

# NXR2

NXR2 - 22 to 69kW Heating

NXR2DHW - 22 to 42kW Heating & Hot Water

## Installation, Operation & Maintenance Manual



February 2008

**POTTERTON**  
COMMERCIAL

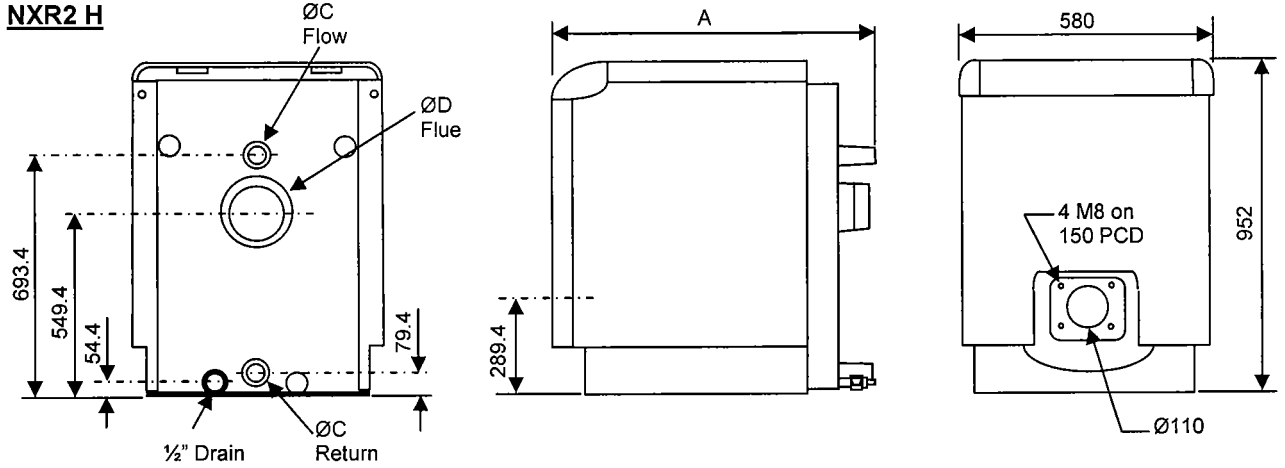
heating specialists

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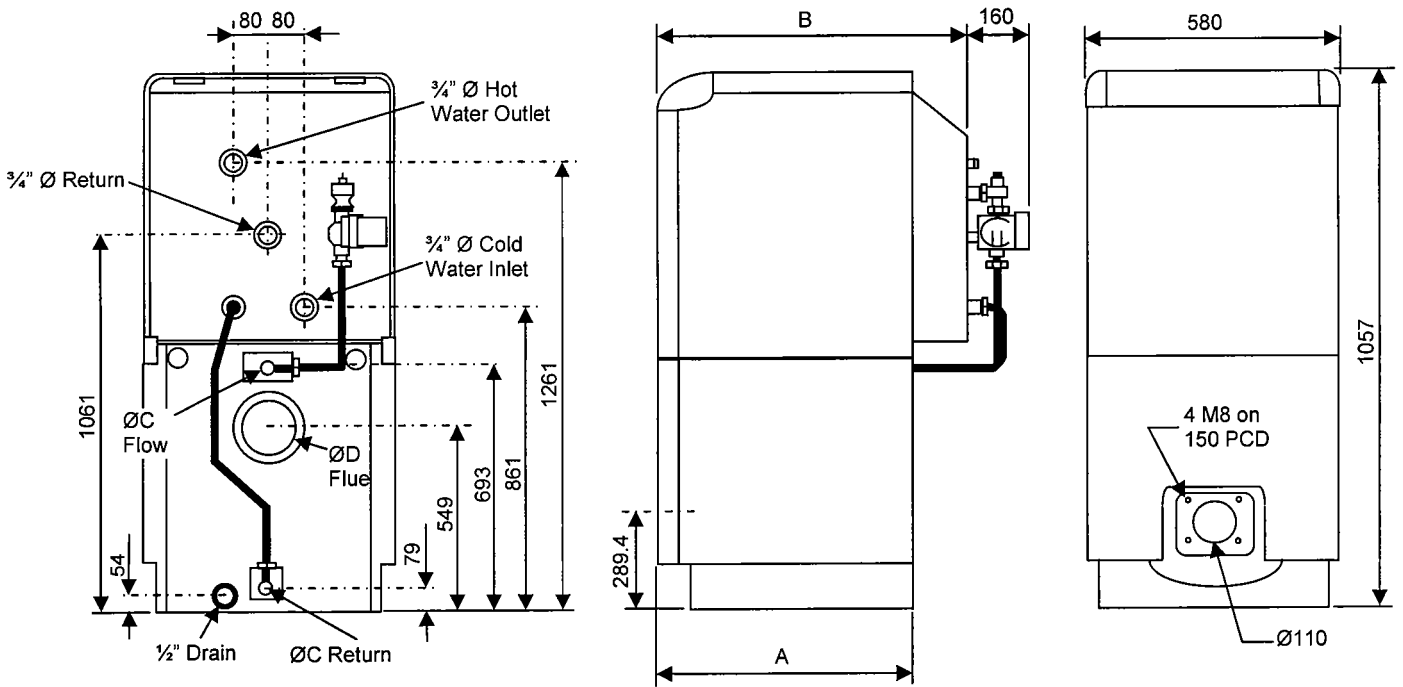
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**Fig. 1 – General Dimensions**

**NXR2 H**



**NXR2 DHW**



**Table 1 – Dimensions**

kW	22		27		35		42		55	69
	H	DHW	H	DHW	H	DHW	H	DHW	H	H
A	600	600	600	600	760	760	760	760	920	1080
B		720		720		880		880		
C	1"								1 1/2"	
D	$\varnothing 139$								$\varnothing 153$	

**Table 2 – Technical Data**

Boiler	Version No.	DHW		H		DHW		H		H		H	
		22		27		35		42		55		70	
Output	kW	22		27		35		42		55		69	
Input	kW	24		29.5		38.3		46.1		60.4		75.6	
Fuel Consumption	m <sup>3</sup> /hr	2.54		3.12		4.05		4.88		6.39		8	
	lit/hr	2.02		2.49		3.23		3.89		5.09		6.38	
Efficiency at 100% load	% - PCI	90.4		90.3		90.1		90.3		91.4		92.6	
Efficiency at 30% load	% - PCI	90.1		90.5		91.1		91.6		91.9		92.2	
Current	A	1.3				2.05				0.9			
Number of sections		2				3				4		5	
Nominal flue connection size	Ømm	Ø139										Ø153	
Flue gas volume	m <sup>3</sup> /hr	0.038		0.038		0.058		0.058		0.077		0.097	
Flue draught requirements		0-4mm. w.g.											
Flue gas temperature	°C	190		187		195		195		200		195	
Ventilation to comply with		BS5440 Part 2										BS6644	
Water Flow @11°C ΔT	lit/sec	0.52		0.65		0.82		1		1.3		1.65	
Hyd Resistance @ 11°C ΔT	kpa	0.28		0.43		0.72		1		0.2		0.32	
Water content	lit	43	45	43	45	57	59	57	59	71		85	
Maximum operating pressure	bar	4											
Minimum operating pressure	bar	0.5											
Maximum Operating Temp	°C	85°C											
Minimum Operating Temp	°C	55°C											
DHW heater capacity	litres	120		120		150		150					
Max. discharge/10 minutes	litres	20		20		25		25					
Max DHW pressure	bar	10		10		10		10					
Auxiliaries consumption	W	104		104		104		104					
DHW power	kW	20		20		28.7		28.7					
Electricity supply		230 V – 50 Hz											
Packaging		1	2	1	2	1	2	1	2	2			
Packaged weight	kg	205	310	205	310	245	370	245	370	310	360		
Net weight	kg	190	280	190	280	230	340	230	340	280	330		

For metric to imperial conversions refer to conversion chart inside the back cover.

**FUEL CONSUMPTION:** Gas fuel consumption is based on natural gas with a gross calorific value of 38.6Mj/m<sup>3</sup>.

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

**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.

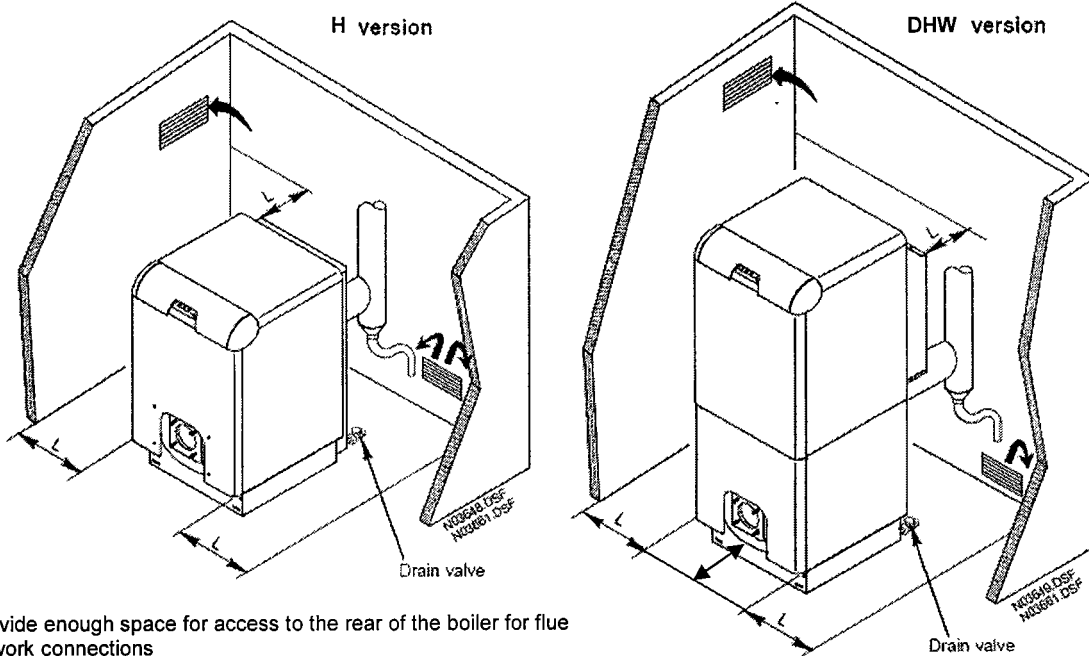
**BOILER FLUE CONNECTION:** This is the nominal flue size of the flue connection spigot.

**FLUE GAS VOLUME:** Flue gas volumes are given at STP (standard temperature and pressure [15°C and 1013.25mbar]). Typical flue gas temperatures are 200°C (gross) at CO<sup>2</sup> levels of 9% and 12% respectively on gas and oil.

**MINIMUM RETURN TEMPERATURE:** If system return temperatures below 55°C are required then contact Potterton Commercial Technical Department.

**Fig. 2 – Clearances**

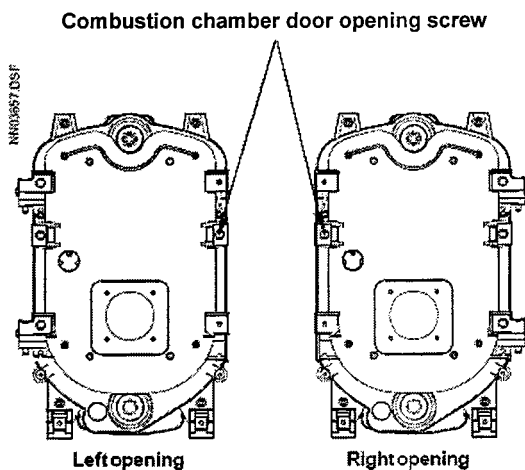
Isolate the electrical supply at the mains isolator and close the fuel supply at the appropriate valve before any maintenance work (draining, cleaning etc.)



L = Provide enough space for access to the rear of the boiler for flue & pipework connections

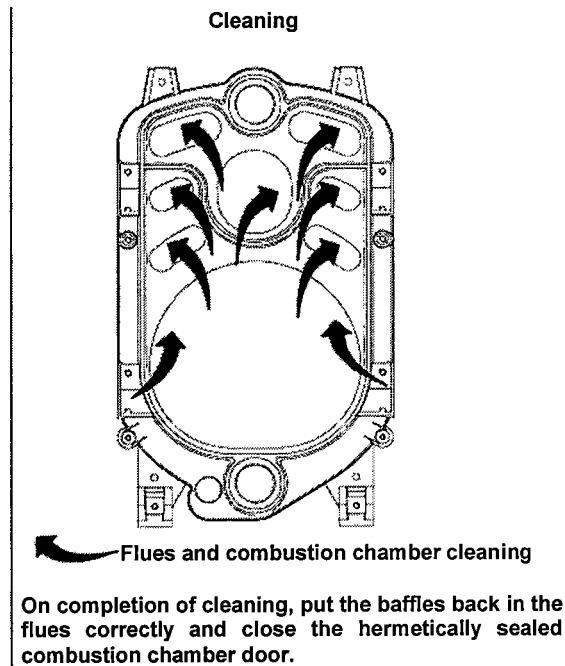
BL = Boiler length for removal of baffles

**Fig. 3 – Combustion Chamber door**



Combustion chamber door is reversible (they can be fitted for left or right opening)

**Fig. 4 – Boiler Cleaning**



On completion of cleaning, put the baffles back in the flues correctly and close the hermetically sealed combustion chamber door.

### GENERAL

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

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

The Potterton NXR2 is a cast iron sectional boiler available in two models Heating (H) and Heating and Hot Water (DHW) with outputs from 22kW to 42kW DHW and 22kW to 69kW H. The heat transfer surfaces for the NXR2 have been specially designed to maximise the boiler efficiency and the combustion chamber capacity ensures environmentally sound combustion reducing CO and NOx emissions. Specially designed and pre-wired control panels allow full boiler control.

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

The NXR2 is suitable for use on fully pumped open vented systems or a sealed system with a maximum design pressure of 4 bar (60 p.s.i.).

The NXR2 boiler is an overpressure type with 3-pass reverse flame design. The first two passes are 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 achieving efficiencies of 91% (net) 84% (gross).

The NXR2 is constructed with BS1452 Grade 220 cast iron heat exchanger, constructed in accordance with EN303.1. The boiler package meets Gas and Oil requirements of M&E3 and the burners EN767.

The powder coated mild steel castings have an 80mm fibre wrap around the castings, thus reducing fuel consumption and emissions.

The NXR2 is supplied assembled.

### STANDARD SUPPLY

- Assembled boiler.
- Cleaning tools.
- Control Panel.

### CONTROLS

The NXR2 range are supplied as standard with an integral control panel which is fitted with control thermostat, thermometer and burner on/off switch.

A 230V single phase supply is taken to the control panel.

### SHIPPING – PACKAGING

The boiler package is delivered assembled on one pallet. With the water tank on a separate crated pallet.

**It is recommended that the manufacturer's trained engineers should carry out erection and commissioning, as this will make valid the LIFETIME GUARANTEE, details on the rear of this manual.**

### INSTALLATION

Before starting work a risk assessment should be carried out on 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 and 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 ACS. 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 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 and 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 16<sup>th</sup> Edition.

BS.5440:1990:Part 1 – Specification for Installation of Flues.

BS.5440.1989:Part 2 – Specification for Installation of Ventilation for Gas Appliances.

BS.6644:2005 – Installation of Gas Fired Hot Water Boilers for Inputs between 60kW and 2MW.

BS.7074:1989:Part 2 – Application Selection and Installation of Expansion Vessels and Ancillary Equipment for Sealed Water Systems.

BS.6880:1988 – Codes of Practice for Low Temperature Hot Water Systems.

BS.779:1989 – Cast Iron Boilers for Central Heating and 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 and Purging Procedure for Non-domestic Installations.

IGE/UP/2 – Gas Installation Pipework, Boosters and Compressors for Industrial and Commercial Premises.

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

### **BOILER SITTING AND BASE**

The boiler should be sited in accordance with BS.6644:2005 with respect to protecting the boiler from damage, air for combustion, clearances for service and access, temperatures, noise levels, the disposal of boiler water and the effects of flooding of the boiler house of seepage from a roof top boiler house. See page 4 for required boiler clearances for service and access.

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

For certain special installations a sound proof plinth may be necessary and a metal plinth resting on anti-vibration pads is recommended in these instances.

Consideration should also be given to fitting steel strips beneath the boiler feet for boiler base protection.

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.

## 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.

For oil see relevant standard. Further guidance on ventilation for gas appliances is provided by BS6644:2005 and BS.5440:1990

**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.

## 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 all the 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 and free zone. The number of bends used should be kept to a minimum and runs of the flue pipe less than 45° to the horizontal should be avoided in order to comply with the recommendations made in BSS 6644:2005 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. The flue system to 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 2 (page 1), these sizes refer to the boiler flue connection spigot.

The actual size of the flue system will depend on individual site applications. Detailed below are general considerations on sizing flue systems. These notes are for guidance only and Potterton Commercial Division cannot accept responsibility for any flue system designs.

### Horizontal Flue Runs

Horizontal flue runs are not recommended particularly over 2m 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 recommended that the services of a specialist flue system manufacturer are sought for the design of common flue systems).**

**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 systems should be indirect and installed in accordance with the relevant parts of British Standards Codes of Practice CP342 and BS 6644:2005.

The maximum and minimum design temperature differential across the boiler should be at 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 in the full boiler output. Boilers operating under constant flow conditions can be more accurately controlled and are not subject to excessive temperature stresses.



The boiler **must not** be fired less than the minimum flow.

On systems with variable flow rates due to flow reducing devices, i.e. TRVs, zone valves, etc or where the minimum heat demand, i.e. 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 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 bellow to take up both axial and lateral movement is recommended.**

### **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.

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.

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 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 de-sludging cannot be carried out then consideration should be given to separating the new boiler system from 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 6644:2005 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****Preparation**

Before commencing erection ensure that all parts shown on the packaging sheets are on site.

The NXR2 range of boilers are factory assembled utilising steel push nipples. On sites with restricted access where the boiler needs to be stripped down and reassembled, it is recommended that the services of Potterton Commercial service offices are utilised (addresses on the back page of this manual) as specialist tools and knowledge will be required.

Warning: The sections are not self supporting until several sections have been assembled. Therefore when attempting to dismantle or reassemble the boiler the sections should be adequately supported to prevent injury or damage.

**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 proposed work.
- ii. Site Manager/Personnel aware that work will be taking place.
- iii. Risk Assessments carried out on possible risks which may affect 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 the persons carrying out the proposed work, attending site. As this will eliminate one source of an on site injury taking place, 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 dry area prior to erection/assembly.
- vii. Water should be available.

- viii. A drain 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 of the boiler.
- xii. Fire evacuation procedures, facilities availability, and specific Health and Safety information etc., should be provided.

Items vii to x are essential if the boilers require pressure testing.

**Erection Procedure**

The boiler is delivered as a fully assembled piece with all components fitted.

Position the boiler on a level non combustible floor or plinth as required.

Ensure that the minimum clearances required are met taking into account the burner (supplied separately) and allowing sufficient room for water, flue and gas/oil connections can be made.

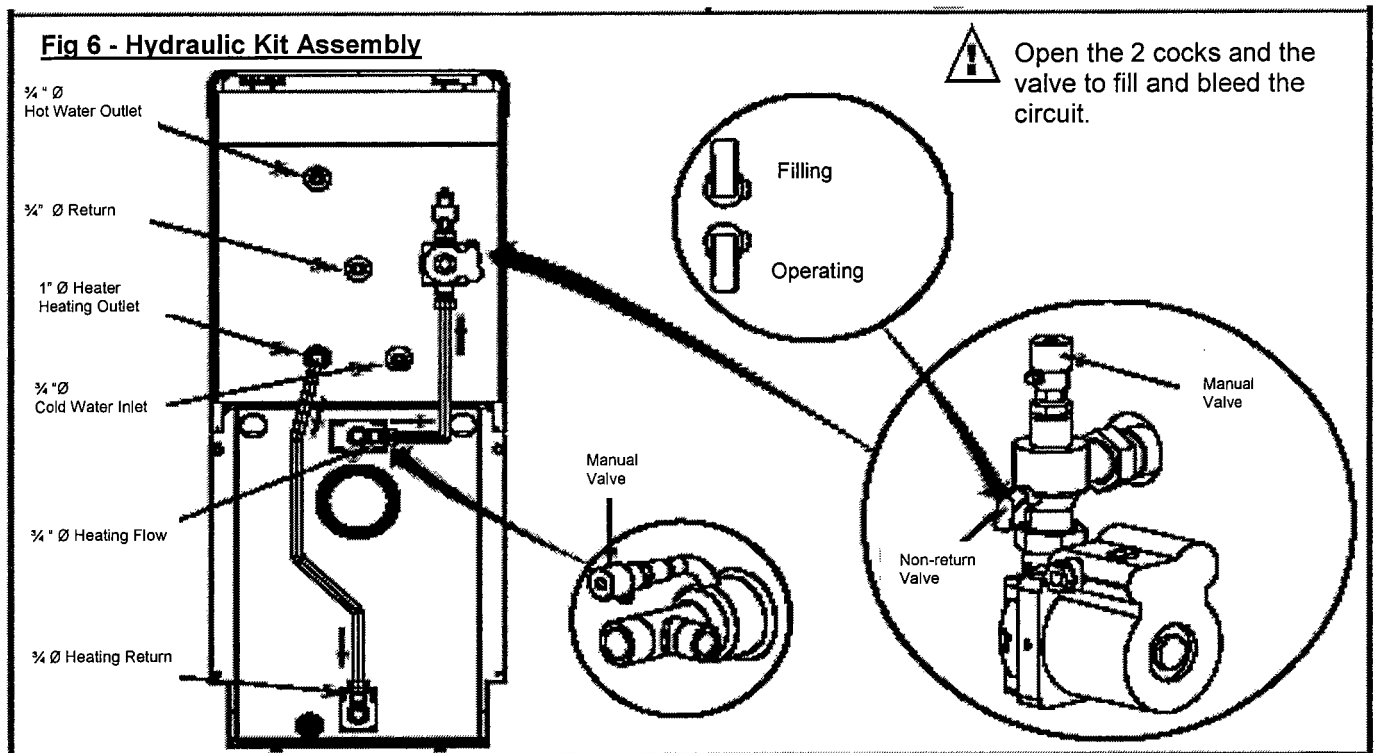
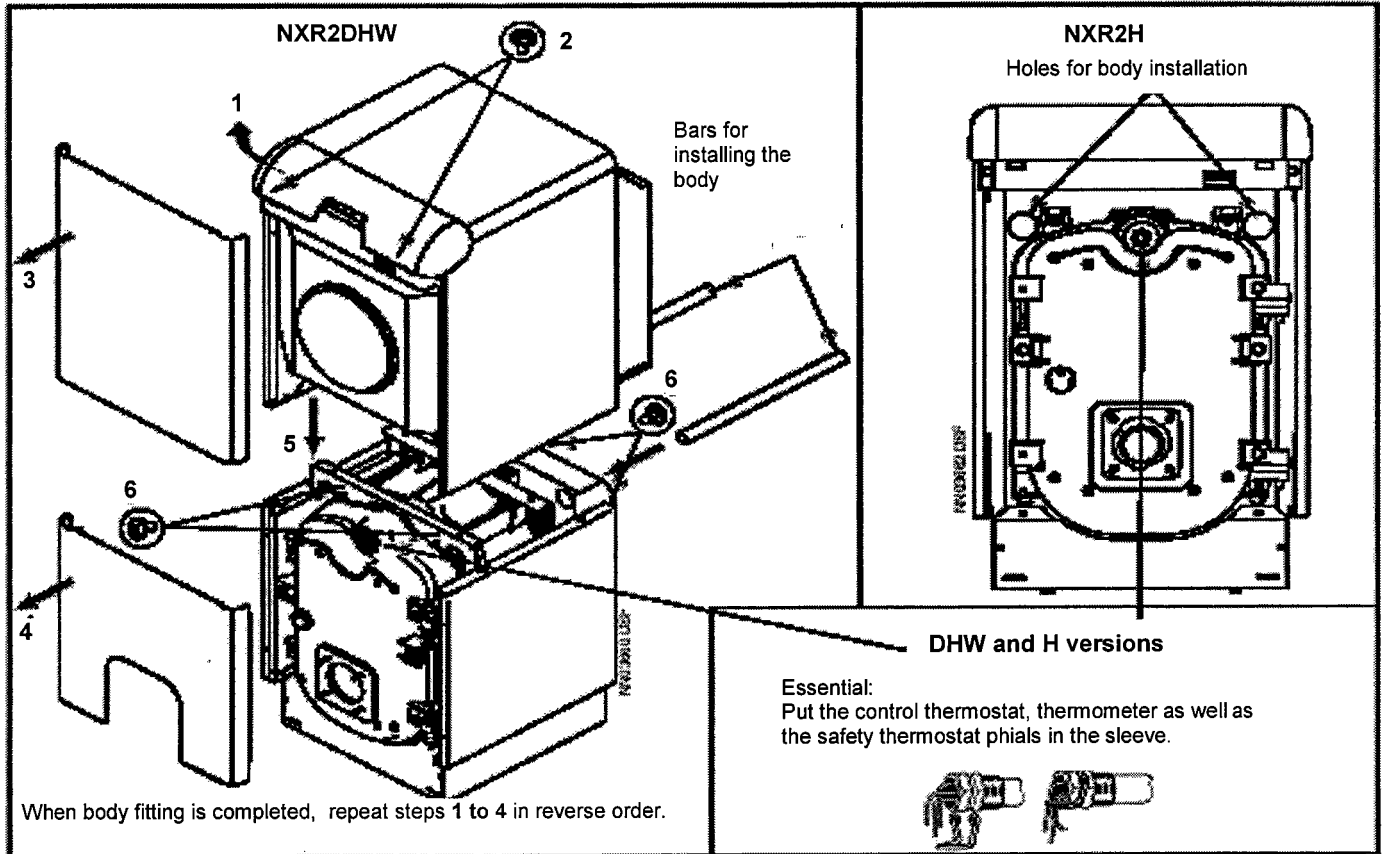
Connect the flow and return system pipework connections at the rear of the boiler are made

Connect the flue system to the rear of the boiler

Fit the burner to the front door of the boiler and make the gas/oil connections

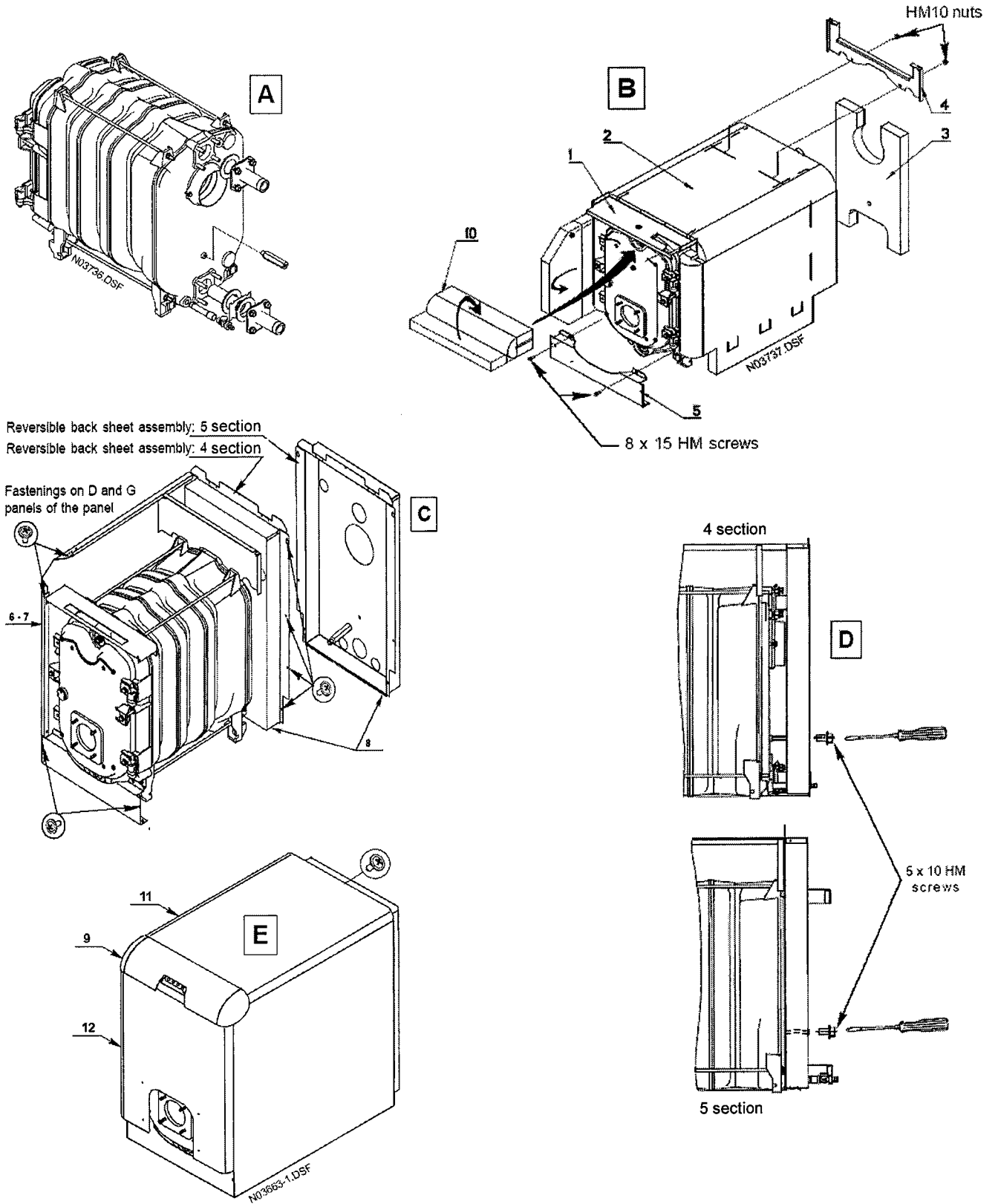
Ensure that all fittings are tight.

**Fig 5 - NXR2 DHW - Fitting the domestic hot water cylinder to the boiler.**

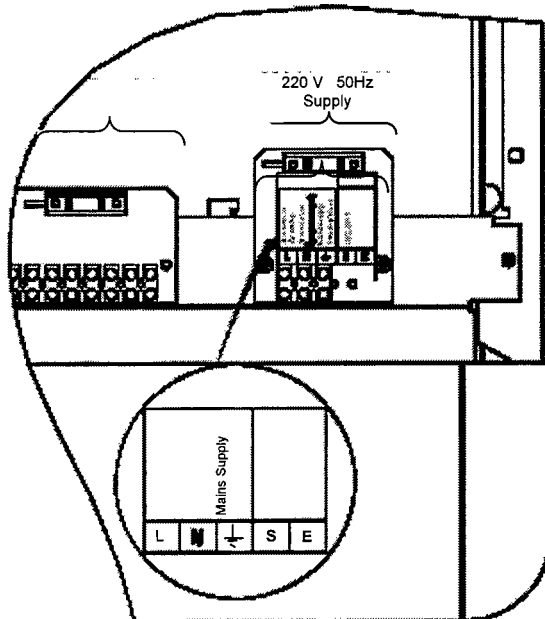


**Fig 7 - NXR2 H 55 & 69 Assembly Procedure**

**IMPORTANT: The rear panel, 1 ½" connection pipe and rear insulation, shall be assembled BEFORE MAKING THE HYDRAULIC AND ELECTRICAL CONNECTIONS.**

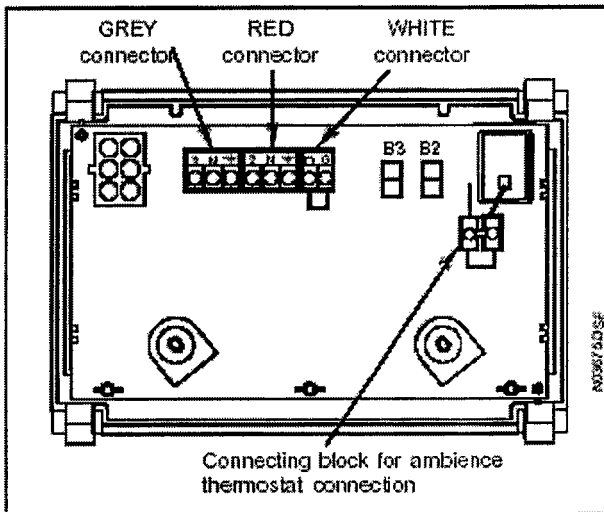


**Fig 8 - Electrical Connection**

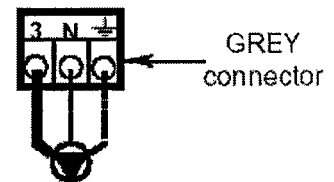


**Fig 9 - To assemble and connect the ECOCONTROL/SP OB**

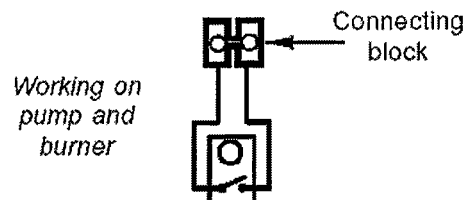
1) Pull out the 3 plug-in connectors at the back of the module.



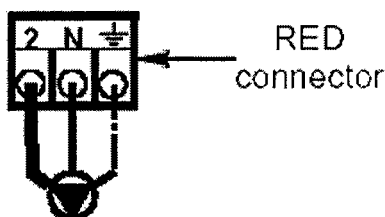
3) Connect the DHW pump to GREY connector with "3 N" mark  $\perp$



4) 2 wire room thermostat connection:  
 - Pull out the connecting block.  
 - Connect the thermostat.

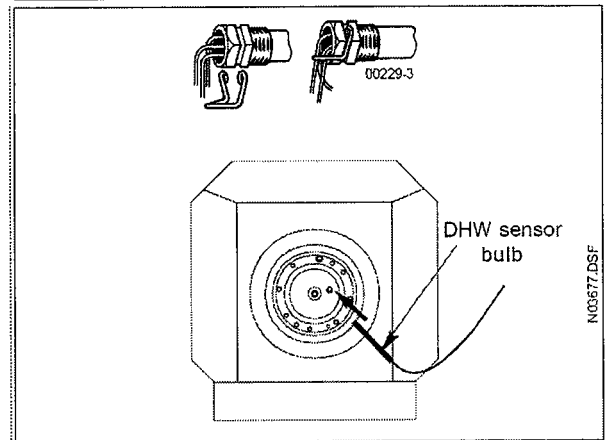


2) Connect heating pump to RED connector with "2 N" mark  $\perp$



5) Insert boiler sensors into the thermostat pocket.

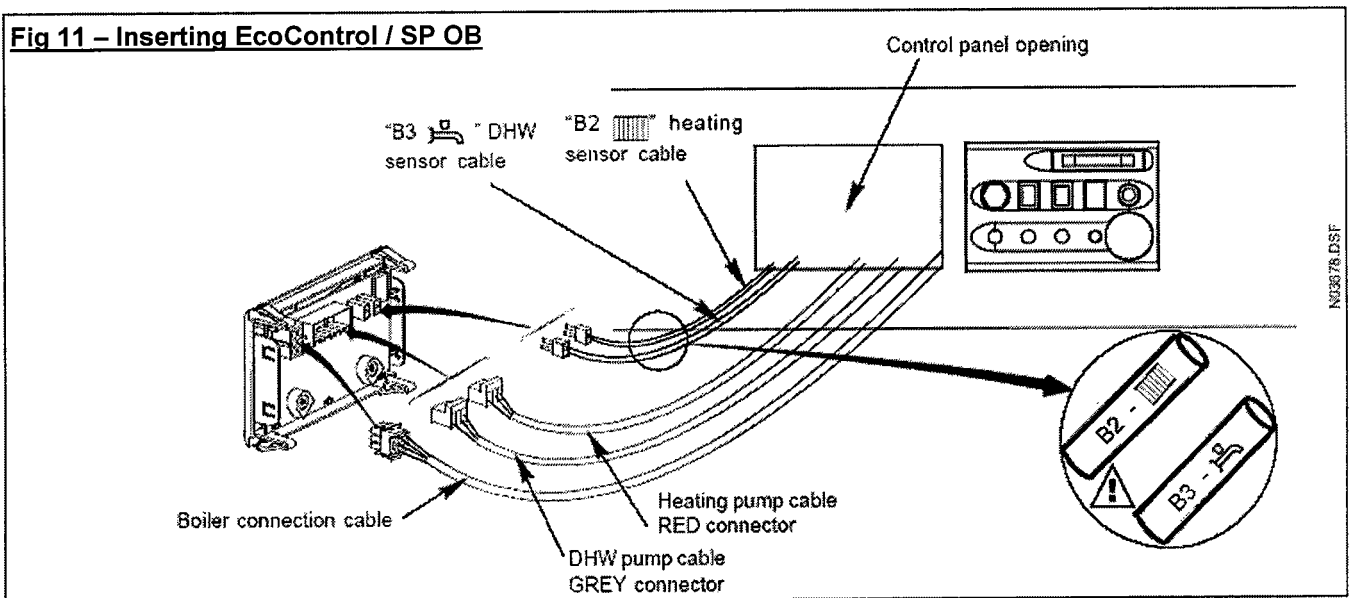
**Fig 10 – Sensor Connections**



6) Insert the DHW sensor into the cylinder thermostat pocket.

7) Pass the connections through the control panel opening and connect them to the ECOCONTROL / SP OB module.

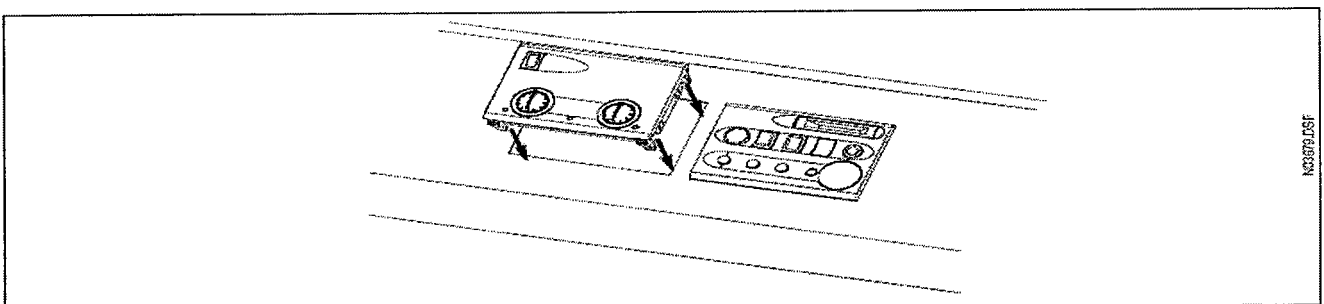
**Fig 11 – Inserting EcoControl / SP OB**



NOTE: Make sure you carefully follow the "Heating" and "DHW" connections by checking the markings on the sensor cables B2 (Radiator) and B3 (Tap) and at the back of the ECOCONTROL / SP OB module.

Use the sensor extension supplied with the cylinder for insertion in the cylinder.

8) Clip the ECOCONTROL /SP OB module in its housing.



**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 condition.

**Potterton Commercial Customer Commissioning Check List**

The items listed below have been put together as a guide to what actions should be completed before commissioning 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. Boilers correctly erected and cased.
- iv. Risk Assessments carried out on possible risks which may effect the persons carrying out the proposed work.
- v. Site wiring complete to boilers.
- vi. Boilers fully flooded.
- vii. Controls connected, operable and calling for heat.
- viii. Sufficient system heating load available to run the boilers in order to complete combustion checks.
- ix. All system pumps operational and available.
- x. Gas supply completed, purged and ready for use (if applicable).
- xi. Oil supply completed, purged and ready for use (if applicable).
- xii. Flue system completed, adequate and fully functional.
- xiii. Permanent ventilation complete and adequate.
- xiv. All safety systems fitted and fully operational (e.g. safety valves, fuel shut off devices, flue fans interlocked, etc.)
- xv. Safe working environment provided.

**CONTRAVENTION OF REGULATIONS**

PLEASE NOTE THAT SHOULD ANY ITMES BE INSTALLED ON A TEMPORARY BASIS, E.G. VENTILATION, FLUES ETC. THEN THE COMMISSIONING ENGINEER WILL NOT BE ABLE TO LEAVE THE BOILERS RUNNING UPON COMPLETION AND WILL NEED TO SHUT DOWN THE APPLIANCES, MAKING THEM INOPERABLE AND ISSUING SHUT DOWN AND WARNING NOTICES.

**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.**

Ensure the system is filled, to fill the boiler, open the two cocks and valve as shown on page 10.

Ensure the system is bled by bleeding all high points in the heating circuit, until obtaining a slight flow.

Make sure that the flue and boiler door including the burner are sealed.

Check the operation of the heating and DHW circulating pumps and unblock them if required. If the pump does not turn:

- Isolate the electrical supply
- Unscrew the centre plug and pull it towards yourself (about 5mm)
- Turn the plug a few turns to the right and left.
- Re-assemble before restarting.

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

Commissioning of the burner unit should be carried out in accordance with the burner manufacturer's handbook provided.

Before commencing to commission the burner check the following:

1. Electrical supply is of the 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.
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.
8. The cold feed and open vent sizes should be checked.
9. Ensure that the burner fitted to the boiler is of the correct specification and size for the boiler and suitable for the fuel supply available.

Following completion of the above checks the burner should be commissioned in accordance with the burners manufacturer's handbook provided with the burner. Typical 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 of this manual.

<u>OIL</u>	CO <sup>2</sup>	- 11 – 12%
	Smoke	- 0 – 1 Bacharach
	Flue Gas Temp	- 200°C
	Draught	- 1 mm Negative

<u>GAS</u>	CO <sup>2</sup>	- 8 – 9%
	O <sup>2</sup>	- 4 – 5%
	CO	- Nil
	Flue Gas Temp	- 200°C
	Draught	- 1 mm Negative

**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.



1. Control and high limit thermostats should be checked for correct operation.
2. 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.
3. 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.
4. That 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.
5. Following commissioning the boiler overheat and control thermostats should be set to the required operating setting.
6. 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.



**Fault Finding**

No Indicator light is on:	<ul style="list-style-type: none"> <li>• Check the boiler isolation switch is "on".</li> <li>• Check incoming mains supply.</li> </ul>
The red indicator light is on: 	<ul style="list-style-type: none"> <li>• Press the burner reset button to restart the burner.</li> <li>• Check that fuel supply is available at the burner, and isolation valves are open.</li> </ul>
The boiler overheat thermostat light (red) is on: 	<ul style="list-style-type: none"> <li>• Indication that the boiler overheat safety thermostat has triggered. Unscrew the cover and re-set the button.</li> <li>• Check that the heating pumps are operating.</li> <li>• Check the boiler water circuit bleed valve.</li> </ul>
The burner does not start:	<ul style="list-style-type: none"> <li>• Check that the boiler On/Off switch is at "On"</li> <li>• Check that the lead from the control panel to the burner is connected.</li> </ul>

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**

Operation of the boiler overheat thermostat is associated with a reduction in boiler water flow. Where overheat operation is reported the following should be checked.

- a) The boiler/system pump is adequate for the duty.
- b) Operation of flow reducing devices, i.e. TRVs, compensated mixing valves, etc. do not reduce the water flow rate through the boiler below the minimum flow rate.
- 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 over fired.

To reset the overheat thermostat allow the boiler to cool down, remove the overheat thermostat knob and press the reset button.

The use of a primary loop system is highly recommended to provide a constant boiler flow rate under all operating conditions.

**Burner Lockout**

The package burners are 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 may 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 address on the back page of this manual.

**WARNING: The lockout reset button should not be repeated 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.

**Boiler Maintenance**

It is essential for efficient and trouble free operation that the boiler plant is regularly maintained. This must be carried out by a qualified and experienced engineers and 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 the service office listed on the back page of this manual. Boilers should be serviced and re-commissioned as a minimum or 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 flueway brush for routine cleaning procedures. 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.

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 stresses within the boiler and may lead to joint leakage or in extreme conditions section failure.

### **Natural Gas**

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

### **Class 'D' Fuel Oil**

The boilers should be brushed out thoroughly at least twice a year for 35 second and 28 second fuel oil 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 flueway surfaces.

It is essential to ensure that cleaning is carried out throughout the full length of the boiler passes and that the rear clean out cover is taken off to allow for the 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 wash out the tubes with water followed by a thorough brushing – this may have been repeated several times.

### **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. Make sure the locknuts are fully tightened after the adjustment is complete.

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

### **Boiler Controls**

The operation of boiler controls including control thermostat and overheat thermostat should be checked on an annual basis and the burner recommissioned.

### **DHW Cylinder**

Corrosion prevention anode

This anode is consumed according to the quality of water and requires checking at least every two years.

### **Inspection, removing and replacing anode**

#### **Inspection**

- Remove the top casing.
- Remove insulation.
- Disconnect the anode earth cable.
- Put an ammeter (internal resistance < 10 ohms) in series between the anode and earth cable.
- Measured current
  - o > 1 mA: good anode
  - o < 1 mA: good anode but needs to be checked regularly
  - o < 0.1 mA: anode should be changed.

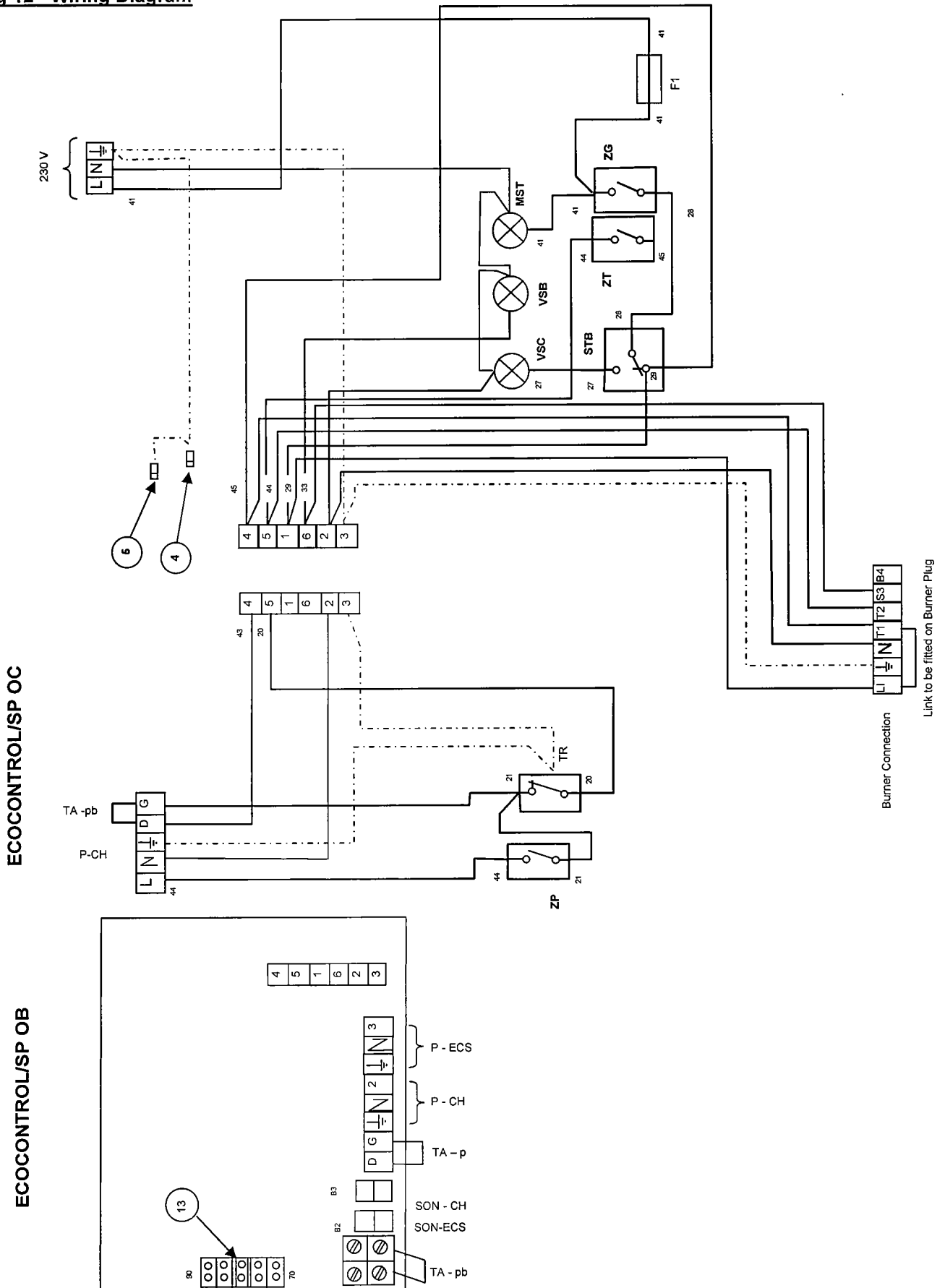
#### **Removing**

- Isolate the cold water inlet.
- Partially drain the cylinder.
- Disconnect the anode earth cable.
- Unscrew the inspection flap fastening screws.
- If required change the anode (15Nm tightening torque).

#### **Replacing**

- Fit a new seal.
- Put the inspection flap back in place, gradually tighten the screws in order: 1 / 2 – 3 / 4 – 5 / 6 – 7 / 8
- Reconnect the anode earth cable.

Fig 12 - Wiring Diagram

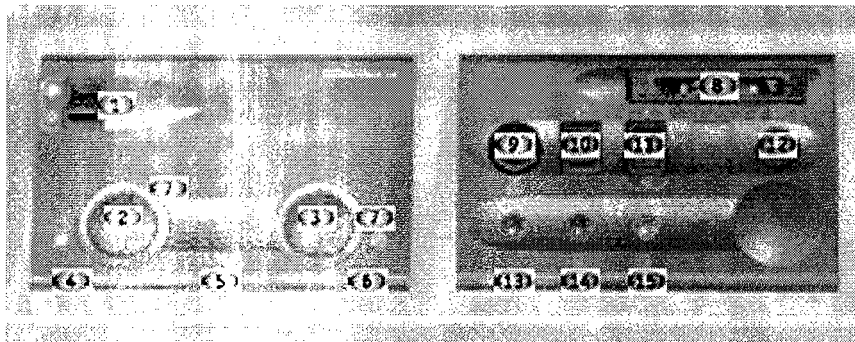


**LEGEND FOR WIRING DIAGRAM**

F1	- Fuse
MST	- Power ON indicator
P – CH	- Heating Pump
P – ECS	- DHW Pump
SON – CH	- Boiler Sensor
STB	- Overheat Safety Thermostat
T – ECS	- DHW Thermostat
TH A – p	- Room Thermostat (action on pump)
TH A – pb	- Room Thermostat (action on pump and burner)
STB	- Limit Thermostat
TR	- Control Thermostat
VSB	- Burner Flame Failure Indicator Light
VSC	- Boiler Safety Indicator / Limit Indicator
ZG	- Master ON/OFF Switch
ZP	- Pump ON/OFF Switch
ZT	- Safety Test Switch
④	- Panel
⑤	- Boiler Casing
⑥	- Mains Line L
⑦	- Blue Wire = Mains Neutral N
⑧	- Yellow/green wire = Earth
⑬	- Limit Thermostat Setting

**Fig 13 - Control Panel Operation****COMFORT MODULE**

- 1 WINTER/SUMMER switch
- 2 Heating thermostat
- 3 Hot water thermostat
- 4 Heating on Indicator light
- 5 Sensor fault Indicator light
- 6 Domestic hot water on Indicator light
- 7 Comfort zones

**BASIC MODULE**

- 8 Thermometer
- 9 Overheating safety thermostat
- 10 Thermostat test button
- 11 Boiler switch
- 12 Fuse
- 13 Overheating safety made safe indicator light
- 14 Burner safety made safe indicator light
- 15 Switched on Indicator light

**START UP**

- Make sure that the orange indicator light (switched on) is on.
- Turn the boiler switch to

**With ECOCONTROL SP OB**

- Turn the switch to SUMMER for domestic hot water only
- Or WINTER for domestic hot water and heating
- Set the temperature with the controls: for heating, for domestic hot water

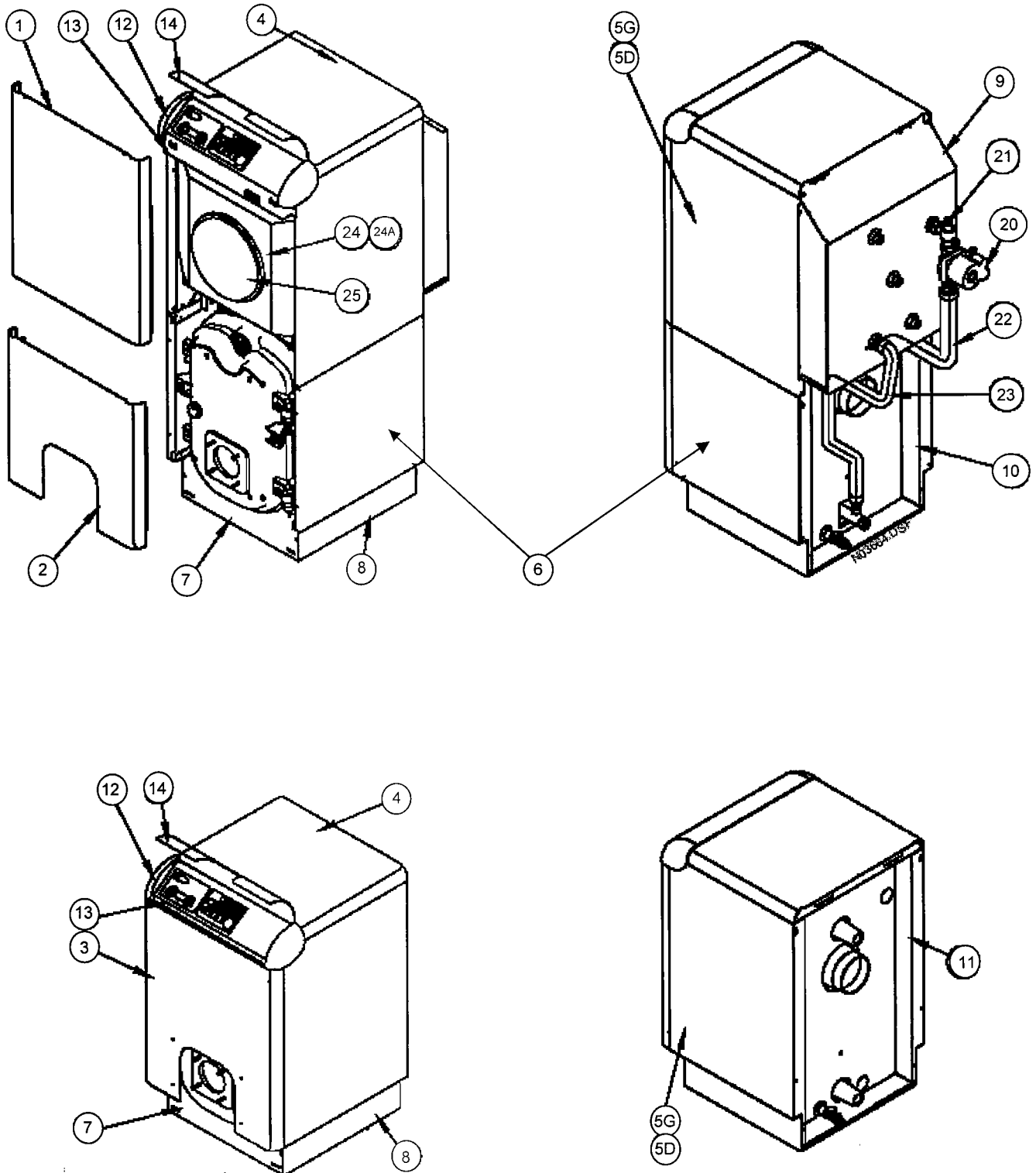
**TROUBLE SHOOTING**

- If the red "burner safety" indicator light goes on, press the reset button on the burner (see burner instructions)
- If the red "overheating safety" indicator light goes on, turn the boiler switch to and contact your installer.
- If the orange "switched on" indicator light goes out, check the fuse and mains connection.

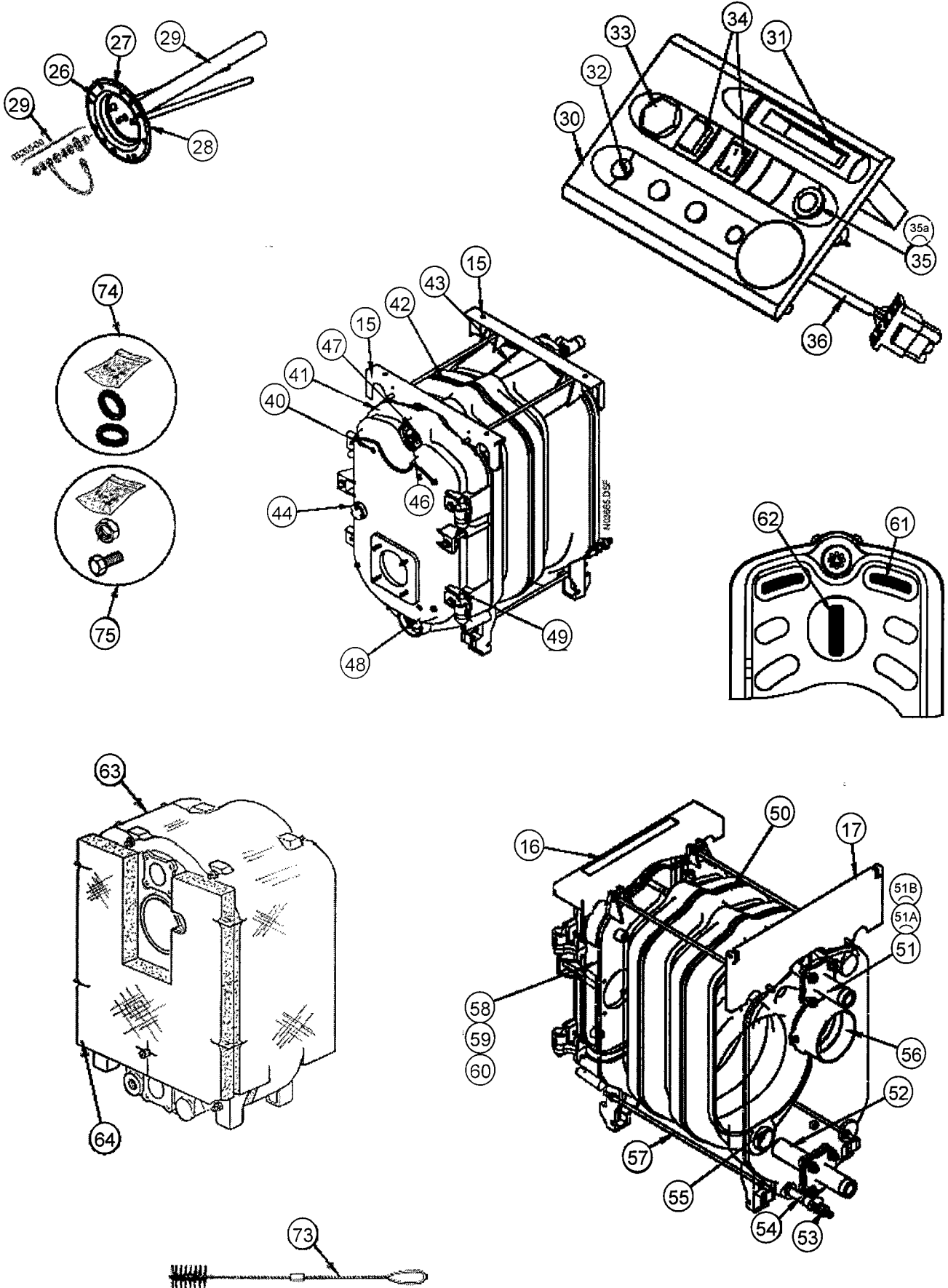
**With ECOCONTROL SP OB**

- If the orange "sensor fault" indicator light goes on, contact your installer.

**Fig 14 – Exploded Diagram**



**Fig 15 – Exploded Diagram Boiler Body**



**Spare Part List**

<b>Description</b>	<b>Part No. Red Casing</b>	<b>Part No. White Casing</b>
1. Upper Front Panel – DHW version	S134023A	S134023EE
2. Lower Front Panel – DHW version	S134049A	S134049EE
3. Front Panel – H version	S134022A	S134022EE
4. Top Panel – 22, 27, 35, 42 H / 22, 27 DHW	S134025A	S134025EE
4. Top Panel – 35, 42 DHW	S134026A	S134026EE
4. Top Panel – 55, 69 H	S134027A	S134027EE
5D. Right Side Panel – 22, 27, 35, 42 H / 22, 27 DHW	S134033A	S134033EE
5D. Right Side Panel – 35, 42 DHW	S134034A	S134034EE
5D. Right Side Panel – 55, 69 H	S134428A	S134428EE
5G. Left Side Panel – 22, 27, 35, 42 H / 22, 27 DHW	S134031A	S134031EE
5G. Left Side Panel – 35, 42 DHW	S134032A	S134032EE
5G. Left Side – 55, 69 H	S134427A	S134427EE
6. Lower Panel – 22, 27 DHW	S134041A	S134041EE
6. Lower Panel – 35, 42 DHW	S134042A	S134042EE
7. Front Mask 22, 27, 35, 42 DHW / H	S134063H	S134063H
7. Front Mask 55, 69 H	S134430A	S134430EE
8. Plinth 22, 27, 35, 42 H / 22, 27 DHW	S134061	S134061
8. Plinth 35, 42 DHW	S134062	S134062
9. Water Heater Rear Top Panel - DHW version	S134054H	S134054H
10. Back Panel - DHW version	S134053H	S134053H
11. Back Panel – H version	S134055H	S134055H
12. Right Corner Support	S17002312	S17002312
12. Left Corner Support	S17002313	S17002313
13. Control Panel	S134841	S506245
14. Control Panel Cover	S134577	S134577
15. Casing Body Support – DHW version	S134051	S134051
16. Casing Front Support – H version	S134052	S134052
17. Casing Back Support – 55, 69 H version	S134429	S134429
18. Support Bleed Valve – DHW version	S138540	S138540
19A. Automatic Air Bleed Valve – D.H.W version	S17006193	S17006193
19B. Manual Bleed Valve – DHW version	S133500	S13500
20. D.H.W Load Pump	S136741	S136741
20. Pump Cable – DHW version	S137393	S137393
21. Non-return Valve – DHW version	S132200	S132200
22. D.H.W Primary Output Pipe	S138324	S138324
23. D.H.W Primary Return Pipe	S138325	S138325
24. 120 L Water Heater 22, 27 D.H.W	S134494	S134494
24A. 150 L Water Heater 35, 42 B	S134495	S134495
25. Inspection Flap Cover – DHW version	S132324	S132324
26. Fitted Inspection Flap – DHW version	S132218	S132218
27. Inspection Flap – DHW version	S132217	S132217
28. Flap Seal – DHW version	S130616	S130616
29. Anode + Earth Cable + Lining	S17020091	S17020091
30. Full Basic Module	S134720	S134720
31. Thermometer	S134421	S134421
32. Indicator Lights Pack	S501970	S501970
33. Safety Thermostat	S17006955	S17006955
34. Switches Pack	S501971	S501971
35. Fuse Holder	S15803999	S15803999
35A. 5 x 20 A Fuse	S15803525	S15803525
36. Complete Strand	S134735	S134735
40. Burner Holder	S17829259	S17829259
41. Front Section	S134079	S134079
42. Intermediate Section	S17803006	S17803006

Description	Part No. Red Casing	Part No. White Casing
43. Rear Section	S134080	S134080
44. Sight Window	S17863795	S17863795
46. Sleeve	S134534	S134534
47. 2" Ø Hollow Plug for Sleeve	S134506	S134506
48. 2" Ø Hollow Plug	S17868225	S17868225
49. Door Hinge Assembly	S17845719	S17845719
50. Complete Body Unit – 22, 27 H	S134531	S134531
50. Complete Body Unit – 35,42 H	S134532	S134532
50. Complete Body Unit – 22, 27 DHW	S138502	S138502
50. Complete Body Unit – 35, 42 B	S138503	S138503
50. Complete Body Unit – 55 H	S134504	S134504
50. Complete Body Unit – 69 H	S134505	S134505
51. 1" Ø Output Sleeve – 22, 27, 35, 42 H	S136131	S136131
51. 1" Ø Return Sleeve – 22, 27, 35, 42 H	S134453	S134453
51A. 1" Ø Sleeve – 22, 27, 35, 42 DHW	S134453	S134453
51B. 1 ½ Ø Sleeve – 55, 69 H	S134527	S134527
52. Terminal Block - 55, 69 H	S17006549	S17006549
53. Drain Valve	S17006472	S17006472
54. Drain Valve Extension	S135113	S135113
55. Nipple	S17004970	S17004970
56. Flue Spigot – 22, 27, 35, 42	S17863835	S17863835
56. Flue Spigot – 55, 69 H	S17863845	S17863845
57. Connection Rods – 22, 27	S15243615	S15243615
57. Connection Rods – 35, 42	S15243616	S15243616
57. Connection Rods – 55 H	S15243617	S15243617
57. Connection Rods – 69 H	S15243618	S15243618
58. External Insulating Door Protection	S17003636	S17003636
59. Internal Insulating Door Protection	S17003637	S17003637
60. Door Seal Strand	S17000198	S17000198
61. Side Baffle – 27	S17863815	S17863815
61. Side Baffle – 42	S17863825	S17863825
61. Side Baffle – 69	S17863885	S17863885
62. Centre Baffle – 27	S17863725	S17863725
62. Centre Baffle – 42	S17863735	S17863735
62. Centre Baffle – 55	S17863745	S17863745
62. Centre Baffle – 69	S17863895	S17863895
63. Side Insulation – 22, 27	S135111	S135111
63. Side Insulation – 35, 42	S135112	S135112
63. Side Insulation – 55, 69	S135116	S135116
64. Back Insulation	S135115	S135115
73. Sweeping Brush	S17000815	S17000815
74. Seal Pack	S501972	S501972
75. Nuts and Bolts Pack	S501973	S501973
- Ecocontrol SP/OB	S134723	S134723
- Sensor	S502095	S502095



# POTTERTON

COMMERCIAL

Wood Lane, Erdington  
Birmingham, B24 9QP  
Telephone 08706 050607 Fax 08706 001516

REPORT SENT TO INSTALLER:	YES	NO
SITE VISIT ( <i>Italics</i> )	COMMISSIONING	
Date: .....		
Signature: .....		
REPORT No: .....	INSTALLER NAME & ADDRESS: .....	
SITE ADDRESS: .....	.....	
.....	.....	
.....	.....	
.....	COMMISSIONING DATE: .....	

1.0	BOILER		
1.1	Type:		
1.2	No of Sections:		
1.3	Boiler No/Position: RH/LH/Centre/1/2/3/ etc		
1.4	Serial No:		
1.5	Fuel: N/Gas, Class D, etc.		
2.0	BURNER		
2.1	Type:		
2.2	Serial Number:		
2.3	Spec Number:		
2.4	Control Box Type:		
2.5	Electrical Supply:		
2.6*	Gas Train Type & Size:		
2.7*	Gas Train Serial No:		
2.8*	Gas Booster Type & Size:		
2.9*	Gas Booster Serial No:		
3.0	BURNER SETTINGS		
3.1	Draught Tube Diameter	mm	
3.2	Draught Tube Projection	mm	
3.3	Diffuser Diameter (if appropriate)	mm	
3.4	Diffuser Setting (if appropriate ) (Distance from end of draught tube )	mm	
3.5*	Gas Nozzle: Side (if appropriate)	No of Holes Diameter	mm
	End (if appropriate)	No of Holes Diameter	mm
	Oil Nozzles: High Fire	Size	
		Type	
3.5¶	Low Fire	Size	
		Type	
3.6	Electrode Settings? (to burner card/manufacturers instructions?)		
3.7	Burner to Specification? (to burner card/manufacturers instructions?)		

4.0	PRE-COMMISSIONING CHECKS (See Note)				
4.1	<b>Is boiler house ventilation as per manual?</b>				
4.2	<b>Electric supplies fused, isolated &amp; earthed?</b>				
4.3	Check external controls allow operation				
4.4	Check boiler/system flooded and pumps operational and any isolation valves open				
4.5*	Check gas available at burner				
4.5¶	Check oil available at burner				
4.6*	<b>Check gas meter sizing adequate</b>				
4.7	<b>Check flue system clear</b>				
5.0	COMBUSTION	Pilot	Low	High	Unit
5.1*	Gas rate				m <sup>3</sup> /hr
5.2*	Burner Head Pressure				mmwg
5.3*	Ionisation Probe/UV Cell Current				µA
5.4	Air Shutter Position				-
5.5¶	Oil Pump Pressure				bar
5.6	CO <sub>2</sub> or O <sub>2</sub>				%
5.7*	CO				ppm
5.8¶	Smoke Number				-
5.9	Gross Flue Gas Temperature				°C
5.10	Ambient Temperature				°C
5.11	Flue Draught				mmwg
5.12*	<b>Inlet Gas Pressure (high fire). If multi boiler installation, inlet gas pressure all boilers high fire.</b>				mmwg
5.13	Combustion Chamber Resistance				mmwg
5.14	Burner Fan Static Pressure				mmwg

**NOTE:** Normally 5.13 and 5.14 only recorded when tappings provided. Position of measurement to be in accordance with boiler and/or burner manufacturers instructions.

\* GAS FIRED INSTALLATIONS ONLY  
¶ OIL FIRED INSTALLATIONS ONLY

**NOTE:** It is the installer's responsibility to ensure that the boiler is correctly commissioned by a competent engineer and that this report is completed and kept as a record. A commissioning service available from Potterton at the address listed on the back page of this manual. When a Potterton engineer commissions, this completed report will be sent to the installer. It is the installer's responsibility to action any points arising. Commissioning by Potterton engineers is restricted to equipment of our supply. No responsibility is accepted for the on site assembly or installation of the equipment unless specifically carried out by Potterton. The installer must ensure that the boiler is installed in accordance with the manufacturers instructions and all relevant BS Codes of Practice and Regulations (see manufacturers instructions for full details). Items 4.1 to 4.6 are related to the boiler installation and as such these pre-commissioning checks should be carried out in the presence of the installer.

Potterton is a Member of the Boiler & Radiator Manufacturers Association (BARMA), and the terms of this Commissioning Document follow the generally agreed conditions of the Association. Potterton, in line with its policy of continuous product development, reserves the right to alter and amend this Document as is deemed necessary at any time.

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*	<b>Check for gas leaks</b>	
6.5*	<b>Check for gas leakage past valve assembly</b>	
6.5¶	<b>Check for oil leaks</b>	
6.6	<b>Check boiler locks out on loss of flame signal</b>	
6.7	<b>Check boiler locks out on air pressure switch operation</b>	
6.8*	Check gas low inlet & overpressure outlet switches	
6.9*	Record switch settings:- LOW ..... OVERPRESSURE.....	
6.10*	Check gas booster interlocks operational	
6.11*	Record 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?	YES / NO
	If so, interlocked?	YES / NO
7.16	Fan assisted ventilation?	YES / NO
7.16	<b>Fan assisted ventilation interlocked? YES / NO</b>	
7.17	<b>Any evidence of condensate formation? YES / NO</b>	
7.18	<b>Any evidence of water leakage? YES / NO</b>	
7.19	<b>Any evidence of flue gas leakage? YES / NO</b>	
7.20	Has boiler been built and cased correctly? YES / NO	
7.21*	<b>Is gas service cock installed? YES / NO</b>	
	<b>If so, accessible? YES / NO</b>	
7.22¶	Is oil filter fitted? YES / NO	
7.23¶	<b>Is fire valve fitted? YES / NO</b>	
7.24¶	Oil supply:	Single Pipe

8.0	COMMENTS ON ACCESSIBILITY FOR MAINTENANCE

9.0	NOTES & COMMENTS BY COMMISSIONING ENGINEER

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

ENGINEER DETAILS	
NAME	
COMPANY	
SIGNATURE	
DATE	

Registered Address: Pentagon House, Sir Frank Whittle Road,  
Derby DE21 4XA  
Registered in Eng

## Conversion Table

	<u>IMPERIAL TO METRIC</u>	<u>METRIC TO IMPERIAL</u>
<b>HEAT</b>		
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
<b>FUEL CONSUMPTION</b>		
1 dm <sup>3</sup> = 1 LITRE 1,000 dm <sup>3</sup> = 1m <sup>3</sup>	1 ft <sup>3</sup> = 28.317 dm <sup>3</sup> (litre) 1 UK Gall = 4.546 litre 1 UK Gall = 1.2 U.S. Gallon	1 m <sup>3</sup> = 35.3147 ft <sup>3</sup> 1 litre = 0.2199 Imp. Gallon
<b>PRESSURE</b>		
1 PSI = 2.307 FT 1 kPa = 1000 Pa 1 bar = 1000 mbar = 100 kPa	1 lb/in <sup>2</sup> = 6895 Pa 1 lb/in <sup>2</sup> = 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 <sup>2</sup> 1 Pa = 0.3858 in.w.g. 1 mm.w.g. = 0.0394 in.w.g. 1 mm.w.g. = 9.8 Pa
<b>LENGTH</b>		
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
<b>VOLUME</b>		
	1 ft <sup>3</sup> = 0.02832 m <sup>3</sup> 1 ft <sup>3</sup> = 28.32 litre	1 m <sup>3</sup> = 35.3147 ft <sup>3</sup> 1 litre = 0.03531 ft <sup>3</sup>
<b>AREA</b>		
	1 in <sup>2</sup> = 645.2 mm <sup>2</sup> 1 in <sup>2</sup> = 6.452 cm <sup>2</sup> 1 ft <sup>2</sup> = 929 cm <sup>2</sup> 1 ft <sup>2</sup> = 0.0929 m <sup>2</sup>	1 mm <sup>2</sup> = 0.00155 in <sup>2</sup> 1 cm <sup>2</sup> = 0.155 in <sup>2</sup> 1 m <sup>2</sup> = 1550 in <sup>2</sup> 1 m <sup>2</sup> = 10.76 ft <sup>2</sup>
<b>FLOW RATE</b>		
1 kg/sec = 1 lit/sec @ 0°C reference temperature	1 gall/min = 0.07577 lit/sec 1 ft <sup>3</sup> /min = 0.4719 lit/sec 1 ft <sup>3</sup> /min = 0.00047 m <sup>3</sup> /sec	1 lit/sec = 13.2 gall/min 1 lit/sec = 2.119 ft <sup>3</sup> /min 1 m <sup>3</sup> /sec = 2119 ft <sup>3</sup> /min
<b>TEMPERATURE</b>	°F to °C = ("X"°F - 32) x 0.5556    °C to °F = ("X" °C x 1.8) + 32	
<b>TEMPERATURE DIFFERENCE</b>	"X"°F x 0.5556 = °C                      "X" °C x 1.8 = °F	
1°C = 1°K		
<b>WEIGHT</b>		
	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

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### Spares

Potterton Commercial spares are available nationwide through the **Interpart** network of approved stockists. Alternatively please contact:

#### Interpart

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### Applications and Installations

Our experienced technical and applications team are available to offer advice on any aspect of heating system design and boiler installation.

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



Registered Office: The Wyvern Business Park, Stanier Way, Derby DE21 6BF - Registered in England No. 03879156

## Commercial Service

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.

Our service department offers 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

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