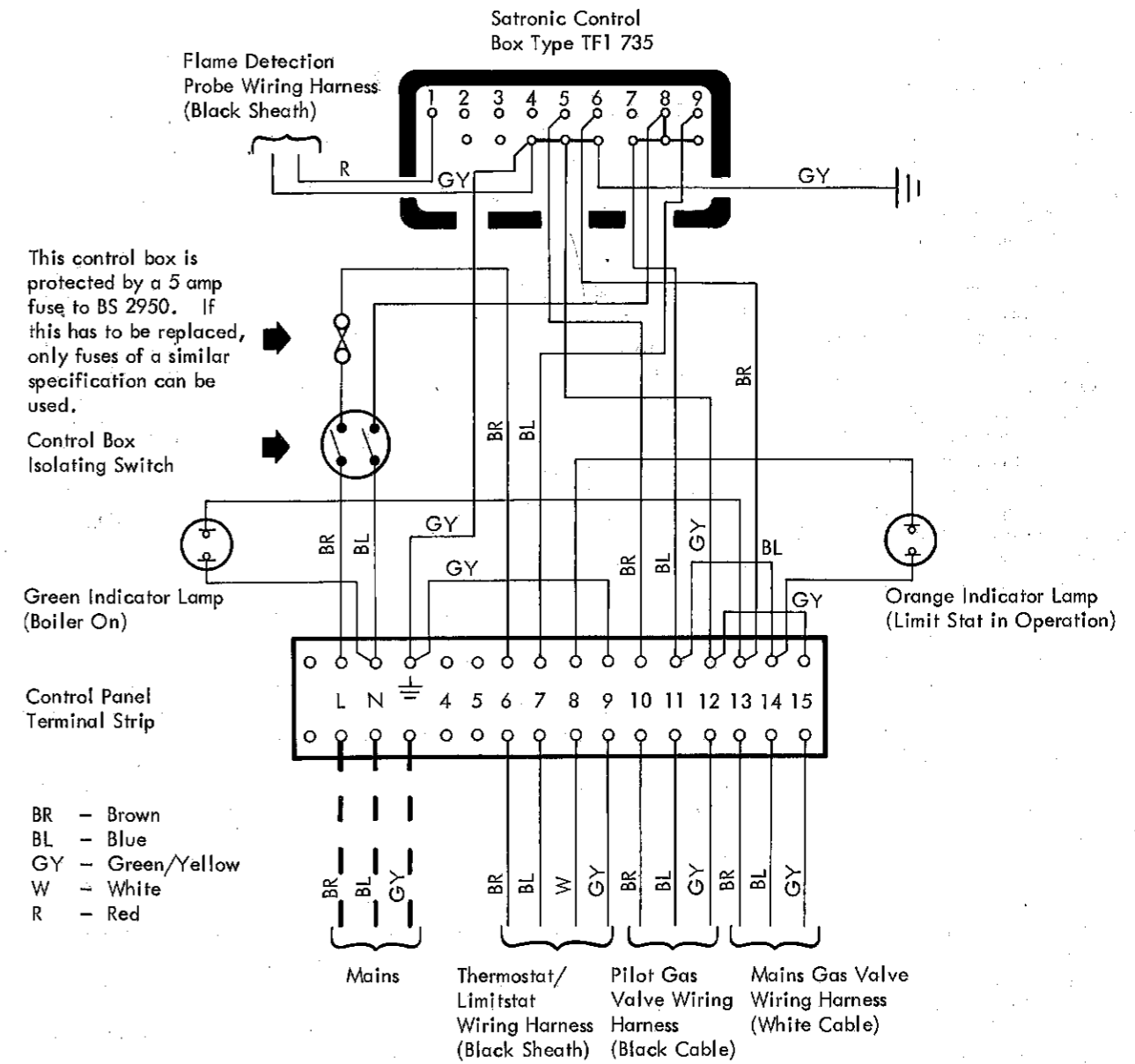


When the boiler is fitted on a shared flue installation a manual reset pressure switch MUST be wired to interrupt the live supply to the boiler if the mains inlet gas pressure falls below 14.9 m bar (gauge) (6" w.g.). The gas connection to the switch must be made to the gas supply immediately before the main gas connection to the boiler.

———— Prewired to Control Box
- - - - Connected by Installer

All external controls must be wired into live lead to boiler.

Figure 12(B)



When the boiler is fitted on a shared flue installation a manual reset pressure switch MUST be wired to interrupt the live supply to the boiler if the mains inlet gas pressure falls below 14.9 m bar (gauge) (6" w.g.). The gas connection to the switch must be made to the gas supply immediately before the main gas connection to the boiler.

———— Prewired to Control Box
- - - - Connected by Installer

All external controls must be wired into live lead to boiler.

Control Panel and Box (Figure 13)

The control panel and box assembly is supplied with the boiler control wiring pre-wired to the terminal strip in the box. The wiring is brought out at the rear of the assembly in FOUR harnesses viz:-

1. White cable - Wiring to main gas shut-off valve.
2. Black cable - Wiring to pilot gas control.
3. Black sheath - Contains four leads for connection to boiler thermostat/limitstat.
4. Black sheath - Contains two leads for connection to the flame detection probe.

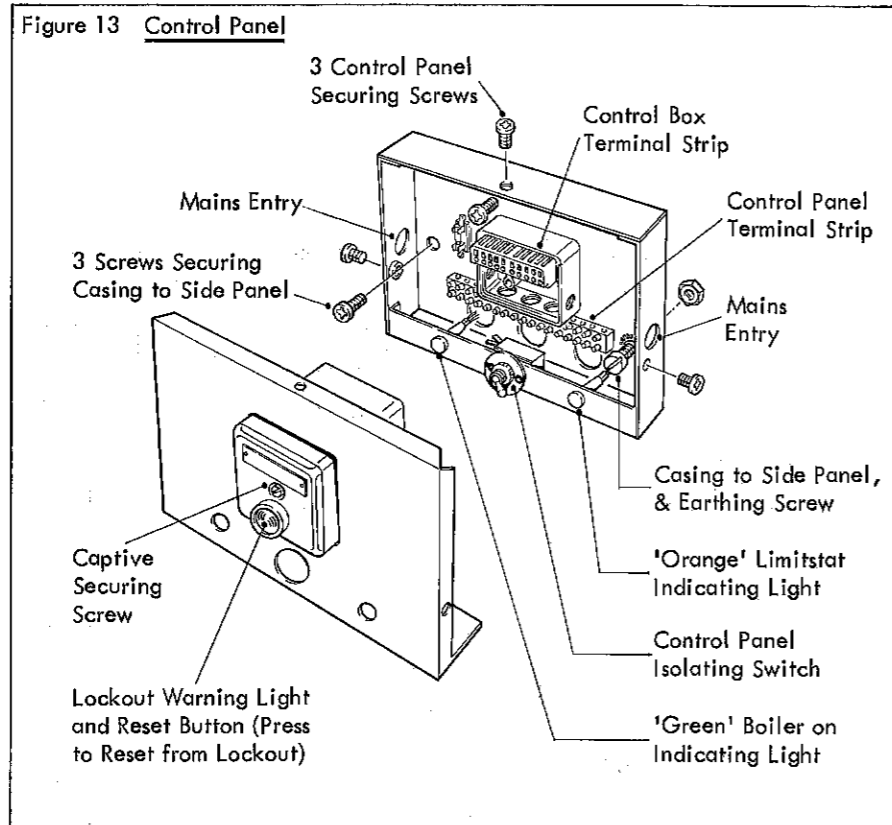
Remove the three screws securing the front of the assembly and lift off the cover. Unscrew the nut at the rear of the cheese-headed brass earth screw BUT DO NOT DISTURB THE EARTH LEAD AND WASHER UNDER THE SCREW HEAD. Now fasten the rear half of the assembly over the opening in the jacket front side panel (already made by removing the appropriate knock-out panel when assembling the jacket). The control box assembly must always be positioned on the same side of the boiler as the gas control line.

Pass all four wiring harnesses through the opening into the jacket. Fasten the rear of the control panel to the threaded bushes in the jacket panel using two M5 x 10 Pozī pan head screws provided loose and the brass cheese head M5 x 20 screw already positioned in the assembly. Replace the nut previously removed on the end of the brass screw after screwing through the bush. THE EARTH CONNECTING WIRE AND WASHER UNDER THE HEAD OF THIS SCREW MUST NOT BE DISTURBED.

Connect the harnesses as follows:- Commence by fitting a rubber grommet to the lower drilling (adjacent to the gas manifold opening) in the front side jacket panel to which the control panel has been screwed. Fit a rubber plug to the equivalent drilling on the opposite side of the boiler. Similarly, fit a grommet in the drilling adjacent to the boiler thermostat and plug the drilling on the opposite side. Thread the WHITE AND BLACK three-core CABLE harnesses through the lower grommet to the outside of the jacket.

WIRING TO HONEYWELL PILOT GAS CONTROL

Remove the two screws securing the terminal cover on the control and lift it off. Pass the BLACK cable through the cable entry clamp in the cover and



connect the three cores as follows:- BLUE AND BROWN (fitted with push-on connectors). Push one onto each of the two valve spade terminals. GREEN/YELLOW (fitted with eyelet terminal). Connect to the screw earth terminal on the valve. Secure the cable entry clamp and replace the cover and screws.

WIRING TO MAIN GAS SHUT-OFF VALVE

Unscrew the large dome nut on the top of the main gas shut-off valve and lift off the cover and gasket. DO NOT disturb the "Throughput Adjustment" nut and screw beneath the cover; this is preset before despatch.

Pass the WHITE cable through the cable entry clamp at the side of the valve and connect the three cores as follows:- BLUE AND BROWN LEADS. One to each of the two connections on the terminal block. The ends of these leads have been bared and solder dipped; it is only necessary to loosen the terminal block screws, insert the bare ends and tighten the screws.

GREEN/YELLOW LEAD fitted with eyelet terminal. Connect to the valve earth screw terminal. Secure the cable with the cable entry clamp, replace the gasket and cover and replace the dome nut.

WIRING TO FLAME DETECTION PROBE (Figure 9)

Next connect the two leads contained in the BLACK sheath (these leads are fitted with eyelet terminals) to the flame detection probe (located on the first burner bar at the gas control line side of the boiler). These two leads are covered with special PTFE insulation to withstand the temperature in the combustion chamber beneath the burner bar. Route the leads at low level through the front opening of the boiler BENEATH the burner bar and connect as follows:-

RED lead to the terminal at the bottom of the flame detection probe. GREEN/YELLOW lead to the earth stud terminal on the probe bracket. Clean tight connections must be made and the black sheath terminate outside the combustion chamber. After completing the wiring of the pilot gas control, main shut-off valve and flame detection probe, the two cables and the black sheath should be clipped together to the rear return angle of the jacket front side panel using the three cable clips supplied, evenly spaced along the length of the panel. The cables and sheath must not be allowed to contact hot metal parts on the boiler body.

WIRING TO BOILER THERMOSTAT/LIMITSTAT

Undo the two screws securing the cover of the thermostat. Remove the cover to give access to the terminals beneath. Take the BLACK sheath covering the four thermostat/limitstat leads and thread it through the grommeted hole in the front jacket side panel adjacent to the thermostat. Should this involve leading the sheath across the width of the boiler, clip it to the lower edge of the upper jacket front panel with the spring clips provided. The sheath must not be allowed to contact hot metal parts of the boiler body.

A standard length of sheath sufficient for wiring the largest boiler with the thermostat located remotely from the control panel is supplied with all boilers. In the majority of cases this length will therefore require shortening. Thread the sheath through the cable entry of the thermostat and then shorten as necessary. Remove the insulation for about 10 mm (3/8") from the end of each lead and connect as follows to the thermostat terminals:-

GREEN/YELLOW. To the earth terminal (marked \perp).

BROWN. To the left-hand group terminal No.3.

WHITE. To left-hand group terminal No.2.

BLUE. To right-hand group terminal No.1.

Check that the pre-wired link between right-hand terminal No.3 and left-hand terminal No.1 is correctly fitted. Refit the cover after tightening the cable entry clamp and replace the two securing screws.

MAINS LEAD

Route the mains supply lead through the entry at the rear side of the control panel (Figure 13). Use the cable entry clamp provided (alternatively standard conduit fittings may be used if desired). Plug the unused entry on the opposite side with the blind rubber grommet provided. Connect to the terminal strip as follows:- BROWN (live) lead to terminal L. BLUE (neutral) lead to terminal N. GREEN/YELLOW (earth) lead to terminal E (\perp).

THE EARTH CONNECTION MUST NEVER BE OMITTED.

The control panel includes a 5 amp BS 2950 fuse. Replacement fuses MUST be of the same type and value.

EXTERNAL SYSTEM CONTROLS

Any external system controls (time switch, frost-stat, etc.) must be suitable

for mains voltage and MUST be wired externally in the live mains lead to the boiler. They MUST NEVER BE CONNECTED to the control panel terminal strip. These controls should be wired in series into the live supply lead with the exception that any control required to override the action of another control or controls (e.g. a frost-stat) should be wired in parallel with the control(s) to be overridden.

COMPLETION OF ASSEMBLY (Figure 15)

Fit the remaining burner bar in the position left vacant adjacent to the pilot burner bar as instructed earlier. Fit the combustion chamber upper front cover to the boiler (insulation facing inward) over the studs on the boiler front and secure in position with the washers and wing-nuts provided. Take the combustion chamber lower front cover and place it on the ground beneath the gas manifold with the shaped edge to the rear and the end with the unique straight-sided cut-out at the gas control line side of the boiler. Now raise the cover into position in front of the upper cover with the shaped cut-outs fitting under the burner venturi tubes. Align the fixing holes in the upper and lower covers and fasten together by passing the M5 x 10 hexagon headed screws provided through the holes in the lower cover to engage the spire nuts on the upper cover. Tighten all screws. The boiler is now ready for commissioning.

COMMISSIONING

General

Check that the system has been filled with water, that all drain cocks fitted are closed and that any stop valves fitted in the flow and return mains are open. **CHECK CAREFULLY THAT THE ELECTRICITY SUPPLY TO THE BOILER IS SWITCHED OFF.**

Purging

WHEN PURGING, EXTINGUISH ALL NAKED LIGHTS, DO NOT SMOKE AND KEEP ALL WINDOWS AND DOORS OPEN. Loosen the union in the gas supply pipe at the boiler inlet and purge air carefully from the pipe-work. Retighten the union as soon as gas is smelled.

Setting the combined boiler thermostat/limitstat

WARNING THE INSTRUMENT OPERATES AT MAINS VOLTAGE. ALWAYS SWITCH OFF THE MAINS SUPPLY BEFORE REMOVING THE COVER.

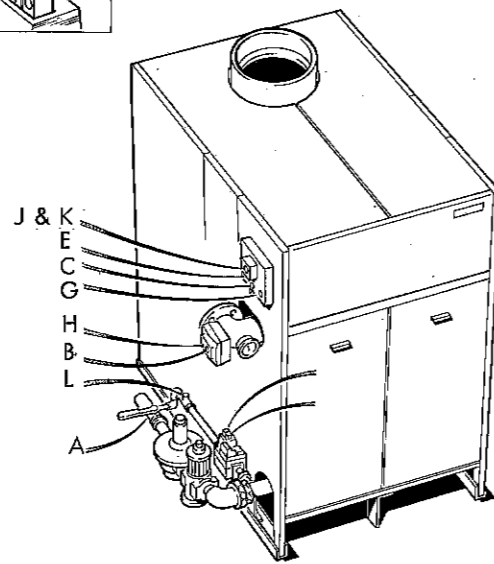
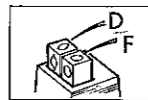
Remove the cover and set the dial underneath (on the left-hand side) to the required limit temperature. This must be at least 10°C (18°F) higher than the maximum operating temperature to which the boiler thermostat knob will be set otherwise unnecessary boiler shut-down (requiring manual re-setting of the limitstat on each occasion) will occur continually. Replace the cover and press the black reset button to ensure that the instrument is in the operating position. Set the boiler thermostat (knob on cover) to the required operating temperature; this must be at least 10°C (18°F) LOWER than the limitstat setting.

INITIAL LIGHTING (Figure 14)

1. Never attempt to light the boiler unless the main (A) and pilot (L) gas cocks have been in the "off" position for at least three minutes.
2. Check that the boiler thermostat (B) is set to the required temperature and that any external system controls (e.g. time switch, etc.) are in the "on" position.
3. Check that the mains isolating switch and the control panel switch (C) are turned off.
4. Open the pilot gas cock (L).
5. Open the swing cover plate in the upper combustion chamber cover plate giving access to the Honeywell permanent pilot burner. Pass a lighted spill through the opening and hold the flame adjacent to the pilot burner at the same time pressing and holding down the button (D) marked with a flame on the Honeywell gas control to allow gas to flow to the burner. Withdraw the spill after a stable flame has been established at the pilot burner; when first lighting a new boiler this may take a little time until all air is discharged from the pipes. Continue to hold the gas control button down for a further 30 seconds after withdrawing the spill. Then release the button. The burner should remain lit with the flame enveloping the thermocouple head by 10-13 mm ($\frac{3}{8}$ " - $\frac{1}{2}$ "). If necessary, correct the flame length by adjusting the permanent pilot gas pressure. (The adjustment is underneath the screw dust cover positioned on the pilot gas control next to the thermocouple lead terminal.) Remove the dust cover and turn the adjuster beneath clockwise to decrease or anti-clockwise to increase flame length). If difficulty is experienced in maintaining the pilot flame, check that the thermocouple terminal at the gas control is clean and tight (but not more than one-eighth turn beyond finger tight). If this fails to cure the trouble, increase the pilot flame length. After making these adjustments replace the dust cover and repeat the lighting sequence.
6. Turn on the mains isolating and control panel switches; after a delay of approximately 10/20 seconds the intermittent pilot burner bar will ignite. Should it not do so however and instead the reset button (K) on the control box is illuminated, this is an indication that the gas feed to the boiler has been insufficiently purged. Should this occur, wait for 30 seconds and then press the illuminated reset button on the control box. This will automatically restart the lighting sequence if the

Figure 14

- | | |
|-----------------------------|-------------------------------------|
| A Main Gas Inlet Cock | G Orange Panel Light |
| B Boiler Thermostat Knob | H Reset Button on Boiler Thermostat |
| C Panel Switch | J Lock-Out Warning Light |
| D Button Marked with Flame | K Lock-Out Reset Button |
| E Green Panel Light | L Pilot Gas Cock |
| F Button Marked with Circle | |



Honeywell permanent pilot burner is still burning. As soon as ignition of the intermittent pilot burner bar is proved by the flame detection equipment, the main gas shut-off valve automatically opens. This is visually indicated by illumination of the green light (E) on the control panel. When the green signal is seen, steadily open the main gas inlet cock (A). All the main burner bars will then ignite.

TESTS FOR GAS LEAKS

1. With the boiler operating, test all gas joints for leakage with soap solution. Make good any leaks discovered before proceeding to the next test.
2. The main gas shut-off valve must be specially tested for gas tightness when closed. Turn off the control panel switch; this will extinguish all burners except the permanent pilot. This may be left burning during this test. Remove the screw from the gas pressure test nipple located on the gas pipe between the main inlet cock and the governor and connect a gas pressure gauge to the nipple. Ensure a leak-proof connection. Open the main gas cock and note the static gas pressure.

Now shut the inlet cock and observe the pressure gauge over a period of one minute. The observed pressure drop must not exceed 0.5 mbar (0.2" w.g.) over the timed period of one minute.

GAS PRESSURE ADJUSTMENT

The main burner and intermittent pilot burner gas pressures must be correctly adjusted and test nipples for this purpose are provided on the gas manifold and the intermittent pilot feed pipe. Start the adjustment procedure with the system cold, on full load and with all temperature controls set at maximum. This is to ensure that as far as possible thermostatic shut-down does not interfere whilst pressures are being adjusted. Remove the screws in the pressure test nipples and securely connect gas pressure gauges to the nipples. Turn on the switch on the control panel to light the boiler. Allow the boiler to operate for about 15 minutes to stabilise the burners and then adjust the pressures to the figure quoted in Table 3 for the appropriate size of boiler. To adjust the main burner manifold pressure remove the screw cover and gasket beneath from the governor column and turn the adjuster beneath DOWN to increase or UP to decrease the pressure. To adjust the

intermittent pilot burner bar pressure, remove the large diameter screw dust cover on the Honeywell gas control (near the button marked with a circular emblem) and turn the adjuster beneath DOWN to increase or UP to decrease the pressure. Do not remove the adjacent small diameter dust cover, which protects a vent.

The pressures quoted in Table 3 are given to facilitate speedy approximate adjustment of the gas rate. After setting the pressure, allow the boiler to operate for about 15 minutes to stabilise and then check the gas rate by reference to a watch second-hand and the gas meter. (Before doing so, make certain that any other gas appliances using the same meter are turned off).

The gas rates for each size of boiler are given in Table 1. A deviation of $\pm 2\%$ of the quoted figures in the observed gas rate is of no practical importance but any greater variation from the correct rate must be adjusted by increasing or decreasing as required the pressure at the manifold and intermittent pilot by small steps until the required rate is obtained. The manifold and intermittent pilot burner bar pressures **MUST BE SET EQUAL**. After adjustment, replace the covers on the governor and control valve. Make certain the gasket is re-fitted beneath the governor cap and the cap tightened down. Replace the test nipple blanking-off screws.

TESTING THE GAS CONTROLS

Thermostat

Confirm by observation that the boiler thermostat shuts off the boiler when the temperature setting is reached. Only the Honeywell permanent pilot burner should remain lit. The green light on the control panel is illuminated when the boiler is firing.

Limit Thermostat

WARNING Live mains voltage terminals are exposed when the cover of this instrument is removed. Take great care accordingly. This instrument will normally only operate if the boiler thermostat fails. It may be tested, however, by removing the cover and rotating the dial beneath to a setting lower than the temperature of the flow from the boiler. This action should shut off the boiler and illuminate the orange light on the control panel. After making this test, reset the dial to the limit temperature required (at least 10°C (18°F)) above the maximum temperature of the boiler thermostat. Replace the cover and

press the small black reset button on the cover. The boiler will then resume firing after the light-up sequence.

FLAME DETECTION EQUIPMENT

Check this equipment by simulating the following conditions:-

Failure of Gas Supply

Turn off the main inlet and pilot gas cocks. The GREEN light on the control panel will go out and, after automatically making one frustrated cycle of the lighting sequence the control box lock-out reset button will be illuminated. Place a lighted spill through the observation opening in the front panel, positioning it adjacent to a burner bar and THEN turn on the main and pilot gas cocks. The boiler should not light. To relight the boiler after satisfactorily making this test:-

1. Turn the main gas inlet cock off.
2. Switch off the control panel switch and press the lock-out reset button on the control panel IN THAT SEQUENCE.
3. Place a lighted spill through the observation opening in the front panel, positioning it adjacent to the Honeywell pilot burner.
4. Press the button marked with a flame emblem on the Honeywell gas control and ignite the Honeywell pilot burner with the spill. Release pressure on the button approximately 30 seconds after ignition of the pilot.
5. Open the main gas inlet cock.
6. Turn on the control panel switch and the boiler will resume firing after the light-up sequence.

Failure of Electricity Supply

With the boiler firing normally, simulate failure of the electricity supply by switching off at the boiler isolating switch. This action should extinguish the boiler burners but the Honeywell permanent pilot burner will remain lit. All signal lights on the control panel will go out. When the current is resumed by switching on at the isolating switch the lighting sequence will be initiated and after a short delay the boiler will light and the green signal on the control panel will be illuminated. Failure of the electricity supply does not result in the controls going to lockout and there is no necessity to press the lockout reset button on the control panel.

IMPORTANT

If any of the control tests detailed above cannot be correctly made, the installation should be carefully re-checked to ensure that the wiring has been completed in accordance with the instructions and that all connections are

clean and securely made. Give special attention to the flame detection probe terminals. If the fault persists, the controls should be examined by a competent controls engineer having specialised knowledge and testing equipment. The boiler **MUST NOT BE OPERATED** until the fault has been diagnosed and rectified.

ROUTINE OPERATION

For short-term shut-down the boiler may be turned off and on by operating the control panel switch. In severe weather, however, **DO NOT USE THIS SWITCH**, as it would override the action of a frost-stat if fitted. When the boiler is to be out of use for an extended period (e.g. boilers out of use during the summer months), switch off the control panel switch and any isolating switch in the boiler mains lead, push down and release the button marked with a circle on the pilot gas control and turn off the main gas inlet cock. To re-light the boiler, follow the instructions given in Section A, paras. 1-8 of the Instruction Plate. This plate will be found fixed to the left-hand front side panel of the jacket.

HANDING OVER

Draw the attention of the owner or his responsible representative to the Lighting Instruction Plate fastened to the left-hand front side panel of the jacket. Explain the functions of the system ancillary controls fitted and explain how they may be adjusted to meet temperature and time schedule requirements. Adjust the controls as required by the owner; set any time switches fitted to the correct time of day. Hand this booklet to the owner or other responsible person and request him to keep it in a safe place readily available for reference. Explain that the boiler should receive regular maintenance at least once annually to ensure reliable and safe operation. Explain the advantages of making a maintenance contract with the Gas Region or others offering a maintenance service. If the boiler is not used during the summer, the boiler flues and burners should always be cleaned at the end of the heating season. This action will prolong the life of the boiler.

General

Full maintenance should be undertaken at least annually. The owner is strongly recommended to make a contract for regular maintenance with the Gas Region or a heating engineer offering a contract maintenance service.

Boiler "Lock-out"

If the boiler persistently "locks-out" and it is established that the condition is not due to interruptions in the gas supply, the current flowing in the flame detection circuit when the boiler is operating should be checked. A sensitive micro-ammeter must be used. Remove the jacket lower front panels and combustion chamber front cover to gain access to the flame detection probe. Unfasten the RED lead from the probe terminal and connect the micro-ammeter leads to this terminal and to the RED probe lead thus wiring the instrument in series with the probe detection circuit. Replace the

combustion chamber front cover and the jacket front panels. Light the boiler and observe the current flowing when the boiler is operating.

Typically, for satisfactory stable operation, between 8 and 13 micro-amps (SATRONIC TF1 735 control box) or, 14 and 22 micro-amps (Landis and Gyr LFC1 control box) should be recorded. ("Lock-out" occurs when the current falls to approximately 1 micro-amp (Satronic Control Box) or 5 micro-amps (Landis and Gyr Control Box)). An acceptable current (i.e. at least 8 micro-amps (Satronic Control Box) or at least 14 micro-amps (Landis and Gyr Control Box)) indicates that the incidence of lock-out is most probably due to an internal fault in the control box; the replacement of this component with a new unit will almost certainly effect a cure. If a low current be recorded:-

1. Check all connections in the probe

circuit (do not overlook the "earth" on the probe bracket). All connections must be clean and tight.

2. Wipe the probe and ceramic insulator clean with a soft rag. Examine the special high temperature insulation of the probe leads.

3. Check that the probe is correctly installed, horizontal and angled at 60° to the burner as fully described and illustrated in the assembly instructions (see Figure 9).

4. Check that the burner flame picture in the area of the probe is normal; clean the burner bar if it is not.

5. Check that the intermittent pilot burner and main burner gas pressures are correct (see Table 3).

Servicing the Boiler (Figures 8-15)

WARNING Before commencing work, turn off the main inlet and pilot gas cocks and **SWITCH OFF** the electricity supply at the isolating switch.

1. Lift off the jacket lower front panels

to gain access to the front of the boiler body.

2. Remove the lower and upper combustion chamber front covers taking care to avoid damage to the flame detection probe leads and the aluminium pilot gas supply pipe. Lift out the floor heat shields and sweep them clean.

3. Lift out the burner bar adjoining the intermittent pilot burner bar to give access to the pilot burner and flame detection probe. Undo the compression union gas connection at the Honeywell pilot burner and disconnect the electric leads at the flame detection probe terminal and earth stud. Take care to avoid losing the small terminal nuts and the permanent pilot gas injector. The gas injector is retained in position by the compression union and may fall out when the pipe is withdrawn.

4. Undo the nut holding the thermocouple in the pilot burner bracket and withdraw the thermocouple head from the bracket.

5. Lift out all burner bars from the boiler. Clean the bars by brushing them down with a stiff bristle (not wire) brush. Check each bar carefully to ensure that all the flame parts are clean and all surfaces free from any accumulated deposit. If available, an industrial vacuum cleaner may be useful to assist this work. Take care to avoid damage to the Honeywell pilot burner and the flame detection probe when cleaning the bar on which they are mounted. Give special attention to these components, wiping them clean gently with a soft, lint-free rag. Clean the ceramic insulation of the probe body and the terminals and eyelet connectors on the leads. Put the clean burner bars in a safe place until required for re-assembly.

6. Examine the thermocouple lead. Wipe the tip with a soft rag. If the tip shows signs of deterioration (e.g. burning or splitting) a new thermocouple lead should be fitted. This action will guard against "call-back" between routine services to replace a worn-out thermocouple.

7. Remove all the flue clean-out covers from the front of the boiler body. Check that the asbestos rope seals on the covers are in good condition and replace any that have deteriorated.

8. Using the special long handled flue brush supplied with the boiler through the clean out cover openings, thoroughly brush all flues between the sections. Use the brush in both upward and downward diagonal directions as well as horizontally to ensure that all the flue

surfaces are cleaned. Next remove the extension handle from the brush and clean the lower areas of the flues by entering the brush into the flues from the combustion chamber. Take great care to ensure that the flues are thoroughly swept. Use of a powerful electric torch will assist inspection.

9. Brush down the top, sides and back of the combustion chamber with a broom. Remove all dislodged debris from underneath the boiler with a brush or industrial vacuum cleaner.

10. Re-assemble in reverse order. **IMPORTANT** The intermittent pilot burner bar (that on which the Honeywell pilot burner and the flame detection probe are mounted) must always be replaced in the combustion chamber in its correct position at the side of the boiler on which the gas control line is fitted. Always replace this bar first, make the pilot gas pipe and probe electrical connections and fit the thermocouple lead to the pilot burner bracket **BEFORE** fitting the remaining burner bars (Refer to Figures 8 and 9).

TESTING AFTER RE-ASSEMBLY

Always make the following tests after the boiler has been serviced and re-assembled.

1. Light the boiler as instructed under "Initial Lighting" (Page 16).

2. Test all joints for gas leaks with soap solution (Page 16).

3. Check the gas pressure and gas rates as described under "Gas Pressure Adjustment" (Page 16).

4. Finally adjust the settings of all time and temperature controls fitted to the system to the owner's requirements. Remember to re-set time controls to the correct time of day.

CARE AT END OF HEATING SEASON

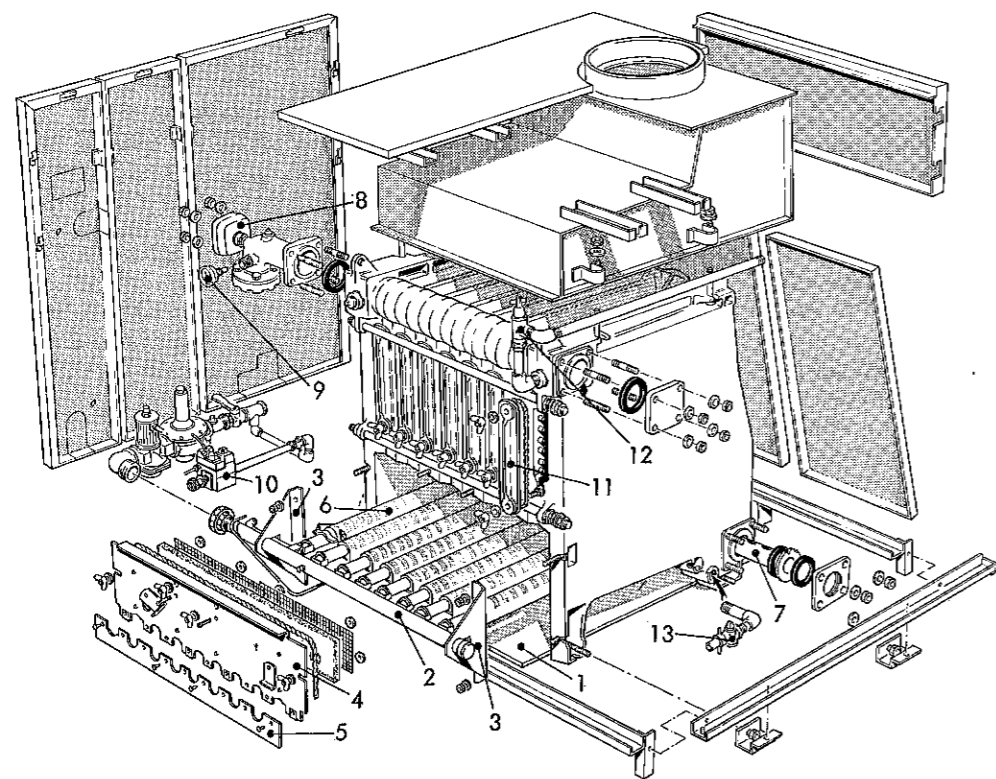
At the end of the heating season, if the boiler is not to be used, the flues and burners should always be thoroughly cleaned in order to minimise corrosive attack. Attention to this instruction will lengthen the life of the boiler.

When the boiler is out of service for a lengthy period, shut the main inlet and pilot gas cocks and switch off the electricity at the isolating and control panel switches.

IMPORTANT - FUSE REPLACEMENT

A 5 amp BS 2950 fuse is located in the control panel. Replacements must be of the correct type and fusing value.

Figure 15



- | | | |
|--|--|--------------------------------|
| 1 Floor Heat Shields | 6 Intermittent Pilot Burner Bar | 11 Flue Clean-Out Covers |
| 2 Burner Manifold | 7 Distributor Tube | 12 Safety Valve |
| 3 Manifold Support Brackets | 8 Combined Boiler Thermostat and Limitstat | 13 Drain Cock (optional extra) |
| 4 Combustion Chamber Upper Front Cover | 9 Combined Pressure Gauge and Thermometer | |
| 5 Combustion Chamber Lower Front Cover | 10 Honeywell Pilot Gas Control | |

2 X
2 Probe Body Support

2 X

5

2 Rear Br.

TED

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