

Isis HE

INSTALLATION, OPERATION & MAINTENANCE MANUAL



MAY 2004

POTTERTON
COMMERCIAL

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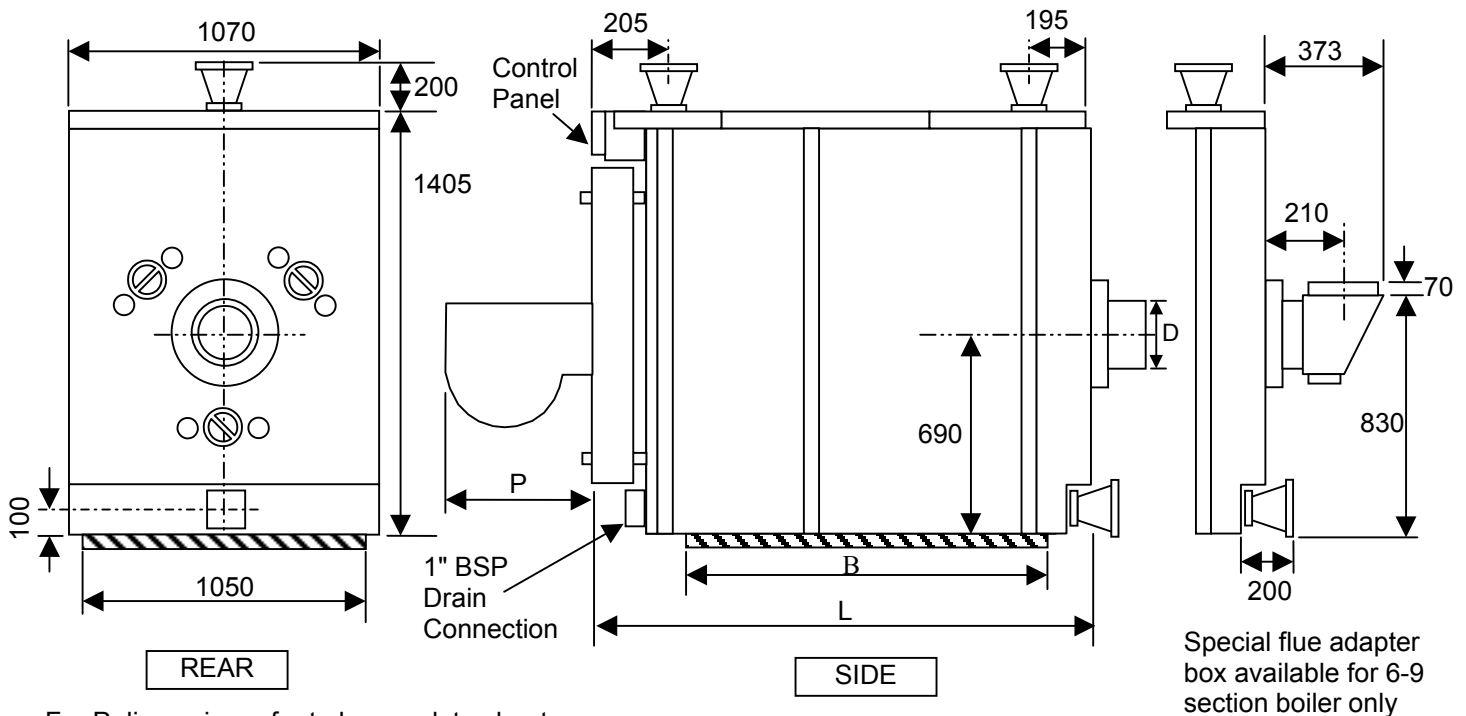
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Fig.1 - General Data & Dimensions (NOT TO SCALE - All measurements in millimetres)



For P dimension refer to burner data sheet

Note: Base must not protrude from rear of boiler.

Table 1 – Boiler Dimensions

No of Sections	6	7	8	9	10	11	12	13	14	15
“L” mm	1255	1435	1615	1795	1975	2155	2335	2515	2695	2875
“D” (Diameter) mm	250					350				
“B” (Diameter) mm	970	1150	1330	1550	1690	1870	2050	2230	2410	2590

NOTE: Each boiler is supplied with 2 x 3”-4” extension turrets, 2 x 3” flanges, 1 x blank flange, 1 x 1” flange for drain cock and 1 x flange for thermostat connections.

Table 2 - Combustion Chamber Data

No of Sections	6	7	8	9	10	11	12	13	14	15
Mean Diameter mm	635									
Cross Sectional Area m ²	0.343									
Length mm	920	1100	1280	1460	1640	1820	2000	2180	2360	2540
Volume m ³	0.291	0.349	0.407	0.465	0.522	0.581	0.639	0.697	0.754	0.811
Surface Area m ²	2.15	2.51	2.86	3.22	3.58	3.94	4.3	4.65	5.01	5.38
Resistance mm	38		55	73	57	71	67	73	57	100
Flue Gas Temperature (Gross) °C	180									
Efficiency (Net) %	90									
(Gross) %	82.2									
Percentage CO ₂ Oil %	12									
Gas %	9									
Heat Release kW/m ²	249.3	250.6	244.1	253.7	259.5	259.9	262.3	262.2	254.3	265.6

Table 3 – Technical Data

	Number of Sections		6	7	8	9	10	11	12	13	14	15
	CE Number	BG/EC87/97/127										
	Output	kW	440	516	586	670	762	840	925	1000	1070	1172
	Input (Gross)	GAS	536	629	714	817	929	1024	1128	1219	1305	1429
		OIL	514	603	685	783	891	982	1082	1169	1251	1370
	Input (Net)	GAS	483	567	643	736	837	922	1016	1098	1175	1287
		OIL	482	566	642	734	836	921	1015	1096	1173	1285
1	Fuel Consumption	GAS	50	58.7	66.7	76.2	86.6	95.5	105.2	113.7	118.8	133.3
		OIL	47.6	55.9	63.5	72.6	82.6	91	100.3	108.3	115.9	127
	Maximum Design Pressure	Bar	6 BAR ALL MODELS									
2	Minimum Operating Pressure	Bar	0.5 BAR ALL MODELS									
3	Nominal Flue Connection Size		250mm DIAMETER				350mm DIAMETER					
4	Flue Gas Volume	m ³ /hr	656	770	874	999	1135	1252	1379	1491	1597	1748
	Flue Draught Requirements		0 – 4 mm ALL MODELS									
5	High Level Natural Ventilation to BS 6644	cm ²	1342	1550	1742	1973	2225	2439	2673	2878	3070	3350
5	Low Ventilation Natural Ventilation to BS 6644	cm ²	2684	3101	3485	3946	4451	4851	5346	5757	6141	6700
6	Mechanical Inlet to BS 6644	m ³ /sec	0.482	0.566	0.644	0.735	0.836	0.922	1.02	1.097	1.175	1.286
7	Water Connection Size (See Fig.3 & 4)	BSP	3"			4"						
8	Water Flow at 11°C Δ t	lit/sec	9.5	11	12.6	14.5	16.5	18.2	20.1	21.7	23.2	25.4
8	Minimum Water Flow at 11°C Δ t	lit/sec	5.2	6.1	6.9	8.0	9.1	10	11	11.9	12.8	14
8	Hydraulic Resistance at 11°C Δ t	kPa	2.8	4	5	6.5	8.2	11	13	14.5	15	21
9	Cold Feet Size to BS 6644 Minimum Bore	mm	38			50						
9	Open Vent Size to BS 6644 Minimum Bore	mm	50			65			80			
	Safety Valve Size to BS 6644 Nominal Size	mm	32	40	50		65				80	
2	Maximum Flow Temperature	°C	90°C ALL MODELS									
10	Minimum Return Temperature	°C	55°C ALL MODELS									
11	Dry Weight	kg	1460	1655	1850	2035	2230	2425	2620	2870	3065	3265
	Water Content	kg	285	330	375	420	465	510	555	600	645	690
	Power Requirements		415V ALL MODELS									

For metric to imperial conversions refer to chart inside back cover

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1. **FUEL CONSUMPTION**

Gas fuel consumption is based on natural gas with a gross calorific value of 38.6 Mj/m³. The gas rate should be corrected for the meter supply pressure particularly on high pressure supplies to prevent overfiring.

Oil fuel consumption is based on Class D (35 second) gas oil with a gross calorific value of 45.5 Mj/kg. Kerosene has a gross calorific value of 46.5 Mj/lit.

2. **MINIMUM OPERATING PRESSURE**

This is the minimum operating pressure of the boiler with pumps operating (NOT static pressure). The requirements of the Health & Safety Executive guidance note PM5 regarding maximum operating temperatures should be observed.

3. **BOILER FLUE CONNECTION**

This is the nominal flue size of the flue connection spigot, for dimensional details of the flue connection spigot see Fig.1. Actual flue size required to achieve correct draught and operation under all running conditions may need to be increased.

4. **FLUE GAS VOLUME**

Flue gas volumes are given at STP (standard temperature and pressure 15°C and 1013.25 mbar). Typical flue gas temperatures are 220°C at CO₂ levels of 9% and 12% respectively on gas and oil

5. **NATURAL VENTILATION**

The sizes indicated are free grille areas and are based on a single boiler installation.

6. **MECHANICAL VENTILATION**

The volume given is for a single boiler installation.

7. **WATER CONNECTION SIZES**

The boiler connections are flanged with 3" BSP screwed counter flanges provided. For further details on water connections see Fig.3 and Fig.4 3" – 4" extension turrets are provided with 4" weldable flanges.

8. **WATER FLOW RATES**

Water flow rates are given for boiler flow and return temperature differences of 11°C and 20°C.

9. **COLD FEED/OPEN VENT/SAFETY VALVE SIZES**

Sizes indicated are minimum sizes for single boiler installations.

10. **MINIMUM RETURN TEMPERATURE**

If system return temperatures below 55°C are required then contact the Potterton Commercial Technical Department.

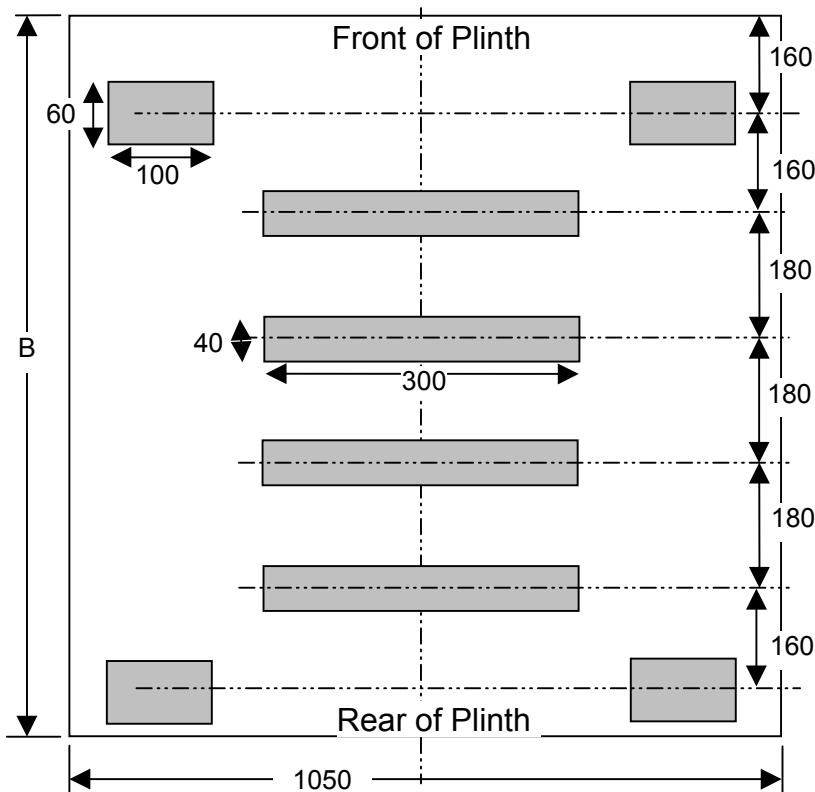
11. **WEIGHT**

The dry weight is exclusive of the burner and gas train, see burner data table for relevant burner weights. Each section measures approximately 1.4m x 1m x 0.18m and weights 196kg (front), 185kg (intermediate) and 200kg (rear).

NOTE: ANY PERSON OR PERSONS MOVING OR LIFTING SHOULD BE TRAINED IN MANUAL HANDLING TECHNIQUES AND IF NECESSARY USE SUITABLE LIFTING EQUIPMENT TO REDUCE THE RISK OF INJURY TO THEMSELVES OR OTHER PEOPLE.

12. Some burners may require higher than 17.0 mbar inlet pressure, please see relevant burner card for details, or contact the Commercial Technical Office.

Fig.2 – Isis Base Details



Feet details shown are from a 6 section boiler. For larger models additional intermediate section feet are added on 180mm spacing

Model	Length (B) Of Plinth
6	970
7	1150
8	1330
9	1510
10	1690
11	1870
12	2050
13	2230
14	2410
15	2590

NOTE: Boiler base **MUST NOT** Protrude from rear of boiler

CLEARANCES

The minimum boiler room clearances for access, erection and maintenance are as follows:-

- REAR - 500mm (19.7 in) or sufficient to make flue and water connections.
- SIDES - 200mm (7.9 in) + burner projection on one side, 500mm on the other.
- FRONT - The length of the boiler to allow for cleaning, 1100mm minimum.

BURNER INFORMATION

For general dimensions and specifications see Potterton Isis burner data sheets. (NB: There is a separate data sheet for each burner type, eg. NuWay, Riello, EOGB.)

The burner should be fitted in accordance with the instructions in Section 4.

The burner unit should be commissioned in accordance with the manufacturers instructions and Potterton burner card supplied with the burner to obtain the combustion figures detailed. Burner commissioning requires specialist knowledge and equipment. We therefore strongly recommend that the services of the Potterton Service Department should be used.

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Fig.3 – Boiler Water Connections (6 & 7 Section)

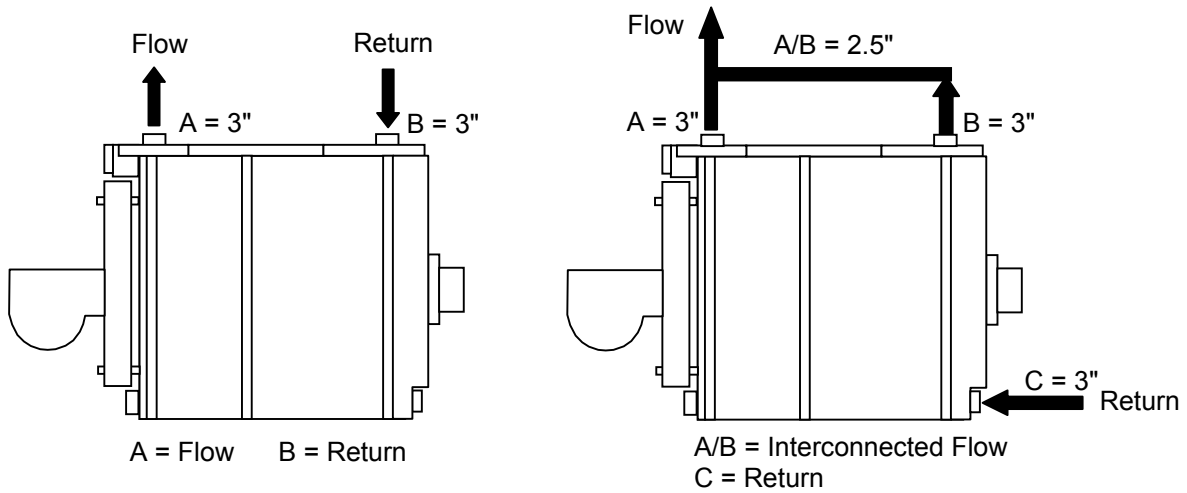
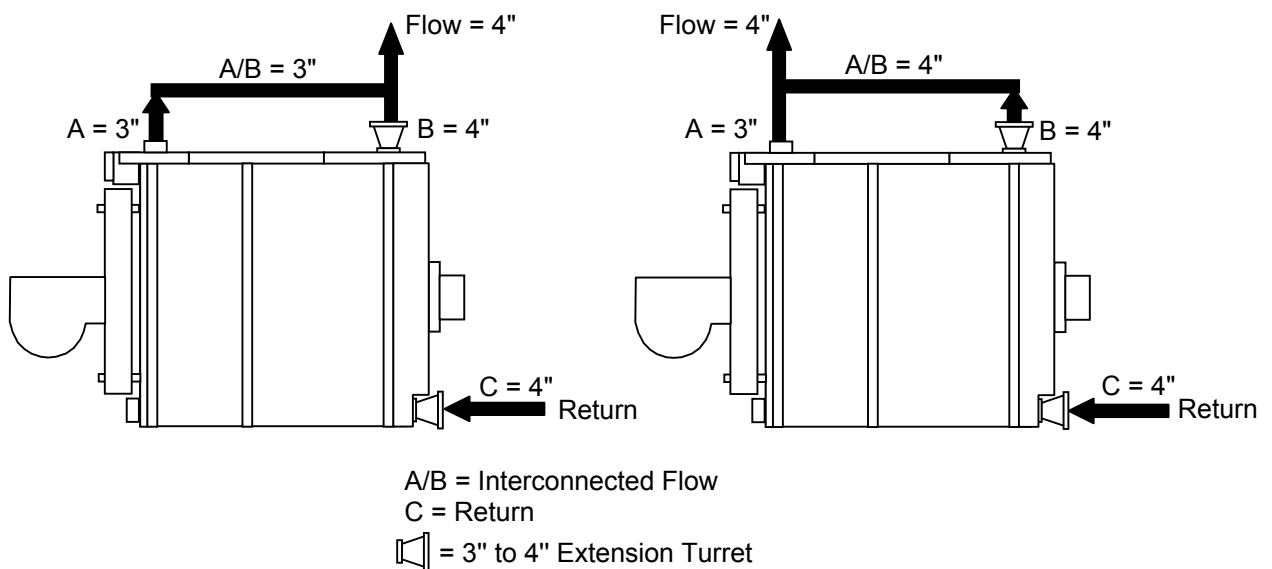


Fig.4 – Boiler Water Connections (8 – 15 Section)



GENERAL

This Boiler is **NOT SUITABLE** for installation in a normally occupied area. (i.e. Kitchen).

A **LIFETIME GAURANTEE** is available on this boiler please refer to our standard terms and conditions for details.

The Potterton Isis HE cast iron sectional boiler available in outputs from 440 kW (6 section model) to 1172 kw (15 section model). Specially designed and prewired control panels allow full boiler control. Table 3 gives kW output and technical data for each model.

The boiler has a match tested package burners, available for Natural Gas, LPG, 35 Second & 28 second Oil. Dual Fuel options are also available. The package burner is supported on the front waterway section to which it is attached by hinges on one side and locking nuts on the other. Hinge points are interchangeable allowing for left or right hand door opening by turning the door through 180° at the erection stage.

The Isis HE is suitable for use on fully pumped open vented or sealed systems with a maximum design pressure of 6-bar (87 p.s.i.) and up to a maximum operating temperature of 90°C.

The Isis HE boiler is an overpressure type with three pass, reverse flame design. The first two passes in the combustion chamber, the third in the convection tubes where the turbulence to achieve high heat transfer is generated by the extended surface area and inserts achieving operating efficiencies of up to 85.5% gross CV (91% nett CV).

The Isis HE is constructed with BS1452 Grade220 cast iron heat exchanger, constructed in accordance with EN303.1 The boiler package meets Gas and Oil requirements of M&E3 and burners EN767.

The waterway sections are joined with 'O' rings and secured with tie rods with the final sealing of the combustion chamber being made during assembly with boiler cement and silicone rubber.

The boilers are supplied unassembled and the largest individual section is approximately 1.4m x 1m x 0.18m and weighs approximately 198 kg.

A 70mm thick insulating blanket encloses the assembled waterway sections and the complete unit is enclosed with pre-coated steel panels finished in red.

Standard Supply

- Unassembled cast iron sections (number dependent on boiler output).
- Flue Spigot, insert tubes, combustion chamber door, burner adaptor plate, flanges, extension turrets.
- Boiler wrap around insulation
- Insulated casing
- Cleaning tools
- Control Panel

Controls

The Isis HE range are supplied as standard with an integral control panel which is fitted with boiler on/off control thermostat, high/low thermostat limit thermostat, boiler thermometer, water pressure gauge and overheat indicator light.

A 240V single-phase supply is taken to the control panel. A 415V three-phase supply should be taken to the burner motor connections.

Optional Extras

- Volt free contacts
- Fully closing dampers

Shipping – Packaging

The boiler package is delivered unassembled on two/three pallets depending on size with the burner separately either in a carton or pallet.

It is recommended that the manufacturer's trained engineers should carry out erection and commissioning, as will make valid the LIFETIME GUARANTEE. See back page of this manual for service office addresses.

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INSTALLATION

Before starting work a risk assessment should be carried out in the boiler and its access to determine and ensure a safe installation and working environment.

Any person installing or working on the boiler must be qualified & competent, and in the case of gas fired boilers attention is drawn to the mandatory requirement of C.O.R.G.I Registration and qualified to A.C.O.P's element 16. Also they must be electrically competent and adhere to the IEE regulations.

Manual Handling – Any person or persons moving or lifting the boiler or any part of it, should be trained in manual handling techniques and if necessary use suitable lifting equipment to reduce the risk of injury to themselves or other people.

The installation should comply with relevant British Standard Specifications, Codes of Practice and current Building Regulations, together with any special regional requirements of the Local Authorities, Gas Undertaking and Insurance Company. All electrical wiring must comply with the IEE Regulations for the Electrical Equipment of Buildings.

The installation of the boiler must be in accordance with the relevant requirements of: -

- Health & Safety at Work Act 1974.
- Building Regulations 1991
- Electricity at Work Regulations 1989
- Management of H&S at Work Regulations 1992
- Manual Handling Regulations 1992
- Model Water By-laws 1986
- BS 7671: 1992 – Requirements for Electrical Installations, IEE Wiring Regulations 16th Edition
- BS 6644: 1991 – Installation of Gas Fired Hot Water Boilers for Inputs between 60kW and 2MW
- BS 7074: 1989 – Part 2 – Application Selection & Installation of Expansion Vessels & Ancillary Equipment for Sealed Water Systems
- BS 6880: 1988 – Codes of Practice for Low Temperature Hot Water Systems
- BS 779: 1989 – Cast Iron Boiler for Central Heating & Indirect Hot water Supply (Rated Output 44kW and above)
- CP342.2 – Centralised Hot Water Supply
- Gas Safety (Installation & Use) Regulations 1994
- IM/11 Flues for Commercial and Industrial gas Fired Boilers and Air Heaters
- IGE/UP/1 – Soundness Testing & Purging Procedure for Non-domestic Installations
- IGE/UP/2 – Gas Installation Pipework, Boosters & Compressors for Industrial & Commercial Premises.
- BS EN 303.1 & 303

In the event of a gas booster being necessary refer to IM/16 'Guidance Notes on the Installation of Gas Pipework, Boosters and Compressors in Customers Premises' and the Gas Act 1972, Schedule 4, Paragraph 18.

Manufacturers notes must not be taken in any way as overriding statutory obligations.

In addition for oil fired appliances refer to the following:-

BS 799 Oil Burning Equipment.

BOILER SITING AND BASE

The boiler should be sited in accordance with BS 6644: 1991 with respect to protecting the boiler from damage, air for combustion and ventilation discharge of products of combustion, clearances for service and access, temperatures, noise levels, the disposal of boiler water and the effects of flooding of the boiler house or seepage from a roof top boiler house. See section 1 for required boiler clearances for service and access.

IMPORTANT: Boiler base must not protrude from rear of boiler otherwise difficulty will occur in fitting 3"- 4" extension turrets on rear return connections.

A level non-combustible floor capable of supporting the weight of the boiler filled with water, see technical data, together with any additional weight bearing down on the base from connections, burner, etc, must be provided. This will typically be a 50mm concrete plinth with an area equal to that of the plan of the boiler.

Consideration should be given to fitting steel strips beneath the boiler feet for boiler base protection, see Fig.2 for base details.

The boiler has a water cooled base and no special insulation is required. When preparing a site, reference should be made to Local Authorities and Building Regulations 1992.

Before any work takes place Risk Assessments should be carried out, to determine what possible risks are associated with the work which is taking place.

L.P.G boilers should not be installed in basements/below ground or in a well.

It is not recommended to install commercial boilers in kitchen or living areas.

For further advice on installations, refer to Potterton Technical Bulletins 1 –4.

VENTILATION

Safe, efficient and trouble free operation of conventionally flued boilers is vitally dependent on the provision of an adequate supply of fresh air to the room in which the appliance is installed. Account must also be taken of any other fuel burning appliance existing or to be fitted when designing the ventilation and combustion air systems.

IMPORTANT: The use of an extractor fan in the same room as the boiler (or in an adjacent room in communication) can, in certain conditions, adversely affect the safe operation of the boiler and therefore must be avoided.

Further guidance on ventilation for gas appliances is provided by BS 6644: 1991. For oil see relevant Standard.

FLUE

To ensure safe and satisfactory operation the chimney system, which may be individual or common in the case of modular boiler installations, shall be capable of the complete evacuation of combustion products at all times. The effective height of the chimney terminal(s) above the boiler(s) flue outlet(s) shall ensure sufficient buoyancy to overcome the resistance of the bends, tees and runs of the flue pipe involved and shall terminate in a down draught free zone. The number of bends used should be kept to a minimum and runs of flue pipe less than 45° to the horizontal should be avoided in order to comply with the recommendations made in BS 6644: 1991 and British Gas publication IM/11 "Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters". The third edition of the 1956 Clean Air Act Memorandum and the Building Regulations should be strictly observed and approval obtained where applicable, combustion chamber details are given in section 1.

The flue system must be designed to work specifically to remove the products of combustion.

IMPORTANT: 90° square bends must not be used on the flue system, including the boiler flue spigot, a straight length followed by an "easy sweep" or lobster back bend should be used.

FLUE SIZE CONSIDERATIONS

Nominal flue connection sizes are given in Table 3, these sizes refer to the boiler flue connection spigot.

The actual size of the flue system will depend on individual site applications. Below are general considerations on sizing flue systems.

Horizontal Flue Runs

Horizontal flue runs are not recommended particularly over 3m in length, where these are unavoidable advice should be sought from a flue system specialist.

Common Flue Systems

Where multiple boilers are installed on a common flue system then the flue system should be designed to ensure the correct operation of the flue on varying load conditions. In particular that the appliance flue draught is within the operating parameter under full load and partial load conditions. For safe and reliable operation of the boiler plant it is recommended that the variance in flue draught available at each appliance under full and part load operation is designed to a minimum.

(It is essential that the services of a specialist flue system manufacturer are sought for the design of common flue systems).

For further information regarding ventilation and flueing see Potterton Technical Bulletin No.4, current issue or see relevant British Standard publication BS6644: 1991.

THE ABOVE RECOMMENDATIONS ARE FOR GENERAL GUIDANCE ONLY. POTTERTON COMMERCIAL DIVISION CANNOT ACCEPT RESPONSIBILITY FOR FLUE SYSTEM DESIGNS BASED ON THE ABOVE RECOMMENDATIONS.

WATER CIRCULATION SYSTEMS

The water circulation system should be indirect and installed in accordance with the relevant parts of British Standards Codes of Practice CP342.2 and BS 6644: 1991.

The maximum and minimum design temperature differential across the boiler should be 20°C and 10°C and the boiler should be prevented from operating with flow rates giving a temperature difference across the boiler greater than 25°C based on the full boiler output.

It is essential that all pipework connections to the boiler are self supporting, correctly aligned and allow for free expansion of both boiler and pipework.

Care should be taken in the pipework design to prevent strain on the connections. Excessive strain can lead to premature failure of the boiler, which is obviously outside the terms of our warranty.

The use of expansion bellows to take up both axial and lateral movement is recommended.

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Boilers operating under constant flow conditions can be more accurately controlled and are not subject to excessive temperature stresses.

The boilers **MUST NOT** be fired under any circumstances with less than the minimum water flow.

On systems with variable flow rates due to flow reducing devices, ie. TRVs, zone valves, etc, or where the minimum heat demand, ie. summer domestic hot water load, does not achieve the minimum boiler flow rate then consideration shall be given to incorporating a primary loop system.

It is recommended that the system is designed to give a constant boiler flow rate. For further information on water circulation systems see Potterton Technical Bulletin No. 1 current issue.

BOILER PROTECTION

The provision of pump overrun by a time delay relay or a thermostat situated in the flow pipe close to the boiler is essential to remove residual heat from the boiler, see Fig.21, section 6.

Unions and isolating valves should be fitted to the flow and return manifolds so that the boiler can be isolated from the system if the need arises. Your legal obligations must be adhered to. (i.e. appropriate safety valves must be fitted).

System Filling

The system must be clean, as debris regress will damage the boiler.

IMPORTANT: The water level in the cistern or expansion tank should be minimal on cold charge to allow expansion without discharge from the overflow between cold and hot operating conditions.

SYSTEM WATER QUALITY

High efficiency boiler systems require the water quality of the system water to be controlled by the use of inhibitors to maintain a neutral Ph and inhibit corrosion. Additionally the water system should be free of leaks to prevent raw water make up which will dilute any inhibitors, promote corrosion and form lime scale.

Existing Systems

On existing systems where boilers are being replaced due to failure then the cause should be investigated before installing new boilers. This can normally be achieved by cutting open a failed boiler

section and examination for system debris or contamination.

Lime scale is a positive indicator of continuous system water make up due to water loss. Evidence of magnetite (black sludge) in the system and the formation of gas in radiators causing air locking is a positive indicator of corrosion.

Where an old system shows evidence of contamination then system cleaning should be carried out before installation of new boilers. The heating system should be chemically flushed to remove any lime scale or corrosion and a corrosion and lime scale inhibitor added. Lime scale descalers if incorrectly used could cause any remaining system debris to continue to breakdown and contaminate the new boiler causing boiler failure.

Advice on system cleaning and suitable products should be sought from specialist suppliers of system cleaners such as Fernox or Sentinel.

It is important to note that corrosion inhibitor can only be used in an attempt to prevent corrosion from occurring, where a system has an existing corrosion problem, inhibitors will be ineffective and the system requires cleaning.

On existing systems where comprehensive descaling and desludging cannot be carried out then consideration should be given to separating the new boiler system from the existing system pipe work by the use of plate heat exchangers.

New Systems

New pipe work systems should be thoroughly flushed with a suitable cleaning agent to remove debris and flux residues before filling. The system water should be dosed with a suitable corrosion and lime scale inhibitor.

System Water Monitoring

The system water should be monitored as part of a maintenance programme to ensure the following.
Raw water make up is not occurring.
Corrosion and lime scale Inhibitors are still active
Water Ph is below Ph 8.5 other wise on systems with aluminium content, component failures may occur.

SEALED SYSTEMS

General

Potterton Commercial boilers are suitable for use on sealed systems designed in accordance with BS 6644: 1991 and BS 6880 Part 2. In addition, reference should be made to the Health & Safety Executive guidance note PM5 "Automatically Controlled Steam & Hot Water Boilers."

BOILER ERECTION

A lifetime guarantee is available on this boiler when erection and commissioning is carried out by the Potterton Commercial service department and the system meets with our recommendations. Please refer to our standard terms and conditions for further details.

Risk Assessment

Before starting work a risk assessment should be carried out on the boiler house and its access to determine and ensure a safe installation and working environment.

Regardless of the type of activity being assessed, the principles of risk assessments are the same. The basic steps are: -

- Classify Activity
- Identify Hazards
- Identify Existing Control Measures
- Determine Risk
- Assess Acceptability of Risk
- Prepare a Control Plan
- Implement Plan
- Review Plan
- Record Results

Manual Handling

Any person or persons moving or lifting the boiler or any part of the boiler, should be trained in manual handling techniques and if necessary use suitable lifting equipment to reduce the risk of injury to themselves and other people.

Personal Protective Equipment

When undertaking any work you must comply with the Personal Protective Equipment Regulations 1992.

Confined Spaces

A "confined space" as defined in the Health & Safety Confined Spaces Regulations 1997 ' means any place, including any chamber, tank, vat, silo, pit, trench, pipe, sewer, flue, well or other similar space in which, by virtue of its enclosed nature, there arises a reasonably foreseeable specified risk.

Precautions should be taken in all areas where by virtue of its even partially enclosed nature, pose a reasonably foreseeable specified risk.

Electrical Safety

Working on appliances can be broken down into two main systems of work.

- 1) Safe systems of work are adapted for all boiler maintenance and repair work undertaken on site.
- 2) The work undertaken does not affect the electrical safety of the appliance. In particular the earth connected to the buildings fixed electrical installation.

In the case of (1) above electrical work should only be undertaken once the boiler has been isolated from the electricity supply and confirmed electrically dead. If this is impractical then suitable precautions must be undertaken to prevent injury.

In the case of (2) above checks are specified to identify any abnormality in the electricity supply to the boiler as well as to confirm that the boiler electrical connections are reinstated correctly where it is necessary to disconnect or reconnect any internal wiring within the boiler.

If it is necessary to disconnect and reconnect the appliance from the site electrical installation other than means of a plug and socket then additional checks shall be undertaken by an approved engineer to check the earth loop impedance in accordance with IEE regulations.

Always carry out preliminary electrical safety checks.

All appliances and central heating systems must be provided with their own means of isolation for safety purposes especially during installation and maintenance.

Packaging Details

A detailed breakdown of the contents of the packages is given in section 7.

Preparation

Preparatory to installation of the boiler a check must be made to ensure that suitable facilities are available for off-loading of the individual waterway sections and conveying them to the boiler room. Each waterway section weighs approximately 198 kg and measures 1400mm x 1000mm x 180mm. Ensure all manual handling techniques are followed.

Particular attention must be paid to ensuring cleanliness of the boiler room and waterway sections, dust or moisture may result in imperfect adhesion of the sealants which are applied during the erection of the waterways. All tapped holes should be degreased before making connections.

ISIS HE

C.O.S.H.H

During the erection procedure there are a number of items which are subject to the Control Of Substances Hazardous to Health (C.O.S.H.H) Regulations, and may require specialist personal protective equipment (P.P.E) beyond what is normally required. Listed below are the items subject to the C.O.S.H.H regulations and the recommended precautions that should be taken. For a full breakdown of any substances listed below, please contact the Commercial Technical Department.

- 1) **Fire Putty 1000** – Wear gloves, overalls and safety glasses. In the case of an irritation rinse the affected area with water and wash gently. In the case of eye contact, flush abundantly with water. If irritation persists seek medical advice.
- 2) **Brandkitt 1000** – Wear gloves, overalls and safety glasses. In the case of an irritation rinse the affected area with water and wash gently. In the case of eye contact, flush abundantly with water. If irritation persists seek medical advice.
- 3) **Refractory Ceramic Fibre** – Wear gloves and overalls. In the case of an irritation rinse the affected area with water and wash gently. In the case of eye contact, flush abundantly with water. If irritation persists seek medical advice.

**Potterton Commercial Customer
Erection/Assembly Check List**

The items listed below have been put together as a guide to what actions should be completed before the erection/assembly of a boiler takes place.

- I. Site access available for persons carrying out the proposed work.
- II. Site managers/personnel aware that work will be taking place.
- III. Risk assessments carried out on possible risks that may effect the persons carrying out the proposed work.
- IV. Sections and fittings boxes should be positioned adjacent to the plinth(s) within the boiler house prior to persons carrying out the proposed work attending site. If this is unable to be done notice prior to attending site should be given.
- V. When boilers are to be stripped and rebuilt, labour and transport should be provided for moving the sections from the delivery point to

the final erection point. If this is unable to be provided notice prior to attending site should be given.

- VI. Sections/casing, etc, should be kept in a clean and dry area prior to erection/assembly.
- VII. Water should be available.
- VIII. A drain off area should be available.
- IX. Power should be available.
- X. A site representative should be available at all times.
- XI. Clear instructions supplied to the persons carrying out the proposed work regarding positioning the boiler.
- XII. Fire evacuation procedures, facilities availability, specific health and safety information, etc, should be provided.

Items VII to X are essential if boilers require pressure testing.

Boiler Erection

Waterway Sealing

The waterway sections are sealed at assembly with silicone rubber compound (Flytande-Packning 260) and boiler sealing cement (Brandkitt-1000 Palokitti 1000). The waterway sealing grooves must be cleaned and primed with the primer liquid before applying the sealant. The primer must be dry before applying the sealant.

The silicone rubber compound and boiler sealing cement are supplied in cartridges which should be loaded into the sealant gun. The primer liquid is supplied in a bottle and is applied by hand (see Fig.4).

All sealing grooves must be primed and then filled with the appropriate sealant to form a bead approximately 5mm (1/4") proud. This is obtained by cutting the correct size aperture in the cartridge nozzle.

If the nozzle is not cut to approximately 5mm (1/4") diameter an incorrect amount of sealant will be applied. When piercing the sealant tube direct the nozzle away from the face or hands to minimise the risk of skin contact.

Before commencing sealing operations sealant and primer must be checked to ensure that there is sufficient for the sections being erected (see table 4 for specific quantities). It is advisable to keep spare cartridges to hand if these are available, particularly for the boiler cement as some cartridges may contain a certain percentage of water, which should be safely drained off before use.

The sealants and sealant gun, which are supplied with the boiler, are classified as consumables. In addition to this items standard boiler erection tools will be required. These should include a crowbar, heavy duty adjustable wrench and a jack for raising the firing door.

Erection procedure

Waterway Sections

1. Check off all materials and parts against the delivery document and boiler parts list (Section 7) ensuring that a sealant gun and adequate supply of sealants and primer have been provided.
2. Using a clean rag and paraffin, clean the 'O' ring grooves and sockets on the rear waterway section.

3. Clean all sealing grooves with a wire brush and apply the primer liquid using the applicator bottle provided. Allow the primer to dry. This is important otherwise the sealant may not stick.
4. Apply a coating of silicone rubber compound 5mm (1/4") proud around each of the two outer boiler sealing grooves. See Fig.5
5. Apply a liberal coating of boiler sealing cement around the inner sealing groove.
6. Support the rear section in its correct position on the boiler base.

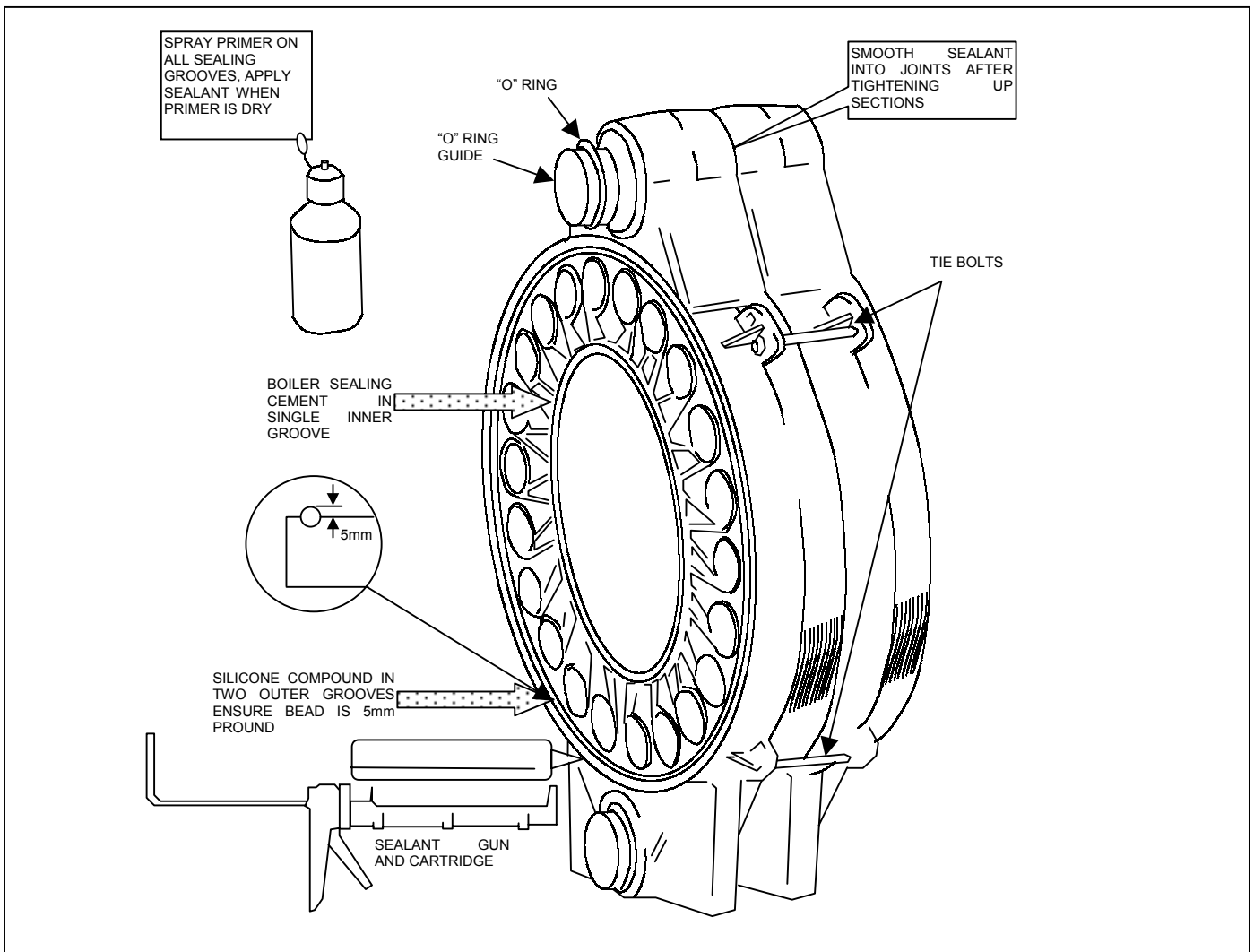
WARNING: THE SECTIONS ARE NOT SELF-SUPPORTING UNTIL SEVERAL SECTIONS HAVE BEEN ASSEMBLED TOGETHER. THEREFORE WHEN STARTING TO BUILD THE BOILER THE REAR SECTION AND ADJACENT INTERMEDIATE SECTIONS SHOULD BE ADEQUATELY SUPPORTED TO PREVENT INJURY OR DAMAGE. DUE TO THE WEIGHT OF THE SECTIONS ASSEMBLY SHOULD BE PERFORMED BY NO LESS THAN TWO OPERATIVES.

TABLE 4 – Section Build Data/Boiler Sealant Details (Giving quantities required per boiler size)

Boiler Size	Output kW	Front Section Pt.No.92210102 Weight 196kg*	Intermediate Section Pt.No.92210202 Weight 185kg*	Rear Section Pt.No.92210301 Weight 200kg	Boiler Cement (Brandkitt) Pt.No.922120 No. Rqd.	Silicone Sealant (Flytande) Pt.No.922111 No.Rqd.	Silicone Primer Pt.No.922119 No. Rqd.
6	440	1	4	1	5	9	2
7	516	1	5	1	5	11	2
8	586	1	6	1	6	12	2
9	670	1	7	1	7	13	3
10	762	1	8	1	8	15	3
11	840	1	9	1	9	16	3
12	925	1	10	1	10	18	3
13	1000	1	11	1	10	19	3
14	1070	1	12	1	11	20	4
15	1172	1	13	1	12	21	4

- Weights are approximate

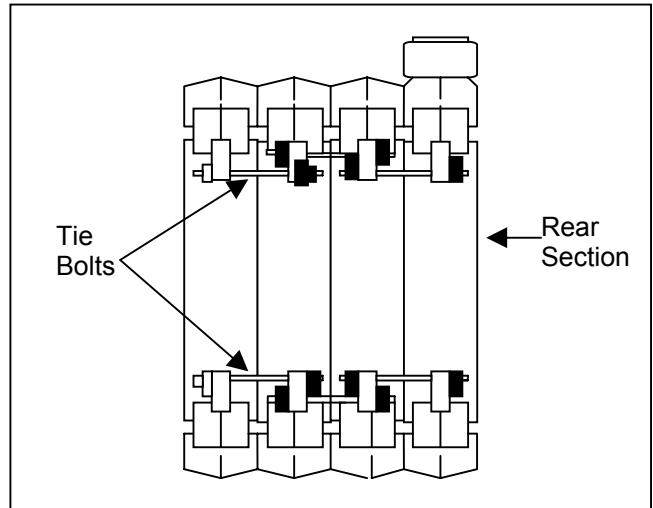
Fig.5 – Waterway Sealing Details



7. Fit a metal guide onto the top and bottom sockets in the rear section. These may require tapping into position using a mallet. Care should be taken to avoid damaging the guide rings. Fit an "O" ring over each guide ring.
8. Prepare one face of the first intermediate section as described in operations 2 – 5 and place in position for assembly to the rear section. The two faces that have been prepared utilising the sealants are now pulled together, this ensures adequate sealant is throughout the boiler sealing grooves.

Position the intermediate section directly in front of the rear section and using a crowbar under the bottom of the intermediate section, gently lift the intermediate section slightly upwards and towards the rear section engaging the two guide rings.

9. Insert tie bolts through the lower holes into the upper and lower securing lugs (Fig.6). Tighten these in turn diagonally to ensure that pulling-up is equalised so giving an even pressure on both 'O' rings. The bolts should be tightened until the two section faces are drawn together and touch around the circumference. Ensure all bolts are fully tightened. A maximum torque of 80 N/m should be applied.
10. Smooth over the sealing compound, which has squeezed the section joint and drew to leave a clean bead, slightly proud. Repeat the procedure after tightening each section.
11. At this stage, position the waterway sections so that the flue outlet is aligned with the flue ducting, if this is already in position. Ensure that the boiler remains in alignment during assembly of the waterways.
12. Prepare the sealing grooves and 'O' ring guides of the forward face of the intermediate section (assembled in operation 8) and the rear face of the next intermediate section to be fitted. Proceed as previously described until all intermediate waterway sections and the front waterway section have been assembled. The front waterway section should be installed with the chamfer pointing towards the front.

Fig.6 – Assembly Tie Bolts

13. Apply primer and silicone rubber compound to the outer grooves in the rear face of the rear waterway section and in the grooves on the face of the flue cover. Offer up the flue cover to the rear waterway section and secure with nuts and washers.

Checking for Leaks

1. Fit blanking plates and gaskets to the boiler flow and return connections but leave a suitable tapping on top rear connection as it used as an air vent during filling and testing.
2. Fit a drain cock with a 1" BSP connection to the flange on the boiler lower front.
3. With all outlets blanked off except the air vent, connect a water supply to the drain cock and fill the boiler. When this has been done all air expelled blank off the boiler vent.
4. The maximum design pressure of the boiler must not exceed 6 bar and the maximum test pressure must not exceed 9 bar.

The applied test pressure for assembled boiler for use on a system designed to operate with a flow temperature not exceeding 100°C (or 17°C below the saturated steam temperature at the design working pressure) shall be 1 ½ times the designed working pressure for a period of 30 minutes. See BS 779: 1989 for further details.

5. Check carefully for leaks around the 'O' ring joints and section interfaces.

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6. Open the drain-cock and drain the boiler. Remove the blanking plates. Connect the flow and return 3" – 4" BSP extension turrets to the boiler (8 – 14 Section only).

Boiler Dismantling

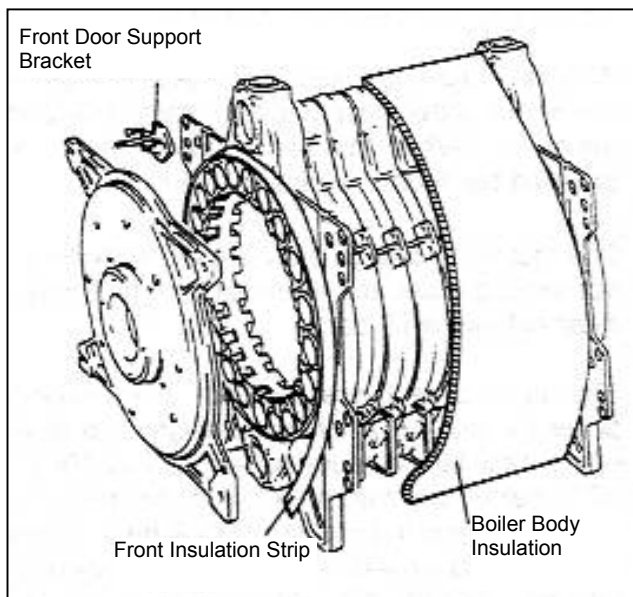
IMPORTANT: THE BOILER SECTIONS ARE NOT SELF SUPPORTING PARTICULARLY WHEN THERE ARE ONLY TWO OR THREE SECTIONS LEFT IN SITU. THEREFORE DURING DISMANTLING THE SECTIONS SHOULD BE SUPPORTED TO PREVENT INJURY TO OPERATIVES.

Dismantling of the boiler is a reversal of the erection procedure as previously detailed. Care should be taken during dismantling due to the weight of the sections and should be carried out by two operators at a time.

Fitting the Casing

To allow fitting of the electrical and fuel services it will be necessary to fit casing panels as detailed in the paragraphs 1 – 12 below, the flue spigot as paragraph 19 and the burner as detailed under relevant section. However, the remaining casing and insulation can, if required, be fitted after construction has ceased in the boiler house to minimise damage to the casing.

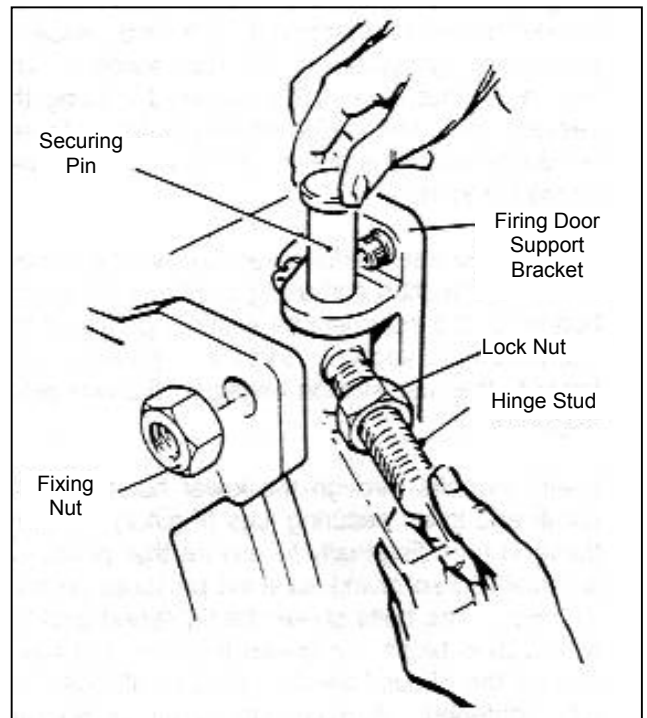
Fig.7 – Boiler Insulation



1. Fit the insulation strip to the front section as shown in Fig.7 and secure in position using the adhesive tape provided.

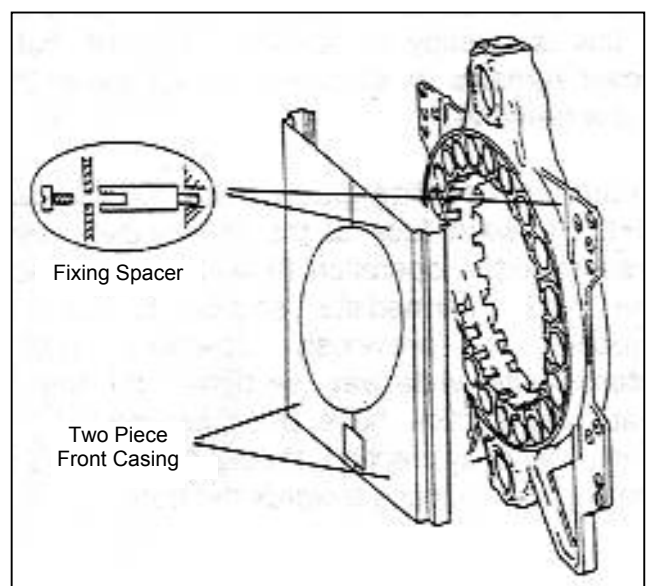
2. Fit firing door support brackets to the front face of the boiler, together with four studs and securing pins. Fit locknuts to the studs on the door hinge side, see Fig.8

Fig.8. – Fitting Locknuts to Studs

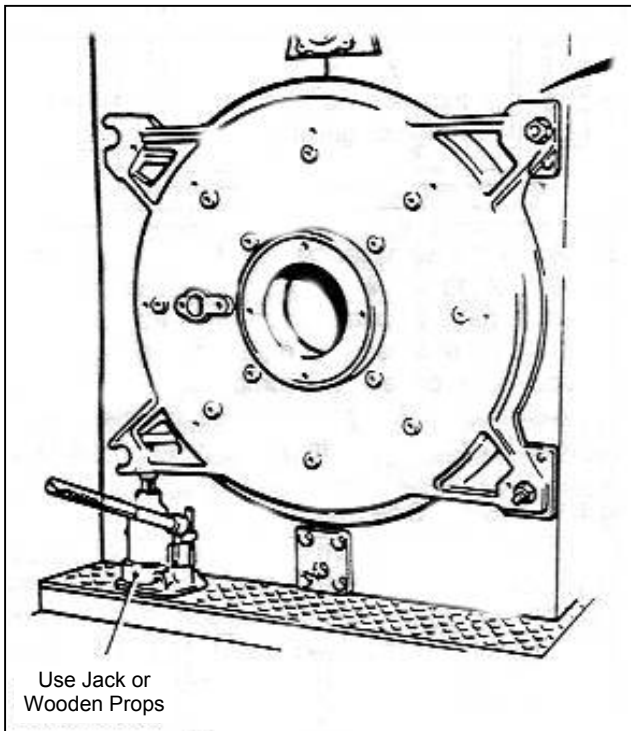


3. Fit the eight hexagonal spacers to the front section and fit the front boiler casing. This is a two piece construction using eight machine screws provided, see Fig.9.

Fig.9. – Front Panel Fixing



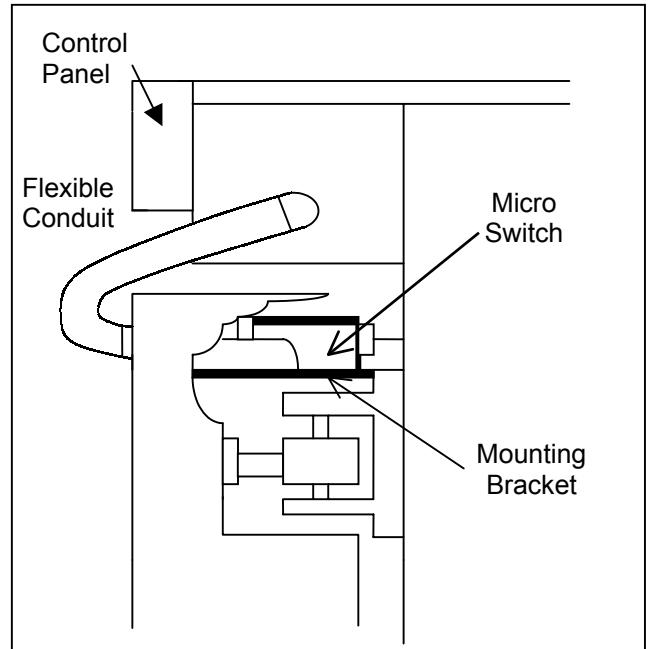
- Position the door for the required left or right hand opening. The two smaller of the four door fixing holes should be positioned on the hinge side. Using a jack raise it into alignment with the door brackets and engage the door holes with the appropriate hinge studs. Fit and tighten the fixing screws. See Fig.10.

Fig.10. – Door Fixing

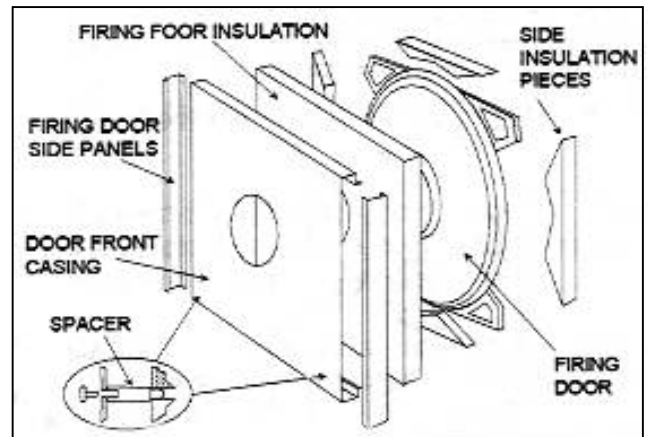
Close the door and fasten it with the door securing nuts, open it and check the impression of the sealing grooves in the braiding. There should be a uniform impression approximately 2mm in depth. Adjust by means of the fixing nuts to obtain the required impression. Tighten the fixing nuts and the door securing nuts diagonally – as you would when tightening the nuts on a car wheel. This is important as it ensures an even and adequate seal between the door and front section. Make sure all locknuts are fully tightened and forming an adequate seal between the door and combustion chamber.

- Fit the door micro switch using the bracket provided. Close the door and adjust the switch so that the plunger is depressed by the front panel when the door is closed. Slots in the bracket facilitates adjustment, see Fig.11.
- Fit the firing door insulation panel, see Fig.12.
- Fit the door casing using the four bolts, nuts and spacers provided, ensure that the top and bottom

side insulation pieces are placed in position, see Fig.12

Fig.11 – Door Micro Switch

Fit the firing door casing side panels using the six screws provided, see Fig.12. When fitting the door casing ensure that the two side insulation pieces are inserted.

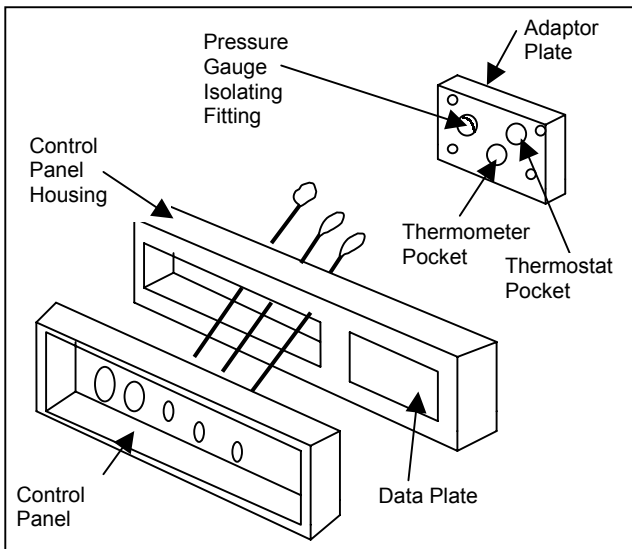
Fig.12 – Firing Door Casing & Insulation

- Fit the adaptor plate and gasket, see Fig.13, to the front waterway section. Screw the thermostat, thermometer pockets and the pressure gauge self isolating fittings into the tapings in the adaptor plate.
- Fit the control panel housing to the front casing using the four screws provided, see Fig.13.

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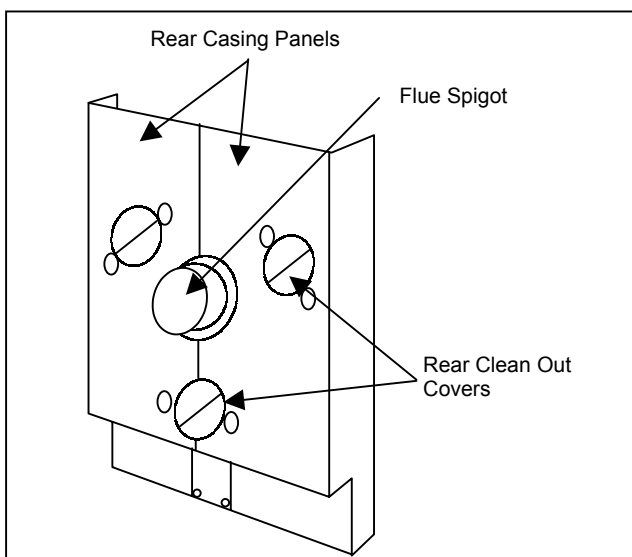
- Fit the control panel using the four screws provided ensuring that the thermostat and thermometer phials are connected into their pockets and the pressure gauge sensing head to the isolating fitting.

Fig.13 – Control Panel



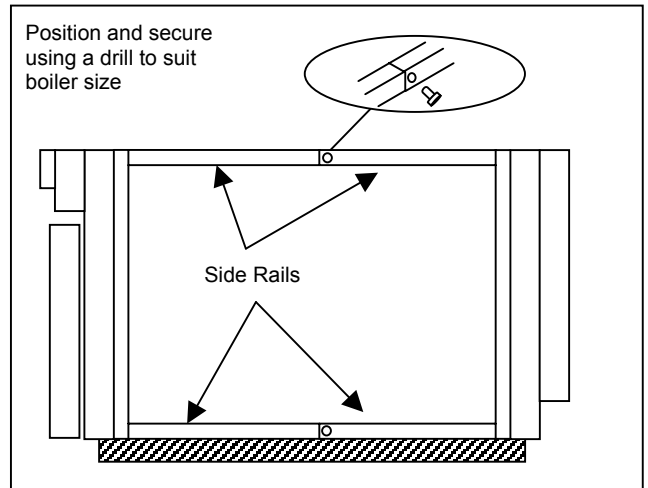
- Insulate the main boiler body ensuring that the insulation is drawn down equally on both sides to the base of the boiler. On larger boilers, where two pieces of insulation are provided, tape the insulation joint with the tape provided.
- Insulate the rear section using the insulation panels provided and mount the rear casing panels using the three bolts and washers and secure the two panels together using the screws provided, see Fig .14.

Fig.14 – Rear Casing



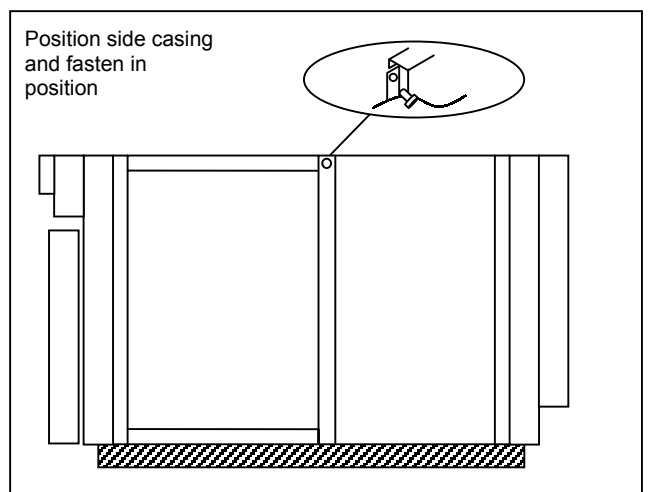
- Mount the rear lower panels.
- Mount the side rails, Fig.15. On 6 section boilers these are omitted. On larger boilers there are eight rails provided (two for each corner) which should be drilled and fixed together to obtain the correct overall case dimension, (see Table 1.).

Fig.15 – Boiler Side Rails

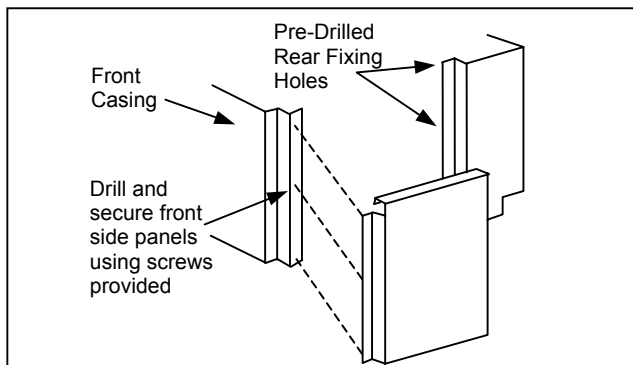


- Mount the side casing panels starting from the rear of the boiler. Larger boilers will have additional side panels, see parts list. It will be necessary to drill fixing holes for these additional panels to compensate for erection tolerances. Ensure side case panels are level from front to back before drilling, see Fig.16.

Fig.16 – Boiler Side Panel Fixing



- Drill and secure the side panel to the front panel using the screws provided, see Fig.17.
- Mount the top panels as shown in Fig.11. Drill and secure in position using the screws provided.

Fig.17 – Side/Front Panel Fixing

18. Fit the sight glass. The sight glass is placed between the two gaskets in the cast flange, which is then bolted onto the door.
19. Mount the rear cleaning doors and flue connection spigot ensuring that the flue gasket is used, see Fig.14.
20. Mount the data plate on the front control panel housing using the fixing screws provided, see Fig.13.
21. When the installation is complete and the boilers are ready to be commissioned, remove the protective plastic film from the casing panels.

Fitting the Inserts

The Isis HE boiler utilises steel insert tubes in the flue way passes to extend the effective heat exchanger surface area thus increasing the operating efficiency.

WARNING THESE INSERTS MUST BE INSTALLED BEFORE THE BURNER IS FIRED OTHERWISE DAMAGE MAY OCCUR TO THE FLUE SYSTEM DUE TO HIGH EXHAUST GAS TEMPERATURES.

1. The insert dimensions vary depending on the boiler size and the dimensions of the tubes to be fitted should be checked against the sizes given in the Parts List prior to fitting to ensure the correct inserts are installed.
2. The inserts should be installed with the pointed end, incorporating the removal ring, pointing towards the front of the boiler and must be pushed fully back as shown in Fig.18.

IMPORTANT: If the inserts are not correctly installed damage to the insert may occur.

3. The inserts should be positioned to ensure that they sit on the support feet as detailed in Fig.19.

Insert Removal

The inserts should be removed using the insert removal tool provided by hooking the insert removal ring and withdrawing.

Boiler Tool Storage

Following completion of boiler assembly, the cleaning tools, insert removal tool and door access socket and "T" bar should be left in a safe and secure position within the boiler room. It is recommended that a tool rack is incorporated within the boiler house for this purpose.

Fitting the Burner

1. Check that the burner which has been supplied is the correct type for the boiler.
2. Fit the burner adaptor plates and boiler gasket to the boiler using the M12 countersunk fixing screws.
3. Place the burner gasket over the burner fixing studs.
4. Insert the burner draught tube into the firing door aperture with the gasket in position on the mounting flange. Secure in position with the nuts and washers provided.
5. Prepare the "Cafco Blaze" insulating compound as detailed below and pack it between the draught tube and the firing door refractory. It is essential that the whole gap is filled and that the compound be compressed and finished flush with the inner face of the door refractory lining.
6. Connect the fuel supply to the burner. The fuel supply pipes should be self-supporting and not apply undue pressure on the burner.
7. Connect the sight glass cooling tube. One end joins the burner body, the other end with the sight glass nipple.

IMPORTANT: Failure to connect the cooling tube can cause damage to the boiler if operated.

8. Connect the burner cable and plug to the Amphenol socket on the control panel.
9. Check the weight of the burner has not affected the sealing of the door to the front section, especially after the door has been opened and closed several times.

Larger burners, especially dual fuel types, should be supported independently with a suitable device whilst still allowing the door to be opened.

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Cafco Blaze Preparation

The Cafco Blaze compound is supplied in nominal 2kg packages. The compound should gradually be mixed with water until pliable. The Cafco Blaze absorbs approximately 2 litres of water per kilogram.

Table. 5 – Insert Dimensions

No of Sections	6	7	8	9	10	11	12	13	14	15
L = Overall Length	945	1125	1315	1315	1665	1665	2025	2025	2385	2385
D = Major Diameter	60	60	55	55	60	60	55	55	50	50
d = Minor Diameter	60	60	50	50	54	54	50	50	44.5	44.5
A = Major Diameter Length	455	635	615	615	1165	1165	1325	1325	1685	1685
B = Minor Diameter Length	490	490	700	700	500	500	700	700	700	700

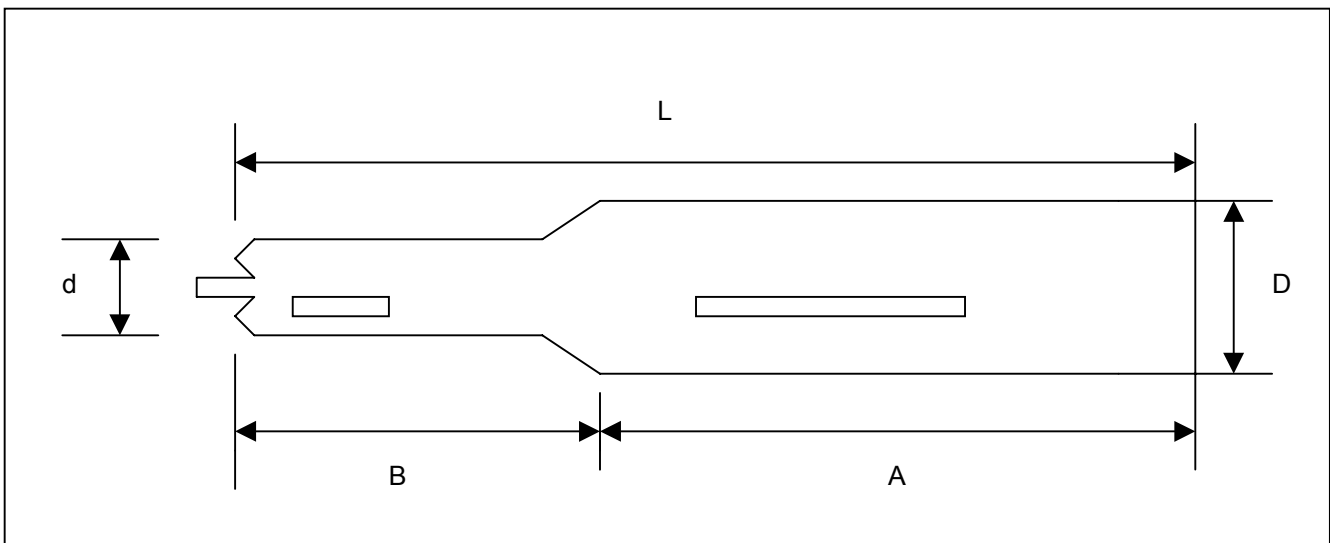
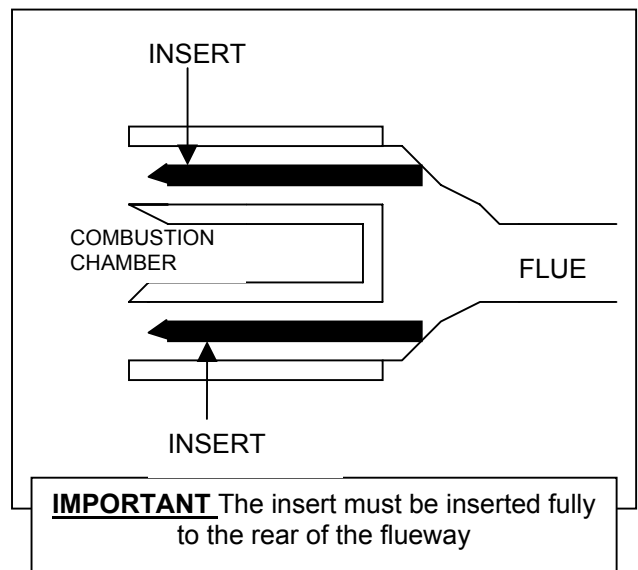
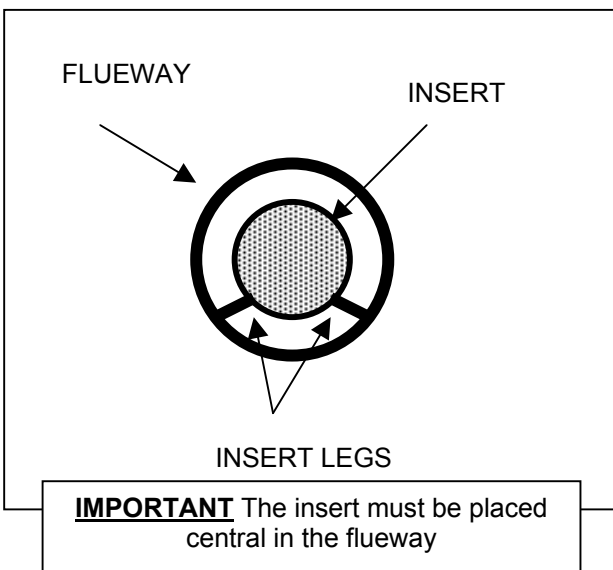


Fig.18 – Insert Position

Fig.19 – Insert Position



BOILER MAINTENANCE

It is essential for efficient and trouble free operation that the boiler plant is regularly maintained. This must be carried out by qualified and experienced engineers and in the case of gas fired appliances attention is drawn to the mandatory requirement of CORGI (Confederation of Registered Gas Installers) registration of personnel undertaking work on these appliances. This facility is available from Potterton Commercial Division, details are available from regional offices listed on the back page back of this manual.

Boilers should be serviced and re-commissioned as a minimum on an annual basis.

It is strongly advised that a maintenance contract be entered into with Potterton Commercial Division to ensure that the boiler/burner unit is correctly and properly maintained.

WARNING

Isolate the electrical and fuel supplies before attempting any maintenance work.

Cleaning of Flue Surfaces

The boilers are supplied with a set of cleaning tools comprising flueway brushes and extension rods for routine cleaning procedures as detailed in the parts list. Boilers may require periodic cleaning with specialist mechanical equipment dependent on boiler conditions, fuel type, etc.

Cleaning of the boiler requires opening of the door, removal of the boiler inserts, these should be removed and re-installed as detailed in Section 4.

Frequency of boiler cleaning varies and is dependent on site conditions, fuel type, heat load, design of controls and running conditions.

For the maximum efficiency and economy in running it is essential that the combustion chamber and flueway surfaces should be kept clean and free from deposits.

A layer of deposits 1/16" thick will reduce the heat transfer through the tube wall by up to 10%.

Not only does this waste fuel but the higher flue gas temperatures that result will increase the thermal stress within the boiler and may lead to joint leakage or in extreme cases section failure.

Natural gas, manufactured gas & LPG Fired Boilers

We recommend brushing out of the combustion chamber and flueways and the removal of the rear clean out covers to check for deposits in the flue box twice a year.

Class 'D' Fuel Oil

The boilers should be brushed out thoroughly at least bi-monthly for 35 second and Class 2, 28 second during the heating season but more frequent attention may be necessary dependent on the operating conditions to prevent the formation of hard adherent scale on the tube surfaces.

It is essential to ensure that cleaning is carried out throughout the full length of the flue tube passes and that the rear clean out covers are taken off to allow for removal of deposits brushed through into the flue box.

Should a heavy or tough adherent deposit become formed, which is too hard for the standard brush to remove, it may be necessary to either:-

1. Wash out the tubes with water followed by a thorough brushing – this may have to be repeated several times.

Or

2. Use a flexible drive rotary tube scaling machine.

Classes 'E' & 'F' Fuel Oils & Sludge Gas

Maintenance for boilers running on these fuels will be required at more frequent intervals, possibly on a weekly basis or even a daily basis dependent on fuel type and quality.

Boiler Ancillaries

Check the sealing of the boiler door against the front section. There should be a uniform depression about 3/32" (2mm) deep from the sealing grooves of the front section in the braiding. If this is not uniform, the sealing may be adjusted by the locknuts on the hinge pins – see Fig.8. Make sure the locknuts are fully tightened after adjustment is complete.

Keep a regular check on the condition of the door refractory and the infill around the burner draught tube. If there is any deterioration this must be made good immediately to prevent damage to the boiler and burner.

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Boiler Controls

The operation of boiler controls including control thermostat, high/low thermostat and overheat thermostat should be checked on an annual basis and the burner recommissioned as detailed below.

Safety Interlocks

The operation of safety interlocks such as flow proving on mechanical flue/ventilation systems should be checked to ensure that operation of the boiler is prevented on a fault.

COMMISSIONING

IMPORTANT: The boiler must be commissioned following completion of installation. Operation of an uncommissioned appliance may cause injury to personnel and damage to the boiler/burner unit and could invalidate the manufacturers warranties.

Commissioning should only be carried out by personnel approved and competent to do so. This facility is available from Potterton Commercial Service Offices at the addresses as listed on the back page of this manual.

Commissioning of the burner unit should be carried out in accordance with the burner manufacturers handbook provided with combustion adjustments in accordance with the Potterton burner data sheet also provided.

Before commencing to commission the burner check the following.

1. Electrical supply is of correct voltage and polarity and earthing is available.
2. Fuel supply is tested for leakage and purged of air. Ensure the burner is suitable for the connected fuel supply and pressure.
3. Boiler and system are fully flooded with water and the operating pressure is within the appliance range.
4. Pumps are operational and any flow proving interlocks are functional. The operation of the pump should be checked, particularly on sealed systems, to ensure that operation does not cause a reduction in pressure within the system below the minimum operating pressure. See section 3 for further details on water circulation systems.
5. Ventilation is adequate and, in the case of mechanical ventilation systems, operation of the

boiler is inhibited unless the ventilation fan is proved.

6. On mechanically assisted flue systems the operation of the boiler plant should be inhibited unless the mechanical flue system is operational and flow proved.
7. The safety valve should be checked to ensure that it is of the correct size and pressure. See Section 3 for further details.
8. The cold feed and open vent sizes should be checked. See Section 3 for further details.
9. Ensure the burner fitted to the boiler is of the correct specification and size for the boiler and suitable for the fuel supply available.
10. The burner blast tube has been sealed to the door refractory and the boiler door seal is correct. See Section 4 for further details.
11. The sight glass cooling tube is connected between the boiler sight glass and burner body.

IMPORTANT: Operation of the burner without the cooling tube connected can lead to boiler damage and a hazardous condition occurring.

12. The boiler door micro switch prevents operation of the burner when door seal is broken.
13. The boiler inserts have been correctly fitted, see Section 4.

Following completion of the above checks the burner should be commissioned in accordance with the burner manufacturers handbook provided with the burner. The combustion figures, etc. should be completed on the commissioning form provided at the back of this manual and returned to Potterton Commercial at the address on the back page.

IMPORTANT: The boiler/burner units are supplied in accordance with Potterton Commercial Quality Assurance plan registered to meet the requirements of BS 5750 Part 2. A condition of the supply of the appliance for compliance with this Quality Assurance plan is the return of the appliance commissioning report.

Following/during commissioning of the burner unit the following additional checks should be carried out.

14. Operation of the control, high/low and high limit thermostats should be checked for correct operation.

15. The flue draught available at the appliance flue outlet should be checked under all operating conditions (hot and cold) and should be within the boiler operating parameters, see Table 3
16. The fuel supply to the appliance should be isolated and the burner operated to ensure safety shut down and lockout of the burner on flame failure.
17. Shut down of the boiler plant by external controls does not cause a hazardous condition and pump overrun is provided to remove residual heat from the boiler.
18. Following commissioning the boiler overheat and control thermostats should be set to the required operating setting. See Section 3 for maximum operating temperature.
19. Following completion of commissioning the soundness of all automatic fuel valves should be checked for leakage.

Additional Checks

Where possible the system should be checked to ensure that following purging of air there is no raw water make-up. In particular, when the system is operated in the hot condition, there should be no discharge of water from the safety valve, open vent or cold feed tank overflow that would otherwise lead to unregulated raw water make-up when the system cools down.

COMBUSTION ANALYSIS (Natural Gas)

When commissioning the burner the combustion figures must be within the following limits:-

CO ₂	9 – 9.5%
CO	0 – 100ppm
Flue Temp	160 220°C (nett)

BURNER FAN ROTATION

Prior to firing the burner check the rotation of the burner fan is correct by starting the burner when switching off and watching the fan slow down (refer to burner manufacturers instructions for correct rotation direction).

FAULT FINDING

General fault finding for burner failure should be in accordance with the burner manufacturers handbook. Set out below are general guidance notes on system fault finding.

Overheat Operation

- a) The boiler/system pump is adequate for the duty.
- b) Operation of flow reducing devices, ie, TRV's compensated mixing valves, etc., do not reduce the water flow rate through the boiler below the minimum flow rates.
- c) Pump overrun is incorporated to dissipate residual heat from the boiler on system shut down.
- d) The operation of boiler back end valves incorporate a time delay to allow for removal of residual heat from the boiler.
- e) The boiler is operating at the correct rate and is not overfired.

The use of a primary loop system is highly recommended to provide a constant boiler flow rate under all operating conditions. For further information refer to Potterton Publication Technical Bulletin No.1 Issue 3.

Burner Lockout

The package burners supplied with the boiler unit have an integral safety system to allow the safe and reliable operation of the burner. Failure of the burner to operate correctly will cause the burner control box to "lockout" and the lockout button on the burner will illuminate to indicate this.

The lockout condition can be manually reset by pushing the reset button and the control box should restart its control sequence in an attempt to light the burner. If the control box lockout will not reset or goes to lockout after being reset then the services of a boiler repair/maintenance company should be sought. This service is available from Potterton Commercial Division service offices at the addresses on the back page of this manual.

WARNING: The lockout reset button should not be repeatedly operated otherwise a hazardous situation may occur.

Should the boiler go to lockout, check the following before attempting to relight the burner.

1. Fuel is available at the burner.
2. The electrical supply to the appliance is of the correct voltage and polarity.

The boiler control boxes in some instances have indicator dials as an aid to fault finding on boiler lockout. In these instances refer to the control box manufacturers data sheet for fault finding details.

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Fig.20 – Control Panel Wiring

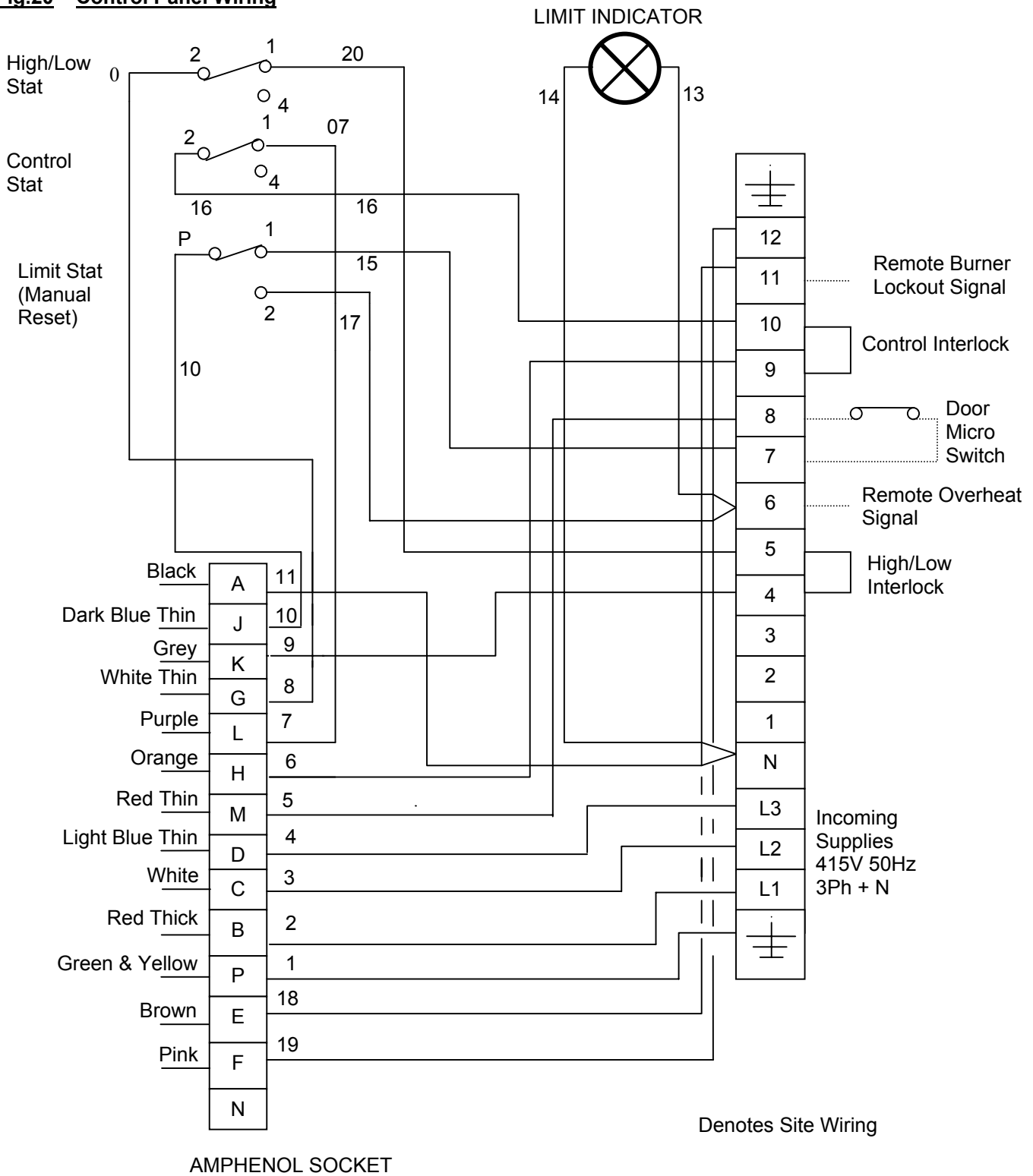


Fig.21 - Pump Overrun Using Changeover Pipe Thermostat

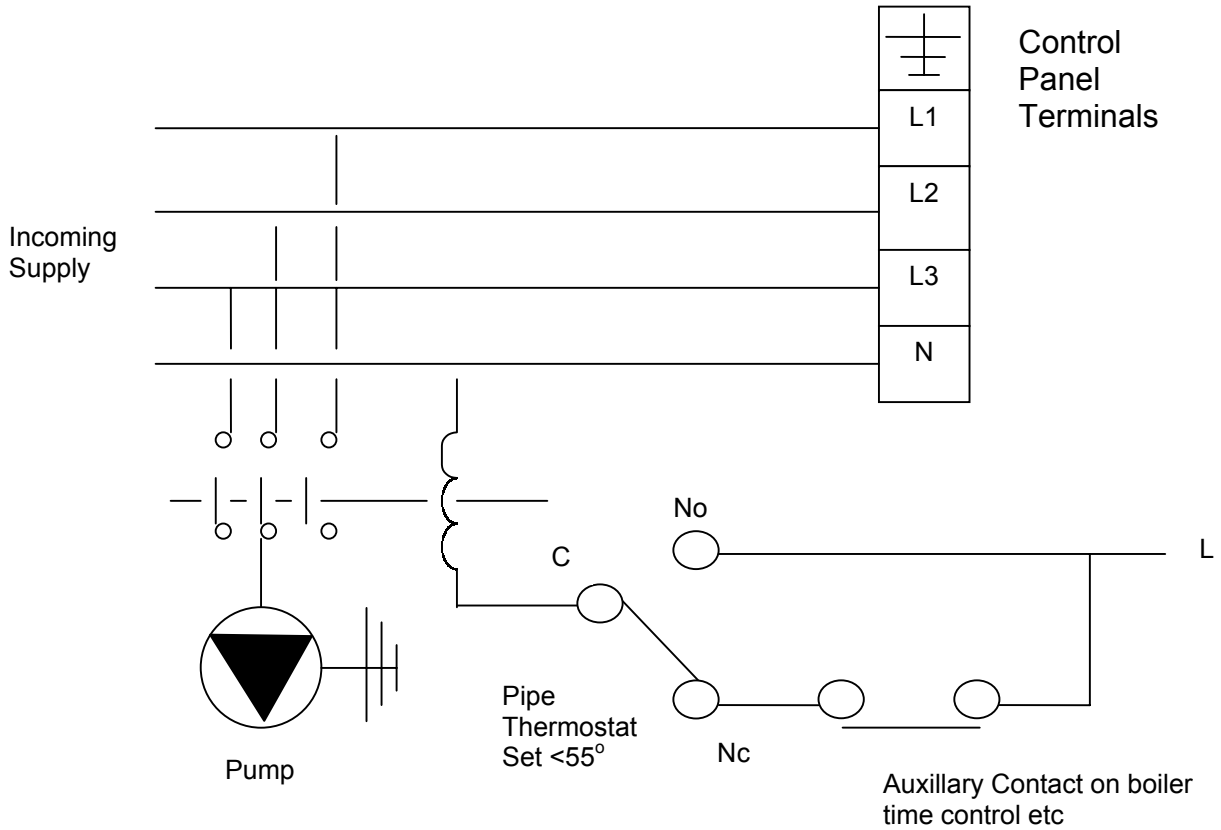
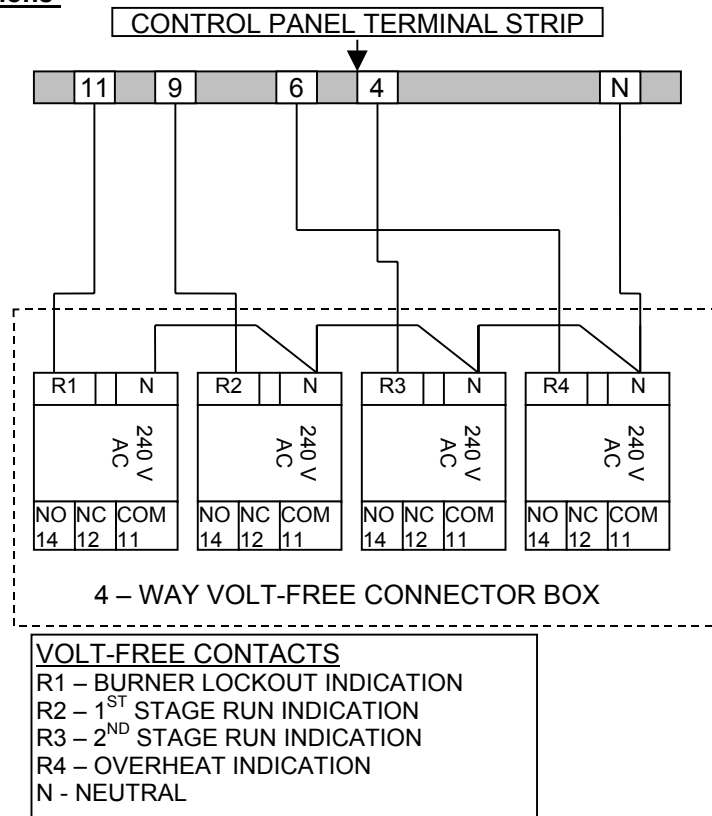


Fig.22 – Volt Free Connections



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ISIS CASING PACK DETAILS (See Drawings)

ITEM	DESCRIPTION	PART NUMBER	QTY/BOILER
A	Front Door Side Plates	922177	2
B	Front Door Casing (Not including side plates)	922176POT	1
C	Control Panel (Complete with Instruments)	922212POT	1
D	Control Panel Housing	922211	1
E	Front Left Hand Panel	922193	1
F	Front Right Hand Panel	922192POT	1
G	Side Panel	(See Table Below)	
H	Left Hand Rear Panel (4– 9 Section)	922196POT	1
	Left Hand Rear Panel (10 – 14 Section)	922197	1
J	Right Hand Rear Panel (6 – 9 Section)	922194	1
	Right Hand Rear Panel (10 – 14 Section)	922195	1
K	Rear Bottom Left Hand Panel	922200	1
L	Rear Bottom Right Hand Panel	922199	1
M	Control Panel Top Plate	922213	1
N	Top Front Panel	922210	
P	Top Rear Intermediate Panel	(See Table Below)	
	Top Intermediate panel *NOT SHOWN* (7 – 14 Section)	922209	1
Q	Top Rear Edge Panel	922198	1
R	Front Door Outer Insulation	922173	1
S	Front Door Top/Bottom Insulation Panels	922175	2
T	Front Door Side Insulation Panels	922174	2
V	Flue Hood Insulation (Left Hand)	922218	1
W	Flue Hood Insulation (Right Hand)	922218	1
X	Side Panel Support Rail	(See Table Below)	
	Boiler Body Insulation 1.2m Roll *NOT SHOWN*	(See Table Below)	
	Boiler Body Insulation 0.6m Roll * NOT SHOWN*	(See Table Below)	
	Front Casing Insulation Strip * NOT SHOWN*	922217	2
	Insulation Sealing Tape *NOT SHOWN*	922214	2
	Cafco Blaze Burner Sealing Compound *NOT SHOWN*	923010POT	2 bags

Casing Pack Details

Boiler Sections	SIDE PANEL No. Off x part No. x length	TOP REAR INTERMEDIATE PANEL No. Off x part No. x Length	SUPPORT RAIL No. Off x Part No. x Length	BOILER INSULATION No. Off x Pt. No x Width
6	2 x 922205 x 916mm	1 x 922208 x 799mm	- x - x -	1 x 922215 x 1.2 m
7	4 x 922203 x 556mm	1 x 922206 x 439mm	4 x 922201 x 1057mm	1 x 922215 x 1.2 m
8	2 x 922203 x 556mm 2 x 922204POT x 736mm	1 x 922207 x 619mm	4 x 922201 x 1057mm	1 x 922215 x 1.2 m 1 x 922216POT x 0.6 m
9	2 x 922203 x 556mm	1 x 922208 x 799mm	8 x 922201 x 1057mm	2 x 922215 x 1.2 m
10	6 x 922203 x 556mm	1 x 922206 x 439mm	8 x 922202 x 1520mm	2 x 922215 x 1.2 m 1 x 922216 x 0.6 m
11	4 x 922203 x 556mm 2 x 922204POT x 736 mm	1 x 922207 x 619mm	8 x 922202 x 1520mm	2 x 922215 x 1.2 m 1 x 922216 x 0.6 m
12	4 x 922203 x 556mm	1 x 922208 x 799mm	8 x 922202 x 1520mm	2 x 922215 x 1.2 m 1 x 922216 x 0.6 m
13	8 x 922203 x 556mm	1 x 922206 x 439mm	8 x 922202 x 1520mm	2 x 922215 x 1.2 m 1 x 922216 x 0.6 m
14	6 x 922203 x 556mm 2 x 922204POT x 736mm	1 x 922207 x 619mm	8 x 922202 x 1520mm	3 x 922215 x 1.2 m
15	4 x 922203 x 556mm 4 x 922204POT x 736mm	1 x 922208 x 799mm	8 x 922202 x 1520mm	3 x 922215 x 1.2 m

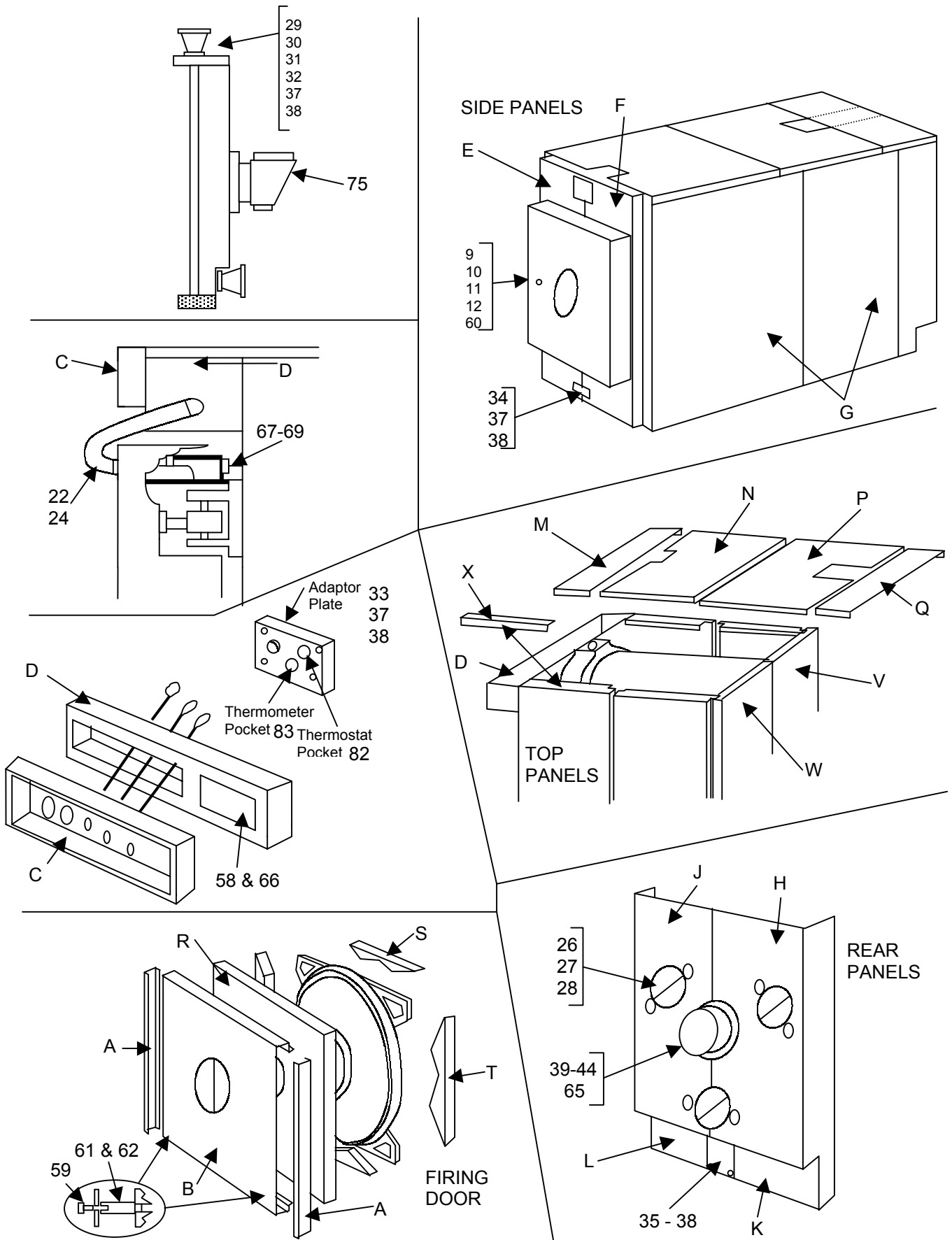
ITEM	DESCRIPTION	PART NUMBER	QTY/BOILER
1	Front Section	92210102	1
2	Intermediate Section	92210202	See Table
3	Rear Section	92210301	1
4	Flue Hood – 250 mm Diameter (6 – 9 Section)	922132POT	1
5	Flue hood – 350 mm Diameter (10 – 15 Section)	922151	1
6	Guide Ring (Solid)	922044POT	See Table
7	"O" Ring (7.3 mm)	922048POT	See Table
8	Front Door (including refractory – 305 mm Diameter)	922107	1
8a	Front Door Rope Seal (Not shown)	922153	1
9	Inspection Glass (including gasket)	922109	1
10	Flange for Inspection Glass	922134	1
11	Cooling Tube	922089	1
12	Connector for Cooling Tube	922108POT	2
13	Front Door "T" Bar	922178	1
14	36 mm Socket for Item 13	922179	1
15	Hinge Bracket	922135	4
16	Hinge Bolt	922112POT	4
17	Retaining Pin	922141POT	4
18	Door Closing Nut – M24 x 55	922180POT	2
19	Door Micro Switch (excluding items 20-25 67&68)	922118	1
20	Bracket for Micro Switch	922165	1
21	Flexible Conduit	922181	1
22	Conduit Elbow (including nut)	922182	1
23	Conduit Coupling (excluding Nut)	922183	1
24	Coupling Nut	922184POT	1
25	Micro Switch Bracket Fixing Screw – M6 x 12mm	922005	2
26	Clean Out Door		3
	Insulation Block	922125	1
	Screws Hex M6 x 30 mm`	COM920060	1
27	Locking Handle (excluding item 28)	922015	6
28	M10 x 50mm Stud	922185	6
29	3" to 4" Extension Turret	922126	2
30	4" Counter Flange (Table D)	650115	2
31	4" Gasket	354697	2
32	M16 x 50mm Bolt including Nut	617610	8
33	Flange for Thermostat	922131	1
34	Flange for Drain (3/4")	922127	1
35	Flange – 3"	921948POT	2
36	Flange Blank	922328POT	1
37	Gasket – 3"	920326	6
38	M12 x 40mm Screw (for 3 flanges)	920007	24
39	Flue Spigot – 250mm Diameter (6 – 9 Section)	922147	1
40	Flue Spigot – 350mm Diameter (10 – 15 Section)	922046	1
41	Gasket for 250mm Diameter Flue Pipe (6 – 9 Section)	922148POT	1
42	Gasket for 350mm Diameter Flue Pipe (10 – 15 Section)	922047	1
43	M10 x 30mm Screw – Flue Spigot (6 – 9 Section)	920063POT	4
	M10 x 30mm Screw – Flue Spigot (10 –15 Section)	920063POT	6
44	M10 Washer – Flue Spigot (6 – 9 Section)	617115	4
	M10 Washer – Flue Spigot (10 – 15 Section)	617115	6
45	Boiler Cement (Brandkitt – 1000 Palokitti 1000)	922120POT	See Table
46	Silicone Sealant (Flytande-Packning 260)	922111	See Table
47	Primer for Silicone	922119	See Table
48	Applicator for Primer	92211901	1
49	Applicator for Items 45 & 46	922099	1
50	Flue Brush **NOT SHOWN**	922186	1

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51	Flue Brush Handle **NOT SHOWN**	922187	1
52	Flue Brush Extension (6 & 7 Section) **NOT SHOWN**	922188POT	1
53	Flue Brush Extension (8 – 10 Section) **NOT SHOWN**	922189	1
54	Flue Brush Extension (11 –13 Section) **NOT SHOWN**	922190	1
55	Flue Brush Extension (14 – 15 section) **NOT SHOWN**	922191	1
56a	M12 Hexagon Nut	635406	1
56	Section Tie Bolts – M12 x 230mm	922122	See Table
57	Flue Hood Tie Bolts – M12 x 160mm	922123	4
58	Data Plate	350464	1
59	M10 x 65mm Screw (Door Panel)	922219	4
60	M10 x 35mm Screw (Sight Glass)	922035	2
61	Spacer (for item 59)	922220POT	4
62	M10 Nut (for item 59)	635402	4
63	M24 Door Securing Nut	920052POT	4
64	M12 x 30mm Screw (Door Hinge)	922221	12
65	M8 x 30mm Screw (Flue Hood)	635234	4
66	No.6 x 3.5mm Screw (Data Plate)	922223	4
67	M4 x 10mm Screw (Micro Switch)	633942	2
68	M4 Nut (Micro Switch)	635434	2
69	M4 Washer (Micro Switch)	617116	2
70	M8 Spacer (Front & Rear Lower)	922227	8
71	M8 Screw	922228POT	12
72	M8 Washer	922229	12
73	Self Tapping Screw (for casing) **NOT SHOWN**	922230	See Table
74	M12 Countersunk Allen Screw (Burner) **NOT SHOWN**	633301	4
75	Optional Special Flue Box (6 – 9 Section)	922163	1
76	Amphenol Socket **NOT SHOWN**	922234	1
77	High Limit Thermostat	922139	1
78	Control Thermostat	922138	1
79	High/Low Thermostat	922138	1
80	Boiler Temperature Gauge	922144POT	1
81	Boiler Altitude Gauge	922158	1
82	Triple Thermostat Pocket	922142	1
83	Single Thermostat Pocket	922143	1
84	Pressure Gauge Non-Return Valve	925082	1
85	Terminal Strip (DIN Rail Mounting)	922001	1
86	DIN Rail	922002	1
87	DIN Rail Support Bracket	922003	1
90	Insert – 6 Section **NOT SHOWN**	922232POT	22
91	Insert – 7 Section **NOT SHOWN**	922233	22
92	Insert – 8 & 9 Section **NOT SHOWN**	922234	22
93	Insert – 10 & 11 Section **NOT SHOWN**	922235	22
94	Insert – 12 & 13 Section **NOT SHOWN**	922236POT	22
95	Insert – 14 & 15 Section **NOT SHOWN**	922237	22

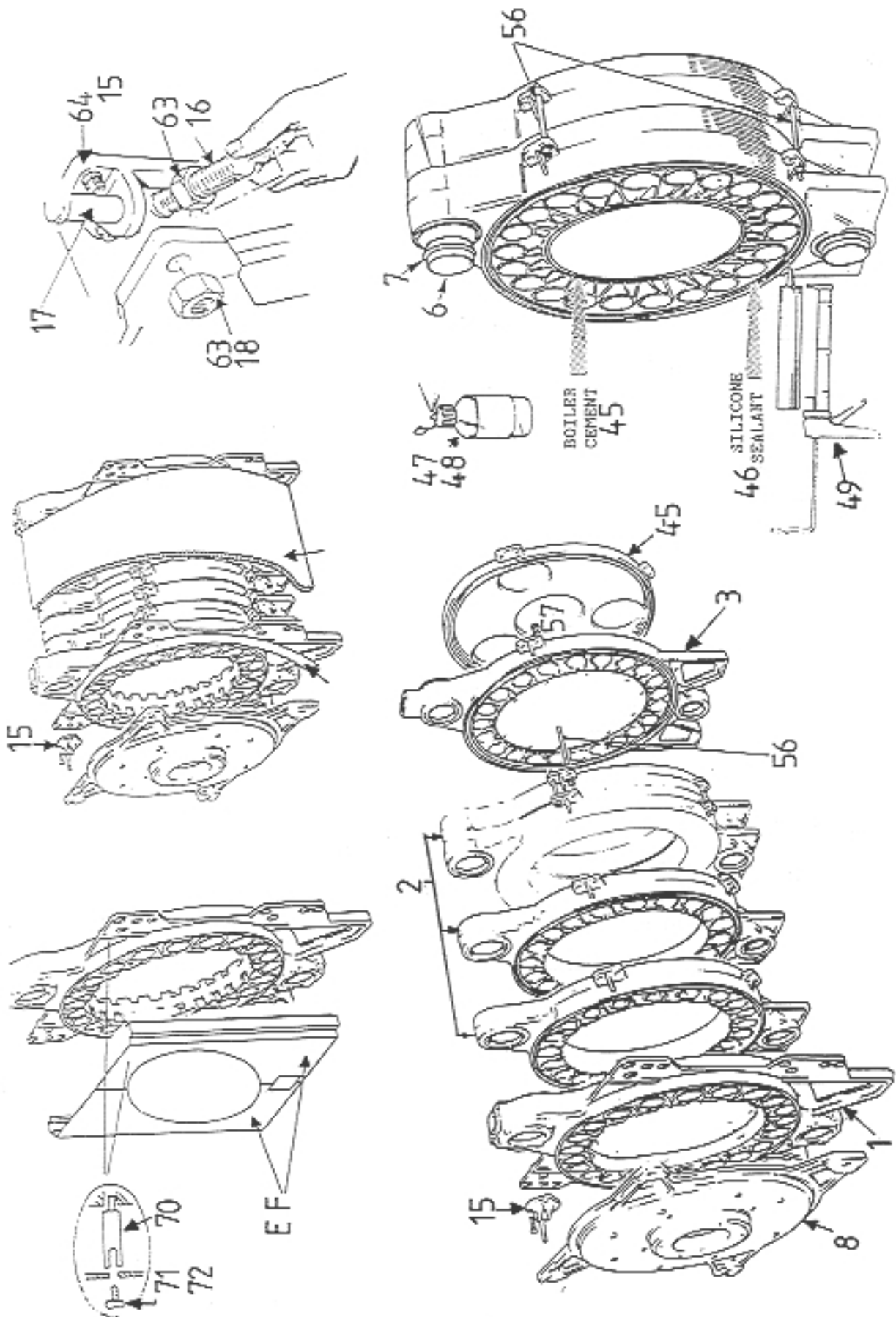
Item	Description	Quantity required Per Boiler Size									
		6	7	8	9	10	11	12	13	14	15
2	Intermediate Section	4	5	6	7	8	9	10	11	12	13
6	Guide Ring (Solid)	10	12	14	16	18	20	22	24	26	28
7	“O” Ring (7.3mm)	10	12	14	16	18	20	22	24	26	28
45	Boiler Cement (Brandkitt – 1000 Palokitti 1000)	5	5	6	7	8	9	10	10	11	11
46	Silicone Sealant (Flytande – Packning 260)	9	11	12	13	15	16	18	19	20	21
47	Primer for Silicone	2	2	2	2	2	2	2	2	2	2
56	Section Tie Bolts – M12 x 230mm	20	24	28	32	36	40	44	48	52	56
73	Self Tapping Screw (for Casing)	70	110	110	110	130	130	130	150	150	150

Isis Casing Details



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Isis Boiler



6.0	OPERATIONAL SAFETY CHECKS	
6.1	Check control stat operation	
6.2	Check limit stat operation	
6.3	Check high/low stat operation	
6.4*	Check for gas leaks	
6.5*	Check for gas leakage past valve assembly	
6.5¶	Check for oil leaks	
6.6	Check boiler locks out on loss of flame signal	
6.7	Check boiler locks out on air pressure switch operation	
6.8	Check boiler locks out on all other safety functions	
6.9*	Check gas booster interlocks operational	
6.10	Record INLET and OUTLET pressure switch settings:- INLET OUTLET	
7.0	BOILER/SYSTEM CHECK LIST	
7.1	Control stat left at	°C
7.2	Limit stat left at	°C
7.3	High/low stat left at	°C
7.4	Maximum flow temperature recorded	°C
7.5	Maximum return temperature recorded	°C
7.6	Boiler water pressure	
7.7	Are pipework connections as per manual?	
7.8	Is safety valve fitted? If so, SIZE _____ PRESSURE RATING _____	
7.9	Are water isolating valves fitted?	
7.10	Are water flow switches fitted?	
7.11	Are return water shut off or diverter valves fitted?	
7.12	Is shunt pump fitted?	
7.13	Is pump overrun fitted?	
7.14	Flue type and diameter of connection to boiler:- TYPE DIAMETER (mm) Where appropriate and for multi boiler installations sketch details of flue system showing length of runs and diameters. Conventional <input type="checkbox"/> Fan Assisted <input type="checkbox"/> Flue Dilution <input type="checkbox"/> Approximate overall height m Is the fan interlocked with the boiler? YES / NO	
7.15	Are flue dampers fitted? If so, interlocked?	YES / NO YES / NO
7.16	Fan assisted ventilation?	YES / NO
7.17	Any evidence of condensate formation?	YES / NO
7.18	Any evidence of water leakage?	YES / NO
7.19	Any evidence of flue gas leakage?	YES / NO
7.20	Has boiler been built and cased correctly?	YES / NO
7.21*	Is gas service cock installed? If so, accessible?	YES / NO YES / NO
7.22¶	Is oil filter fitted?	YES / NO
7.23¶	Is fire valve fitted?	YES / NO
7.24¶	Oil supply:	Single Pipe
		Two Pipe
		Ring Main

8.0	COMMENTS ON ACCESSIBILITY FOR MAINTENANCE

9.0	NOTES & COMMENTS BY COMMISSIONING ENGINEER

FINDINGS		
	YES	NO
Is the installation safe for use?		
If the answer is NO, has a warning label been raised?		
Is any remedial work required?		
Have warning labels been fitted?		
Has RIDDOR form been raised?		
Customer Signature:		
Print Name:		
Date:		

ENGINEER DETAILS	
NAME	
COMPANY	
SIGNATURE	
DATE	

Document ID Ref: PCF/029/3

CONVERSION TABLE

	<u>IMPERIAL TO METRIC</u>	<u>METRIC TO IMPERIAL</u>
<u>HEAT</u> 1 Therm = 100,000 Btu/hr	1 Btu/hr = 0.2931 W 1 Btu = 1055 J 1 Btu/hr = 0.252 kcal/hr	1 kW = 3412 Btu/hr 1 J = 0.0009478 Btu 1 kcal/hr = 3.968 Btu/hr
<u>FUEL CONSUMPTION</u> 1 dm³ = 1 LITRE 1,000 dm³ = 1m³	1 ft ³ = 28.317 dm ³ (litre) 1 UK Gall = 4.546 litre 1 UK Gall = 1.2 U.S. Gallon	1 m ³ = 35.3147 ft ³ 1 litre = 0.2199 Imp. Gallon
<u>PRESSURE</u> 1 PSI = 2.307 FT 1 kPa = 1000 Pa 1 bar = 1000 mbar = 100 kPa	1 lb/in ² = 6895 Pa 1 lb/in ² = 68.95 mbar 1 in.w.g. = 249.1 Pa 1 in.w.g. = 2.491 mbar 1 in.w.g. = 25.4 mm.w.g.	1 bar = 33.45 ft.w.g. 1 kPa = 0.3345 ft.w.g. 1 bar = 14.5 lb/in ² 1 Pa = 0.3858 in.w.g. 1 mm.w.g. = 0.0394 in.w.g. 1 mm.w.g. = 9.8 Pa
<u>LENGTH</u> 1m = 1000mm	1 inch = 25.4mm 1 ft = 0.3048 m 1 yard = 0.9144 m 1 mile = 1.609 km	1 mm = 0.03937 in 1 m = 3.281 ft 1 m = 1.094 yard 1 km = 0.6214 mile
<u>VOLUME</u>	1 ft ³ = 0.02832 m ³ 1 ft ³ = 28.32 litre	1 m ³ = 35.3147 ft ³ 1 litre = 0.03531 ft ³
<u>AREA</u>	1 in ² = 645.2 mm ² 1 in ² = 6.452 cm ² 1 ft ² = 929 cm ² 1 ft ² = 0.0929 m ²	1 mm ² = 0.00155 in ² 1 cm ² = 0.155 in ² 1 m ² = 1550 in ² 1 m ² = 10.76 ft ²
<u>FLOW RATE</u> 1 kg/sec = 1 lit/sec @ 0°C reference temperature	1 gall/min = 0.07577 lit/sec 1 ft ³ /min = 0.4719 lit/sec 1 ft ³ /min = 0.00047 m ³ /sec	1 lit/sec = 13.2 gall/min 1 lit/sec = 2.119 ft ³ /min 1 m ³ /sec = 2119 ft ³ /min
<u>TEMPERATURE</u>	°F to °C = ("X"°F - 32) x 0.5556	°C to °F = ("X" °C x 1.8) + 32
<u>TEMPERATURE DIFFERENCE</u> 1°C = 1°K	"X"°F x 0.5556 = °C	"X" °C x 1.8 = °F
<u>WEIGHT</u>	1 lb = 0.4536 kg 1 cwt = 50.8 kg 1 ton = 1016 kg	1 kg = 2.205 lb 1 tonne = 0.9842 ton 1 tonne = 2204.6 lb

For further details on Potterton Commercial boiler products contact the following:-

COMMERCIAL SALES & TECHNICAL ENQUIRIES

Potterton Commercial Products Division
Brooks House
Coventry Road
WARWICK
CV34 4LL

Tel: (08706) 050607
Fax: (08706) 001516
Sales Direct Line: (08706) 001991
Technical Direct Line: (08706) 002322
e-mail: commercialboilers@potterton.co.uk
Web Site: www.pottertoncommercial.co.uk

COMMERCIAL SERVICE OFFICES

Our service organisation covers the whole of the U.K. to look after your needs for all Potterton Commercial Products. We are also able to offer our services for other manufacturers products.

SOUTHERN REGION

Potterton Commercial Service Dept
Unit 2, Borehamwood Enterprise Centre
Theobald Street
BOREHAMWOOD
Herts WD6 4RQ
Tel: (08702) 412759
Fax: (02082) 072466

NORTHERN REGION

Potterton Commercial Service Dept
Unit 102, Batley Enterprise Centre
513 Bradford Road
BATLEY
West Yorkshire WF17 8JY
Tel: (08702) 412759
Fax: (01924) 420276

Our service offices offer a wide range of specialised services including:-

- Boiler Site Assembly
- Burner Commissioning for all Fuels
- Boiler Maintenance & Maintenance Contracts
- Breakdown & Repair Services
- Boiler Dismantling & Re-Jointing
- Burner & Boiler Replacement
- Oil/Gas Conversions
- System Conditioning
- Water Treatment & Descaling
- Packaged Units

SPARES

Potterton Commercial spares are available nationwide through the Potterton Interpart network. Alternatively please contact:-

interpart

Brooks House, Coventry Road, Warwick CV34 4LL - Telephone: 08706 000454
Fax: 08706 000545

"All descriptions and illustrations contained in this leaflet have been carefully prepared but we reserve the right to make changes and improvements in our product which may affect the accuracy of the information contained in this leaflet"



A Baxi Group Company

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